



CUTLER - HAMMER

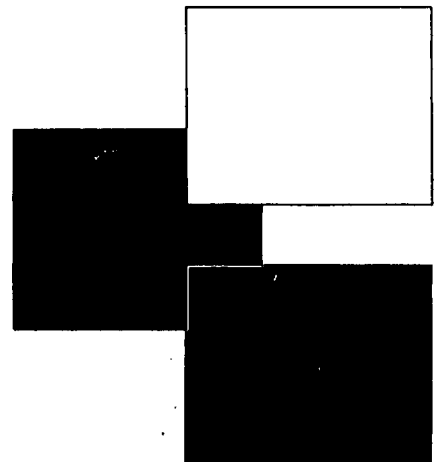
Catalog

Compliments of

JOHN IVERSON COMPANY

Minot - Mandan - Williston

North Dakota



SC-EEI-0035



CUTLER / HAMMER

Catalog





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*Trademark of Cutler-Hammer.

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GENERAL INFORMATION

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CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.BUSWAYS &
POWER CENTERS
—UNIBUS®PANELBOARDS &
SWITCHBOARDSSAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

GENERAL TERMS AND CONDITIONS

All prices and discounts subject to change without notice. All orders accepted by Cutler-Hammer are subject to the general terms and conditions of sale as set forth in seller's Bulletin 94. Copy of Bulletin 94 available upon request.

Discount Schedules are set up for various groups of apparatus and are indicated throughout this catalog. For information on application of these discount schedules to your order refer to your local authorized Cutler-Hammer distributor or Cutler-Hammer sales office. (Cutler-Hammer sales offices listed on page 291.)

PRODUCTS OF CUTLER-HAMMER

INDUSTRIAL APPARATUS

A. Standard General Industry Motor Control

- (1) Full Voltage Starters and Contactors
- (2) Reduced Voltage Starters
- (3) Accessories and Components
- (4) Industrial Purpose Brakes
- (5) Rheostats and Resistors

B. Engineered General Industry Motor Control

- (1) Synchronous General Industry Motor Control
- (2) Control Centers
- (3) High Voltage Control
- (4) Multi-Motor Control Panels

C. Specific Industry Motor Control

- (1) Railroad Locomotive Control
- (2) Heavy Duty Brakes
- (3) Marine and Navy Control
- (4) Crane and Hoist Control
- (5) Fire Pump Control
- (6) Laundry Control
- (7) Refrigerating Machine Control
- (8) Mill Control (Rubber, Textile, etc.)

D. Systems Control

- (1) Continuous Process Control
- (2) Gas Measuring and Mixing Control
- (3) Adjustable Speed Drives and Control
- (4) Graphic Arts Control
- (5) Newspaper Drives and Control
- (6) Materials Handling Systems

E. Related Apparatus

- (1) Magnetic Clutches
- (2) Lifting Magnets
- (3) Newspaper Counter-Stackers
- (4) Newspaper Conveyors
- (5) Weighing & Batching Equipment

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SPECIALTY PRODUCTS

A. Small Motor Switches (Military and Commercial)

B. Aircraft Relays and Contactors

C. Heating Elements

D. Thermostats (Refrigeration and Air Conditioning)

DISTRIBUTION APPARATUS

A. Safety Switches & Enclosed Circuit Breakers

B. Fusible Service Entrance Equipment

C. Breaker Service Entrance Equipment

D. Panelboards and Switchboards

E. Busways and Power Centers

ELECTRONIC APPARATUS

AIR DIVISION

A. Radar Systems

B. Reconnaissance Systems

C. Electronic Counter-Measures Equipment

D. Space Technology

- (1) Satellite Vehicle Systems

- (2) Ground Check-Out and Data Processing Equipment

E. Air Traffic and Safety Control Studies and Equipment

F. Low Noise Receiver Systems

G. Human Factors Engineering

H. Analog and Digital Data Handling Equipment

I. Test Instrumentation

J. Medical Electronic Equipment

K. Industrial Electronic Equipment

- (1) Data Processing Systems

- (2) Electronic Gaging and Machine Control

- (3) Continuous Process Control

(Also see typical illustrations on the following pages.)

CUTLER-HAMMER

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GENERAL INFORMATION

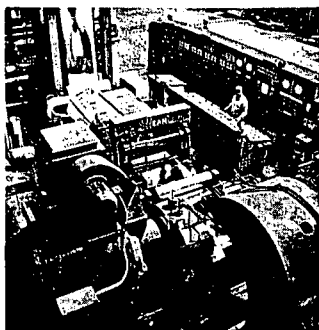


Other Cutler-Hammer Products

Illustrated here are some of the many "other" Cutler-Hammer products. These illustrations are representative of the varied and comprehensive offering of the Cutler-Hammer product line. For each product shown there are literally hundreds of similar or comparable items for every requirement.

MILL CONTROL

Complete systems for Ore Preparation, Rolling and Finishing and Metal Reduction—adjustable speed drives, electronic, static, data handling—accessories and auxiliary control—magnetic brakes, clutches—resistors—master switches and pilot devices.



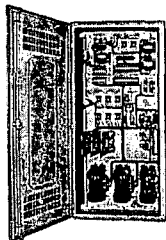
Tinning Line
System Control



Complete Process
Line Control
Systems



Blast Furnace Charging
Control and Automatic
Stock House Control



Rubber Mill
Controllers



Ultraflex—Magnetic Amplifier
Adjustable Speed Drive

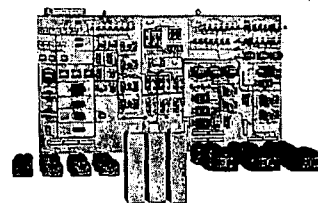
For more information, available descriptive literature is listed on page 16. If the needed brochure is not listed, contact your local Cutler-Hammer representative. A list of sales offices may be found on page 291.

HOIST AND CRANE

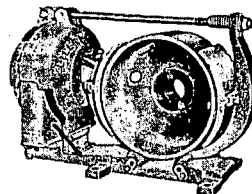
Bridge, trolley and hoist controls—constant and adjustable voltage—accessories—master switches—power and control limit switches—magnetic brakes—lifting magnets.



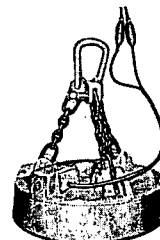
D-c Open Type Unitized
Contactor Crane Control



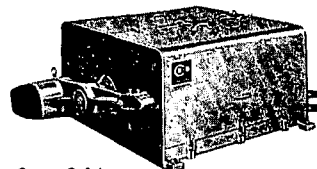
A-c Secondary Reactor
Crane Control



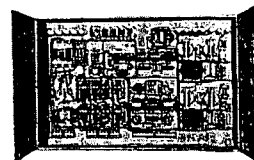
D-c Magnetic
Shoe Brakes



Circular—Aluminum
Wound—Lifting Magnets



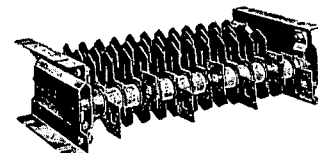
Crane Safety
Limit Stops



Primary Reactor—
Static Type Crane
Controller—
Hoist Service



Crane Cam Master Switch



Non-Breakable Resistor Frame



GENERAL INFORMATION

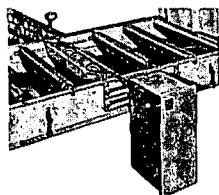
Other Cutler-Hammer Products

MATERIALS HANDLING

Complete conveyor and materials handling systems and hardware.

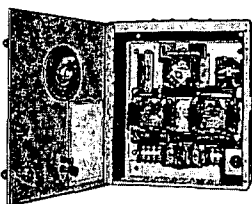


Complete Automatic Materials Handling Systems

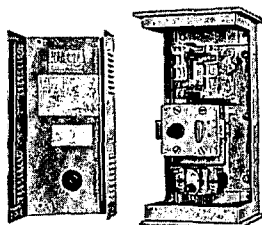


Diverter Mechanism—Skate Wheel Type

MARINE AND NAVY CONTROL



A-c Magnetic Dripproof Marine Controls



A-c Magnetic Dripproof High Shock Navy Controls

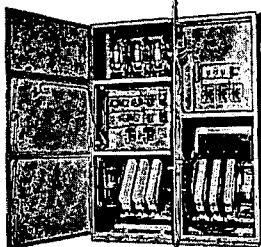
FIRE PUMP CONTROL

Fire Pump Controller—Combined Manual and Automatic Operation

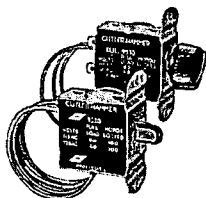


REFRIGERATION AND AIR CONDITIONING

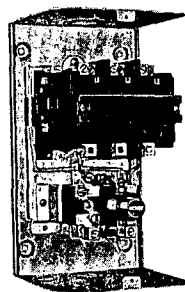
Magnetic compressor control and thermostats.



High Voltage Control for Hermetic Centrifugal Refrigeration Machines



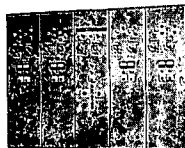
Straight Range Refrigeration Thermostat



Definite Purpose Hermetic Compressor Controls

NEWSPAPER AND GRAPHIC ARTS

Electronic and magnetic drives, A-c and D-c—single and multi-motor—conveyors—stackers—bundlers—complete mail room systems.



A-c Unit Drive for Newspaper Press



Bottom Wrap



Heavy Duty Newspaper Conveyors

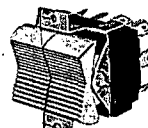


Newspaper Counter Stackers

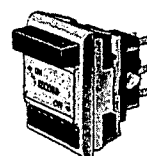
SMALL MOTOR SWITCHES

Commercial small motor switches
Power relays and circuit breakers

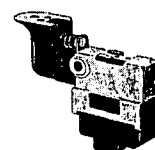
Military switches



Rockette Switch



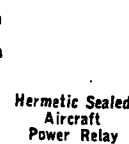
Illuminated Computer Switch



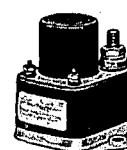
Tool Handle Switch



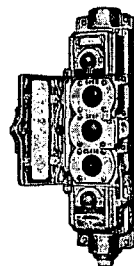
Positive Action Miniature Military Switch



Hermetic Sealed Aircraft Power Relay

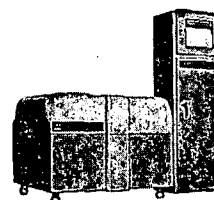


VALVE CONTROL



Valve Control Station with Door and Lock and Controls

GAS MEASURING AND MIXING



Calorimeter, Gas Measuring Unit and Recorder

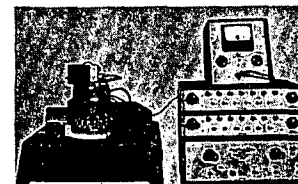
MACHINE TOOLS

Electronic and magnetic control systems.

ELECTRONIC GAGING, MEASURING, INSPECTION



Inchworm System



Automatic Dice Gage

ELECTRONIC SYSTEMS

Air traffic control—Space technology—Medical—Data handling.

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS®

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION



Terminology

TERMINOLOGY

(In addition to terminology shown see N.E.C. section 100 and Nemo Standards for Industrial Control)

A-c—Alternating Current—A current changing both in magnitude and direction—most common current in use.

Accessory—(control use) A device that controls the operation of magnetic motor control. (Also see master switch, pilot device and pushbuttons.)

Across-The-Line—A method of motor starting—connects motor directly to supply line on starting or running. (Also called full voltage.)

Ampere—Unit of electrical current.

Automatic Starter—A self acting starter—completely controlled by master or pilot switches or some other sensing device.

Auxiliary Contact—Contact of a switching device in addition to the main circuit contacts and operated by the main contacts.

Brake—An electro-mechanical friction device to stop and hold a load. Generally electric release spring applied—coupled to motor shaft.

Busway—A system of enclosed power transmission—current and voltage rated.

Circuit Breaker—Automatic device—opens under abnormal current in carrying circuit—no injury to itself on current interruption—ampere, voltage and horsepower rated.

Contact—Current conducting member of a device to complete or interrupt a circuit.

Contact—A device to repeatedly establish or interrupt an electric power circuit.

Controller—A device—group of devices—governs in predetermined manner delivery of electric power to apparatus connected to it.

Controller Function—Regulate—accelerate—decelerate—start—stop—reverse or protect devices connected to an electric controller.

Controller Service—Specific application of controller—**General Purpose**—Standard or usual service.

Definite Purpose—Service condition for specific application other than usual.

D-c—Direct Current—A continuous one direction non-varying current.

Disconnect—A device—group of devices—removes conductors of a circuit from source of supply.

Drum Controller—Electrical contacts made on surface of rotating cylinder or sector—contacts made also by operation of a rotating cam.

Duty—Specific controller function—

Continuous Duty—constant load—indefinite long time period.

Short Time Duty—constant load—short or specified time period.

Intermittent Duty—varying load—alternate intervals—specified time periods.

Periodic Duty—intermittent duty with recurring load conditions.

Varying Duty—varying loads—varying time intervals—wide variations.

Electronic Control—Control system—vapor or gas filled tubes to perform function.

Enclosure—Degree of mechanical—electrical—environmental protection for control devices.

Eutectic Alloy—Low and sharp melting point—used in thermal overload relays—converts from solid to liquid state at specific recurring point.

Frequency—Number of complete variations—cycles—made by an alternating current per second.

Full Voltage Control—Also across-the-line—connects equipment directly to line supply on starting.

Fuse—Protecting device—fusible link—disconnects circuit on abnormal current—destroys itself—ampere and voltage rated.

High Voltage Control—Formerly all control above 600 volts—Now all above 5000 volts—See Medium Voltage for 600 to 5000 volt equipment.

Horsepower—Mechanical work rating of an electrical motor—comparative value of ability to do work.

Jogging (inch)—Momentary operation—small movement of driven machine.

Load Center—Service entrance—controls distribution—provides protection of residential power—generally circuit breaker type—Cutler Hammer Safetybreaker.

Local Control—Control function, initiation or change accomplished at the same location as the electric controller.

Low Voltage Protection (LVP)—magnetic control only—non-automatic restarting—3 wire control—power failure disconnects service—power restored manual restarting required.

Low Voltage Release (LVR)—magnetic control only—automatic restarting—2 wire control—power failure disconnects service—power restored controller automatically restarts.

Magnetic Contactor—A contactor—operated electro-mechanically.

Magnetic Controller—An electric controller—device functions operated by electromagnets.

Manual Controller—An electric controller—device functions operated by mechanical means—by hand.

Master Switch—A switch operating contactors,, relays or other remotely controlled electrical devices.

Medium Voltage Control—Formerly known as High Voltage—Includes 600 to 5000 volt apparatus—Air break or oil-immersed main contactors—High interrupting capacity fuses—150,000 Kva at 2300 volts, 250,000 Kva at 4000-5000 volts.



GENERAL INFORMATION

9

Terminology

Motor—Device for converting electrical power to mechanical work through rotary motion—horsepower rated.

Motor Circuit Switch—Motor branch circuit switch—horsepower rated—capable of interrupting overload motor current.

Multispeed Starter—an electric controller—two or more speeds—reversing or non-reversing—full or reduced voltage starting.

NEMA Size—Electric controller device rating—specific standards for horsepower, voltage, current and interrupting characteristics.

Non-Automatic Controller—Requires personal operation to perform function—not necessarily a manual controller.

Non-Reversing—Operation in one direction only.

Overload Relay—running overcurrent protection—operates on excessive current—not necessarily protection for short circuit—causes and maintains interruption of device from power supply.

Overload Relay Heater Coil—Coils used in thermal overload relays—provides heat to melt eutectic alloy.

Overload Relay Reset—Pushbutton used to reset thermal overload relay after relay has operated.

Panelboard—Panel—group of panels or units—an assembly into single panel—includes buses—with or without switches and/or automatic overcurrent protective devices—control of light, heat, power circuits—placed in or against wall or partition—front accessible only.

Phase—Relation of current to voltage at particular time in an A-c circuit.

Single Phase—A single voltage and current in the supply.

Three Phase—Three electrically related (120 degree electrical difference) single phase supplies.

Pilot Device—Directs operation of another device.

Float Switch—A pilot device responding to liquid levels.

Foot Switch—A pilot device operated by the foot of an operator.

Limit Switch—A pilot device operated by part or motion of power driven machine—alters electrical circuit with machine or equipment.

Pressure Switch—A pilot device operated in response to pressure levels.

Temperature Switch—A pilot device operated in response to temperature values.

Plugging—Braking by reverse line voltage or phase sequence—motor develops retarding force.

Pushbutton—A master switch—manually operable plunger or button for actuating device, assembled into pushbutton stations.

Reduced Voltage Starter—Applies reduced supply voltage to motor during starting.

Relay—Operated by change in one electrical circuit to control a device in the same circuit or another circuit—ampere rated—used in control circuits.

Remote Control—Controls function initiation or change of electrical device from some remote point.

Resistor—Device to introduce resistance (current opposition) into an electrical circuit.

Safety Switch—Enclosed manually operated disconnecting switch—horsepower and current rated—disconnects all power lines.

Selector Switch—A master switch—manually operated—rotating motion for actuating device—assembled into pushbutton master stations.

Semi-Automatic Starter—A starter part of operation non-automatic with selected portions automatically controlled.

Semi-Magnetic Control—An electric controller—functions partly controlled by electro-magnets.

Sensing Device—A pilot device—measures, compares or recognizes change or variation in system monitored—provides controlled signal for operating or controlling other devices.

Service Equipment—Necessary equipment, circuit breakers or switch and fuse, with accessories—mounted near entry of electrical supply—constitutes main control or cutoff for supply.

Solenoid—Tubular coil—current carrying—provides magnetic action to perform various work functions.

Starter—An electric controller—start, stop and protect connected motor.

Static Control—Control system—solid state devices to perform function.

Switchboard—Large single panel—frame—assembly of panels—devices mounted on face, back or both—contains switches, overcurrent or protective devices—buses—usually instruments—accessible from rear and front—not installed in wall type cabinets. (see panelboard)

Timer—A pilot device—also considered a timing relay—provides adjustable time period to perform function—motor driven—solenoid actuated—electronic.

Transformer—Converts voltages for use in power transmission and operation of control devices—an electromagnetic device.

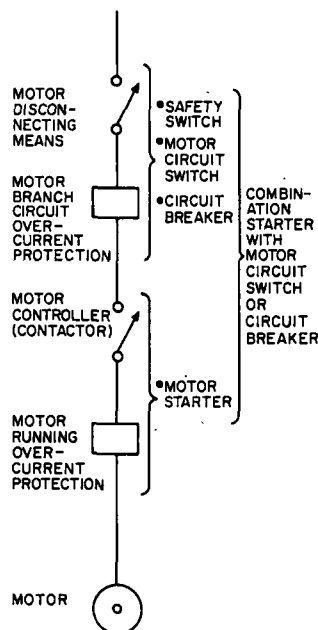
CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.BUSWAYS &
POWER CENTERS
—UNIBUS®PANELBOARDS &
SWITCHBOARDSSAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

GENERAL INFORMATION



MOTOR CIRCUIT ELEMENTS



DISCONNECT SWITCH—Horsepower rated—located in sight of controller—arranged for padlocking in open position—disconnects motor and controller from ungrounded power conductors—position indicating—readily accessible—115% carrying capacity of full load motor current—interrupting capacity of stalled motor current—may serve as disconnect for more than one motor if motors driving parts of single machine or motors all in single room within sight of disconnecting means, must equal sum of horsepower ratings to be disconnected—device may be general use switch, motor circuit switch or circuit

breaker meeting code requirements—disconnecting means should contain motor branch-circuit short circuit and ground fault protection (See Safety Switches and Industrial Circuit Breakers).

CONTACTOR—starting, stopping motor it controls—interrupt stalled motor current—horsepower rated—not lower than horsepower of motor controlled—contactor not in sight of connected motor must have disconnect capable of locking in open position or manually operable switch which will prevent contactor closing within sight of motor—interrupt all ungrounded power lines—manual or magnetically operated.

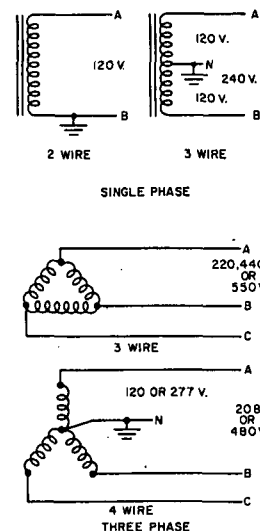
MOTOR RUNNING OVERCURRENT PROTECTION—called overload relay—protect motor and control apparatus against overheating due to motor overload—does not protect against short circuits or ground faults—selected to trip at not more than 125% full load motor current, 40 degree C. rise hermetic compressor motors—115% all other motors—continuous duty motor protection—intermittent duty motors protected by branch circuit protection—sufficient time delay to permit motor to start and accelerate load without tripping—carry sensing devices in at least one ungrounded conductor for single phase, two for three phase—in unattended locations three sensing devices (heater coils) required for 3 phase. Thermal overload relays provide tripping selection and setting adjustment—match motor heating characteristics—Cutler-Hammer manual reset standard.

CONTROLLER OR STARTER—non combination contains contactor and motor running overcurrent protection in one enclosure—starts, stops, protects and regulates motor—combination starters contain disconnecting means, branch short circuit protection in same enclosure. (See Motor Control Sections—3 Phase, single phase and D-c.)

PILOT DEVICES—ACCESSORIES—MASTER SWITCHES—Controllers or starters manually operated do not require auxiliary devices for operation—magnetic operated devices automatic, semi-automatic require use of pilot devices, accessory or master switch for operation.—master switch may be pushbutton or selector switch—pilot device or accessory may be relay, timer, limit or pressure switch, other suitable sensing device. (See Contactors, Relays, Timers, Pushbuttons and Lights, Limit Switches, Foot Switches, Miscellaneous Accessories and Components).

POWER SUPPLIES

All electrical power supplied as A-c or D-c.—Primarily A-c—Generation, transmission and some distribution of power at high voltage (above 5000 volts) or medium voltage (600 to 5000 volts).—most power distribution at use voltage for industrial and residential is 600 volts and under—A-c power generally at 60 cycles per second frequency—50 and 25 cycles used in some specific areas—A-c distribution at use location single or three phase—limited areas have two phase—**SINGLE PHASE**—two wire, 120 volts one line grounded—120/240 volts three wire center line grounded—residential distribution, lighting, heat, fractional horsepower motors, business machines—**THREE PHASE**—three wire delta 220/440 volts, 550 volts—4 wire wye 208/440, 277/480 volts neutral line grounded—primary industrial power distribution—main motor drives, integral horsepower motors, lighting, heating, fractional horsepower motors, business machines—used as three phase or single phase power supply.



DISTRIBUTION AND UTILIZATION

Cutler-Hammer equipment used for domestic and general power control (see N.E.C. requirements) Distribution Equipment—consists of Circuit Breaker Load Centers and Fusible Service Equipment—Motor control used in this area generally Single Phase including accessories, master and pilot switches—manual and magnetic control.

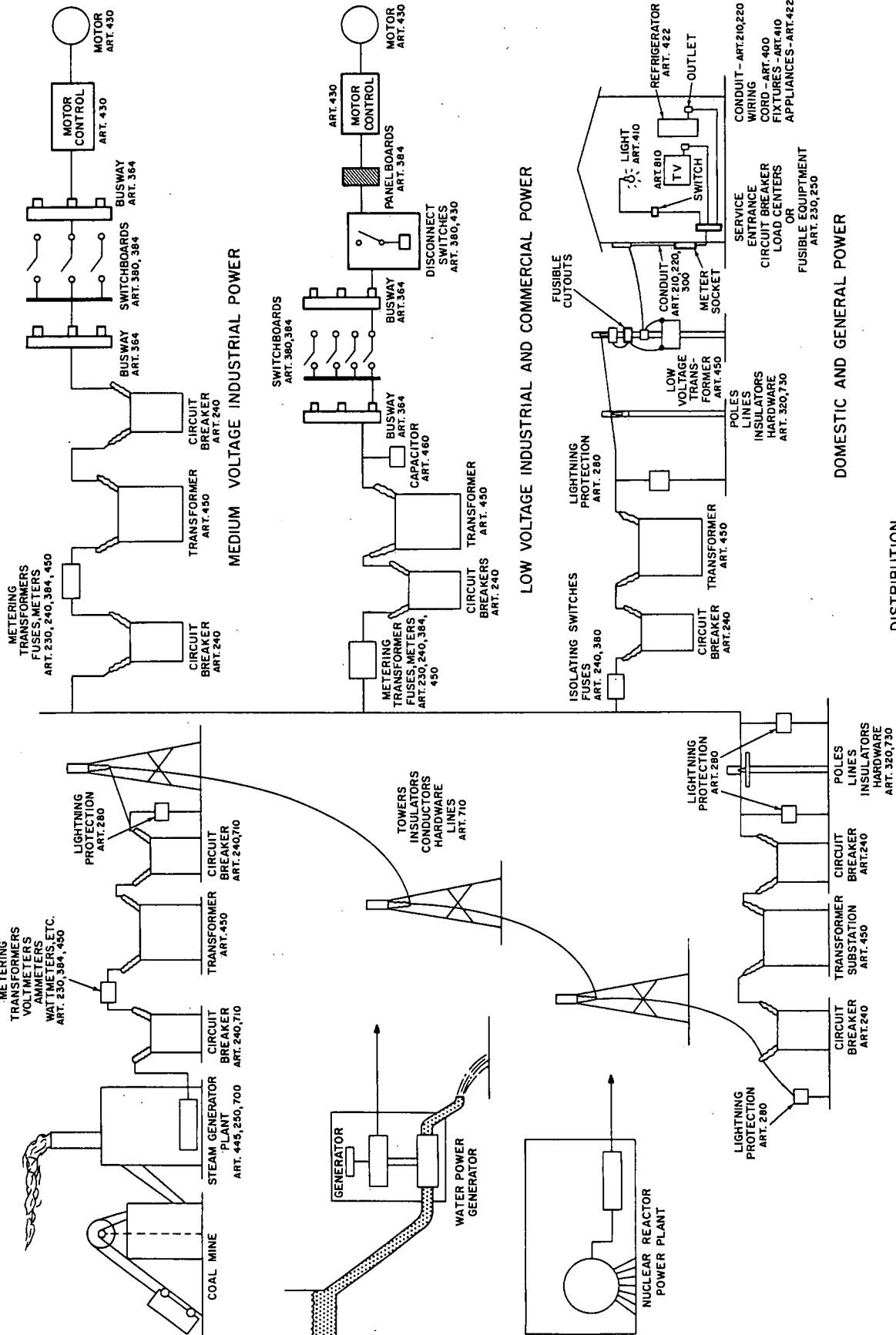
Low Voltage and Commercial Power (see N.E.C. requirements)—Distribution equipment consists of Switchboards, Panelboards, Busways, Safety Switches and Industrial Circuit Breakers—Motor control consists of single and three phase Full Voltage, Reduced Voltage and Multispeed, accessories, master and pilot switches.

Medium Voltage Industrial Power (See N.E.C. requirements)—No distribution equipment available—Motor control consists of Full Voltage and Primary Reactor reduced voltage Medium Voltage Motor Control.



GENERAL INFORMATION

National Electrical Code Requirements



UTILIZATION

NOTE - ARTICLE NUMBERS REFER TO N.E.C. SECTION.

PRIMARY - SECONDARY

DISTRIBUTION

CONVERSION

GENERATION

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
-UNIBUS®

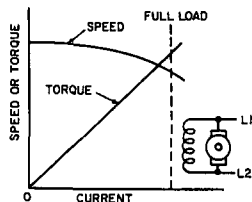
PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

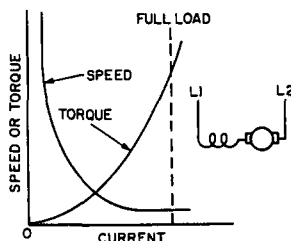


MOTOR TYPES



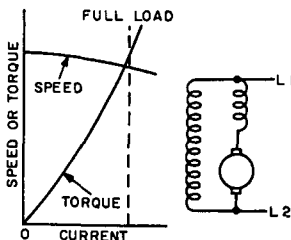
D-c Shunt Motor—main field winding designed for parallel connection to armature—stationary field—rotating armature with commutator—has a no load speed—full speed at full load less than no load

speed—torque increases directly with load.



D-c Series Motor—main field winding designed for series connection to armature—stationary field—rotating armature with commutator—does not have a no load speed—requires solid direct connection to load to prevent

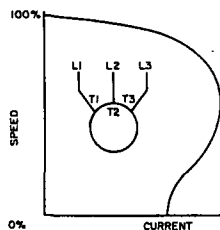
runaway at no load—speed decreases rapidly with increase in load—torque increases as square of armature current—main motor for crane hoists, excellent starting torque.



D-c Compound Motor—main field both shunt (parallel) and series—stationary fields—rotating armature with commutator—combination shunt and series fields produce characteristics between straight shunt or series

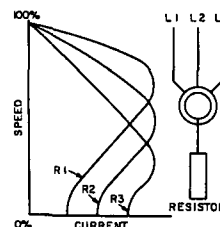
D-c motor—good starting torque—main motor for D-c driven machinery—mills, presses, etc.

A-c Squirrel Cage Motor—single or three phase—single phase requires starting winding—three phase self starting—stationary stator winding—no electrical connection to short circuited rotor—torque produced from magnetic reaction of stator and rotor fields—speed a function of supply frequency and number of electrical poles



wound on stator—considered as constant speed even though speed decreases slightly with increased load—good starting torque—high inrush currents during starting on full voltage—rugged construction—easily serviced and maintained—high efficiency—good running power factor when delivering full load—requires motor control only for stator windings.

A-c Wound Rotor Induction Motor—characteristics similar to squirrel cage motor—stationary stator winding—



rotor windings terminate on slip rings—external addition of resistance to rotor circuit for speed control—good starting torque—high inrush current during starting on full voltage—low efficiency when resistor inserted in rotor

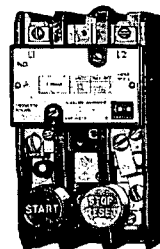
windings—good running power factor—requires motor controls for both stator and rotor circuits.

A-c Synchronous Motor—stationary a-c stator winding—rotating d-c field winding—no starting torque unless motor has starting winding—generally poor starting torque—constant speed when motor up to speed and d-c field winding energized.—can provide power factor correction with proper d-c field excitation—requires special motor control for both ac and dc windings to prevent the d-c field winding from being energized until a specified percent of running speed has been obtained.

FUNCTIONS OF CONTROL

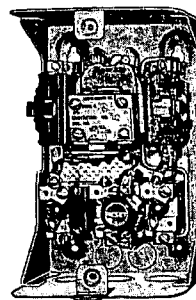
Controller functions to start, stop, reverse, regulate and protect connected motor—when functions do not include speed regulation device is known as a starter rather than controller—general and domestic power applications for control functions on fans, pumps, heating and applications of variable torque and horsepower where relatively infrequent cycling is necessary—functions usually starting and stopping with or without motor running overcurrent protection—manual or magnetic control—Commercial and Industrial control functions for constant horsepower, constant or variable torque machine loads, constant torque metal working machinery, variable torque and horsepower fans and blowers, constant power heating, lighting, pumps and motors for all types of applications—may include speed regulation—good for cycling or infrequent starting and stopping—with or without motor running overcurrent protection—manual or magnetic.

MANUAL AND MAGNETIC CONTROL



Manual—mechanically operated—makes and breaks power supply to motor—motor running overcurrent protection—local control only—drum, lever or pushbutton operated—recommended for infrequent starting and stopping—full voltage or reduced voltage—single or multispeed—reversing or non-reversing—non-automatic—low voltage—single and three phase A-c—D-c.

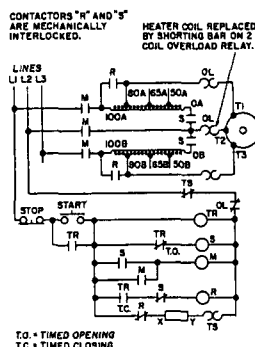
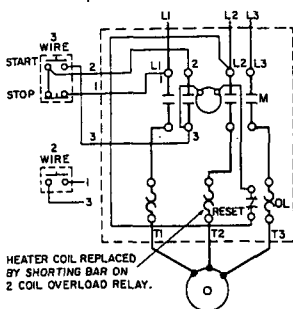
Magnetic—electro-magnetically operated—makes and breaks power supply to motor—motor running overcurrent



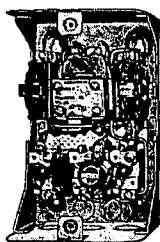
protection—non combination or combination—local or remote control—automatic, semi-automatic or non-automatic—pushbutton, master switch or pilot switch operated—recommended where frequent starting and stopping required—full voltage or reduced voltage—reversing or non-reversing—single or multispeed—low voltage protection or release—medium or low voltage supply—single or three phase—A-c—D-c.

WIRING DIAGRAMS

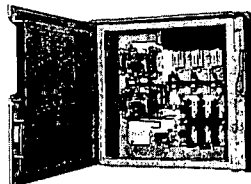
A symbolic representation of operation and function of control devices.



NON-REVERSING AND REVERSING



Non-reversing—single contactor and overload relay for each speed—single direction.



Reversing—two contactors and one overload relay for each speed—reversals of direction by internal connection of line leads to contactors—contactors electrically and mechanically interlocked to prevent line shorts and energization of both contactor coils simultaneously.

JOGGING, INCHING, PLUGGING SERVICE

Jogging or inching—momentary operation of driven machine for small movement or positioning—requires non-maintained operator and electrical control circuit—control subject to motor inrush current on each jog or inch cycle—contactor derated where service requirement demands more than 5 cycles per minute.
Plugging—plugging stop or plugging reverse—reverse power supplied to motor—motor generates braking—contactors subjected to motor inrush during plugging—requires reversing contactors—contactor derated for plugging service.

REDUCED VOLTAGE AND FULL VOLTAGE

Most applications suitable for full voltage starting—full motor inrush current during starting—maximum acceleration—simplest control construction—lowest control cost—easy maintenance—motor connected directly to power supply.

Restrictions in power supply capacity or machine design may require reduced voltage starting—motor connected to power supply at voltage lower than supply voltage—requires use of primary resistance, reactance or use of auto-transformer—special motor designs such as part winding and wye-delta considered as reduced voltage starting.

ACCESSORIES, MASTER OR PILOT SWITCHES

Primarily used with magnetic control—directs function of starter or controller—provide non-automatic, semi-automatic or automatic operating function—local or remote connection to control—device may be personally operated or respond to specified pre-determined conditions—usually enclosed—ampere rated—cover pushbuttons, limit, foot and float switches, brakes, pressure and temperature switches, relays and timers.

SENSING OR SIGNALING DEVICES

Direct magnetic control functions—differ from master or pilot devices as they monitor and compare specific circuit conditions and respond in predetermined selected manner—may require original initiation from a master switch—provide for automatic control—devices such as resistor and transistor sensitive relays, proximity limit switches etc.

REMOTE AND LOCAL CONTROL

Local Control—Controlling or sensing device, master switch or pilot device initiating operation located in same enclosure as directed electric controller.
Remote Control—controlling devices located at some other point than directed electric controller—may have more than one operating point with control devices connected in parallel or in series depending on operating sequence required.

TWO AND THREE WIRE CONTROL

Two Wire—automatic restarting—maintained contact master switch (example, selector switch)—low voltage release (LVR)—two wires from pilot device or master switch to controller—disconnects motor from power supply on power failure—automatically restarts motor on resumption of power—operation from only one location unless latched relaying used.

Three Wire—non-automatic restarting—momentary contact master switch (example, start-stop pushbuttons)—low voltage protection (LVP)—three wires from pilot device or master switch to controller—disconnects motor from power supply on power failure—control remains disconnected when power restored—to maintain operation in running condition control requires auxiliary contact (also called holding circuit interlock)—requires personal operation by operator to initiate control operation.

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS®

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

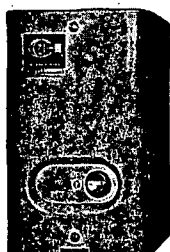
GENERAL INFORMATION

GENERAL INFORMATION

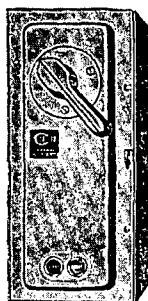
CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.BUSWAYS &
POWER CENTERS
—UNIBUS®PANELBOARDS &
SWITCHBOARDSSAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

ENCLOSURES—for mechanical and electrical protection of operator and equipment—specific industrial conditions

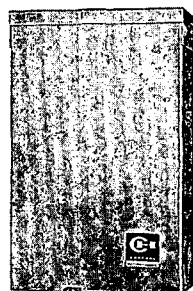


General Purpose NEMA 1—indoor—atmospheric conditions normal—sheet metal—does not prevent entry of liquid or airborne foreign particles—conduit entrances standard.



General Purpose NEMA 1 Gasketed—indoor—designed to exclude dust and other foreign airborne particles—does not meet dusttight requirements—sheet metal—conduit entrances standard.

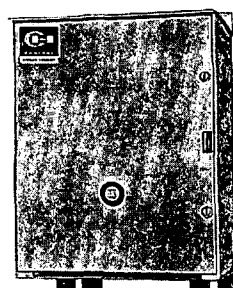
Driptight—NEMA 2—indoor—general purpose enclosure with shields for protection from dripping liquids—conduit entrances gasketed may require special glands or hubs.



Weather Resistant (Raintight) (Weatherproof) NEMA 3—outdoor—controls operate satisfactorily exposed to rain or sleet—sheet metal—special conduit hub or entrance to maintain weather resistant characteristics.

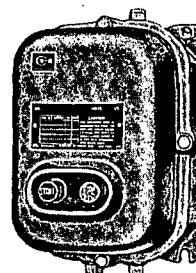


Watertight NEMA 4—outdoor—water or moisture excluded from splashing or direct stream—meets specific hose test requirements—sheet metal or cast construction—special hubs or glands required for conduit entrance—no conduit entrance knockouts—external mounting feet.

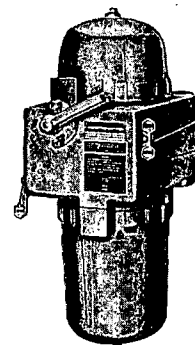


Dusttight NEMA 5—indoor—prevents entry of dusts—non hazardous locations—sheet metal or cast construction—gasketed or equivalent—no conduit knockouts—conduit entrances predrilled—sealtight bushings required—external mounting feet.

Hazardous Locations—Gas—NEMA 7D—meets requirements of N.E.C. for class I group D hazardous locations—cast enclosure bolted or threaded—threaded conduit entrances—special hubs or glands required—external mounting feet.



Bolted



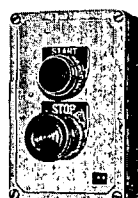
Threaded

NEMA 7 and 9

Hazardous Locations—Dust—NEMA 9 E-F-G—meets requirements of N.E.C.—class II hazardous locations—cast construction—bolted or threaded—threaded conduit entrances—special hubs or glands required—external mounting feet.



Industrial NEMA 12—indoor—meets JIC electrical standards for industrial equipment—excludes dust, lint, fibers, flyings and oil or coolant seepage—sheet metal gasketed—no conduit entrances—sealtight bushings required—external mounting feet.



Oiltight—no specific NEMA number designation—indoor—designed to exclude entrance of oils or coolant—used in applications similar to NEMA type 12.

MOTOR CONTROLS FOR SPECIFIC APPLICATION

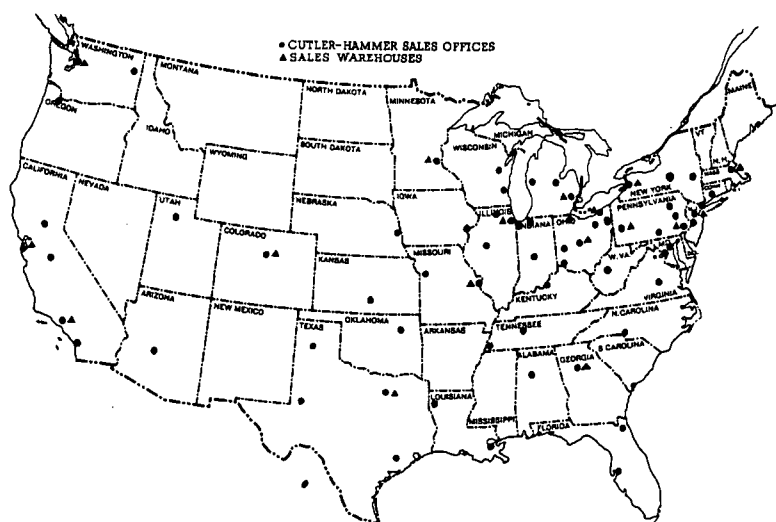
Some regulating bodies and specific requirements of application and industry require special controls not covered in General Duty usual use. Motor controls designed for these special categories are separated into this section or a specific industry section—typical examples—oil well pumping—textile—mill—crane and hoist—fire pump—refrigeration compressor—military etc.



GENERAL INFORMATION

Cutler-Hammer Organization

United States



Sales offices listed on page 291.

CUTLER-HAMMER DIVISION

- Manufacturing Plants
Milwaukee, Wisconsin—Control
Lincoln, Illinois—Distribution Equipment
- Sixty-eight Sales Offices—Nationwide
- Independent Nationwide Electrical Distributor Organization
- 17 District Sales Warehouses
- Sales Assembly Plants
Allentown—Atlanta—Chicago
Dallas—Los Angeles—San Francisco

AIRBORNE Instruments Laboratory Division —Commercial and Military Electronics Systems

- Plants—Deer Park, Melville
Long Island, N. Y.

THAYER SCALE DIVISION

- Plant—Pembroke, Mass.

UNIBUS INC.—Subsidiary—Allentown, Pa.

International

CUTLER-HAMMER INTERNATIONAL

- Subsidiaries—Cutler-Hammer Canada Limited
Cutler-Hammer Mexicana SA.
- Associates—Brookhirst Igranic Limited—England
N.S.F. Limited—England
Electric Control and Engineering Limited—Australia

• World Wide Sales Representatives

AFRICA—Egypt
Republic of South Africa
Northern Rhodesia

MIDDLE EAST—Israel
Lebanon
Turkey

LATIN AMERICA—Argentina
Brazil
Chile
Colombia
Costa Rica
El Salvador
Honduras
Mexico
Nicaragua
Peru
Panama
Venezuela

WEST INDIES—Dominican Republic
Haiti
Jamaica
Puerto Rico

AUSTRALIA

FAR EAST—Ceylon
Hong Kong
Japan
Korea
Philippines
Singapore
Taiwan

EUROPE—Austria
Belgium
Finland
France
Germany
Holland
Italy
Spain
Sweden
Switzerland
United Kingdom

CIRCUIT BREAKER
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SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT-BREAKERS

GENERAL INFORMATION

GENERAL INFORMATION



Descriptive Literature

Listed here are some of the available descriptive brochures and booklets covering apparatus manufactured by Cutler-Hammer. Also listed are several books outlining the "Systems Engineering" capabilities of Cutler-Hammer.

To order desired publications, or for information not covered in this listing, write to: Cutler-Hammer Inc., Department C-536, Milwaukee 1, Wisconsin.

APPARATUS LISTED IN CATALOG

Pub. No.

"Safetybreaker Saves YOU Money" — Circuit Breaker story	LJ-74
Selection Guide for Circuit Breaker Load Centers	LU-40
Price list for above publication	LU-40PL
"Your Guide to Modern Housepower"	ED-123
Pocket sized edition of above publication	ED-138
Fusible Service Entrance Equipment Line	ED-50
Busways and Power Centers — Unibus®	LU-23
Panelboards and Switchboards	ED-49
Handbook of 3 Phase Full Voltage Magnetic Starters	LO-70
Combination Starters	LU-20
Combination Starters in Stainless Steel Enclosures	LJ-39
Type SF — "Safety First" — Switch Type Combination Starters	LJ-112
3 Phase Full Voltage Reversing Drum Switches	LU-34
Convertibility Story of New Style Starters — Cover Control Kits and 2 to 3 overload relay conversions explained	LU-12
3 Phase Reduced Voltage Starters	EN-89
Single Phase, Single and Two Speed Manual Starters	LJ-86
Type AA General Purpose Relays	LU-15
Type CF — "Compact 300" A-c Relays	LO-79
Type LR A-c Load Relays	LU-16
Type MX Intrinsically Safe Relays	LU-44
Type PT One Minute Pneumatic Timers	LJ-97
Renewal (Repair) Parts Guide	ED-127
"Master Design" — Type T Oil Tight Pushbuttons & Indicating Lights	LO-104
Types L & LD Oil Tight Limit Switches	LJ-48
Type LP Oil Tight Limit Switches	LU-30
Rotating Gear Limit Switches	ED-46
Snap Action, Precision Limit Switches	EN-154
Foot Switches	LO-91
Solenoid Operated Brakes — Type S	LJ-75
Domestic Water Heater Elements	EN-87
Motor Control Center Handbook	LJ-1
8-Hi Motor Control Centers	EN-142
D-c Full Voltage Reversing Drum Switches	LU-34
Oil Well Pumping Controllers	LJ-135
Pumping Plant Controllers	EA-1

OTHER PRODUCTS

Pub. No.

Adjustable Speed Drives, Electronic Type	EN-64
Adjustable Speed Drives, Magnetic-Amplifier Type	EN-65
Adjustable Speed Drives Handbook	LO-47
Step by Step solutions to Automation Problems	LJ-130
Batching/Proportioning Systems for Industrial Processes	LU-58
Commercial Type Small Motor Switches	LJ-121
Control Problems Solved — "Talents Teamed for Tomorrow"	LO-328
Crane Control, A-c Reactor Type	LU-43
D-c Crane Control	LJ-76
Crane Safety Limit Stops	LU-51
Custom Built Panels	EN-185
Definite Purpose Contactors and Starters	LO-5
DSL — Direct Static Logic Control	LU-55
Fire Pump Controllers	LJ-25
Calorimeter Gas Measuring Control	EN-48
Calorimixer Gas Mixing Control	LO-117
Caloroptic BTU Indicators	LO-121
Thermeter Gas Measuring Control	LO-118
Illuminated Computer Type Switches	LO-15
Illuminated Pushbutton Switches	LO-87
29" Magnet for Mobile Mounting	EA-80
Lifting Magnet Line	LO-108
Material Handling Systems and Components	LO-93
Military Type Positive Action Toggle Switches	EA-168
Military Type Miniature Positive Action Toggle Switches	ED-20
Military Type Switches and Power Relays	LU-526
"505" Mill Duty Brakes	LO-37
D-c Mill type Contactors	LO-80
Mill Duty Resistors	EC-63
Navy and Marine Control	ED-129
Bottom Wrap Machine for Newspapers	LJ-114
Newspaper Equipment Line	LO-3
Numerical Positioning Control	LU-62
Printing Press A-c Webmaster Unit Drives	EN-90
Printing Press D-c Webmaster Unit Drives	LO-12
Printing Press D-c Webmaster Group Drives	ED-57
Oil Well Controller Pump-off Control	LO-16
Domestic Refrigeration control units	EC-87
Refrigerating Machine Controllers	LU-21



General Description

CIRCUIT BREAKER LOAD CENTERS

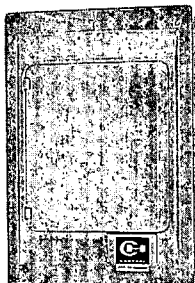
Circuit breaker load centers centralize the control, protection and distribution for residential power—regulate and protect lighting, heating, appliances, small motors—Underwriters Labs approved.

Panel Construction

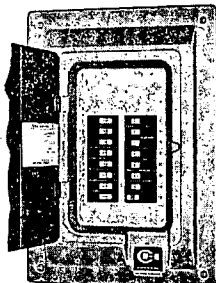


Surface Without Door

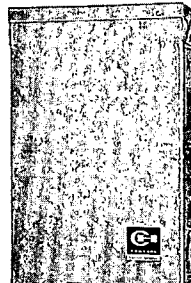
Solid copper bus bar—few heat producing joints—circuit breaker connecting pins protected from corrosion—line lugs accept aluminum and copper wire—box type—environment proof—enclosures bonderized, baked enamel finish—indoor installations sandalwood color—outdoor industrial gray—all enclosures contain concentric knockouts—entrance top, bottom, sides and rear—three point mounting—surface or flush—fits 16 inch standard stud spacing—adjustable panel



Surface With Door



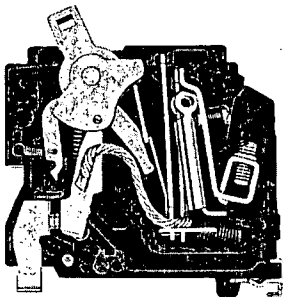
Flush With Door



Raintight

depth—general purpose and raintight—prepackaged for individual on the job installation.

Circuit Breaker



Safetybreakers thermal-magnetic trip—ambient compensated—two position indicating ON-OFF—phenolic enclosed—Underwriters Laboratory approved file numbers E11713, E24522 and EE3624—meets NEMA standards and Federal Specification WP-131A—meets N.E.C. noninterchangeability requirements paragraph 240-

25G—complete range of ampere sizes—single pole 120 volts 15-50 amps.—double pole common trip 120/240 volts 15-100 amps.—double pole common trip 240 volts 15-100 amps.—three pole common trip 240 volts 15-100 amps.—two and three wire switched neutral 120—120/240 volts 15-20 amps.—three pole delta 240 volts 15-60 amps.—complete line of accessories—prepackaged in box, carton and package quantities for stocking and installation.

This section contains

Pages

CIRCUIT BREAKER LOAD CENTERS

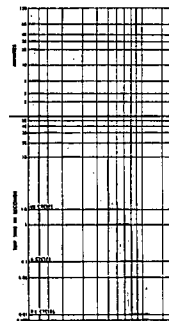
Lug Main Panels	18
Split Bus Panels	19
200 Ampere Main Disconnect Panels	19
Combination Meter Socket Panels	20
Circuit Breakers (residential)	

SAFETYBREAKERS

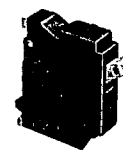
Typical Wiring Diagrams	22
Approximate Dimensions	23

FUSIBLE SERVICE EQUIPMENT

Parallel Connected Main and Branch Circuits	
100 Ampere Service	24-25
100-200 Ampere Service	26
Yard Pole Type	26
Series Connected Main and Branch Circuits	
100 Ampere Service	27-28
100-200 Ampere Service	29
Branch Circuit Panels	30



Tripping Time Curve



1 Pole



Double Pole



3 Pole



2 Wire Switched Neutral

FUSIBLE SERVICE EQUIPMENT

Centralize control protection and distribution of residential power—suitable for lighting, heating, appliances, small motors—Underwriters Lab approved.

Panel and Enclosure Construction

Pre-wired for immediate on the job installation—pull-outs cartridge fuse type—phenolic molding—plugs standard plug types—phenolic molding—enclosure sheet metal—corrosion-resistant medium light gray finish—plugs noninterchangeable—concentric knockouts top, bottom, side and rear—general purpose and raintight—solid neutral—dead front—three point mounting—Underwriters Lab approved file numbers E9565, E5291, E10625, E10703.



Parallel



Series

Parallel connected type—120/240 volt—100 and 200 ampere service entrance—up to 6 pullouts—12 plug fuses for branch circuits.

Series Connected type—120/240 volt—30 through 200 ampere service entrance—up to 5 pullouts—32 plug fuses for branch circuits.

Branch circuit fuse panels—120/240 volts—30 through 100 ampere service—up to 20 plug fuses.

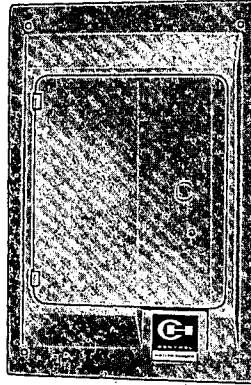
CIRCUIT BREAKER LOAD CENTERS



Lug Main Panels

WHEN ORDERING SPECIFY

- Catalog number of panel and cover
- Catalog number of safety-breakers, see page 21.



CH12



CH8

Poles	Mains Amp. Rating	General Purpose Panel with Cover				① Raintight Panel with Cover					
		Catalog Number		② Price	Ship. Wt. Lbs.	Catalog Number	② Price	Ship. Wt. Lbs.			
		Surface Mounted	Flush Mounted								
SINGLE PHASE—3 WIRE—SOLID NEUTRAL—120/240 V AND 240 V A-C											
2	40	CH2-S	---	\$3.30	3	CH2-R	\$9.10	6			
2	40	---	CH2-F	4.	4	---	---	---			
2	70	CH2A-S	CH2A-F	5.	4	CH2A-R	10.	6			
2	100	CH2B-S	CH2B-F	5.80	7	CH2B-R	11.	9			
4	70	CH4-S	CH4-F	5.80	6	CH4-R	11.	9			
④ 4	50	CH4W-S	CH4W-F	5.90	6	---	---	---			
6	100	CH6-S	CH6-F	7.40	8	CH6-R	12.40	12			
8	100	CH8-S	CH8-F	9.	9	CH8-R	14.20	12			
8	③ 200	CH8A-S	CH8A-F	21.60	19	CH8A-R	32.40	20			
12	③ 200	CH12A-S	CH12A-F	27.40	20	CH12A-R	43.30	27			
16	③ 200	CH16A-S	CH16A-F	30.50	21	CH16A-R	46.	28			
THREE PHASE — 4 WIRE — SOLID NEUTRAL — 240 V A-C											
3	70	CH4003-S	CH4003-F	\$8.70	5	CH4003-R	\$13.90	7			
3	100	CH4003A-S	---	15.50	6	CH4003A-R	20.70	10			
Poles	Mains Amp. Rating	General Purpose						① Raintight Panel With Cover			
		Panel Without Cover			Cover With Door			Catalog Number	② Price	Ship. Wt. Lbs.	
		Catalog Number	② Price	Ship. Wt. Lbs.	Catalog Number		② Price				Ship. Wt. Lbs.
					Surface	Flush					
SINGLE PHASE—3 WIRE—SOLID NEUTRAL—120/240 V AND 240 V A-C											
12	125	CH12	\$8.90	9	CHC12-S	CHC12-F	\$3.	5	CH12-R	\$22.70	18
16	125	CH16	13.90	12	CHC16-S	CHC16-F	4.	7	CH16-R	28.70	22
20	125	CH20	19.90	13	CHC20-S	CHC20-F	4.	7	CH20-R	36.	23
24	125	CH24	22.50	16	CHC24-S	CHC24-F	7.40	8	CH24-R	42.	27
30	150	CH30	30.90	25	CHC30-S	CHC30-F	7.40	10	CH30-R	62.50	40
30	200	CH30A	35.90	25	CHC30-S	CHC30-F	7.40	10	CH30A-R	67.50	40
42	210	CH42	61.50	28	CHC42-S	CHC42-F	9.40	13	---	---	---
THREE PHASE — 4 WIRE — SOLID NEUTRAL — 120/208-240 V A-C											
12	125	CH4012	\$24.	10	CHC12-S	CHC12-F	\$3.	5	CH4012-R	\$38.50	16
18	125	CH4018	32.10	13	CHC18-S	CHC18-F	4.	7	CH4018-R	47.20	23
30	125	CH4030	46.10	23	CHC30-S	CHC30-F	7.40	10	---	---	---
24	200	CH4024A	45.	20	CHC30-S	CHC30-F	7.40	10	---	---	---
30	200	CH4030A	52.40	23	CHC30-S	CHC30-F	7.40	10	---	---	---
36	200	CH4036	61.20	28	CHC42-S	CHC42-F	9.40	13	---	---	---
42	200	CH4042	71.50	31	CHC42-S	CHC42-F	9.40	13	---	---	---

① Raintight panels have opening in top covered by a blank plate. Interchangeable hubs may be selected from table, page 20.

② Prices do not include Safetybreakers.*

③ Door in cover.

④ Water heater panel—2 separate 2 pole feeds; no neutral.

DIMENSIONS and DIAGRAMS, pages 22-23

*Trademark of Cutler-Hammer

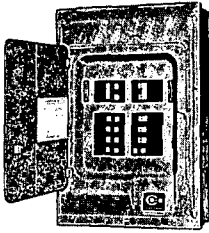
DISCOUNT SCHEDULE 22 CD

CUTLER-HAMMER

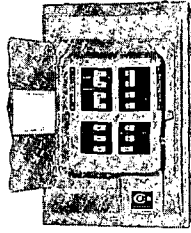


CIRCUIT BREAKER LOAD CENTERS

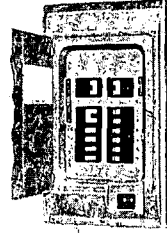
Split Bus Panels



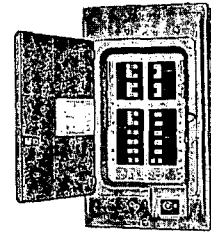
CH208



CH308



CH310



CH510

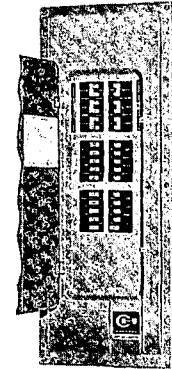
Single Phase—3 Wire Solid Neutral—120/240 Volts A-c

Double Poles		Single Poles	Mains Amp. Rating	General Purpose Panel with Cover				③ Raintight Panel with Cover		
Lighting Main	Branch			Catalog Number		Price ②	Lbs.	Catalog Number	Price ②	Lbs.
				Surface	Flush					
1	1	8	125	CH208-S	CH208-F	\$20.	15	CH208-R	\$32.50	18
① 1	2	8	125	CH308-S	CH308-F	21.50	15	CH308-R	34.	18
1	2	10	125	CH310-S	CH310-F	22.90	17	CH310-R	35.	18
1	3	12	125	CH412-S	CH412-F	27.50	18	CH412-R	40.	19
1	4	10	125	CH510-S	CH510-F	31.90	18	CH510-R	44.40	20
1	5	12	125	CH612-S	CH612-F	35.90	24	CH612-R	49.	27
1	5	14	150	CH614-S	CH614-F	42.85	37	CH614-R	54.95	40
1	5	14	200	CH614A-S	CH614A-F	47.85	37	CH614A-R	59.95	40
2	4	20	150	CH620-S	CH620-F	52.80	41	CH620-R	65.	43
2	4	20	200	CH620A-S	CH620A-F	57.80	41	CH620A-R	70.	43

① Lighting main on CH308 controls 6 single poles, 2 are above the split.

② Prices do not include safetybreakers.*

③ Raintight panels have opening in top covered by blank plate. Interchangeable hubs may be selected from table, next page.



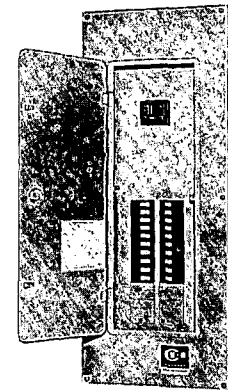
CH620

200 Ampere Main Disconnect Panels

BREAKER MAINS

Single Phase—3 Wire Solid Neutral—120/240 Volts A-c

Poles	Main Breaker Amps.	General Purpose						
		Panel without Cover			Cover with Door			
		Catalog Number	Price \$	Ship. Wt. Lbs.	Catalog Number		Price \$	Ship Wt.
					Surface	Flush		
24	200	CH24BM	\$69.	43	CHC30SM-S	CHC30SM-F	\$10.	18
30	200	CH30BM	79.	43	CHC30SM-S	CHC30SM-D	10.	19
						CHC30SM-F	10.	18
40	200	CH40BM	96.	47	CHC40SM-S	CHC30SM-D	10.	19
						CHC40SM-F	14.	22
						CHC40SM-D	14.	22



CH30BM

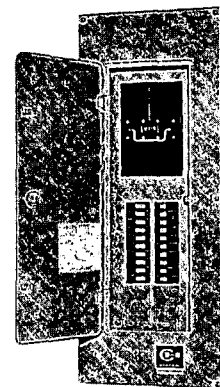
FUSIBLE PULLOUT MAINS

Single Phase—3 Wire Solid Neutral—120/240 Volts A-c

Poles	Main Pullout Amps.	General Purpose						
		Panel without Cover			Cover with Door			
		Catalog Number	Price \$	Ship. Wt. Lbs.	Catalog Number		Price \$	Ship Wt. Lbs.
					Surface	Flush		
20	200	CH20SM	\$60.	44	CHC30SM-S	CHC30SM-F	\$10.	18
						④ CHC30SM-D	10.	19
24	200	CH24SM	65.	44	CHC30SM-S	CHC30SM-F	10.	18
						④ CHC30SM-D	10.	19
30	200	CH30SM	75.	45	CHC30SM-S	CHC30SM-F	10.	18
						④ CHC30SM-D	10.	19
40	200	CH40SM	92.	51	CHC40SM-S	CHC40SM-F	14.	22
						④ CHC40SM-D	14.	22

④ Semiflush cover for 3/4" drywall installations.

⑤ Prices do not include Safetybreakers.*



CH20SM

DISCOUNT SCHEDULE 22 CD

*Trademark of Cutler-Hammer

DIMENSIONS and DIAGRAMS, pages 22-23

CUTLER-HAMMER

CIRCUIT BREAKER LOAD CENTERS

Combination Meter Socket Panels



CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER-CENTERS
— UNIBUS ®

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

WHEN ORDERING SPECIFY

- Catalog number of panel and cover
- Catalog numbers of Safetybreakers*

Single Phase 3 Wire Solid Neutral—120/240 Volts A-c Ⓢ

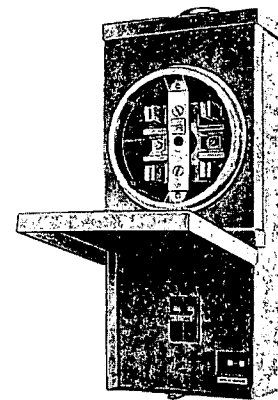
Poles	Main Breaker Amps.	Raintight Panel with Cover					
		① Surface Panel			Semi-Flush Panel		Lbs.
		Catalog Number	Price ⑤	Hub Size Inches	Catalog Number	Price ⑤	
PANELS WITH BREAKER MAINS							
0	100	CHM2100M-R	\$42.50	1¼ or 1½	CHM2100M-RF	\$42.50	20
0	100	② CHM2100M-RI	42.50	1¼ or 1½	---	---	---
8	100	CHM8M-R	52.50	1¼ or 1½	CHM8M-RF	52.50	35
10	50	CHM10M50-R	40.80	1 or 1¼	CHM10M50-RF	40.80	28
12	100	CHM12M-R	55.	1¼ or 1½	CHM12M-RF	55.	35
14	70	CHM14M70-R	55.30	1 or 1¼	CHM14M70-RF	55.30	30
16	100	CHM16M-R	57.90	1¼ or 1½	CHM16M-RF	57.90	40
20	100	CHM20M-R	59.90	1¼ or 1½	CHM20M-RF	59.90	40
PANELS WITH 200A. FUSIBLE PULLOUT MAINS							
0	200	CHM200M-R	\$136.80	2	CHM200M-RF	\$136.80	51
PANELS WITH MAIN LUGS ONLY							
12	100	CHM12-R	\$30.70	1 or 1¼	CHM12-RF	\$30.70	29

① Surface panel includes hub, but is not included in price. On order specify hub to be supplied. Add \$2.60 for 1¼" or 1½" hub, \$4.40 for 2" hub.

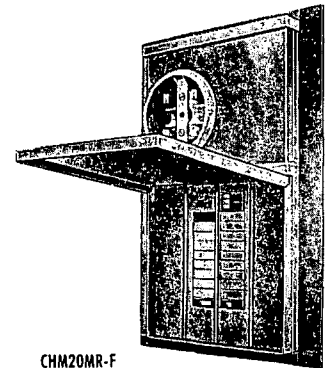
② Narrow enclosure for pole mounting.

③ Prices do not include Safetybreakers.*

④ CHM2100M panels have bonded neutral.



CHM2100M-R

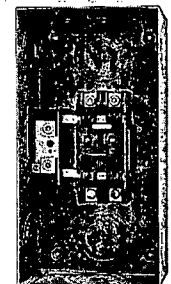
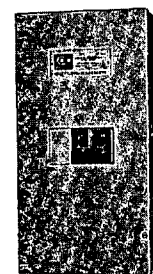


CHM20MR-F

200 Ampere—Enclosed Circuit Breaker

Thermal—Magnetic—Independent Trip—Single Phase—3 Wire Solid Neutral—120/240 Volts A-c
10,000 Ampere Interrupting Capacity

Poles	Amp	General Purpose with Cover				Raintight with Cover		
		Catalog Number		Price	Ship. Wt. Lbs.	Catalog Number	Price	Ship. Wt. Lbs.
		Surface	Flush					
2	200	4416H1200-S	4416H1200-F	\$56.80	17	4416H1200-R	\$88.	19

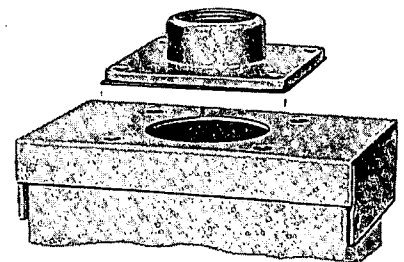


Interchangeable Conduit Hubs

Conduit Size	Catalog Number	Price	Quantity per Carton	Lbs. Each
Blank Plate	4199			
	H1	\$0.40	100	¼
	H2	2.60	10	½
	H3	2.60	10	¾
	H4	2.60	10	1
	H5	2.60	10	1½
	④ H6	4.40	10	2
	⑤ H31	4.40	10	1.7
	⑤ H32	7.80	10	2.2
	⑤ H33	13.10	10	2.5
	⑤ H34	0.40	50	1

④ 4199H6 for 100-125 ampere panels only.

⑤ For use with 150-200 ampere panels only.



DIMENSIONS and DIAGRAMS, pages 22-23

*Trademark of Cutler-Hammer

DISCOUNT SCHEDULE 22 CD

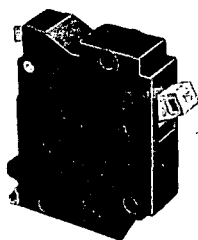
CUTLER-HAMMER



CIRCUIT BREAKER LOAD CENTERS

Safetybreakers*

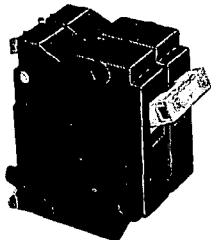
WHEN ORDERING SPECIFY Catalog Number



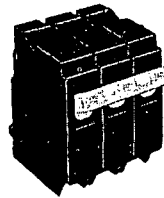
Single Pole



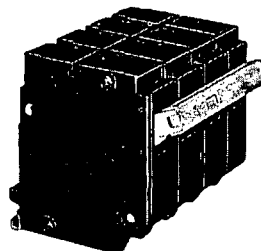
Double Pole



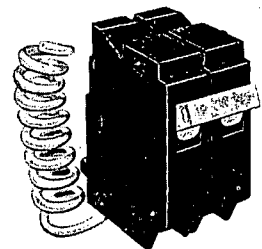
3 Pole



Delta

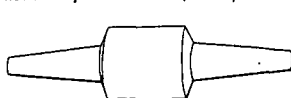


2 Wire
Solid Neutral



Amps.	Catalog Number	Price	Packaged Quantities			Ship. Wt. Lbs. Each	Catalog Number	Price	Packaged Quantities			Ship. Wt. Lbs. Each
			Box	Carton	Package				Box	Carton	Package	
SINGLE POLE—120 VOLTS A-C							DOUBLE POLE—COMMON TRIP—120/240 VOLTS A-C					
15	CH115	\$3.10	2	10	100	¼	CH215	\$6.90	1	5	20	½
20	CH120	3.10	2	10	100	¼	CH220	6.90	1	5	20	½
30	CH130	3.10	2	10	40	¼	CH230	6.90	1	5	20	½
40	CH140	3.10	2	10	40	¼	CH240	6.90	1	5	20	½
50	CH150	3.10	2	10	40	¼	CH250	6.90	1	5	20	½
60	---	---	---	---	---	---	CH260	6.90	1	5	20	½
70	---	---	---	---	---	---	CH270	13.	1	5	20	½
90	---	---	---	---	---	---	CH290	17.60	1	---	10	1
100	---	---	---	---	---	---	CH2100	17.60	1	---	10	1
① DOUBLE POLE—COMMON TRIP—240 VOLTS A-C							① THREE POLE—COMMON TRIP—240 VOLTS A-C					
15	CH215H	\$17.60	---	5	20	½	CH315	\$22.	---	---	4	¾
20	CH220H	17.60	---	5	20	½	CH320	22.	---	---	4	¾
30	CH230H	17.60	---	5	20	½	CH330	22.	---	---	4	¾
40	CH240H	17.60	---	5	20	½	CH340	22.	---	---	4	¾
50	CH250H	17.60	---	5	20	½	CH350	22.	---	---	4	¾
60	CH260H	17.60	---	5	20	½	CH360	28.	---	---	4	¾
70	CH270H	17.60	---	5	20	½	CH370	28.	---	---	4	¾
100	CH2100H	20.50	---	---	10	1	CH3100	32.	---	---	1	1½
2 WIRE SWITCHED NEUTRAL—120 VOLTS A-C							3 WIRE SWITCHED NEUTRAL—120/240 VOLTS A-C					
15	CH215SW	\$9.10	---	---	4	½	CH315SW	\$12.80	---	---	4	¾
20	CH220SW	9.10	---	---	4	½	CH320SW	12.80	---	---	4	¾
THREE POLE—DELTA—240 VOLTS A-C												
Amps.	Catalog Number	Price	Quantity per Package	Ship. Wt. Lbs. Each	Amps.	Catalog Number	Price	Quantity per Package	Ship. Wt. Lbs. Each			
15	CH315D	\$22.	1	¾	40	CH340D	\$22.	1	¾			
20	CH320D	22.	1	¾	50	CH350D	22.	1	¾			
30	CH330D	22.	1	¾	60	CH360D	28.	1	¾			

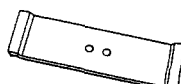
NOTE: Safetybreakers* have 5,000 amperes interrupting capacity.



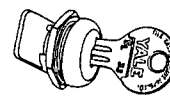
Handle Tie



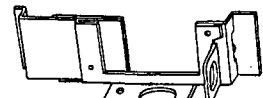
Handle Lock



Closure Plate



Flush Lock

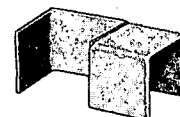


Padlocking Device

SAFETYBREAKER* ACCESSORIES

Description	Catalog Number	Price	Packaged Quantities		Ship. Wt. Lbs. per Package
			Carton	Package	
Handle Tie.....	CH9HT	\$0.10	10	100	¾
Handle Lock.....	CH9LO	0.20	10	100	½
Closure Plate.....	CH9CP	0.70	10	100	3½
Flush Lock.....	CH9FL	4.40	---	5	¾
Padlocking Device.....	CH9PL	0.70	---	10	½
Handle Extension.....	CH9HE	0.20	---	100	½
100A. Neutral Lug.....	CH9LU	0.30	---	10	½
100A. Line Screw.....	CH9LS	0.20	---	10	½

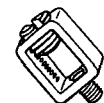
① CH 2100H and CH3100 will be available 4th quarter, 1963.



Handle Extension



100A Line Screw



100A Neutral Lug

DISCOUNT SCHEDULE 22 CD

*Trademark of Cutler-Hammer

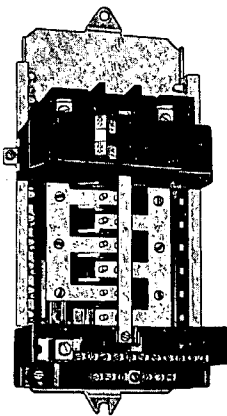
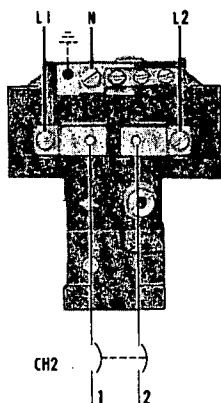
CUTLER-HAMMER

CIRCUIT BREAKER LOAD CENTERS

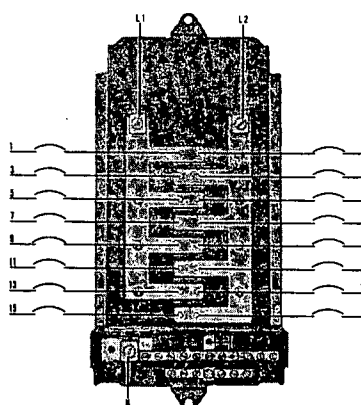


Typical Wiring Diagrams

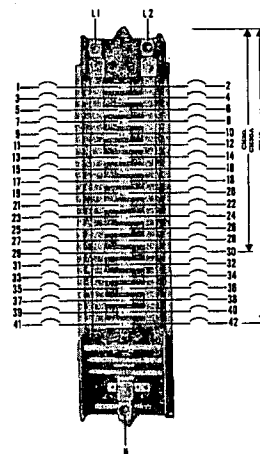
LUG MAIN PANELS



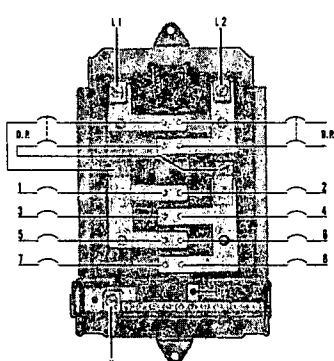
CH8 and Main Breaker



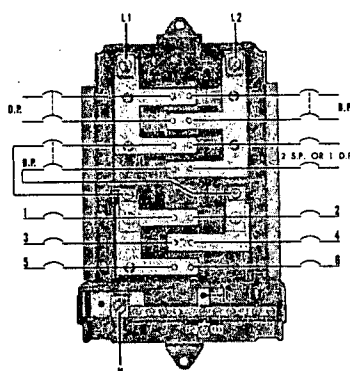
CH16A



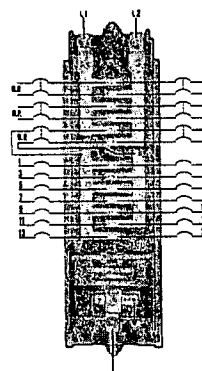
SPLIT BUS



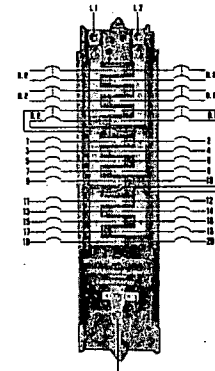
CH208



CH308

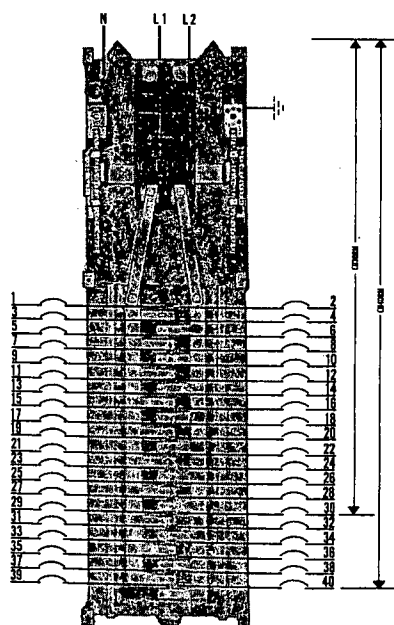


CH614

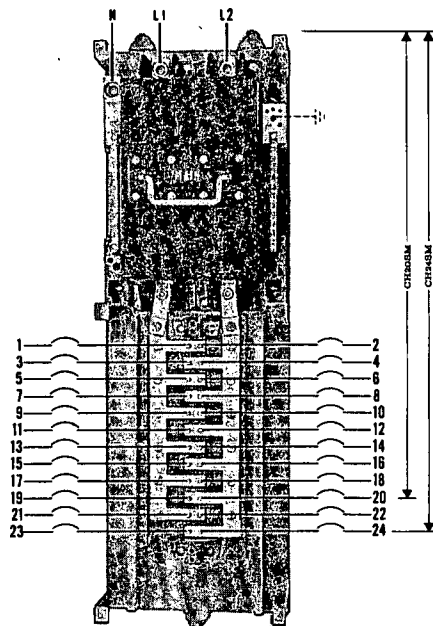


CH620

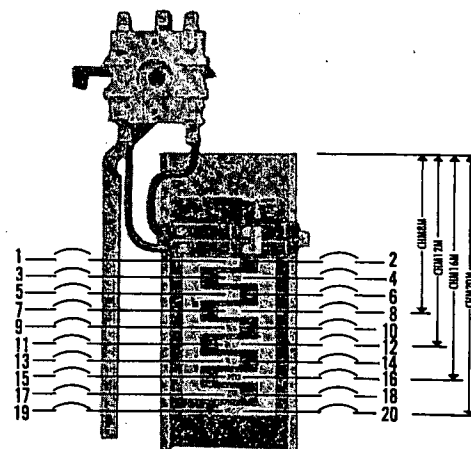
BREAKER MAINS

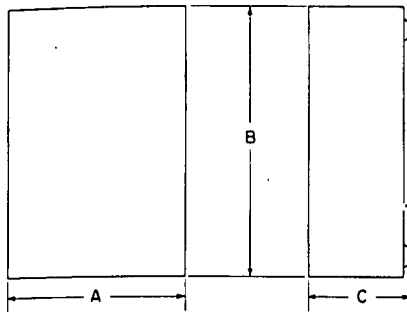


FUSIBLE PULLOUT MAINS

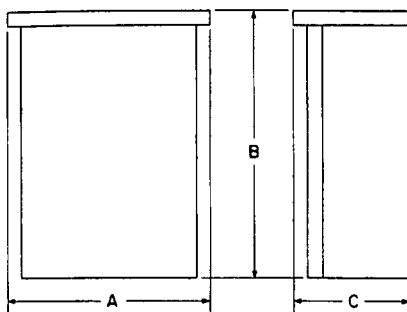


COMBINATION METER SOCKET



**CIRCUIT BREAKER LOAD CENTERS****Approximate Dimensions****LUG MAIN PANELS**

General Purpose



Raintight

Catalog Number	General Purpose Panels Dimensions in Inches			Raintight Panels Dimensions in Inches		
	Wide A	High B	Deep C	Wide A	High B	Deep C
CH2-S	3 $\frac{7}{8}$	6	3 $\frac{1}{4}$	5 $\frac{1}{4}$	9 $\frac{3}{8}$	4 $\frac{1}{4}$
CH2-F	4 $\frac{1}{4}$	8 $\frac{1}{8}$	3 $\frac{3}{8}$	---	---	---
CH2A	4 $\frac{1}{4}$	8 $\frac{1}{8}$	3 $\frac{3}{8}$	5 $\frac{1}{4}$	9 $\frac{3}{8}$	4 $\frac{1}{4}$
CH2B	6 $\frac{7}{8}$	12 $\frac{1}{2}$	3 $\frac{3}{8}$	6 $\frac{3}{8}$	12 $\frac{1}{4}$	4 $\frac{3}{8}$
CH4	8 $\frac{7}{8}$	8 $\frac{3}{8}$	3 $\frac{3}{4}$	8 $\frac{3}{4}$	8 $\frac{3}{8}$	4 $\frac{3}{4}$
CH6	9 $\frac{3}{8}$	11 $\frac{1}{4}$	3 $\frac{3}{8}$	9 $\frac{3}{8}$	11 $\frac{1}{4}$	4 $\frac{1}{2}$
CH8	9 $\frac{3}{8}$	11 $\frac{1}{4}$	3 $\frac{3}{8}$	9 $\frac{3}{8}$	11 $\frac{1}{4}$	4 $\frac{1}{2}$
CH8A	12 $\frac{1}{8}$	17 $\frac{3}{8}$	3 $\frac{3}{8}$	13 $\frac{3}{8}$	20 $\frac{3}{8}$	4 $\frac{3}{8}$
CH12	10 $\frac{3}{8}$	15 $\frac{1}{4}$	3 $\frac{3}{8}$	10 $\frac{3}{8}$	16 $\frac{1}{2}$	4 $\frac{3}{8}$
CH12A	12 $\frac{1}{8}$	20 $\frac{3}{8}$	3 $\frac{3}{8}$	13 $\frac{3}{8}$	20 $\frac{3}{8}$	4 $\frac{3}{8}$
CH16	12 $\frac{1}{8}$	17 $\frac{3}{8}$	3 $\frac{3}{8}$	13 $\frac{3}{8}$	18 $\frac{3}{8}$	4 $\frac{3}{8}$
CH16A	12 $\frac{1}{8}$	20 $\frac{3}{8}$	3 $\frac{3}{8}$	13 $\frac{3}{8}$	20 $\frac{3}{8}$	4 $\frac{3}{8}$
CH20	12 $\frac{1}{8}$	17 $\frac{3}{8}$	3 $\frac{3}{8}$	13 $\frac{3}{8}$	18 $\frac{3}{8}$	4 $\frac{3}{8}$
CH24	12 $\frac{1}{8}$	22 $\frac{3}{8}$	3 $\frac{3}{8}$	13 $\frac{3}{8}$	22 $\frac{3}{8}$	4 $\frac{3}{8}$
CH30	12 $\frac{1}{8}$	28	3 $\frac{3}{8}$	13 $\frac{1}{2}$	28 $\frac{3}{8}$	4 $\frac{3}{8}$
CH30A	12 $\frac{1}{8}$	28	3 $\frac{3}{8}$	13 $\frac{1}{2}$	28 $\frac{3}{8}$	4 $\frac{3}{8}$
CH42	12 $\frac{1}{8}$	32 $\frac{1}{8}$	3 $\frac{3}{8}$	---	---	---
CH4003	8 $\frac{3}{8}$	8 $\frac{3}{8}$	3 $\frac{3}{8}$	8 $\frac{3}{4}$	8 $\frac{3}{8}$	4 $\frac{3}{4}$
CH4003A	10 $\frac{3}{8}$	15 $\frac{1}{4}$	3 $\frac{3}{8}$	10 $\frac{3}{8}$	16 $\frac{1}{2}$	4 $\frac{3}{8}$
CH4012	10 $\frac{3}{8}$	15 $\frac{1}{4}$	3 $\frac{3}{8}$	10 $\frac{3}{8}$	16 $\frac{1}{2}$	4 $\frac{3}{8}$
CH4018	12 $\frac{1}{8}$	17 $\frac{3}{8}$	3 $\frac{3}{8}$	13 $\frac{3}{8}$	18 $\frac{3}{8}$	4 $\frac{3}{8}$
CH4024	12 $\frac{1}{8}$	27 $\frac{3}{8}$	4 $\frac{1}{16}$	---	---	---
CH4030	12 $\frac{1}{8}$	27 $\frac{3}{8}$	3 $\frac{3}{8}$	---	---	---
CH4030A	12 $\frac{1}{8}$	27 $\frac{3}{8}$	4 $\frac{1}{16}$	---	---	---
CH4036	12 $\frac{1}{8}$	32 $\frac{3}{8}$	3 $\frac{3}{8}$	---	---	---
CH4042	12 $\frac{1}{8}$	32 $\frac{3}{8}$	4 $\frac{1}{16}$	---	---	---

SPLIT BUS

Catalog Number	Dimensions in Inches					
	General Purpose Panel			Raintight Panel		
	Wide A	High B	Deep C	Wide A	High B	Deep C
CH208	10 $\frac{3}{8}$	15 $\frac{1}{4}$	3 $\frac{3}{8}$	10 $\frac{3}{8}$	16 $\frac{1}{2}$	4 $\frac{3}{8}$
CH308	10 $\frac{3}{8}$	15 $\frac{1}{4}$	3 $\frac{3}{8}$	10 $\frac{3}{8}$	16 $\frac{1}{2}$	4 $\frac{3}{8}$
CH310	10 $\frac{3}{8}$	17 $\frac{3}{8}$	3 $\frac{3}{8}$	10 $\frac{3}{8}$	18 $\frac{3}{4}$	4 $\frac{3}{8}$
CH412	10 $\frac{3}{8}$	17 $\frac{3}{8}$	3 $\frac{3}{8}$	10 $\frac{3}{8}$	18 $\frac{3}{4}$	4 $\frac{3}{8}$
CH510	10 $\frac{3}{8}$	17 $\frac{3}{8}$	3 $\frac{3}{8}$	10 $\frac{3}{8}$	18 $\frac{3}{4}$	4 $\frac{3}{8}$
CH612	12 $\frac{1}{8}$	22 $\frac{3}{8}$	3 $\frac{3}{8}$	13 $\frac{1}{2}$	28 $\frac{3}{8}$	4 $\frac{3}{8}$
CH614	12 $\frac{1}{8}$	28	3 $\frac{3}{8}$	13 $\frac{1}{2}$	28 $\frac{3}{8}$	4 $\frac{3}{8}$
CH614A	12 $\frac{1}{8}$	28	3 $\frac{3}{8}$	13 $\frac{1}{2}$	28 $\frac{3}{8}$	4 $\frac{3}{8}$
CH620	12 $\frac{1}{8}$	32 $\frac{3}{8}$	3 $\frac{3}{8}$	13 $\frac{1}{2}$	30 $\frac{1}{4}$	4 $\frac{3}{8}$
CH620A	12 $\frac{1}{8}$	32 $\frac{3}{8}$	3 $\frac{3}{8}$	13 $\frac{1}{2}$	30 $\frac{1}{4}$	4 $\frac{3}{8}$

200 AMP MAIN DISCONNECTS

Catalog Number	Dimensions in Inches		
	Wide A	High B	Deep C
CH24BM	13 $\frac{3}{8}$	33 $\frac{3}{4}$	4 $\frac{1}{2}$
CH30BM	13 $\frac{3}{8}$	33 $\frac{3}{4}$	4 $\frac{1}{2}$
CH40BM	13 $\frac{3}{8}$	37 $\frac{1}{2}$	4 $\frac{1}{2}$
CH20SM	13 $\frac{3}{8}$	33 $\frac{3}{8}$	4 $\frac{1}{2}$
CH24SM	13 $\frac{3}{8}$	33 $\frac{3}{8}$	4 $\frac{1}{2}$
CH30SM	13 $\frac{3}{8}$	33 $\frac{3}{8}$	4 $\frac{1}{2}$
CH40SM	13 $\frac{3}{8}$	34	4 $\frac{1}{2}$
4416H1200	8 $\frac{3}{8}$	17 $\frac{3}{8}$	5 $\frac{1}{4}$

COMBINATION METER SOCKET

Catalog Number	Dimensions in Inches					
	Surface Panel			Semi Flush Panel		
	Wide A	High B	Deep C	Wide A	High B	Deep C
CHM2100M	13	16	4 $\frac{1}{2}$	17 $\frac{1}{4}$	17 $\frac{1}{4}$	4 $\frac{1}{2}$
CHM2100M-RI	8	18 $\frac{1}{2}$	4 $\frac{1}{2}$	---	---	---
CHM8M	13	24	4 $\frac{1}{2}$	17 $\frac{1}{2}$	25 $\frac{1}{4}$	4 $\frac{1}{2}$
CHM10M50	13	24	4 $\frac{1}{2}$	13	24	4 $\frac{1}{2}$
CHM12	13	24	4 $\frac{1}{2}$	13	24	4 $\frac{1}{2}$
CHM12M	13	24	4 $\frac{1}{2}$	17 $\frac{1}{2}$	25 $\frac{1}{4}$	4 $\frac{1}{2}$
CHM14M70	13	24	4 $\frac{1}{2}$	13	24	4 $\frac{1}{2}$
CHM16M	13	24	4 $\frac{1}{2}$	17 $\frac{1}{2}$	25 $\frac{1}{4}$	4 $\frac{1}{2}$
CHM20M	13	24	4 $\frac{1}{2}$	17 $\frac{1}{2}$	25 $\frac{1}{4}$	4 $\frac{1}{2}$
CHM200M	13 $\frac{3}{8}$	28	5 $\frac{1}{2}$	15 $\frac{1}{8}$	29 $\frac{1}{8}$	5 $\frac{1}{2}$

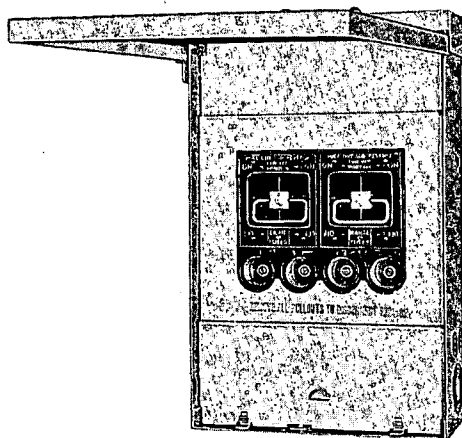
FUSIBLE SERVICE EQUIPMENT



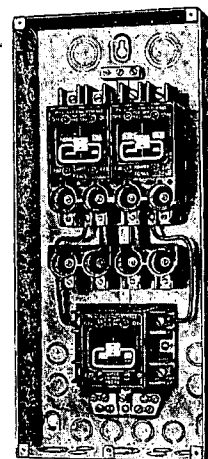
Parallel Connected Main and Branch Circuits

WHEN ORDERING SPECIFY

- Catalog number



4335H204RT



4335H308

SINGLE PHASE—3 Wire Solid Neutral—120/240 Volts A-c—Grounded Neutral—Main (lighting) pullout controls plug fuse circuits and sub-feed taps.

Main Lug Amps.	Lighting Pullout ②	Branch Circuits		General Purpose Panel				① Raintight Panel		
				Catalog Number		Price	Ship. Wt. Lbs.	Catalog Number	Price	Ship. Wt. Lbs.
		② 2 Pole Pullout	Plug Fuse	Surface Mounted	Flush Mounted					
100 AMPERE SERVICE—2 TO 5 PULLOUTS										
100	1—60A.	1—60A.	4	4335- H204-S	4335- H204-F	\$16.	10	4335- H204RT	\$26.	13
			6	H206-S	H206-F	28.	12	H206RT	38.	17
			8	H208-S	H208-F	32.	13	H208RT	42.	18
			10	H210-S	H210-F	39.	17	H210RT	49.	20
			12	H212-S	H212-F	43.	18	H212RT	53.	21
100	1—60A.	2—60A.	4	H304-S	H304-F	31.	16	---	---	---
			6	H306-S	H306-F	36.	17	---	---	---
			8	H308-S	H308-F	40.	18	---	---	---
100	1—60A.	1—60A. and 1—30A.	4	H1304-S	H1304-F	31.	16	---	---	---
			6	H1306-S	H1306-F	36.	17	---	---	---
			8	H1308-S	H1308-F	40.	18	---	---	---
100	1—60A.	2—60A. & 1—30A.	8	H1408-S	H1408-F	48.	18	---	---	---
			12	H1412-S	H1412-F	58.	34	---	---	---
100	1—60A.	1—60A. and 2—30A.	4	H2404-S	H2404-F	39.	16	---	---	---
			6	H2406-S	H2406-F	43.	18	---	---	---
			8	H2408-S	H2408-F	48.	19	---	---	---
			10	H2410-S	H2410-F	54.	23	---	---	---
			12	H2412-S	H2412-F	58.	34	---	---	---
100	1—60A.	1—60A. & 3—30A.	8	H3508-S	H3508-F	58.	24	---	---	---
			10	H3510-S	H3510-F	62.	24	---	---	---
FOR "OFF PEAK" WATER HEATER SERVICE										
100	1—60A.	1—60A. & 2—30A.	8	4335- H8408-S	4335- H8408-F	\$48.	24	---	---	---
EXPANDABLE PARALLEL TYPE										
Furnished with 1 Pullout and Provisions for Adding 1 or 2 Pullout Assemblies.										
100	1—60A.	Provision for 1 or 2	8	4332- H308-S	4332- H308-F	\$29.	21	---	---	---
			10	H310-S	H310-F	33.	24	---	---	---
			12	H312-S	H312-F	37.	25	---	---	---
Add On ② Pullout Assemblies		Amperes		Catalog Number		Price		Ship. Wt. Lbs.		Carton
		30 60		4332- H30 H60		\$6. 6.		1½ 1½		10 10

① Raintight panels have opening in top covered by a blank plate. Interchangeable hubs may be selected from table, page 30.

② Pullouts also HP rated. 30 ampere unit, 1½ HP standard, 3 HP maximum. 60 ampere unit, 3 HP standard, 10 HP maximum.

CUTLER-HAMMER

DISCOUNT SCHEDULE 17 CD-2



FUSIBLE SERVICE EQUIPMENT

Parallel Connected Main and Branch Circuits

25

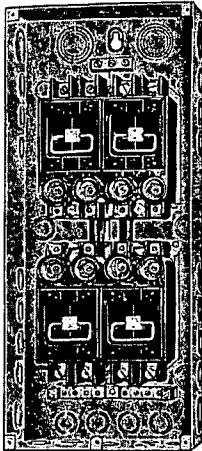
CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS®

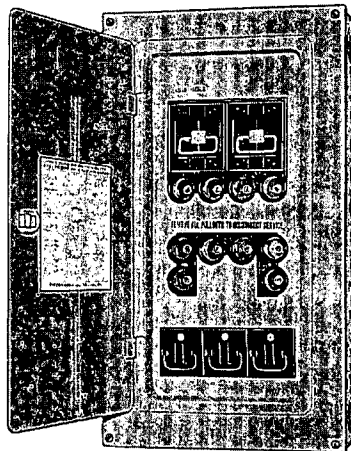
PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

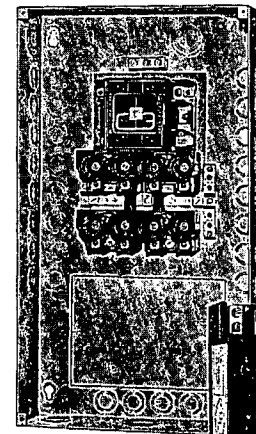
GENERAL INFORMATION



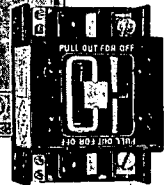
4335H1408



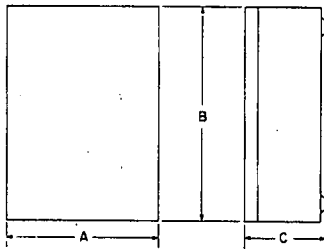
4335H3510



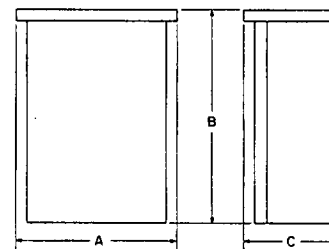
Bull 4332



APPROXIMATE DIMENSIONS



General Purpose Panel



Raintight Panel

Catalog Number	General Purpose Panel Dimensions in Inches			Raintight Panel Dimensions in Inches		
	Wide A	High B	Deep C	Wide A	High B	Deep C
4335-						
H204	8 $\frac{3}{8}$	12 $\frac{1}{2}$	3 $\frac{1}{2}$	9 $\frac{1}{8}$	14 $\frac{1}{2}$	3 $\frac{3}{8}$
H206	8 $\frac{3}{4}$	15 $\frac{1}{8}$	3 $\frac{1}{2}$	9 $\frac{1}{8}$	17 $\frac{1}{8}$	3 $\frac{3}{8}$
H208	8 $\frac{3}{4}$	15 $\frac{1}{8}$	3 $\frac{1}{2}$	9 $\frac{1}{8}$	17 $\frac{1}{8}$	3 $\frac{3}{8}$
H210	8 $\frac{3}{8}$	20 $\frac{3}{8}$	3 $\frac{1}{2}$	10 $\frac{1}{8}$	20 $\frac{3}{8}$	3 $\frac{3}{8}$
H212	8 $\frac{3}{8}$	20 $\frac{3}{8}$	3 $\frac{1}{2}$	10 $\frac{1}{8}$	20 $\frac{3}{8}$	3 $\frac{3}{8}$
H304, H1304	8 $\frac{3}{8}$	17 $\frac{3}{8}$	3 $\frac{1}{2}$	---	---	---
H306, H1306	8 $\frac{3}{8}$	20 $\frac{3}{8}$	3 $\frac{1}{2}$	---	---	---
H308, H1308	8 $\frac{3}{8}$	20 $\frac{3}{8}$	3 $\frac{1}{2}$	---	---	---
H1408	8 $\frac{3}{4}$	20 $\frac{3}{8}$	3 $\frac{1}{2}$	---	---	---
H1412	12 $\frac{3}{8}$	24 $\frac{3}{8}$	3 $\frac{3}{8}$	---	---	---
H2404	8 $\frac{3}{4}$	17 $\frac{3}{8}$	3 $\frac{1}{2}$	---	---	---
H2406	8 $\frac{3}{4}$	20 $\frac{3}{8}$	3 $\frac{1}{2}$	---	---	---
H2408	8 $\frac{3}{4}$	20 $\frac{3}{8}$	3 $\frac{1}{2}$	---	---	---
H2410	12	21 $\frac{1}{8}$	3 $\frac{1}{2}$	---	---	---
H2412	12 $\frac{3}{8}$	24 $\frac{3}{8}$	3 $\frac{3}{8}$	---	---	---
H3508	12	21 $\frac{1}{8}$	3 $\frac{1}{2}$	---	---	---
H3510	12	21 $\frac{1}{8}$	3 $\frac{1}{2}$	---	---	---
H8408	12	21 $\frac{1}{8}$	3 $\frac{1}{2}$	---	---	---
4332-						
H308	12	21 $\frac{1}{8}$	3 $\frac{1}{2}$	---	---	---
H310	12	24 $\frac{3}{8}$	3 $\frac{1}{2}$	---	---	---
H312	12	24 $\frac{3}{8}$	3 $\frac{1}{2}$	---	---	---

FUSIBLE SERVICE EQUIPMENT



Parallel Connected Main and Branch Circuits

WHEN ORDERING SPECIFY

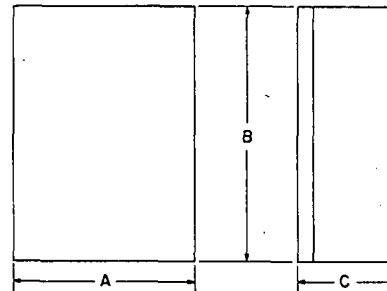
- Catalog number

SINGLE PHASE—3 Wire Solid Neutral—120/240 Volts A-c—Grounded Neutral—Main (lighting) pullout controls plug fuse circuits and sub-feed taps.

Main Lug Amps.	② Lighting Pullout	Branch Circuits		General Purpose Panel			
				Catalog Number		Price	Ship. Wt. Lbs.
		② 2 Pole Pullout	Plug Fuse	Surface Mounted	Flush Mounted		
100-200 AMPERE SERVICE—6 PULLOUTS							
100	1-60A.	1-60A.	12	4335H4612-S	4335H4612-F	\$79.	43
125		and 4-30A.	12	4344H4612-S	4344H4612-F	79.	43
150			12	4346H4612-S	4346H4612-F	79.	43
200			12	4348H4612-S	4348H4612-F	89.	43
100	1-60A.	2-60A.	12	4335H3612-S	4335H3612-F	79.	43
125		and 3-30A.	12	4344H3612-S	4344H3612-F	79.	43
150			12	4346H3612-S	4346H3612-F	79.	43
200			12	4348H3612-S	4348H3612-F	89.	43

APPROXIMATE DIMENSIONS

Catalog Number	General Purpose Panels Dimensions in Inches		
	Wide A	High B	Deep C
4335- H3612, H4612	12 $\frac{3}{4}$	30 $\frac{3}{4}$	3 $\frac{3}{4}$
4344- H3612, H4612	12 $\frac{3}{4}$	30 $\frac{3}{4}$	3 $\frac{3}{4}$
4346- H3612, H4612	12 $\frac{3}{4}$	30 $\frac{3}{4}$	3 $\frac{3}{4}$
4348- H3612, H4612	12 $\frac{3}{4}$	30 $\frac{3}{4}$	3 $\frac{3}{4}$

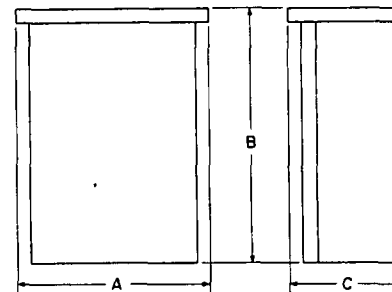


200 AMPERE—RAINTIGHT—YARD POLE TYPE

Main Lug Amps.	2 Pullouts		Raintight Panel with 2 $\frac{1}{2}$ " Hub			1 Raintight Panel without Hub		
	Main	Auxiliary	Catalog Number	Price	Ship. Wt. Lbs.	Catalog Number	Price	Ship. Wt. Lbs.
200	2-100A.	1-30A. 1-60A. 1-30A. & 1-60A.	4348- H1300R-25 H300R-25 H1400R-25	\$103.80 103.00 111.80	48 48 49	4348- H1300R H300R H1400R	\$96. 96. 104.	47 47 47

APPROXIMATE DIMENSIONS

Catalog Number	Raintight Panels Dimensions in Inches		
	Wide A	High B	Deep C
4348- H1300R H300R H1400R	15 $\frac{3}{4}$ 15 $\frac{3}{4}$ 15 $\frac{3}{4}$	26 $\frac{3}{4}$ 26 $\frac{3}{4}$ 26 $\frac{3}{4}$	4 $\frac{3}{4}$ 4 $\frac{3}{4}$ 4 $\frac{3}{4}$



① Raintight panels have opening in top covered by a blank plate. Interchangeable hubs may be selected from table, page 30.

② Pullouts also HP rated. 30 ampere unit, 1 $\frac{1}{2}$ HP standard, 3 HP maximum. 60 ampere unit, 3 HP standard, 10 HP maximum. 100 ampere unit, 7 $\frac{1}{2}$ HP standard, 15 HP maximum.

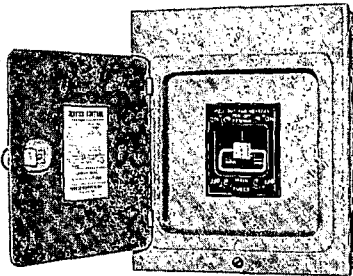


FUSIBLE SERVICE EQUIPMENT

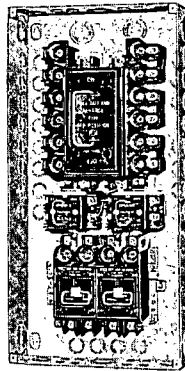
Series Connected Main and Branch Circuits

WHEN ORDERING SPECIFY

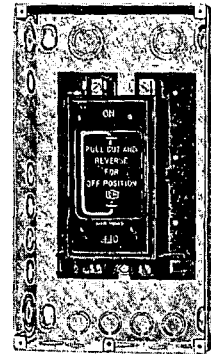
- Catalog number of panel



4330H100



4336H2516



4336H100

SINGLE PHASE—3 Wire Solid Neutral—120/240 Volts A-c—Main Pullout controls all branches—Grounded Neutral.

④ Main Pullout Amps	Branch Circuits		General Purpose Panel				① Raintight Panel		
			Catalog Number		Price	Ship. Wt. Lbs.	Catalog Number	Price	Ship. Wt. Lbs.
	④ Pullout	Plug Fuse	Surface	Flush					
ONE PULLOUT—NO BRANCHES									
30	0	0	4330- H1100-S	4330- H1100-F	\$12.	7	4330- H1100RT	\$13.10	9
60	0	0	H100-S	H100-F	12.	8	H100RT	13.10	9
100	0	0	4336- ② H100-S	4336- ② H100-F	30.	13	4336- ② H100RT	35.	16
200	0	0	4338- H100-S	4338- H100-F	67.	26	4338- H100RT	90.	30
60 AMPERE SERVICE—ONE PULLOUT									
60	0	4 6 8	4330- H104-S H106-S H108-S	4330- H104-F H106-F H108-F	15. 20. 24.	10 13 14	4330- H104RT H106RT H108RT	25. 31. 35.	13 17 19
60 AMPERE SERVICE—2 AND 3 PULLOUTS									
60	1-60A	4 6 8	4334- H204-S H206-S H208-S	4334- H204-F H206-F H208-F	\$16. 28. 32.	10 13 14	4334- H204RT H206RT H208RT	\$26. 38. 42.	13 17 19
60	1-60A and 1-30A	4 6 8	H1304-S H1306-S H1308-S	H1304-F H1306-F H1308-F	31. 36. 40.	16 18 18	--- --- ---	--- --- ---	--- --- ---
① 100 AMPERE SERVICE—1 TO 5 PULLOUTS									
100	0	8	4336- H108-S	4336- H108-F	41.	19	4336- H108RT	51.	22
	0	12	H112-S	H112-F	50.	20	H112RT	60.	23
	1-60A 1-60A	8 12	H208-S H212-S	H208-F H212-F	47. 55.	24 25	H208RT H212RT	57. 65.	26 27
100	2-60A	8	H308-S	H308-F	55.	25	H308RT	65.	28
		10	H310-S	H310-F	59.	25	H310RT	69.	28
		12	H312-S	H312-F	63.	26	H312RT	73.	29
		16	H316-S	H316-F	71.	26	H316RT	81.	29
		20	H320-S	H320-F	80.	26	H320RT	90.	35
100	1-60A and 1-30A	8	H1308-S	H1308-F	55.	25	H1308RT	65.	28
		10	H1310-S	H1310-F	59.	25	H1310RT	69.	28
		12	H1312-S	H1312-F	63.	26	H1312RT	73.	29
		16	H1316-S	H1316-F	71.	26	H1316RT	81.	29
		20	H1320-S	H1320-F	80.	26	H1320RT	90.	35
100	2-60A and 1-30A	8	H1408-S	H1408-F	64.	28	H1408RT	74.	38
		12	H1412-S	H1412-F	72.	29	H1412RT	82.	39
		16	H1416-S	H1416-F	84.20	29	H1416RT	94.20	40
100	1-60A and 2-30A	8	H2408-S	H2408-F	64.	28	H2408RT	74.	38
		12	H2412-S	H2412-F	72.	29	H2412RT	82.	39
		16	H2416-S	H2416-F	84.20	29	H2416RT	94.20	40
100	2-60A and 2-30A	12	H2512-S	H2512-F	83.20	29	H2512RT	93.20	39
		16	H2516-S	H2516-F	92.20	29	H2516RT	102.20	40

① Raintight panels have opening in top covered by a blank plate. Interchangeable hubs may be selected from table, page 30.

② Also suitable for 250 volts A-C, 3 phase 3 wire system with 1 phase grounded.

③ For 200 ampere service, 3-5 pullouts see page 29.

④ Pullouts also HP rated. 30A, 1 1/4 HP std., 3 HP max. 60A, 3 HP std., 10 HP max. 100A, 7 1/4 HP std., 15 HP max. 200A, 15 HP std.

DISCOUNT SCHEDULE 17 CD-2

DIMENSIONS, next page

CUTLER-HAMMER

FUSIBLE SERVICE EQUIPMENT

Series Connected Main and Branch Circuits



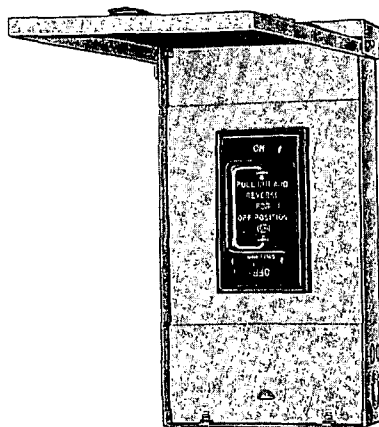
CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS®

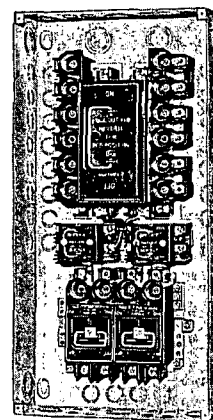
PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

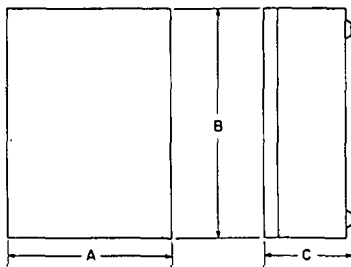


4336H100RT

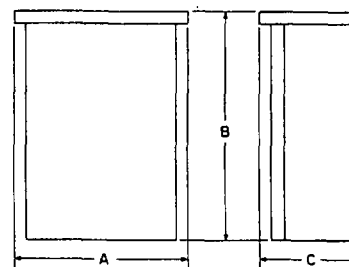


4336H2516

APPROXIMATE DIMENSIONS



General Purpose Panel



Raintight Panel

Catalog Number	General Purpose Panel Dimensions in Inches			Raintight Panel Dimensions in Inches		
	Wide A	High B	Deep C	Wide A	High B	Deep C
4330-						
H1100	8 $\frac{3}{8}$	10 $\frac{1}{2}$	3 $\frac{1}{2}$	9	10 $\frac{1}{2}$	3 $\frac{3}{8}$
H100	8 $\frac{3}{8}$	10 $\frac{1}{2}$	3 $\frac{1}{2}$	9	10 $\frac{1}{2}$	3 $\frac{3}{8}$
H104	8 $\frac{3}{4}$	12 $\frac{1}{2}$	3 $\frac{1}{2}$	9 $\frac{1}{8}$	14 $\frac{1}{4}$	4 $\frac{1}{4}$
H106	8 $\frac{3}{4}$	15 $\frac{1}{8}$	3 $\frac{1}{2}$	9 $\frac{3}{8}$	17 $\frac{3}{4}$	4 $\frac{1}{4}$
H108	8 $\frac{3}{4}$	15 $\frac{1}{8}$	3 $\frac{1}{2}$	9 $\frac{3}{8}$	17 $\frac{3}{4}$	4 $\frac{1}{4}$
4334-						
H204	8 $\frac{3}{8}$	12 $\frac{1}{2}$	3 $\frac{1}{2}$	9 $\frac{3}{8}$	14 $\frac{3}{4}$	4 $\frac{1}{4}$
H206	8 $\frac{3}{4}$	15 $\frac{1}{8}$	3 $\frac{1}{2}$	9 $\frac{3}{8}$	17 $\frac{3}{4}$	4 $\frac{1}{4}$
H208	8 $\frac{3}{4}$	15 $\frac{1}{8}$	3 $\frac{1}{2}$	9 $\frac{3}{8}$	17 $\frac{3}{4}$	4 $\frac{1}{4}$
H1304	8 $\frac{5}{8}$	17 $\frac{3}{8}$	3 $\frac{1}{2}$	---	---	---
H1306	8 $\frac{5}{8}$	20 $\frac{1}{8}$	3 $\frac{1}{2}$	---	---	---
H1308	8 $\frac{5}{8}$	20 $\frac{1}{8}$	3 $\frac{1}{2}$	---	---	---
4336-						
H100	8 $\frac{3}{8}$	15 $\frac{1}{8}$	3 $\frac{1}{2}$	9 $\frac{1}{2}$	17 $\frac{3}{4}$	3 $\frac{3}{4}$
H108	12	16 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	18 $\frac{1}{4}$	3 $\frac{3}{4}$
H112	12	16 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	18 $\frac{1}{4}$	3 $\frac{3}{4}$
H208	12	21 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	23	3 $\frac{3}{4}$
H212	12	21 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	23	3 $\frac{3}{4}$
H308, H1308	12	21 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	23	3 $\frac{3}{4}$
H310, H1310	12	21 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	23	3 $\frac{3}{4}$
H312, H1312	12	21 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	23	3 $\frac{3}{4}$
H316, H1316	12	21 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	23	3 $\frac{3}{4}$
H320, H1320	12	24 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	25 $\frac{3}{4}$	3 $\frac{3}{4}$
H1408, H2408	12	24 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	25 $\frac{3}{4}$	3 $\frac{3}{4}$
H1412, H2412	12	24 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	25 $\frac{3}{4}$	3 $\frac{3}{4}$
H1416, H2416	12	24 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	25 $\frac{3}{4}$	3 $\frac{3}{4}$
H2512	12	24 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	25 $\frac{3}{4}$	3 $\frac{3}{4}$
H2516	12	24 $\frac{1}{8}$	3 $\frac{1}{2}$	13 $\frac{1}{4}$	25 $\frac{3}{4}$	3 $\frac{3}{4}$
4338-						
H100	13 $\frac{1}{4}$	20 $\frac{1}{4}$	4	13 $\frac{1}{4}$	20 $\frac{1}{4}$	5 $\frac{1}{4}$

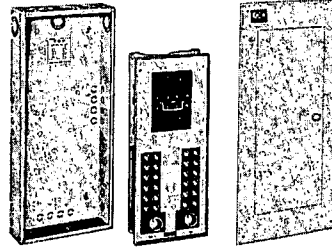


FUSIBLE SERVICE EQUIPMENT

Series Connected Main and Branch Circuits

WHEN ORDERING SPECIFY

- Catalog numbers of interior, box and cover.

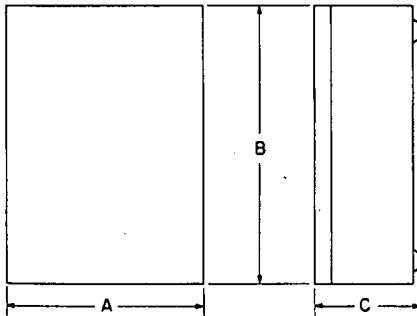


SINGLE PHASE—3 Wire Solid Neutral—120/240 Volts A-c—Main Pullout controls all branches—Insulated (Groundable) Neutral.

② Main Pullout Amps.	Branch Circuits		Interiors Only			General Purpose Enclosures										① Raintight Enclosure (Includes Cover)		
						Box Only			Covers Only									
	2 Pole Pullout	Plug Fuse	Cat. No.	Price	Ship. Wt. Lbs.				Surface			Flush						
						Cat. No.	Price	Ship. Wt. Lbs.	Cat. No.	Price	Ship. Wt. Lbs.	Cat. No.	Price	Ship. Wt. Lbs.	Cat. No.	Price	Ship. Wt. Lbs.	
200 AMPERE SERVICE—3 TO 5 PULLOUTS																		
200	2-60A	20	4338-N320	\$125.	27	4338-B2	\$16.	20	4338-C2S	\$16.	15	4338-C2F	\$16.	19	4338-B2RT	\$59.	38	
		24	N324	135.	27	B2	16.	20	C2S	16.	15	C2F	16.	19	B2RT	59.	38	
		28	N328	143.	29	B3	17.	25	C3S	17.	15	C3F	17.	20	B3RT	62.	39	
		32	N332	153.	30	B3	17.	25	C3S	17.	15	C3F	17.	20	B3RT	62.	39	
200	1-60A and 1-30A	20	N1320	125.	27	B2	16.	20	C2S	16.	15	C2F	16.	19	B2RT	59.	38	
		24	N1324	135.	27	B2	16.	20	C2S	16.	15	C2F	16.	19	B2RT	59.	38	
		28	N1328	143.	29	B3	17.	25	C3S	17.	15	C3F	17.	20	B3RT	62.	39	
		32	N1332	153.	30	B3	17.	25	C3S	17.	15	C3F	17.	20	B3RT	62.	39	
200	2-60A and 1-30A	16	N1416	124.	28	B2	16.	20	C2S	16.	15	C2F	16.	19	B2RT	59.	38	
		20	N1420	134.	28	B2	16.	20	C2S	16.	15	C2F	16.	19	B2RT	59.	38	
		24	N1424	143.	30	B3	17.	25	C3S	17.	15	C3F	17.	20	B3RT	62.	39	
		28	N1428	152.	31	B3	17.	25	C3S	17.	15	C3F	17.	20	B3RT	62.	39	
200	1-60A and 2-30A	16	N2416	124.	28	B2	16.	20	C2S	16.	15	C2F	16.	19	B2RT	59.	38	
		20	N2420	134.	28	B2	16.	20	C2S	16.	15	C2F	16.	19	B2RT	59.	38	
		24	N2424	143.	30	B3	17.	25	C3S	17.	15	C3F	17.	20	B3RT	62.	39	
		28	N2428	152.	31	B3	17.	25	C3S	17.	15	C3F	17.	20	B3RT	62.	39	
200	2-60A & 2-30A	20	N2520	143.	31	B3	17.	25	C3S	17.	15	C3F	17.	20	B3RT	62.	39	
		24	N2524	151.	31	B3	17.	25	C3S	17.	15	C3F	17.	20	B3RT	62.	39	
200	1-60A & 3-30A	20	N3520	143.	31	B3	17.	25	C3S	17.	15	C3F	17.	20	B3RT	62.	39	
		24	N3524	151.	31	B3	17.	25	C3S	17.	15	C3F	17.	20	B3RT	62.	39	

② Pullouts also HP rated. 30 amperes, 1 1/2 HP standard, 3 HP maximum. 60 ampere, 3 HP standard, 10 HP maximum. 200 amperes, 15 HP standard.

APPROXIMATE DIMENSIONS



Catalog Number	General Purpose Panel Dimensions in Inches			Raintight Panel Dimensions in Inches		
	Wide A	High B	Deep C	Wide A	High B	Deep C
4338-B2	14 3/8	33	4 3/8	14 3/4	33 1/4	5
4338-B3	14 3/8	36	4 3/8	14 3/4	36 1/4	5

INTERCHANGEABLE CONDUIT HUBS

For Bul. 4338 Raintight Enclosures

Conduit Size	Catalog Number	Price	Carton
2"	4338-H7	\$4.40	5
2 1/2"	4338-H8	7.80	5

① Bulletin 4338 raintight enclosures have an opening in top covered by a blank plate. Interchangeable hubs must be ordered as a separate item, see table above.

DISCOUNT SCHEDULE 17 CD-2

CUTLER-HAMMER

CIRCUIT BREAKER
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BUSWAYS &
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PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

FUSIBLE SERVICE EQUIPMENT

Branch Circuit Fuse Panels

WHEN ORDERING SPECIFY

- catalog number

3 WIRE SOLID NEUTRAL—125/250 Volts A-c or D-c

Number of Circuits	Amps.	General Purpose Panel			
		Catalog Number		Price	Ship. Wt. Lbs.
		Surface Mounted	Flush Mounted		
2	30	4383- ① H2-S	4383- ① H2-F	\$5.70	4
4	30	H4-S	H4-F	7.80	4
6	60	H6-S	H6-F	13.10	8
8	60	H8-S	H8-F	17.70	9
10	60	H10-S	H10-F	22.50	13
12	60	H12-S	H12-F	27.	14
14	100	H14-S	H14-F	31.50	14
16	100	H16-S	H16-F	36.	14
18	100	H18-S	H18-F	40.50	16
20	100	H20-S	H20-F	45.	17
2	30	4385- H2-S	4385- H2-F	5.70	4

① 4383H2 is a 2 wire solid neutral 125 volts; for 3 wire neutral applications use 4385H2.

APPROXIMATE DIMENSIONS

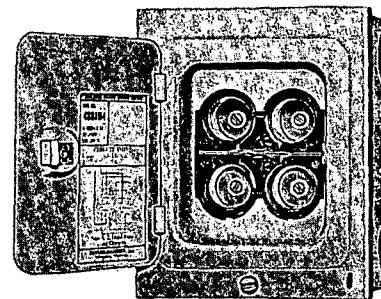
Catalog Number	General Purpose Panel Dimensions in Inches		
	Wide A	High B	Deep C
4383- H2	5½	5½	3½
H4	5½	6¾	3½
H6	8¾	10	3½
H8	8¾	10	3½
H10	8¾	12¾	3½
H12	8¾	12¾	3½
H14	8¾	17¾	3½
H16	8¾	17¾	3½
H18	8¾	20¾	3½
H20	8¾	20¾	3½
4385- H2	6¾	4½	2¾

INTERCHANGEABLE HUBS

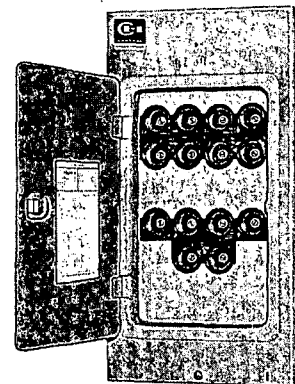
Conduit Size	Catalog Number	Price	Quantity per Carton	Lbs. Each
Blank Plate	4199-			
¾"	H1	\$0.40	100	⅓
1"	H2	2.60	10	⅓
1¼"	H3	2.60	10	⅓
1½"	H4	2.60	10	⅓
2"	H5	2.60	10	⅓
2"	② H6	4.40	10	⅓
2½"	③ H31	4.40	10	1.7
3"	④ H32	7.80	10	2.2
	⑤ H33	13.10	10	2.5
Blank Plate	⑥ H34	0.40	50	1.0

② For 100-125 ampere panels only.

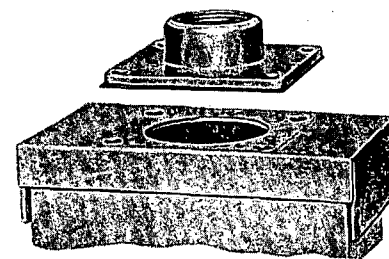
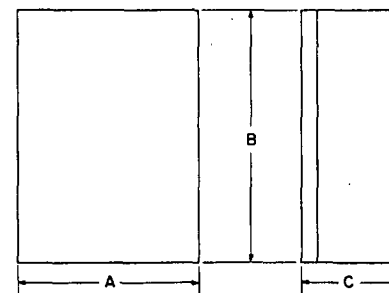
③ For 150-200 ampere panels only except 433882RT and 433883RT.



4383H4



4383H14



DISCOUNT SCHEDULE 17 CD-2

CUTLER-HAMMER



BUSWAYS

Pricing Information

SYSTEM TYPE	DESCRIPTION
P	Premium—Low Impedance Duct.
H	High Performance—Low Impedance Duct.
E	Economy Duct.
B	Balanced Voltage—High Frequency.
S	Slimway Duct.
L	Laboratory Duct.

Pricing Information for "P, H, E and B" Type Systems

The Type Premium, High Performance, Economy and Balanced Voltage UNI-BUS systems are priced on a footage basis. To price a system proceed as follows:

1. Make a complete layout of the system showing all dimensions in feet and inches, including the fittings and adapters.
2. Label all the runs of duct and their fittings as to type (Feeder or Plug-in; Ventilated or Non-ventilated, etc.) and their ampere rating. Also indicate adapters if used.
3. Add all dimensions for a specific type of duct and fittings (excluding adapters) and round off the total to the next higher whole foot.
4. Multiply the total footage by the applicable price per foot.
5. Total the forming prices for each fitting that will be used that carries a forming price (tees, elbows, crosses, etc.)
6. Total the complete device price for each device and accessory that will be used that carries a complete device price (junction boxes, transverse barriers, adapters, end boxes, etc.)
7. Add the prices from the preceding steps 4, 5 and 6. This will be the total list price for a specific type of duct, its fittings and adapters.

NOTE

The third through sixth steps of the above pricing procedure must be repeated for each type of duct (Feeder or Plug-in, Ventilated or Non-ventilated, different ampere rated sections, etc.) that will be included in the overall system.

Pricing Information for "S" and "L" Type Systems

The Slimway and Laboratory UNI-BUS systems are priced on a standardized section basis. To price a system proceed as follows:

1. Make a complete layout of the system showing all dimensions in feet and inches, including the fittings and adapters.
2. Label all the runs of duct and their fittings as to type (no. of poles, ampere rating, etc.) Also identify the adapters.
3. Price the runs of duct using the standardized section prices for each specific type of duct (excluding adapters).
4. Total the complete device price for those devices and accessories with a complete device price (end boxes, tees, elbows, junction boxes, adapters, etc.)
5. Add the prices from the preceding steps 3 and 4. This will be the total list price for a specific type of duct, its fittings and adapters.

NOTE

The third and fourth steps of the above pricing procedure must be repeated for each type of duct (5 pole, 8 pole, 3 pole with insulated busbar, etc.) that will be included in the overall system.

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BUSWAYS &
POWER CENTERS
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PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

BUSWAYS

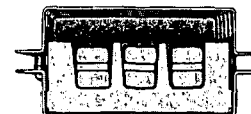


Premium-Low Impedance UNI-BUS® Duct and Fittings

WHEN ORDERING SPECIFY

- Complete layout of the system including all dimensional information and labeled parts.
- Computations from which the final list price was established.

(See page 31 for pricing procedures)



FEEDER DUCT AND FITTINGS—TYPE PF—VENTILATED OR NON-VENTILATED

System	Amps.	Duct Price per Foot		Forming Price					Complete Device Price				
		Alumi- num Bus Type PFA	Copper Bus Type PFC	Elbow	Flexible Con- nector	Tee	Cross	Expan- sion Joint	End Box	Cable Tap Box	Switch- board Adapter Box	Switch- board Stub	Trans- former Tap Fitting
2 POLE—600 VOLTS (6 INCH FACE)													
	800	\$23.	\$28.	\$102.	\$102.	\$122.	\$144.	\$102.	\$14.	\$92.	\$12.	\$110.	\$50.
	1000	28.	34.	102.	②	122.	144.	102.	14.	100.	12.	130.	60.
	1350	38.	46.	136.		170.	202.	204.	28.	178.	24.	220.	100.
	1600	46.	56.	136.		170.	202.	204.	28.	206.	24.	220.	100.
	2000	56.	68.	136.		170.	202.	204.	30.	214.	24.	260.	120.
	2500	70.	85.	136.		170.	202.	204.	42.	240.	---	330.	150.
	3000	84.	102.	170.		202.	236.	408.	45.	268.	---	390.	180.
	4000	112.	136.	170.		202.	236.	408.	60.	420.	---	520.	240.
3 POLE—600 VOLTS (6 INCH FACE)													
	800	\$31.	\$36.	\$102.	\$102.	\$122.	\$144.	\$102.	\$14.	\$92.	\$12.	\$110.	\$80.
	1000	36.	44.	102.	②	122.	144.	102.	14.	100.	12.	130.	100.
	1350	50.	60.	136.		170.	202.	204.	28.	178.	24.	220.	160.
	1600	62.	72.	136.		170.	202.	204.	28.	206.	24.	220.	160.
	2000	72.	88.	136.		170.	202.	204.	30.	214.	24.	260.	200.
	2500	90.	108.	136.		170.	202.	204.	42.	240.	---	330.	240.
	3000	108.	132.	170.		202.	236.	408.	45.	268.	---	390.	300.
	4000	144.	176.	170.		202.	236.	408.	60.	420.	---	520.	400.
4 POLE—HALF NEUTRAL—277/480 VOLTS (7 1/2 INCH FACE)													
	800	\$36.	\$43.	\$122.	\$122.	\$144.	\$168.	\$122.	\$14.	\$100.	\$14.	\$130.	\$130.
	1000	44.	52.	122.	②	144.	168.	122.	14.	116.	14.	150.	160.
	1350	59.	70.	170.		202.	236.	244.	28.	214.	28.	260.	260.
	1600	72.	89.	170.		202.	236.	244.	28.	246.	28.	260.	260.
	2000	88.	104.	170.		202.	236.	244.	30.	262.	28.	300.	320.
	2500	110.	130.	170.		202.	236.	244.	42.	284.	---	390.	390.
	3000	132.	156.	202.		236.	270.	488.	45.	312.	---	450.	480.
	4000	176.	208.	202.		236.	270.	488.	60.	448.	---	600.	640.
4 POLE—FULL NEUTRAL—277/480 VOLTS (7 1/2 INCH FACE)													
	800	\$41.	\$49.	\$122.	\$122.	\$144.	\$168.	\$122.	\$14.	\$100.	\$14.	\$130.	\$130.
	1000	49.	60.	122.	②	144.	168.	122.	14.	116.	14.	150.	160.
	1350	66.	81.	170.		202.	236.	244.	28.	214.	28.	260.	260.
	1600	82.	98.	170.		202.	236.	244.	28.	246.	28.	260.	260.
	2000	98.	120.	170.		202.	236.	244.	30.	262.	28.	300.	320.
	2500	123.	150.	170.		202.	236.	244.	42.	284.	---	390.	390.
	3000	147.	180.	202.		236.	270.	488.	45.	312.	---	450.	480.
	4000	196.	240.	202.		236.	270.	488.	60.	448.	---	600.	640.

① Duct price includes sufficient hangers for proper mounting (2 per 10 feet of duct). U.L. approved for 10 foot support spacing.

For Weatherproof construction, add 20% to footage price only.

For Feeder Duct as risers requiring a limited number of plug-in outlets per floor, add \$10 for each outlet, 3 or 4 pole.

② For flexible connectors above 800 amperes, consult factory.



BUSWAYS

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Premium—Low Impedance UNI-BUS® Duct and Fittings

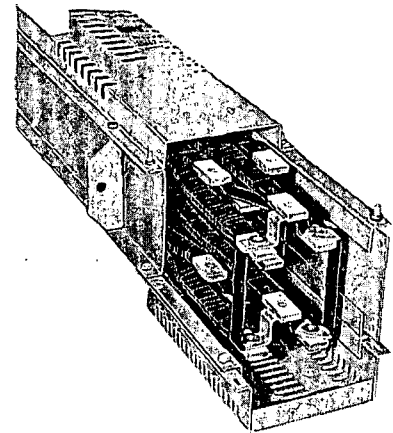
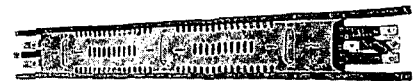
PLUG-IN DUCT AND FITTINGS—TYPE PP—VENTILATED OR NON-VENTILATED

System	Amps. Ⓐ	Ⓛ Duct Price per Foot		Forming Price					Complete Device Price				
		Alumi- num Bus Type PPA	Copper Bus Type PPC	Elbow	Flexible Con- nector	Tee	Cross	Expan- sion Joint	End Box	Cable Tap Box	Switch- board Adapter Box	Switch- board Stub	Trans- former Tap Fitting
2 POLE—600 VOLTS (6 INCH FACE)													
	400	\$16.	\$19.	\$102.	\$102.	\$122.	\$144.	\$102.	\$14.	\$72.	\$12.	\$75.	\$50.
	600	19.	22.	102.	102.	122.	144.	102.	14.	92.	12.	110.	50.
	800	24.	29.	102.	102.	122.	144.	102.	14.	92.	12.	110.	50.
	1000	29.	35.	102.	Ⓜ	122.	144.	102.	14.	100.	12.	130.	60.
3 POLE—600 VOLTS (6 INCH FACE)													
	400	\$17.	\$22.	\$102.	\$102.	\$122.	\$144.	\$102.	\$14.	\$72.	\$12.	\$75.	\$80.
	600	23.	27.	102.	102.	122.	144.	102.	14.	92.	12.	110.	80.
	800	32.	37.	102.	102.	122.	144.	102.	14.	92.	12.	110.	80.
	1000	37.	45.	102.	Ⓜ	122.	144.	102.	14.	100.	12.	130.	100.
4 POLE—HALF NEUTRAL—277/480 VOLTS (7½ INCH FACE)													
	400	\$21.	\$28.	\$122.	\$122.	\$144.	\$168.	\$122.	\$14.	\$86.	\$14.	\$95.	\$130.
	600	27.	33.	122.	122.	144.	168.	122.	14.	100.	14.	130.	130.
	800	37.	44.	122.	122.	144.	168.	122.	14.	100.	14.	130.	130.
	1000	45.	53.	122.	Ⓜ	144.	168.	122.	14.	116.	14.	150.	160.
4 POLE—FULL NEUTRAL—277/480 VOLTS (7½ INCH FACE)													
	400	\$25.	\$31.	\$122.	\$122.	\$144.	\$168.	\$122.	\$14.	\$86.	\$14.	\$95.	\$130.
	600	33.	40.	122.	122.	144.	168.	122.	14.	100.	14.	130.	130.
	800	42.	50.	122.	122.	144.	168.	122.	14.	100.	14.	130.	130.
	1000	50.	61.	122.	Ⓜ	144.	168.	122.	14.	116.	14.	150.	160.

TECHNICAL DATA

Amp Rating	④Maximum Voltage Drop per 100 Ft. Line to Line	Short Circuit Ratings RMS Amps	Enclosure Dimensions in inches		Weight Pounds per Foot		Bus Bars per Phase	
			2 and 3 Pole	4 Pole	2 and 3 Pole	4 Pole	Num- ber	Size in inches
TYPE PFA—ALUMINUM FEEDER								
400	2.2	75,000	3½x7¾	3½x9¼	7	8	2	¼x1
600	2.8	75,000	3¾x7¾	3¾x9¼	8	10	2	⅜x1
800	3.4	75,000	3¾x7¾	3¾x9¼	9	11	2	⅜x1
1000	2.8	75,000	8½x7¾	8½x9¼	11	12	4	½x1
1350	2.4	150,000	8½x7¾	8½x9¼	15	19	4	½x1
1600	3.4	150,000	9¼x7¾	9¼x9¼	16	20	4	⅝x1
2000	2.8	150,000	14¾x7¾	14¾x9¼	20	25	6	⅝x1
2500	2.6	225,000	20¼x7¾	20¼x9¼	24	30	8	¾x1
3000	3.2	225,000	20¼x7¾	20¼x9¼	24	30	8	¾x1
4000	3.4	300,000	25¾x7¾	25¾x9¼	40	50	10	¾x1
TYPE PFC—COPPER FEEDER								
400	2.8	75,000	3½x7¾	3½x9¼	9	11	2	⅜x1
600	2.8	75,000	3¾x7¾	3¾x9¼	12	14	2	¼x1
800	2.8	75,000	3¾x7¾	3¾x9¼	13	17	2	⅝x1
1000	3.0	75,000	3¾x7¾	3¾x9¼	16	21	2	½x1
1350	2.2	150,000	8½x7¾	8½x9¼	26	33	4	¾x1
1600	2.6	150,000	8½x7¾	8½x9¼	29	37	4	7/16x1
2000	3.0	150,000	8½x7¾	8½x9¼	32	41	4	½x1
2500	2.8	225,000	13½x7¾	13½x9¼	44	56	6	7/16x1
3000	3.0	225,000	13½x7¾	13½x9¼	48	67	6	½x1
4000	3.0	300,000	18½x7¾	18½x9¼	64	87	8	½x1
TYPE PPA—ALUMINUM PLUG-IN								
400	1.1	75,000	3½x7¾	3½x9¼	8	9	2	¼x1
600	1.4	75,000	3¾x7¾	3¾x9¼	9	11	2	⅜x1
800	1.7	75,000	3¾x7¾	3¾x9¼	10	12	2	⅜x1
1000	1.4	75,000	8½x7¾	8½x9¼	12	13	4	⅝x1
TYPE PPC—COPPER PLUG-IN								
400	1.4	75,000	3½x7¾	3½x9¼	10	12	2	⅜x1
600	1.4	75,000	3¾x7¾	3¾x9¼	13	15	2	¼x1
800	1.4	75,000	3¾x7¾	3¾x9¼	14	18	2	¾x1
1000	1.5	75,000	3¾x7¾	3¾x9¼	17	22	2	½x1

- ① Duct price includes sufficient hangers for proper mounting (2 per 10 feet of duct). U.L. approved for 10 foot support spacing. For dusttight construction of contact areas add 10% to footage price of plug-in duct.
- ② For flexible connectors above 800 amperes, consult factory.
- ③ Plug-in duct above 1000 amperes, consult factory.
- ④ Voltage drop values shown are for concentrated load for feeder duct and distributed load for plug-in duct at worst power factor.



ACCESSORIES

Transverse Barrier (Fire Stop) . . .	\$ 44.
Weather Seal	100.
Wall Flange	42.
Hook Stick Hardware (Pole or Stick Not Included)	8.

BUSWAYS



High Performance—Low Impedance UNI-BUS® Duct and Fittings

WHEN ORDERING SPECIFY

- Complete layout of the system including all dimensional information and labeled parts.
- Computations from which the final list price was established. (See page 31 for pricing procedures.)

FEEDER DUCT AND FITTINGS—TYPE HF—VENTILATED

System	Amps.	Duct Price ① per Foot		Forming Price					Complete Device Price				
		Alumi- num Bus Type HFA	Copper Bus Type HFC	Elbow	Flexible Con- nector	Tee	Cross	Expan- sion Joint	End Box	Cable Tap Box	Switch- board adapter Box	Switch- board Stub	Trans- former Tap Fitting
2 POLE—600 VOLTS (6 INCH FACE)													
	800	\$18.	\$23.	\$102.	\$102. ②	\$122.	\$144.	\$102.	\$14.	\$92.	\$12.	\$110.	\$50.
	1000	23.	29.	102.		122.	144.	102.	14.	100.	12.	130.	60.
	1350	34.	41.	136.		170.	202.	204.	28.	178.	24.	220.	100.
	1600	40.	50.	136.		170.	202.	204.	28.	206.	24.	220.	100.
	2000	50.	62.	136.		170.	202.	204.	30.	214.	24.	260.	120.
	2500	63.	77.	136.		170.	202.	204.	42.	240.	---	330.	150.
	3000	75.	93.	170.		202.	236.	408.	45.	268.	---	390.	180.
4000	100.	124.	170.		202.	236.	408.	60.	420.	---	520.	240.	
3 POLE—600 VOLTS (6 INCH FACE)													
	800	\$26.	\$31.	\$102.	\$102. ②	\$122.	\$144.	\$102.	\$14.	\$92.	\$12.	\$110.	\$80.
	1000	31.	39.	102.		122.	144.	102.	14.	100.	12.	130.	100.
	1350	47.	54.	136.		170.	202.	204.	28.	178.	24.	220.	160.
	1600	56.	66.	136.		170.	202.	204.	28.	206.	24.	220.	160.
	2000	66.	82.	136.		170.	202.	204.	30.	214.	24.	260.	200.
	2500	83.	102.	136.		170.	202.	204.	42.	240.	---	330.	240.
	3000	99.	123.	170.		202.	236.	408.	45.	268.	---	390.	300.
4000	132.	164.	170.		202.	236.	408.	60.	420.	---	520.	400.	
4 POLE—HALF NEUTRAL—277/480 VOLTS (7 1/2 INCH FACE)													
	800	\$31.	\$38.	\$122.	\$122. ②	\$144.	\$168.	\$122.	\$14.	\$100.	\$14.	\$130.	\$130.
	1000	39.	47.	122.		144.	168.	122.	14.	116.	14.	150.	160.
	1350	55.	66.	170.		202.	236.	244.	28.	214.	28.	260.	260.
	1600	66.	80.	170.		202.	236.	244.	28.	246.	28.	260.	260.
	2000	82.	98.	170.		202.	236.	244.	30.	262.	28.	300.	320.
	2500	102.	123.	170.		202.	236.	244.	42.	284.	---	390.	390.
	3000	123.	147.	202.		236.	270.	488.	45.	312.	---	450.	480.
4000	164.	196.	202.		236.	270.	488.	60.	448.	---	600.	640.	
4 POLE—FULL NEUTRAL—277/480 VOLTS (7 1/2 INCH FACE)													
	800	\$36.	\$44.	\$122.	\$122. ②	\$144.	\$168.	\$122.	\$14.	\$100.	\$14.	\$130.	\$130.
	1000	44.	55.	122.		144.	168.	122.	14.	116.	14.	150.	160.
	1350	62.	77.	170.		202.	236.	244.	28.	214.	28.	260.	260.
	1600	76.	92.	170.		202.	236.	244.	28.	246.	28.	260.	260.
	2000	92.	114.	170.		202.	236.	244.	30.	262.	28.	300.	320.
	2500	115.	143.	170.		202.	236.	244.	42.	284.	---	390.	390.
	3000	138.	171.	202.		236.	270.	488.	45.	312.	---	450.	480.
4000	184.	228.	202.		236.	270.	488.	60.	448.	---	600.	640.	

① Duct price includes sufficient hangers for proper mounting (2 per 10 feet of duct). U.L. approved for 10 foot support spacing.
For weatherproof construction, add 20% to footage price only.

For Feeder Duct as risers requiring a limited number of plug-in outlets per floor, add \$10 for each outlet, 3 or 4 pole.

② For flexible connectors above 800 amperes, consult factory.

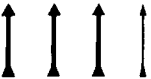
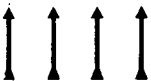


BUSWAYS

35

High Performance—Low Impedance UNI-BUS® Duct and Fittings

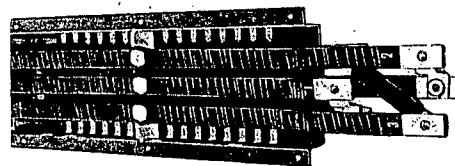
PLUG-IN DUCT AND FITTINGS—TYPE HP—VENTILATED

System	Amps. Ⓐ	Duct Price ① per Foot		Forming Price					Complete Device Price				
		Alumi- num Bus Type HPA	Copper Bus Type HPC	Elbow	Flexible Con- nector	Tee	Cross	Expan- sion Joint	End Box	Cable Tap Box	Switch- board Adapter Box	Switch- board Stub	Trans- former Tap Fitting
2 POLE—600 VOLTS (6 INCH FACE)													
	400	\$13.	\$15.	\$102.	\$102.	\$122.	\$144.	\$102.	\$14.	\$72.	\$12.	\$75.	\$50.
	600	15.	18.	102.	102.	122.	144.	102.	14.	92.	12.	110.	50.
	800	20.	24.	102.	102.	122.	144.	102.	14.	92.	12.	110.	50.
	1000	24.	29.	102.	ⓐ	122.	144.	102.	14.	100.	12.	130.	60.
3 POLE—600 VOLTS (6 INCH FACE)													
	400	14.	18.	102.	102.	122.	144.	102.	14.	72.	12.	75.	80.
	600	19.	22.	102.	102.	122.	144.	102.	14.	92.	12.	110.	80.
	800	26.	31.	102.	102.	122.	144.	102.	14.	92.	12.	110.	80.
	1000	31.	37.	102.	ⓐ	122.	144.	102.	14.	100.	12.	130.	100.
4 POLE—HALF NEUTRAL—277/480 VOLTS (7½ INCH FACE)													
	400	17.	23.	122.	122.	144.	168.	122.	14.	86.	14.	95.	130.
	600	22.	27.	122.	122.	144.	168.	122.	14.	100.	14.	130.	130.
	800	31.	37.	122.	122.	144.	168.	122.	14.	100.	14.	130.	130.
	1000	37.	44.	122.	ⓐ	144.	168.	122.	14.	116.	14.	150.	160.
4 POLE—FULL NEUTRAL—277/480 VOLTS (7½ INCH FACE)													
	400	20.	25.	122.	122.	144.	168.	122.	14.	86.	14.	95.	130.
	600	27.	33.	122.	122.	144.	168.	122.	14.	100.	14.	130.	130.
	800	35.	42.	122.	122.	144.	168.	122.	14.	100.	14.	130.	130.
	1000	42.	51.	122.	ⓐ	144.	168.	122.	14.	116.	14.	150.	160.

TECHNICAL DATA

Amp Rating	①Maximum Voltage Drop per 100 Ft. Line to Line	Short Circuit Ratings RMS Amps	Enclosure Dimensions in Inches		Weight Pounds per Foot		Bus Bars per Phase	
			2 and 3 Pole	4 Pole	2 and 3 Pole	4 Pole	Num- ber	Size in Inches
TYPE HFA—ALUMINUM FEEDER								
400	4.0	50,000	3⅝x7¾	3⅝x9¼	5	6	2	⅝x1
600	3.2	50,000	3⅝x7¾	3⅝x9¼	5.5	6.8	2	¼x1
800	3.8	50,000	3⅝x7¾	3⅝x9¼	7	9	2	⅜x1
1000	4.4	50,000	3⅝x7¾	3⅝x9¼	10	11	2	⅝x1
1350	3.8	100,000	8½x7¾	8½x9¼	12	15	4	⅝ ₁₆ x1
1600	3.8	100,000	8½x7¾	8½x9¼	13	16	4	⅜x1
2000	4.4	100,000	9¼x7¾	9¼x9¼	19	24	4	⅜x1
2500	3.6	150,000	14¾x7¾	14¾x9¼	23	29	6	⅝x1
3000	4.4	150,000	14¾x7¾	14¾x9¼	23	29	6	⅝x1
4000	4.4	200,000	20¼x7¾	20¼x9¼	38	48	8	⅝x1
TYPE HFC—COPPER FEEDER								
400	3.4	50,000	3⅝x7¾	3⅝x9¼	6.5	8.5	2	.110x1
600	4.0	50,000	3⅝x7¾	3⅝x9¼	8	10	2	⅝ ₃₂ x1
800	3.6	50,000	3⅝x7¾	3⅝x9¼	10	12	2	¼x1
1000	3.4	50,000	3⅝x7¾	3⅝x9¼	12	16	2	⅜x1
1350	4.0	100,000	8½x7¾	8½x9¼	16	20	4	⅝ ₁₆ x1
1600	3.6	100,000	8½x7¾	8½x9¼	19	23	4	¼x1
2000	3.4	100,000	8½x7¾	8½x9¼	25	32	4	⅜x1
2500	3.0	150,000	13½x7¾	13½x9¼	38	49	6	⅜x1
3000	3.4	150,000	13½x7¾	13½x9¼	38	49	6	⅜x1
4000	3.4	200,000	18½x7¾	18½x9¼	50	64	8	⅜x1
TYPE HPA—ALUMINUM PLUG-IN								
400	2.0	50,000	3⅝x7¾	3⅝x9¼	6	7	2	⅝ ₃₂ x1
600	1.6	50,000	3⅝x7¾	3⅝x9¼	6.5	7.8	2	¼x1
800	1.9	50,000	3⅝x7¾	3⅝x9¼	8	10	2	⅜x1
1000	2.2	50,000	3⅝x7¾	3⅝x9¼	9	12	2	⅝x1
TYPE HPC—COPPER PLUG-IN								
400	1.7	50,000	3⅝x7¾	3⅝x9¼	7.5	9.5	2	.110x1
600	2.0	50,000	3⅝x7¾	3⅝x9¼	9	11	2	⅝ ₃₂ x1
800	1.8	50,000	3⅝x7¾	3⅝x9¼	12	14	2	¼x1
1000	1.7	50,000	3⅝x7¾	3⅝x9¼	13	17	2	⅝x1

- ① Plug-in Duct above 600 amperes, as application.
 ② Duct price includes sufficient hangers for proper mounting (2 per 10 feet of duct). U.L. approved for 10 foot support spacing.
 ③ Voltage drop values are for distributed load at worst power factor.



ACCESSORIES

Transverse Barrier	\$ 44.
Weather Seal	100.
Wall Flange	42.
Hook Stick Hardware (Pole or Stick Not Included)	8.

BUSWAYS

Economy UNI-BUS® Duct and Fittings



WHEN ORDERING SPECIFY

- Complete layout of system including all dimensional information and labeled parts.
- Computations from which the final list price was established. (See page 31 for pricing procedure.)



PLUG-IN DUCT AND FITTINGS — TYPE E — VENTILATED AND NON-VENTILATED

System	Amps. ①	② Duct Price per Foot				Forming Price					Complete Device Price					
		Ventilated		Non-Ventilated												
		Alumi- num Bus Type EA-V	Copper Bus Type EC-V	Alumi- num Bus Type EA-E	Copper Bus Type EC-E	Elbow	Flexible Con- nector	Tee	Cross	Expansion Joint	End Box	Cable Tap Box	Switch- board Adapter Box	Switch- board Stub	Trans- former Tap Fitting	
2 POLE—600 VOLTS (6 INCH FACE)																
↑ ↑	225	\$8.	\$9.	\$9.	\$10.	\$102.	\$102.	\$122.	\$144.	\$102.	\$14.	\$72.	\$12.	\$75.	\$50.	
	400	11.	14.	13.	16.	102.	102.	122.	144.	102.	14.	72.	12.	75.	50.	
	600	14.	16.	16.	19.	102.	102.	122.	144.	102.	14.	92.	12.	100.	50.	
3 POLE—600 VOLTS (6 INCH FACE)																
↑ ↑ ↑	225	\$9.	\$10.	\$10.	\$11.	\$102.	\$102.	\$122.	\$144.	\$102.	\$14.	\$72.	\$12.	\$75.	\$80.	
	400	12.	16.	14.	19.	102.	102.	122.	144.	102.	14.	72.	12.	75.	80.	
	600	17.	20.	20.	24.	102.	102.	122.	144.	102.	14.	92.	12.	100.	80.	
4 POLE—HALF NEUTRAL—277/480 VOLTS (7 1/2 INCH FACE)																
↑ ↑ ↑ ↑	225	\$10.	\$12.	\$12.	\$14.	\$122.	\$122.	\$144.	\$168.	\$122.	\$14.	\$86.	\$14.	\$95.	\$130.	
	400	15.	21.	18.	25.	122.	122.	144.	168.	122.	14.	86.	14.	95.	130.	
	600	20.	26.	24.	30.	122.	122.	144.	168.	122.	14.	100.	14.	130.	130.	
4 POLE—FULL NEUTRAL—277/480 VOLTS (7 1/2 INCH FACE)																
↑ ↑ ↑ ↑	225	\$11.	\$14.	\$13.	\$16.	\$122.	\$122.	\$144.	\$168.	\$122.	\$14.	\$86.	\$14.	\$95.	\$130.	
	400	19.	24.	22.	28.	122.	122.	144.	168.	122.	14.	86.	14.	95.	130.	
	600	26.	31.	30.	37.	122.	122.	144.	168.	122.	14.	100.	14.	130.	130.	

TECHNICAL DATA

Amp Rating	③Maximum Voltage Drop per 100 Ft. Line to Line	Short Circuit Ratings RMS Amps	Enclosure Dimensions in Inches		Weight Pounds per Foot		Bus Bars per Phase	
			2 and 3 Pole	4 Pole	2 and 3 Pole	4 Pole	Num-ber	Size in Inches
TYPE EA-V — VENTILATED ALUMINUM								
225	2.5	25,000	2⅞x7¾	2⅞x9¾	5	6	1	⅝x1
400	2.8	25,000	2⅞x7¾	2⅞x9¾	5.5	6.6	1	⅝x1
600	3.0	25,000	2⅞x7¾	2⅞x9¾	6	7	1	½x1
TYPE EC-V — VENTILATED COPPER								
225	2.2	25,000	2⅞x7¾	2⅞x9¾	6	8	1	.110x1
400	2.5	25,000	2⅞x7¾	2⅞x9¾	7	9	1	⅜x1
600	2.7	25,000	2⅞x7¾	2⅞x9¾	9	11	1	⅝x1
TYPE EA-E — NON-VENTILATED ALUMINUM								
225	2.5	25,000	2⅞x7¾	2⅞x9¾	6	7	1	⅝ ₃₂ x1
400	2.0	25,000	2⅞x7¾	2⅞x9¾	7	8	1	½x1
600	2.0	25,000	3⅜x7¾	3⅜x9¾	9	11	2	⅝x1
TYPE EC-E — NON-VENTILATED COPPER								
225	2.2	25,000	2⅞x7¾	2⅞x9¾	7	9	1	.110x1
400	1.8	25,000	2⅞x7¾	2⅞x9¾	10	12	1	⅝x1
600	2.0	25,000	2⅞x7¾	2⅞x9¾	12	14	1	½x1

① Plug-in Duct above 600 amperes, on application.

② Duct price includes sufficient hangers for proper mounting (2 per 10 feet of duct). U.L. approved for 10 foot support spacing.

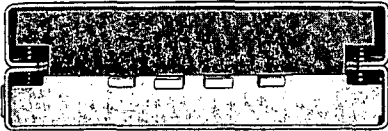
③ Voltage drop values are for distributed load at worst power factor.

ACCESSORIES

Transverse Barrier (Fire Stop) . \$ 44.
 Weather Seal 100.
 Wall Flange 42.
 Hook Stick Hardware (Pole or Stick Not Included) 8.

**BUSWAYS****Slimway UNI-BUS® Duct and Fittings****WHEN ORDERING SPECIFY**

- Complete layout of system including all dimensional information and labeled parts.
- Computations from which the final list price was established. (See page 31 for pricing procedure.)

**PLUG-IN DUCT AND FITTINGS—NON-VENTILATED ALUMINUM BUS—TYPE S**

Amps. ②	① Duct Price for Straight Lengths		Complete Device Price							
	10 Ft. Section	5 Ft. Section	Elbow	Tee	Flexible Connector	End Box	Switch-board Stub	Cable Tap Boxes		
								Source or Load Type	Center Type	Plug-in Type ③
3 POLE—600 VOLTS WITH BARE BUS BARS										
100	\$30.	\$20.	\$20.	\$30.	\$50.	\$4.	\$30.	\$24.	\$20.	\$20.
4 POLE—277/480 VOLTS WITH BARE BUS BARS										
100	\$40.	\$26.	\$20.	\$30.	\$60.	\$4.	\$30.	\$31.	\$27.	\$27.
3 POLE—600 VOLTS WITH INSULATED BUS BARS										
100 225	\$45. 66.	\$28. 44.	\$20. 50.	\$30. 75.	\$50. 100.	\$4. 4.	\$30. 50.	\$24. 44.	\$20. 40.	\$20. 72.
4 POLE—277/480 VOLTS WITH INSULATED BUS BARS										
100 225	\$60. 100.	\$36. 66.	\$20. 50.	\$30. 75.	\$60. 120.	\$4. 4.	\$30. 50.	\$31. 58.	\$27. 54.	\$27. 86.

TECHNICAL DATA

Amp. Rating	Maximum Voltage Drop per 100 Ft. Distributed Load	Short Circuit Ratings RMS Amps.	Enclosure Dimensions in inches	Weight Pounds per Foot		Bus Bar Size in inches
				3 Pole	4 Pole	
100 225	3.0 3.0	15,000 25,000	2 x 6 2 x 7½	4 5	5 6	½/32 x ¾ ¾/32 x ¾

① Duct price includes sufficient hangers for proper mounting (2 per 10 feet of duct). U.L. approved for 10 foot support spacing.

② 100 Amp. systems have 6 inch face, 225 Amp. systems have 7½ inch face.

③ Plugs into any plug-in outlet.

DISCOUNT SCHEDULE 17 CD-1

CUTLER-HAMMER

BUSWAYS



Laboratory and Balanced Voltage UNI-BUS® Duct and Fittings

WHEN ORDERING SPECIFY

- Complete layout of system including all dimensional information and labeled parts.
- Computations from which the final price was established. (See page 31 for pricing procedure.)



Type L



Type B

LABORATORY PLUG-IN DUCT AND FITTINGS—NON-VENTILATED—TYPE L

Amps.	① Duct Price for Straight Lengths				Complete Device Price					
	10 Ft. Section	8 Ft. Section	6 Ft. Section	5 Ft. Section	Elbow	Tee	End Box	Junction Boxes		
								Source or Load Type	Center Type	Plug-in Type ③
5 POLE — 480 VOLTS — ALUMINUM BUS — TYPE LA										
100 ②	\$50.	\$45.	\$40.	\$35.	\$40.	\$60.	\$4.	\$40.	\$40.	\$50.
225	85.	78.	68.	60.	100.	150.	4.	75.	80.	180.
6 POLE — 480 VOLTS — ALUMINUM BUS — TYPE LA										
100	\$60.	\$55.	\$45.	\$40.	\$50.	\$75.	\$4.	\$50.	\$50.	\$60.
7 POLE — 480 VOLTS — ALUMINUM BUS — TYPE LA										
100	\$70.	\$65.	\$55.	\$50.	\$60.	\$90.	\$4.	\$60.	\$60.	\$70.
④ 8 TO 13 POLE — 480 VOLTS — TYPE L										
Amps.	Price for 10 feet of enclosure only (Use largest rated bus bar for assorted ratings.)		Addition per 10 feet of bus bar (8 bars minimum)		Fitting Forming Price				Complete Fitting	
					Elbow	Tee	Cross	Switch-board Stub	End Box	Cable Tap Box
	Plug-In	Feeder	Aluminum Bus	Copper Bus						
100	\$ 80.	---	---	\$12.50	\$110.	\$135.	\$180.	\$130.	\$4.	\$160.
225	100.	\$60.	\$15.	18.	120.	160.	195.	140.	4.	200.
400	120.	80.	---	28.	150.	180.	220.	160.	4.	220.

NOTES: Conductors may be connected in parallel for ratings up to 1000 amperes.
Enclosure dimensions: 100 or 225 amperes, copper bus — 2" x 7½".
225 or 400 amperes, aluminum bus — 3" x 7½".

BALANCED VOLTAGE—HIGH FREQUENCY PLUG-IN DUCT AND FITTINGS—NON-VENTILATED—TYPE B

Amps.	① Duct Price per Foot		Forming Price				Complete Device Price		
	Aluminum Bus Type BA	Copper Bus Type BC	Elbow	Tee	Cross	Flexible Connector	End Box	Switch-board Stub	Cable Tap Box
4 POLE—FULL NEUTRAL—277/480 VOLTS (7½ INCH FACE)									
400	\$24.	\$30.	\$122.	\$144.	\$168.	\$122.	\$14.	\$95.	\$110.
800	48.	60.	170.	202.	236.	170.	28.	130.	140.

Technical Data—On Application

- ① Duct price includes sufficient hangers for proper mounting (2 per 10 feet of duct).
- ② 100 Amp. 5 pole system has 6 inch face, all others have 7½ inch face.
- ③ Plugs into any plug-in outlet.
- ④ Maximum number of bus bars is 13 for plug-in and 14 for feeder duct.

DISCOUNT SCHEDULE 23 CD

CUTLER-HAMMER



BUSWAYS

UNI-BUS® Adapters

WHEN ORDERING SPECIFY

- Catalog number
- Type and rating of source and load ends of duct.

DESCRIPTION

UNI-BUS adapters are used to join two sections of different ratings together to comply with the National Electrical Code, Article 364. The adapter supplants 5 feet of duct of the run being serviced and this length of duct is included in the adapter price. Adapters are available for all types of duct except Slimway, Laboratory or Balanced Voltage. Refer these to the factory.



Type L Duct



Type B Duct



Adapter

Amps.	2 Pole				3 Pole				4 Pole			
	240 Volts A-c 250 Volts D-c		600 Volts A-c		240 Volts A-c		600 Volts A-c		120/208 Volts A-c		277/480 Volts A-c	
	Catalog Number	Price	Catalog Number	Price	Catalog Number	Price	Catalog Number	Price	Catalog Number	Price	Catalog Number	Price

FUSIBLE SWITCH TYPE

200	A224	\$539.	A264	\$573.	A324	\$566.	A364	\$600.	A324N	\$615.	A364N	\$649.
400	A225	625.	A265	697.	A325	690.	A365	750.	A325N	772.	A365N	838.
600	A226	712.	A266	785.	A326	813.	A366	887.	A326N	900.	A366N	987.
800	A227	943.	A267	1017.	A327	1111.	A367	1169.	A327N	1226.	A367N	1292.

CIRCUIT BREAKER TYPE

225	---	---	AJA222	\$689.	---	---	AJA322	\$760.	---	---	AJA322N	\$798.
400	---	---	ALA240	943.	---	---	ALA340	1025.	---	---	ALA340N	1178.
600	---	---	AMA260	1126.	---	---	AMA360	1355.	---	---	AMA360N	1417.
800	---	---	AMA280	1380.	---	---	AMA380	1560.	---	---	AMA380N	1610.

LARGE AIR CIRCUIT BREAKERS

Amperes	Interrupting Rating in Amperes	3 Pole		4 Pole	
		600 Volts A-c 250 Volts D-c		277/480 Volts A-c 250 Volts D-c	
		Catalog Number	Price	Catalog Number	Price
400 to 600	25,000	AC360	\$2672.	AC360N	\$2702.
800	50,000	AC380	4263.	AC380N	4293.
1600	50,000	AC3160	4490.	AC3160N	4520.
2000	75,000	AC3200	10135.	AC3200N	10234.

DISCOUNT SCHEDULE 23 CD

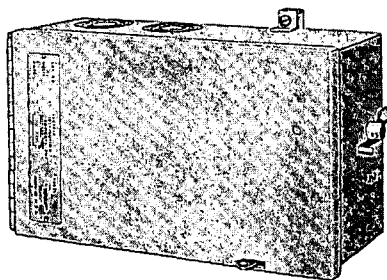
CUTLER-HAMMER



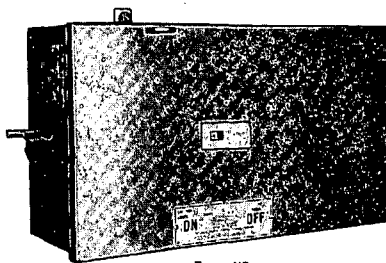
SAF-KEY Fusible Plug-in Devices for Use with UNI-BUS® Plug-in Duct

WHEN ORDERING SPECIFY

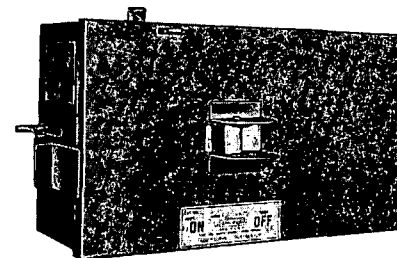
- Catalog number



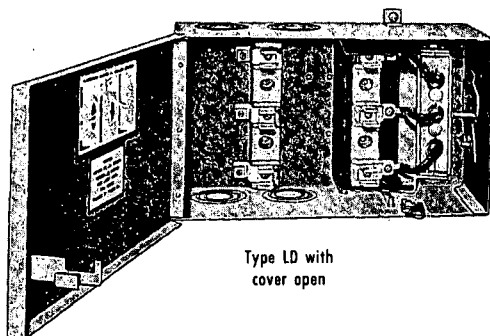
Type LD



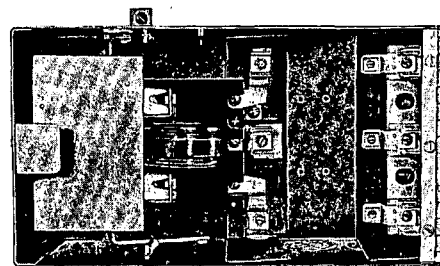
Type ND



Type HD



Type LD with
cover open



Type ND or HD
with cover open

PLUGS FOR USE WITH 2 AND 3 POLE DUCT SYSTEMS (6 inch Face) Premium, High Performance, Economy and Slimway Type Ducts.

Amps.	2 Pole, 240 Volts A-c				2 Pole, 480 Volts A-c				3 Pole, 240 Volts A-c				3 Pole, 480 Volts A-c			
	Max. Hp. Ratings		Catalog Number	Price	Max. Hp. Ratings		Catalog Number	Price	Max. Hp. Ratings		Catalog Number	Price	Max. Hp. Ratings		Catalog Number	Price
	Std. Fuses	Dual Element Fuses			Std. Fuses	Dual Element Fuses			Std. Fuses	Dual Element Fuses			Std. Fuses	Dual Element Fuses		
HANDLE OPERATED—NORMAL DUTY—QUICK MAKE—QUICK BREAK CONTACTS																
30	1½	3	ND221	\$37.	3	7½	ND261	\$39.	3	7½	ND321	\$39.	7½	15	ND361	\$41.
60	3	10	ND222	39.	5	20	ND262	41.	7½	15	ND322	43.	15	30	ND362	45.
100	7½	15	ND223	52.	10	30	ND263	54.	15	30	ND323	56.	25	50	ND363	63.
HANDLE OPERATED AND HOOK STICK OPERABLE—HEAVY DUTY—QUICK MAKE—QUICK BREAK CONTACTS																
30	1½	3	HD221	\$45.	3	7½	HD261	\$47.	3	7½	HD321	\$49.	7½	15	HD361	\$50.
60	3	10	HD222	50.	5	20	HD262	54.	7½	15	HD322	57.	15	50	HD362	60.
100	7½	15	HD223	76.	10	30	HD263	80.	15	30	HD323	84.	30	50	HD363	87.
200	15	---	HD224	140.	30	50	HD264	150.	25	50	HD324	148.	50	---	HD364	156.
HANDLE OPERATED AND HOOK STICK OPERABLE—HEAVY DUTY—BOLT-ON TYPE MUST BE BOLTED ON AT JOINT SECTION—QUICK MAKE—QUICK BREAK CONTACTS																
400	---	---	---	---	---	---	---	---	---	---	HD325	\$368.	---	---	HD365	\$368.
600	---	---	---	---	---	---	---	---	---	---	HD326	502.	---	---	HD366	502.
FOR NON-OPERATING DISCONNECT PURPOSES																
30	---	---	① LD221	\$15.	---	---	LD261	\$29.	---	---	① LD321	\$16.	---	---	LD361	\$29.
② 30	---	---	LDR221	26.	---	---	---	---	---	---	LDR321	26.	---	---	---	---
60	---	---	LD222	26.	---	---	LD262	30.	---	---	LD322	26.	---	---	LD362	30.
100	---	---	LD223	46.	---	---	LD263	48.	---	---	LD323	50.	---	---	LD363	54.
200	---	---	LD224	100.	---	---	LD264	114.	---	---	LD324	110.	---	---	LD364	122.
400	---	---	LD225	260.	---	---	LD265	270.	---	---	LD325	275.	---	---	LD365	288.

① 30 ampere LD plugs must be connected by flexible cable only since to replace fuses on these plugs they must be removed from the duct.

② 60 ampere plugs (cover removable) with 30 ampere fuse clips permitting the use of rigid conduit.

DISCOUNT SCHEDULE 17 CD-1

CUTLER-HAMMER



BUSWAYS

41

SAF-KEY Fusible Plug-in Devices for Use with UNI-BUS® Plug-in Duct

PLUGS FOR USE WITH 4-POLE DUCT SYSTEMS (7½ Inch Face)

Premium, High Performance, Economy, Slimway and Balanced Voltage Types.

Amps.	3 Pole, 240 Volts A-c				3 Pole, 480 Volts A-c				3 Phase, 4 Wire 120/208 Volts A-c				3 Phase, 4 Wire 277/480 Volts A-c			
	Max. Hp. Ratings		Catalog Number	Price	Max. Hp. Ratings		Catalog Number	Price	Max. Hp. Ratings		Catalog Number	Price	Max. Hp. Ratings		Catalog Number	Price
	Std. Fuses	Dual Element Fuses			Std. Fuses	Dual Element Fuses			Std. Fuses	Dual Element Fuses			Std. Fuses	Dual Element Fuses		
HANDLE OPERATED—NORMAL DUTY—QUICK MAKE—QUICK BREAK CONTACTS																
30	3	7½	ND1321	\$39.	7½	15	ND1361	\$41.	3	7½	ND1321N	\$50.	7½	15	ND1361N	\$52.
60	7½	15	ND1322	43.	15	30	ND1362	45.	7½	15	ND1322N	52.	15	30	ND1362N	54.
100	15	30	ND1323	56.	25	50	ND1363	63.	15	30	ND1323N	67.	25	50	ND1363N	71.
HANDLE OPERATED AND HOOK STICK OPERABLE—HEAVY DUTY QUICK MAKE—QUICK BREAK CONTACTS																
30	3	7½	HD1321	\$49.	7½	15	HD1361	\$50.	3	7½	HD1321N	\$59.	7½	15	HD1361N	\$60.
60	7½	15	HD1322	57.	15	30	HD1362	60.	7½	15	HD1322N	66.	15	30	HD1362N	68.
100	15	30	HD1323	84.	25	50	HD1363	87.	15	30	HD1323N	92.	30	50	HD1363N	97.
200	25	50	HD1324	164.	50	---	HD1364	173.	25	50	HD1324N	184.	50	---	HD1364N	192.
HANDLE OPERATED AND HOOK STICK OPERABLE—BOLT-ON TYPE MUST BE BOLTED ON AT JOINT SECTION—QUICK MAKE—QUICK BREAK CONTACTS																
400	---	---	HD1325	\$368.	---	---	HD1365	\$368.	---	---	HD1325N	\$398.	---	---	HD1365N	\$398.
600	---	---	HD1326	502.	---	---	HD1366	502.	---	---	HD1326N	532.	---	---	HD1366N	532.
FOR NON-OPERATING DISCONNECT PURPOSES																
30	---	---	① LD1321	\$16.	---	---	① LD1361	\$29.	---	---	① LD1321N	\$18.	---	---	① LD1361N	\$31.
② 30	---	---	LDR1321	26.	---	---	---	---	---	---	LDR1321N	28.	---	---	---	---
60	---	---	LD1322	26.	---	---	LD1362	30.	---	---	LD1322N	28.	---	---	LD1362N	32.
100	---	---	LD1323	50.	---	---	LD1363	54.	---	---	LD1323N	58.	---	---	LD1363N	62.
200	---	---	LD1324	110.	---	---	LD1364	122.	---	---	LD1324N	128.	---	---	LD1364N	140.
400	---	---	LD1325	275.	---	---	LD1365	288.	---	---	LD1325N	295.	---	---	LD1365N	318.
③ SPECIAL NON-OPERATING DISCONNECTS. FOR USE WITH 100 AMPERE SLIMWAY ONLY																
30	---	---	---	---	---	---	---	---	---	---	① LD321N	\$18.	---	---	① LD361N	\$31.
② 30	---	---	---	---	---	---	---	---	---	---	LDR321N	28.	---	---	---	---
60	---	---	---	---	---	---	---	---	---	---	LD322N	28.	---	---	LD362N	32.
100	---	---	---	---	---	---	---	---	---	---	LD323N	58.	---	---	LD363N	62.

APPROXIMATE WEIGHTS AND DIMENSIONS

Type	Ampere Rating	Voltage	For 2 or 3 Pole Duct (6 Inch Face)						For 3 or 4 Pole Duct (7½ Inch Face)					
			Dimensions in Inches			Weight in Pounds			Dimensions in Inches			Weight in Pounds		
			Wide	High	Deep	2 Pole	3 Pole		Wide	High	Deep	3 Pole	4 Pole	
ND	30 or 60	240 or 480	13½	7½	5	13	14		13½	9	5	17	18	
ND	100	240	13½	7½	5	14	15		13½	9	5	18	19	
ND	100	480	17½	7½	5	17	18		17½	9	5	21	22	
HD	30, 60 or 100	240 or 480	17½	7½	5	17	18		17½	9	5	21	22	
HD	200	240 or 480	25½	10	5½	59	62		25½	11½	5½	64	65	
HD	400 or 600	240 or 480	On application											
LD	30 or 60	240 or 480	13½	7½	5	11	12		13½	7½	5	12	13	
LD	100	240 or 480	13½	7½	5	12	13		13½	7½	5	13	14	
LD	200	240 or 480	25½	10	5½	37	38		25½	11½	5½	40	43	
LD	400	240 or 480	On application											

- ① 30 ampere LD plugs must be connected by flexible conduit cable only since to replace fuses on these plugs they must be removed from the duct.
 ② 60 ampere plugs (cover removable) with 30 ampere fuse clips permitting the use of rigid conduit.
 ③ 4 pole 100 ampere Slimway Duct system has 6 inch face.

DISCOUNT SCHEDULE 17 CD-1

CUTLER-HAMMER

41

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNI-BUS®

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

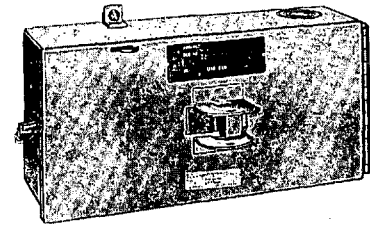
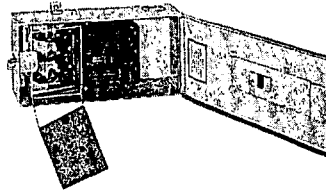
BUSWAYS



SAF-KEY Circuit Breaker Plug-in Devices For Use with UNI-BUS® Plug-in Duct

WHEN ORDERING SPECIFY

- Catalog number



HANDLE OPERATED AND HOOK STICK OPERABLE WITH INTERLOCKED HINGED COVER TO PREVENT OPENING COVER WITH BREAKER IN "ON" POSITION

Amps.	"Plugs" for Use with 2 and 3 Pole Duct Systems (6 Inch Face) Premium, High Performance, Economy and Slimway Types				"Plugs" for Use with 4 Pole 100 Amp Slimway Duct Only (6 Inch Face)		"Plugs" for Use with 4 Pole Duct Systems (7½ Inch Face) Premium, High Performance, Economy, Slimway and Balanced Voltage Types			
	2 Pole 120/240 Volts A-c		3 Pole 240 Volts A-c		3 Phase, 4 Wire 120/208 Volts A-c		3 Pole 240 Volts A-c		3 Phase, 4 Wire 120/240 Volts A-c	
	Catalog Number	Price	Catalog Number	Price	Catalog Number	Price	Catalog Number	Price	Catalog Number	Price
TYPE HE WITH E FRAME BREAKER										
15	HE21	\$65.	HE31	\$80.	HE31N	\$91.	HE131	\$80.	HE131N	\$91.
20	HE22	65.	HE32	80.	HE32N	91.	HE132	80.	HE132N	91.
30	HE23	65.	HE33	80.	HE33N	91.	HE133	80.	HE133N	91.
40	HE24	65.	HE34	80.	HE34N	91.	HE134	80.	HE134N	91.
50	HE25	65.	HE35	80.	HE35N	91.	HE135	80.	HE135N	91.
70	HE27	93.	HE37	108.	HE37N	117.	HE137	108.	HE137N	117.
100	HE210	93.	HE310	108.	HE310N	117.	HE1310	108.	HE1310N	117.
TYPE HEH WITH EH FRAME BREAKER										
15	2 Pole 480 Volts A-c		3 Pole 480 Volts A-c		3 Phase, 4 Wire 277/480 Volts A-c		3 Pole 480 Volts A-c		3 Phase, 4 Wire 277/480 Volts A-c	
	HEH21	\$93.	HEH31	107.	HEH31N	\$120.	HEH131	\$107.	HEH131N	\$120.
20	HEH22	93.	HEH32	107.	HEH32N	120.	HEH132	107.	HEH132N	120.
30	HEH23	93.	HEH33	107.	HEH33N	120.	HEH133	107.	HEH133N	120.
40	HEH24	93.	HEH34	107.	HEH34N	120.	HEH134	107.	HEH134N	120.
50	HEH25	93.	HEH35	107.	HEH35N	120.	HEH135	107.	HEH135N	120.
70	HEH70	108.	HEH37	124.	HEH37N	133.	HEH137	124.	HEH137N	133.
100	HEH100	108.	HEH310	124.	HEH310N	133.	HEH1310	124.	HEH1310N	133.
TYPE HF WITH F FRAME BREAKER										
15	2 Pole 600 Volts A-c		3 Pole 600 Volts A-c				3 Pole 600 Volts A-c		3 Phase, 4 Wire 277/480 Volts A-c	
	HF21	\$102.	HF31	\$119.	---	---	HF131	\$119.	HF131N	\$132.
20	HF22	102.	HF32	119.	---	---	HF132	119.	HF132N	132.
30	HF23	102.	HF33	119.	---	---	HF133	119.	HF133N	132.
40	HF24	102.	HF34	119.	---	---	HF134	119.	HF134N	132.
50	HF25	102.	HF35	119.	---	---	HF135	119.	HF135N	132.
70	HF27	119.	HF37	138.	---	---	HF137	138.	HF137N	147.
100	HF210	119.	HF310	138.	---	---	HF1310	138.	HF1310N	147.
TYPE HJA WITH JA FRAME BREAKER										
70	HJA27	\$264.	HJA37	\$311.	---	---	HJA137	\$311.	HJA137N	\$326.
100	HJA210	264.	HJA310	311.	---	---	HJA1310	311.	HJA1310N	326.
125	HJA212	264.	HJA312	311.	---	---	HJA1312	311.	HJA1312N	326.
150	HJA215	264.	HJA315	311.	---	---	HJA1315	311.	HJA1315N	326.
175	HJA217	264.	HJA317	311.	---	---	HJA1317	311.	HJA1317N	326.
200	HJA220	264.	HJA320	311.	---	---	HJA1320	311.	HJA1320N	326.
225	HJA222	264.	HJA322	311.	---	---	HJA1322	311.	HJA1322N	326.
TYPE HLA WITH LA FRAME BREAKER										
250	HLA225	\$581.	HLA325	\$667.	---	---	HLA1325	\$667.	HLA1325N	\$697.
300	HLA230	581.	HLA330	667.	---	---	HLA1330	667.	HLA1330N	697.
350	HLA235	581.	HLA335	667.	---	---	HLA1335	667.	HLA1335N	697.
400	HLA240	581.	HLA340	667.	---	---	HLA1340	667.	HLA1340N	697.
① TYPE HMA WITH MA FRAME BREAKER										
500	HMA250	\$766.	HMA350	\$916.	---	---	HMA1350	\$916.	HMA1350N	\$946.
600	HMA260	766.	HMA360	916.	---	---	HMA1360	916.	HMA1360N	946.
700	HMA270	866.	HMA370	1006.	---	---	HMA1370	1006.	HMA1370N	1105.
800	HMA280	866.	HMA380	1006.	---	---	HMA1380	1006.	HMA1380N	1105.

① Must be bolted on at joint section.

DISCOUNT SCHEDULE 17 CD-1

CUTLER-HAMMER

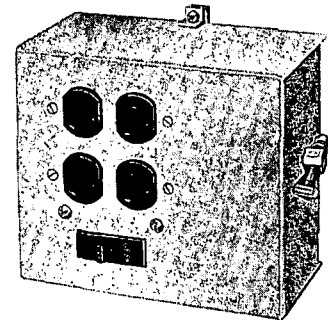
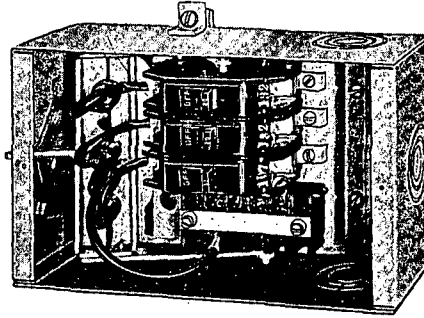
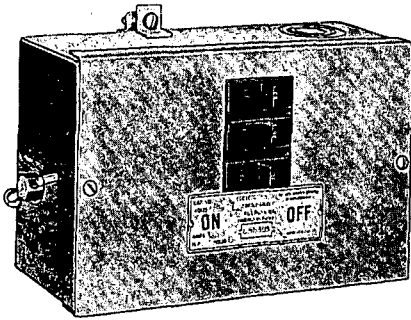


BUSWAYS

43

SAF-KEY Circuit Breaker Plug-in Devices For Use with UNI-BUS®

Plug-in Duct



CIRCUIT BREAKER HANDLE OPERATES THROUGH COVER

Amps.	"Plugs" for Use with 2 and 3 Pole Duct Systems (6 Inch Face) Premium, High Performance, Economy and Slimway Types						"Plugs" for Use with 4 Pole 100 Amp Slimway Duct Only		"Plugs" for Use with 4 Pole Duct Systems (7½ Inch Face) Premium, High Performance, Economy, Slimway and Balanced Voltage Types			
	1 Pole		2 Pole		3 Pole		3 Phase, 4 Wire		3 Pole		3 Phase, 4 Wire	
	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price

① TYPE Q WITH Q FRAME BREAKER

	120/240 Volts A-c		120/240 Volts A-c		240 Volts A-c		120/208 Volts A-c		240 Volts A-c		120/208 Volts A-c	
15	Q11	\$14.10	Q21	\$17.90	Q31	\$31.	Q31N	\$33.	Q131	\$31.	Q131N	\$33.
20	Q12	14.10	Q22	17.90	Q32	31.	Q32N	33.	Q132	31.	Q132N	33.
30	Q13	14.10	Q23	17.90	Q33	31.	Q33N	33.	Q133	31.	Q133N	33.
40	Q14	14.10	Q24	17.90	Q34	31.	Q34N	33.	Q134	31.	Q134N	33.
50	Q15	14.10	Q25	17.90	Q35	31.	Q35N	33.	Q135	31.	Q135N	33.

① TYPE E WITH E FRAME BREAKER

	120/240 Volts A-c		120/240 Volts A-c		240 Volts A-c		120/208 Volts A-c		240 Volts A-c		120/208 Volts A-c	
15	E11	\$41.	E21	\$58.	E31	\$71.	E31N	\$78.	E131	\$71.	E131N	\$78.
20	E12	41.	E22	58.	E32	71.	E32N	78.	E132	71.	E132N	78.
30	E13	41.	E23	58.	E33	71.	E33N	78.	E133	71.	E133N	78.
40	E14	41.	E24	58.	E34	71.	E34N	78.	E134	71.	E134N	78.
50	E15	41.	E25	58.	E35	71.	E35N	78.	E135	71.	E135N	78.
70	E17	53.	E27	76.	E37	90.	E37N	97.	E137	90.	E137N	97.
100	E110	53.	E210	76.	E310	90.	E310N	97.	E1310	90.	E1310N	97.

① TYPE EH WITH EH FRAME BREAKER

	277/480 Volts A-c		277/480 Volts A-c		480 Volts A-c		277/480 Volts A-c		480 Volts A-c		277/480 Volts A-c	
15	EH11	\$44.	EH21	\$81.	EH31	\$95.	EH31N	\$102.	EH131	\$95.	EH131N	\$102.
20	EH12	44.	EH22	81.	EH32	95.	EH32N	102.	EH132	95.	EH132N	102.
30	EH13	44.	EH23	81.	EH33	95.	EH33N	102.	EH133	95.	EH133N	102.
40	EH14	44.	EH24	81.	EH34	95.	EH34N	102.	EH134	95.	EH134N	102.
50	EH15	44.	EH25	81.	EH35	95.	EH35N	102.	EH135	95.	EH135N	102.
70	EH17	56.	EH27	95.	EH37	109.	EH37N	116.	EH137	109.	EH137N	116.
100	EH110	56.	EH210	95.	EH310	109.	EH310N	116.	EH1310	109.	EH1310N	116.

APPROXIMATE DIMENSIONS AND WEIGHTS

Type	Ampere Rating	Voltage	For 2 or 3 Pole Duct (6 Inch Face)						For 3 or 4 Pole Duct (7½ Inch Face)					
			Dimensions in Inches			Weight in Pounds			Dimensions in Inches			Weight in Pounds		
			Wide	High	Deep	2 Pole	3 Pole		Wide	High	Deep	3 Pole	4 Pole	
HE	15 to 100	240	13½	7½	5	14	15		13½	7½	5	15	16	
HEH	15 to 100	480	13½	7½	5	15	16		13½	7½	5	16	17	
HF	15 to 100	600	17½	7½	5	23	25		17½	7½	5	25	27	
HJA	70 to 225	600	23½	7½	5	38	40		23½	9	5	40	42	
HLA	250 to 400	600						On application						
HMA	500 to 800	600						On application						
Q	15 to 50	240	10	6¼	3½	6	7		10	7½	3½	8	9	
E or EH	15 to 100	240 or 480	13½	6¼	3½	13	14		13½	6¼	3½	14	15	

① For space and bracket mount for two duplex receptacles, add \$8. to the price of Q type breaker "plugs", and add \$12. to the price of E and EH type breaker "plugs". Receptacles are not included.

DISCOUNT SCHEDULE 17 CD-1

CUTLER-HAMMER

43

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNI-BUS®

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

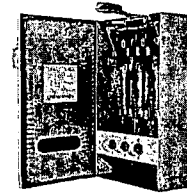
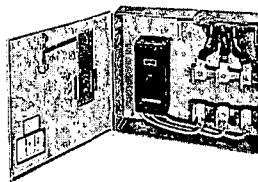
BUSWAYS



SAF-KEY Circuit Breaker Plug-in Devices For Use with UNI-BUS® Plug-in Duct

WHEN ORDERING SPECIFY

- Catalog number



COMBINATION (CIRCUIT BREAKER AND FUSE) CURRENT LIMITING "PLUGS"

handle operated and hook stick operable.

Circuit Breaker Amperes	Current Limiting Fuse Amperes	"Plugs" for Use with 2 and 3 Pole Duct Systems (6 Inch Face) Premium, High Performance, Economy and Slimway Types				"Plugs" for Use with 4 Pole Duct Systems (7½ Inch Face) Premium, High Performance, Economy, Slimway and Balanced Voltage Types					
		2 Pole		3 Pole		3 Pole		3 Phase, 4 Wire			
		Catalog Number	Price	Catalog Number	Price	Catalog Number	Price	Catalog Number	Price		
TYPE TE WITH E FRAME BREAKER											
15 20 30 40 50 70 100	70 70 100 100 100 200 200	120/240 Volts A-c		240 Volts A-c		240 Volts A-c		120/208 Volts A-c			
		TE21	\$125.	TE31	\$140.	TE131	\$140.	TE131N	\$155.		
		TE22	125.	TE32	140.	TE132	140.	TE132N	155.		
		TE23	125.	TE33	140.	TE133	140.	TE133N	155.		
		TE24	125.	TE34	140.	TE134	140.	TE134N	155.		
		TE25	125.	TE35	140.	TE135	140.	TE135N	155.		
		TE27	150.	TE37	165.	TE137	165.	TE137N	180.		
		TE210	150.	TE310	165.	TE1310	165.	TE1310N	180.		
		TYPE TEH WITH EH FRAME BREAKER									
		15 20 30 40 50 70 100	70 70 100 100 100 200 200	480 Volts A-c		480 Volts A-c		480 Volts A-c		277/480 Volts A-c	
				TEH21	\$200.	TEH31	\$215.	TEH131	\$215.	TEH131N	\$225.
				TEH22	200.	TEH32	215.	TEH132	215.	TEH132N	225.
TEH23	200.			TEH33	215.	TEH133	215.	TEH133N	225.		
TEH24	200.			TEH34	215.	TEH134	215.	TEH134N	225.		
TEH25	200.			TEH35	215.	TEH135	215.	TEH135N	225.		
TEH27	215.			TEH37	230.	TEH137	230.	TEH137N	240.		
TEH210	215.			TEH310	230.	TEH1310	230.	TEH1310N	240.		
TYPE TJA WITH JA FRAME BREAKER											
70 100 125 150 175 200 225	300 300 300 300 300 400 400			600 Volts A-c		600 Volts A-c		600 Volts A-c		277/480 Volts A-c	
				TJA27	\$400.	TJA37	\$438.	TJA137	\$438.	TJA137N	\$458.
				TJA210	400.	TJA310	438.	TJA1310	438.	TJA1310N	458.
		TJA212	400.	TJA312	438.	TJA1312	438.	TJA1312N	458.		
		TJA215	400.	TJA315	438.	TJA1315	438.	TJA1315N	458.		
		TJA217	400.	TJA317	438.	TJA1317	438.	TJA1317N	458.		
		TJA220	400.	TJA320	438.	TJA1320	438.	TJA1320N	458.		
		TJA222	400.	TJA322	438.	TJA1322	438.	TJA1322N	458.		

APPROXIMATE DIMENSIONS AND WEIGHTS

Type	Ampere Rating	Voltage	For 2 or 3 Pole Duct (6 Inch Face)					For 3 or 4 Pole Duct (7½ Inch Face)				
			Dimensions in Inches			Weight in Pounds		Dimensions in Inches			Weight in Pounds	
			Wide	High	Deep	2 Pole	3 Pole	Wide	High	Deep	3 Pole	4 Pole
TE or TEH	15 to 50	240 or 480	17½	7½	5	17	18	17½	7½	5	18	19
TE or TEH	70 to 100	240 or 480	23½	7½	5	23	24	23½	7½	5	24	25
TJA	70 to 225	480 or 600					On application					

SPECIAL SAF-KEY "PLUGS"

DISCOUNT SCHEDULE 23 CD

Ground detector "plug", 3 pole, 600 volts	Cat. No. GD	Price
Transformer "plug" (for UNI-BUS Systems rated 1 to 15 KVA)		\$ 76.00
Capacitor "plug" (for UNI-BUS Systems rated 5 to 15 KVAR)		On application

DISCOUNT SCHEDULE 17 CD-1

CUTLER-HAMMER



POWER CENTERS

Plug-in Trof Pricing Information

PRICING PROCEDURE

1. Determine the number of spaces that will be required to accommodate the "Saf-Key" plugs selected from the following tables.
2. If main switches or breakers are to be used, add space required to total from step one.
3. If total spaces required exceed 10, layout two or more assemblies of equal height (each sec-

tion may be of reduced ampere rating) and include a base price for each main bus and wireway of the size and ampere rating desired.

4. Add prices for features desired. (Main switch or breaker; solid neutral for single phase, 3 wire or 3 phase 4 wire systems; through lugs, etc.). If more than one "Trof"

section is used, the prices of either through lugs or horizontal bus bars (one less than total number of sections used) must be added.

5. Price the selected plugs from the appropriate tables and add to the above prices.
6. Price auxiliary "Trof" wireway and accessories and add to total price, when required.

PRICE EXAMPLE

REQUIRED

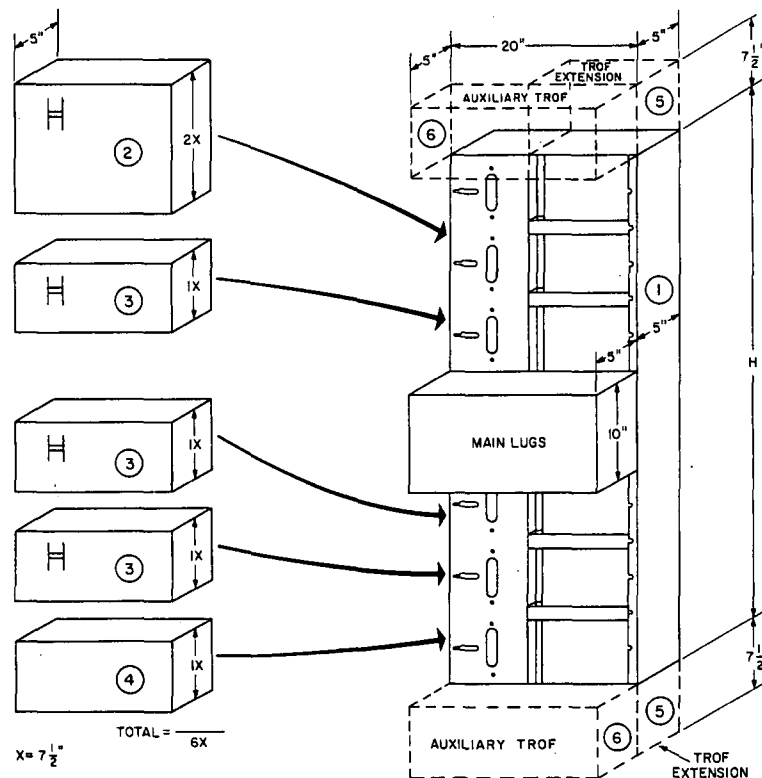
1. One motor starter center with 300 ampere main lugs only with 6 modular spaces and arranged for 3 phase 220 volts, 60 cycle operation incorporating the following:
2. One size 2 full voltage combination starter with 40 ampere circuit breaker, 10 HP, 220 volts.
3. Three size 1 full voltage combination starters with 50 ampere circuit breakers, 7½ HP, 220 volts.
4. One raised blank filler.
5. One Trof Extension (for additional wireway space).
6. One Auxiliary Trof (for additional wireway space and flush front).

Note: Items 5 and 6 may be located at either top or bottom of assembly.

PROCEDURE

1. Select base from table on page 46
2. Select size 2-10 HP, 220 volt combination starter from table on page 47
3. Select size 1-7½ HP, 220 volt combination starter from table on page 47 at \$172.00 each
4. Select one raised filler from table on page 46
5. Select Trof Extension from table on page 46
6. Select Auxiliary Trof from table on page 46

Cat. No.	Price
PTM306	\$110.00
4652A224	220.00
4652A125	516.00
PTA3	11.00
PTA2	8.80
PTA1	6.60
Total \$872.40	



SHIPMENT

Plug-in Trof is shipped as components for on the job assembly. For completely assembled mains and plugs, add 10% and use discount schedule **23CD**.

POWER CENTERS



Plug-in Trof—Motor Starter Application

WHEN ORDERING SPECIFY

- Catalog number

SPECIFICATIONS

Application: For use on A-c or D-c Systems.

Service: 250 V. Single Phase A-c or D-c.
125/250 V. Single Phase, Three Wire A-c.
250 V. or 600 V. Three Phase, Three Wire A-c.
120/208 V. Three Phase, Four Wire A-c.
277/480 V. Three Phase, Four Wire A-c.

Mains: Main Lugs Only:
100A—1—#14—1/0; 300A—1—#1—350MCM;
400A—2—#1—350MCM; 600A—2—#1—350MCM.
Main Switch:
100A—1—#14—1/0; 200A—1—#1—350MCM.
Main Breakers:
100A—1—#14—1/0; 225A—1—#1—350MCM;
400A—2—#1—350MCM; 600A—2—#1—350MCM.

PLUG-IN TROF BASE—(Two or Three Pole)

Mains Ampere Rating	No. of 7½" Space Units	Height of Main Lug Section	① Catalog Number	Price	Unit Height
100	2	0 inches	PTM-102	\$55.	17
100	4	0	104	72.	32½
300	6	10	306	110.	56
300	8	10	308	128.	71¼
300	10	10	310	138.	86½
400	6	10	406	128.	56
400	8	10	408	148.	71¼
400	10	10	410	168.	86½
600	6	10	606	160.	56
600	8	10	608	180.	71¼
600	10	10	610	200.	86½

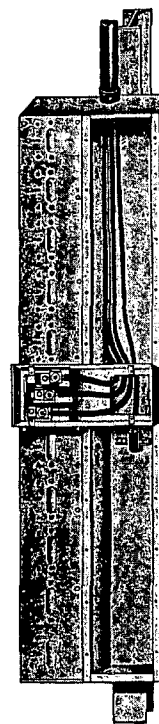
① When size 4 starters are required, add suffix "S4" to catalog number of plug-in trof base.

ACCESSORIES

Description	No. of 7½" Space Units	Catalog Number	Price
② MAIN FUSIBLE SWITCH			
100 Amp.—2 Pole.....	None	PTA14	\$143.
100 Amp.—3 Pole.....	None	15	170.
200 Amp.—2 Pole.....	2	16	160.
200 Amp.—3 Pole.....	2	17	310.
③ MAIN CIRCUIT BREAKER			
100 Amp.—2 Pole.....	None	PTA18	130.
100 Amp.—3 Pole.....	None	19	155.
225 Amp.—2 Pole.....	None	20	240.
225 Amp.—3 Pole.....	None	21	300.
400 Amp.—2 Pole.....	4	22	400.
400 Amp.—3 Pole.....	4	23	510.
600 Amp.—2 Pole.....	4	24	566.
600 Amp.—3 Pole.....	4	25	731.
HORIZONTAL CROSS BUS			
300 Amp.....	---	PTA7	25.
400 Amp.....	---	8	30.
600 Amp.....	---	9	50.
INCREASED MAIN LUGS			
To 400 Amp.....	---	PTA26	24.
To 600 Amp.....	---	27	40.
SOLID NEUTRAL			
100 Amp.....	---	PTA10	25.
300 Amp.....	---	11	32.
400 Amp.....	---	12	46.
600 Amp.....	---	13	60.

② Specify voltage.

③ Specify trip rating and voltage.



Description	Catalog Number	Price
1—AUXILIARY TROF—Provides main or branch circuit space at top or bottom and/or wiring channel between adjacent Plug-in Trof assemblies. It employs the top or bottom 7½" plug space unless used in conjunction with a Plug-in Trof Extension. One required for each Plug-in Trof assembly being ganged.....	PTA1	\$6.60
2—TROF EXTENSION—Used with Auxiliary Trof to allow full utilization of all 7½" plug-in spaces when ganging Plug-in Trof assemblies. One required for each Plug-in Trof assembly being ganged.....	PTA2	8.80
3—RAISED FILLER—Used for filling blank spaces and providing a flush front to the distribution center.....	PTA3	11.00
4—FLAT FILLER—Used for filling blank spaces in distribution center.....	PTA4	2.40
5—MAIN LUG SECTION COLLAR.....	PTA5	2.50
6—AUXILIARY TROF COLLAR.....	PTA6	2.50
7—ENGRAVED NAME PLATES (Bakelite).....	---	2.

DISCOUNT SCHEDULE 17 CD-1

CUTLER-HAMMER



POWER CENTERS

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Plug-in Trof-Motor Starter Application

WHEN ORDERING SPECIFY • Catalog number, voltage, current, frequency and horsepower.

SAF-KEY COMBINATION MOTOR STARTER PLUGS WITH FUSIBLE SWITCHES

RESET BUTTON ONLY — 2 COIL OVERLOAD RELAY

Maximum Horsepower 3 Phase		Maximum Voltage	Fuse Clip Rating Amperes	NEMA Size	Non-Reversing			Reversing		
Standard Fuses	Dual Element Fuses				Catalog Number	Price ①	Number of 7½" Spaces	Catalog Number	Price ①	Number of 7½" Spaces
3	3	208/220	30	0	4642-A023	\$114.	1	4644-A023	\$260.	2
5	5	440	30	0	A043	135.	1	A043	281.	2
5	5	550	30	0	A053	135.	1	A053	281.	2
—	7½	208/220	30	1	A123	126.50	1	A123	286.	2
7½	—	208/220	60	1	A126	133.	1	A126	293.	2
—	10	440	30	1	A143	148.	1	A143	308.	2
10	—	440	60	1	A146	148.	1	A146	308.	2
—	10	550	30	1	A153	148.	1	A153	308.	2
10	—	550	60	1	A156	148.	1	A156	308.	2
—	15	208/220	60	2	A226	181.	2	A226	405.	3
15	—	208/220	100	2	A2210	196.	2	A2210	420.	3
15	25	440	60	2	A246	196.	2	A246	420.	3
25	—	440	100	2	A2410	222.	2	A2410	446.	3
15	25	550	60	2	A256	196.	2	A256	420.	3
25	—	550	100	2	A2510	222.	2	A2510	446.	3
—	30	208/220	100	3	A3210	315.	3	A3210	614.	4
30	—	208/220	200	3	A3220	392.	3	A3220	692.	4
30	50	440	100	3	A3410	341.	3	A3410	641.	4
50	—	440	200	3	A3420	437.	3	A3420	737.	4
30	50	550	100	3	A3510	341.	3	A3510	641.	4
50	—	550	200	3	A3520	437.	3	A3520	737.	4
—	50	208/220	200	4 ②	A4220	632.50	4	A4220	1257.	5
—	60	440	100	4 ②	A4410	602.50	4	A4410	1206.	5
60	100	440	200	4 ②	A4420	698.50	4	A4420	1302.	5
—	60	550	100	4 ②	A4510	602.50	4	A4510	1206.	5
60	100	550	200	4 ②	A4520	698.50	4	A4520	1302.	5

SAF-KEY COMBINATION MOTOR STARTER PLUGS WITH CIRCUIT BREAKERS

RESET BUTTON ONLY — 2 COIL OVERLOAD RELAY

Maximum Horsepower 3 Phase	Maximum Voltage	Maximum Breaker Amp. & Type	NEMA Size	Non-Reversing			Reversing		
				Catalog Number	Price ①	No. of 7½" Spaces	Catalog Number	Price ①	No. of 7½" Spaces
1½	208/220	15E	0	4652-A021	\$158.	1	4654-A021	\$305.	2
2	208/220	20E	0	A022	158.	1	A022	305.	2
3	208/220	30E	0	A023	158.	1	A023	305.	2
3	440	15EH	0	A041	175.	1	A041	322.	2
5	440	20EH	0	A042	175.	1	A042	322.	2
5	208/220	40E	1	A124	172.	1	A124	331.	2
7½	208/220	50E	1	A125	172.	1	A125	331.	2
7½	440	30EH	1	A143	188.	1	A143	348.	2
10	440	40EH	1	A144	188.	1	A144	348.	2
10	208/220	70E	2	A227	220.	2	A227	443.	3
15	208/220	100E	2	A2210	220.	2	A2210	443.	3
15-20	440	50EH	2	A245	236.	2	A245	460.	3
25	440	100EH	2	A2410	236.	2	A2410	460.	3
20-25	208/220	100F	3	A3210	407.	3	A3210	707.	4
30	208/220	125JA	3	A3212	530.	3	A3212	830.	4
30	440	70F	3	A347	370.	3	A347	707.	4
40	440	100F	3	A3410	370.	3	A3410	707.	4
50	440	100F	3	A3410	370.	3	A3410	707.	4
40	208/220	175JA	4 ②	A4217	842.	4	A4217	1395.	4
50	208/220	200JA	4 ②	A4220	842.	4	A4220	1395.	4
60	440	125JA	4 ②	A4412	842.	4	A4412	1395.	4
75	440	150JA	4 ②	A4415	842.	4	A4415	1395.	4
100	440	200JA	4 ②	A4420	842.	4	A4420	1395.	4

① Price includes starter with thermal overload relays and heater coils. It does not include fuses where required. Heater coils are deductible at \$4. per pair.

② When size 4 starters are used the plug-in Trof catalog number should be specified with the suffix "S4" to insure modification of the Trof to suit the starter.

DISCOUNT SCHEDULE 17 CD-1

OPTIONAL FEATURES, next page

CUTLER-HAMMER

47

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
— UNIBUS ③

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT-BREAKERS

GENERAL INFORMATION

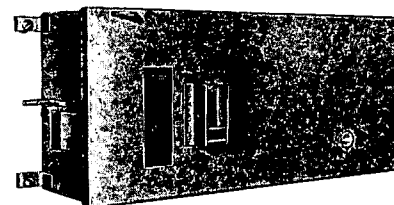
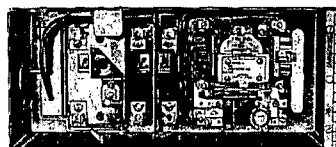
POWER CENTERS



Plug-in Trof—Motor Starter Application

WHEN ORDERING SPECIFY

- Catalog number



SAF-KEY FUSIBLE SWITCH PLUGS—HANDLE OPERATED —Horsepower Rated, Quick Make, Quick Break Contacts

Amps.	250 Volt								600 Volt								Number of 7½" Spaces
	2 Pole				3 Pole				2 Pole				3 Pole				
	Max. Hp.		Catalog No.	Price	Max. Hp.		Catalog No.	Price	Max. Hp.		Catalog No.	Price	Max. Hp.		Catalog No.	Price	
	Std. Fuse	Dual Element			Std. Fuse	Dual Element			Std. Fuse	Dual Element			Std. Fuse	Dual Element			
NORMAL DUTY																	
30	1½	3	NDT221	\$37.	3	7½	NDT321	\$39.	3	7½	NDT261	\$39.	7½	15	NDT361	\$41.	1
60	3	10	NDT222	39.	7½	15	NDT322	43.	5	20	NDT262	41.	15	30	NDT362	45.	1
100	7½	15	NDT223	52.	15	30	NDT323	56.	10	30	NDT263	54.	25	50	NDT363	63.	1
HEAVY DUTY																	
30	1½	3	HDT221	\$45.	3	7½	HDT321	\$49.	3	7½	HDT261	\$47.	7½	15	HDT361	\$50.	1
60	3	10	HDT222	50.	7½	15	HDT322	57.	5	20	HDT262	54.	15	30	HDT362	60.	1
100	7½	15	HDT223	76.	15	30	HDT323	84.	10	30	HDT263	80.	25	50	HDT363	87.	1
200	15	---	HDT224	140.	25	50	HDT324	148.	30	50	HDT264	150.	50	---	HDT364	156.	2

SAF-KEY CIRCUIT BREAKER PLUGS—(Circuit Breaker Handle Through Cover)

Breaker Type	Breaker Amps.	Maximum Volts	One Pole			Two Pole			Three Pole			No. of 7½ inch Spaces
			No. of Breakers	Catalog Number	Price	No. of Breakers	Catalog Number	Price	No. of Breakers	Catalog Number	Price	
P	15	120/240	12	PT11-312	\$ 90.	—	—	—	—	—	—	1
P	15	120/208	12	PT11-412	90.	—	—	—	—	—	—	1
P	20	120/240	12	PT12-312	90.	—	—	—	—	—	—	1
P	20	120/208	12	PT12-412	90.	—	—	—	—	—	—	1
QL	15	120/240	12	QLT11-312	90.	—	—	—	—	—	—	1
QL	15	120/208	12	QLT11-412	90.	—	—	—	—	—	—	1
QL	20	120/240	12	QLT12-312	90.	—	—	—	—	—	—	1
QL	20	120/208	12	QLT12-412	90.	—	—	—	—	—	—	1
E	15	120/240	6	ET11-36	126.	3	ET21-3	\$129.	2	ET31-2	\$136.	1
E	15	120/208	6	ET11-46	126.	—	—	—	—	—	—	1
E	20	120/240	6	ET12-36	126.	3	ET22-3	129.	2	ET32-2	136.	1
E	20	120/208	6	ET12-46	126.	—	—	—	—	—	—	1
E	30	120/240	6	ET13-36	126.	3	ET23-3	129.	2	ET33-2	136.	1
E	30	120/208	6	ET13-46	126.	—	—	—	—	—	—	1
E	40	120/240	6	ET14-36	126.	3	ET24-3	129.	2	ET34-2	136.	1
E	40	120/208	6	ET14-46	126.	—	—	—	—	—	—	1
E	50	120/240	6	ET15-36	126.	3	ET25-3	129.	2	ET35-2	136.	1
E	50	120/208	6	ET15-46	126.	—	—	—	—	—	—	1
E	70	120/240	—	—	—	2	ET27-2	142.	1	ET37	100.	1
E	90	120/240	—	—	—	2	ET210-2	142.	1	ET310	100.	1
EH	15	277/480	6	EHT11-46	144.	—	—	—	2	EHT31-2	182.	1
EH	20	277/480	6	EHT12-46	144.	—	—	—	2	EHT32-2	182.	1
EH	30	277/480	6	EHT13-46	144.	—	—	—	2	EHT33-2	182.	1
EH	40	277/480	6	EHT14-46	144.	—	—	—	2	EHT34-2	182.	1
EH	50	277/480	6	EHT15-46	144.	—	—	—	2	EHT35-2	182.	1
EH	70	277/480	—	—	—	2	EHT27-2	182.	1	EHT37	120.	1
EH	100	277/480	—	—	—	2	EHT210-2	182.	1	EHT310	120.	1
JA	125	600	—	—	—	1	JAT212	245.	1	JAT312	290.	1
JA	150	600	—	—	—	1	JAT215	245.	1	JAT315	290.	1
JA	175	600	—	—	—	1	JAT217	245.	1	JAT317	290.	1
JA	200	600	—	—	—	1	JAT220	245.	1	JAT320	290.	1
JA	225	600	—	—	—	1	JAT222	245.	1	JAT322	290.	1

OPTIONAL FEATURES FOR COMBINATION MOTOR STARTER PLUGS

	Price Addition
Start-Stop pushbutton or selector switch in cover	\$11.
Pilot light in cover	36.
Extra electrical interlocks, N.O. or N.C. (each)	15.
Additional overload relays — Size 0 and 1	8.
Size 2	13.
Size 3	34.
Size 4	60.
Control circuit transformer — Size 0 and 1	40.
Size 2	55.
Size 3	90.
Size 4	100.

NOTES: If three coil overload relay, size 1 starter is furnished in a one space enclosure add \$12.00 list for THIRD COIL and motor and control wiring terminal block required for wiring convenience.

If the transformer of size 1 must be within the starter enclosure two spaces are required and the list price addition for the size 1 transformer becomes \$54.00. In this device for 3 coil add suffix "T" and list addition \$4.00.

Where size 1 starter is desired in size 2 box for additional space requirements add \$14.00 to list price.

① For modification of P, QL, E and EH breaker panels see next page.

② The addition of certain of these optional features may result in the combination starters requiring more than a normal number of 7½ inch space units. Check with Cutler-Hammer before ordering.

CUTLER-HAMMER

DISCOUNT SCHEDULE 17 CD-1



POWER CENTERS

Plug-in Trof-Motor Starter Application

MODIFICATION OF P AND QL BREAKER PLUGS

15 ampere, 120 volt, single pole breakers will be supplied as standard. 20, 30, 40 or 50 ampere single pole breakers can be substituted without price change.

Prices are with all spaces filled. For omission of breakers... deduct \$3.10 each

For substitution of double pole independent trip breakers for two single pole breakers—providing double pole manual operation... add \$0.50 each

For substitution of 2 or 3 pole common trip breaker for 2 or 3 single pole breakers add to the standard price as follows:

Poles	Amp. Range	Voltage	Price Addition
2	15-50	120/240	\$.70
2	15-50	240	11.80
3	15-50	240	12.70

MODIFICATION OF EH BREAKER PLUGS

15 ampere, 277 volt single pole breakers will be supplied as standard. 20, 30, 40 or 50 ampere single pole breakers can be substituted without price change.

Prices are with all spaces filled. For omission of breakers... deduct \$12.40 each

MODIFICATION OF E BREAKER PLUGS

15 ampere, 120 volt single pole breakers will be supplied as standard. 20, 30 or 50 ampere single pole breakers can be substituted without price change.

Prices are with all spaces filled. For omission of breakers... deduct \$9.70 each

For substitution of 2 or 3 pole common trip breaker for 2 or 3 single pole breakers add to the standard price as follows:

Poles	Amp. Range	Voltage	Price Addition
2	15-50	240	\$5.50
3	15-50	240	7.00

For substitution of 2 or 3 pole common trip breaker for 2 or 3 single pole breakers add to the standard price as follows:

Poles	Amp. Range	Voltage	Price Addition
2	15-50	480	\$59.50
3	15-50	480	76.50

Plug-in Trof Wireway

Plug-in Trof Wireway, developed primarily as a matching channel for Plug-in Trof, are available in two sizes (7½" x 5" and 11½" x 5"). With associated fittings they serve as an economical method of secondary distribution of lighting, power, or control circuits. Adapters are available for connection to switchboards, motor control centers, etc.

NOTE

Wire fill and installation of Plug-in Trof Wireway is to be made in accordance with Article 362 of the National Electrical Code.

PLUG-IN TROF WIREWAY

Plug-in Trof Wireway is furnished in shelf-engineered lengths of 120, 60, 40, 35, 30, 25, 15 and 10 inches or it may be priced by the foot to the nearest 6 inches. For individual lengths and fittings see Accessory table below.

Plug-in Trof Wireway (11½" x 5")	① \$11.00 per ft.
Plug-in Trof Wireway (7½" x 5")	① 9.00 per ft.

PLUG-IN TROF WIREWAY—INDIVIDUAL LENGTHS AND ACCESSORIES

Part	Description	7½" Size		11½" Size	
		Cat. No.	Price	Cat. No.	Price
120" length	Electrical Wireway	TWS120	\$37.	TW120	\$65.
60" length	Electrical Wireway	TWS60	18.90	TW60	33.
40" length	Electrical Wireway	TWS40	14.	TW40	27.
35" length	Electrical Wireway	TWS35	11.30	TW35	23.
30" length	Electrical Wireway	TWS30	10.	TW30	20.
25" length	Electrical Wireway	TWS25	9.	TW25	17.
20" length	Electrical Wireway	TWS20	8.50	TW20	16.
15" length	Electrical Wireway	TWS15	8.	TW15	15.
10" length	Electrical Wireway	TWS10	7.40	TW10	14.
Junction Box	Universal Application—May Be Used as Ell, Tee, Cross	TWSJB	13.80	TWJB	35.
End Plate	Closure for End of Runs or Junction Box Openings	TWSEP	1.20	TWEP	2.20
Hanger	Used to Support Wireway in Horizontal or Vertical Mounting	TWSH	4.	TWH	5.50
Adapter	Connects to Switchboards, Panels, Motor Controllers, Etc.	TWSA	5.	TWA	7.40
Connector	Couples Wireway Sections	TWSC	1.90	TWC	1.90
Flat Ell	90° Directional Change in Wireway Runs	TWSLF	11.	TWLF	16.50
Edge Ell	90° Directional Change in Wireway Runs	TWSLE	11.	TWLE	16.50

① Price is functional for estimating and includes necessary hangers, connectors and fittings for representative installations.

DISCOUNT SCHEDULE 17 CD-1

CUTLER-HAMMER

POWER CENTERS



Plug-in Trof—Motor Starter Application

SELECTION TABLE

Saf-Key circuit Breaker plugs for prices see page 48

SAF-KEY Plug Type	Comparative Panel Type	Breaker Type	Trip Rating Amps.	Maximum Number of Poles	Service Voltage	Line Connection	Interrupting Rating Amps.	WP-131-A Fed. Spec. Class
PT	NPLAB	P	15-50	12	120/240 A-c 120/208 A-c	Plug-in	5000	A-1
QLT	NLAB	QL	15-50	12	120/240 A-c 120/208 A-c	Bolted	5000	A-1
ET	NAIB	E	15-50	6	120/240 A-c 240 A-c 120/208 A-c 125/250 D-c	Bolted	7500	C-1
EHT	NHIB	EH	15-50	6	277/480 A-c	Bolted	10000	D-1
ET	NDP	E	15-50 70-100	6 4	120/240 A-c 240 A-c 120/208 A-c 125/250 D-c	Bolted	7500	C
Lugs Only or Main Circuit Breaker 100A, 225A, 400A, 600A	All Types	E, EH F, JA LA, MA	70-100 125-225 225-400 600	One 3 Pole 225A. Circ. Bkr. in this 10" Space ①	Up to 600 Volts Max.	Bolted	7500 10000 15000 25000	All Classes
EHT	NHDP	EH	15-50 70-100	6 4	277/480 A-c 480 A-c	Bolted	10000	D
ET	CDP	E	15-50 70-100	6 4	120/240 A-c 240 A-c 120/208 A-c 125/250 D-c	Bolted	5000	C, D, E
EHT	CDP	EH	15-50 70-100	6 4	277/480 A-c 480 A-c	Bolted	10000	C, D, E
FT	CDP	F	15-50 70-100	6 4	277/480 A-c 600 A-c 250 D-c	Bolted	15000	C, D, E
JAT	CDP	JA	125-225	One 3 Pole Two 2 Pole	Up to 600 Volts Max.	Bolted	25000	C, D, E

① For 400 ampere and 600 ampere circuit breaker, consult factory.

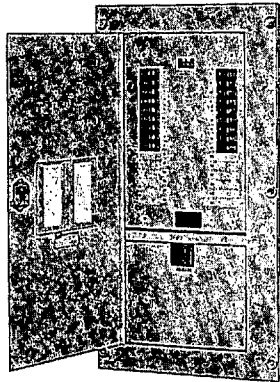


PANELBOARDS AND SWITCHBOARDS

Description

PANELBOARDS for lighting and power distribution—designed to meet specifications for lighting and power applications. Provide efficient electrical distribution from a central point. Short circuit and overload protection provided for wiring systems fed by panel—panelboards may be MAIN LUGS ONLY or CIRCUIT BREAKER MAINS.

CONSTRUCTION code gauge galvanized stretcher leveled steel—trimmed can-gray baked enamel—adequate wiring space—all lugs for use with copper wire—lugs suitable for use with aluminum or copper available at extra cost on application. Flush or surface mounted fronts with doors—full hinge-interiors adjustable for flush plaster or drywall installations. Doors provided with flush ring catch and lock—circuit directory furnished.

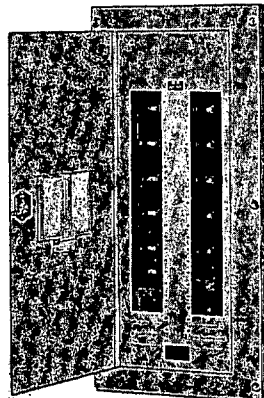


NLAB AND NPLAB circuit breaker lighting panels—commercial—industrial—institutional buildings—can be used for protection and switching appliances, small motors and business machines. Service 120/240 volts, single phase—3 wire, 240 volts single phase—2 wire or three phase—3 wire, 120/208 volts, 3 phase—4 wire. NPLAB has plug-in breakers, NLAB bolt-in breakers.

NA1B circuit breaker lighting panels—stores, factories, office building, schools, public institutions—switching, lighting and appliance—service 120/240 volts, single phase—3 wire, 240 volts, single phase—2 wire or three phase—3 wire, 120/208 volts, three phase—4 wire, 125/250 volts, 3 wire D-c.—Bolt-in breakers.

NH1B circuit breaker lighting panel—stores, factories—office building, schools, public institutions—where 277 volt fluorescent lighting used—service 277/480 volt three phase—4 wire grounded neutral. Bolt-in breakers.

NDP AND NHDP circuit breaker distribution panels—industrial and commercial—circuits for heat, power and lighting—NDP service 120/240 volts, single phase—3 wire, 240 volts, single phase—2 wire or three phase—3 wire, 120/208 volts, three phase—4 wire, 125/250 volts—3 wire D-c. type E bolt-in breakers—NHDP service 277/480 volt three phase—4 wire, 480 volt three phase—3 wire—Type EH bolt-in breakers.



THIS SECTION CONTAINS:

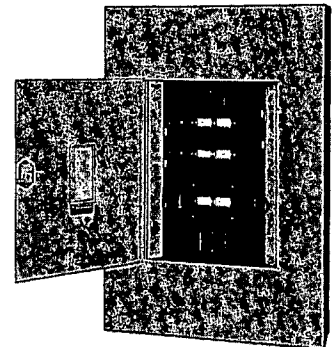
PANELBOARDS

	Pages
Type NPLAB	54
Type NLAB	55
Type NA1B	56
Type NH1B	57
Type NDP	58-59
Type NHDP	58-59
Type CDP	60-61

SWITCHBOARDS

Service section	64-65
Combination service and distribution	66
Distribution sections	67-68
Fusible switch units	72
Circuit breaker units	69-71
Starter units	72
Modifications and accessories	73
Replacement Parts	74-76

CDP circuit breaker panelboards—industrial—convertible—heat, power and lighting loads—service 600 volts maximum A-c, 250 volts maximum D-c, single phase 2 or 3 wire, three phase—3 or 4 wire—bolt-in breakers.



LOW VOLTAGE SWITCHBOARDS—Modular design—free floor standing—dead front—dead rear—Nema 1 enclosure—12 gauge steel—die formed—gusset welded—rust inhibiting phosphate treated—gray baked enamel—leveling bolts bottom each section—side plates ventilated or non-ventilated—removable for cross bussing where required—standardized horizontal bussing for connection between sections. Custom built installations of service and distribution sections—standardized section dimensions—90 inches high—15 through 50 inches deep—24 through 57 inches wide.

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS®

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

PANELBOARDS AND SWITCHBOARDS



Description

This Section Contains:

PANELBOARDS	Page
Type NPLAB	54
Type NLAB	55
Type NA1B	56
Type NH1B	57
Type NDP	58-59
Type NHDP	58-59
Type CDP	60-61

SWITCHBOARDS

Service sections	64-65
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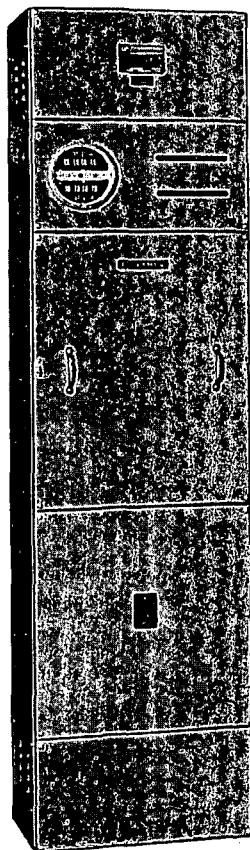
SERVICE SECTIONS

Type FSN—fusible main disconnect—knife type—200 to 1200 amperes — interrupts rated current.

Type HFSN—fusible main disconnect—bolted pressure contact switch—slow make quick break—provision for current limiting fuses—1200 to 4000 amperes.

Type OSN—without main—provision for switches or circuit breakers—400 to 2000 amperes.

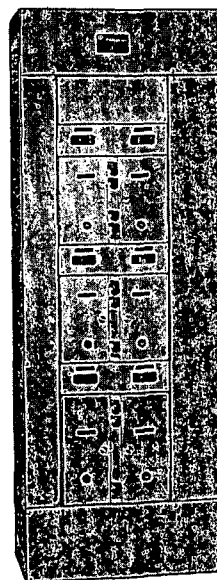
Type CBN—Circuit breaker main disconnect—molded case and switchboard air circuit breakers—200 to 6000 amperes.



CBN324
Service Section

COMBINATION SERVICE AND DISTRIBUTION SECTIONS
Provides for main disconnect and distribution units. Type VSN fusible main disconnect — Type CSN circuit breaker main disconnect — distribution units either circuit breaker or fusible type — barriered compartment at right hand side of 1 phase and 3 phase-3 wire sections for load conductors requiring top exit — 200 to 800 ampere — caution suggested when adding distribution units as space limited.

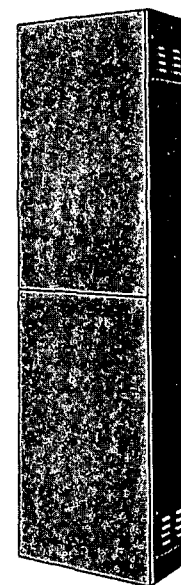
DISTRIBUTION SECTIONS



V8394
Distribution Section

Type CB-VB — with switchboard branch air circuit breaker — bus risers provide 35 inches for installation of distribution units — distribution units either circuit breaker, fusible or magnetic starter — 800 to 1600 ampere.

Type VB—bus risers provide 67½ inches for installation of distribution units—distribution units either circuit breaker, fusible or magnetic starter 200 to 2000 ampere.



2490PB
Pull Box Section

Type QVB—panelboard distribution sections—for power distribution remote from service section—provision for mounting main fusible switch, branch circuit breakers, branch fusible switch and magnetic motor starters—200 to 1200 ampere—standard box sizes—45, 55, 65, 75 or 85 inches.

PULL BOX SECTIONS—for use with service sections where service conductors brought in underground—match service section height and depth—12, 24, 32, 44 and 57 inch widths available—corner post sections available.

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS®

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

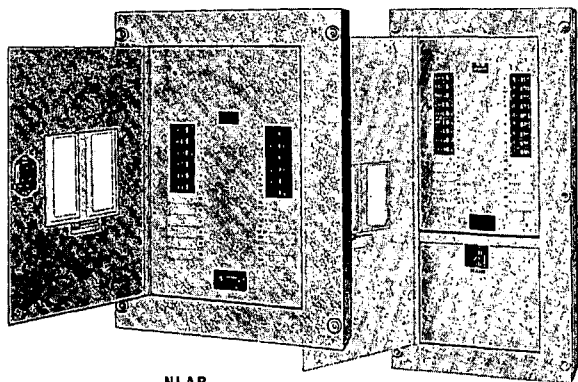
GENERAL INFORMATION



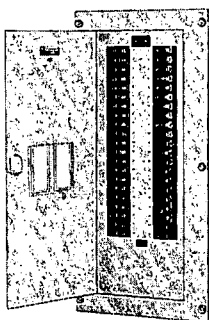
PANELBOARDS and SWITCHBOARDS

Selection Table

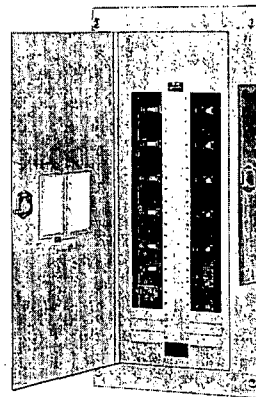
PANEL				BRANCH CIRCUITS						
Type	W-P-131a Federal Specification Class	Max. Ampere Rating Mains		Breaker Type	Connection	No. of Poles	Max. Circuit Rating	Service Voltage	Interrupting Capacity (Asym. Amps.)	Catalog Page
		Lugs Only	Circuit Breaker							
NPLAB	A1 A2 A3 A5	225	225	P	Plug-in	1	70	120/240V A-c	5,000	54
						2	100	120/240V A-c		
						2	70	240V A-c		
						3	100	240V A-c		
NLAB	A1 A2 A3 A5	225	225	QL	Bolted	1	70	120/240V A-c	5,000	55
						2	100	120/240V A-c		
						2	70	240V A-c		
						3	70	240V A-c		
NA1B	C1	225	225	E	Bolted	1	100	120V A-c 125V D-c	7,500	56
						2 or 3	100	240V A-c	7,500	
								125/250V D-c	5,000	
NH1B	D	225	225	EH	Bolted	1	100	277V A-c 125V D-c	10,000 5,000	57
						2	100	240V A-c 480V A-c 250V D-c	15,000 10,000 10,000	
						3	100	240V A-c 480V A-c	15,000 10,000	
NDP	C	600	400	E	Bolted	1, 2 or 3		(See panel NA1B)		58-59
NHDP	D	600	400	EH	Bolted	1, 2 or 3		(See panel NH1B)		58-59
CDP or QVB or VB	C, D or E	1200	800	E	Bolted			(See panel NA1B)		60-61
				EH	Bolted			(See panel NA1B)		
				F	Bolted	2 or 3	100	240V A-c 600V A-c 250V D-c	20,000 15,000 10,000	
				JA	Bolted	2 or 3	225	240V A-c 480V A-c 600V A-c 250V D-c	25,000 20,000 15,000 10,000	
	C, D or E	1200	1000	KA	Bolted	2 or 3	225	240V A-c 480V A-c 600V A-c 250V D-c	30,000 25,000 25,000 10,000	
				LA	Bolted	2 or 3	400	240V A-c 480V A-c 600V A-c 250V D-c	50,000 35,000 25,000 20,000	
	C, D or E	2000	1000	MA	Bolted	2 or 3	800	240V A-c 480V A-c 600V A-c 250V D-c	50,000 35,000 25,000 20,000	
				LM	Bolted	2 or 3	1000	(Same as MA)		
				HF	Bolted	2 or 3	100	240V A-c 480V A-c 600V A-c 250V D-c	75,000 30,000 20,000 20,000	
				HK	Bolted	2 or 3	225	240V A-c 480V A-c	75,000 40,000	
				HKL	Bolted	2 or 3	400	600V A-c 30,000	30,000	
				HLM	Bolted	2 or 3	600	250V D-c	20,000	
QVB or VB	C, D or E	1200	1000	TPF	Bolted	2 or 3	100		100,000	67-68
				TPK	Bolted	2 or 3	225	600V A-c		
				TPKL	Bolted	2 or 3	400	250V D-c		
				TPL	Bolted	2 or 3	600			



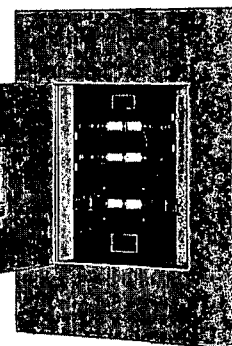
NLAB

NLAB
With Main Breaker

NA1B



NDP and NHDP



CDP

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.BUSWAYS &
POWER CENTERS
—UNIBUS®PANELBOARDS &
SWITCHBOARDSSAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

PANELBOARDS

Type NPLAB Circuit Breaker Lighting Panelboards

WHEN ORDERING SPECIFY

SPECIFICATIONS NPLAB AND NLAB

- Catalog number
- Surface or flush mounting
- Special features and options required

Example: NPLAB08-3L100, surface mounting, 2-40 amp. single pole breakers, 2-40 amp. double pole common trip breakers.

APPLICATION: A-c only. Meets Federal Specification W-P-131a, class A. Underwriter's Laboratory listed.

SERVICE: 120/240 volts, single phase—3 wire. 240 volts, single phase—2 wire or 3 phase—3 wire. 120/208 volts, 3 phase—4 wire.

MAINS: Lugs only—100 amps., 14-1/0 Cu wire—225 amps., 6-250 MCM Cu wire.

Breakers—50 amps. 14-4 Cu wire—100 amps.—14-1 Cu wire—225 amps., 6-250 MCM Cu wire.

Panels furnished standard with terminals for Cu wire only. For AL-Cu Lugs—Information on application.

BRANCHES: NPLAB—Single pole type P plug-in breakers—15 to 50 amps.

NLAB—Single pole type QL bolt-in breakers—15 to 50 amps.

WITH TYPE P PLUG-IN BREAKERS

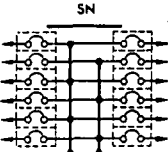
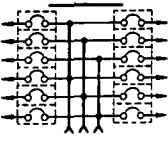
System	No. of Poles	With Main Lugs Only						With Circuit Breaker Mains							
		Main Amps.	Catalog Number	① Price	Dimen. in Inches			Ship. Wt. Lbs.	Main Amps.	Catalog Number	① Price	Dimen. in Inches			Ship. Wt. Lbs.
					High	Wide	Deep					High	Wide	Deep	
SINGLE PHASE, 3 WIRE—TYPE NPLAB—3															
	8	100	NPLAB-08-3L100	\$105.	27	16	4 3/4	52	50	NPLAB-08-3AB50	\$138.	33	16	4 3/4	58
	10	100	10-3L100	116.	27	16	4 3/4	53	50	10-3AB50	149.	33	16	4 3/4	59
	12	100	12-3L100	127.	27	16	4 3/4	53	100	12-3AB100	180.	33	16	4 3/4	59
	14	100	14-3L100	138.	27	16	4 3/4	58	100	14-3AB100	191.	33	16	4 3/4	64
	16	100	16-3L100	149.	27	16	4 3/4	59	100	16-3AB100	202.	33	16	4 3/4	65
	18	100	18-3L100	160.	27	16	4 3/4	59	100	18-3AB100	213.	33	16	4 3/4	65
	20	100	20-3L100	171.	27	16	4 3/4	64	100	20-3AB100	224.	33	16	4 3/4	125
	22	225	22-3L225	186.	27	16	4 3/4	65	225	22-3AB225	391.	51	16	6	126
	24	225	24-3L225	197.	27	16	4 3/4	66	225	24-3AB225	402.	51	16	6	126
	26	225	26-3L225	208.	33	16	4 3/4	73	225	26-3AB225	413.	51	16	6	132
	28	225	28-3L225	219.	33	16	4 3/4	74	225	28-3AB225	424.	51	16	6	133
	30	225	30-3L225	230.	33	16	4 3/4	74	225	30-3AB225	435.	51	16	6	133
	32	225	32-3L225	241.	39	16	4 3/4	79	225	32-3AB225	446.	51	16	6	138
	34	225	34-3L225	252.	39	16	4 3/4	80	225	34-3AB225	457.	51	16	6	139
	36	225	36-3L225	263.	39	16	4 3/4	80	225	36-3AB225	468.	51	16	6	139
	38	225	38-3L225	274.	39	16	4 3/4	88	225	38-3AB225	479.	51	16	6	145
	40	225	40-3L225	285.	39	16	4 3/4	89	225	40-3AB225	490.	51	16	6	146
	42	225	42-3L225	296.	39	16	4 3/4	89	225	42-3AB225	491.	51	16	6	146
3 PHASE, 4 WIRE—SOLID NEUTRAL—TYPE NPLAB—4															
	8	100	NPLAB-08-4L100	\$115.	27	16	4 3/4	53	50	NPLAB-08-4AB50	\$163.	33	16	4 3/4	59
	10	100	10-4L100	126.	27	16	4 3/4	54	50	10-4AB50	174.	33	16	4 3/4	60
	12	100	12-4L100	137.	27	16	4 3/4	54	50	12-4AB50	185.	33	16	4 3/4	60
	14	100	14-4L100	148.	27	16	4 3/4	59	100	14-4AB100	196.	33	16	4 3/4	65
	16	100	16-4L100	159.	27	16	4 3/4	60	100	16-4AB100	228.	33	16	4 3/4	66
	18	100	18-4L100	170.	27	16	4 3/4	60	100	18-4AB100	239.	33	16	4 3/4	66
	20	100	20-4L100	181.	27	16	4 3/4	65	100	20-4AB100	250.	39	16	4 3/4	73
	22	100	22-4L100	192.	27	16	4 3/4	66	225	22-4AB225	261.	39	16	6	74
	24	100	24-4L100	203.	27	16	4 3/4	66	225	24-4AB225	272.	39	16	6	74
	26	100	26-4L100	214.	33	16	4 3/4	76	225	26-4AB225	283.	39	16	6	80
	28	100	28-4L100	225.	33	16	4 3/4	77	225	28-4AB225	294.	39	16	6	81
	30	100	30-4L100	236.	33	16	4 3/4	77	225	30-4AB225	305.	39	16	6	81
	32	225	32-4L225	254.	39	16	4 3/4	81	225	32-4AB225	506.	51	16	6	139
	34	225	34-4L225	265.	39	16	4 3/4	82	225	34-4AB225	517.	51	16	6	140
	36	225	36-4L225	276.	39	16	4 3/4	82	225	36-4AB225	528.	51	16	6	140
	38	225	38-4L225	287.	39	16	4 3/4	88	225	38-4AB225	539.	51	16	6	146
	40	225	40-4L225	298.	39	16	4 3/4	89	225	40-4AB225	550.	51	16	6	147
	42	225	42-4L225	309.	39	16	4 3/4	89	225	42-4AB225	561.	51	16	6	147

① Price includes door, lock and circuit directory. Main breakers have non-interchangeable trip. Dimensions and weights approximate.

DISCOUNT SCHEDULE 23 CD

CUTLER-HAMMER

**PANELBOARDS****Type NLAB Circuit Breaker
Lighting Panelboards****WITH TYPE QL BOLT-IN BREAKERS**

System	No. of Poles	With Main Lugs Only						With Circuit Breaker Mains								
		Main Amps.	Catalog Number	Price	Dimen. in Inches			Ship. Wt. Lbs.	Main Amps.	Catalog Number	Price	Dimen. in Inches			Ship. Wt. Lbs.	
					High	Wide	Deep					High	Wide	Deep		
SINGLE PHASE, 3 WIRE—TYPE NLAB—3																
	8	100	NLAB-08-3L100	\$105.	22	20	5 1/4	54	50	NLAB-08-3AB50	\$138.	28	20	5 1/4	67	
	10	100	10-3L100	116.	22	20	5 1/4	62	50	10-3AB50	149.	28	20	5 1/4	76	
	12	100	12-3L100	127.	22	20	5 1/4	62	100	12-3AB100	180.	28	20	5 1/4	76	
	14	100	14-3L100	138.	22	20	5 1/4	64	100	14-3AB100	191.	28	20	5 1/4	80	
	16	100	16-3L100	149.	22	20	5 1/4	64	100	16-3AB100	202.	28	20	5 1/4	80	
	18	100	18-3L100	160.	22	20	5 1/4	72	100	18-3AB100	213.	28	20	5 1/4	85	
	20	100	20-3L100	171.	28	20	5 1/4	72	100	20-3AB100	224.	40	20	5 1/4	85	
	22	225	22-3L225	186.	28	20	5 1/4	83	225	22-3AB225	391.	40	20	5 1/4	115	
	24	225	24-3L225	197.	28	20	5 1/4	83	225	24-3AB225	402.	40	20	5 1/4	115	
	26	225	26-3L225	208.	28	20	5 1/4	91	225	26-3AB225	413.	40	20	5 1/4	137	
	28	225	28-3L225	219.	28	20	5 1/4	91	225	28-3AB225	424.	40	20	5 1/4	137	
	30	225	30-3L225	230.	28	20	5 1/4	93	225	30-3AB225	435.	40	20	5 1/4	142	
	32	225	32-3L225	241.	34	20	5 1/4	93	225	32-3AB225	446.	46	20	5 1/4	142	
	34	225	34-3L225	252.	34	20	5 1/4	101	225	34-3AB225	457.	46	20	5 1/4	146	
	36	225	36-3L225	263.	34	20	5 1/4	101	225	36-3AB225	468.	46	20	5 1/4	146	
	38	225	38-3L225	274.	34	20	5 1/4	110	225	38-3AB225	479.	46	20	5 1/4	153	
	40	225	40-3L225	285.	34	20	5 1/4	110	225	40-3AB225	490.	46	20	5 1/4	153	
	42	225	42-3L225	296.	34	20	5 1/4	112	225	42-3AB225	501.	46	20	5 1/4	158	
3 PHASE, 4 WIRE—TYPE NLAB—4																
	8	100	NLAB-08-4L100	\$115.	22	20	5 1/4	55	50	NLAB-08-4AB50	\$163.	28	20	5 1/4	68	
	10	100	10-4L100	126.	22	20	5 1/4	63	50	10-4AB50	174.	28	20	5 1/4	77	
	12	100	12-4L100	137.	22	20	5 1/4	63	50	12-4AB50	185.	28	20	5 1/4	77	
	14	100	14-4L100	148.	22	20	5 1/4	65	100	14-4AB100	196.	28	20	5 1/4	81	
	16	100	16-4L100	159.	22	20	5 1/4	65	100	16-4AB100	228.	28	20	5 1/4	81	
	18	100	18-4L100	170.	22	20	5 1/4	73	100	18-4AB100	239.	28	20	5 1/4	86	
	20	100	20-4L100	181.	28	20	5 1/4	73	100	20-4AB100	250.	34	20	5 1/4	86	
	22	100	22-4L100	192.	28	20	5 1/4	84	100	22-4AB100	261.	34	20	5 1/4	94	
	24	100	24-4L100	203.	28	20	5 1/4	84	100	24-4AB100	272.	34	20	5 1/4	94	
	26	100	26-4L100	214.	28	20	5 1/4	92	100	26-4AB100	283.	34	20	5 1/4	102	
	28	100	28-4L100	225.	28	20	5 1/4	92	100	28-4AB100	294.	34	20	5 1/4	102	
	30	100	30-4L100	236.	28	20	5 1/4	95	100	30-4AB100	305.	34	20	5 1/4	104	
	32	225	32-4L225	254.	34	20	5 1/4	95	225	32-4AB225	506.	46	20	5 1/4	144	
	34	225	34-4L225	265.	34	20	5 1/4	103	225	34-4AB225	517.	46	20	5 1/4	148	
	36	225	36-4L225	276.	34	20	5 1/4	103	225	36-4AB225	528.	46	20	5 1/4	148	
	38	225	38-4L225	287.	34	20	5 1/4	112	225	38-4AB225	539.	46	20	5 1/4	155	
	40	225	40-4L225	298.	34	20	5 1/4	112	225	40-4AB225	550.	46	20	5 1/4	155	
	42	225	42-4L225	309.	34	20	5 1/4	114	225	42-4AB225	561.	46	20	5 1/4	160	

SPECIAL FEATURES AND OPTIONS—NPLAB AND NLAB

- 15 amp., 120 volt, single pole breakers supplied as standard. 20, 30, 40 or 50 amp., 1 Pole breakers can be supplied without price change. Higher rated breakers may require increased main bus capacity.
- Prices of panelboards are with all spaces filled. For omission of breakers deduct \$3.10 each
- Substitution of double pole independent trip breakers for two single pole breakers add \$0.50 each
- Substitution of 2 or 3 pole common trip breakers for 2 or 3 single pole breakers, use Table below.
- Omission of solid neutral bar deduct \$11.00
- Increase of main bus and lug capacity
100 to 225 amps. 2 pole 3 pole
\$14.00 \$14.00
- Subfeed lugs—
225 amps and below, 2 or 3 pole add \$11.00
- Subfeed breakers—
225 amp., 2 pole, JA Frame add \$193.00
225 amp., 3 pole, JA Frame add \$242.00

Poles	Amp. Range	Voltage	Price Addition	
			NPLAB	NLAB
2	15-50	120/240	\$.70 ea.	\$.70 ea.
2	70	120/240	② .50	6.80
2	100	120/240	③ .50	11.90
2	15-50	240	11.80	11.80
2	70	240	② .50	11.90
3	15-50	240	12.70	12.70
3	70	240	③ 9.40	28.30
3	90-100	240	④ 13.40	---

- ③ 4 single pole spaces are required; no breakers can be mounted opposite these breakers.
④ 6 single pole spaces are required; no breakers can be mounted opposite these breakers.

① Price includes door, lock and circuit directory. Main breakers have non-interchangeable trip.
Dimensions and weights approximate.

DISCOUNT SCHEDULE 23 CD

CUTLER-HAMMER

PANELBOARDS

Type NA1B Circuit Breaker Lighting Panelboards



WHEN ORDERING SPECIFY

- Catalog number
- Surface or flush mounting
- Special features and options requested

Example: NA1B 08-3L100, surface mounting, 2-40 amp. single pole breakers and 2-40 amp. double pole common trip breakers.

APPLICATION: AC or DC meets Federal Specification W-P-131a, Class C, Underwriter's Laboratories listed.

SERVICE: 120/240 volts, single phase—3 wire, 240 volts, single phase—2 wire or 3 phase—3 wire. 120/208 volts, 3 phase—4 wire, 125/250 volts, 3 wire d-c.

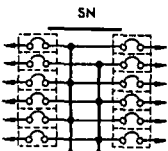
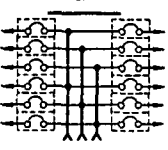
MAINS: Lugs only—100 amps., 14-1/0 Cu wire, 225 amps., 6-250 MCM Cu wire.

Breakers—50 amps. 14-4 Cu wire. 100 amps., 14-1 Cu wire. 225 amps., 6-250 MCM Cu wire.

Panels furnished with Cu Lugs only. For AL-Cu Lugs information on application.

BRANCHES: Single pole, type E bolt-in breakers 15 to 50 amps.

WITH TYPE E BOLT-IN BREAKERS

System	No. of Poles	With Main Lugs Only							With Circuit Breaker Mains						
		Main Amps.	Catalog Number	① Price	Dimen. in Inches			Ship. Wt. Lbs.	Main Amps.	Catalog Number	① Price	Dimen. in Inches			Ship. Wt. Lbs.
					High	Wide	Deep					High	Wide	Deep	
SINGLE PHASE, 3 WIRE—TYPE NA1B—3															
	8	100	NA1B-08-3L100	\$171.	22	20	5 1/4	60	50	NA1B-08-3AB50	\$204.	28	20	5 1/4	72
	10	100	10-3L100	198.	22	20	5 1/4	67	50	10-3AB50	231.	28	20	5 1/4	79
	12	100	12-3L100	225.	22	20	5 1/4	69	100	12-3AB100	278.	28	20	5 1/4	81
	14	100	14-3L100	252.	28	20	5 1/4	78	100	14-3AB100	305.	34	20	5 1/4	90
	16	100	16-3L100	279.	28	20	5 1/4	80	100	16-3AB100	332.	34	20	5 1/4	92
	18	100	18-3L100	306.	28	20	5 1/4	88	100	18-3AB100	359.	34	20	5 1/4	100
	20	100	20-3L100	333.	34	20	5 1/4	90	100	20-3AB100	386.	46	20	5 1/4	102
	22	225	22-3L225	364.	34	20	5 1/4	99	225	22-3AB225	569.	46	20	5 1/4	148
	24	225	24-3L225	391.	34	20	5 1/4	101	225	24-3AB225	596.	46	20	5 1/4	150
	26	225	26-3L225	418.	34	20	5 1/4	110	225	26-3AB225	623.	46	20	5 1/4	158
	28	225	28-3L225	445.	34	20	5 1/4	112	225	28-3AB225	650.	46	20	5 1/4	160
	30	225	30-3L225	472.	34	20	5 1/4	121	225	30-3AB225	677.	46	20	5 1/4	168
	32	225	32-3L225	499.	40	20	5 1/4	123	225	32-3AB225	704.	52	20	5 1/4	170
	34	225	34-3L225	526.	40	20	5 1/4	132	225	34-3AB225	731.	52	20	5 1/4	178
	36	225	36-3L225	553.	40	20	5 1/4	134	225	36-3AB225	758.	52	20	5 1/4	180
	38	225	38-3L225	580.	46	20	5 1/4	154	225	38-3AB225	785.	58	20	5 1/4	188
	40	225	40-3L225	607.	46	20	5 1/4	156	225	40-3AB225	812.	58	20	5 1/4	190
	42	225	42-3L225	634.	46	20	5 1/4	165	225	42-3AB225	839.	58	20	5 1/4	198
3 PHASE, 4 WIRE—TYPE NA1B—4															
	8	100	NA1B-08-4L100	\$182.	22	20	5 1/4	61	50	NA1B-08-4AB50	\$230.	28	20	5 1/4	75
	10	100	10-4L100	209.	22	20	5 1/4	68	50	10-4AB50	257.	28	20	5 1/4	82
	12	100	12-4L100	236.	22	20	5 1/4	70	50	12-4AB50	284.	28	20	5 1/4	84
	14	100	14-4L100	263.	28	20	5 1/4	79	50	14-4AB50	311.	34	20	5 1/4	93
	16	100	16-4L100	290.	28	20	5 1/4	81	100	16-4AB100	359.	34	20	5 1/4	95
	18	100	18-4L100	317.	28	20	5 1/4	89	100	18-4AB100	386.	34	20	5 1/4	103
	20	100	20-4L100	344.	34	20	5 1/4	91	100	20-4AB100	413.	34	20	5 1/4	105
	22	100	22-4L100	371.	34	20	5 1/4	99	100	22-4AB100	440.	34	20	5 1/4	113
	24	100	24-4L100	398.	34	20	5 1/4	101	100	24-4AB100	467.	34	20	5 1/4	115
	26	100	26-4L100	425.	34	20	5 1/4	110	100	26-4AB100	494.	40	20	5 1/4	123
	28	100	28-4L100	452.	34	20	5 1/4	112	100	28-4AB100	521.	40	20	5 1/4	125
	30	100	30-4L100	479.	34	20	5 1/4	121	100	30-4AB100	548.	40	20	5 1/4	133
	32	225	32-4L225	512.	40	20	5 1/4	125	225	32-4AB225	764.	52	20	5 1/4	173
	34	225	34-4L225	539.	40	20	5 1/4	134	225	34-4AB225	791.	52	20	5 1/4	181
	36	225	36-4L225	566.	40	20	5 1/4	136	225	36-4AB225	818.	52	20	5 1/4	183
	38	225	38-4L225	593.	46	20	5 1/4	156	225	38-4AB225	845.	58	20	5 1/4	191
	40	225	40-4L225	620.	46	20	5 1/4	158	225	40-4AB225	872.	58	20	5 1/4	193
	42	225	42-4L225	647.	46	20	5 1/4	167	225	42-4AB225	899.	58	20	5 1/4	201

① Price includes door, lock and circuit directory. Main breakers have non-interchangeable trip. Dimensions and weights approximate.

SPECIAL FEATURES SEE NEXT PAGE

CUTLER-HAMMER

DISCOUNT SCHEDULE 23 CD



PANELBOARDS

Type NH1B Circuit Breaker Lighting Panelboards

WHEN ORDERING SPECIFY See previous page

SPECIFICATIONS—NH1B

APPLICATION: A-C only. Meets Federal specification W-P-131a. Class D. Underwriter's Laboratory listed.

SERVICE: 277/480 volts, 3 phase—4 wire.

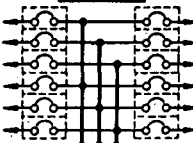
MAINS: Lugs only—50 amps., 14-4 Cu wire. 100 amps., 14-1/0 Cu wire. 225 amps., 6-250 MCM Cu wire.

Breakers—50 amps., 14-4 Cu wire. 100 amps., 14-1 Cu wire. 225 amps., 6-250 MCM Cu wire.

Panels furnished with Cu lugs only. For AL-Cu lugs, information on application.

BRANCHES: Single pole, type EH bolt-in breakers. 15 to 50 amperes.

WITH TYPE EH BOLT-IN BREAKERS

System	No. of Poles	② With Main Lugs Only							② With Circuit Breaker Main						
		Main Amps.	Catalog Number	① Price	Dimen's. in Inches			Ship. Wt. Lbs.	Main Amps.	Catalog Number	① Price	Dimen's. in Inches			Ship. Wt. Lbs.
					High	Wide	Deep					High	Wide	Deep	
3 PHASE, 4 WIRE — TYPE NH1B															
	8	100	NH1B-08-4L100	\$210.	22	20	5¾	61	50	NH1B-08-4AB50	\$281.	28	20	5¾	88
	10	100	10-4L100	244.	22	20	5¾	68	50	10-4AB50	315.	28	20	5¾	95
	12	100	12-4L100	278.	22	20	5¾	70	50	12-4AB50	349.	28	20	5¾	97
	14	100	14-4L100	312.	28	20	5¾	79	50	14-4AB50	383.	34	20	5¾	106
	16	100	16-4L100	346.	28	20	5¾	81	100	16-4AB100	433.	34	20	5¾	108
	18	100	18-4L100	380.	28	20	5¾	89	100	18-4AB100	467.	34	20	5¾	116
	20	100	20-4L100	414.	34	20	5¾	91	100	20-4AB100	501.	34	20	5¾	118
	22	100	22-4L100	448.	34	20	5¾	99	100	22-4AB100	535.	34	20	5¾	126
	24	100	24-4L100	482.	34	20	5¾	101	100	24-4AB100	569.	34	20	5¾	128
	26	100	26-4L100	516.	34	20	5¾	110	100	26-4AB100	603.	40	20	5¾	136
	28	100	28-4L100	550.	34	20	5¾	112	100	28-4AB100	637.	40	20	5¾	138
	30	100	30-4L100	584.	34	20	5¾	121	100	30-4AB100	671.	40	20	5¾	146
	32	225	32-4L225	628.	40	20	5¾	125	225	32-4AB225	876.	52	20	5¾	173
	34	225	34-4L225	658.	40	20	5¾	134	225	34-4AB225	910.	52	20	5¾	181
	36	225	36-4L225	692.	40	20	5¾	136	225	36-4AB225	944.	52	20	5¾	183
	38	225	38-4L225	726.	46	20	5¾	156	225	38-4AB225	978.	58	20	5¾	191
	40	225	40-4L225	760.	46	20	5¾	158	225	40-4AB225	1012.	58	20	5¾	193
	42	225	42-4L225	794.	46	20	5¾	167	225	42-4AB225	1046.	58	20	5¾	201

SPECIAL FEATURES AND OPTIONS—NA1B AND NH1B

1. 15 amp., 120 volt, single pole breakers supplied as standard. 20, 30, 40 or 50 amp., single pole breakers can be supplied without price change. Higher rated breakers may require increased main bus capacity.

2. Prices of panelboards are with all spaces filled. For omission of breakers NA1B..... deduct \$9.70 each
NH1B..... deduct \$12.40 each

3. Substitution of 2 or 3 pole common trip breakers for 2 or 3 single pole breakers, use Table below.

Poles	Amp. Range	Voltage	Price Addition	
			NA1B	NH1B
2	15-50	240	\$5.50	---
		480	---	\$22.40
2	70-100	240	25.50	---
		480	---	36.40
3	15-50	240	7.00	---
		480	---	22.10
3	70-100	240	28.50	---
		480	---	36.10

4. Omission of solid neutral bar..... deduct \$11.00

5. Increase main bus and lug capacity

	2 pole	3 pole
100 to 225 amps.	\$14.00	\$14.00

6. Subfeed lugs—
225 amps. and below, 2 and 3 pole..... \$11.00

7. ③ Subfeed breakers—
225 amps., 2 pole, JA Frame..... \$193.00
225 amps., 3 pole, JA Frame..... \$242.00

③ On NH1B panels a maximum of one subfeed breaker per panel may be added.

Additional Features and Options, Page 62.

① Price includes door, lock, and circuit directory. Main breakers have non-interchangeable trip.

② Dimensions and weights approximate.

PANELBOARDS

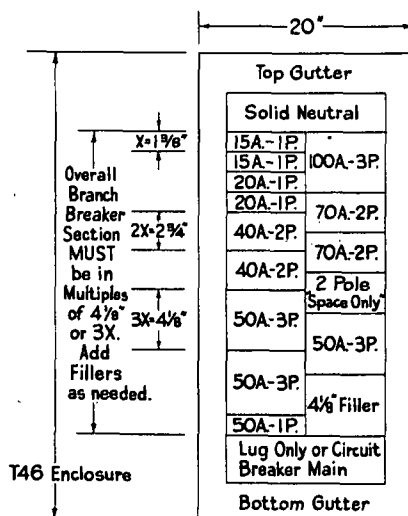


Convertible Circuit Breaker Distribution Panelboards Type NDP - with Type E Bolt-in Breakers and Type NHDP - with Type EH Bolt-in Breakers

WHEN ORDERING

- Make a sketch of panelboard, similar to typical one shown.
- Label sketch with type panelboard required, NDP or NHDP.
- List ampere capacity of all components—neutral, branches, main lugs or breaker and panel.
- If total X-unit spaces required exceeds 30, layout 2 or more panelboards. If panels are to be cabled together, include subfeed lugs or breakers.
- Submit labeled sketch with order and list of priced components, similar to pricing example.

TYPICAL PANELBOARD LAYOUT



TYPE NDP SPECIFICATIONS

APPLICATION: For AC or DC. Meets Federal specification W-P-131a, Class C. Underwriter's Laboratories listed.

SERVICE: 120/240 volts, single phase—3 wire 240 volts, single phase—2 wire or 3 phase—3 wire. 120/208 volts, 3 phase—4 wire. 125/250 volts, d-c.

MAINS: Lugs only—100 amps., 14-1/0 Cu wire. 225 amps., 6-250 MCM Cu wire. 400 amps., 6-600 MCM Cu wire. 600 amps., (2) 6-600 MCM Cu wire. Breakers—100 amps., 14-1 Cu wire. 225 amps., 6-250 MCM Cu wire. 400 amps., 6-600 MCM or (2) 2/0—250 MCM Cu wire.

Panels furnished with Cu lugs only. For AL-Cu lugs, information on application.

Branches: Single, double or three pole—Type E bolt-in breakers, 15 to 100 amperes.

TYPE NHDP SPECIFICATIONS

APPLICATION: AC only. Meets Federal specification W-P-131a, Class D. **SERVICE:** 277/480 volts, 3 phase—4 wire. 480 volts, 3 phase—3 wire. Underwriter's Laboratories listed.

MAINS: Lugs only—100 amps., 14-1/0 Cu wire. 225 amps., 6-250 MCM Cu wire. 400 amps., 6-600 MCM Cu wire. 600 amps., (2) 6-600 MCM Cu wire.

Breakers—100 amps., 14-1 Cu wire. 225 amps., 6-250 MCM Cu wire. 400 amps., 6-600 MCM or (2) 2/0—250 MCM Cu wire.

Panels furnished with Cu lugs only. For AL-Cu lugs, information on application.

BRANCHES: Single, double or three pole—Type EH bolt-in breakers, 15 to 100 amperes.

PRICING EXAMPLE— TYPE NDP

120/208 Volts, 3 Phase—4 Wire, A-c with Solid Neutral	
Base Price—225A. 3 pole with circuit breaker main	
225A. solid neutral	\$325.00
2—15A. single pole breakers	25.00
2—20A. single pole breakers	27.00
1—50A. single pole breaker	27.00
2—40A. double pole breakers	13.50
2—70A. double pole breakers	65.00
1—Double pole "Space Only"	105.00
3—50A. three pole breakers	6.50
1—100A. three pole breaker	142.50
1—4 1/8" filler	69.00
	N/C

Total price of panel including T46 cabinet.....\$805.50

PRICING EXAMPLE— TYPE NHDP

277/480 Volts, 3 Phase—4 Wire, A-c with Solid Neutral	
Base Price—225A. 3 pole with circuit breaker main	
225A. solid neutral	\$ 325.00
2—15A. single pole breakers	25.00
2—20A. single pole breakers	39.00
1—50A. single pole breaker	39.00
2—40A. double pole breakers	19.50
2—70A. double pole breakers	119.00
1—Double pole "Space Only"	147.00
3—50A. three pole breakers	8.50
1—100A. three pole breaker	229.50
1—4 1/8" filler	90.50
	N/C

Total price of panel including T46 cabinet.....\$1042.00

SELECTION TABLES, NEXT PAGE.

CUTLER-HAMMER

**PANELBOARDS****Convertible Circuit Breaker Distribution Panelboards****Type NDP—With Type E Bolt-in Breakers****Type NHDP—With Type EH Bolt-in Breakers**

FOR PRICING INSTRUCTIONS SEE PREVIOUS PAGE.

BASE PRICE—TYPE NDP AND NHDP

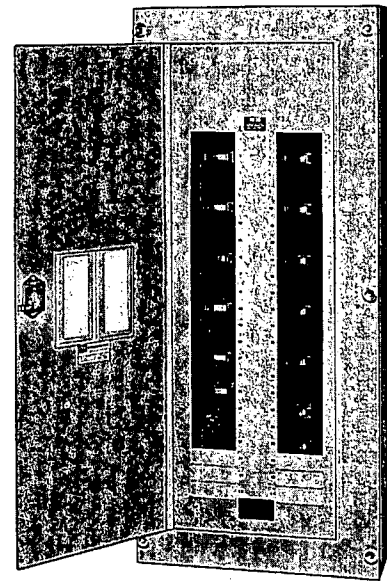
Main Amperes	NDP, NHDP With Main Lugs Only		NDP With Circuit Breaker Main		NHDP With Circuit Breaker Main	
	2 Pole	3 Pole	2 Pole	3 Pole	2 Pole	3 Pole
100	\$56.	\$67.	\$109.	\$136.	\$128.	\$155.
225	60.	73.	265.	325.	265.	325.
400	82.	97.	427.	514.	427.	514.
600	104.	119.	---	---	---	---

FOR NDP—TYPE E BOLT-IN BRANCH BREAKERS

No. of Poles	Voltage	Price			X—Units ②
		15-50 Amperes	70-100 Amperes	① Space Only	
1	120	\$13.50	\$27.00	\$4.00	1X
2	240	32.50	52.50	6.50	2X
3	240	47.50	69.00	8.50	3X

FOR NHDP—TYPE EH BOLT-IN BRANCH BREAKERS

No. of Poles	Voltage	Price			X—Units ②
		15-50 Amperes	70-100 Amperes	① Space Only	
1	277	\$19.50	---	\$5.00	1X
2	480	59.50	\$73.50	8.50	2X
3	480	76.50	90.50	11.50	3X



NDP or NHDP

**SOLID NEUTRAL—
TYPE NDP AND NHDP**

Ampere Rating	Price
100	\$20.00
225	25.00
400	32.00
600	46.00

**MODIFICATIONS
TYPE NDP AND NHDP**

Ampere Rating	Price	
	2 Hot Bus Bars	3 Hot Bus Bars
SPLIT BUS		
225	\$26.00	\$37.00
400	55.00	65.00
600	65.00	72.00
SUBFEED LUGS		
225	\$11.00	\$11.00
400	37.00	43.00
SUBFEED BREAKERS		
225	\$193.	\$242.

ENCLOSURES—TYPE NDP AND NHDP

Total X—Units	With Main Lugs Only				With Circuit Breaker Main		
	100 Amps.	225 Amps.	400 Amps.	600 Amps.	100 Amps.	225 Amps.	400 Amps.
3X	T22	T22	T28	T34	T28	T34	T40
4X	T22	T22	T28	T34	T28	T34	T40
5X	T22	T22	T28	T34	T28	T34	T40
6X	T22	T22	T28	T34	T28	T34	T40
7X	T28	T28	T34	T40	T34	T40	T46
8X	T28	T28	T34	T40	T34	T40	T46
9X	T28	T28	T34	T40	T34	T40	T46
11X	T34	T34	T40	T46	T40	T46	T52
13X	T34	T34	T40	T46	T40	T46	T52
15X	T34	T34	T40	T46	T40	T46	T52
16X	T40	T40	T46	T52	T46	T52	T58
17X	T40	T40	T46	T52	T46	T52	T58
19X	T46	T46	T52	T58	T52	T58	T64
20X	T46	T46	T52	T58	T52	T58	T64
22X	T46	T46	T52	T58	T52	T58	T64
26X	T52	T52	T58	T64	T58	T64	T70
30X	T52	T52	T58	T64	T58	T64	T70

① "Space only" includes means for mounting future breakers.

② For each pair of breakers mounted opposite each other. For example, 10 single pole breakers take 5x-units and 2 three pole breakers take 3x-units of space when mounted opposite each other.

③ Enclosures are approximately 20 inches wide by 5 3/4 inches deep. Last two digits of enclosure number approximate height in inches.

DISCOUNT SCHEDULE 23 CD

ADDITIONAL SPECIAL FEATURES, page 62.

CUTLER-HAMMER

PANELBOARDS



Convertible Type CDP Circuit Breaker Panelboards With Types E, EH, F, JA, KA, LA and MA Breakers

WHEN ORDERING

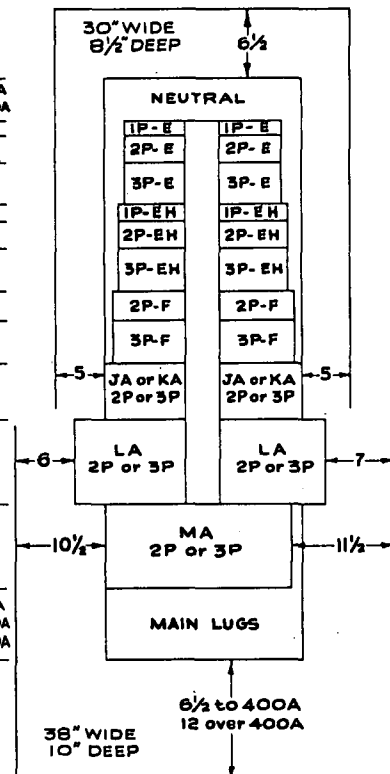
- Make sketch of panelboard similar to one shown in example.
- List ampere capacity of all components—neutral, branches, and mains.
- Specify flush or surface mounting.
- If total X-unit spaces required exceeds 48, layout 2 or more single panels. Add subfeed lugs to all but one panel.
- If total X-unit spaces required does not equal a panel height shown in the dimension table, the next larger panelboard should be used.
- Provide drilling template or other specifications with order, or boxes will be supplied without knockouts.
- Submit labeled sketch with order and list of priced components, similar to pricing example.

PRICING EXAMPLE NO. 1

400 A., Solid Neutral.....	\$ 32.
1—15A, 2P., 250V.....	39.
1—30A, 2P., 250V.....	39.
2—50A, 3P., 250V.....	112.
1—200A, 3P., 250V. JA Frame.....	242.
Base Price, 400A.....	108.
	\$572.

220 Volts		
Neutral Bar, 400 A.	3X	
15A, 2 P. E Frame	2X	30 A, 2 P. E Frame
50 A, 3 P. E Frame	3X	50 A, 3 P. E Frame
200 A, 3 P. JA Frame	4X	
400 A. Main Lug Section	3X	
	15X	

3X to 400A	
4X over 400A	
X = 1 5/8	
2X = 2 3/4	
3X = 4 1/8	
X = 1 5/8	
2X = 2 3/4	
3X = 4 1/8	
4X = 5 1/2	



PRICING EXAMPLE NO. 2

600A, Solid Neutral.....	\$ 46.
1—50A, 3P., 600V.....	92.
1—90A, 3P., 600V.....	108.
1—30A, 2P., 600V.....	71.
1—100A, 2P., Space.....	6.50
1—125A, 3P., 600V. JA Frame.....	242.
1—200A, 2P., JA Frame.....	193.
1—225A, 3P., Space.....	18.50
1—600A, 3P., 600V.....	731.
Base Price, 600A.....	208.
	\$1716.

440 Volts		
600 A. Solid Neutral	4X	
50 A, 3 P. F frame	3X	90 A, 3 P. F frame
30 A, 2 P. F frame	2X	Space 2 P. F frame
125 A, 3 P. JA frame	4X	200 A, 2 P. JA frame
Space 3 P. KA frame	4X	
600 A, 3 P. Main Breaker	6X	
	23X	

3X to 400A	
5X 401-800A	
9X 1000-1200A	

PANEL AND BOX INSIDE DIMENSIONAL DATA

Length of Panel Only	Dimensions in Inches—Main Bus Capacity								
	Up to 225 A.			250 to 400 A.			450 A. and Above		
	Wide	High	Deep	Wide	High	Deep	Wide	High	Deep
12X	30	29 1/4	8 1/2	38	29 1/4	10 1/2	38	35	10 1/2
16X	30	35	8 1/2	38	35	10 1/2	38	40 1/2	10 1/2
20X	30	40 1/2	8 1/2	38	40 1/2	10 1/2	38	46	10 1/2
24X	30	46	8 1/2	38	46	10 1/2	38	51 1/2	10 1/2
28X	30	51 1/2	8 1/2	38	51 1/2	10 1/2	38	57	10 1/2
32X	30	57	8 1/2	38	57	10 1/2	38	62 1/2	10 1/2
36X	30	62 1/2	8 1/2	38	62 1/2	10 1/2	38	68	10 1/2
40X	30	68	8 1/2	38	68	10 1/2	38	73 1/2	10 1/2
44X	30	73 1/2	8 1/2	38	73 1/2	10 1/2	38	79	10 1/2
48X	30	79	8 1/2	38	79	10 1/2	38	84 1/2	10 1/2

PRICES NEXT PAGE. Price includes door, lock and circuit directory.
ALL DIMENSIONS APPROXIMATE.



PANELBOARDS

Convertible Type CDP Circuit Breaker Panelboards

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FOR PRICING INSTRUCTIONS,
See Previous Page.

BASE PRICE ①

② Amp. Mains 2, 3 or 4 Wire	Largest Breaker Allowed			Space Req. X—Units
	225 A JA or KA	400 A LA or MA	600 A MA	
225	\$86.	---	---	3X
400	108.	\$140.	---	3X
600	140.	173.	\$208.	5X
800	173.	208.	273.	5X
1200	238.	273.	347.	9X

BRANCH CIRCUITS

Breaker			Price					Space X Units X = 1½"
Frame and Type	Trip Rating	No. of Poles	250V. A-c 125V. D-c	480V. A-c	600V. A-c 250V. D-c	Ⓢ Space Only	Provision for Future Breaker	
NON-INTERCHANGEABLE TRIP								
Ⓢ 50 Amp.	15, 20, 30, 40, 50 Amp.	1	\$19.50 (E)	\$22. (EH)	---	\$5.50	\$8.	1X
		2	39. (E)	62. (EH)	\$71. (F)	6.50	11.	2X
		3	56. (E)	80. (EH)	92. (F)	8.50	15.	3X
100 Amp. Ⓢ	70, 90, 100 Amp.	2	57. (E)	76. (EH)	87. (F)	6.50	11.	2X
		3	75. (E)	94. (EH)	108. (F)	8.50	15.	3X
225 Amp. JA	125, 150, 175, 200, 225 Amp.	2	193.	193.	193.	18.50	28.	4X
		3	242.	242.	242.	18.50	42.	4X
INTERCHANGEABLE TRIP								
225 Amp. KA ④	125, 150, 175, 200, 225 Amp.	2	\$246.	\$246.	\$246.	\$18.50	\$58.	4X
		3	317.	317.	317.	18.50	83.	4X
400 Amp. LA ④ ⑤	250, 300, 350, 400, Amp.	2	368.	368.	368.	18.50	65.	6X
		3	453.	453.	453.	18.50	87.	6X
600 Amp. MA	250, 275, 300, 325, 350, 400, 450, 500, 550, 600 Amp.	2	566.	566.	566.	37.	110.	6X
		3	731.	731.	731.	37.	153.	6X
800 Amp. MA	700, 800 Amp.	2	737.	737.	737.	37.	144.	6X
		3	953.	953.	953.	37.	188.	6X

SPECIFICATIONS

Application: A-c or D-c. Meets Federal Specification W-P-131a. Underwriter's Laboratories listed.

Service: 600 volts A-c, 250 volts D-c, max.
Single phase—2 or 3 wire.
Three phase—3 or 4 wire.

Mains: Lugs only—up to 1200 amperes
Breaker—up to 800 amperes

Standard Terminals CU wire only.
AL-CU Lugs—Information on Application.

Branches: Types E, EH, F, JA, KA, LA and MA breakers.

SOLID NEUTRAL BARS ⑥

Amp.	Price	Space Req. X—Units
225	\$25.	3X
400	32.	3X
600	46.	4X
800	65.	4X
1200	77.	4X

SPLIT BUS-LUGS

Amp.	Price		Space Req. X—Units
	2 Pole	3 Pole	
200	\$46.	\$55.	3X
400	55.	65.	6X
600	65.	72.	6X
800	92.	102.	8X
1200	110.	119.	12X

SUB-FEED LUGS ONLY OR FEED THROUGH LUGS AT BOTH ENDS

Main Amps.	Price	
	2 Bus Bars	3 Bus Bars
225	\$18.	\$24.
400	37.	43.
600	65.	72.
800	92.	102.
1000	110.	120.

① Use once per Breaker panel, Base Price is determined by largest breaker in panel (Main or Branch). Price includes top and bottom gutters, with respective sections of bus, box and front to circuit edge. Remaining equipment for complete Breaker panel included in Branch Circuit Prices.

② For Panelboard with Main Breaker, consider main breaker as branch breaker with main lugs and price accordingly.

③ "Space Only" prices are to be used only when specifications require space for future circuits.

④ KA and LA frame circuit breakers require full width of panel when used as main breakers. No branch breaker may be mounted opposite.

⑤ Price includes neutral bar, lug for each branch circuit, portion of back plate, box and trim.

⑥ E and EH breakers cannot be located opposite F frame breakers.

DISCOUNT SCHEDULE 23 CD

FOR OPTIONS AND SPECIAL FEATURES see next page

CUTLER-HAMMER

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CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS ⑧

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

PANELBOARDS

Special Features



LIGHTING & POWER DISTRIBUTION BREAKER PANELS

- 1—Split bus (meter loop)
Not available on NPLAB

	2 Hot Bus Bars	3 Hot Bus Bars
Lighting Breakerpanels only	\$ 28.	\$ 39.
2—Increased gauge over standard. Maximum 10 gauge—		
Box only		\$ 27.
Trim only		27.
Box & Trim		36.
3—Increased end gutters over standard. For each 12" or fraction thereof increase in length of cabinet, add		36.
4—Increased side gutters over standard. For each 7" or fraction thereof increase in width of cabinet, add		36.
5—Increased depth of panelboards over standard to 8" maximum increase, add		36.
6—Weatherproof cabinets:		
(a) Single door-Breakerpanels requiring boxes not over 20" wide	102.	
(b) Single door-Breakerpanels requiring boxes over 20" wide	136.	
(c) Door-back-of-door-Breakerpanels requiring boxes not over 20" wide	136.	
(d) Door-back-of-door-Breakerpanels requiring boxes over 20" wide	205.	
7—Dust Resisting Cabinets (Felt or rubber gaskets provided for door and front only):		
(a) Breakerpanels requiring boxes not over 20" wide	54.	
(b) Breakerpanels requiring boxes over 20" wide	72.	
8—Mounting only of any standard steel-panel mounted device (such as pilot lights, tumbler switches, etc.) in Breaker panel trim-device not included.		
For first device	18.	
For each additional device	9.	
9—Mounting only of instruments (such as time clocks) add	36.	
(Price includes drilling only. Extra space may be required—add for space from notes 4, 5 and 6).		
10—Special trim or door arrangements:		
(a) Double or split doors, one above the other	54.	
(b) One front with two doors in place of two individual fronts to cover two separate boxes mounted side by side	54.	
(c) Special directory frame (2½ x 6½ is standard)	6.	
11—Hot-dipped Galvanized Cabinet—		
(a) Maximum dimensions—20" x 60"		
Box or front only	92.	
Box and front	135.	
(b) Maximum dimensions—30" x 84"		
Box or front only	183.	
Box and front	236.	
12—Cadmium Plated Cabinet—		
(a) Maximum dimensions—20" x 48"		
Box or front only	37.	
Box and front	64.	
(b) Maximum dimensions—30" x 84"		
Box or front only	78.	
Box and front	126.	
13—Special paint finish on boxes or fronts or both—(No extra charge for prime coat only)	54.	
14—Special Locks and keying		
(a) Special locks	25.	
(b) Master keying—(2 master keys furnished) per lock	3.	
NOTE: Enclosures up to 52" in height have flush type locks which are keyed alike.		
15—Vault handle and 3 point catch (when not standard)	27.	

- 16—Cross bussing (connecting two panel busses in a common enclosure):

	2 Hot Busses	3 Hot Busses	Solid Neutral Bus
Mains—200 A.	\$ 49.	\$ 75.	\$ 32.
400 A.	81.	117.	39.
600 A.	99.	127.	42.
800 A.	117.	150.	50.

- 17—Remote control switches. (Price includes space and complete installation except pushbutton controls.)

	Mechani- cally Held ASCO Bul. 920	Electri- cally Held ASCO Bul. 1025
30 Amp. 2 Pole—(Light Duty)	\$143.	---
30 Amp. 3 Pole—(Light Duty)	173.	---
30 Amp. 2 Pole	242.	\$192.
60 Amp. 2 Pole	290.	256.
75 Amp. 2 Pole	340.	---
100 Amp. 2 Pole	379.	309.
150 Amp. 2 Pole	556.	506.
200 Amp. 2 Pole	658.	549.
30 Amp. 3 Pole	274.	222.
60 Amp. 3 Pole	340.	288.
75 Amp. 3 Pole	388.	---
100 Amp. 3 Pole	428.	363.
150 Amp. 3 Pole	625.	606.
200 Amp. 3 Pole	755.	678.
Remote control switch shock and vibration mounts —Per Set	33.	33.

- 18—Time Clocks

(Time clocks mounted in top section of panelboard cabinet under separate door. Price includes required addition hardware and mounting panel—No wiring.)	
(a) Sangamo Type L-12	\$195.
(b) Sangamo Type L-12 with Astronomic Dial	231.
(c) Tork, Model 1197	148.
(d) Tork, Model 1197 with Astronomical Dial	184.

- 19—Conduit Hubs

(a) 1½" and below	\$ 5.
(b) 1½"-3"	9.
(c) 3½"-4½"	15.

LIGHTING BREAKER PANELS ONLY

- 1—Increased main bus capacity:

	Lugs Only	Circuit Breaker
50 Amp. to 100 amp. 2 pole	N/C	\$ 31.
50 Amp. to 100 amp. 3 pole	N/C	44.
50 Amp. to 225 amp. 2 pole	\$ 14.	183.
50 Amp. to 225 amp. 3 pole	14.	225.
100 Amp. to 225 amp. 2 pole	14.	165.
100 Amp. to 225 amp. 3 pole	14.	188.
225 Amp. to 400 amp. 2 pole	114.	---
225 Amp. to 400 amp. 3 pole	129.	---

- 2—Subfeeds (only one per Breaker panel)

	Lugs Only	Circuit Breaker
50 Amp. 2 pole	\$ 11.	\$ 33.
50 Amp. 3 pole	11.	48.
100 Amp. 2 pole	11.	53.
100 Amp. 3 pole	11.	64.
225 Amp. 2 pole	11.	193.
225 Amp. 3 pole	11.	242.

- 3—Double lugs priced same as sub feed lugs

OPTIONAL

- 1—Main lugs at top instead of bottom. (No Charge)

- 2—Special knockouts, drillings or blank ends in ends of boxes (drilling template must accompany order). (Charge \$11. for each different size).

- 3—Engraved name plates, Each \$6.

- 1 Deduct 25% if individual order calls for duplicate cabinets with the same special feature or if quantity of 10 or more assorted breaker panels are involved.
2 These modifications require increase in dimensions of enclosure (included in price).

CUTLER-HAMMER

DISCOUNT SCHEDULE 23 CD



SWITCHBOARDS

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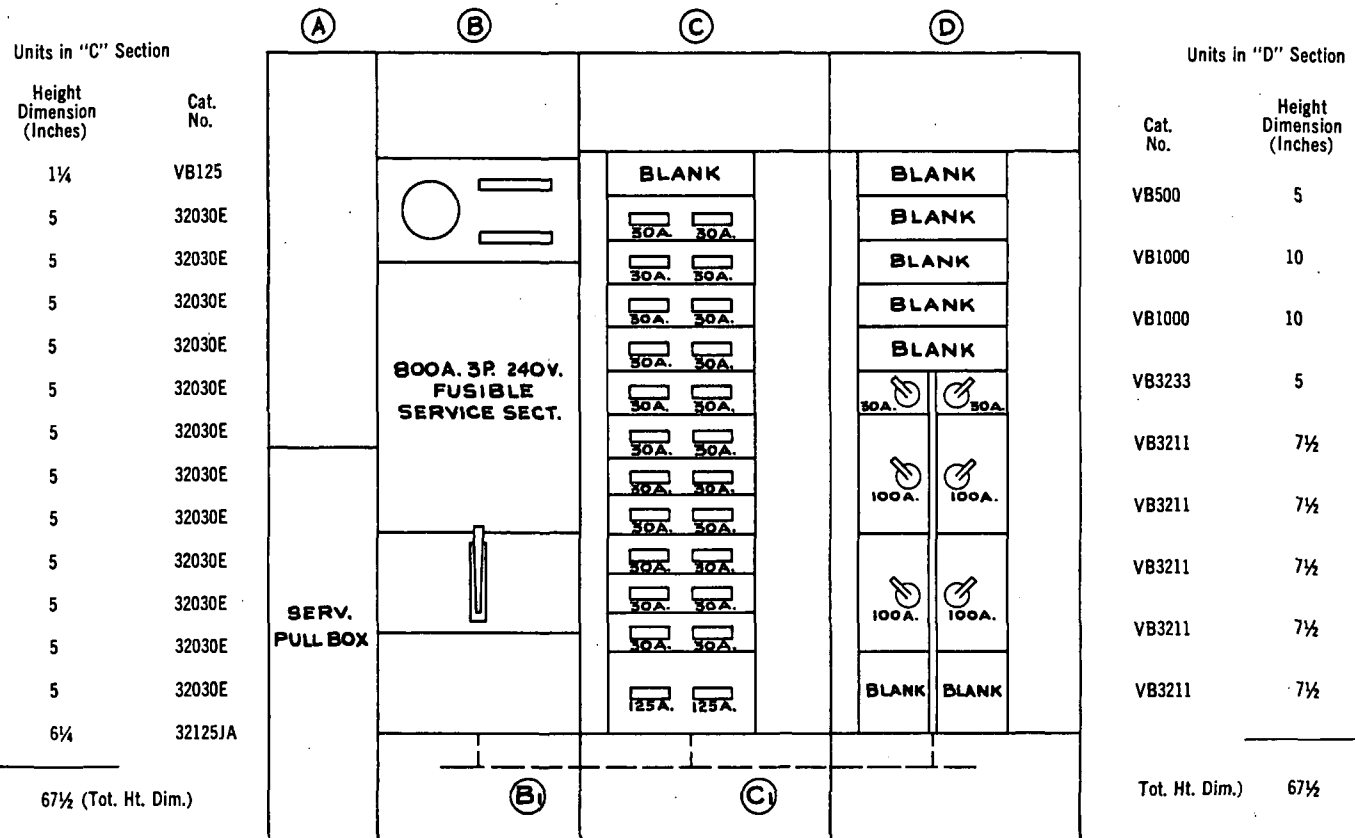
Pricing Procedure—Service Sections

SERVICE SECTION INFORMATION

The Main Service switchboards listed include, in addition to the main service switch or circuit breaker, the necessary mounting provisions only for the serving utility's metering current transformers, watthour meter, reactivehour meter, reactiformer, and secondary test switch as required by the Pacific Utilities Electric Service Requirements Coordinating Committee (P. U. E. S. R. C. C.) standards. Refer inquiries from areas served by utilities which do not prescribe to these standards, or have different requirements, to Cutler-Hammer.

TYPICAL SWITCHBOARD ESTIMATE

- 1—Make a layout of the switchboard, similar to the one below.
- 2—Label all components on the layout and list them separately.
- 3—Determine prices of components and add to component listing.
- 4—The total of the component and unit prices shall be the total price of the switchboard.



PRICING ESTIMATE

Item	Component	Prices
"A"	1—1290PB Underground Pullbox Section.....	\$100.00
"B"	1—FSN328, 800 A., 3 P., 240 V. Fusible Service Section, complete.....	972.00
"B1"	1—XB38, 800 A., 3 P., Cross Bus.....	120.00
"C"	1—VB398, 800 A., 3 P. Distribution Section, containing:.....	420.00
	24—32030E, 30 A., 3 P., 240 V. Circuit Breakers.....	1344.00
	2—36125JA, 125 A., 3 P., 600 V. Circuit Breakers.....	484.00
	1—VB125, 1 1/4 inch Blank Filler Unit.....	N/C
"C1"	1—XB38, 800 A., 3 P. Cross Bus.....	120.00
"D"	1—VB398, 800 A., 3 P. Distribution Section, containing:.....	420.00
	5—VB3211, 100/100 A., 3 P., 240 V. Fusible Switch.....	570.00
	1—VB3233, 30/30 A., 3 P., 240 V. Fusible Switch.....	82.00
	2—VB1000, 10 inch Blank Filler Units.....	N/C
	1—VB500, 5 inch Blank Filler Unit.....	N/C
TOTAL LIST PRICE		\$4632.00

SWITCHBOARDS

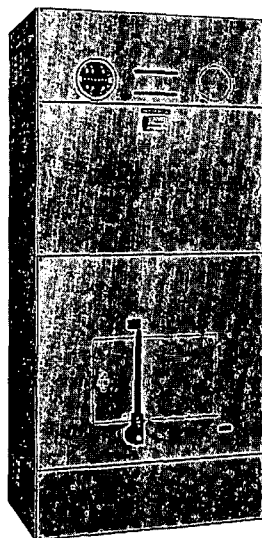
Service Sections

Type FSN, HFSN, OSN and CBN—with Provision for WHM Metering and
Current Transformer

For ordering instructions, see page 63.



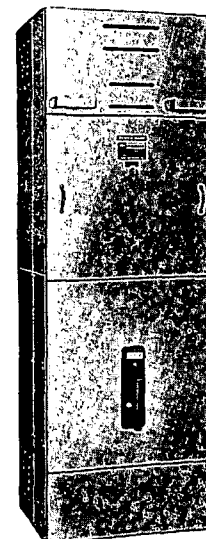
Type FSN



Type HFSN



Type CBN—200-800 Amp.



Type CBN—600-1600 Amp.

TYPE FSN

System	Ampere Rating	Catalog Number	Price ①	Dimensions in Inches			Ship. Wt. Lbs.
				Wide	High	Deep	
WITH FUSIBLE MAIN DISCONNECT							
3 Wire S/N (2 Blades, 2 Fuses) 120/240 V. A-c 240 V. A-c	200	FSN-222	\$308.	24	90	15	290
	400	224	380.	24	90	15	310
	600	226	486.	24	90	15	350
	800	228	918.	24	90	15	380
	1200	2212	1188.	32	90	15	400
3 Pole 240 V. A-c	200	322	356.	24	90	15	300
	400	324	428.	24	90	15	324
	600	326	594.	24	90	15	370
	800	328	972.	24	90	15	400
	1200	3212	1404.	32	90	15	440
3 Pole 480 V. A-c	200	352	390.	24	90	15	300
	400	354	452.	24	90	15	330
	600	356	654.	24	90	15	370
4 Wire S/N (3 Blades, 3 Fuses) 120/208 V. A-c 240 V. A-c	200	422	390.	32	90	15	310
	400	424	476.	32	90	15	340
	600	426	666.	32	90	15	380
	800	428	1188.	32	90	15	410
	1200	4212	1544.	42	90	15	450
4 Wire S/N (3 Blades, 3 Fuses) 277/480 V. A-c	200	452	424.	32	90	15	320
	400	454	500.	32	90	15	350
	600	456	736.	32	90	15	390

① Price does not include fuses.

② Deduct \$150. from list price and 13" from width dimension if WHM meter mounting provision or space is not required.
Dimensions and weights, approximate.

TYPE HFSN

System	Ampere Rating	Catalog Number	Price ①	Dimensions in Inches			Ship. Wt. Lbs.
				Wide	High	Deep	
WITH HIGH CAPACITY FUSIBLE MAIN DISCONNECT AND WITH PROVISIONS FOR CURRENT LIMITING TYPE FUSES							
3 Wire S/N (2 Blades, 2 Fuses) 120/240 V. A-c 240 V. A-c	1200	HFSN-2212	\$2050.	42	90	25	1500
	1600	2216	2380.	42	90	25	1600
	2000	2220	2730.	42	90	25	1700
	② 2500	2225	3920.	60	90	25	1900
	② 3000	2230	4680.	60	90	25	2200
	② 4000	2240	5890.	60	90	29	2600
3 Pole 240 V. A-c	1200	3212	2470.	42	90	25	1600
	1600	3216	2830.	42	90	25	1700
	2000	3220	3250.	42	90	25	1800
	② 2500	3225	4550.	60	90	25	2000
	② 3000	3230	5520.	60	90	25	2300
	② 4000	3240	7160.	60	90	29	2700
3 Pole 480 V. A-c 600 V. A-c	1200	3512	3050.	42	90	25	1900
	1600	3516	3370.	42	90	25	2000
	2000	3520	3750.	42	90	25	2100
	② 3000	3530	6910.	60	90	29	2600
	② 4000	3540	9240.	66	90	35	3000
	4 Wire S/N (3 Blades, 3 Fuses) 120/208 V. A-c 120/240 V. A-c (Delta)	1200	4212	2620.	42	90	25	1700
1600		4216	3000.	42	90	25	1800
2000		4220	3450.	42	90	25	1900
② 2500		4225	4680.	60	90	25	2100
② 3000		4230	5670.	60	90	25	2400
② 4000		4240	7360.	60	90	29	2900
4 Wire S/N (3 Blades, 3 Fuses) 277/480 V. A-c	1200	4512	3200.	42	90	25	2000
	1600	4516	3540.	42	90	25	2100
	2000	4520	3970.	42	90	25	2200
	② 3000	4530	7060.	60	90	29	2700
	② 4000	4540	9440.	66	90	35	3200

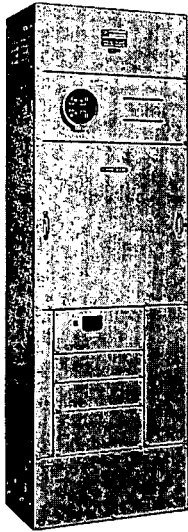
MODIFICATIONS AND ACCESSORIES, page 73.

DISCOUNT SCHEDULE 23 CD

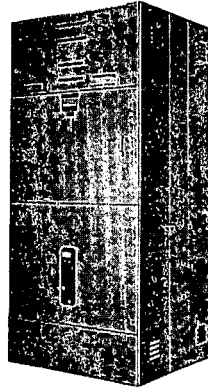
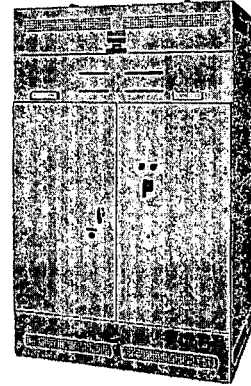


SWITCHBOARDS

Type FSN, HFSN, OSN and CBN – with Provisions for WHM Metering and Current Transformer



Type OSN

Type CBN
2000-4000 Amps.Type CBN
5000-6000 Amps.

TYPE OSN

System	Ampere Rating	Catalog Number	Price	Dimen. in Inches			Ship. Wt. Lbs.
				Wide	High	Deep	
② WITHOUT MAIN AND WITH PROVISIONS FOR SWITCHES OR CIRCUIT BREAKERS							
3 Wire S/N 120/240V A-c	400	OSN-224	\$300.	32	90	15	300
	600	226	375.	32	90	15	310
	800	228	450.	32	90	15	335
	④ 1200	2212	600.	32	90	15	360
	④ 1600	2216	750.	32	90	15	385
	④ 2000	2220	900.	32	90	25	470
3 Pole 250V A-c 480V A-c	400	354	300.	32	90	15	325
	600	356	375.	32	90	15	340
	800	358	450.	32	90	15	370
	④ 1200	3512	600.	32	90	15	410
	④ 1600	3516	750.	32	90	15	440
	④ 2000	3520	900.	32	90	25	535
④ 4 Wire S/N 120/208V A-c 120/240V A-c 277/480V A-c	400	454	330.	32	90	15	320
	600	456	405.	32	90	15	335
	800	458	480.	32	90	15	365
	1200	4512	650.	42	90	15	400
	1600	4516	800.	42	90	15	430
	2000	4520	950.	42	90	25	520

CURRENT LIMITING FUSES —For HFSN

240V. and 480V.

Ampere Rating	Price (per Fuse)	Ship. Wt. Lbs.
600	\$70.	4
1200	120.	5
1600	160.	6
2000	200.	9
2500	250.	14
3000	300.	18
4000	400.	26

TYPE CBN

System	Ampere Rating	① Catalog Number	Price	Dimen. in Inches			Ship. Wt. Lbs.
				Wide	High	Deep	
WITH CIRCUIT BREAKER MAIN DISCONNECT							
3 Wire S/N 120/240V A-c 240V A-c 600V A-c	200	CBN-262	\$508.	24	90	15	290
	400	264	880.	24	90	15	310
	600	266	998.	24	90	15	330
	800	268P	1782.	24	90	15	350
	800	268	3348.	32	90	25	910
	1000	2610P	2567.	32	90	15	400
	1200	2612	3672.	32	90	25	925
	1600	2616	3672.	32	90	25	980
	2000	2620	9147.	32	90	39¼	1160
	3000	2630	9964.	32	90	39¼	1280
	4000	2640	13067.	32	90	39¼	1610
3 Pole 240, 480 or 600V A-c	200	362	594.	24	90	15	300
	400	364	1022.	24	90	15	330
	600	366	1198.	24	90	15	350
	800	368P	1944.	24	90	15	370
	800	368	3618.	32	90	25	970
	1000	3610P	2620.	32	90	15	420
	1200	3612	3942.	32	90	25	1000
	1600	3616	3942.	32	90	25	1050
	2000	3620	9800.	32	90	39¼	1200
	3000	3630	10780.	32	90	39¼	1330
	4000	3640	14157	42	90	39¼	1710
	5000	3650	⑤	57	90	50	⑤
	6000	3660	③	57	90	50	③
4 Pole S/N 120/208V A-c 277/480V A-c	200	462	648.	32	90	15	340
	400	464	1070.	32	90	15	370
	600	466	1264.	32	90	15	390
	800	468P	2052.	32	90	15	410
	800	468	3964.	42	90	25	1000
	1000	4610P	2700.	42	90	15	430
	1200	4612	4288.	42	90	25	1100
	1600	4616	4288.	42	90	25	1150
	2000	4620	10350.	42	90	39¼	2000
	3000	4630	11480.	42	90	39¼	2200
	4000	4640	14760.	42	90	39¼	2500
	5000	4650	⑤	57	90	50	⑤
	6000	4660	⑤	57	90	50	⑤

① Plastic case breakers furnished in units to 600 amps. also 800 and 1000 amp. units, where suffix "P" follows catalog number. All others 800 amps. and higher furnished with air circuit breaker.

② Main bus risers provide 30" of space for switches or circuit breaker units.

③ On application.

Dimensions and weights approximate.

④ Do not include wiring space for top exit of load conductors. Add 1290PB or 2490PB pullbox (from page 71) if top exit is required.

DISCOUNT SCHEDULE 23 CD

MODIFICATIONS AND ACCESSORIES, page 73

CUTLER-HAMMER

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS®

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

SWITCHBOARDS



Combination Service and Distribution Sections

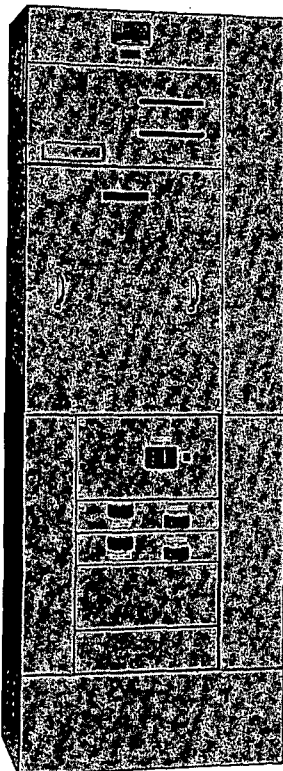
With Provisions for WHM and KVAR Metering and Current Transformer

For Ordering Instructions, see page 63.

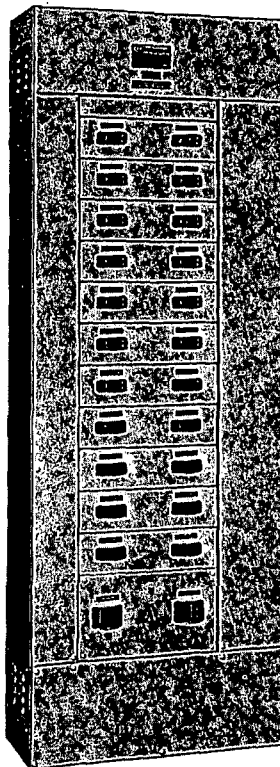
TYPE VSN AND CSN

System	With Fusible Main Disconnect				With Circuit Breaker Main Disconnect				Dimensions in Inches			Ship. Wt. Lbs.
	Ampere Rating	Space for Branch Units in Inches	Catalog Number	Price	Ampere Rating	Space for Branch Units in Inches	Catalog Number	Price				
									Wide	High	Deep	
3 Wire S/N 120/240V A-c 240V A-c ---	200	22½	VSN-222	\$428.	225	23¾	CSN-222	\$628.	32	90	15	320
	400	15	224	500.	400	20	224	1000.	32	90	15	340
	600	15	226	606.	600	20	226	1118.	32	90	15	360
	---	---	---	---	800	20	228P	1982.	32	90	15	380
3 Pole 240V A-c ---	200	15	322	478.	225	18¾	322	714.	32	90	15	320
	400	10	324	548.	400	15	324	1142.	32	90	15	340
	600	10	326	714.	600	15	326	1318.	32	90	15	360
	---	---	---	---	800	15	328P	2144.	32	90	15	380
3 Pole 600V A-c ---	200	15	362	510.	225	18¾	362	714.	32	90	15	320
	400	10	364	574.	400	15	364	1142.	32	90	15	340
	600	10	366	774.	600	15	366	1318.	32	90	15	360
	---	---	---	---	800	15	368P	2144.	32	90	15	380
4 Wire S/N 120/208V A-c	200	15	422	510.	---	---	---	---	32	90	15	300
	400	10	424	596.	---	---	---	---	32	90	15	320
	600	10	426	786.	---	---	---	---	32	90	15	340
4 Wire S/N 277/480V A-c ---	200	15	452	554.	225	18¾	462	728.	32	90	15	300
	400	10	454	694.	400	15	464	1190.	32	90	15	320
	600	10	456	834.	600	15	466	1384.	32	90	15	340
	---	---	---	---	800	15	468P	2172.	32	90	15	360

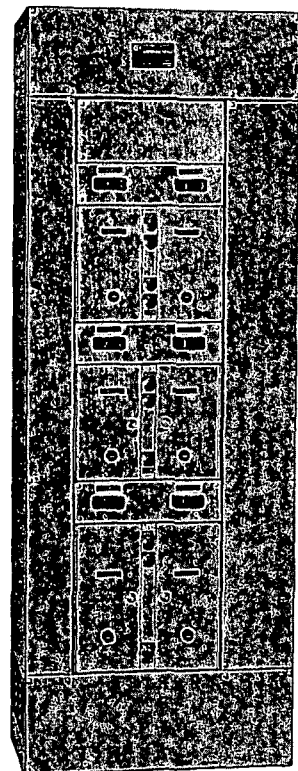
④ Do not include wiring space for top exit of load conductors. Add 1290PB pullbox if top exit is required.



Type CSN without distribution section filled



Type VB with circuit breakers



Type VB with circuit breakers and motor starters

Circuit Breakers, Fusible Switches and Starters, pages 69-72.
MODIFICATIONS AND ACCESSORIES, page 73.

DISCOUNT SCHEDULE 23 CD

CUTLER-HAMMER



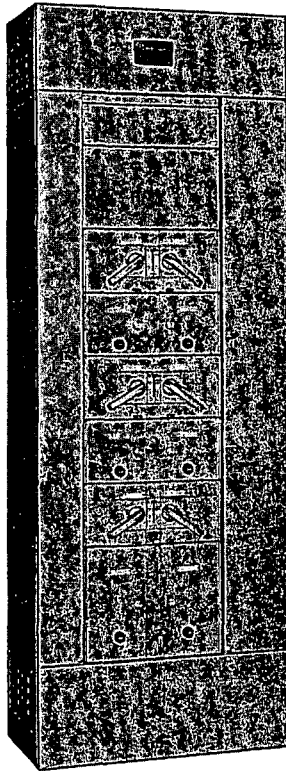
SWITCHBOARDS

Distribution Sections

With Provision for Circuit Breakers, Fusible Switches and Magnetic Motor Starters

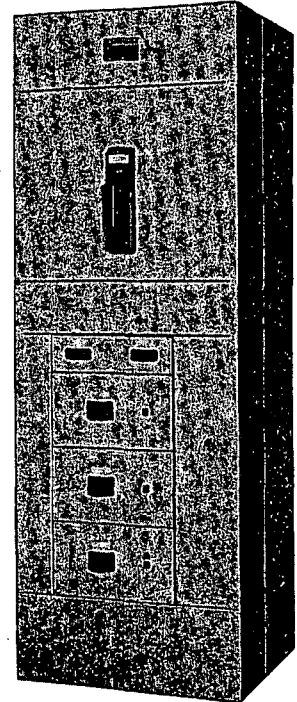
TYPE CB-VB —with 800, 1200 or 1600 ampere circuit breaker

System	Branch Circuit Breaker Amperes	Catalog Number	Price ②	Dimensions in Inches			Ship. Wt. Lbs.
				Wide	High	Deep	
3 Wire S/N 120/240V A-c	800	CB-298VB	\$3480.	32	90	25	960
	1200	2912VB	3810.	32	90	25	975
	1600	2916VB	3810.	32	90	25	1030
3 Pole 240, 480 or 600V A-c	800	398VB	3757.	32	90	25	1020
	1200	3912VB	4084.	32	90	25	1050
	1600	3916VB	4084.	32	90	25	1100



Type VB with fusible switches and motor starters

Type CB-VB



TYPE VB

System	Ampere Rating	Catalog Number	Price	Dimensions in Inches			Ship. Wt. Lbs.
				Wide	High	Deep	
3 Wire S/N 120/240V A-c		VB-					
	200	292	\$270.	32	90	15	290
	400	294	320.	32	90	15	300
	600	296	350.	32	90	15	310
	800	298	420.	32	90	15	335
	1200	2912	540.	32	90	15	360
	1600	2916	600.	32	90	15	385
	2000	2920	1080.	32	90	25	470
3 Pole 240, 480 or 600V A-c	200	392	\$270.	32	90	15	310
	400	394	320.	32	90	15	325
	600	396	350.	32	90	15	340
	800	398	420.	32	90	15	370
	1200	3912	540.	32	90	15	410
	1600	3916	650.	32	90	15	440
	2000	3920	1080.	32	90	25	535
4 Pole S/N 120/208V A-c 120/240V (Delta) 277/480V A-c	200	492	\$300.	32	90	15	300
	400	494	350.	32	90	15	320
	600	496	400.	32	90	15	335
	800	498	500.	32	90	15	365
	1200	4912	600.	32	90	15	400
	1600	4916	800.	32	90	15	430
	2000	4920	1200.	32	90	25	520

① Bus bar risers provide 35" of space for units.

② Price includes branch air circuit breaker.

③ Main bus risers provide 67½" of space for units. Deduct 5" of this space for solid neutral in sizes up to 1200 amperes and deduct 7½" on 1600 and 2000 ampere sizes.

DISCOUNT SCHEDULE 23 CD

Circuit Breakers, Fusible Switches and Starters, Pages 69-72.
MODIFICATIONS AND ACCESSORIES, page 73.

GUTLER-HAMMER

SWITCHBOARDS

Panel Board Distribution Sections



PRICING INSTRUCTIONS

1. Make a sketch. Show system voltage, location of main lugs (top or bottom), and indicate quantity and size of feeders.
2. List main switch or breaker if required.
3. List neutral if required (Indicate quantity and size of conductors).
4. List branches, fusible switches, breakers and motor starters.
5. List any additional features.
6. List price and unit height required opposite each item including base and lug height shown in base price table.
7. If height totals less than 45", 55", 65", 75" or 85" add necessary blank fillers to adjust height to one of these box heights.
8. If height totals more than 85", price as two separate panels and add for subfeed lugs.
9. Total prices for all items listed.
10. Total height of all items listed; this is the box height and must total 45", 55", 65", 75" or 85" for each panelboard distribution section.

TYPE QVB—BASE PRICE—LUGS ONLY

System	Ampere Rating	Maximum Branch Circuit: 200 Amp. Fusible Switch 400 Amp. Circuit Breaker Size 5 Magnetic Starter Enclosure: 30" Wide, 12½" Deep			Maximum Branch Circuit: 600 Amp. Fusible Switch 1000 Amp. Circuit Breaker Size 5 Magnetic Starter Enclosure: 36" Wide, 12½" Deep			Main Lug Sizes (Cu. Wire)	
		① Catalog Number	Price	Base and Lug Height	① Catalog Number	Price	Base and Lug Height	Quan. per ph.	Range
2 Pole 120V A-c 240V A-c 480V A-c 600V A-c	200	QVB-202X3	\$80.	17½	QVB-202X6	\$180.	17½	1	6—250 MCM
	400	204X3	100.	21¼	204X6	200.	21¼	2	6—250 MCM
	600	206X3	120.	21¼	206X6	220.	21¼	2	6—500 MCM
	800	208X3	160.	22½	208X6	260.	22½	3	6—500 MCM
	1200	212X3	210.	25	212X6	310.	25	4	6—500 MCM
3 Wire S/N 120/240V A-c	200	202N3	110.	22½	202N6	210.	22½	1	6—250 MCM
	400	204N3	140.	26¼	204N6	240.	26¼	2	6—250 MCM
	600	206N3	170.	26¼	206N6	270.	26¼	2	6—500 MCM
	800	208N3	220.	27¼	208N6	320.	27¼	3	6—500 MCM
	1200	212N3	290.	31¼	212N6	390.	31¼	4	6—500 MCM
3 Pole 240V A-c 480V A-c 600V A-c	200	302X3	90.	17½	302X6	190.	17½	1	6—250 MCM
	400	304X3	110.	21¼	304X6	210.	21¼	2	6—250 MCM
	600	306X3	140.	21¼	306X6	240.	21¼	2	6—500 MCM
	800	308X3	180.	22½	308X6	280.	22½	3	6—500 MCM
	1200	312X3	240.	25	312X6	340.	25	4	6—500 MCM
4 Wire S/N 120/208V A-c 120/240V A-c 277/480V A-c	200	302N3	120.	22½	302N6	220.	22½	1	6—250 MCM
	400	304N3	150.	26¼	304N6	250.	26¼	2	6—250 MCM
	600	306N3	190.	26¼	306N6	290.	26¼	2	6—500 MCM
	800	308N3	240.	27¼	308N6	340.	27¼	3	6—500 MCM
	1200	312N3	320.	31¼	312N6	420.	31¼	4	6—500 MCM

MAIN FUSIBLE SWITCH

System	Ampere Rating	Catalog Number	Price	Height in Inches
2 Pole 120 or 240V A-c, or 3 Wire S/N 120/240V A-c	100	VB-2201M	\$120.	7½
	200	2202M	120.	10
	400	2204M	300.	20
	600	2206M	440.	20
3 Pole 240V A-c or 4 Wire S/N 120/208V A-c	100	3201M	160.	7½
	200	3202M	160.	10
	400	3204M	410.	20
	600	3206M	560.	20
3 Pole 480V A-c or 4 Wire S/N 277/480V A-c	100	3501M	210.	7½
	200	3502M	210.	10
	400	3504M	508.	20
	600	3506M	605.	20

① Add suffix 45, 55, 65, 75 or 85 to indicate box height required.
MODIFICATIONS AND ACCESSORIES, page 73.

SUB FEED LUGS

Sub-Feed Ampere Rating	Price		Height in Inches
	2 Pole	3 Pole	
200	\$20.	\$30.	0
400	35.	45.	3¼
600	65.	75.	3¼
800	90.	100.	5
1200	110.	120.	7½
Sub-Feed Ampere Rating	Price		Height in Inches
	3-Wire S/N	4-Wire S/N	
200	\$30.	\$40.	0
400	45.	55.	3¼
600	75.	85.	7½
800	100.	110.	10
1200	120.	130.	15

Branch Circuit Breakers, Branch Fusible Switches and Magnetic Starters, see pages 69-72.

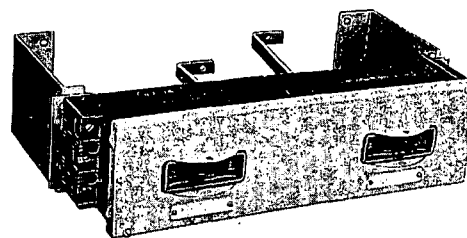
DISCOUNT SCHEDULE 23 CD

CUTLER-HAMMER



SWITCHBOARDS

Circuit Breaker Units



FOR ORDERING INSTRUCTIONS, SEE PAGE 63.
FOR INTERRUPTING CAPACITIES, SEE PAGE 53.

Circuit Breakers Twin VB Mounting

Ampere Rating	2 Pole or 3 Wire S/N				3 Pole or 4 Wire S/N			
	Catalog Number	Price	Unit Height in Inches ①	Shipping Weight	Catalog Number	Price	Unit Height in Inches ①	Shipping Weight
E—FRAME 240VAC								
15	22015E	\$39.	3¾	4	32015E	\$56.	5	5
20	22020E	39.	3¾	4	32020E	56.	5	5
30	22030E	39.	3¾	4	32030E	56.	5	5
40	22040E	39.	3¾	4	32040E	56.	5	5
50	22050E	39.	3¾	4	32050E	56.	5	5
70	22070E	57.	3¾	4	32070E	75.	5	5
90	22090E	57.	3¾	4	32090E	75.	5	5
100	22100E	57.	3¾	4	32100E	75.	5	5
EH—FRAME 480VAC								
15	24015EH	\$62.	3¾	4	34015EH	\$80.	5	5
20	24020EH	62.	3¾	4	34020EH	80.	5	5
30	24030EH	62.	3¾	4	34030EH	80.	5	5
40	24040EH	62.	3¾	4	34040EH	80.	5	5
50	24050EH	62.	3¾	4	34050EH	80.	5	5
70	24070EH	76.	3¾	4	34070EH	94.	5	5
90	24090EH	76.	3¾	4	34090EH	94.	5	5
100	24100EH	76.	3¾	4	34100EH	94.	5	5
F—FRAME 600VAC								
15	26015F	\$71.	3¾	10	36015F	\$92.	5	11
20	26020F	71.	3¾	10	36020F	92.	5	11
30	26030F	71.	3¾	10	36030F	92.	5	11
40	26040F	71.	3¾	10	36040F	92.	5	11
50	26050F	71.	3¾	10	36050F	92.	5	11
70	26070F	87.	3¾	10	36070F	108.	5	11
90	26090F	87.	3¾	10	36090F	108.	5	11
100	26100F	87.	3¾	10	36100F	108.	5	11
JA—FRAME 600VAC								
125	26125JA	\$193.	6¾	20	36125JA	\$242.	6¾	22
150	26150JA	193.	6¾	20	36150JA	242.	6¾	22
175	26175JA	193.	6¾	20	36175JA	242.	6¾	22
200	26200JA	193.	6¾	20	36200JA	242.	6¾	22
225	26225JA	193.	6¾	20	36225JA	242.	6¾	22
KA—FRAME 600VAC								
125	26125KA	\$246.	6¾	23	36125KA	\$317.	6¾	35
150	26150KA	246.	6¾	23	36150KA	317.	6¾	35
175	26175KA	246.	6¾	23	36175KA	317.	6¾	35
200	26200KA	246.	6¾	23	36200KA	317.	6¾	35
225	26225KA	246.	6¾	23	36225KA	317.	6¾	35
LA—FRAME 600VAC								
250	26250LA	\$368.	10	35	36250LA	\$453.	10	42
300	26300LA	368.	10	35	36300LA	453.	10	42
350	26350LA	368.	10	35	36350LA	453.	10	42
400	26400LA	368.	10	35	36400LA	453.	10	42
MA—FRAME 600VAC								
400	26400MA	\$566.	10	120	36400MA	\$731.	10	130
500	26500MA	566.	10	120	36500MA	731.	10	130
600	26600MA	566.	10	120	36600MA	731.	10	130
700	26700MA	737.	10	120	36700MA	953.	10	130
800	26800MA	737.	10	120	36800MA	953.	10	130
② LM—FRAME 600VAC								
900	26900LM	\$1126.	10	140	36900LM	\$1318.	10	150
1000	261000LM	1126.	10	140	361000LM	1318.	10	150

① Two E, EH, F, JA or KA breakers of the same frame size are normally mounted opposite each other in the unit height indicated. Prices shown are for individual breakers. When only one breaker of a frame size is required order a dummy cover plate from table on next page in lieu of the second breaker. Two LA frame breakers may be mounted opposite each other in the unit height indicated providing left-hand breaker does not exceed 225 amperes in rating.

② Not U/L listed.

DISCOUNT SCHEDULE 23 CD

CUTLER-HAMMER

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS ②

PANEL BOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

SWITCHBOARDS

Circuit Breaker Units With High Interrupting Capacity



For ordering instructions, see page 63.

For Interrupting Capacities, see page 53.

Ampere Rating	2 Pole or 3 Wire S/N				3 Pole or 4 Wire S/N			
	Catalog Number	Price	Unit Height in Inches ①	Shipping Weight	Catalog Number	Price	Unit Height in Inches ①	Shipping Weight
HF—FRAME 600VAC, 250VDC (2 POLE ONLY)								
15	26015HF	\$109.	5	13	36015HF	\$130.	5	14
20	26020HF	109.	5	13	36020HF	130.	5	14
25	26025HF	109.	5	13	36025HF	130.	5	14
30	26030HF	109.	5	13	36030HF	130.	5	14
35	26035HF	109.	5	13	36035HF	130.	5	14
40	26040HF	109.	5	13	36040HF	130.	5	14
50	26050HF	109.	5	13	36050HF	130.	5	14
70	26070HF	124.	5	13	36070HF	145.	5	14
90	26090HF	124.	5	13	36090HF	145.	5	14
100	26100HF	124.	5	13	36100HF	145.	5	14
HK—FRAME 600VAC, 250VDC (2 POLE ONLY)								
70	26070HK	\$432.	10	35	36070HK	\$529.	10	40
90	26090HK	432.	10	35	36090HK	529.	10	40
100	26100HK	432.	10	35	36100HK	529.	10	40
125	26125HK	432.	10	35	36125HK	529.	10	40
150	26150HK	432.	10	35	36150HK	529.	10	40
175	26175HK	432.	10	35	36175HK	529.	10	40
200	26200HK	432.	10	35	36200HK	529.	10	40
225	26225HK	432.	10	35	36225HK	529.	10	40
HKL—FRAME 600VAC, 250VDC (2 POLE ONLY)								
125	26125HKL	\$587.	10	40	36125HKL	\$712.	10	50
150	26150HKL	587.	10	40	36150HKL	712.	10	50
175	26175HKL	587.	10	40	36175HKL	712.	10	50
200	26200HKL	587.	10	40	36200HKL	712.	10	50
225	26225HKL	587.	10	40	36225HKL	712.	10	50
250	26250HKL	587.	10	40	36250HKL	712.	10	50
300	26300HKL	587.	10	40	36300HKL	712.	10	50
350	26350HKL	587.	10	40	36350HKL	712.	10	50
400	26400HKL	587.	10	40	36400HKL	712.	10	50
HLM—FRAME 600VAC, 250VDC (2 POLE ONLY)								
125	26125HLM	\$725.	10	130	36125HLM	\$890.	10	140
150	26150HLM	725.	10	130	36150HLM	890.	10	140
175	26175HLM	725.	10	130	36175HLM	890.	10	140
200	26200HLM	725.	10	130	36200HLM	890.	10	140
225	26225HLM	725.	10	130	36225HLM	890.	10	140
250	26250HLM	725.	10	130	36250HLM	890.	10	140
300	26300HLM	725.	10	130	36300HLM	890.	10	140
350	26350HLM	725.	10	130	36350HLM	890.	10	140
400	26400HLM	725.	10	130	36400HLM	890.	10	140
500	26500HLM	725.	10	130	36500HLM	890.	10	140
600	26600HLM	725.	10	130	36600HLM	890.	10	140
700	26700HLM	896.	10	130	36700HLM	1112.	10	140
800	26800HLM	896.	10	130	36800HLM	1112.	10	140
900	26900HLM	1324.	10	140	36900HLM	1550.	10	150
1000	261000HLM	1324.	10	140	361000HLM	1550.	10	150

DUMMY BREAKER COVER PLATE

Description	Catalog Number	Price
E	CB100—DE	\$12.
EH	CB100—DEH	12.
F & HF	CB100—DF	12.
JA & KA	CB100—DJA	12.

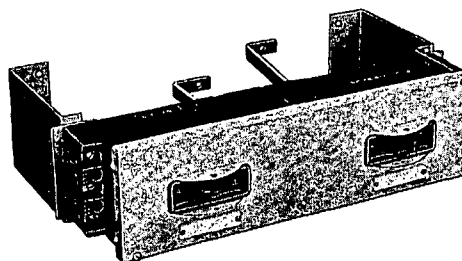
① Two HF breakers are normally mounted opposite each other in the unit height indicated. Prices shown are for individual breakers. When only one breaker of a frame size is required order a dummy cover plate, from the table above, in lieu of the second breaker.



SWITCHBOARDS

Circuit Breaker Units With Current Limiting Fuses

FOR ORDERING INSTRUCTIONS, SEE PAGE 63.
FOR INTERRUPTING CAPACITIES, SEE PAGE 53.



Ampere Rating	2 Pole or 3 Wire S/N				3 Pole or 4 Wire S/N			
	Catalog Number	Price ①	Unit Height in Inches	Ship. Wt.	Catalog Number	Price ①	Unit Height in Inches	Ship. Wt.
② TPF—FRAME								
15	26015TPF	\$366.	5	15	36015TPF	\$452.	5	20
20	26020TPF	366.	5	15	36020TPF	452.	5	20
30	26030TPF	366.	5	15	36030TPF	452.	5	20
40	26040TPF	366.	5	15	36040TPF	452.	5	20
50	26050TPF	366.	5	15	36050TPF	452.	5	20
70	26070TPF	366.	5	15	36070TPF	453.	5	20
90	26090TPF	366.	5	15	36090TPF	452.	5	20
100	26100TPF	366.	5	15	36100TPF	452.	5	20
Non-Auto	N26100TPF	352.	5	15	N36100TPF	437.	5	20
TPK—FRAME								
70	26070TPK	\$692.	10	70	36070TPK	\$866.	10	80
100	26100TPK	692.	10	70	36100TPK	866.	10	80
125	26125TPK	692.	10	70	36125TPK	866.	10	80
150	26150TPK	692.	10	70	36150TPK	866.	10	80
175	26175TPK	692.	10	70	36175TPK	866.	10	80
200	26200TPK	692.	10	70	36200TPK	866.	10	80
225	26225TPK	692.	10	70	36225TPK	866.	10	80
Non-Auto	N26225TPK	649.	10	70	N36225TPK	815.	10	80
TPKL—FRAME								
125	26125TPKL	\$900.	10	90	36125TPKL	\$1142.	10	100
150	26150TPKL	900.	10	90	36150TPKL	1142.	10	100
175	26175TPKL	900.	10	90	36175TPKL	1142.	10	100
200	26200TPKL	900.	10	90	36200TPKL	1142.	10	100
225	26225TPKL	900.	10	90	36225TPKL	1142.	10	100
250	26250TPKL	900.	10	90	36250TPKL	1142.	10	100
300	26300TPKL	900.	10	90	36300TPKL	1142.	10	100
350	26350TPKL	900.	10	90	36350TPKL	1142.	10	100
400	26400TPKL	900.	10	90	36400TPKL	1142.	10	100
Non-Auto	N26400TPKL	803.	10	90	N36400TPKL	1006.	10	100
② TPL—FRAME								
125	26125TPL	\$1334.	10	150	36125TPL	\$1642.	10	160
150	26150TPL	1334.	10	150	36150TPL	1642.	10	160
175	26175TPL	1334.	10	150	36175TPL	1642.	10	160
200	26200TPL	1334.	10	150	36200TPL	1642.	10	160
250	26250TPL	1334.	10	150	36250TPL	1642.	10	160
300	26300TPL	1334.	10	150	36300TPL	1642.	10	160
350	26350TPL	1334.	10	150	36350TPL	1642.	10	160
400	26400TPL	1334.	10	150	36400TPL	1642.	10	160
450	26450TPL	1334.	10	150	36450TPL	1642.	10	160
500	26500TPL	1334.	10	150	36500TPL	1642.	10	160
550	26550TPL	1334.	10	150	36550TPL	1642.	10	160
600	26600TPL	1334.	10	150	36600TPL	1642.	10	160
Non-Auto	N26600TPL	1220.	10	150	N36600TPL	1490.	10	160

① Price includes fuses.

② A 42" wide VB distribution section is required to mount TPL frame breakers or to twin-mount TPF frame breakers. Add \$168. to VB section for increased width.

DISCOUNT SCHEDULE 23 CD

CUTLER-HAMMER

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS®

PANELBOARDS &
SWITCHBOARDS

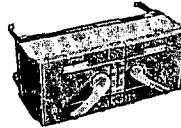
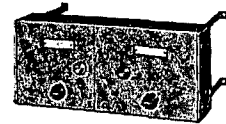
SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

SWITCHBOARDS

Branch Fusible Switch Units

FOR ORDERING INSTRUCTIONS, SEE PAGE 63.

Fusible
SwitchStarter
Units

System	① Ampere Rating	② Horsepower Ratings		Catalog Number	Price	Height in Inches	Shipping Weight
		A-c	D-c				
3 Wire S/N 120/240 V. A-c 240 V. A-c 250 V. D-c	30-30	1½-3	5	VB-2233	\$60.	5	23
	30-60	1½-3, 3-10	5-10	2236	60.	5	23
	60-60	3-10	10	2266	60.	5	23
	100-100	7½-15	20	2211	91.	7½	27
	200	15	40	2202	112.	7½	32
	400	---	50	2204	246.	15	64
	600	---	---	2206	383.	15	67
3 Pole 240 V. A-c or 4 Wire S/N 120/240 V. A-c	30-30	3-7½	---	3233	82.	5	25
	30-60	3-7½, 7½-15	---	3236	82.	5	25
	60-60	7½-15	---	3266	82.	5	25
	100-100	15-30	---	3211	114.	7½	29
	200	25-50	---	3202	157.	10	34
	400	50	---	3204	356.	15	73
	600	---	---	3206	503.	15	76
3 Pole 480, 600 V. A-c or 4 Wire S/N 277/480 V. A-c	30-30	480 V. A-c	600 V. A-c	3533	108.	7½	25
	30-60	5-15	7½-20	3536	108.	7½	25
	60-60	5-15, 15-30	7½-15, 20-50	3566	108.	7½	25
	100	15-30	15-30	3501	86.	7½	25
	200	25-50	30-50	3502	201.	10	34
	400	50	50	3504	454.	15	73
	600	---	---	3506	551.	15	76

Across-The-Line Starter Units

Size	Non-Reversing Types				Reversing Types			
	Catalog Number	Price	Unit Height in Inches	Ship. Wt.	Catalog Number	Price	Unit Height in Inches	Ship. Wt.
0 with Space for Additional Size 0	VBS-0-B	\$130.	7½	20	---	---	---	---
0	---	---	---	---	VBS-0R	\$280.	8¾	30
2-0's	VBS-0-0	212.	7½	25	VBS-0R-0R	440.	13¾	45
1	---	---	---	---	VBS-1R	306.	8¾	30
1 with Space for Additional Size 0 or 1	VBS-1-B	142.	8¾	25	---	---	---	---
1 and 0	VBS-1-0	224.	8¾	30	---	---	---	---
2-1's	VBS-1-1	236.	8¾	30	VBS-1R-1R	486.	15	50
2	---	---	---	---	VBS-2R	432.	13¾	55
2 with Space for Additional 0, 1, or 2	VBS-2-B	224.	11¼	40	---	---	---	---
2 and 1	VBS-2-1	318.	11¼	45	---	---	---	---
2-2's	VBS-2-2	388.	11¼	50	VBS-2R-2R	768.	21¼	90
3	---	---	---	---	VBS-3R	656.	17½	90
3 with Space for Additional 0, 1, 2 or 3	VBS-3-B	332.	15	50	---	---	---	---
3 and 1	VBS-3-1	432.	15	55	---	---	---	---
3 and 2	VBS-3-2	496.	15	65	---	---	---	---
2-3's	VBS-3-3	592.	15	70	VBS-3R-3R	1210.	23¾	130
4	VBS-4	660.	17½	65	VBS-4R	1236.	26¾	110
4 with Space for Additional 0, 1, 2, 3 or 4	VBS-4-B	700.	17½	65	---	---	---	---
4 and 1	VBS-4-1	802.	17½	70	---	---	---	---
4 and 2	VBS-4-2	884.	17½	80	---	---	---	---
4 and 3	VBS-4-3	992.	17½	85	---	---	---	---
2-4's	VBS-4-4	1220.	17½	90	---	---	---	---
5	VBS-5	1412.	27½	110	---	---	---	---

① The 30-30, 60-60 etc., indicates two switch units in one enclosure. The price includes both switches. When only one switch is required the same price applies. Single units are not available for 30, 60 or 100 ampere—250 volt or 30 or 60 ampere—600 volt classes.

② The higher horsepower ratings apply only when time lag fuses are used.

DISCOUNT SCHEDULE 23 CD

CUTLER-HAMMER



SWITCHBOARDS

Modifications and Accessories

CROSS BUS for Connecting 2 or More Sections

Ampere Rating	3 Wire S/N 120/240, 240 V. A-c			3 Pole 600 V. A-c			4 Wire S/N 120/208, 277/480 V. A-c			Number of Bus Bars Per Phase	Size of Bus Bars	Height above section mounting surface ①
	Catalog Number	Price	Ship. Wt.	Catalog Number	Price	Ship. Wt.	Catalog Number	Price	Ship. Wt.			
200	XB- 22	\$24.	10	XB- 32	\$42.	18	XB- 42	\$60.	20	1	1 3/4 x 2	7 1/4
400	24	40.	10	34	60.	18	44	80.	20	1	1 3/4 x 2	7 1/4
600	26	60.	15	36	90.	25	46	120.	30	1	1 3/4 x 2	7 1/4
800	28	80.	20	38	120.	35	48	160.	40	2	1 3/4 x 2	7 1/4
1200	212	120.	30	312	180.	55	412	240.	60	2	1 3/4 x 2	7 1/4
1600	216	160.	40	316	240.	70	416	320.	80	3	(1) 1 3/4 x 2 or (2) 1 3/4 x 2	7 1/4
2000	220	185.	50	320	270.	90	420	450.	100	2	1 3/4 x 4	5 1/4
3000	230	300.	75	330	450.	130	430	500.	150	3	1 3/4 x 4	5 1/4
4000	240	500.	100	340	600.	175	440	700.	200	4	1 3/4 x 4	5 1/4
5000	250	③	120	350	750.	220	450	900.	240	5	1 3/4 x 4	5 1/4

PULLBOX SECTIONS

Application	Dimen's. in Inches			Catalog Number	Price	Ship. Wt.
	Wide	High	Deep			
0 to 800 A.	12	90	15	1290PB	\$100.	165
0 to 800 A.	12	90	25	1290PBD	156.	195
801 to 3000 A.	24	90	15	2490PB	144.	235
801 to 3000 A.	24	90	25	2490PBD	208.	275
3000 A. and Up	32	90	15	3290PB	156.	280
3000 A. and Up	32	90	25	3290PBD	231.	390
3000 A. and Up	44	90	15	4490PB	371.	450
3000 A. and Up	44	90	25	4490PBD	435.	525
3000 A. and Up	57	90	15	5790PB	472.	535
3000 A. and Up	57	90	25	5790PBD	545.	750
Corner Post Section	15	90	15	1590CPS	139.	160
Vertical Barrier	15	90	15	9015B	28.	40
Vertical Barrier	25	90	25	9025B	46.	75

STARTER ENCLOSURES ONLY

Enclosure Size	Catalog Number	Price
0	VBS-0E	\$58.
1	VBS-1E	58.
2	VBS-2E	71.
3	VBS-3E	112.
4	VBS-4E	135.
5	VBS-5E	185.

STARTER ADDITIONS

Addition	Starter Size	
	0 to 4	5
Start-Stop Pushbutton.....	\$22.	\$44.
Selector Switch.....	22.	44.
Forward-Reverse-Stop Pushbutton.....	48.	68.
Pilot Light.....	36.	36.
Extra Auxiliary contact (unwired).....	15.	15.

① When cross bus over 2000 amperes is required, all sections must be 25" minimum depth to accommodate special spacing between phases.

② Furnished no charge when used on original order

③ Prices on application.

DISCOUNT SCHEDULE 23 CD

HINGED ENCLOSURES for VB Distribution Sections

Dimensions in Inches			Catalog Number	Price
Width	Height	Depth		
16	6 1/4	5 1/4	VB625HE	\$40.
16	7 1/4	4 1/2	VB750HE	40.
16	8 1/4	7 1/4	VB875HE	40.
16	11 1/4	8 1/4	VB1125HE	50.
16	13 1/4	5 1/2	VB1375HE	50.
16	15	8 1/4	VB1500HE	60.
16	17 1/4	8 1/4	VB1750HE	60.
16	21 1/4	7 1/4	VB2125HE	80.

Turn catch knob standard. For flush type lock.....add \$10.

HINGED DOOR SECTIONS

Application	Dimensions in Inches			Catalog Number	Price
	Width	Height	Depth		
Single Hinged Door	24	90	15	2490H	\$239.
Single Hinged Door	32	90	15	3290H	252.
Vert. Double Door	32	90	15	3290H-H	312.
Mounting Panel	24	90	15	2490MP	52.
Mounting Panel	32	90	15	3290MP	68.

BLANK FILLERS for VB Distribution Sections

Dimensions in Inches		Catalog Number	Price ②
Height	Width		
1 1/4	17 1/2	VB125	\$4.
2 1/4	17 1/2	VB250	5.
3 1/4	17 1/2	VB375	6.
5	17 1/2	VB500	8.
7 1/2	17 1/2	VB750	10.
10	17 1/2	VB1000	12.

SIDE FILLER PLATE ②

Description	Cat. No.	Price
7" x 11" Blank Plate.....	BP390	\$3.
7" x 11" Louvered Plate.....	LP390	4.

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS ②

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

CUTLER-HAMMER

SWITCHBOARDS



Replacement Parts List—Circuit Breaker Units

(Packaged Separately)

FOR INTERRUPTING CAPACITIES, SEE PAGE 53.

Breaker Type	Ampere Rating	2 Pole				3 Pole			
		Catalog Number	Price	Mounting ¹ Parts Group	Price	Catalog Number	Price	Mounting ¹ Parts Group	Price
"E" Frame 240 V. A-c	15	P22015E	\$28.	CBW100-2E	\$22.	P32015E	\$41.	CBW100-3E	\$30.
	20	P22020E	28.	CBW100-2E	22.	P32020E	41.	CBW100-3E	30.
	30	P22030E	28.	CBW100-2E	22.	P32030E	41.	CBW100-3E	30.
	40	P22040E	28.	CBW100-2E	22.	P32040E	41.	CBW100-3E	30.
	50	P22050E	28.	CBW100-2E	22.	P32050E	41.	CBW100-3E	30.
	70	P22070E	46.	CBW100-2E	22.	P32070E	60.	CBW100-3E	30.
	90	P22090E	46.	CBW100-2E	22.	P32090E	60.	CBW100-3E	30.
	100	P22100E	46.	CBW100-2E	22.	P32100E	60.	CBW100-3E	30.
"EH" Frame 480 V. A-c	15	P24015EH	51.	CB100-2EH	22.	P34015EH	65.	CB100-3EH	30.
	20	P24020EH	51.	CB100-2EH	22.	P34020EH	65.	CB100-3EH	30.
	30	P24030EH	51.	CB100-2EH	22.	P34030EH	65.	CB100-3EH	30.
	40	P24040EH	51.	CB100-2EH	22.	P34040EH	65.	CB100-3EH	30.
	50	P24050EH	51.	CB100-2EH	22.	P34050EH	65.	CB100-3EH	30.
	70	P24070EH	65.	CB100-2EH	22.	P34070EH	79.	CB100-3EH	30.
	90	P24090EH	65.	CB100-2EH	22.	P34090EH	79.	CB100-3EH	30.
	100	P24100EH	65.	CB100-2EH	22.	P34100EH	79.	CB100-3EH	30.
"F" Frame 600 V. A-c	15	P26015F	60.	CB100-2F	22.	P36015F	77.	CB100-3F	30.
	20	P26020F	60.	CB100-2F	22.	P36020F	77.	CB100-3F	30.
	30	P26030F	60.	CB100-2F	22.	P36030F	77.	CB100-3F	30.
	40	P26040F	60.	CB100-2F	22.	P36040F	77.	CB100-3F	30.
	50	P26050F	60.	CB100-2F	22.	P36050F	77.	CB100-3F	30.
	70	P26070F	76.	CB100-2F	22.	P36070F	93.	CB100-3F	30.
	90	P26090F	76.	CB100-2F	22.	P36090F	93.	CB100-3F	30.
	100	P26100F	76.	CB100-2F	22.	P36100F	93.	CB100-3F	30.
"JA" Frame 600 V. A-c	125	P26125JA	170.	CB225-2JA	56.	P36125JA	210.	CB225-3JA	84.
	150	P26150JA	170.	CB225-2JA	56.	P36150JA	210.	CB225-3JA	84.
	175	P26175JA	170.	CB225-2JA	56.	P36175JA	210.	CB225-3JA	84.
	200	P26200JA	170.	CB225-2JA	56.	P36200JA	210.	CB225-3JA	84.
	225	P26225JA	170.	CB225-2JA	56.	P36225JA	210.	CB225-3JA	84.
"KA" Frame 600 V. A-c	125	P26125KA	207.	CB225-2JA	56.	P36125KA	258.	CB225-3JA	84.
	150	P26150KA	207.	CB225-2JA	56.	P36150KA	258.	CB225-3JA	84.
	175	P26175KA	207.	CB225-2JA	56.	P36175KA	258.	CB225-3JA	84.
	200	P26200KA	207.	CB225-2JA	56.	P36200KA	258.	CB225-3JA	84.
	225	P26225KA	207.	CB225-2JA	56.	P36225KA	258.	CB225-3JA	84.
"LA" Frame 600 V. A-c ^①	250	P26250LA	330.	CB400-2LA	63.	P36250LA	400.	CB400-3LA	87.
	300	P26300LA	330.	CB400-2LA	63.	P36300LA	400.	CB400-3LA	87.
	350	P26350LA	330.	CB400-2LA	63.	P36350LA	400.	CB400-3LA	87.
	400	P26400LA	330.	CB400-2LA	63.	P36400LA	400.	CB400-3LA	87.
"MA" Frame 600 V. A-c	400	P26400MA	501.	CB400-2MA	110.	P36400MA	636.	CB400-3MA	153.
	500	P26500MA	501.	CB800-2MA	144.	P36500MA	636.	CB800-3MA	188.
	600	P26600MA	501.	CB800-2MA	144.	P36600MA	636.	CB800-3MA	188.
	700	P26700MA	653.	CB800-2MA	144.	P36700MA	840.	CB800-3MA	188.
	800	P26800MA	653.	CB800-2MA	144.	P36800MA	840.	CB800-3MA	188.
"LM" Frame 600 V. A-c ^②	900	P26900LM	928.	CB1000-2LM	198.	P36900LM	1070.	CB1000-3LM	248.
	1000	P261000LM	928.	CB1000-2LM	198.	P361000LM	1070.	CB1000-3LM	248.

CIRCUIT BREAKERS with High Interrupting Capacity

"HF" Frame 600 V. A-c	15	P26015HF	\$98.	CB100-2HF	\$22.	P36015HF	\$115.	CB100-3F	\$30.
	20	P26020HF	98.	CB100-2HF	22.	P36020HF	115.	CB100-3F	30.
	25	P26025HF	98.	CB100-2HF	22.	P36025HF	115.	CB100-3F	30.
	30	P26030HF	98.	CB100-2HF	22.	P36030HF	115.	CB100-3F	30.
	35	P26035HF	98.	CB100-2HF	22.	P36035HF	115.	CB100-3F	30.
	40	P26040HF	98.	CB100-2HF	22.	P36040HF	115.	CB100-3F	30.
	50	P26050HF	98.	CB100-2HF	22.	P36050HF	115.	CB100-3F	30.
250 V. D-c 2 Pole Only	70	P26070HF	113.	CB100-2HF	22.	P36070HF	130.	CB100-3F	30.
	90	P26090HF	113.	CB100-2HF	22.	P36090HF	130.	CB100-3F	30.
	100	P26100HF	113.	CB100-2HF	22.	P36100HF	130.	CB100-3F	30.
"HK" Frame 600 V. A-c	70	P26070HK	409.	CB225-2HK	39.	P36070HK	494.	CB225-3K	59.
	90	P26090HK	409.	CB225-2HK	39.	P36090HK	494.	CB225-3K	59.
	100	P26100HK	409.	CB225-2HK	39.	P36100HK	494.	CB225-3K	59.
	125	P26125HK	409.	CB225-2HK	39.	P36125HK	494.	CB225-3K	59.
250 V. D-c 2 Pole Only	150	P26150HK	409.	CB225-2HK	39.	P36150HK	494.	CB225-3K	59.
	175	P26175HK	409.	CB225-2HK	39.	P36175HK	494.	CB225-3K	59.
	200	P26200HK	409.	CB225-2HK	39.	P36200HK	494.	CB225-3K	59.
	225	P26225HK	409.	CB225-2HK	39.	P36225HK	494.	CB225-3K	59.

^① Two E, EH, F, JA, KA or HF breakers, of the same frame size, are normally mounted opposite each other in the unit height indicated. Prices shown are for individual breakers. When only one breaker of a frame size is required order a dummy cover plate, from the table at right, in lieu of the second breaker.

Prices do not include dummy breaker cover plates: See chart at right.

^② Not U/L listed.

^③ Prices and mounting hardware shown for single mounting. Two LA breakers may be mounted opposite each other providing left-hand breaker does not exceed 225 amperes in rating. Use mounting parts group CB422-2LA, \$126., for each pair of 2 pole breakers and CB422-3LA, \$174., for each 3 pole pair of breakers.

DUMMY BREAKER COVER PLATE

Catalog Number	Description	Price
PCB100-DE	E, EH	\$1.
PCB100-DF	F, HF, TPF	2.
PCB225-DJA	JA, KA	4.
PCB422-DLA	LA	4.

Circuit Breakers — Discount Schedule 17CD-1
Mounting Parts — Discount Schedule 23CD

CUTLER-HAMMER



SWITCHBOARDS

Replacement Parts List—Circuit Breaker Units

(Continued)

FOR INTERRUPTING CAPACITIES, SEE PAGE 53.

Breaker Type	Ampere Rating	2 Pole				3 Pole			
		Catalog Number	Price	Mounting Parts Group	Price	Catalog Number	Price	Mounting Parts Group	Price
"HKL" Frame 600 V. A-c 250 V. D-c 2 Poles Only	125	P26125HKL	\$546.	CB400-2KL	\$49.	P36125HKL	\$653.	CB400-3KL	\$71.
	150	P26150HKL	546.	CB400-2KL	49.	P36150HKL	653.	CB400-3KL	71.
	175	P26175HKL	546.	CB400-2KL	49.	P36175HKL	653.	CB400-3KL	71.
	200	P26200HKL	546.	CB400-2KL	49.	P36200HKL	653.	CB400-3KL	71.
	225	P26225HKL	546.	CB400-2KL	49.	P36225HKL	653.	CB400-3KL	71.
	250	P26250HKL	546.	CB400-2KL	49.	P36250HKL	653.	CB400-3KL	71.
	300	P26300HKL	546.	CB400-2KL	49.	P36300HKL	653.	CB400-3KL	71.
	350	P26350HKL	546.	CB400-2KL	49.	P36350HKL	653.	CB400-3KL	71.
	400	P26400HKL	546.	CB400-2KL	49.	P36400HKL	653.	CB400-3KL	71.
"HLM" Frame 600 V. A-c 250 V. D-c 2 Pole Only	125	P26125HLM	660.	CB1000-2LM	198.	P36125HLM	795.	CB1000-3LM	248.
	150	P26150HLM	660.	CB1000-2LM	198.	P36150HLM	795.	CB1000-3LM	248.
	175	P26175HLM	660.	CB1000-2LM	198.	P36175HLM	795.	CB1000-3LM	248.
	200	P26200HLM	660.	CB1000-2LM	198.	P36200HLM	795.	CB1000-3LM	248.
	225	P26225HLM	660.	CB1000-2LM	198.	P36225HLM	795.	CB1000-3LM	248.
	250	P26250HLM	660.	CB1000-2LM	198.	P36250HLM	795.	CB1000-3LM	248.
	300	P26300HLM	660.	CB1000-2LM	198.	P36300HLM	795.	CB1000-3LM	248.
	350	P26350HLM	660.	CB1000-2LM	198.	P36350HLM	795.	CB1000-3LM	248.
	400	P26400HLM	660.	CB1000-2LM	198.	P36400HLM	795.	CB1000-3LM	248.
	500	P26500HLM	660.	CB1000-2LM	198.	P36500HLM	795.	CB1000-3LM	248.
	600	P26600HLM	660.	CB1000-2LM	198.	P36600HLM	795.	CB1000-3LM	248.
	700	P26700HLM	812.	CB1000-2LM	198.	P36700HLM	999.	CB1000-3LM	248.
	800	P26800HLM	812.	CB1000-2LM	198.	P36800HLM	999.	CB1000-3LM	248.
	900	P26900HLM	1087.	CB1000-2LM	198.	P36900HLM	1229.	CB1000-3LM	248.
	1000	P261000HLM	1087.	CB1000-2LM	198.	P361000HLM	1229.	CB1000-3LM	248.

CIRCUIT BREAKERS with Current Limiting Fuses (Price includes Fuses)

		2 Pole				3 Pole			
		Catalog Number	Price	Mounting Parts Group	Price	Catalog Number	Price	Mounting Parts Group	Price
"TPF" Frame ① ②	15	P26015TPF	\$268.	CB100-2TPF	\$80.	P36015TPF	\$325.	CB100-3TPF	\$100.
	20	P26020TPF	268.	CB100-2TPF	80.	P36020TPF	325.	CB100-3TPF	100.
	30	P26030TPF	268.	CB100-2TPF	80.	P36030TPF	325.	CB100-3TPF	100.
	40	P26040TPF	268.	CB100-2TPF	80.	P36040TPF	325.	CB100-3TPF	100.
	50	P26050TPF	268.	CB100-2TPF	80.	P36050TPF	325.	CB100-3TPF	100.
	70	P26070TPF	268.	CB100-2TPF	80.	P36070TPF	325.	CB100-3TPF	100.
	90	P26090TPF	268.	CB100-2TPF	80.	P36090TPF	325.	CB100-3TPF	100.
	100	P26100TPF	268.	CB100-2TPF	80.	P36100TPF	325.	CB100-3TPF	100.
	Non-Auto.	PN26100TPF	254.	CB100-2TPF	80.	PN36100TPF	310.	CB100-3TPF	100.
"TPK" Frame ②	70	P26070TPK	508.	CB225-2TPK	75.	P36070TPK	642.	CB225-3TPK	90.
	100	P26100TPK	508.	CB225-2TPK	75.	P36100TPK	642.	CB225-3TPK	90.
	125	P26125TPK	508.	CB225-2TPK	75.	P36125TPK	642.	CB225-3TPK	90.
	150	P26150TPK	508.	CB225-2TPK	75.	P36150TPK	642.	CB225-3TPK	90.
	175	P26175TPK	508.	CB225-2TPK	75.	P36175TPK	642.	CB225-3TPK	90.
	200	P26200TPK	508.	CB225-2TPK	75.	P36200TPK	642.	CB225-3TPK	90.
	225	P26225TPK	508.	CB225-2TPK	75.	P36225TPK	642.	CB225-3TPK	90.
	Non-Auto.	PN26225TPK	465.	CB225-2TPK	75.	PN36225TPK	591.	CB225-3TPK	90.
"TPKL" Frame ②	125	P26125TPKL	684.	CB400-2TPKL	80.	P36125TPKL	858.	CB400-3TPKL	100.
	150	P26150TPKL	684.	CB400-2TPKL	80.	P36150TPKL	858.	CB400-3TPKL	100.
	175	P26175TPKL	684.	CB400-2TPKL	80.	P36175TPKL	858.	CB400-3TPKL	100.
	200	P26200TPKL	684.	CB400-2TPKL	80.	P36200TPKL	858.	CB400-3TPKL	100.
	225	P26225TPKL	684.	CB400-2TPKL	80.	P36225TPKL	858.	CB400-3TPKL	100.
	250	P26250TPKL	684.	CB400-2TPKL	80.	P36250TPKL	858.	CB400-3TPKL	100.
	300	P26300TPKL	684.	CB400-2TPKL	80.	P36300TPKL	858.	CB400-3TPKL	100.
	350	P26350TPKL	684.	CB400-2TPKL	80.	P36350TPKL	858.	CB400-3TPKL	100.
	400	P26400TPKL	684.	CB400-2TPKL	80.	P36400TPKL	858.	CB400-3TPKL	100.
	Non-Auto.	PN26400TPKL	587.	CB400-2TPKL	80.	PN36400TPKL	722.	CB400-3TPKL	100.
"TPL" Frame ① ②	125	P26125TPL	1002.	CB600-2TPL	110.	P36125TPL	1214.	CB600-3TPL	135.
	150	P26150TPL	1002.	CB600-2TPL	110.	P36150TPL	1214.	CB600-3TPL	135.
	175	P26175TPL	1002.	CB600-2TPL	110.	P36175TPL	1214.	CB600-3TPL	135.
	200	P26200TPL	1002.	CB600-2TPL	110.	P36200TPL	1214.	CB600-3TPL	135.
	250	P26250TPL	1002.	CB600-2TPL	110.	P36250TPL	1214.	CB600-3TPL	135.
	300	P26300TPL	1002.	CB600-2TPL	110.	P36300TPL	1214.	CB600-3TPL	135.
	350	P26350TPL	1002.	CB600-2TPL	110.	P36350TPL	1214.	CB600-3TPL	135.
	400	P26400TPL	1002.	CB600-2TPL	110.	P36400TPL	1214.	CB600-3TPL	135.
	450	P26450TPL	1002.	CB600-2TPL	110.	P36450TPL	1214.	CB600-3TPL	135.
	500	P26500TPL	1002.	CB600-2TPL	110.	P36500TPL	1214.	CB600-3TPL	135.
	550	P26550TPL	1002.	CB600-2TPL	110.	P36550TPL	1214.	CB600-3TPL	135.
	600	P26600TPL	1002.	CB600-2TPL	110.	P36600TPL	1214.	CB600-3TPL	135.
	Non-Auto.	PN26600TPL	888.	CB600-2TPL	110.	PN36600TPL	1062.	CB600-3TPL	135.

① A 42" wide VB distribution section is required to mount TPL frame or twin-mount TPF frame breakers. Add \$168. to VB section price for increased width.

② Not U/L listed.

Circuit Breakers — Discount Schedule 17CD-1

Mounting Parts — Discount Schedule 23CD

CUTLER-HAMMER

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
— UNIBUS®

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION



SWITCHBOARDS

Replacement Parts List

Fusible Switch Units

(Packaged Separately)

System	Ampere Rating ①	② Horsepower Ratings		Catalog Number	Price ③	Height in Inches	Shipping Weight
		A-c	D-c				
3 Wire S/N 120/240 V. A-c 240 V. A-c 250 V. D-c	30-30	1½-3	5	PVB- 2233	\$46.	5	23
	30-60	1½-3, 3-10	5-10	2236	46.	5	23
	60-60	3-10	10	2266	46.	5	23
	100-100	7½-15	20	2211	69.	7½	27
	200	15	40	2202	83.	7½	32
	400	---	50	2204	202.	15	64
	600	---	---	2206	316.	15	67
3 Pole 240 V. A-c or 4 Wire S/N 120/240 V. A-c	30-30	3-7½	---	3233	63.	5	25
	30-60	3-7½, 7½-15	---	3236	63.	5	25
	60-60	7½-15	---	3266	63.	5	25
	100-100	15-30	---	3211	87.	7½	29
	200	25-50	---	3202	118.	10	34
	400	50	---	3204	283.	15	73
	600	---	---	3206	414.	15	76
3 Pole 480, 600 V. A-c or 4 Wire S/N 277/480 V. A-c	30-30	480 V. A-c	600 V. A-c				
		5-15	7½-20	3533	93.	7½	25
		5-15, 15-30	7½-15, 20-50	3536	93.	7½	25
		15-30	15-30	3566	93.	7½	25
	100	25-50	30-50	3501	73.	7½	25
	200	50	50	3502	166.	10	34
	400	---	---	3504	375.	15	73
	600	---	---	3506	451.	15	76
	30-30	5-15	7½-20	3533	93.	7½	25
		5-15, 15-30	7½-15, 20-50	3536	93.	7½	25

① The 30-30, 60-60 etc., indicates two switch units in one enclosure. The price includes both switches. When only one switch is required the same price applies. Single units are not available for 30, 60 or 100 ampere—250 volt or 30 or 60 ampere 600 volt classes.

② The higher horsepower ratings apply only when time lag fuses are used.

③ Price includes 2 or 3 pressure terminals on load side and necessary hardware to mount switch to standard VB switchboard.



SAFETY SWITCHES and INDUSTRIAL CIRCUIT BREAKERS

77

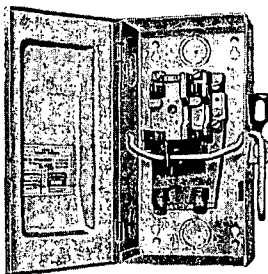
General Description

Safety Switches—fusible or non-fusible disconnecting means—Horsepower and ampere rated—Visible circuit condition indication, open or closed—Can be padlocked "Off" or "On".

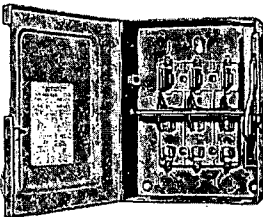
SAFETY SWITCH LUG CAPACITIES

Ampere Rating	Minimum Wire Size	Maximum Wire Size
30	14	6
60	14	4
100	8	1/0
200 (4105, 4131)	6	4/0
200 (4121, 4141, 4143, 4162)	1/0	200 MCM
400	2-1/0	2-350 MCM or 1-500 MCM
600	2-1/0	2-350 MCM
800	3-1/0	3-350 MCM
① 800 (Optional)	4-1/0 or 3-4/0	4-350 MCM or 3-600 MCM
1200	4-1/0	4-350 MCM
① 1200 (Optional)	4-4/0	4-600 MCM

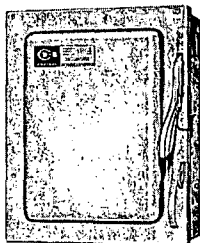
① Available on request from factory.



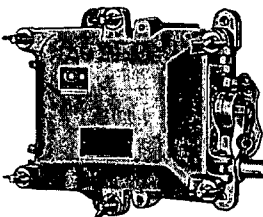
General (light) Duty—Use in homes, shops, commercial buildings—Suitable for light duty motor disconnect—U.L. file E5239—Meet Federal Specification W-S-865c for type LD switches—Positive make, quick break mechanism except 30 amperes which are positive make and break.



Standard Heavy Duty—For use as industrial or commercial disconnect—Group motor disconnect—Dual interlocked cover—U.L. file E5239—Exceeds Federal Specification W-S-865c for type NDS switches—Quick make, quick break mechanism—Cadmium plated current carrying parts—Non-carbonizing arc shields.



Mill Heavy Duty—For severest duty—Withstand any heat from correctly applied fuses—U.L. file E5239—Exceeds Federal Specification W-S-865c for type NDS switches. Quick make, quick break mechanism—Silver plated current carrying parts—Dual interlocked cover.



Special Service Enclosures—Mill heavy duty mechanisms—NEMA 4-5 cast iron—Excludes corrosive or conductive dust which would interfere with safe operation—Watertight for outdoor installations—NEMA 7-D & 9-EFG—Use where vapor, gas or dust are present in explosive quantities—U.L. file E12066.

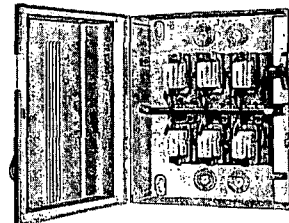
This section contains:

Safety Switches

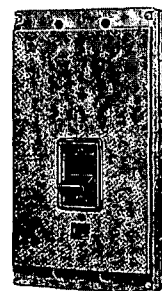
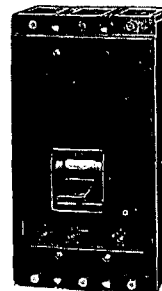
General (Light) Duty	78-79
Standard Heavy Duty	80-81
Mill Heavy Duty	82-83
Special Service Enclosures	84
Double Throw	85
Selection Tables for Motor Branch Circuits	86-87

Industrial Circuit Breakers — AB-I DE-ION*

Standard Types E, EH, F, JA, KA and LA	88-89
Standard Types MA and LM	90
Mark 75* Types HF, HK, HKL and HLM	91
Tri-pac* Types, F, K, KL and L	92
Special Types — Adjustable Magnetic, SAFTVUE* and Ambient Compensating	93-94
Accessories and Optional Features	96



Double Throw Switches—Power transfer switches—Positive make, quick break—Not horsepower rated—Not intended for disconnecting purposes.



Industrial Circuit Breakers—Used like safety switches—Eliminates fuse replacement—Saves mounting space—Front mounted operating handle—Provides tripped or overload condition indication—Individually factory calibrated and tested—Thermal elements sealed to prevent tampering—Overload on any pole trips all 3 through insulated common trip bar—Prevents single phasing polyphase motors—Trip free handle—Cannot be held closed on overload or short circuits—Inverse time-delay protection—Bi-metal thermal element—Ambient compensated breakers available—High interrupting capacity breakers—Tri-pac* 100,000 amperes at 600 volts A-c—Mark 75* 75,000 amperes 240 volts A-c—Solderless lugs accept copper or aluminum conductors (see page 96 for range of sizes.)—Approved for service entrance applications—U.L. listed except Tri-pac*—NEMA 1, 1A, 1B, 3R, 3-4-5 (fabricated sheet steel or cast iron), 7-CD and 9-EFG, 12 enclosures available.

*Trademark of Westinghouse Electric Corp.

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS®

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

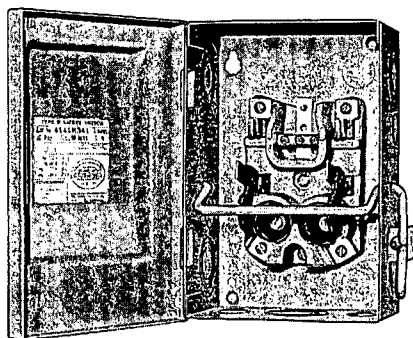
SAFETY SWITCHES

General (Light) Duty — Single Throw

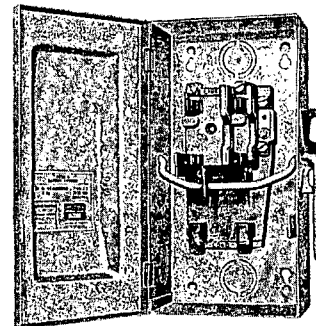


WHEN ORDERING SPECIFY

- Catalog number

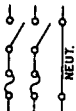


30 Ampere 3 Wire S/N



60 Ampere, 3 Wire S/N

FUSIBLE

System	Amperes	Type of Fuses	Side Operated				Front Operated		② Maximum Horsepower			
			Indoor Enclosure NEMA 1		③ Raintight Enclosure NEMA 3R		Indoor Enclosure NEMA 1		A-C		D-C	
			Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Single Phase			
									120 Volts	240 Volts		3 Phase
2 WIRE S/N (1 BLADE, 1 FUSE) 120 VOLTS A-C AND D-C												
	30	Plug	4141H241	\$5.	4141H3241	\$11.20	4151H241	\$5.	¾	---	---	---
	30	Plug	---	---	---	---	① 4151H1241	5.90	¾	---	---	---
	30	Cart.	4143H241	5.50	---	---	---	---	¾-1	---	---	2-3
2 POLE—120/240 VOLTS A-C AND D-C (PLUG)—240 VOLTS A-C AND D-C (CARTRIDGE)												
	30	Plug	4141H201	6.20	4141H3201	12.80	4151H201	6.20	¾	1½	---	---
	30	Cart.	4143H201	7.40	4143H3201	13.10	---	---	---	1½-3	---	5
3 WIRE S/N (2 BLADES, 2 FUSES)—120/240 VOLTS A-C AND D-C (PLUG AND CARTRIDGE)—240 VOLTS A-C (CARTRIDGE)												
	30	Plug	4141H341	6.50	4141H3341	13.10	4151H341	6.50	¾	1½	---	---
	30	Plug	① 4141H1341	8.90	---	---	① 4151H1341	7.70	¾	1½	---	---
	30	Cart.	4143H341	8.40	4143H3341	13.80	---	---	---	1½-3	3-7½	5
	60	Cart.	4143H342	15.	4143H3342	23.20	---	---	---	3	---	10
	100	Cart.	4143H343	30.	4143H3343	35.	---	---	---	7½	---	10
	200	Cart.	4143H344	65.	4143H3344	88.	---	---	---	15	---	30
	400	Cart.	4143H345	183.	---	---	---	---	---	---	---	50
	600	Cart.	4143H346	366.	---	---	---	---	---	---	---	---
3 WIRE SW/N (3 BLADES, 2 FUSES) 120-240 VOLTS A-C AND D-C												
	30	Plug	4141H351	11.20	---	---	---	---	---	1½	---	---
3 POLE—120 VOLTS A-C (PLUG)—240 VOLTS A-C (CARTRIDGE)												
	30	Plug	4141H301	11.20	4141H3301	20.40	---	---	---	---	1½	---
	30	Cart.	4143H301	14.40	4143H3301	20.90	---	---	---	1½-3	3-7½	---
	60	Cart.	4143H302	22.90	4143H3302	32.	---	---	---	---	7½	---
	100	Cart.	4143H303	42.	4143H3303	59.	---	---	---	---	15	---
	200	Cart.	4143H304	89.	4143H3304	107.	---	---	---	---	25	---
	400	Cart.	4143H305	196.	---	---	---	---	---	---	50	---
600	Cart.	4143H306	392.	---	---	---	---	---	---	---	---	
4 WIRE S/N (3 BLADES, 3 FUSES) 240 VOLTS A-C												
	30	Cart.	4143H441	14.40	4143H3441	20.90	---	---	---	---	3-7½	---
	60	Cart.	4143H442	22.90	4143H3442	32.	---	---	---	---	7½	---
	100	Cart.	4143H443	42.	4143H3443	59.	---	---	---	---	15	---
	200	Cart.	4143H444	89.	4143H3444	107.	---	---	---	---	25	---
	400	Cart.	4143H445	222.	---	---	---	---	---	---	50	---

Prices do not include fuses or hubs

① Dead front type.

② The higher horsepower ratings apply when time delay (dual element) type fuses are used.

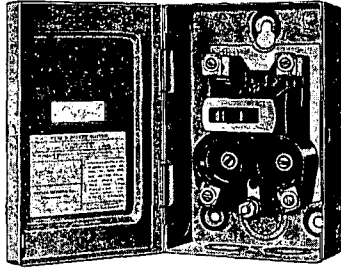
③ Interchangeable or permanent hubs, page 81.



SAFETY SWITCHES

General (Light) Duty – Single Throw

NON-FUSIBLE

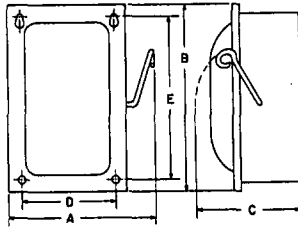


30 Amperes, 3 Wire Solid Neutral

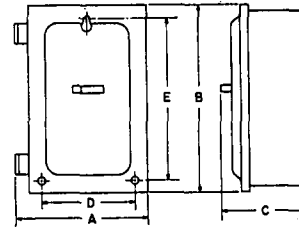
System	Amperes	Indoor Enclosure NEMA 1		① Raintight Enclosure NEMA 3R		Maximum Horsepower		
		Catalog Number	Price	Catalog Number	Price	A-C		D-C
						Single Phase	3 Phase	
2 POLE 240 VOLTS A-C AND D-C								
	30	4143- H221	\$7.40	---	---	3	---	5
	60	H222	15.	---	---	10	---	10
	100	H223	30.	---	---	15	---	10
3 POLE 240 VOLTS A-C								
	30	4143- H321	\$11.20	4143- H3321	\$20.90	3	7½	5
	60	H322	15.	H3322	32.	---	7½	---
	100	H323	35.	H3323	59.	---	20	---
	200	H324	65.	---	---	---	40	---

① Interchangeable or permanent hubs, page 81.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Cat. Nos. 4141, 4143



Cat. No. 4151

Catalog Number	Dimensions in Inches					Ship. Wt. Lbs.	Catalog Number	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting				Wide A	High B	Deep C	Mounting		
				D	E						D	E	
4141-							4143-						
H201	7½	7¾	3¾	4¼	6½	4	H345	23½	36¼	9½	17½	33¾	132
H241	5¾	6	3¾	2¾	4¾	3	H346	22	46	11¾	16	43½	208
H301	8¾	8¾	3¾	5½	7½	5	H441	8¾	7¾	3¾	5½	6½	5
H341	7½	7¾	3¾	4¼	6½	4½	H442	12¾	13¾	4¾	8½	10¾	15
H351	8¾	8¾	3¾	5½	7½	5	H443	15¼	17¾	4¾	8½	14¾	20
H1341	7½	7¾	3¾	4¼	6½	4½	H444	18¾	27¾	8¾	14¾	25¾	65
H3201	7½	8¾	3¾	3½	4¾	6	H445	28¾	36¾	9½	19¾	33¾	173
H3241	7½	8¾	3¾	3½	4¾	6	H3201	7¾	8¾	3¾	3½	4¾	6
H3301	8½	8¾	3½	4¾	6¾	7	H3301	8¾	8¾	3½	4¾	6¾	8
H3341	7½	8¾	3¾	3½	4¾	6	H3302	11	13¾	4¾	6¾	11	15
4143-							H3303	13	17¾	4¾	8½	14	21
H201	7½	7¾	3¾	4¼	6¾	4	H3304	16¼	27¼	8¾	10¾	23¾	64
H221	7½	7¾	3¾	4¼	6¾	4	H3321	8½	8¾	3¾	4¾	6¾	8
H222	11	13¾	4¾	6½	10¾	13	H3322	9	13¾	4¾	4¾	11	15
H223	11	13¾	4¾	6½	10¾	13	H3323	13	17¾	4¾	8½	14	21
H241	7½	7¾	3¾	4¼	6¾	3	H3341	8½	8¾	3½	4¾	6¾	7
H301	8¾	7¾	3¾	5½	6½	5	H3342	9	13¾	4¾	4¾	11	12
H302	11	13¾	4¾	6½	10¾	13	H3343	13	17¾	4¾	8½	14	19
H303	13	17¾	4¾	8½	14¾	20	H3344	16¼	27¼	8¾	10¾	23¾	59
H304	15¾	27¾	8¾	11¾	25¾	61	H3441	8½	8¾	3½	4¾	6¾	8
H305	23½	36¾	9¾	17½	33¾	148	H3442	13	13¾	4¾	8¾	11	17
H306	22	46	11¾	16	43½	221	H3443	13	17¾	4¾	8½	14	21
H321	8¾	7¾	3¾	5½	6½	5	H3444	18½	27¾	8¾	13	23¾	71
H322	11	13¾	4¾	6½	10¾	13	4151-						
H323	13	13¾	4¾	8½	10¾	16	H201	4¾	5¾	3¾	2¾	4¾	2
H324	15¾	21¾	8¾	11¾	19¾	50	H241	3¾	5¾	3¾	1¾	4	2
H341	8¾	7¾	3¾	5½	6½	5	H341	4¾	5¾	3¾	2¾	4¾	2
H342	9	13¾	4¾	4½	10¾	11	H1241	4¾	5¾	3¾	2¾	4¾	2
H343	13	17¾	4¾	8½	14¾	18	H1341	4¾	5¾	3¾	2¾	4¾	2
H344	15¾	27¾	8¾	11¾	25¾	56							

DISCOUNT SCHEDULE 17CD-2

CUTLER-HAMMER

CIRCUIT BREAKER
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PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

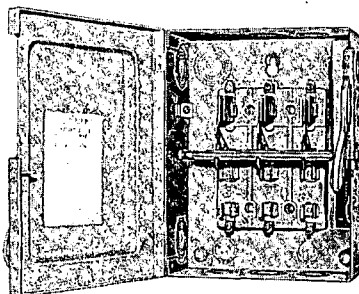
SAFETY SWITCHES



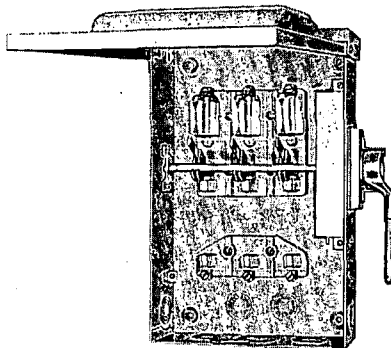
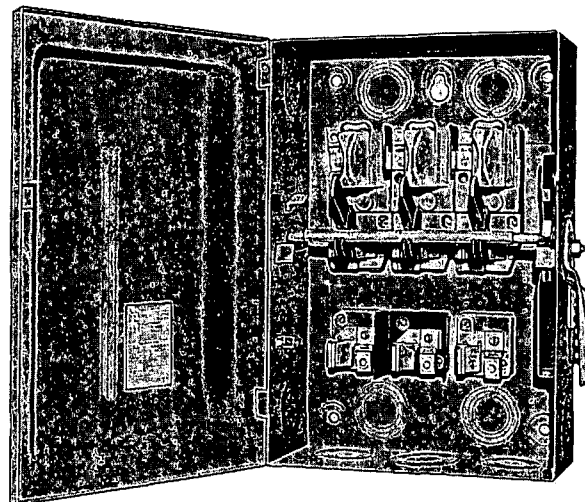
Standard Heavy Duty — Single Throw

WHEN ORDERING SPECIFY

- Catalog number



30 Ampere 3 Pole NEMA 1

3 Pole 30 Ampere
NEMA 3R (Raintight)

3 Pole 200 Ampere NEMA 1

FUSIBLE

System	Amperes	240 Volts Maximum							600 Volts Maximum					
		Indoor Enclosure NEMA 1		Raintight Enclosure ⑤ NEMA 3-R		① Maximum Horsepower A-c			Indoor Enclosure NEMA 1		Raintight Enclosure ⑤ NEMA 3-R		① Maximum Horse- power—A-c 3 Phase	
		Catalog Number	Price	Catalog Number	Price	Single Phase	3 Phase	D-c	Catalog Number	Price	Catalog Number	Price	480 Volts	600 Volts
2 POLE A-C AND D-C														
	30	4131- H201	\$17.90	4131- H3201	\$32.	1½-3	---	5	Use 3 Pole Switches (outside poles only)					
	60	H202	33.	H3202	61.	3-10	---	10						
	100	H203	53.	H3203	79.	7½-15	---	20						
	200	H204	94.	H3204	113.	15	---	40						
	400	H205	194.	---	---	---	---	50						
	600	H206	386.	---	---	---	---	---						
3 WIRE S/N (2 BLADES, 2 FUSES) 120/240 VOLTS A-C AND D-C—240 VOLTS A-C														
	30	4131- H341	\$17.90	4131- H3341	\$32.	1½-3	3-7½	5	Use 4 Wire S/N					
	60	H342	33.	H3342	61.	3-10	7½-15	10						
	100	H343	53.	H3343	79.	---	15-30	20						
	200	H344	94.	H3344	113.	15	25-50	40						
	400	H345	220.	H3345	276.	---	50	50						
	600	H346	413.	H3346	517.	---	---	---						
3 POLE A-C														
	30	4131- H301	\$21.90	4131- H3301	\$40.	---	3-7½	---	4131- ②H311	\$39.	4131- ---	---	5	7½
	30	---	---	---	---	---	---	---	③H1311	39.	H3311	\$65.	5-15	7½-20
	60	H302	39.	H3302	64.	---	7½-15	---	H312	46.	H3312	77.	15-30	15-50
	100	H303	61.	H3303	92.	---	15-30	---	H313	84.	H3313	119.	25-50	30-50
	200	H304	105.	H3304	127.	---	25-50	---	H314	125.	H3314	164.	50	50
	400	H305	243.	H3305	283.	---	50	---	④	---	H3315	386.	---	---
600	H306	439.	H3306	589.	---	---	---	④	---	---	---	---	---	
4 WIRE S/N (3 BLADES, 3 FUSES)—240 VOLTS A-C—277/480, 600 VOLTS A-C														
	30	4131- H441	\$21.90	4131- H3441	\$40.	---	3-7½	---	4131- H461	\$46.	---	---	5	7½
	60	H442	39.	H3442	64.	---	7½-15	---	H462	56.	---	---	15-30	15-50
	100	H443	61.	H3443	92.	---	15-30	---	H463	99.	---	---	25-50	30-50
	200	H444	105.	H3444	127.	---	25-50	---	---	---	---	---	---	---
	400	H445	270.	H3445	352.	---	50	---	---	---	---	---	---	---
	600	H446	464.	H3446	674.	---	---	---	---	---	---	---	---	---

Prices do not include fuses or hubs.

- ① The higher H.P. ratings apply only when time delay (dual element) type fuses are used.
- ② Small enclosure, 9¼" wide by 13¼" high.
- ③ Larger enclosure, 10¼" wide by 17¼" high.
- ④ Use mill heavy duty types; see pages 82-83.
- ⑤ Interchangeable and permanent hubs, next page.

CUTLER-HAMMER

DISCOUNT SCHEDULE 17 CD-1

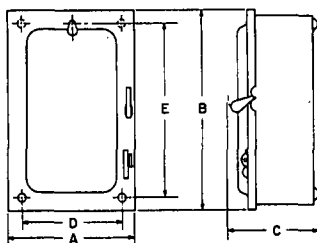


SAFETY SWITCHES

Standard Heavy Duty — Single Throw

NON-FUSIBLE

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



System	Am-peres	Indoor Enclosure NEMA 1		5 Raintight Enclosure NEMA 3R		Maximum Horsepower A-C 3 Phase		
		Catalog Number	Price	Catalog Number	Price	240 Volts	480 Volts	600 Volts
2 POLE OR 3 POLE 240-600 VOLTS A-C (For 2 pole applications, use outside poles only.)								
	30	4131- H321	\$19.80	4131- ---	---	7½	---	---
	30	H331	19.80	H3331	\$36.	7½	15	20
	60	H332	36.	H3332	63.	15	30	50
	100	H333	56.	H3333	89.	30	50	50
	200	H334	87.	---	---	50	50	50
	400	H335	196.	---	---	50	---	---
	600	H336	347.	---	---	---	---	---

⑤ Rated 240 volts maximum. ⑤ Prices do not include hubs.

Catalog Number	Dimensions in Inches					Ship. Wt. Lbs.	Catalog Number	Dimensions in Inches					Ship. Wt. Lbs.
	Wide	High	Deep	Mounting				Wide	High	Deep	Mounting		
				D	E						D	E	
4131-							4131-						
H201	6¾	9¾	7¾	4¾	8¾	8	H461	9¾	13¾	3¾	7¾	12¾	14
H202	8¾	15	8½	5¾	13	16	H462	10¾	17½	4	8¾	15½	22
H203	9¾	21¼	9¾	7½	19¾	26	H463	12¾	23¾	4½	10½	21¼	34
H204	14¾	21½	11¾	11¾	18¾	48	H1311	10¾	17½	8½	8¾	15½	22
H205	15¾	38	18¾	12½	34¾	122	H3201	9	15	9	6½	12¾	19
H206	17¾	45	19¾	14½	41¾	200	H3202	9	15	9	6½	12¾	24
H301	8¾	9¾	7¾	6½	8¾	10	H3203	10¾	23¾	9¾	8¾	20¾	32
H302	10¾	15	8½	8¾	13	21	H3204	15¾	21¾	11¾	12	18¾	74
H303	12¾	21¼	9¾	10½	19¾	31	H3301	11½	15	9	9	12¾	23
H304	14¾	21½	11¾	11¾	18¾	54	H3302	11½	15	9	9	12¾	25
H305	20¾	38	18¾	17	34¾	166	H3303	13¾	23¾	9¾	① 11¼	20¾	36
H306	22¾	45	19¾	19½	41¾	223	H3304	15¾	21¾	11¾	12	18¾	93
H311	9¾	13¾	7¾	7¾	12¾	14	H3305	21¾	38	17½	16¾	33¾	160
H312	10¾	17¾	8½	8¾	15½	21	H3306	26½	45½	17¾	21¾	41¼	280
H313	12¾	23¾	9¾	10½	21¼	33	H3311	11½	17½	9	9	15¾	25
H314	14¾	24	11¾	11¾	20¾	57	H3312	11½	17½	9	9	15¾	25
H321	8¾	9¾	7¾	6½	8¾	10	H3313	13¾	23¾	9¾	① 11¼	20¾	38
H331	10¾	13	8½	8¾	11	17	H3314	15¾	24¾	11¾	12	20¾	65
H332	10¾	13	8½	8¾	11	17	H3315	21¾	42¾	17½	16¾	36¾	188
H333	12¾	15¾	9¾	10½	13¾	26	H3331	11½	13¾	9	② 9	10¾	22
H334	14¾	21½	11¾	11¾	18¾	67	H3332	11½	13¾	9	② 9	10¾	22
H335	20¾	29¾	18¾	17	26¾	125	H3333	13¾	15¾	9¾	① 11¼	13¾	29
H336	22¾	34½	19¾	19½	31¾	178	H3341	9	15	9	6½	12¾	20
H341	6¾	9¾	7¾	4¾	8¾	8	H3342	9	15	9	6½	12¾	22
H342	8¾	15	8½	5¾	13	16	H3343	10¾	23¾	9¾	8¾	20¾	32
H343	9¾	21¼	9¾	7½	19¾	25	H3344	15¾	21¾	11¾	12	18¾	76
H344	14¾	21½	11¾	11¾	18¾	49	H3345	16¾	38	17½	12¾	33¾	134
H345	15¾	38	18¾	12½	34¾	127	H3346	21¾	45½	17¾	16¾	41¼	275
H346	20¾	45	19¾	17	41¾	188	H3441	11½	15	9	9	12¾	25
H441	8¾	9¾	7¾	6½	8¾	10	H3442	11½	15	9	9	12¾	26
H442	10¾	15	8½	8¾	13	21	H3443	13¾	23¾	9¾	11¼	20¾	39
H443	12¾	21¼	9¾	10½	19¾	32	H3444	15¾	24¾	11¾	12	20¾	57
H444	14¾	24	11¾	11¾	20¾	58	H3445	21¾	38	17½	16¾	33¾	196
H445	20¾	38	18¾	17	34¾	168	H3446	26½	45½	17¾	21¾	41¼	280
H446	25¾	45	19¾	22	41¾	233							

① Upper mounting holes only. Lower mounting hole dimension 10".

② Upper mounting holes only. Lower mounting hole dimension 7".

SEPARATE INTERCHANGEABLE HUBS

Conduit Size	Cat. No.	Price	Lbs.	Carton
Blank plate.....	4199-			
¾" hub.....	H1	\$.40	⅙	100
1" hub.....	H2	2.60	⅙	10
1¼" hub.....	H3	2.60	⅙	10
1½" hub.....	H4	2.60	⅙	10
1¾" hub.....	H5	2.60	⅙	10
2" hub.....	H6	4.40	⅙	10

PERMANENT HUBS

		No Hub	One Hub		Two Hubs	
		Suffix	Suffix	Price	Suffix	Price
Interchangeable plate	200 Amp.	—0	---	---	---	---
Blank end wall	400-600 Amp.	—0	---	---	---	---
2½" hub	200 Amp.	---	—25	\$7.80	---	---
3" hub	400-600 Amp.	---	—30	13.10	—230	\$25.50
3½" hub	400-600 Amp.	---	—35	19.	—235	38.

DISCOUNT SCHEDULE 17 CD-1

CUTLER-HAMMER

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

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PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

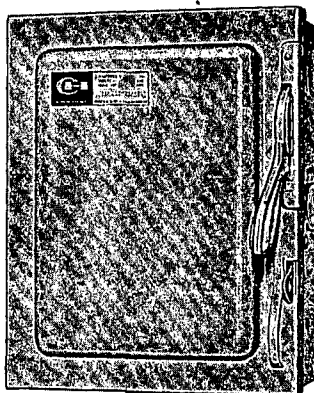
GENERAL INFORMATION

SAFETY SWITCHES

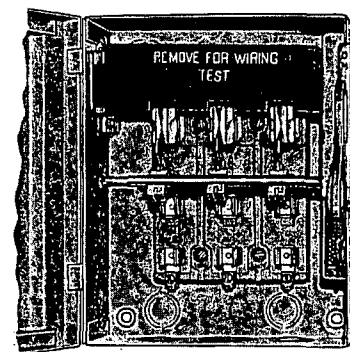
Mill Heavy Duty — Single Throw

WHEN ORDERING SPECIFY

- Catalog number

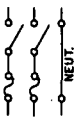


NEMA 1—Enclosed



Open View

FUSIBLE

System	Amperes	240 Volts Maximum					600 Volts Maximum						
		Indoor Enclosure NEMA 1		① Maximum Horsepower			Indoor Enclosure NEMA 1		① Maximum Horsepower				D-c
				A-c		A-c							
		Catalog Number	Price	Single Phase	3 Phase	D-c	Catalog Number	Price	Single Phase		3 Phase		
									480 Volts	600 Volts	480 Volts	600 Volts	
2 POLE A-C AND D-C													
	30	4105-H201	\$32.	1½-3	---	5	4105-H211	\$54.	3-7½	---	---	---	7½
	60	H202	43.	3-10	---	10	H212	56.	5-20	10-25	---	---	25-30
	100	H203	65.	7½-15	---	20	H213	87.	10-30	15-40	---	---	40-50
	200	H204	108.	15	---	40	H214	130.	25-30	30-50	---	---	50
	400	H205	244.	---	---	50	H215	299.	---	---	---	---	---
	600	H206	427.	---	---	---	H216	473.	---	---	---	---	---
	② 800	H207	597.	---	---	---	H217	732.	---	---	---	---	---
	② 1200	H208	826.	---	---	---	③ H218	1030.	---	---	---	---	---
3 WIRE S/N (2 BLADES, 2 FUSES) 120/240 VOLTS A-C AND D-C—240 VOLTS A-C													
	30	4105-H341	\$36.	1½-3	3-7½	5	---	---	---	---	---	---	---
	60	H342	48.	3-10	7½-15	10	---	---	---	---	---	---	---
	100	H343	77.	---	15-30	20	---	---	---	---	---	---	---
	200	H344	119.	---	25-50	40	---	---	---	---	---	---	---
	400	H345	271.	---	50	50	---	---	---	---	---	---	---
	600	H346	452.	---	---	---	---	---	---	---	---	---	---
	② 800	H347	649.	---	---	---	---	---	---	---	---	---	---
	② 1200	H348	895.	---	---	---	---	---	---	---	---	---	---
3 POLE A-C													
	30	4105-H301	\$40.	---	3-7½	---	4105-H311	\$62.	---	---	5	7½	---
	60	H302	56.	---	7½-15	---	H312	65.	---	---	15-30	15-50	---
	100	H303	87.	---	15-30	---	H313	100.	---	---	25-50	30-50	---
	200	H304	130.	---	25-50	---	H314	161.	---	---	50	50	---
	400	H305	287.	---	50	---	H315	323.	---	---	---	---	---
	600	H306	479.	---	---	---	H316	545.	---	---	---	---	---
	② 800	H307	811.	---	---	---	H317	941.	---	---	---	---	---
	② 1200	H308	1033.	---	---	---	③ H318	1238.	---	---	---	---	---
4 WIRE S/N (3 BLADES, 3 FUSES)—240 VOLTS A-C—277/480, 600 VOLTS A-C													
	30	4105-H441	\$54.	---	3-7½	---	4105-H461	\$69.	---	---	5	7½	---
	60	H442	65.	---	7½-15	---	H462	74.	---	---	15-30	15-50	---
	100	H443	103.	---	15-30	---	H463	116.	---	---	25-50	30-50	---
	200	H444	152.	---	25-50	---	---	---	---	---	---	---	---
	400	H445	314.	---	50	---	---	---	---	---	---	---	---
	600	H446	505.	---	---	---	---	---	---	---	---	---	---
	② 800	H447	865.	---	---	---	---	---	---	---	---	---	---
	② 1200	H448	1090.	---	---	---	---	---	---	---	---	---	---

Prices do not include fuses.

- ① The higher H.P. ratings apply when time delay (dual element) type fuses are used.
- ② These switches have two fuses per pole. Knockouts are provided at no extra cost when instructions as to size and location accompany the order.
- ③ With 3 point catch and keyhole in place of cover interlock.

CUTLER-HAMMER

DISCOUNT SCHEDULE 176D-1

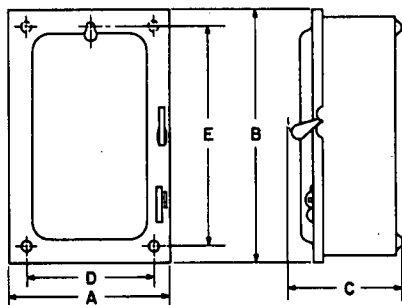


SAFETY SWITCHES

Mill Heavy Duty - Single Throw

NON-FUSIBLE

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



System	Amperes	240 Volts Maximum					600 Volts Maximum				
		Indoor Enclosure NEMA 1		Max. Horsepower		D-c	Indoor Enclosure NEMA 1		Maximum Horsepower		D-c
				A-c					A-c Single Phase	A-c 3 Phase	
		Catalog Number	Price	Single Phase	3 Phase		Catalog Number	Price	480V.	600V.	
2 POLE A-C AND D-C											
	30	4105-H221	\$30.	3	---	5	4105-H231	\$36.	10	---	15
	60	H222	40.	10	---	10	H232	47.	25	---	30
	100	H223	64.	15	---	20	H233	77.	40	---	50
	200	H224	91.	15	---	40	H234	100.	50	---	50
	400	H225	209.	---	---	50	H235	244.	---	---	---
	600	---	---	---	---	---	H236	353.	---	---	---
	800	---	---	---	---	---	H237	528.	---	---	---
	1200	---	---	---	---	---	H238	722.	---	---	---
3 POLE A-C											
	30	4105-H321	\$36.	---	7½	---	4105-H331	\$43.	---	15	20
	60	H332	54.	---	15	---	H332	54.	---	30	50
	100	H333	79.	---	30	---	H333	79.	---	50	50
	200	H334	105.	---	50	---	H334	105.	---	50	50
	400	H335	272.	---	50	---	H335	272.	---	---	---
	600	H336	436.	---	---	---	H336	436.	---	---	---
	800	H337	706.	---	---	---	H337	706.	---	---	---
	1200	H338	948.	---	---	---	H338	948.	---	---	---

② Knockouts are provided at no extra cost when instructions as to size and location accompany the order.

Catalog Catalog	Dimensions in Inches					Ship. Wt. Lbs.	Catalog Number	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting				Wide A	High B	Deep C	Mounting		
				D	E						D	E	
4105- H201	6¾	9¾	7¾	4¾	8¾	8	4105- H311	9¾	13¾	7¾	7¾	12½	13
H202	8¾	15	8½	5¾	13	16	H312	10¾	17½	8½	8¾	15½	22
H203	9¾	21¼	9¾	7¾	19¾	26	H313	12¾	23¾	9¾	10½	21¼	34
H204	11¾	30¾	14¾	8¾	24¾	67	H314	15¾	32¾	14¾	12	27¾	86
H205	15¾	38	18¾	12¾	34¾	117	H315	20¾	41	18¾	17	37¾	185
H206	17¾	45	19¾	14¾	41¾	197	H316	22¾	48	19¾	19¾	44¾	225
H207	27½	44¼	22¼	21¼	40½	250	H317	37	47¼	22¼	30¾	44¾	342
H208	28¾	53¾	23¾	22¾	50¾	342	H318	39¾	56¾	23¾	33	53¾	515
H211	8¾	13¾	7¾	6¾	12¾	11	H321	8¾	9¾	7¾	6¾	8¾	9
H212	10¾	17½	8¾	8¾	15½	20	H331	10¾	13	8½	8¾	11	18
H213	9¾	23¾	9¾	7¾	21¾	26	H332	10¾	13	8¾	8¾	11	19
H214	11¾	32¾	14¾	8¾	27¾	66	H333	12¾	15¾	9¾	10½	13¾	27
H215	15¾	41	18¾	12	37¾	134	H334	15¾	23	14¾	12	17¾	69
H216	17¾	48	19¾	12	44¾	205	H335	20¾	29¾	18¾	17	26¾	121
H217	27½	47¼	22¼	21¼	44½	280	H336	22¾	34¾	19¾	19½	31¾	177
H218	28¾	56¾	23¾	22¾	53¾	510	H337	37	39¾	22¾	30¾	36¾	257
H221	6¾	9¾	7¾	4¾	8¾	8	H338	39¾	47	23¾	33¾	44¾	315
H222	8¾	13	8½	5¾	11	15	H341	6¾	9¾	7¾	4¾	8¾	9
H223	9¾	15¾	9¾	7¾	13¾	21	H342	8¾	15	8¾	5¾	13	17
H224	11¾	23	14¾	8¾	17¾	56	H343	9¾	21¾	9¾	7¾	19¾	26
H225	15¾	29¾	18¾	12	26¾	99	H344	12¾	30¾	14¾	9¾	24¾	72
H231	8¾	13	8½	5¾	11	15	H345	15¾	38	18¾	12½	34¾	122
H232	8¾	13	8½	5¾	11	15	H346	20¾	45	19¾	17	41¾	219
H233	9¾	15¾	9¾	7¾	13¾	21	H347	37	44¾	22¾	30¾	40¾	323
H234	11¾	23	14¾	8¾	17¾	56	H348	39¾	53¾	23¾	33	50¾	450
H235	15¾	29¾	18¾	12	26¾	99	H441	8¾	9¾	7¾	6¾	8¾	11
H236	17¾	34¾	19¾	12	31¾	142	H442	10¾	15	8¾	8¾	13	21
H237	27¾	39¾	22¾	21¾	36½	204	H443	12¾	21¾	9¾	10¾	19¾	33
H238	28¾	47	23¾	22¾	44¾	246	H444	16	30¾	14¾	12¾	24¾	88
H301	8¾	9¾	7¾	6¾	8¾	9	H445	20¾	38	18¾	17	34¾	165
H302	10¾	15	8½	8¾	13	20	H446	25¾	45	19¾	22	41¾	233
H303	12¾	21¾	9¾	10¾	19¾	32	H447	47¾	44½	22¾	41	40¾	421
H304	15¾	30¾	14¾	12	24¾	84	H448	49¾	53¾	23¾	43	50¾	600
H305	20¾	38	18¾	17	34¾	159	H461	9¾	13¾	7¾	7¾	12¾	14
H306	22¾	45	19¾	19½	41¾	224	H462	10¾	17¾	8½	8¾	15½	22
H307	37	44¾	22¾	30¾	40¾	323	H463	12¾	23¾	9¾	10½	21¾	34
H308	39¾	53¾	23¾	33	50¾	483							

DISCOUNT SCHEDULE 17CD-1

CUTLER-HAMMER

SAFETY SWITCHES



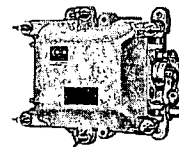
Mill Heavy Duty Special Enclosures

WHEN ORDERING SPECIFY

- Catalog number



3 Pole 30 Ampere NEMA 7



3 Pole 30 Ampere NEMA 4 and 5

DUSTTIGHT AND WATERTIGHT—NEMA 4 AND 5

System	Amperes	Cat. No.	② Price	① Horsepower			Cat. No.	② Price	① Horsepower				D-c
				1 φ	3 φ	D-c			1 φ	3 φ			
										240 V.	480 V.	600 V.	
FUSIBLE													
2 POLE—240 V. A-C, D-C							2 POLE—600 V. A-C, D-C						
	30	4105-H5201	\$119.	2	---	5	4105-H5211	\$147.	---	---	---	---	7½
	60	H5202	128.	5	---	10	H5212	160.	---	---	---	---	15
	100	H5203	328.	7½-15	---	20	H5213	352.	10-30	---	---	---	40-50
	200	H5204	482.	15	---	---	H5214	508.	25-30	---	---	---	50
3 POLE—240 V. A-C							3 POLE—600 V. A-C						
	30	H5301	133.	---	3	---	H5311	162.	---	---	---	7½	---
	60	H5302	146.	---	7½	---	H5312	175.	---	---	---	20	---
	100	H5303	361.	---	15-30	---	H5313	380.	---	---	25-30	30-50	---
	200	H5304	518.	---	25-50	---	H5314	530.	---	---	50	50	---
NON-FUSIBLE—3 POLE—240-600 V. A-C													
	30	H5331	133.	240V.3φ	600V.	---	① On fusible switches the higher horsepower ratings apply only when time delay (dual element) type fuses are used. ② Prices include 2 topped holes in the bottom (30A.-¾", 60A.-1¼", 100A.-1½", 200A.-2¼"). 2 extra holes at sides or top where pads are located, will be furnished no charge if specified. Additional holes or redrilling can be supplied at extra charge.						
	60	H5332	142.	7½	20	---							
	100	H5333	353.	15	50	---							
	200	H5334	482.	30	50	---							

HAZARDOUS LOCATIONS—NON-FUSIBLE

2 POLE—240 V. A-C, D-C							3 POLE—240-600 V. A-C						
System	Amperes	Cat. No.	Price	Horsepower			System	Amperes	Cat. No.	Price	Horsepower		
				1 φ		D-C					3 φ		
				240 V.	600 V.						240 V.	480 V.	600 V.
NEMA 7-D													
	30	4105-H7231	\$182.	3	5	5		30	4105-H7331	\$199.	7½	10	10
	60	H7232	212.	10	15	10		60	H7332	232.	15	25	25
NEMA 9-EFG													
	30	H9231	120.	3	---	15		30	H9331	133.	7½	15	20
	60	H9232	130.	10	---	30		60	H9332	142.	15	30	50
	100	H9233	331.	15	---	50		100	H9333	353.	30	50	50
	200	H9234	459.	15	---	50		200	H9334	482.	50	50	50

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Catalog Number	Dimensions in Inches					Ship. Wt. Lbs.	Catalog Number	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting				Wide A	High B	Deep C	Mounting		
				D	E						D	E	
4105-							4105-						
H5201	12½	10¼	5½	7½	9	34	H5331	12½	10¼	5½	7½	9	37
H5202	15	13½	6¾	9¾	12¼	62	H5332	15	13½	6¾	9¾	12¼	62
H5203	18½	27½	10	12½	25¼	190	H5333	18½	27½	10	12½	25¼	190
H5204	21¼	34¾	12½	14¾	32¾	220	H5334	21¼	34¾	12½	14¾	32¾	255
H5211	12½	12½	5½	7½	11½	39	H7231	13½	13	6¾	8	11¼	85
H5212	15	16	6¾	9¾	14¾	66	H7232	16¾	18	6¾	9¾	16¾	140
H5213	18½	27½	10	12½	25¼	200	H7331	13½	13	6¾	8	11¼	85
H5214	21¼	34¾	12½	14¾	32¾	222	H7332	16¾	18	6¾	9¾	16¾	100
H5301	12½	10¼	5½	7½	9	38	H9231	12½	10¼	5½	7½	9	36
H5302	15	13½	6¾	9¾	12¼	63	H9232	15	13½	6¾	9¾	12¼	57
H5303	18½	27½	10	12½	25¼	192	H9233	18½	19¾	10	12½	17¾	124
H5304	21¼	34¾	12½	14¾	32¾	260	H9234	21	25½	12½	14¾	23¾	202
H5311	12½	12½	5½	7½	11½	40	H9331	12½	10¼	5½	7½	9	40
H5312	15	16	6¾	9¾	14¾	70	H9332	15	13½	6¾	9¾	12¼	59
H5313	18½	27½	10	12½	25¼	205	H9333	18½	19¾	10	12½	17¾	132
H5314	21¼	34¾	12½	14¾	32¾	258	H9334	21	25½	12½	14¾	23¾	211

DISCOUNT SCHEDULE 17 ICD-1

CUTLER-HAMMER



SAFETY SWITCHES

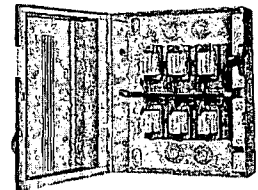
85

WHEN ORDERING SPECIFY

- Catalog number

Double Throw

3 Pole
30 Ampere
Non-Fusible



FUSIBLE

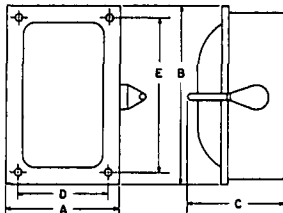
System	Am- peres	240 V. Maximum				600 V. Max.	
		NEMA 1		Ⓜ NEMA 3-R		NEMA 1	
		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
2 POLE A-C, D-C							
	30	4162- H201	\$62.	---	---	4162- H211	\$124.
	60	H202	112.	---	---	H212	129.
	100	H203	167.	---	---	H213	223.
	200	4121- H22	234.	---	---	4121- H28	272.
	400	---	---	---	---	H29	508.
	3 POLE A-C						
	30	4162- H301	\$66.	4162- ---	---	4162- H311	\$132.
	60	H302	121.	H3302	\$133.	H312	135.
	100	H303	204.	H3303	216.	H313	239.
	200	4121- H33	308.	---	---	4121- H39	358.
	400	H34	649.	---	---	H40	666.
	600	H35	784.	---	---	---	---

Prices do not include fuses.

NON-FUSIBLE

System	Am-peres	240 V. Maximum				600 V. Maximum			
		NEMA 1		NEMA 3-R		NEMA 1		NEMA 7D-9EFG	
		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
2 POLE A-C, D-C									
	30	4162-H221	\$39.	---	---	4162-H232	---	4162-H7232	---
	60	H222	61.	---	---	H233	\$62.96.	---	\$454.
	100	H223	88.	---	---	---	---	---	---
		4121-H4	118.	---	---	H126	132.	---	---
	400	H5	333.	---	---	H127	374.	---	---
	600	---	---	---	---	H128	525.	---	---
3 POLE A-C									
	30	4162-H321	\$44.	---	---	4162-H332	---	4162-H7332	---
	60	H322	66.	H3322	\$109.	H332	\$74.	---	\$473.
	100	H323	107.	H3323	119.	H333	118.	---	---
		4121-H10	168.	---	---	4121-H131	182.	---	---
	200	H11	446.	---	---	H132	471.	---	---
	400	H12	619.	---	---	H133	681.	---	---

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



- ⑥ Prices do not include hubs. Interchangeable and permanent hubs, see page 81.
- ⑦ Prices include 3 tapped holes in the bottom for 1 1/4" conduit. 2 extra holes, at sides or top where pads are located, will be furnished no charge if specified. Additional holes or other sizes can be supplied at extra charge.
- ⑧ Rated A-c only.

Catalog Number	Dimensions in Inches					Ship. Wt. Lbs.	Catalog Number	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting				Wide A	High B	Deep C	Mounting		
				D	E						D	E	
4121-H4	17%	27½	13½	11%	25%	84	4162-H212	12¾	27	8½	10%	24%	46
H5	18%	33	14%	13	30½	140	H213	13¾	34	10	11½	31%	65
H10	20%	27½	13½	15%	25%	98	H221	8	11¾	8	5%	9%	13
H11	23%	33	14%	18	30%	172	H222	9%	15½	8½	7½	13%	20
H12	25%	42%	15½	20	40	265	H223	10½	18½	10	8%	16%	28
H22	17½	36½	13½	11%	34%	118	H232	9%	15½	8½	7½	13%	21
H28	17½	44½	13½	11%	42	140	H233	13%	18½	10	11½	16%	37
H29	18%	56½	14%	13	54	210	H301	10%	15½	8	8%	13%	22
H33	20%	36½	13½	15%	34%	130	H302	12%	22	8½	10%	19%	34
H34	23%	50½	14%	18	48	260	H303	13%	30	10	11½	27%	54
H35	25%	63½	15½	20	61	418	H311	10½	21¼	8	8%	19	27
H39	20%	44½	13½	15	42	172	H312	12%	27	8½	10%	24%	44
H40	23%	56½	14%	18	54	300	H313	13%	34	10	11½	31%	59
H126	17%	27½	13½	11%	25%	90	H321	10½	11¾	8	8%	9%	17
H127	18%	33	14%	13	30½	145	H322	12%	15½	8½	10%	13%	26
H128	21%	42½	15½	16	40	208	H323	13%	18½	10	11½	16%	35
H131	20%	27½	13½	15%	25%	101	H332	12%	15½	8½	10%	13%	29
H132	23%	33	14%	18	30½	182	H333	13%	18½	10	11½	16%	36
H133	25%	42½	15½	20	40	260	H3302	17%	22	9%	11%	17%	55
							H3303	17%	30	9%	11%	25%	65
4162-H201	8	15½	8	5%	13%	17	H3322	17%	15½	9%	11%	11%	45
H202	9%	22	8½	7%	19%	27	H3323	17%	18%	9%	11%	14%	45
H203	13¾	30	10	11½	27%	48	H7232	20%	20%	8%	12%	18%	185
H211	12%	27	8½	10%	24%	39	H7332	20%	20%	8%	12%	18%	200

DISCOUNT SCHEDULE 17 CD-1

CUTLER-HAMMER

85

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
- UNIBUS ®

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

SAFETY SWITCHES



Selection Table

For Motor Branch Circuits

Cutler-Hammer Catalog Numbers of proper switches for use with motors based on using standard types of fuses as specified by the fusing tables of the National Electrical Code.

The table below is based on the ratings in horsepower of switches with standard types of fuses as covered by N. E. C. fusing tables. For motors larger than 50 Hp switches (non-hp rated switches) may be used in accordance with Article 430—109 d, 1962 N. E. C. and may be selected as follows:

Fusible—Based on maximum fuse values as shown in Table 430—146, 1962 N. E. C. for standard fuses but the switch rating should be at least 25% in excess of the motor load full current. **Non-Fusible**—The switch rating should be at least 115% of the motor full load current.

NEMA recommends the selection of fusible switches rated at least 50% in excess of load, especially for continuous duty.

Motor Hp	Catalog Number 4105			Catalog Number 4131 or 4143		
	Squirrel Cage and Synchronous X-Line resis. and react. starting	Squirrel Cage and Synchronous Autotrans. start. and high react. starting	Wound Rotor	Squirrel Cage and Synchronous X-Line resis. and react. starting	Squirrel Cage and Synchronous Autotrans. start. and high react. starting	Wound Rotor
FUSIBLE SAFETY SWITCHES FOR 220 VOLT, 3 PHASE MOTORS						
½-3	4105H301	4105H301	4105H301	4131H301 4143H301	4131H301 4143H301	4131H301 4143H301
5	4105H302	4105H302	① 4105H302	4131H302 4143H302	4131H302 4143H302	① 4131H302 4143H302
7½	② 4105H302	4105H302	4105H302	② 4131H302 4143H302	4131H302 4143H302	4131H302 4143H302
10	4105H303	4105H303	① 4105H303	4131H303 4143H303	4131H303 4143H303	① 4131H303 4143H303
15	② 4105H303	4105H303	4105H303	② 4131H303 4143H303	4131H303 4143H303	4131H303 4143H303
20	4105H304	4105H304	4105H304	4131H304 4143H304	4131H304 4143H304	4131H304 4143H304
25	4105H304	4105H304	4105H304	4131H304 4143H304	4131H304 4143H304	4131H304 4143H304
30	① 4105H305	① 4105H305	① 4105H305	① 4131H305	① 4131H305	① 4131H305
40	4105H305	① 4105H305	① 4105H305	4131H305	① 4131H305	① 4131H305
50	4105H305	4105H305	① 4105H305	4131H305	4131H305	① 4131H305
60	4105H306	4105H305	4105H305	4131H306	4131H305	4131H305
75	4105H306	4105H305	4105H305	4131H306	4131H305	4131H305
100	.....	4105H306	4105H305	.....	4131H306	4131H305
125	.....	.....	4105H306	.....	.....	4131H306
150	.....	.....	4105H306	.....	.....	4131H306
FUSIBLE SWITCHES FOR 220 VOLT, 3 PHASE MOTORS—ON 3 PHASE LINES WITH 1 PHASE GROUND						
½-3	4105H341	4105H341	4105H341	4131H341	4131H341	4131H341
5	4105H342	4105H342	① 4105H342	4131H342	4131H342	① 4131H342
7½	② 4105H342	4105H342	4105H342	② 4131H342	4131H342	4131H342
10	4105H343	4105H343	① 4105H343	4131H343	4131H343	① 4131H343
15	② 4105H343	4105H343	4105H343	② 4131H343	4131H343	4131H343
20	4105H344	4105H344	4105H344	4131H344	4131H344	4131H344
25	4105H344	4105H344	4105H344	4131H344	4131H344	4131H344
30	① 4105H345	4105H345	① 4105H345	① 4131H345	① 4131H345	① 4131H345
40	4105H345	① 4105H345	① 4105H345	4131H345	① 4131H345	① 4131H345
50	4105H345	① 4105H345	① 4105H345	4131H345	4131H345	① 4131H345
60	4105H346	4105H345	4105H345	4131H346	4131H345	4131H345
75	4105H346	4105H345	4105H345	4131H346	4131H345	4131H345
100	.....	4105H346	4105H345	.....	4131H346	4131H345
125	.....	.....	4105H346	.....	.....	4131H346
150	.....	.....	4105H346	.....	.....	4131H346
FUSIBLE SAFETY SWITCHES FOR 440 VOLT, 3 PHASE MOTORS						
½-5	4105H311	4105H311	4105H311	4131H311	4131H311	4131H311
7½	4105H312	4105H312	① 4105H312	4131H312	① 4131H312	① 4131H312
10	4105H312	4105H312	① 4105H312	4131H312	4131H312	① 4131H312
15	4105H312	4105H312	① 4105H312	4131H312	4131H312	① 4131H312
20	4105H313	① 4105H313	① 4105H313	4131H313	① 4131H313	① 4131H313
25	4105H313	4105H313	① 4105H313	4131H313	4131H313	① 4131H313
30	① 4105H314	① 4105H314	① 4105H314	① 4131H314	① 4131H314	① 4131H314
40	4105H314	① 4105H314	① 4105H314	4131H314	① 4131H314	① 4131H314
50	4105H314	4105H314	① 4105H314	4131H314	4131H314	① 4131H314
60	4105H315	4105H314	4105H314	.....	4131H314	4131H314
75	4105H315	4105H314	4105H314	.....	4131H314	4131H314
100	4105H315	4105H315	4105H314	.....	.....	4131H314
125	4105H316	4105H315	4105H315	.....	.....	.....
150	4105H316	4105H315	4105H315	.....	.....	.....
200	.....	4105H316	4105H315	.....	.....	.....

NOTE: Switches above 50 Hp are intended for disconnect service only.

- ① To comply with National Electrical Code requirements on motor branch circuit fusing, fuse reducers may be required with these switches.
 ② For squirrel cage and synchronous motors (full voltage, reactor and resistor starting) the next larger size switch should be used if the maximum permitted fusing is desired.



SAFETY SWITCHES

Selection Table

For Motor Branch Circuits

Motor Hp	Catalog Number 4105			Catalog Number 4131 or 4143		
	Squirrel Cage and Synchronous X-Line resis. and react. starting	Squirrel Cage and Synchronous Autotrans. start. and high react. starting	Wound Rotor	Squirrel Cage and Synchronous X-Line resis. and react. starting	Squirrel Cage and Synchronous Autotrans. start. and high react. starting	Wound Rotor
FUSIBLE SAFETY SWITCHES FOR 550 VOLT, 3 PHASE MOTORS						
½-7½	4105H311	4105H311	4105H311	4131H311	4131H311	4131H311
10	4105H312	① 4105H312	① 4105H312	4131H312	① 4131H312	① 4131H312
15	4105H312	4105H312	① 4105H312	4131H312	4131H312	① 4131H312
20	4105H313	① 4105H313	① 4105H313	4131H313	① 4131H313	① 4131H313
25	4105H313	4105H313	① 4105H313	4131H313	4131H313	① 4131H313
30	4105H313	4105H313	① 4105H313	4131H313	4131H313	① 4131H313
40	4105H314	① 4105H314	① 4105H314	4131H314	① 4131H314	① 4131H314
50	4105H314	① 4105H314	① 4105H314	4131H314	① 4131H314	① 4131H314
60	4105H314	4105H314	① 4105H314	4131H314	4131H314	① 4131H314
75	4105H315	4105H314	4105H314	.....	4131H314	4131H314
100	4105H315	4105H314	4105H314	.....	4131H314	4131H314
125	4105H315	4105H315	4105H314	.....	.....	4131H314
150	4105H316	4105H315	4105H315	.....	.....	.....
200	4105H316	4105H315	4105H315	.....	.....	.....

FUSIBLE SAFETY SWITCHES FOR D-C MOTORS

Motor Hp	Catalog Number 4105		Catalog Number 4131
	250 Volt	600 Volt	250 Volt
½-2	4105H201	4105H211	4131H201
3	4105H201	4105H211	4131H201
5	4105H201	4105H211	4131H201
7½	4105H202	4105H211	4131H202
10	4105H202	① 4105H212	4131H202
15	4105H203	4105H212	4131H203
20	4105H204	① 4105H213	4131H204
25	4105H204	① 4105H213	4131H204
30	4105H204	① 4105H214	4131H204
40	4105H205	① 4105H214	4131H205
50	4105H205	4105H214	4131H205
60	4105H205	4105H214	4131H205
75	4105H206	4105H214	4131H206
100	4105H206	4105H215	4131H206
125	.....	4105H215	.....
150	.....	4105H215	.....
200	.....	4105H216	.....

NOTE: Switches above 50 Hp are intended for disconnect service only.

① To comply with National Electrical Code requirements on motor branch circuit fusing, fuse reducers should be used with these switches.

NOT FUSIBLE SAFETY SWITCHES FOR A-C MOTORS

Motor Hp	220 Volt, 3 Phase Motors		440 Volt or 550 Volt, 3 Phase Motors	
	Cat. No. 4105	Cat. No. 4131	Cat. No. 4105	Cat. No. 4131
½-3	4105H321	4131H321	4105H331	4131H331
5	4105H321	4131H321	4105H331	4131H331
7½	4105H321	4131H321	4105H331	4131H331
10	4105H332	4131H332	4105H331	4131H331
15	4105H332	4131H332	4105H331	4131H331
20	4105H333	4131H333	4105H331	4131H331
25	4105H333	4131H333	4105H332	4131H332
30	4105H333	4131H333	4105H332	4131H332
40	4105H334	4131H334	4105H332	4131H332
50	4105H334	4131H334	4105H332	4131H332

NOT FUSIBLE SAFETY SWITCHES FOR D-C MOTORS

Motor Hp	Cat. No. 4105	
	250 Volts	600 Volts
½-2	4105H221	4105H231
3	4105H221	4105H231
5	4105H221	4105H231
7½	4105H222	4105H231
10	4105H222	4105H231
15	4105H223	4105H231
20	4105H223	4105H232
25	4105H224	4105H232
30	4105H224	4105H232
40	4105H224	4105H233
50	4105H225	4105H233

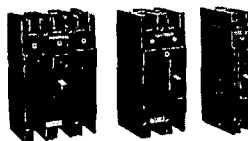
INDUSTRIAL CIRCUIT BREAKERS

AB-I DE-ION* Circuit Breakers and Enclosures



WHEN ORDERING SPECIFY

- Circuit breaker and enclosure catalog numbers

Type EH
Breaker

NEMA 1



NEMA 1B



TYPES E, EH, AND F

System	Ampere Rating	Circuit Breaker Only		Enclosure Only															
				General Purpose NEMA 1 and 1-B			Dust Resistant— Industrial			Raintight NEMA 3-R		Watertight—Dusttight NEMA 3, 4, and 5				Hazardous Locations			
		Cat. No.	Price	Surf. Mtd.	Flush Mtd.	Price	NEMA 1-A	NEMA 12	Price	Cat. No.	Price	Sheet Steel	Cast Iron	Price	Price	NEMA 7-CD	NEMA 9-EFG	Price	Price
TYPE E—240 VOLTS—A-C—125/250 VOLTS D-C—FIXED TRIP																			
	15	E1015	\$11.10													XEH050	\$70.	XEH050	\$70.
	20	E1020	11.10													XEH050	70.	XEH050	70.
	30	E1030	11.10	SEH	FEH	\$13.	DEH	CEH	\$21.	REH	\$35.	WEH	\$79.	IE050-2	\$51.	XEH050	70.	XEH050	70.
	40	E1040	11.10													XEH050	70.	XEH050	70.
	50	E1050	11.10													XEH050	70.	XEH050	70.
	15	E2015	\$28.													XEH050	\$70.	YEO50	\$70.
	20	E2020	28.													XEH050	70.	YEO50	70.
	30	E2030	28.													XEH050	70.	YEO50	70.
	40	E2040	28.													XEH050	70.	YEO50	70.
	50	E2050	28.	SEH	FEH	\$13.	DEH	CEH	\$21.	REH	\$35.	WEH	\$79.	IE050-2	\$51.	XEH050	70.	YEO50	70.
	70	E2070	46.													XEH	112.	XEH	112.
	90	E2090	46.													XEH	112.	XEH	112.
	100	E2100	46.													XEH	112.	XEH	112.
	100 Non-Auto	E2100N	28.													XEH	112.	XEH	112.
																XEH	112.	XEH	112.
	15	E3015	41.													XEH050	70.	YEO50	70.
	20	E3020	41.													XEH050	70.	YEO50	70.
	30	E3030	41.													XEH050	70.	YEO50	70.
	40	E3040	41.													XEH050	70.	YEO50	70.
	50	E3050	41.	SEH	FEH	\$13.	DEH	CEH	\$21.	REH	\$35.	WEH	\$79.	IE050-3	\$73.	XEH050	70.	YEO50	70.
	70	E3070	60.													XEH	112.	XEH	112.
	90	E3090	60.													XEH	112.	XEH	112.
	100	E3100	60.													XEH	112.	XEH	112.
	100 Non-Auto	E3100N	41.													XEH	112.	XEH	112.
																XEH	112.	XEH	112.
TYPE EH—480 VOLTS A-C—250 VOLTS D-C—FIXED TRIP																			
	15	EH2015	\$51.													XEH050	\$70.	XEH050	\$70.
	20	EH2020	51.													XEH050	70.	XEH050	70.
	30	EH2030	51.													XEH050	70.	XEH050	70.
	40	EH2040	51.													XEH050	70.	XEH050	70.
	50	EH2050	51.	SEH	FEH	\$13.	DEH	CEH	\$21.	REH	\$35.	WEH	\$79.	---	---	XEH050	70.	XEH050	70.
	70	EH2070	65.													XEH	112.	XEH	112.
	90	EH2090	65.													XEH	112.	XEH	112.
	100	EH2100	65.													XEH	112.	XEH	112.
100 Non-Auto	EH2100N	46.													XEH	112.	XEH	112.	
	15	EH3015	65.													XEH050	70.	XEH050	70.
	20	EH3020	65.													XEH050	70.	XEH050	70.
	30	EH3030	65.													XEH050	70.	XEH050	70.
	40	EH3040	65.													XEH050	70.	XEH050	70.
	50	EH3050	65.	SEH	FEH	\$13.	DEH	CEH	\$21.	REH	\$35.	WEH	\$79.	---	---	XEH050	70.	XEH050	70.
	70	EH3070	79.													XEH	112.	XEH	112.
	90	EH3090	79.													XEH	112.	XEH	112.
	100	EH3100	79.													XEH	112.	XEH	112.
100 Non-Auto	EH3100N	60.													XEH	112.	XEH	112.	
TYPE F—600 VOLTS A-C—250 VOLTS D-C—FIXED TRIP																			
	15	F2015	\$60.													IF050	\$82.	XF050	\$112.
	20	F2020	60.													IF050	82.	XF050	112.
	30	F2030	60.													IF050	82.	XF050	112.
	40	F2040	60.													IF050	82.	XF050	112.
	50	F2050	60.	SF	FF	\$16.	DF	CF	\$26.	RF	\$50.	WF	\$130.			IF050	82.	XF050	112.
	70	F2070	76.													IF	124.	XF	157.
	90	F2090	76.													IF	124.	XF	157.
	100	F2100	76.													IF	124.	XF	157.
	100 Non-Auto	F2100N	60.													IF	124.	XF	157.
																IF	124.	XF	157.
	15	F3015	77.													IF050	82.	XF050	112.
	20	F3020	77.													IF050	82.	XF050	112.
	30	F3030	77.													IF050	82.	XF050	112.
	40	F3040	77.													IF050	82.	XF050	112.
	50	F3050	77.	SF	FF	\$16.	DF	CF	\$26.	RF	\$50.	WF	\$130.			IF050	82.	XF050	112.
	70	F3070	93.													IF	124.	XF	157.
	90	F3090	93.													IF	124.	XF	157.
	100	F3100	93.													IF	124.	XF	157.
	100 Non-Auto	F3100N	77.													IF	124.	XF	157.
																IF	124.	XF	157.

① Single pole E frame breaker rated 120/240 volts A-C.

② Interchangeable hubs, page 81.

*Trademark of Westinghouse Electric Corp.

OPTIONAL FEATURES, page 96

SPECIAL BREAKERS, pages 93-94.

DISCOUNT SCHEDULE 17CD-1

CUTLER-HAMMER



INDUSTRIAL CIRCUIT BREAKERS

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INTERRUPTING CAPACITIES ②

Breaker Type	Continuous Ampere Rating	No. of Poles	Asymmetrical Interrupting Ratings in Amperes				
			120V. A-c	240V. A-c	277V. A-c	480V. A-c	600V. A-c
E	15-100	1	7,500	---	10,000	---	---
E	15-100	2 or 3	---	7,500	---	---	---
EH	15-100	2 or 3	---	---	---	10,000	---
F	15-100	2 or 3	---	---	---	15,000	15,000
JA	70-225	2 or 3	---	20,000	---	20,000	15,000
KA	70-225	2 or 3	---	25,000	---	25,000	15,000
LA	125-400	2 or 3	---	30,000	---	35,000	25,000
MA	125-800	2 or 3	---	50,000	---	35,000	25,000
LM	900-1000	2 or 3	---	50,000	---	35,000	25,000

AB-I DE-ION* Circuit Breakers and Enclosures



NEMA 1A



NEMA 12



NEMA 3-4-5

TYPES JA, KA, AND LA

System	Ampere Rating	Circuit Breaker Only		Enclosure Only													
				General Purpose NEMA 1 and 1B			Dust Re- sistant NEMA 1A	In- dus- trial NEMA 12		① Raintight NEMA 3R		Watertight— ① Dusttight (Fabricated Sheet Steel) NEMA 3, 4 and 5		Hazardous Locations			
				Sur- face M't'd	Flush M't'd	Price								NEMA 7, C & D		NEMA 9, E, F & G	
										Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
TYPE JA—600 VOLTS A-C—250 VOLTS D-C—FIXED TRIP																	
	70	JA2070	\$170.														
	100	JA2100	170.														
	125	JA2125	170.														
	150	JA2150	170.														
	175	JA2175	170.	SKA	FKA	\$22.	DKA	CKA	\$35.	RKA	\$53.	WKA	\$189.	XKA	\$260.	XKA	\$260.
	200	JA2200	170.														
	225	JA2225	170.														
	225 Non-Auto	JA2225N	135.														
	70	JA3070	210.														
	100	JA3100	210.														
	125	JA3125	210.														
	150	JA3150	210.														
	175	JA3175	210.	SKA	FKA	\$22.	DKA	CKA	\$35.	RKA	\$53.	WKA	\$189.	XKA	\$260.	XKA	\$260.
	200	JA3200	210.														
	225	JA3225	210.														
	225 Non-Auto	JA3225N	170.														
TYPE KA—600 VOLTS A-C—250 VOLTS D-C—INTERCHANGEABLE TRIP																	
	70	KA2070	\$207.														
	100	KA2100	207.														
	125	KA2125	207.														
	150	KA2150	207.														
	175	KA2175	207.	SKA	FKA	\$22.	DKA	CKA	\$35.	RKA	\$53.	WKA	\$189.	XKA	\$260.	XKA	\$260.
	200	KA2200	207.														
	225	KA2225	207.														
	225 Non-Auto	KA2225N	165.														
	70	KA3070	\$258.														
	100	KA3100	258.														
	125	KA3125	258.														
	150	KA3150	258.														
	175	KA3175	258.	SKA	FKA	\$22.	DKA	CKA	\$35.	RKA	\$53.	WKA	\$189.	XKA	\$260.	XKA	\$260.
	200	KA3200	258.														
	225	KA3225	258.														
	225 Non-Auto	KA3225N	203.														
TYPE LA—600 VOLTS A-C—250 VOLTS D-C—INTERCHANGEABLE TRIP																	
	125	LA2125	\$330.														
	150	LA2150	330.														
	175	LA2175	330.														
	200	LA2200	330.														
	225	LA2225	330.	SLA	FLA	\$22.	DLA	CLA	\$62.	RLA	\$117.	WLA	\$375.	XLA	\$582.	XLA	\$582.
	250	LA2250	330.														
	300	LA2300	330.														
	350	LA2350	330.														
	400	LA2400	330.														
	400 Non-Auto	LA2400N	286.														
	125	LA3125	400.														
	150	LA3150	400.														
	175	LA3175	400.														
	200	LA3200	400.														
	225	LA3225	400.	SLA	FLA	\$22.	DLA	CLA	\$62.	RLA	\$117.	WLA	\$375.	XLA	\$582.	XLA	\$582.
	250	LA3250	400.														
	300	LA3300	400.														
	350	LA3350	400.														
	400	LA3400	400.														
	400 Non-Auto	LA3400N	344.														

*Trademark of Westinghouse Electric Corp.

① Interchangeable hubs, page 81.

② Listed ratings based on NEMA test procedures.

DISCOUNT SCHEDULE 17CD-1

SPECIAL BREAKERS, pages 93-94.

OPTIONAL FEATURES, page 96

CUTLER-HAMMER

89

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS ③

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

INDUSTRIAL CIRCUIT BREAKERS



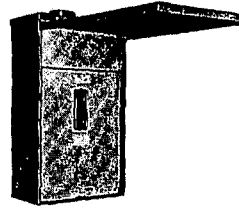
AB-I DE-ION* Circuit Breakers and Enclosures

WHEN ORDERING SPECIFY

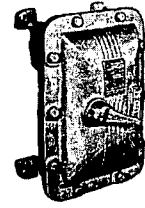
- Circuit breaker and enclosure catalog numbers



Type MA



NEMA 3R



NEMA 7-9

TYPES MA AND LM (For interrupting capacities, see previous page.)

		Circuit Breaker Only		Enclosure Only															
System	Am- pere Rating			General Purpose NEMA 1 and 1B			Dust Re- sistant NEMA 1A	In- dus- trial NEMA 12		① Raintight NEMA 3R		Watertight—Dusttight NEMA 3, 4 and 5				Hazardous Locations			
				Sur- face M't'd	Flush M't'd							② Fabricated Sheet Steel		Cast Iron		NEMA 7 C & D		NEMA 9 E, F & G	
		Cat. No.	Price	Cat. No.	Cat. No.	Price	Cat. No.	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
TYPE MA—600 VOLTS A-C—250 VOLTS D-C—INTERCHANGEABLE TRIP																			
	125	MA2125	\$501.																
	150	MA2150	501.																
	175	MA2175	501.																
	200	MA2200	501.																
	225	MA2225	501.	SMA- 600	FMA- 600	\$40.	DMA- 600	CMA- 600	\$117.	RMA	\$152.	WMA	\$612.	IMA	\$598.	XMA	\$733.	XMA	\$733.
	250	MA2250	501.																
	300	MA2300	501.																
	350	MA2350	501.																
	400	MA2400	501.																
	500	MA2500	501.																
600	MA2600	501.																	
①	700	MA2700	653.																
	800	MA2800	653.	SMA	FMA	\$40.	DMA	CMA	\$117.	RMA	\$152.	WMA	\$612.	IMA	\$598.	XMA	\$733.	XMA	\$733.
	800 Non- Auto																		
		MA2800N	384.																
	125	MA3125	636.																
	150	MA3150	636.																
	175	MA3175	636.																
	200	MA3200	636.																
	225	MA3225	636.	SMA- 600	FMA- 600	\$40.	DMA- 600	CMA- 600	\$117.	RMA	\$152.	WMA	\$612.	IMA	\$598.	XMA	\$733.	XMA	\$733.
	250	MA3250	636.																
	300	MA3300	636.																
	350	MA3350	636.																
	400	MA3400	636.																
	500	MA3500	636.																
600	MA3600	636.																	
①	700	MA3700	840.																
	800	MA3800	840.	SMA	FMA	\$40.	DMA	CMA	\$117.	RMA	\$152.	WMA	\$612.	IMA	\$598.	XMA	\$733.	XMA	\$733.
	800 Non- Auto																		
		MA3800N	487.																
TYPE LM—600 VOLTS A-C—250 VOLTS D-C—INTERCHANGEABLE TRIP																			
	② 900	LM-2900	\$928.	SLM- 1000	FLM- 1000	\$80.	DLM- 1000	CLM- 1000	\$152.	RLM- 1000	\$200.	WLM- 1000	\$612.	---	---	---	---	---	---
	② 1000	LM21000	928.	SLM- 1000	FLM- 1000	80.	DLM- 1000	CLM- 1000	152.	RLM- 1000	200.	WLM- 1000	612.	---	---	---	---	---	---
	② 900	LM3900	\$1070.	SLM- 1000	FLM- 1000	\$80.	DLM- 1000	CLM- 1000	\$152.	RLM- 1000	\$200.	WLM- 1000	\$612.	---	---	---	---	---	---
	② 1000	LM31000	1070.	SLM- 1000	FLM- 1000	80.	DLM- 1000	CLM- 1000	152.	RLM- 1000	200.	WLM- 1000	612.	---	---	---	---	---	---

- ① A-C only.
 ② Not UL listed.
 ③ Interchangeable hubs, page 81.
 ④ WMA and WLM have 3 hubs for 3/4" conduit in top and bottom.
 *Trademark of Westinghouse Electric Corp.

OPTIONAL FEATURES, page 96

SPECIAL BREAKERS, pages 93-94.

DISCOUNT SCHEDULE 17CD-1

CUTLER-HAMMER



INDUSTRIAL CIRCUIT BREAKERS

MARK 75* AB-I DE-ION* Circuit Breakers and Enclosures

WHEN ORDERING SPECIFY

- Circuit breaker and enclosure catalog numbers

TYPES HF, HK, HKL, AND HLM

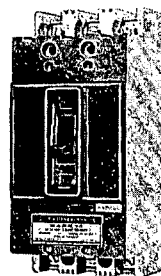
System	Am- pere Rating	Circuit Breaker Only	Enclosure Only						
			General Purpose NEMA 1 and 1B			Dust Re- sist- ant NEMA 1A	In- dus- trial NEMA 12	Price	
			Sur- face M't'd	Flush M't'd					
			Cat. No.	Price	Cat. No.	Cat. No.	Price	Cat. No.	Cat. No.
TYPE HF—600 VOLTS A-C—250 VOLTS D-C—FIXED TRIP									
	15	HF2015	\$98.	SF	FF	\$16.	DF	CF	\$26.
	20	HF2020	98.						
	25	HF2025	98.						
	30	HF2030	98.						
	35	HF2035	98.						
	40	HF2040	98.						
	50	HF2050	98.						
	70	HF2070	113.						
	90	HF2090	113.						
	100	HF2100	113.						
	15	HF3015	115.	SF	FF	16.	DF	CF	26.
	20	HF3020	115.						
	25	HF3025	115.						
	30	HF3030	115.						
	35	HF3035	115.						
	40	HF3040	115.						
	50	HF3050	115.						
	70	HF3070	130.						
	90	HF3090	130.						
	100	HF3100	130.						
TYPE HK—600 VOLTS A-C—250 VOLTS D-C—INTERCHANGEABLE TRIP									
	70	HK2070	\$409.	SK	FK	\$22.	DKL	CKL	\$62.
	90	HK2090							
	100	HK2100							
	125	HK2125							
	150	HK2150							
	175	HK2175							
	200	HK2200							
	225	HK2225							
	70	HK3070	494.	SK	FK	22.	DKL	CKL	62.
	90	HK3090							
	100	HK3100							
	125	HK3125							
	150	HK3150							
	175	HK3175							
	200	HK3200							
	225	HK3225							
TYPE HKL—600 VOLTS A-C—250 VOLTS D-C—INTERCHANGEABLE TRIP									
	125	HKL2125	\$546.	SKL	FKL	\$26.	DKL	CKL	\$62.
	150	HKL2150							
	175	HKL2175							
	200	HKL2200							
	225	HKL2225							
	250	HKL2250							
	300	HKL2300							
	350	HKL2350							
	400	HKL3400							
		125								HKL3125	653.	SKL	FKL	26.	DKL	CKL	62.
150		HKL3150							
175		HKL3175							
200		HKL3200							
225		HKL3225							
250		HKL3250							
300		HKL3300							
350		HKL3350							
400		HKL3400							

INTERRUPTING CAPACITIES ⑤

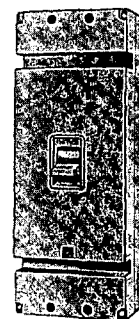
Breaker Type	Continuous Ampere Rating	No. of Poles	Asymmetrical Interrupting Rating in Amperes		
			240V. A-c	480V. A-c	600V. A-c
HF	15-100	2 or 3	75,000	30,000	20,000
HK	70-225	2 or 3	75,000	40,000	30,000
HKL	125-400	2 or 3	75,000	40,000	30,000
HLM	125-800	2 or 3	75,000	40,000	30,000

⑤ Listed ratings based on NEMA test procedures.

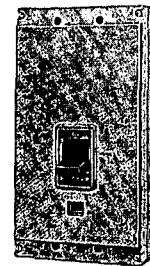
System	Am- pere Rating	Circuit Breaker Only		Enclosure Only						
				General Purpose NEMA 1 and 1B			Dust Re- sist- ant NEMA 1A	In- dus- trial NEMA 12	Price	
				Sur- face M't'd	Flush M't'd					
				Cat. No.	Price	Cat. No.	Cat. No.	Price	Cat. No.	Cat. No.
TYPE HLM—600 VOLTS A-C—250 VOLTS D-C— INTERCHANGEABLE TRIP										
	125	HLM2125	\$660.	SL	FL	\$40.	DL	CL	\$117.	
	150	HLM2150								
	175	HLM2175								
	200	HLM2200								
	225	HLM2225								
	250	HLM2250								
	300	HLM2300								
	350	HLM2350								
	400	HLM2400								
	500	HLM2500								
	600	HLM2600								
		700	HLM2700	812.	SLM	FLM	40.	DLM	CLM	117.
800		HLM2800								
125		HLM3125	795.	SL	FL	40.	DL	CL	117.	
150		HLM3150								
175		HLM3175								
200		HLM3200								
225		HLM3225								
250		HLM3250								
300		HLM3300								
350		HLM3350								
400		HLM3400								
500		HLM3500								
600	HLM3600									
	700	HLM3700	999.	SLM	FLM	40.	DLM	CLM	117.	
	800									



Type HF



Type HLM



Type HK

*Trademark of Westinghouse Electric Corp.
DISCOUNT SCHEDULE 17CD-1

SPECIAL BREAKERS, pages 93-94.

OPTIONAL FEATURES, page 96

CUTLER-HAMMER

INDUSTRIAL CIRCUIT BREAKERS



TRI-PAC* AB-I DE-ION* Circuit Breakers and Enclosures

WHEN ORDERING SPECIFY • Circuit breaker and enclosure catalog numbers

TYPES F, K, KL, AND L

System	Am- pere Rating	Circuit Breaker Only		Enclosure Only					
				Dust Re- sistant NEMA 1A		Industrial NEMA 12		Watertight— ② Dusttight (Fabricated Sheet Steel) NEMA 3, 4, 5	
		Cat. No.	Price	Cat. No.	Cat. No.	Price	Cat. No.	Price	

TYPE F—600 VOLTS A-C—250 VOLTS D-C

	15	F2015P	\$268.					
	20	F2020P	268.					
	30	F2030P	268.					
	40	F2040P	268.	DF-P	CF-P	\$39.	WF	\$130.
	50	F2050P	268.					
	70	F2070P	268.					
	100	F2100P	268.					
	① 100	F2100NP	254.					

	15	F3015P	325.					
	20	F3020P	325.					
	30	F3030P	325.					
	40	F3040P	325.	DF-P	CF-P	\$39.	WF	130.
	50	F3050P	325.					
	70	F3070P	325.					
	100	F3100P	325.					
	① 100	F3100NP	310.					

TYPE K—600 VOLTS A-C—250 VOLTS D-C

	70	K2070P	\$508.					
	100	K2100P	508.					
	125	K2125P	508.					
	150	K2150P	508.	DKL-P	CKL-P	\$106.	WKL	\$480.
	175	K2175P	508.					
	200	K2200P	508.					
	225	K2225P	508.					
	① 225	K2225NP	465.					

	70	K3070P	642.					
	100	K3100P	642.					
	125	K3125P	642.					
	150	K3150P	642.	DKL-P	CKL-P	106.	WKL	480.
	175	K3175P	642.					
	200	K3200P	642.					
	225	K3225P	642.					
	① 225	K3225NP	591.					

TYPE KL—600 VOLTS A-C—250 VOLTS D-C

	125	KL2125P	\$684.					
	150	KL2150P	684.					
	175	KL2175P	684.					
	200	KL2200P	684.					
	225	KL2225P	684.	DKL-P	CKL-P	\$106.	WKL	\$480.
	250	KL2250P	684.					
	300	KL2300P	684.					
	① 400	KL2400NP	587.					

	125	KL3125P	858.					
	150	KL3250P	858.					
	175	KL3175P	858.					
	200	KL3200P	858.					
	225	KL3225P	858.	DKL-P	CKL-P	106.	WKL	480.
	250	KL3250P	858.					
	300	KL3300P	858.					
	① 400	KL3400NP	722.					

*Trademark of Westinghouse Electric Corp.

System	Am- pere Rating	Circuit Breaker Only		Enclosure Only					
				Dust Re- sistant NEMA 1A		Industrial NEMA 12		Watertight— ② Dusttight (Fabricated Sheet Steel) NEMA 3, 4, 5	
		Cat. No.	Price	Cat. No.	Cat. No.	Price	Cat. No.	Price	

TYPE L—600 VOLTS A-C—250 VOLTS D-C

	125	L2125P	\$1002.					
	150	L2150P	1002.					
	175	L2175P	1002.					
	200	L2200P	1002.					
	225	L2225P	1002.					
	250	L2250P	1002.	DLM	CLM	\$117.	WLM	\$612.
	300	L2300P	1002.					
	① 600	L2600NP	888.					

	125	L3125P	1214.					
	150	L3150P	1214.					
	175	L3175P	1214.					
	200	L3200P	1214.					
	225	L3225P	1214.	DLM	CLM	117.	WLM	612.
	250	L3250P	1214.					
	300	L3300P	1214.					
	① 600	L3600NP	1062.					

ASYMMETRICAL INTERRUPTING RATING IN AMPERES ④

Breaker Type	Continuous Ampere Rating	No. of Poles	600V. A-c
F	15-100	2 or 3	100,000
K	70-225	2 or 3	100,000
KL	125-400	2 or 3	100,000
L	125-600	2 or 3	100,000

① Non automatic.

② WLM has 3 hubs for 3/4" conduit top and bottom.

③ Interchangeable hubs, page 81.

④ Listed ratings based on NEMA test procedures.



Type F



Type L



Type K-KL

OPTIONAL FEATURES, page 96

SPECIAL BREAKERS, pages 93-94.

DISCOUNT SCHEDULE 17CD-1

CUTLER-HAMMER



INDUSTRIAL CIRCUIT BREAKERS

AB-I DE-ION* CIRCUIT BREAKERS

Special Types—Adjustable Magnetic—SAFTVUE*—Ambient Compensating

WHEN ORDERING SPECIFY

- Type and catalog number

1. Adjustable magnetic only AB-I compensated circuit breakers available in types F, JA, KA, LA and MA, 2 and 3 pole.
2. SAFTVUE* AB-I breakers available in standard type F (3 pole only) and types JA, KA, and LA (2 and 3 pole).
3. Ambient compensated AB-I breakers available in all ratings.

① ADJUSTABLE MAGNETIC AND SAFTVUE BREAKERS

Trip units are calibrated and factory set on the high value of the trip range. The trip setting may be changed by turning the adjusting knobs in front cover of breaker. Adjustment follows linear scale—each of the 9 settings has definite ampere significance within calibration tolerances.

Am- pere Rating Cont.	Amperes Mag. Trip Range	Complete Breaker						③ Trip Unit Only Standard and SAFTVUE			
		2-Pole			3-Pole			2-Pole		3-Pole	
		Standard Cat. No.	SAFTVUE Cat. No.	Price	Standard Cat. No.	SAFTVUE Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
TYPE F—100 AMP. 2-POLE, 600 VOLTS A-C, 250 VOLTS D-C 3-POLE, 600 VOLTS A-C											
3	7-15	F2015M	---	\$60.	F3015M	F3105SM	\$77.	---	---	---	---
5	7-15	454D676G02	---	60.	454D676G13	---	77.	---	---	---	---
5	15-35	F2035M	---	60.	F3035M	F3035SM	77.	---	---	---	---
10	15-35	454D676G03	---	60.	454D676G14	---	77.	---	---	---	---
10	32-80	F2080M	---	60.	F3080M	F3080SM	77.	---	---	---	---
25	32-80	454D676G04	---	60.	454D676G15	---	77.	---	---	---	---
25	66-190	F2190M	---	60.	F3190M	F3190SM	77.	---	---	---	---
50	66-190	454D676G05	---	60.	454D676G16	---	77.	---	---	---	---
50	160-560	F2560M	---	60.	F3560M	F3560SM	77.	---	---	---	---
70	100-270	F2270M	---	76.	F3270M	F3270SM	93.	---	---	---	---
100	160-560	454D676G07	---	76.	454D676G18	---	93.	---	---	---	---
100	490-1550	F21550M	---	76.	F31550M	F31550SM	93.	---	---	---	---
TYPE JA—225 AMP. ② 2-POLE, 600 VOLTS A-C, 250 VOLTS D-C 3-POLE, 600 VOLTS A-C											
225	350-700	JA2700M	JA2700SM	\$170.	JA3700M	JA3700SM	\$210.	---	---	---	---
	625-1250	JA21250M	JA21250SM		JA3125M	JA31250SM		---	---	---	---
	750-1500	JA21500M	JA21500SM		JA31500M	JA31500SM		---	---	---	---
	875-1750	JA21750M	JA21750SM		JA31750M	JA31750SM		---	---	---	---
	1125-2250	JA22250M	JA22250SM		JA32250M	JA32250SM		---	---	---	---
TYPE KA—225 AMP. ② 2-POLE, 600 VOLTS A-C, 250 VOLTS D-C 3-POLE, 600 VOLTS A-C											
225	350-700	KA2700M	KA2700SM	\$207.	KA3700M	KA3700SM	\$258.	KA2700TM	\$54.	KA3700TM	\$68.
	625-1250	KA21250M	KA21250SM		KA31250M	KA31250SM		KA21250TM		KA31250TM	
	750-1500	KA21500M	KA21500SM		KA31500M	KA31500SM		KA21500TM		KA31500TM	
	875-1750	KA21750M	KA21750SM		KA31750M	KA31750SM		KA21750TM		KA31750TM	
	1050-2250	KA22250M	KA22250SM		KA32250M	KA32250SM		KA22250TM		KA32250TM	
TYPE LA—400 AMP ② 2-POLE, 600 VOLTS A-C, 250 VOLTS D-C 3-POLE, 600 VOLTS A-C											
400	625-1250	LA21250M	LA21250SM	\$330.	LA31250M	LA31250SM	\$400.	LA21250TM	\$54.	LA31250TM	\$68.
	750-1500	LA21500M	LA21500SM		LA31500M	LA31500SM		LA21500TM		LA31500TM	
	875-1750	LA21750M	LA21750SM		LA31750M	LA31750SM		LA21750TM		LA31750TM	
	1050-2250	LA22250M	LA22250SM		LA32250M	LA32250SM		LA22250TM		LA32250TM	
	1500-3000	LA23000M	LA23000SM		LA33000M	LA33000SM		LA23000TM		LA33000TM	
	2000-4000	LA24000M	LA24000SM		LA34000M	LA34000SM		LA24000TM		LA34000TM	
TYPE MA —800 AMP. ② 2-POLE, 600 VOLTS A-C, 250 VOLTS D-C 3-POLE, 600 VOLTS A-C											
800	625-1250	MA21250M	---	\$501.	MA31250M	---	\$636.	MA21250TM	\$150.	MA31250TM	\$197.
	1000-2000	MA22000M	---	501.	MA32000M	---	636.	MA22000TM	150.	MA32000TM	197.
	1500-3000	MA23000M	---	501.	MA33000M	---	636.	MA23000TM	150.	MA33000TM	197.
	2000-4000	MA24000M	---	501.	MA34000M	---	636.	MA24000TM	150.	MA34000TM	197.
	3000-6000	MA26000M	---	653.	MA36000M	---	840.	MA26000TM	288.	MA36000TM	380.
	4000-8000	MA28000M	---	653.	MA38000M	---	840.	MA28000TM	288.	MA38000TM	380.

① Not U/L listed.

② 2-pole breakers or trips supplied in 3-pole frames with center current parts omitted.

③ When ordering Adj. Mag. trip only, indicate standard Cat. No. from previous listing. Also specify trip unit Cat. No. selected from above table. Circuit breaker price remains the same.

*Trademark of Westinghouse Electric Corp.

DISCOUNT SCHEDULE 17CD-1

CUTLER-HAMMER

INDUSTRIAL CIRCUIT BREAKERS

AB-I DE-ION* Circuit Breakers



ADJUSTABLE MAGNETIC TRIP UNITS—continued

Am- pere Rating Cont.	Amperes Mag. Trip Range	⑤ Trip Unit Only			
		2-Pole		3-Pole	
		Cat. No.	Price	Cat. No.	Price
MARK 75* —225 Amp. — 2-Pole, 600 Volts A-c, 250 Volts D-c Type HKL — 3-Pole, 600 Volts A-c					
225	300-700 450-1500 600-2250	HK2700TM HK21500TM HK22250TM	\$54.	HK3700TM HK31500TM HK32250TM	\$68.
MARK 75* —400 Amp. — 2-Pole, 600 Volts A-c, 250 Volts D-c Type HK — 3-Pole, 600 Volts A-c					
400	400-1250 500-1750 600-2250 800-3000 1000-4000	HKL21250TM HKL21750TM HKL22250TM HKL23000TM HKL24000TM	\$118.	HKL31250TM HKL31750TM HKL32250TM HKL33000TM HKL34000TM	\$163.
MARK 75* —800 Amp. — 2-Pole, 600 Volts A-c, 250 Volts D-c Type HLM — 3-Pole, 600 Volts A-c					
800	340-700 350-1000 600-2000 1100-4000 1500-6000 3000-7000 3300-8000	HLM2700TM HLM21000TM HLM22000TM HLM24000TM HLM26000TM HLM27000TM HLM28000TM	\$150. 150. 150. 150. 150. 288. 288.	HLM3700TM HLM31000TM HLM32000TM HLM34000TM HLM36000TM HLM37000TM HLM38000TM	\$197. 197. 197. 197. 197. 380. 380.

AMBIENT COMPENSATING BREAKERS

Ambient compensating breakers have both thermal and magnetic trip elements. They are thermally compensated to carry rated load at 50°C while still meeting U/L tripping requirements at 25°C.

Am- pere Rating Cont.	Amp. Mag. Trip Range	1-Pole		2-Pole		3-Pole		
		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	
Type E— 100 Amp.		120 Volts A-c 125 Volts D-c		240 Volts A-c 125/250 Volts D-c		240 Volts A-c 125/250 Volts D-c		
①	15	---	E1015A	\$12.20	E2015A	\$31.	E3015A	\$45.
	15	---	E1015BA	15.40	---	---	---	---
	20	---	E1020A	12.20	E2020A	31.	E3020A	45.
	20	---	E1020BA	15.40	---	---	---	---
	30	---	E1030A	12.20	E2030A	31.	E3030A	45.
	40	---	E1040A	12.20	E2040A	31.	E3040A	45.
	50	---	E1050A	12.20	E2050A	31.	E3050A	45.
	70	---	E1070A	24.80	E2070A	51.	E3070A	67.
	90	---	E1090A	24.80	E2090A	51.	E3090A	67.
	100	---	E1100A	24.80	E2100A	51.	E3100A	67.
② Type EH— 100 Amp.		277 Volts A-c 125 Volts D-c		② 480 Volts A-c 250 Volts D-c		480 Volts A-c		
15	---	EH1015A	\$15.70	EH2015A	\$56.10	EH3015A	\$71.50	
20	---	EH1020A	15.70	EH2020A	56.10	EH3020A	71.50	
30	---	EH1030A	15.70	EH2030A	56.10	EH3030A	71.50	
40	---	EH1040A	15.70	EH2040A	56.10	EH3040A	71.50	
50	---	EH1050A	15.70	EH2050A	56.10	EH3050A	71.50	
70	---	EH1070A	28.60	EH2070A	71.50	EH3070A	86.90	
90	---	EH1090A	28.60	EH2090A	71.50	EH3090A	86.90	
100	---	EH1100A	28.60	EH2100A	71.50	EH3100A	86.90	
Type F— 100 Amp.				600 Volts A-c 240 Volts D-c		600 Volts A-c		
15	---	---	---	F2015A	\$67.	F3015A	\$84.	
20	---	---	---	F2020A	67.	F3020A	84.	
30	---	---	---	F2030A	67.	F3030A	84.	
40	---	---	---	F2040A	67.	F3040A	84.	
50	---	---	---	F2050A	67.	F3050A	84.	
70	---	---	---	F2070A	83.	F3070A	103.	
90	---	---	---	F2090A	83.	F3090A	103.	
100	---	---	---	F2100A	83.	F3100A	103.	

① 277 volts A-C.

② 70, 90 and 100 amp. breaker rated at 125/250 V. D-C.

③ Not U/L listed.

④ 2-pole breakers or trips supplied in 3-pole frames with center current parts omitted.

⑤ When ordering Adj. Mag. trip only, indicate standard Cat. No. from previous section. Also specify trip unit Cat. No. selected from above table. The circuit breaker price remains the same.

*Trademark of Westinghouse Electric Corp.

AMBIENT COMPENSATING BREAKERS—continued

Am- pere Rating Cont.	Amperes Mag. Trip Range	2-Pole		3-Pole	
		Cat. No.	Price	Cat. No.	Price
③ Type JA—225 Amp.		④ 600 Volts A-c 250 Volts D-c		600 Volts A-c	
70	350-700	JA2070A	\$187.	JA3070A	\$231.
100	500-1000	JA2100A		JA3100A	
125	625-1250	JA2125A		JA3125A	
150	750-1500	JA2150A		JA3150A	
175	875-1750	JA2175A		JA3175A	
200	1000-2000	JA2200A		JA3200A	
225	1125-2250	JA2225A		JA3225A	
Trip Unit Only					
③ Type KA—225 Amp.		④ 600 Volts A-c 250 Volts D-c		600 Volts A-c	
70	350-700	KA2070TA	\$70.	KA3070TA	\$88.
100	500-1000	KA2100TA		KA3100TA	
125	625-1250	KA2125TA		KA3125TA	
150	750-1500	KA2150TA		KA3150TA	
175	875-1750	KA2175TA		KA3175TA	
200	1000-2000	KA2200TA		KA3200TA	
225	1125-2250	KA2225TA		KA3225TA	
Trip Unit Only					
③ Type LA—400 Amp.		④ 600 Volts A-c 250 Volts D-c		600 Volts A-c	
125	625-1250	LA2125TA	\$70.	LA3125TA	\$88.
150	750-1500	LA2150TA		LA3150TA	
175	875-1750	LA2175TA		LA3175TA	
200	1000-2000	LA2200TA		LA3200TA	
225	1125-2250	LA2225TA		LA3225TA	
250	1250-2500	LA2250TA		LA3250TA	
300	1500-3000	LA2300TA		LA3300TA	
350	1750-3500	LA2350TA		LA3350TA	
400	2000-4000	LA2400TA		LA3400TA	
Trip Unit Only					
③ MARK 75* Type HF—100 Amp.		④ 600 Volts A-c 250 Volts D-c		600 Volts A-c	
15	---	HF2015A	\$108.	HF3015A	\$127.
20	---	HF2020A	108.	HF3020A	127.
30	---	HF2030A	108.	HF3030A	127.
40	---	HF2040A	108.	HF3040A	127.
50	---	HF2050A	108.	HF3050A	127.
70	---	HF2070A	124.	HF3070A	143.
90	---	HF2090A	124.	HF3090A	143.
100	---	HF2100A	124.	HF3100A	143.
Trip Unit Only					
MARK 75* Type HK—225 Amp.		③ ④ 600 Volts A-c 250 Volts D-c		600 Volts A-c	
70	300-700	HK2070TA	\$70.	HK3070TA	\$88.
90	400-900	HK2090TA		HK3090TA	
100	400-1000	HK2100TA		HK3100TA	
125	400-1250	HK2125TA		HK3125TA	
150	500-1500	HK2150TA		HK3150TA	
175	500-1750	HK2175TA		HK3175TA	
200	600-2000	HK2200TA		HK3200TA	
225	600-2250	HK2225TA		HK3225TA	
Trip Unit Only					
MARK 75* Type HKL—400 Amp.		③ ④ 600 Volts A-c 250 Volts D-c		600 Volts A-c	
125	400-1250	HKL2125TA	\$157.	HKL3125TA	\$216.
150	500-1500	HKL2150TA		HKL3150TA	
175	500-1750	HKL2175TA		HKL3175TA	
200	600-2000	HKL2200TA		HKL3200TA	
225	600-2250	HKL2225TA		HKL3225TA	
250	700-2500	HKL2250TA		HKL3250TA	
300	800-3000	HKL2300TA		HKL3300TA	
350	900-3500	HKL2350TA		HKL3350TA	
400	1000-4000	HKL2400TA		HKL3400TA	

③ Note 1: MARK 75* Type HF 100 Amp. magnetic only breakers are nonadjustable breakers. Trip setting must be specified and can be set between 9 to 11 times normal rating of breaker.

Note 2: TRI-PAC* special breakers available on request. Consult Cutler-Hammer.

CUTLER-HAMMER



INDUSTRIAL CIRCUIT BREAKERS

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AB-I DE-ION*, MARK 75* and TRI-PAC* Circuit Breakers

ENCLOSURE ONLY

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Breaker Frame Size	Ampere Range	Dimensions in Inches			Ship. Wt. Lbs.	Dimensions in Inches			Ship. Wt. Lbs.
		Wide A	High B	Deep C		Wide A	High B	Deep C	
SURFACE MOUNTING NEMA 1						FLUSH MOUNTING NEMA 1B			
E	15 to 100	7 ⁷ / ₈	13 ¹ / ₄	3 ³ / ₈	10	8 ⁷ / ₈	14 ¹ / ₂	3 ³ / ₈	10
EH	15 to 100	7 ⁷ / ₈	13 ¹ / ₄	3 ³ / ₈	10	8 ⁷ / ₈	14 ¹ / ₂	3 ³ / ₈	10
F	15 to 100	7 ⁷ / ₈	17 ¹ / ₈	4 ¹ / ₂	12	8 ⁷ / ₈	18 ³ / ₈	4 ¹ / ₂	12
JA, KA	70 to 225	10 ³ / ₄	20 ³ / ₈	5 ¹ / ₄	22	12	21 ⁷ / ₈	5 ¹ / ₄	22
K	70 to 225	---	---	---	---	---	---	---	---
KL	125 to 400	---	---	---	---	---	---	---	---
LA	125 to 400	15 ¹ / ₂	24 ³ / ₈	6 ¹ / ₄	28	16 ³ / ₄	25 ³ / ₈	6 ¹ / ₄	28
MA	125 to 600	15 ³ / ₄	38 ¹ / ₂	7 ³ / ₄	85	17	39 ³ / ₄	7 ³ / ₄	85
MA	700 to 800	18 ³ / ₄	42 ³ / ₄	7 ³ / ₄	120	19 ³ / ₄	43 ³ / ₈	7 ³ / ₄	120
LM	900 to 1000	18 ³ / ₄	42 ¹ / ₂	7 ³ / ₄	120	19 ¹ / ₂	43 ³ / ₄	7 ³ / ₄	120

FLUSH MOUNTING NEMA 1B									
NEMA 1A									
E and EH	15 to 100	7 1/2	---	6 1/2	11	7 1/2	15 3/8	6 3/8	11
F	15 to 100	7 3/4	---	7 3/8	13	7 3/4	18 3/8	7 1/2	13
F (Tri-Pac)	15 to 100	7 3/4	---	7 3/8	18	7 3/4	21 3/8	7 1/2	18
JA, KA	70 to 225	10	---	8	30	10	23 3/4	8	30
LA	125 to 400	15 1/2	---	8 3/8	38	15 3/8	27 1/4	8 1/2	38
K (Tri-Pac)	70 to 225	15 1/2	---	8 3/8	50	15 3/8	36 1/2	8 3/8	50
KL (Tri-Pac)	125 to 400	15 3/4	---	8 3/8	50	15 3/8	36 3/8	8 3/8	50
L (Tri-Pac)	225 to 600	20 3/8	---	10 1/4	112	20 3/8	51 7/8	10 3/8	112
MA	125 to 600	16 3/8	---	10 1/4	60	16 3/8	39 3/8	10 1/4	60
MA	700 to 800	20	---	10 1/4	80	20	45 3/8	10 1/4	80
LM	900 to 1000	20 3/8	---	10 1/4	120	20 3/8	51 1/4	10 3/8	120

CAST IRON NEMA 3, 4, AND 5									
FABRICATED SHEET STEEL NEMA 3, 4 AND 5									
E	15 to 50	5 3/4	8 3/8	5 3/4	12 1/2	---	---	---	---
E 3-Pole	15 to 50	9 3/4	3 3/4	6 1/2	24	---	---	---	---
E and EH	15 to 100	---	---	---	---	8 7/8	16 3/8	7	22 1/2
F	15 to 50	8 3/8	15 3/8	7 3/8	61	---	---	---	---
F	70 to 100	8 3/8	15 3/8	7 3/8	63	---	---	---	---
F	15 to 100	---	---	---	---	8 7/8	21 1/2	7 3/8	31 1/2
JA	70 to 225	---	---	---	---	---	---	---	---
KA	70 to 225	---	---	---	---	11 1/8	23 3/8	8 3/8	50
K (Tri-Pac)	70 to 225	---	---	---	---	16 3/8	35 3/8	10	83
LA	125 to 400	---	---	---	---	16 3/8	27 3/8	8 3/8	66
KL (Tri-Pac)	125 to 400	---	---	---	---	16 3/8	35 3/8	10	83
L (Tri-Pac)	125 to 600	---	---	---	---	21 1/8	51 3/8	12 3/8	112
MA	125 to 800	23 1/2	31 3/8	19 3/4	704	21 1/8	45 3/8	10 3/8	150
LM	900 to 1000	---	---	---	---	21 1/8	51 3/8	12 3/8	169

CAST IRON NEMA 7 C AND D									
CAST IRON NEMA 9 E, F AND G									
E 1-Pole	15 to 50	9 3/4	12 3/4	7 3/8	36	9 3/4	12 3/4	7 3/8	36
E 2, 3-Pole	15 to 50	10 1/2	15 3/8	8 3/8	36	10 1/2	15 3/8	8 3/8	24
E 2, 3-Pole	70 to 100	10 1/2	15 3/8	8 3/8	65	10 1/2	15 3/8	8 3/8	65
F 2, 3-Pole	15 to 50	10 1/2	15 3/8	8 3/8	65	10 1/2	15 3/8	8 3/8	56
F 2, 3-Pole	70 to 100	10 1/2	18 3/8	8 3/8	78	10 1/2	18 3/8	8 3/8	69
JA, KA	70 to 225	18 1/2	24 3/8	9	200	18 1/2	24 3/8	9	200
K	70 to 225	20 1/2	30 3/8	15	---	20 1/2	30 3/8	15	---
LA	125 to 400	20 1/2	30 3/8	15	500	20 1/2	30 3/8	15	500
MA	125 to 800	23 1/2	47	19 3/4	700	23 1/2	47	19 3/4	700

NEMA 3R									
E and EH	15 to 100	7 3/4	13 1/4	4 3/8	12	---	---	---	---
F	15 to 100	9 3/4	17 1/4	6	14	---	---	---	---
JA, KA	70 to 225	10 1/2	21 1/2	5 3/4	24	---	---	---	---
K	70 to 225	12 3/4	26 3/8	6 3/4	---	---	---	---	---
LA	125 to 400	15 1/2	25 3/8	7 3/8	35	---	---	---	---
MA	125 to 800	20 3/8	43	9 3/8	150	---	---	---	---
LM	900 to 1000	20 3/8	43	9 3/8	150	---	---	---	---

BREAKER ONLY

APPROXIMATE SHIPPING WEIGHTS

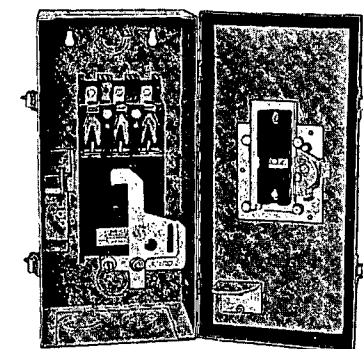
Breaker Frame Size	Poles	Ship. Wt. Lbs.	Breaker Frame Size	Poles	Ship. Wt. Lbs.
E	1 2 3	1 1/4 3 4	MA	2 3	37 44
EH	2 3	3 3/4 4 3/4	LM	2 3	52 59
F	2 3	5 7 1/2	HF	2 3	9 1/2 10 1/2
JA	2 3	12 14	HK	2 3	23 31
KA	2 3	12 14	HKL	2 3	31 1/4 37
LA	2 3	21 1/4 24 1/4	HLM	2 3	58 65

TRI-PAC					
F	2 3	11 1/2 11 1/2	KL	2 3	44 44
K	2 3	43 43	L	2 3	78 78

CAST IRON ENCLOSURES—Tapped hole size and location.

Breaker Type	Top of Enclosure	Bottom of Enclosure
NEMA 3, 4 and 5		
E, 1 & 2 Pole	1-1 1/4"	1-1 1/4"
E, 3 Pole	1-1 1/4"	2-1 1/4"
F, 15-50 Amp.	1-1 1/4"	2-1 1/4"
F, 70-100 Amp.	1-2"	2-2"
MA	2-4"	2-4"
NEMA 7CD and 9EFG		
E & EH, 15-50 Amp.	1-1 1/4"	2-1 1/4"
E & EH, 70-100 Amp.	1-2"	2-2"
F	1-2"	2-2"
JA & KA	2-2 1/2"	2-2 1/2"
LA	2-3"	2-3"
MA	2-4"	2-4"

Boxes may be inverted if desired for reversed conduit entrance placement.



Safety Lock

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.

BUSWAYS &
POWER CENTERS
—UNIBUS®

PANELBOARDS &
SWITCHBOARDS

SAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

*Trademark of Westinghouse Electric Corp.

OPTIONAL FEATURES, next page

CUTLER-HAMMER

INDUSTRIAL CIRCUIT BREAKERS

Accessories and Optional Features

CIRCUIT BREAKER
LOAD CENTERS &
FUSIBLE SERV. EQUIP.BUSWAYS &
POWER CENTERS
—UNIBUS®PANELBOARDS &
SWITCHBOARDSSAFETY SWITCHES
& INDUSTRIAL
CIRCUIT BREAKERS

GENERAL INFORMATION

ELECTRICAL AND MOTOR OPERATED MECHANISMS			
Dust-Resistant NEMA 1-A			
Breaker Frame Size	Ampere Rating	① Enclosure with Electrically Operated Mechanism Only Cat. No.	Price
Electrical Operated Mechanisms			
E	15 to 50	DF-EO	\$172.
240V. A-c	70 to 100	DF-EO	191.
	Non-Auto	DF-EO	172.
EH	15 to 50	DF-EO	196.
480V. A-c	70 to 100	DF-EO	210.
	Non-Auto	DF-EO	191.
④ F, HF	15 to 50	DF-EO	230.
600V. A-c	70 to 100	DF-EO	246.
	Non-Auto	DF-EO	230.
Motor Operated Mechanisms			
J	70 to 225	DLA-MO	\$778.
JK	70 to 225	DLA-MO	802.
K	70 to 225	DLA-MO	826.
LA	125 to 400	DLA-MO	944.
KL	125 to 400	DLM-MO	1069.
MA	125 to 600	DLM-MO	1180.
MA	700 to 800	DLM-MO	1384.
LM	125 to 600	DLM-MO	1180.
LM	700 to 800	DLM-MO	1384.

For Circuit Breakers select from listings on previous pages.

② INSULATED GROUNDABLE NEUTRALS

Max. Ampere Rating	Cat. No.	Wire Range	Price
50	IN050	14 ②	\$7.
100	IN100	14 1/0	11.
225	IN225	6—350 MCM	15.
400	IN400	4—600 MCM ①	18.
		1/0—250 MCM ②	
600	IN600	3/0—500 MCM ②	22.
800	IN800	4/0—400 MCM ③	22.
1000	IN1000	4/0—500 MCM ③	30.

Addition of a neutral bar assembly provides a breaker with a solid neutral. Example: A 2-pole breaker plus a neutral bar becomes a 3-pole solid neutral breaker.

SAF-T-LOK®

An accessory for E, EH, F 3-pole only, and LA and MA 2- and 3-pole only breakers. Gives positive interlocking for all AB-I breakers. Interlocks breaker to keep breaker handle in "OFF" position when cover of enclosure is open. Designed specifically for industrial plants with rigid safety regulations, Saf-T-Lok has provisions for three padlocks and may be installed in the field.

Breaker Frame	Catalog Number	Price
E and EH	455D799G01	\$6.
F	455D799G02	7.
LA	455D799G07	10.
MA	455D799G06	10.

- ① Prices do not include remote control switches.
 ② A-C only. NEMA 3, 4-5 and 7-9 enclosures. Must have neutral installed on order.
 ③ Primer can be supplied with standard finish or left for customers' finish.
 ④ Will not operate with standard F or HF. Order modified, F or HF. For motor operation.
 *Trademark of Westinghouse Electric Corp.

CUTLER-HAMMER

AUXILIARY SWITCHES

Internally mounted, opens and closes relays or control circuits as breaker operates, and operates indicating lights in remote locations. Switch capacity at 120 volts A-c, 10 amps; at 600 volts A-c, 2 amps.

"A" contacts close, "B" contacts open when breaker closes.

Specify "A" and/or "B" contacts. Do not order by "normally open" or "normally closed".

Breaker Size	Contacts	Price Addition
E	1-A and 1-B Contacts (2-, 3-pole frames) 2-A and 2-B Contacts (3-pole frame only)	\$10.80 21.60
EH	1-A and 1-B Contacts (2-, 3-pole frames) 2-A and 2-B Contacts (2-, 3-pole frames)	24. 48.
F, HF, JA and KA	1-A and 1-B Contacts (2-, 3-pole frames) 2-A and 2-B Contacts (3-pole frame only)	26. 52.
LA, HKL, MA and HLM	2 Contacts—1-A and 1-B 2 Contacts—2-A's or 2-B's 3 Contacts—Combination of A's and B's (not available on 2-pole G) 4 Contacts—Combination of A's and B's (not available on 2-pole G or K)	26. 36. 45. 52.

③ SPECIAL ENCLOSURE FINISHES

Breaker Frame Size	Price Addition Aluminum Finish or Zinc Chromate Primer
E, EH	\$11.
F	23.
JA, KA	29.
LA	49.
MA	54.

STAINLESS STEEL OR CHROME PLATED COVERS NEMA 1-B Enclosures

Breaker Frame	Price Addition
E and EH	\$65.
F	70.
JA, KA	80.
LA	90.
MA	100.

SPECIAL DRILLING AND TAPPING Cast Iron Enclosures

Conduit Size	Price per Hole
1¼-Inch and Below	\$8.
1½-Inch to 3-Inch	17.
3½-Inch or Over	25.

SPECIAL ATTACHMENTS

	Price
Shunt Trip including leads and cut-off switch	\$64.
Low Voltage Trip, including leads and external resistors when required— instantaneous non-adjustable	64.
Reverse Current Attachment operates on as little as 10% reversal current (D-c only)	168.
Bell Alarm	26.
Kirk Interlock	140.

PILOT LIGHTS

NEMA 1 AND 1-B ENCLOSURES

Field Mounting Kit: Consists of pilot light assembly (bulb included) and mounting strap assembly. Order by Cat. No. of kit plus Cat. No. of mounting strap assembly. Price—\$10.

Pilot Light Kit		Mounting Strap Assembly	
Volts	Cat. No.	Type Enclosure	Cat. No. Strap Assembly
125	59AO422G21	SEH—FEH	Refer to Cutler-Hammer
277	59AO422G22	SF, FF	207B937G01
480	59AO422G23	SKA—FKA	207B937G07
600	59AO422G24	SLA—FLA SMA—600 FMA—600 SMA—FMA	207B937G06 207B937G05

Factory Assembled: Order standard device except with pilot light. Specify voltage and frequency. Price Addition—\$10.

NEMA 1-A AND 12 ENCLOSURES

Factory Assembled: Order standard device except with pilot light. Specify voltage and frequency. Price Addition—\$35.

NOTE: NEMA 1-A and 12 must be factory assembled.

SOLDERLESS TERMINALS

Breaker Frame Size	Ampere Rating	Wire Size	
		Max.	Min.
E	15 to 30	#8	#16
	35 to 50	#4	#14
	70 to 100	#1	#6
EH	15 to 100	#0	#14
F	15 to 100	#1	#14
JA	70 to 225	350 MCM	#6
KA	70 to 225	350 MCM	#6
LA	125 to 200	350 MCM	#6
	250 to 400	1—600 MCM or 2—250 MCM	1—#3 or 2—#1/0
MA	125 to 225	350 MCM	#6
	250 to 400	1—600 MCM or 2—250 MCM	1—#4 or 2—#1/0
	500 to 600	2—600 MCM	2—#3/0
	700 to 800	3—400 MCM	3—#4/0

DISCOUNT SCHEDULE 17CD-1



A-C FULL VOLTAGE-MAGNETIC and MANUAL

97

3 Phase Starter Description

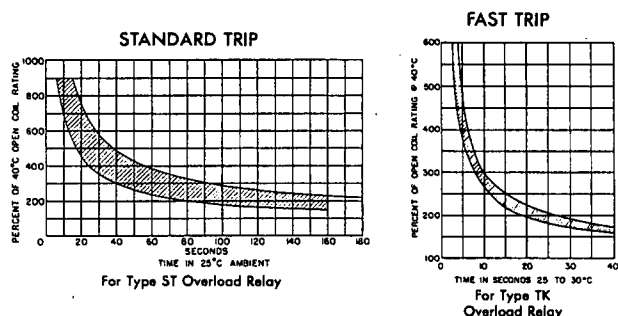
FULL VOLTAGE STARTERS—Connect motor directly to line
—Draw full inrush current to start motor.

MAGNETIC STARTERS—
Contactor to make and
break motor power cir-
cuit plus running over
current protection (over-
load relay).

POWER CONTACTS—
Non-welding silver al-
loy; Melamine phenolic
enclosed—low arc track-
ing—protection against
mechanical damage.

MAGNET COILS—Molded, color-coded epoxy resin—Easy
identification, greater durability, permanently marked
with voltage and frequency.

OVER LOAD RELAY (Motor running over-current protec-
tion) Eutectic alloy thermal sensing—Two or three coil—
Readily convertible on the job—Interchangeable heater
coils—Ratings matched to motor current—HEATER COIL
selection from horsepower table or motor current listing
—**FAST TRIP** overload relay—standard option on all
designs. See typical trip curves below.



Note: 40°C. open coil rating is approximately 1.25 times
minimum current listed in heater coil tables. See page 279.

TERMINALS—Positive pressure connector type.

COVER CONTROL—Supplied as **REMOTE** (overload reset
only)—On the job conversion to "Start-Stop" or "Hand-
Off-Automatic" (HOA or ROA) with convenient kits—
All types also furnished factory assembled.

CONTROL CIRCUIT—Open types wired for separate con-
trol, enclosed for common control (i.e. power and con-
trol circuits factory interwired)—Either option supplied
on request.

This section contains:

	Pages
Magnetic, Non-Reversing	
Standard Cat. 9586	99-101
Combination w/Motor Circuit Switch	
Cat. 9589	102-105
Combination w/Circuit Breaker	
Cat. 9591	106-108
Magnetic, Reversing	
Standard, Cat. 9656	109, 110
Combination w/Motor Circuit Switch	
Cat. 9658	111, 112
Combination w/Circuit Breaker	
Cat. 9659	113, 114
Magnetic Starters, Optional Features	115
Manual, Non-Reversing Cat. 9115	116
Manual, Reversing	
Cat. 9441 - 9109 - 9122	117, 118

Auxiliary Contacts (interlocks)—Kits for on the job addi-
tion or furnished factory assembled on request—**Main-**
taining Circuit Interlock supplied as standard on all
starters.

CONTROL TRANSFORMER—Provides 110 volt operator
(pilot) circuit on starter—Dual voltage primary supplied for
220/440—Other primary voltages available.

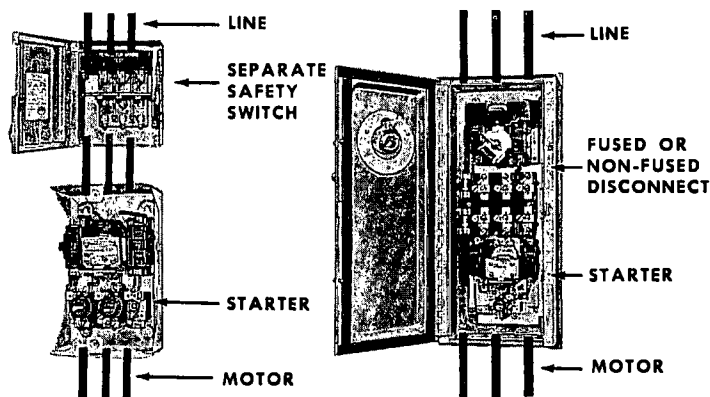
MAGNETIC NON-REVERSING—

a) Standard non-combination—w/o motor disconnect
switch (use separate safety switch).

b) Combination w/fusible and non-fusible motor
switch (type A).

c) Combination type SF—Similar to (b) above except
includes additional Safety-first provision i.e. 3 padlock
lock-off, positive visibility blades, door lock and seal,
operating handle permanently affixed to case (no
chance for cover to operator misalignment).

Note: For (b) and (c) above fuse clip conversion kits
for on-the-job conversion of non-fused to fused combi-
nation or to change fuse rating supplied as standard
packaged.



CUTLER-HAMMER

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3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

A-C-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

A-C FULL VOLTAGE—MAGNETIC and MANUAL



3 Phase Starter Description

This section contains:

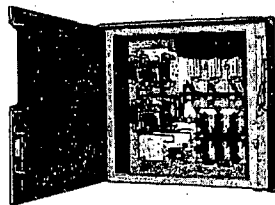
Pages

Magnetic, Non-Reversing	
Standard Cat. 9586	99-101
Combination w/Motor Circuit Switch	
Cat. 9589	102-105
Combination w/Circuit Breaker	
Cat. 9591	106-108
Magnetic, Reversing	
Standard, Cat. 9656	109-110
Combination w/Motor Circuit Switch	
Cat. 9658	111-112
Combination w/Circuit Breaker	
Cat. 9659	113-114
Magnetic Starters, Optional Features	115
Manual, Non-Reversing Cat. 9115	116
Manual, Reversing	
Cat. 9441 - 9109 - 9122	117-118

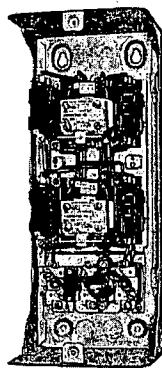
d) Combination w/circuit breaker—Adjustable instantaneous trip, magnetic type breaker (except "E" frame non-adjustable) in place of fused disconnect—Interrupting capacity as follows:

Breaker Type	Maximum		Interrupting Capacity		
	Amps	Volts	240V	480V	600V
E	100	277	10000	.....	.....
F	100	600	20000	15000	15000
JA	225	600	25000	20000	15000
LA	400	600	50000	35000	25000

MAGNETIC REVERSING—Non-Combination and combination type provided in same variety as non-reversing starters including SF type. Reversing starters combine two



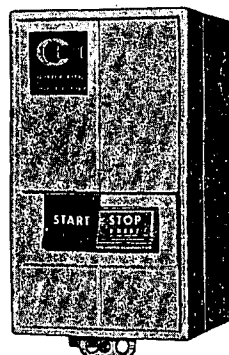
Type SF combination reversing starter with motor circuit switch



Non-combination reversing starter—vertical construction

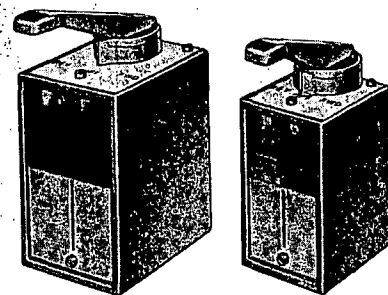
contacts electrically and mechanically interlocked in same enclosure—Both vertical and horizontal mounting arrangements supplied to fit wide variety of space requirements—Reversing and non-reversing designs identical including same convertibility of 3 coil protection, fuse clip kits etc. Breaker ratings same as non-reversing.

MANUAL STARTERS—Three pole contact structure mechanically actuated to open and close power circuit—Available with **LOCAL CONTROL ONLY**—Application limited to less-frequent operation—Auxiliary contacts not available.



3 Phase Manual Non-Reversing With Jog Feature

MANUAL NON-REVERSING—Available with and without overload protection—2 or 3 coil overload protection—field convertible from 2 to 3 coil—NEMA 1 enclosed or open types—standard pushbutton operated or with "Jog" feature.



Manual Reversing—Drum Type DRO - DR1

MANUAL REVERSING—Provide forward—Reverse; up—down—etc. Devices **without overload protection only**—Maximum ratings: Nema size 2 in drum type, Nema size 0 pushbutton operated—Drum Type construction provides simple, inexpensive reversing control for lathes, hoists etc. with broad variety of operators including rope



drive, large and small levers, knobs and remote rod. Pushbutton devices provided with interlocked "Stop" transfers to "Forward" or "Reverse." Also "Up"—"Down" hold down control provided in pendant device without separate stop button.

**A-C FULL VOLTAGE-MAGNETIC****3 Phase Non-Reversing Starters**

WHEN ORDERING SPECIFY

• Catalog Number

• Voltage and Frequency

• Heater coil number or full load current.

FOR REMOTE CONTROL

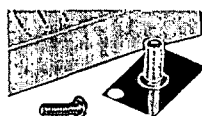
Maximum Horsepower 60-50-25 Cycles			NEMA Size	General Purpose NEMA 1		Weather Resistant NEMA 3		① Watertight (Stainless Steel) NEMA 4		Dusttight— Industrial NEMA 5-12		Hazardous Gas NEMA 7-D		Hazardous Dust NEMA 9-EFG		Open Type Separate Control	
208/220 Volts	440 Volts	550 Volts		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
2 COIL OVERLOAD RELAY—RESET ONLY																	
1½	2	2	00	9586- H6902	\$32.	9586- P01	---	9586- H7032	---	9586- H7035	---	9586- H6072	---	9586- H6024	---	9586- H6921	\$30.
3	5	5	0	H6045	39.	P01	\$51.	H7032	\$74.	H7035	\$51.	H6072	\$140.	H6024	\$74.	H6067	37.
7½	10	10	1	H6170	44.	P11	56.	H7041	80.	H7044	56.	H6137	146.	H6140	80.	H6990	42.
15	25	25	2	H6206	84.	P21	106.	H7050	156.	H6245	106.	H6236	234.	H6263	190.	H6281	74.
30	50	50	3	H6303	138.	P31	164.	H7053	240.	H6327	164.	H6336	350.	H6339	284.	H6355	118.
50	100	---	4	H6415	308.	P41	394.	H7058	482.	H6445	394.	H6460	563.	H6475	556.	H6492	266.
---	---	100	4	H6418	308.	P41	394.	H7059	482.	H6448	394.	H6463	563.	H6478	556.	H6493	266.
100	200	---	5	H6510	684.	P51	794.	H7068	904.	H6525	904.	H6535	1268.	H6535	1268.	H6505	607.
---	---	200	5	H6513	684.	P51	794.	H7069	904.	H6528	904.	H6538	1268.	H6538	1268.	H6508	607.
200	---	---	6	H6631	2017.	---	---	W1	2517.	W10	2517.	---	---	---	---	H6618	1517.
---	400	---	6	H6632	2017.	---	---	W2	2517.	W11	2517.	---	---	---	---	H6619	1517.
---	---	400	6	H6633	2017.	---	---	W3	2517.	W12	2517.	---	---	---	---	H6620	1517.
300	---	---	7	H6849	2629.	---	---	W4	3129.	W13	3129.	---	---	---	---	H6836	2129.
---	600	---	7	H6850	2629.	---	---	W5	3129.	W14	3129.	---	---	---	---	H6837	2129.
---	---	600	7	H6851	2629.	---	---	W6	3129.	W15	3129.	---	---	---	---	H6838	2129.
450	---	---	8	H6875	4220.	---	---	W7	4720.	W16	4720.	---	---	---	---	H6862	3720.
---	900	---	8	H6876	4220.	---	---	W8	4720.	W17	4720.	---	---	---	---	H6863	3720.
---	---	900	8	H6877	4220.	---	---	W9	4720.	W18	4720.	---	---	---	---	H6864	3720.

3 COIL OVERLOAD RELAY—RESET ONLY

Factory Assembled 3 coil starter, add suffix "T" to catalog number and through Size 4 add \$4., Size 5 add \$40. Size 6 and above add \$70.

Field Conversion from 2 coil to 3 coil, through Size 4, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50.

Prices include necessary heater coils at \$1.50 each.



Conversion Kit for 3 Coil
Overload Relay



Conversion Kit for
Pushbutton in Cover

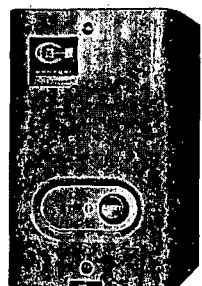
CONVERSION KITS For NEMA 1 enclosed starters without control transformer.

Cover Control Kit	Size 00	Size 0 & 1	Size 2	Size 3	Size 4	Size 5	Price
Start, Stop Pushbuttons.....	10935- H1	10935- H12	10935- H14	10935- H16	10935- H18	10935- H26	\$8.
Run-Off-Auto Selector Switch	H2	H13	H15	H17	H19	H31	8.
Neon Pilot Light 110-550V. (Red lens)	---	H37	H37	H37	H37	---	15.

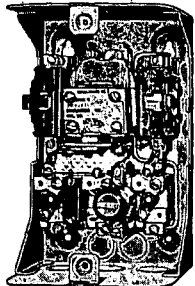
HEATER COILS For starters in NEMA 1 enclosure for average 60 cycle 1800 R.P.M. motors.

H.P.	208/220 Volts	440 Volts	550 Volts	H.P.	208/220 Volts	440 Volts	550 Volts
¼	10177- H1017	10177- H1010	10177- H1008	10	10177- H1047	10177- H1042	10177- H1040
⅓	H1019	H1013	H1010	15	H1050	H1044	H1042
½	H1024	H1018	H1016	20	H1050	H1046	H1044
¾	H1066	H1021	H1019	25	H1054	H1048	H1046
1	H1028	H1023	H1021	30	H1055	H1048	H1046
1½	H1031	H1026	H1024	40	H1057	H1050	H1048
2	H1035	H1027	H1026	50	H1058	H1054	H1050
3	H1038	H1031	H1030	60	H1026	H1054	H1051
5	H1042	H1036	H1034	75	H1027	H1056	H1054
7½	H1046	H1039	H1037	100	H1029	H1058	H1056

For more accurate selection, and for other enclosures select heater coils by full load current. See index on page 279.



Size 0, NEMA 1



① Stainless steel through size 5. Cast aluminum size 0 and 1, see optional features page 115.

DISCOUNT SCHEDULE ICD

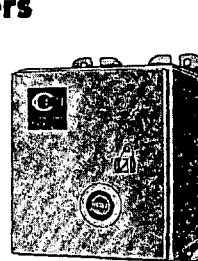
DIMENSIONS, page 101.

OPTIONAL FEATURES, page 115

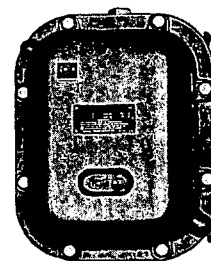
CUTLER-HAMMER

A-C FULL VOLTAGE—MAGNETIC**3 Phase Non-Reversing Starters****WHEN ORDERING SPECIFY**

- Catalog Number
- Voltage and Frequency
- Heater coil number or full load current (see previous page.)



Size 0, NEMA 5-12



Size 2, NEMA 7-D

WITH LOCAL COVER CONTROL

Maximum Horsepower 60-50-25 Cycles			NEMA Size	General Purpose NEMA 1		Weather Resistant NEMA 3		① Watertight (Stainless Steel) NEMA 4		Dusttight— Industrial NEMA 5-12		Hazardous Gas NEMA 7-D		Hazardous Dust NEMA 9-EFG		Open Type Separate Control	
208/220 Volts	440 Volts	550 Volts		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price

2 COIL OVERLOAD RELAY—START, STOP PUSHBUTTONS

1½	2	2	00	9586- H6903	\$40.	9586- P02	---	9586- H7033	---	9586- H7036	---	9586- H6073	---	9586- H6025	---	9586- H6922	\$38.
3	5	5	0	H6046	47.	P12	\$59.	H7042	\$96.	H7045	\$73.	H6138	\$162.	H6141	\$96.	H6966	45.
7½	10	10	1	H6171	52.	P22	64.	H7051	102.	H6246	78.	H6237	168.	H6264	102.	H6991	50.
15	25	25	2	H6207	92.		114.		178.		128.		256.		212.	H6282	82.
30	50	50	3	H6304	146.	P32	172.	H7054	262.	H6328	186.	H6337	372.	H6340	306.	H7056	126.
50	100	---	4	H6416	316.	P42	402.	H7060	504.	H6446	416.	H6461	585.	H6476	578.	H7064	274.
---	---	100	4	H6419	316.	P42	402.	H7061	504.	H6449	416.	H6464	585.	H6479	578.	H7065	274.
100	200	---	5	H6511	692.	P52	802.	W19	926.	W21	926.	W23	1290.	W25	1290.	W27	615.
---	---	200	5	H6514	692.	P52	802.	W20	926.	W22	926.	W24	1290.	W26	1290.	W28	615.

2 COIL OVERLOAD RELAY—RUN-OFF-AUTO SELECTOR SWITCH

1½	2	2	00	H6904	40.	---	---	---	---	---	---	---	---	---	---	H6923	38.
3	5	5	0	H6047	47.	P03	59.	H7034	96.	H7037	73.	H6074	162.	H6026	96.	H6967	45.
7½	10	10	1	H6172	52.	P13	64.	H7043	102.	H7046	78.	H6139	168.	H6142	102.	H6992	50.
15	25	25	2	H6208	92.	P23	114.	H7052	178.	H6247	128.	H6238	256.	H6265	212.	H6283	82.
30	50	50	3	H6305	146.	P33	172.	H7055	262.	H6329	186.	H6338	372.	H6341	306.	H7057	126.
50	100	---	4	H6417	316.	P43	402.	H7062	504.	H6447	416.	H6462	585.	H6477	578.	H7066	274.
---	---	100	4	H6420	316.	P43	402.	H7063	504.	H6450	416.	H6465	585.	H6480	578.	H7067	274.
100	200	---	5	H6512	692.	P53	802.	W29	926.	W31	926.	W33	1290.	W35	1290.	W37	615.
---	---	200	5	H6515	692.	P53	802.	W30	926.	W32	926.	W34	1290.	W36	1290.	W38	615.

3 COIL OVERLOAD RELAY

Factory Assembled 3 coil starter, add suffix "T" to catalog number and through Size 4 add \$4., Size 5 add \$40.

Field Conversion from 2 coil to 3 coil, through Size 4, use spindle kit 10176-H150—\$2.50 and heater coil—\$1.50.

Prices include necessary heater coils at \$1.50 each.

WITH CONTROL TRANSFORMER

Maximum Horsepower 60-50 Cycle			NEMA Size	② General Purpose NEMA 1			
208/220 Volts	440 Volts			Overload Relay Reset Button	Start, Stop Pushbuttons	Run-Off-Auto Selector Switch	
				Cat. No.	Price	Cat. No.	Price

2 COIL OVERLOAD RELAY

3	5	0	9586- H6068	\$66.	9586- H6069	\$74.	9586- H6975	\$74.
7½	10	1	H6801	71.	H6802	79.	H6978	79.
15	25	2	H6290	122.	H6291	130.	H6986	130.
30	50	3	H6356	194.	H6357	202.	H6996	202.

3 COIL OVERLOAD RELAY

Factory Assembled 3 coil starter, add suffix "T" to catalog number and add \$4.

Field Conversion from 2 coil to 3 coil, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50.

Prices include necessary heater coils at \$1.50 each.

WITH FAST TRIP OVERLOAD RELAY

Select heater coils from table listed in Index on page 279.

Maximum Horsepower 60-50-25 Cycle			NEMA Size	② General Purpose NEMA 1		Open Type	
110 Volts	208/220 Volts	440-550 Volts		Overload Relay Reset Button			
				Cat. No.	Price	Cat. No.	Price

2 COIL OVERLOAD RELAY

1½	3	5	0	9586- H7004	\$39.	9586- H6949	\$37.
3	7½	10	1	H7005	44.	H6953	42.
7½	15	25	2	H7007	84.	H6957	74.

3 COIL OVERLOAD RELAY

Factory Assembled 3 coil starter, add suffix "T" to catalog number and add \$1.50.

Field Conversion from 2 coil to 3 coil, add heater coil—\$1.50.

Prices include necessary heater coils at \$1.50 each.

① Cast aluminum size 0 and 1, see optional features page 115.

② Cover control and pilot light conversion kits, see page 226.

OPTIONAL FEATURES, page 115

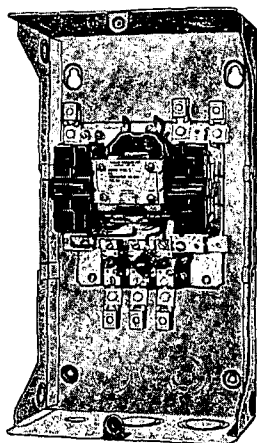
CUTLER-HAMMER



A-C FULL VOLTAGE - MAGNETIC

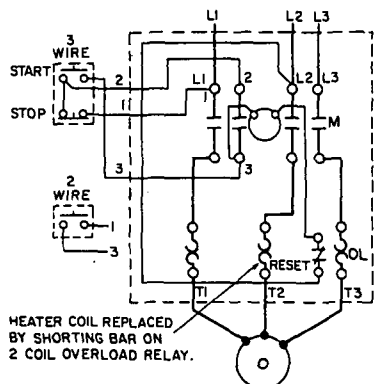
3 Phase Non-Reversing Starters

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

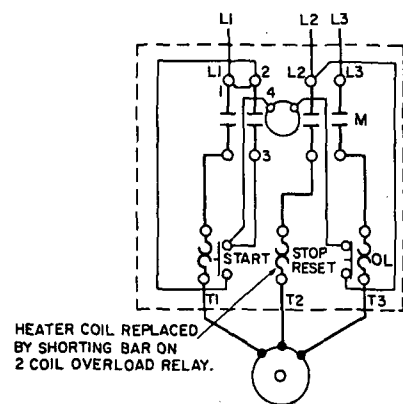


Size 4, NEMA 1

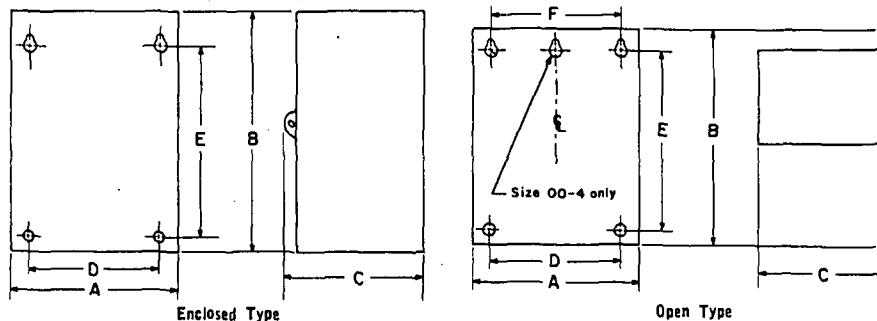
TYPICAL WIRING DIAGRAMS



Starter with Overload Relay Reset Button Only



Starter with Local Start, Stop Pushbuttons



NEMA 1							OPEN TYPE								
NEMA Size	Dimensions in Inches					Ship. Wt. Lbs.	Type	Dimensions in Inches						Ship Wt. Lbs.	
	Wide A	High B	Deep C	Mounting				Wide A	High B	Deep C	Mounting				
				D	E						D	E	F		
00	5⅝	7	4⅝	3½	5½	7	All	4⅝	5½	4⅝	2½	5	---	---	3¼
0	5⅝	8⅝	5	3½	6¼	7½	All	4¾	6⅝	4⅝	2¾	5½	---	---	3¾
1	6⅝	9½	5⅝	4⅝	7⅝	9½	All	5⅝	6¾	4⅝	4	5¾	---	---	5
2	8⅝	13¾	7½	6¾	11⅝	24	All	7¾	9	5⅝	5½	7⅝	---	---	12
3	11¼	18⅝	8⅝	8	14½	39	All	9	10¾	7½	7	9⅝	---	---	19
4	13	23¾	8⅝	10	18½	49	440 V. Max.	10	13⅝	5⅝	7	9	---	---	26
							550 V. Max.	10	13⅝	7	7	9	---	---	26
5	17	37¾	11½	14¾	36¾	75	440 V. Max.	13	15¾	6⅝	12	11	4½	---	50
							550 V. Max.	13	15¾	7½	12	11	4½	---	50
6	28	60	28½	Floor Mtd.		---	---	---	---	---	---	---	---	---	---
7 & 8	48	72	40¾	Floor Mtd.		---	---	---	---	---	---	---	---	---	---

NEMA 3							NEMA 4						
NEMA Size	Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches					Ship. Wt. Lbs.	
	Wide A	High B	Deep C	Mounting			Wide A	High B	Deep C	Mounting			
				D	E					D	E		
0	9⅞	10⅞	6⅞	5	8¾	16	8	11¾	8⅞	4¾	10¾	23	
1	9⅞	10⅞	6⅞	5	8¾	18	8	11¾	8⅞	4¾	10¾	25	
2	10⅞	14⅞	6⅞	5	11¾	32	10¾	16¾	9⅞	7½	15¾	33	
3	13¼	19¼	8½	6	16¾	52	13	21¼	9½	9¾	20¾	55	
4	14¼	24	10⅞	7	21⅞	65	13	24¾	9½	9¾	23¾	68	
5	18¼	34	10⅞	10	31⅞	87	17	37¾	10⅞	14¾	36¾	90	

NEMA 5-12							NEMA 7-D & 9-EFG							
NEMA Size	Dimensions in Inches					Ship. Wt. Lbs.	NEMA Type	Dimensions in Inches					Ship Wt. Lbs.	
	Wide A	High B	Deep C	Mounting				Wide A	High B	Deep C	Mounting			
				D	E						D	E		
0	8	11¾	7	4¾	10¾	22	7	9¾	11½	7¾	8	9¾	20	
1	8	11¾	7	4¾	10¾	24	9	7⅞	10	7	5¼	9¾	14	
							7	9¾	11½	7¾	8	9¾	22½	
2	10¾	16⅝	9¼	7⅝	15½	33	9	8½	10⅞	7¼	6⅝	10	17¼	
							7 & 9	12½	15⅝	8¾	10¼	13⅝	43	
3	13	21¼	9⅞	9⅞	20	55	7 & 9	14⅞	21⅞	9¾	12¾	19⅞	70	
4	13	24⅞	9⅞	9⅞	23¾	68	7 & 9	16⅞	24⅞	9¾	14	23¼	95	
5	17	37¾	11½	14¾	36¾	90	7 & 9	23	28½	25½	8	17	280	

NEMA 1 WITH CONTROL TRANSFORMER							NEMA 1 WITH FAST TRIP OVERLOAD RELAY						
NEMA Size	Dimensions in Inches					Ship Wt. Lbs.	Dimensions in Inches					Ship. Wt. Lbs.	
	Wide A	High B	Deep C	Mounting			Wide A	High B	Deep C	Mounting			
				D	E					D	E		
0	7½	16¼	6⅞	4¾	14	17¼	5⅞	8⅞	5	3½	6¾	7½	
1	7½	16¼	6⅞	4¾	14	19	6⅞	9½	5⅞	4⅞	7⅞	9½	
2	9⅞	21⅞	9⅞	6⅞	18¾	39½	8⅞	13¾	7½	6⅞	11⅞	24	
3	12¾	26¾	8⅞	9	22½	65	11¾	18⅞	8⅞	8	14½	39	

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

A-C CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

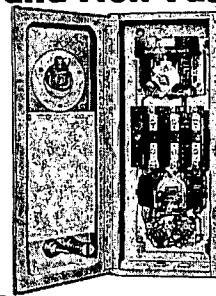
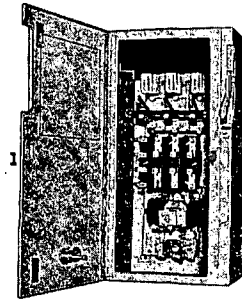
A-C FULL VOLTAGE—MAGNETIC

3 Phase Non-Reversing Combination Starters with Motor Circuit Switch

Fusible and Non-Fusible

WHEN ORDERING SPECIFY

- Catalog Number
- For Fusible Add Fuse Clip Kit
- Voltage and Frequency
- Heater coil or full load current

Size 1, NEMA 1
Type ASize 1, NEMA 1
Type SF**FOR REMOTE CONTROL NON-FUSIBLE** (For Fusible Add Fuse Clip Kit)

Maximum Horsepower 60-50 Cycles		NEMA Size	General Purpose NEMA 1			General Purpose NEMA 1 with Gasketed Cover		Weatherproof Watertight (Stainless Steel) NEMA 3-4		Dusttight-Industrial NEMA 5-12					Hazardous ② Gas NEMA 7-D		Hazardous ② Dust NEMA 9-EFG	
208/220 Volts	440-550 Volts		External Operating Buttons					External Operating Buttons		Internal Operating Buttons		External Operating Buttons						
			Type A Cat. No.	Type SF Cat. No.	Price	Type A Cat. No.	Price	Type A Cat. No.	Price	Type A Cat. No.	Type SF Cat. No.	Type A Cat. No.	Type SF Cat. No.	Price	Type A Cat. No.	Price	Type A Cat. No.	Price
2 COIL OVERLOAD RELAY—RESET ONLY																		
3	5	0	9589- H3503	9589- ---	\$ 94.	9589- H4088	\$104.	9589- H4644	\$190.	9589- H4483	9589- ---	9589- H4489	9589- ---	\$118.	9589- H4248	\$236.	9589- W1	\$187.
7½	10	1	H3539	H4609	99.	H3542	109.	H4650	195.	H4537	H4612	H3637	H4615	123.	H4254	242.	W2	192.
15	25	2	H3761	H4623	155.	H4112	171.	H4656	303.	H3929	H4626	H3938	H4628	189.	H4260	349.	W3	338.
30	50	3	H4273	---	256.	H4285	278.	H4662	514.	H4309	---	H4315	---	300.	H4266	565.	W4	542.
50	100	4	H4327	---	491.	H4339	529.	H4668	821.	H4363	---	H4369	---	613.	---	---	W5	860.
2 COIL OVERLOAD RELAY—CONTROL TRANSFORMER—RESET ONLY																		
3	5	0	H4465	---	\$121.	H4471	\$131.	H4647	\$217.	H4491	---	H4497	---	145.	---	---	---	---
7½	10	1	H3593	H4616	126.	H3596	136.	H4653	222.	H3663	H4619	H3669	H4622	150.	---	---	---	---
15	25	2	H3770	H4629	193.	H4121	209.	H4659	341.	H3941	H4632	H3947	H4634	227.	---	---	---	---
30	50	3	H4279	---	312.	H4291	334.	H4665	570.	H4317	---	H4323	---	356.	---	---	---	---
50	100	4	H4333	---	559.	H4345	597.	H4671	889.	H4371	---	H4377	---	681.	---	---	---	---
2 COIL OVERLOAD RELAY—CONTROL TRANSFORMER WITH WORKLIGHT CAPACITY—RESET ONLY																		
3	5	0	---	---	---	---	---	---	---	W6	---	H4499	---	166.	---	---	---	---
7½	10	1	---	---	---	---	---	---	---	W7	H4704	H3670	H4705	171.	---	---	---	---
15	25	2	---	---	---	---	---	---	---	W8	H4635	H3949	H4637	251.	---	---	---	---
30	50	3	---	---	---	---	---	---	---	W9	---	H4325	---	378.	---	---	---	---
50	100	4	---	---	---	---	---	---	---	W10	---	H4379	---	701.	---	---	---	---
3 COIL OVERLOAD RELAY—RESET ONLY																		
Factory Assembled 3 coil starter, add suffix "T" to catalog number and add \$4.										Field Conversion from 2 coil to 3 coil, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50.								
Prices include necessary heater coils at \$1.50 each.																		

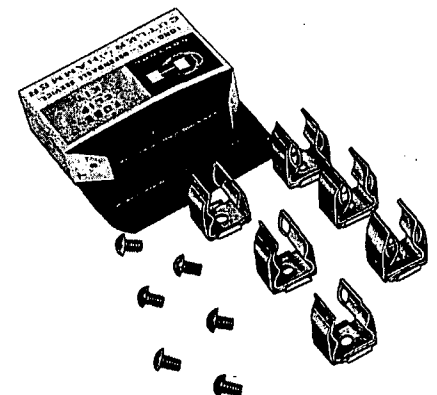
FUSE CLIP KITS—3 POLE (3 Fuses) For NEMA Type 1, 3-4 and 5-12 Enclosed Starters

NEMA Controller Size	Volts	Maximum Horsepower (3 Phase)		Fuse Clip Rating		Fuse Clip Kit Not Installed		Fuse Clip Kit Factory Installed	
		Std. Fuses	Dual Element Fuses	Amps.	Volts	Fuse Clip Catalog Number	Price	Add to Starter Cat. No.	Price Addition
0	208/220	3	3	30	250	10982- H14	\$ 1.00	—81	\$ 3.00
	440/550	5	5	30	600	H15	1.50	—91	3.50
1	208/220	3	7½	30	250	H14	1.00	—81	3.00
	208/220	7½	---	60	250	H15	1.50	—82	3.50
	440	7½	10	30	600	H15	1.50	—91	3.50
	550	10	10	30	600	H15	1.50	—91	3.50
2	208/220	7½	15	60	250	H16	1.50	—82	4.00
	208/220	15	---	100	250	H18	10.50	—83	13.00
	440/550	15	25	60	600	H17	3.00	—92	5.50
	440/550	25	---	100	600	H18	10.50	—93	13.00
3	208/220	30	30	200	250	H23	16.00	—84	20.50
	440/550	30	50	100	600	H24	10.50	—93	15.00
	440/550	50	---	200	600	H25	16.00	—94	20.50
4	208/220	50	50	400	250	H26	46.00	—85	51.00
	440/550	60	100	200	600	H27	16.00	—94	21.00
	440/550	100	---	400	600	H28	46.00	—95	51.00

Prices do not include fuses

① For size 5 see page 104.

② Fuses not recommended for hazardous areas NEMA 7 and 9.



Fuse Clip Kit

OPTIONAL FEATURES, page 115

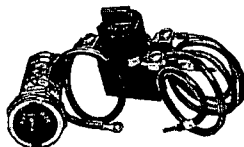
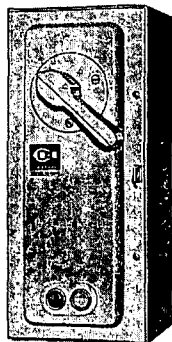
DIMENSIONS, page 105

DISCOUNT SCHEDULE 100

CUTLER-HAMMER

**A-C FULL VOLTAGE—MAGNETIC****3 Phase Non-Reversing Combination Starters with Motor Circuit Switch
Fusible and Non-Fusible**

CONVERSION KITS for local cover control in NEMA 1 enclosure

Conversion Kit for
Selector Switch in Cover

Size 1, NEMA 1

Cover Control Kit	Size 0	Size 1		Size 2		Size 3	Size 4	Price
		Type A	Type SF	Type A	Type SF			
Start, Stop Pushbuttons..	10935-H20	10935-H20	10935-H24	10935-H22	10935-H25	10935-H22	10935-H23	\$8.
Run-Off-Auto Selector Switch.....	H21	H21	H31	H31	H31	H31	H31	8.

HEATER COILS For starters in NEMA 1 enclosure for average 60 cycle 1800 R.P.M. motors

H.P.	208/220 Volts	440 Volts	550 Volts	H.P.	208/220 Volts	440 Volts	550 Volts
1/4	10177-H1017	10177-H1010	10177-H1008	10	10177-H1046	10177-H1041	10177-H1038
1/2	H1019	H1012	H1010	15	H1049	H1043	H1041
3/4	H1023	H1017	H1015	20	H1050	H1046	H1044
1	H1066	H1021	H1018	25	H1052	H1048	H1046
	H1028	H1023	H1021	30	H1055	H1048	H1046
1 1/2	H1031	H1026	H1024	40	H1056	H1050	H1048
2	H1033	H1027	H1026	50	H1058	H1052	H1050
3	H1036	H1030	H1029	60	H1026	H1052	H1050
5	H1041	H1035	H1033	75	H1027	H1055	H1052
7 1/2	H1045	H1038	H1036	100	H1029	H1058	H1056

For more accurate selection and for other enclosures, select heater coils by full load current. See index on page 279.

WITH LOCAL COVER CONTROL NON-FUSIBLE (FOR FUSIBLE ADD FUSE CLIP KIT)

Maximum Horsepower 60-50 Cycles		① NEMA Size	General Purpose NEMA 1			General Purpose NEMA 1 with Gasketed Cover		Weatherproof Watertight (Stainless Steel) NEMA 3-4		Dusttight-Industrial NEMA 5-12			Hazardous ② Gas NEMA 7-D		Hazardous ② Dust NEMA 9-EFG	
208/220 Volts	440-550 Volts		Type A Cat. No.	Type SF Cat. No.	Price	Type A Cat. No.	Price	Type A Cat. No.	Price	Type A Cat. No.	Type SF Cat. No.	Price	Type A Cat. No.	Price	Type A Cat. No.	Price
2 COIL OVERLOAD RELAY — START, STOP PUSHBUTTONS																
3	5	0	9589- H3504	9589- H4610	\$102.	9589- H4089	\$112.	9589- H4645	\$212.	9589- H4484	9589- ---	\$140.	9589- H4249	\$258.	9589- W13	\$209.
7½	10	1	H3540	H4610	107.	H3543	117.	H4651	217.	H4538	H4613	145.	H4255	264.	W14	214.
15	25	2	H3762	H4624	163.	H4113	179.	H4657	325.	H3930	H4627	211.	H4261	371.	W15	360.
30	50	3	H4275	---	264.	H4287	286.	H4663	536.	H4311	---	322.	H4267	587.	W16	564.
50	100	4	H4329	---	499.	H4341	537.	H4669	843.	H4365	---	635.	---	---	W17	882.
2 COIL OVERLOAD RELAY — RUN-OFF-AUTO SELECTOR SWITCH																
3	5	0	H3505	---	102.	H4090	112.	H4646	212.	H4485	---	140.	H4250	258.	W18	209.
7½	10	1	H3541	H4611	107.	H3544	117.	H4652	217.	H4539	H4614	145.	H4256	264.	W19	214.
15	25	2	H3763	H4625	163.	H4114	179.	H4658	325.	H3931	W23	211.	H4262	371.	W20	360.
30	50	3	H4277	---	264.	H4289	286.	H4664	536.	H4313	---	322.	H4268	587.	W21	564.
50	100	4	H4331	---	499.	H4343	537.	H4670	843.	H4367	---	635.	---	---	W22	882.
2 COIL OVERLOAD RELAY — CONTROL TRANSFORMER — START, STOP PUSHBUTTONS																
3	5	0	H4466	---	129.	H4472	139.	H4648	239.	H4492	---	167.	---	---	---	---
7½	10	1	H3594	H4617	134.	H4526	144.	H4654	244.	H3664	H4620	172.	---	---	---	---
15	25	2	H3771	H4630	201.	H4122	217.	H4660	363.	H3942	H4633	249.	---	---	---	---
30	50	3	H4281	---	320.	H4293	342.	H4666	592.	H4319	---	378.	---	---	---	---
50	100	4	H4335	---	567.	H4347	605.	H4672	911.	H4373	---	703.	---	---	---	---
2 COIL OVERLOAD RELAY — CONTROL TRANSFORMER — RUN-OFF-AUTO SELECTOR SWITCH																
3	5	0	H4467	---	129.	H4473	139.	H4649	239.	H4493	---	167.	---	---	---	---
7½	10	1	H3595	H4618	134.	H4527	144.	H4655	244.	H3665	H4621	172.	---	---	---	---
15	25	2	H3772	H4631	201.	H4123	217.	H4661	363.	H3943	W24	249.	---	---	---	---
30	50	3	H4283	---	320.	H4295	342.	H4667	592.	H4321	---	378.	---	---	---	---
50	100	4	H4337	---	567.	H4349	605.	H4673	911.	H4375	---	703.	---	---	---	---

Factory Assembled 3 coil starter, add suffix "T" to catalog number and add \$4.

Field Conversion from 2 coil to 3 coil, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50.

Prices include necessary heater coils at \$1.50 per coil.

① For size 5 see next page

② Fuses not recommended for hazardous areas NEMA 7 and 9.

DISCOUNT SCHEDULE 1CD

DIMENSIONS, page 105

OPTIONAL FEATURES, page 115

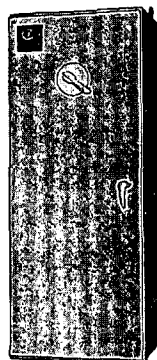
CUTLER-HAMMER

A-C FULL VOLTAGE—MAGNETIC

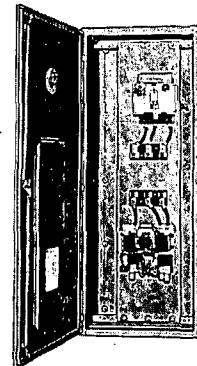
3 Phase Non-Reversing Combination Starters with Motor Circuit Switch Fusible and Non-Fusible — Size 5

WHEN ORDERING SPECIFY

- Catalog Number
- Voltage and Frequency
- Heater coil number or full load current. (See page 279)



Size 5, NEMA 1
Type A



Size 5, NEMA 1
Type A

FOR REMOTE CONTROL

Maximum Horsepower 60-50-25 Cycles		Volts	NEMA Size	Fuse Clip Rating Amps.	General Purpose NEMA 1		General Purpose NEMA 1 with Gasketed Cover		Weatherproof Watertight (Stainless Steel) NEMA 3-4		Dusttight-Industrial NEMA 5-12		
Non Fusible or Standard Fuses	Dual Element Fuses				External Operating Buttons						External Operating Buttons	Internal Operating Buttons	Price
					Type A Cat. No.	Price	Type A Cat. No.	Price	Type A Cat. No.	Price	Type A Cat. No.	Type A Cat. No.	
					2 COIL OVERLOAD RELAY—RESET ONLY								
100	---	208/220	5	N.F.	9589- H4380	\$1060.	9589- H4382	\$1126.	9589- H4674	\$1902.	9589- H4386	9589- H4388	\$1356.
200	---	440	5	N.F.	H4380	1060.	H4382	1126.	H4674	1902.	H4386	H4388	1356.
200	---	550	5	N.F.	H4381	1060.	H4383	1126.	H4675	1902.	H4387	H4389	1356.
100	100	208/220	5	600	H4400	1195.	H4405	1261.	H4676	2037.	---	H4415	1491.
125	200	440	5	400	H4401	1096.	H4406	1162.	H4677	1938.	---	H4416	1392.
200	---	440	5	600	H4402	1237.	H4407	1303.	H4678	2079.	---	H4417	1533.
150	200	550	5	400	H4403	1096.	H4408	1162.	H4679	1938.	---	H4418	1392.
200	---	550	5	600	H4404	1237.	H4409	1303.	H4680	2079.	---	H4419	1533.

3 COIL OVERLOAD RELAY—RESET ONLY

Factory Assembled 3 coil starter, add suffix "T" to catalog number and add \$40.

Prices include necessary heater coils at \$1.50 each. Fuses are not supplied.

FOR REMOTE CONTROL—WITH CONTROL TRANSFORMER

Maximum Horsepower 60-50 Cycles		Volts	NEMA Size	Fuse Clip Rating Amps.	General Purpose NEMA 1		General Purpose NEMA 1 with Gasketed Cover		Weatherproof Watertight (Stainless Steel) NEMA 3-4		Dusttight-Industrial NEMA 5-12					
Non Fusible or Standard Fuses	Dual Element Fuses				External Operating Buttons				Control Transformer without Worklight Capacity		Control Transformer with Worklight Capacity					
					Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Cat. No.	Price	Cat. No.	Cat. No.	Price
2 COIL OVERLOAD RELAY—RESET ONLY																
100	---	208/220	5	N.F.	9589- H4390	\$1137.	9589- H4392	\$1203.	9589- H4688	\$1979.	9589- H4396	9589- H4398	\$1433.	9589- W25	9589- W28	\$1454.
200	---	440	5	N.F.	H4390	1137.	H4392	1203.	H4688	1979.	H4396	H4398	1433.	W26	W29	1454.
200	---	550	5	N.F.	H4391	1137.	H4393	1203.	H4689	1979.	H4397	H4399	1433.	W27	W30	1454.
100	100	208/220	5	600	H4420	1272.	H4425	1338.	H4690	2114.	---	H4435	1568.	---	W31	1589.
125	200	440	5	400	H4421	1173.	H4426	1239.	H4691	2015.	---	H4436	1469.	---	W32	1490.
200	---	440	5	600	H4422	1314.	H4427	1380.	H4692	2156.	---	H4437	1610.	---	W33	1631.
150	200	550	5	400	H4423	1173.	H4428	1239.	H4693	2015.	---	H4438	1469.	---	W34	1490.
200	---	550	5	600	H4424	1314.	H4429	1380.	H4694	2156.	---	H4439	1610.	---	W35	1631.

3 COIL OVERLOAD RELAY—RESET ONLY

Factory Assembled 3 coil starter, add suffix "T" to catalog number and add \$40.

Prices include necessary heater coils at \$1.50 each. Fuses are not supplied.

OPTIONAL FEATURES, page 115

DISCOUNT SCHEDULE 1C0

CUTLER-HAMMER



A-C FULL VOLTAGE-MAGNETIC

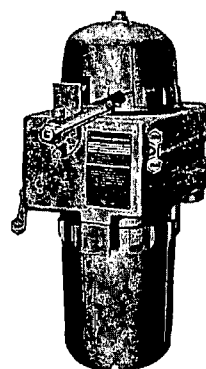
3 Phase Non-Reversing Combination Starters with Motor Circuit Switch Fusible and Non-Fusible



Size 1, NEMA 3-4
Type A

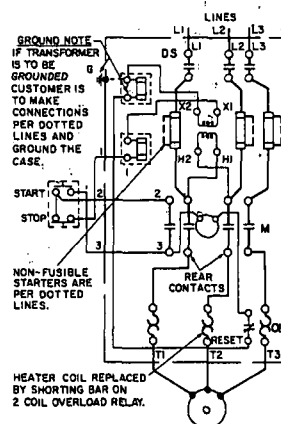
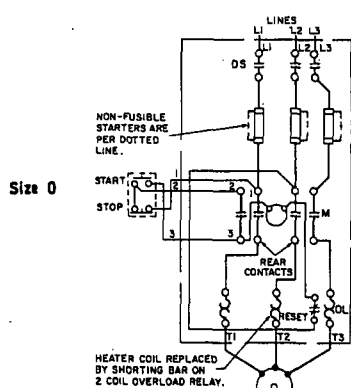


Size 1, NEMA 5-12
Type SF

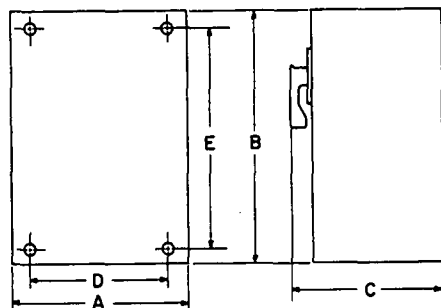


Size 1, NEMA 7-9
Type A

TYPICAL WIRING DIAGRAMS



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



NEMA Type Encl.	NEMA Size	Type	Fusible or Non-Fus.	Dimensions in Inches					Ship. Wt. Lbs.
				Wide A	High B	Deep C	Mounting		
							D	E	
1	0	A	N.F. or F.	9 1/4	21 1/4	9 1/4	6 1/4	19 1/4	36
	1	A	N.F. or F.	9 1/4	21 1/4	9 1/4	6 1/4	19 1/4	40
	1	S.F.	N.F. or F.	12 1/4	24 1/4	11 1/4	8	21 1/4	65
	2	A	N.F. or F.	10 3/4	30 3/4	10 3/4	7 3/4	27 1/2	75
	① 3	S.F.	N.F. or F.	12 1/4	32 1/4	11 1/4	8	29 1/2	100
	② 3	A	N.F. or F.	12 1/4	30 3/4	10 3/4	9	26	125
	4	A	N.F. or F.	16 1/4	30 3/4	10 3/4	13	26	130
	5	A	N.F. or F.	18 1/4	35 1/4	12 3/4	15	31	190
	5	A	N.F.	19	49	13 1/4	14 1/2	47 1/2	275
	5	A	Fusible	28	72	21 1/4	Floor Mtd.		③
3-4 and 5-12	1	A	N.F. or F.	9 3/4	23 3/4	9 1/4	6 1/2	22 1/4	40
	1	S.F.	N.F. or F.	12 1/4	27	11 1/4	9	25 1/4	65
	2	A	N.F. or F.	10 3/4	32 3/4	10 1/4	7 3/4	31 1/4	75
	2	S.F.	N.F. or F.	12 1/4	35 1/4	11 1/4	9	34 1/4	100
	① 3	A	N.F. or F.	13	33	10 3/4	9 3/4	32	125
	② 3	A	N.F. or F.	17	33	10 3/4	13 3/4	32	130
	4	A	N.F. or F.	19	37 1/4	13	15 1/4	36 1/4	190
	5	A	N.F.	19	49	13 1/4	14 1/2	47 1/2	275
	5	A	Fusible	31 1/4	78	20 3/4	Floor Mtd.		③
	7-D and 9-EFG	0-1	A	N.F.	10 3/4	25 3/4	14 1/4	5 1/4	9 3/4	75
2		A	N.F.	12	30	16 1/4	5 1/4	9 3/4	110
3		A	N.F.	16 1/4	36 1/4	20 1/4	5 1/2	11	160

① Without control transformer

② With control transformer

③ On application

A-C FULL VOLTAGE—MAGNETIC



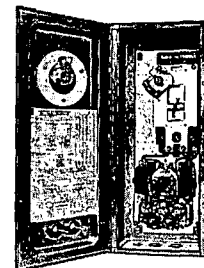
3 Phase Non-Reversing Combination Starters with Circuit Breaker

WHEN ORDERING SPECIFY

- Catalog Number
- Horsepower, Voltage and Frequency
- Heater coil number or full load current.

DESCRIPTION

Circuit breakers in these starters are adjustable, instantaneous trip magnetic type except the E frame breakers which are non-adjustable thermal and magnetic trip type.



Size 1, NEMA 1

FOR REMOTE CONTROL

Maximum Horsepower 60-50 Cycles			Type of Breaker Frame	NEMA Size	General Purpose NEMA 1		General Purpose NEMA 1 with Gasketed Cover		Weatherproof Watertight (Stainless Steel) NEMA 3-4		Dusttight-Industrial NEMA 5-12			Hazardous Locations NEMA 7-D & 9-EGG	
208/220 Volts	440 Volts	550 Volts			External Operating Buttons						External Operating Buttons	Internal Operating Buttons	Price	External Operating Buttons	
					Cat. No.	Price	Cat. No.	Price	Cat. No.	Price				Cat. No.	Price
2 COIL OVERLOAD RELAY—RESET ONLY															
3 3	--- 5	--- 5	E F	0	9591- H3300 H3267	\$101. 130.	9591- H3303 H3270	\$111. 140.	9591- H3646 H3647	\$197. 226.	9591- H3633 H3634	9591- H3635 H3636	\$125. 154.	9591- H3406 H3403	\$224. 248.
7½ 7½	--- 10	--- 10	E F	1	H3306 H3276	106. 135.	H3309 H3279	116. 145.	H3648 H3649	202. 231.	H3312 H3296	H3315 H3299	130. 159.	H3418 H3415	228. 254.
15 15	--- 25	--- 25	E F	2	H3341 H3329	161. 190.	H3392 H3380	177. 206.	H3650 H3651	309. 338.	H3377 H3359	H3736 H3362	195. 224.	H3430 H3427	312. 338.
30 ---	50 60	50 75	F F	3 4	H3445 H3472 H3475	275. 600.	H3451 H3481 H3484	297. 638.	H3652 H3653 H3654	533. 930.	H3463 H3499 H3502	H3466 H3505 H3506	319. 722.	H3439 H3526 H3529	557. 866.
75 100 ---	150 200 ---	--- 200	JA LA JA	5	H3538 H3541 H3544	1349.	H3556 H3559 H3562	1415.	H3655 H3656 H3657	1569.	H3592 H3595 H3598	H3610 H3611 H3612	1569.	H3616 H3622 H3619	1843.
200	400	400	---	6	W1	2991.	W2	3091.	---	---	W3	W4	3261.	---	---
2 COIL OVERLOAD RELAY—CONTROL TRANSFORMER—RESET ONLY															
3 3	--- 5	--- 5	E F	0	H3625 H3626	128. 157.	H3629 H3630	138. 167.	H3661 H3662	224. 253.	H3637 H3638	H3639 H3640	152. 181.	---	---
7½ 7½	--- 10	--- 10	E F	1	H3627 H3286	133. 162.	H3631 H3289	143. 172.	H3663 H3664	229. 258.	H3641 H3642	H3643 H3328	157. 186.	---	---
15 15	--- 25	--- 25	E F	2	H3628 H3335	199. 228.	H3632 H3386	215. 244.	H3665 H3666	347. 376.	H3644 H3367	H3645 H3370	233. 262.	---	---
30 ---	50 60	50 75	F F	3 4	H3448 H3478 H3512	331. 668.	H3454 H3487 H3515	353. 706.	H3667 H3668 H3669	589. 998.	H3467 H3507 H3521	H3470 H3510 H3524	375. 790.	---	---
75 100 ---	150 200 ---	--- 200	JA LA JA	5	H3547 H3550 H3553	1426.	H3565 H3568 H3571	1492.	H3670 H3671 H3672	1646.	H3601 H3604 H3607	H3613 H3614 H3615	1646.	---	---

3 COIL OVERLOAD RELAY—RESET ONLY

Factory Assembled 3 coil starter, add suffix "T" to catalog number, through size 4 add \$4., size 5 add \$40. size 6 add \$70.

Field Conversion from 2 coil to 3 coil, through size 4 use Spindle Kit 10176-H150—\$2.50 and heater coil—\$1.50.

Prices include necessary heater coils at \$1.50 each.

HEATER COILS For starters in NEMA 1 enclosure for average 60 cycle 1800 R.P.M. motors.

H.P.	208/220 Volts	440 Volts	550 Volts	H.P.	208/220 Volts	440 Volts	550 Volts
¼	10177- H1017	10177- H1010	10177- H1008	10	10177- H1046	10177- H1041	10177- H1038
½	H1019	H1012	H1010	15	H1049	H1043	H1041
¾	H1023	H1017	H1015	20	H1050	H1046	H1044
1	H1066	H1021	H1018	25	H1052	H1048	H1046
	H1028	H1023	H1021	30	H1055	H1048	H1046
1½	H1031	H1026	H1024	40	H1056	H1050	H1048
2	H1033	H1027	H1026	50	H1058	H1052	H1050
3	H1036	H1030	H1029	60	H1026	H1052	H1050
5	H1041	H1035	H1033	75	H1027	H1055	H1052
7½	H1045	H1038	H1036	100	H1029	H1058	H1056

For more accurate selection and for other enclosures, select heater coils by full load current. See index on page 279.

CONVERSION KITS for local cover control in NEMA 1 Enclosure.

Cover Control Kit	Size 0 & 1	Size 2, 3 & 4	Price
Start, Stop Pushbuttons....	H20	H22	\$8.
Run-Off-Auto Selector Switch.	H21	H31	8.

① 440 volts maximum.

OPTIONAL FEATURES, page 115

DIMENSIONS, page 108

DISCOUNT SCHEDULE 1CD

CUTLER-HAMMER

**A-C FULL VOLTAGE—MAGNETIC****3 Phase Non-Reversing Combination Starters with Circuit Breaker****WITH LOCAL COVER CONTROL**

Maximum Horsepower 60-50 Cycles			Type of Breaker Frame	NEMA Size	General Purpose NEMA 1		General Purpose NEMA 1 with Gasketed Cover		Weatherproof Watertight (Stainless Steel) NEMA 3-4		Dusttight-Industrial NEMA 5-12		Hazardous Locations NEMA 7D-9EFG	
208/220 Volts	440 Volts	550 Volts			Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
2 COIL OVERLOAD RELAY — START, STOP PUSHBUTTONS														
3	---	---	E	0	9591- H3301	\$109.	9591- H3304	\$119.	9591- H3676	\$219.	9591- W5	\$147.	9591- H3407	\$246.
3	5	5	F		H3268	138.	H3271	148.	H3677	248.	W6	176.	H3404	270.
7½	---	---	E	1	H3307	114.	H3310	124.	H3678	224.	H3313	152.	H3419	250.
7½	10	10	F		H3277	143.	H3280	153.	H3679	253.	H3297	181.	H3416	276.
15	---	---	E	2	H3342	169.	H3393	185.	H3680	331.	H3378	217.	H3431	334.
15	25	25	F		H3330	198.	H3381	214.	H3681	360.	H3360	246.	H3428	360.
30	50	50	F	3	H3446	283.	H3452	305.	H3682	555.	H3464	341.	H3440	579.
---	60	75	F	4	H3473		H3482		H3683		H3500		① H3527	
50	100	100	JA		H3476	608.	H3485	646.	H3684	952.	H3503	744.	① H3530	888.
75	150	---	JA	5	H3539		H3557		H3685		H3593		H3617	
100	200	---	LA		H3542	1357.	H3560	1423.	H3686	1619.	H3596	1619.	H3623	1865.
---	---	200	JA		H3545		H3563		H3687		H3599		H3620	

2 COIL OVERLOAD RELAY — RUN-OFF-AUTO SELECTOR SWITCH

3	---	---	E	0	H3302	109.	H3305	119.	H3706	219.	W7	147.	H3408	246.
3	5	5	F		H3269	138.	H3272	148.	H3707	248.	W8	176.	H3405	270.
7½	---	---	E	1	H3308	114.	H3311	124.	H3708	224.	H3314	152.	H3420	250.
7½	10	10	F		H3278	143.	H3281	153.	H3709	253.	H3298	181.	H3417	276.
15	---	---	E	2	H3343	169.	H3394	185.	H3710	331.	H3379	217.	H3432	334.
15	25	25	F		H3331	198.	H3382	214.	H3711	360.	H3361	246.	H3429	360.
30	50	50	F	3	H3447	283.	H3453	305.	H3712	555.	H3465	341.	H3441	579.
---	60	75	F	4	H3474	608.	H3483	646.	H3713	952.	H3501	744.	H3528	888.
50	100	100	JA		H3477		H3486		H3714		H3504		H3531	
75	150	---	JA	5	H3540	1357.	H3558	1423.	H3715	1619.	H3594	1619.	H3618	1865.
100	200	---	LA		H3543		H3561		H3716		H3597		H3624	
---	---	200	JA		H3546		H3564		H3717		H3600		H3621	

2 COIL OVERLOAD RELAY — CONTROL TRANSFORMER — START, STOP PUSHBUTTONS

3	---	---	E	0	W9	136.	W13	146.	H3691	246.	W17	174.	---	---
3	5	5	F		W10	165.	W14	175.	H3692	275.	W18	203.	---	---
7½	---	---	E	1	W11	141.	W15	151.	H3693	251.	W19	179.	---	---
7½	10	10	F		H3287	170.	H3290	180.	H3694	280.	W20	208.	---	---
15	---	---	E	2	W12	207.	W16	223.	H3695	369.	W21	255.	---	---
15	25	25	F		H3336	236.	H3387	252.	H3696	398.	H3368	284.	---	---
30	50	50	F	3	H3449	339.	H3455	361.	H3697	611.	H3468	397.	---	---
---	60	75	F	4	H3479	676.	H3488	714.	H3698	1020.	H3508	812.	---	---
50	100	100	JA		H3513		H3516		H3699		H3522		---	---
75	150	---	JA	5	H3548	1434.	H3566	1500.	H3700	1696.	H3602	1696.	---	---
100	200	---	LA		H3551		H3569		H3701		H3605		---	---
---	---	200	JA		H3554		H3572		H3702		H3608		---	---

2 COIL OVERLOAD RELAY — CONTROL TRANSFORMER — RUN-OFF-AUTO SELECTOR SWITCH

3	---	---	E	0	W22	136.	W26	146.	H3721	246.	W30	174.	---	---
3	5	5	F		W23	165.	W27	175.	H3722	275.	W31	203.	---	---
7½	---	---	E	1	W24	141.	W28	151.	H3723	251.	W32	179.	---	---
7½	10	10	F		H3288	170.	H3291	180.	H3724	280.	W33	208.	---	---
15	---	---	E	2	W25	207.	W29	223.	H3725	369.	W34	255.	---	---
15	25	25	F		H3337	236.	H3388	252.	H3726	398.	H3369	284.	---	---
30	50	50	F	3	H3450	339.	H3456	361.	H3727	611.	H3469	397.	---	---
---	60	75	F	4	H3480	676.	H3489	714.	H3728	1020.	H3509	812.	---	---
50	100	100	JA		H3514		H3517		H3729		H3523		---	---
75	150	---	JA	5	H3549	1434.	H3567	1500.	H3730	1696.	H3603	1696.	---	---
100	200	---	LA		H3552		H3570		H3731		H3606		---	---
---	---	200	JA		H3555		H3573		H3732		H3609		---	---

3 COIL OVERLOAD RELAY

Factory Assembled 3 coil starter, add suffix "T" to catalog number; through size 4 add \$4.; size 5 add \$40.

Field Conversion from 2 coil to 3 coil, through size 4, use spindle kit 10176-H150—\$2.50 and heater coil—\$1.50

Prices include necessary heater coils at 1.50 each.

① 440 volts maximum

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

A-C DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

A-C FULL VOLTAGE-MAGNETIC



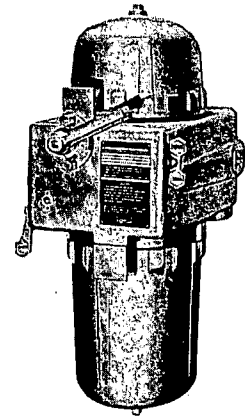
3 Phase Non-Reversing Combination Starters with Circuit Breaker



Size 1, NEMA 1

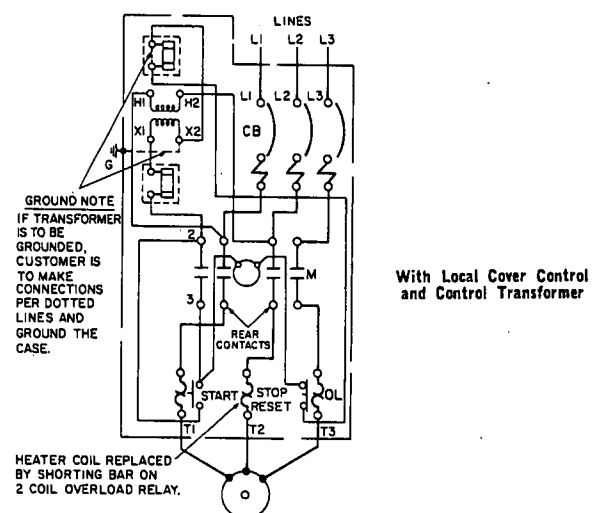
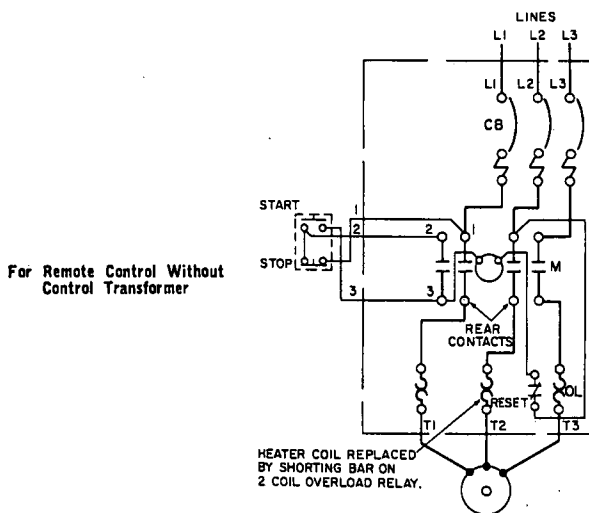


Size 1, NEMA 5-12

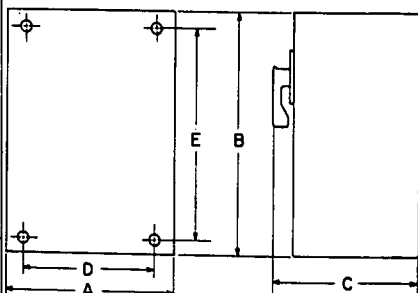


Size 1, NEMA 7-9

TYPICAL WIRING DIAGRAMS



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



NEMA Type Encl.	NEMA Size	Dimensions in Inches					Ship. Wt. Lbs.
		Wide A	High B	Deep C	Mounting		
					D	E	
1	0-1	9¾	21¼	9¾	6¼	19¼	38
	2	10⅝	24⅜	10⅝	7¾	21½	65
	3	12⅞	30⅝	10⅝	9	26	95
	4	13	34⅝	10⅝	9	30⅝	105
	5	19	49	13¼	14½	47½	200
	6	28	75	34½	Floor Mounted		760
3-4 and 5-12	0-1	9¾	23⅞	9¾	6½	22¾	38
	2	10¾	26¾	10¾	7⅞	25⅝	65
	3	13	33	10⅝	9⅞	32	95
	4	13	37	10⅝	9⅞	36	105
	5	19	49	13¼	14½	47½	200
7-D and 9-EFG	0-1	10⅝	25⅞	14¾	5¼	9⅞	75
	2	12	30	16¾	5¼	9⅞	110
	3	16⅝	36½	20⅞	5½	11	160
	4	16⅝	36½	20⅞	5½	11	170
	① 4	16⅝	44½	20¼	5½	11	190
	② 5	23	53	25½	8	17	---

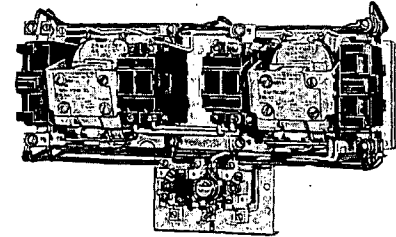
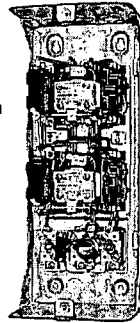
① Dimensions of 60 hp, 440 V.

② Dimensions of 50 hp, 220 V.

**A-C FULL VOLTAGE-MAGNETIC****3 Phase Reversing Starters****WHEN ORDERING SPECIFY**

- Catalog number
- Voltage and frequency
- Heater coil number or full load current

Size 1 — Vertical Construction
— NEMA 1 enclosure with
cover removed



Size 2 — Horizontal Construction
3 Coil Overload Relay

FOR REMOTE CONTROL

Non-Plugging Maximum Horsepower 60-50-25 Cycles			NEMA Size	General Purpose NEMA 1			Weatherproof- Watertight NEMA 3-4	Dusttight- Industrial NEMA 5-12		Hazardous Gas NEMA 7-D		Hazardous Dust NEMA 9-EFG		Open Type Separate Control				
				Vertical Con- struction Cat. No.	Horizontal Con- struction Cat. No.	Price		② Vertical Construction								Vertical Con- struction Cat. No.	Horizontal Con- struction Cat. No.	Price
							Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price				
2 COIL OVERLOAD RELAY—RESET ONLY																		
1 --- ---	--- 1 ---	--- --- 1	① 00	--- --- ---	9595- H2087 H2088 H2089	\$72.	9595- W1 W2 W3	\$118.	--- --- ---	--- --- ---	--- --- ---	9595- W4 W5 W6	\$118.	--- --- ---	9595- H2074 H2075 H2076	\$68.		
3	5	5	0	9656- H19	9656- H26	84.	9656- H33	130.	9656- H537	\$102.	9656- H47	\$245.	9656- H54	130.	9656- H66	9656- H67	80.	
7½	10	10	1	H119	H126	96.	H133	160.	H539	114.	H147	257.	H154	160.	H161	H162	90.	
15	25	25	2	H213	H218	184.	H223	288.	H228	214.	H235	427.	H238	326.	H246	H243	168.	
30	50	50	3	H308	H318	305.	H333	459.	H338	371.	H323	684.	H328	503.	H343	H346	277.	
50 ---	100 ---	--- 100	4 4	H421 H422	--- ---	724. 724.	H429 H430	996. 996.	H437 H438	826. 826.	H445 H446	1173. 1173.	H453 H454	1070. 1070.	H462 H463	H468 H469	672. 672.	
100 ---	200 ---	--- 200	5 5	H507 H508	--- ---	1551. 1551.	H517 H518	1903. 1903.	H512 H513	1903. 1903.	--- ---	--- ---	--- ---	--- ---	H495 H496	H482 H483	1250. 1250.	
200	400	400	6	W1	---	4015.	W4	4515.	W7	4515.	---	---	---	---	W10	---	3515.	
300	600	600	7	W2	---	4950.	W5	5450.	W8	5450.	---	---	---	---	W11	---	4450.	
450	900	900	8	W3	---	6830.	W6	7330.	W9	7330.	---	---	---	---	W12	---	6330.	

3 COIL OVERLOAD RELAY—RESET ONLY

Factory Assembled 3 coil starter—Add suffix "T" to catalog number and for sizes 0 through 4 add \$4.00. for size 5 add \$40.00 and for size 6 and above add \$70.00.

Field Conversion from 2 coil to 3 coil, sizes 0 through 4, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50.

Prices include necessary heater coils at \$1.50 each.

- ① 60 cycle only. Order 50 or 25 cycle by description and complete motor data.
② Except size 00.

**Plugging and Jogging
Service Horsepower Ratings**

Maximum Horsepower where operation is interrupted more than 5 times per minute.

NEMA Size	208/220 Volts	440-550 Volts
00	½	½
0	1	1
1	3	5
2	10	15
3	20	30
4	30	60
5	75	150
6	150	300

HEATER COILS for starters in NEMA 1 enclosure for average 60 cycle 1800 R.P.M. motors

H.P.	208/220 Volts	440 Volts	550 Volts	H.P.	208/220 Volts	440 Volts	550 Volts
¼	9586- H1345	9586- H1338	9586- H1336	10	10177- H1046	10177- H1040	10177- H1038
½	H1348	H1340	H1338	15	H1050	H1044	H1042
¾	H1353	H1346	H1343	20	H1050	H1046	H1044
1	H1357	H1349	H1347	25	H1054	H1048	H1046
	H1359	H1352	H1349	30	H1055	H1048	H1046
1½	10177- H1031	10177- H1025	10177- H1023	40	H1057	H1050	H1048
2	H1033	H1027	H1026	50	H1058	H1052	H1050
3	H1036	H1030	H1029	60	H1026	H1054	H1051
5	H1041	H1034	H1032	75	H1027	H1056	H1054
7½	H1045	H1038	H1036	100	H1029	H1058	H1056

For more accurate selection and for other enclosures select heater coils by full load current. See index on page 279.

DISCOUNT SCHEDULE 1 CD

DIMENSIONS, next page.

OPTIONAL FEATURES, page 115.

CUTLER-HAMMER

A-C FULL VOLTAGE—MAGNETIC



3 Phase Reversing Starters

WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency
- Heater coil number or full load current (See page 279)

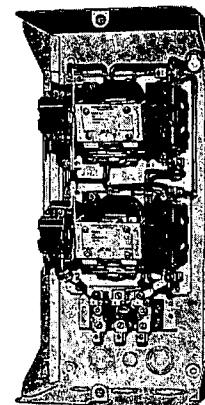
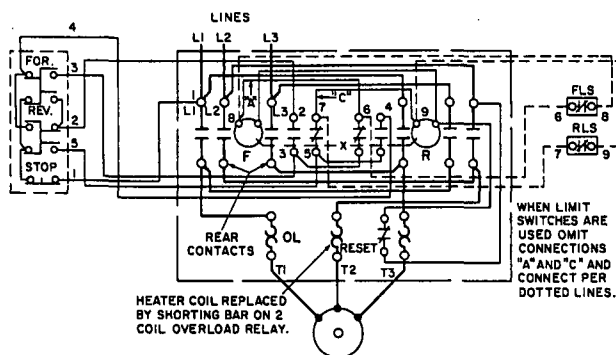
With Control Transformer—NEMA 1—Vertical Construction

Maximum Horsepower		NEMA Size	Reset Only			
			2 Coil Overload Relay		3 Coil Overload Relay	
208/220 Volts	440-550 Volts		Catalog Number	Price	Catalog Number	Price
3	5	0	9656-H69	\$111.	9656-H69T	\$115.
7½	10	1	H164	123.	H164T	127.

Field Conversion from 2 coil to 3 coil, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50.

Prices include necessary heater coils at \$1.50 each.

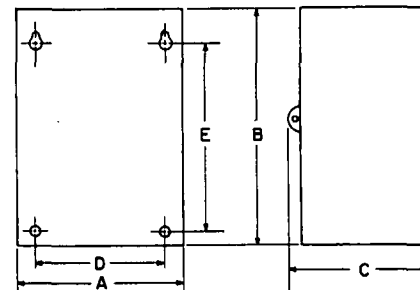
TYPICAL WIRING DIAGRAM



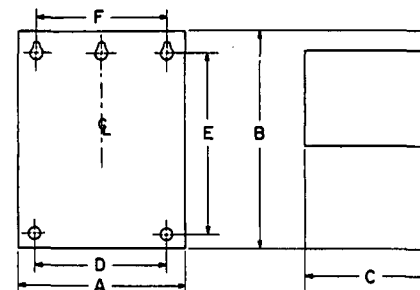
Size 3 Vertical Reverser
NEMA 1 enclosure
with cover removed

APPROXIMATE DIMENSIONS and SHIPPING WEIGHTS

NEMA Size	VERTICAL CONSTRUCTION						HORIZONTAL CONSTRUCTION						
	Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches						Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting			Wide A	High B	Deep C	Mounting			
	A	B	C	D	E		A	B	C	D	E	F	
NEMA 1 Enclosed													
00	---	---	---	---	---	---	7½	11½	5	5¼	9½	---	13
0	6½	15¼	6¼	3½	13½	15½	14½	10¼	7½	11¼	8¾	---	26½
1	7½	16¼	6¾	4¾	14	19½	14½	10¼	7½	11¼	8¾	---	28
2	9½	22	9½	6¼	18¼	46	18½	13¾	9½	15	11	---	48
3	12¼	26½	8¾	9	22½	74	21½	19	10½	18½	15½	---	77
4	14	31½	9¾	10	27	97	---	---	---	---	---	---	---
5	19	49	12¼	14½	47½	180	---	---	---	---	---	---	---
Open Type													
00	---	---	---	---	---	---	6	8½	4¾	5¼	8¼	---	10
0	4¾	11¼	4¾	3¾	10¾	8½	12½	7	4½	8	6¾	8	11
1	5¾	12	4½	4¾	11¾	11	12½	7	4¾	8	6¾	8	13
2	7½	16¾	6¾	6	15¾	25	16¾	9¾	6¾	12¾	8½	9¾	25
3	9	18¾	7¾	7	14¾	40	19¾	11¾	7¾	13¾	11	10¾	40
4	10	22¾	7¾	7	18¾	50	21	14¾	7¾	14¾	10½	11	50
5	13¾	23½	7¾	12	19¾	80	27¾	15¾	7¾	26¾	11	19¾	80
VERTICAL CONSTRUCTION													
NEMA 1 Enclosed with Control Transformer							NEMA 3-4 Cast Enclosure						
0 & 1	12¼	18¾	6¾	9½	16	26	8¾	16¼	7	6¾	15¼	---	27
NEMA 3-4 or 5-12 Enclosed							NEMA 7-D & 9-EFG Cast Enclosures						
0 & 1 (5-12 or 9)	9¾	18¾	8	6½	17¾	30	8¾	16¼	7	6¾	15¼	---	27
0 & 1 (7)	---	---	---	---	---	---	10¼	16¾	7¾	8½	15½	---	35
2	10¾	23¾	9¾	7¾	22¾	52	12¾	23¾	9½	11	21½	---	86
3	13½	29¾	9¾	9¾	28¾	84	14¾	29¾	10½	12¾	27¾	---	150
4	14¾	34¾	9¾	11	33	98	17¾	34¾	10	15	33	---	205
5	19	49	11¼	14½	47½	180	---	---	---	---	---	---	---



Enclosed Type



Open Type

OPTIONAL FEATURES, page 115.

CUTLER-HAMMER

DISCOUNT SCHEDULE 1 CD



A-C FULL VOLTAGE-MAGNETIC

111

3 Phase Reversing Combination Starters with Motor Circuit Switch Fusible or Non-fusible

WHEN ORDERING SPECIFY

- Catalog Number
- For Fusible Add Fuse Clip Kit
- Voltage and Frequency
- Heater coil number or full load current.

Plugging and Jogging Service Horsepower Ratings

Maximum Horsepower where operation is interrupted more than 5 times per minute.

NEMA Size	208/220 Volts	440-550 Volts
0	1	1
1	3	5
2	10	15
3	20	30
4	30	60

NON-FUSIBLE FOR REMOTE CONTROL For fusible add fuse clip kit.

Non-Plugging Maximum HP 60-50 Cycles		NEMA Size	General Purpose NEMA 1		General Purpose NEMA 1 with Gasketed Cover		Weatherproof Watertight NEMA 3-4		Dusttight—Industrial NEMA 5-12					
									External Operating Buttons		Internal Operating Buttons		Price	
			208/220 Volts	440-550 Volts	Type A Cat. No.	Type SF Cat. No.	Price	Type A Cat. No.						Price	Type A Cat. No.	Type SF Cat. No.	Price
2 COIL OVERLOAD RELAY—RESET ONLY														
3	5	0	9658- H154	9658- ---	\$152.	9658- H155	\$170.	9658- H156	\$274.	9658- H159	9658- ---	9658- H160	9658- ---	\$186.
7½	10	1	H1	H144	162.	H90	180.	H157	284.	H9	X1101	H10	H145	196.
15	25	2	H29	H149	269.	H31	295.	H158	455.	H53	X1201	H54	H150	313.
30	50	3	H101	---	440.	H105	472.	H109	776.	H113	---	H117	---	498.
50	100	4	H123	---	927.	H127	987.	H131	1339.	H135	---	H139	---	1086.
2 COIL OVERLOAD RELAY AND CONTROL TRANSFORMER—RESET ONLY														
7½	10	1	9658- H2	9658- H146	\$189.	9658- H91	\$207.	9658- X1102	9658- \$311.	9658- H11	9658- X1103	9658- H12	9658- H147	\$223.
15	25	2	H30	H151	307.	H32	333.	X1202	493.	H55	X1203	H56	H152	351.
2 COIL OVERLOAD RELAY AND CONTROL TRANSFORMER WITH WORKLIGHT CAPACITY—RESET ONLY														
7½	10	1	9658- X1104	9658- X1105	\$210.	9658- X1106	\$228.	9658- X1107	\$332.	9658- X1108	9658- X1109	9658- H13	9658- H148	\$244.
15	25	2	X1204	X1205	331.	X1206	357.	X1207	517.	X1208	X1209	H57	H153	375.

3 COIL OVERLOAD RELAY—RESET ONLY

Factory Assembled 3 coil starter—Add suffix "T" to catalog number and \$4.00 to price.

Field Conversion from 2 coil to 3 coil, use spindle kit 10176H150—\$2.50 and heater coil \$1.50.

Prices include necessary heater coils at \$1.50 each.

HEATER COILS for starters in NEMA 1 enclosure, for average 60 cycle 1800 R.P.M. motors.

H.P.	208/220 Volts	440 Volts	550 Volts	H.P.	208/220 Volts	440 Volts	550 Volts
¼	10177- H1017	10177- H1010	10177- H1008	10	10177- H1045	10177- H1040	10177- H1038
½	H1019	H1012	H1010	15	H1049	H1043	H1041
¾	H1022	H1016	H1013	20	H1050	H1045	H1043
1	H1025	H1019	H1017	25	H1052	H1047	H1045
	H1027	H1021	H1019	30	H1054	H1048	H1046
1½	H1030	H1025	H1023	40	H1056	H1050	H1048
2	H1033	H1066	H1025	50	H1058	H1052	H1050
3	H1036	H1029	H1028	60	---	H1054	H1050
5	H1041	H1034	H1032	75	---	H1055	H1052
7½	H1045	H1038	H1036	100	---	H1058	H1056

For more accurate selection and for other enclosures select heater coils by full load current. See index on page 279.

FUSE CLIP KITS—3 POLE (3 FUSE)

Starter NEMA Size	Voltage	Maximum Horsepower		Fuse Clip Ratings		Fuse Clip Kit Not Installed		Fuse Clip Kit Factory Installed	
		Stand- ard Fuses	Dual Element Fuses	Am- peres	Voltage	Fuse Clip Cat.No.	Price	Add to Starter Cat.No.	Price Addition
0	208/220	3	3	30	250	10982- H14	\$1.00	—81	\$3.00
	440-550	5	5	30	600	H15	1.50	—91	3.50
1	208/220	3	7½	30	250	H14	1.00	—81	3.00
	208/220	7½	---	60	250	H15	1.50	—82	3.50
	440	7½	10	30	600	H15	1.50	—91	3.50
	550	10	10	30	600	H15	1.50	—91	3.50
2	208/220	7½	15	60	250	H16	1.50	—82	4.00
	208/220	15	---	100	250	H18	10.50	—83	13.00
	440-550	15	25	60	600	H17	3.00	—92	5.50
	440-550	25	---	100	600	H18	10.50	—93	13.00
3	208/220	30	30	200	250	H23	16.00	—84	20.50
	440-550	30	50	100	600	H24	10.50	—93	15.00
	440-550	50	---	200	600	H25	16.00	—94	20.50
	208/220	50	50	400	250	H26	46.00	—85	51.00
4	440-550	60	100	200	600	H27	16.00	—94	21.00
	440-550	100	---	400	600	H28	46.00	—95	51.00

Prices do not include fuses

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

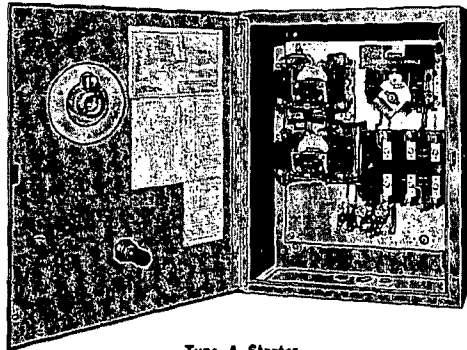
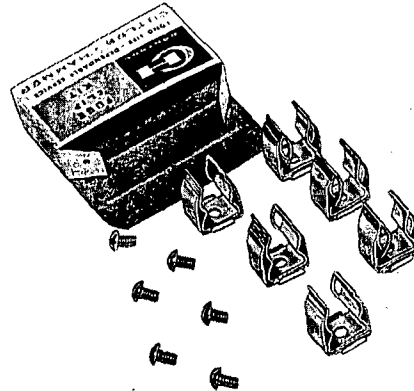
A-C FULL VOLTAGE-MAGNETIC



3 Phase Reversing Combination Starters with Motor Circuit Switch Fusible or Non-fusible

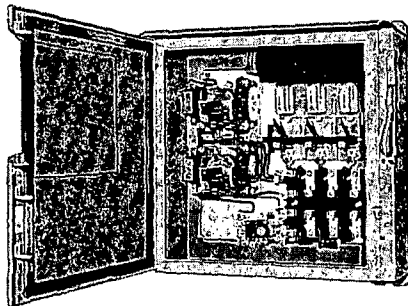
3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

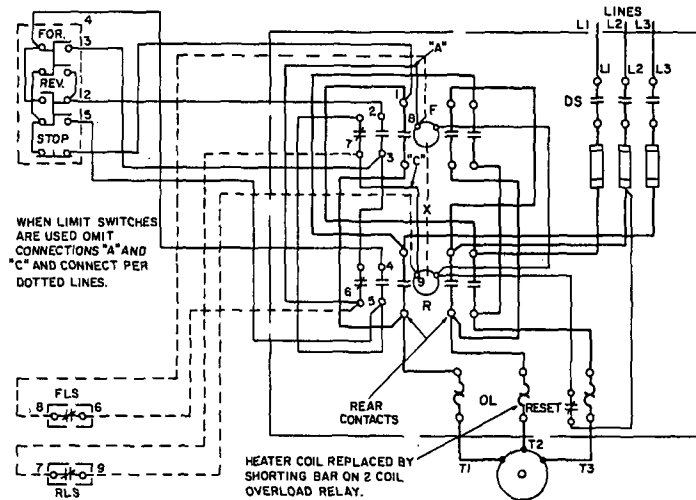
AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTSType A Starter
in NEMA 1 Enclosure

Fuse Clip Kit

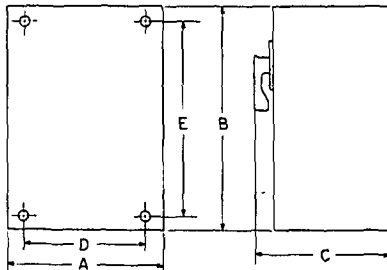
TYPICAL WIRING DIAGRAM



Type SF Starter in NEMA 5-12 Enclosure



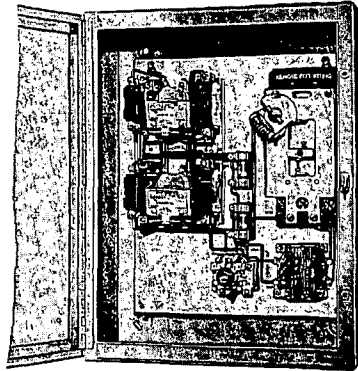
APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



NEMA 1 Enclosed							NEMA 3-4 (Type A only) & NEMA 5-12 Enclosed					
NEMA Size	Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting			Wide A	High B	Deep C	Mounting		
				D	E					D	E	
TYPE A												
0 & 1	16½	20	9½	12½	16½	58	16½	22½	9½	13½	21½	60
2	20	25	10½	16	21½	99	20	27½	11	17	26½	103
3	22½	30½	11	19	26	160	23	32½	11	19½	31½	165
4	18½	44½	12½	15.	40	230	19	46½	12½	15½	45½	237
TYPE SF												
1	18½	18	11½	14½	15	78	19	20½	11½	15½	19½	80
2	21½	22½	12	16½	20½	120	21½	26½	12½	18	25½	125

**A-C FULL VOLTAGE-MAGNETIC****3 Phase Reversing Combination Starters with Circuit Breaker****WHEN ORDERING SPECIFY**

- Catalog Number
- Voltage and Frequency
- Heater coil number or full load current.

**DESCRIPTION**

Breakers are adjustable instantaneous trip-magnetic type except E frames which are non-adjustable thermal-magnetic type.

NEMA Size 1 Starter
with Control Transformer
in NEMA 5-12 enclosure

FOR REMOTE CONTROL

Non-Plugging Maximum HP 60-50 Cycles			Type of Breaker Frame	NEMA Size	General Purpose NEMA 1		General Purpose NEMA 1 with Gasketed Cover		Weatherproof- Watertight NEMA 3-4		Dusttight—Industrial NEMA 5-12			Hazardous Locations NEMA 7D & 9EFG	
208/220 Volts	440 Volts	550 Volts			External Operating Buttons						External Operating Buttons Cat. No.	Internal Operating Buttons Cat. No.	Price	External Operating Buttons	
					Cat. No.	Price	Cat. No.	Price	Cat. No.	Price				Cat. No.	Price
2 COIL OVERLOAD RELAY—RESET ONLY															
3	---	---	E	0	9659- X1001	\$159.	9659- X1003	\$177.	9659- X1005	\$281.	9659- X1007	9659- X1009	\$193.	9659- W29	\$341.
3	5	5	F	0	X1002	182.	X1004	200.	X1006	304.	X1008	X1010	216.	W30	341.
7½	---	---	E	1	X1101	171.	X1102	189.	X1104	293.	X1106	X1107	205.	W31	353.
7½	10	10	F	1	H1	194.	X1103	212.	X1105	316.	H3	H4	228.	W32	353.
15	---	---	E	2	X1201	285.	X1202	311.	X1203	471.	X1205	X1206	329.	W33	523.
15	25	25	F	2	H8	308.	H10	334.	X1204	494.	H12	H13	352.	W34	523.
30	50	50	F	3	H18	459.	H20	491.	H22	785.	H24	H26	517.	W35	871.
---	60	75	F	4	H29	1036.	H33	1096.	H37	1448.	H41	H45	1195.	W36	1671.
50	100	100	JA	4	H30	1036.	H34	1096.	H38	1448.	H42	H46	1195.	W37	1671.
100	200	200	---	5	W1	2057.	W2	2155.	W3	3109.	W4	W5	2435.	---	---
2 COIL OVERLOAD RELAY AND CONTROL TRANSFORMER—RESET ONLY															
3	---	---	E	0	9659- W6	\$186.	9659- W7	\$204.	9659- W8	\$308.	9659- W9	9659- W10	\$220.	9659- W38	\$368.
3	5	5	F	0	W11	209.	W12	227.	W13	331.	W14	W15	243.	W39	368.
7½	---	---	E	1	W16	198.	W17	216.	W18	320.	W19	W20	232.	W40	380.
7½	10	10	F	1	H2	221.	W27	239.	W28	343.	H5	H6	255.	W41	380.
15	---	---	E	2	W21	323.	W22	349.	W23	509.	W24	W25	367.	W42	561.
15	25	25	F	2	H9	346.	H11	372.	W26	532.	H14	H15	390.	W43	561.
30	50	50	F	3	H19	515.	H21	547.	H23	841.	H25	H27	573.	W44	927.
---	60	75	F	4	H31	1104.	H35	1164.	H39	1516.	H43	H47	1263.	W45	1739.
50	100	100	JA	4	H32	1104.	H36	1164.	H40	1516.	H44	H48	1263.	W46	1739.

Factory Assembled 3 coil starter—Add suffix "T" to catalog number and through size 4 add \$4.00 and for size 5 add \$40.00.

Field Conversion from 2 coil to 3 coil, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50.

Prices include necessary heater coils at \$1.50 each.

**Plugging and Jogging
Service Horsepower Ratings**

Maximum Horsepower where operation is interrupted more than 5 times per minute.

NEMA Size	208/220 Volts	440-550 Volts
0	1	1
1	3	5
2	10	15
3	20	30
4	30	60
5	75	150

HEATER COILS for starters in NEMA 1 enclosure, for average 60 cycle 1800 R.P.M. motors

H.P.	208/220 Volts	440 Volts	550 Volts	H.P.	208/220 Volts	440 Volts	550 Volts
¼	10177- H1017	10177- H1010	10177- H1008	10	10177- H1045	10177- H1040	10177- H1038
½	H1019	H1012	H1010	15	H1049	H1043	H1041
¾	H1022	H1016	H1013	20	H1050	H1045	H1043
1	H1025	H1019	H1017	25	H1052	H1047	H1045
1½	H1027	H1021	H1019	30	H1054	H1047	H1045
2	H1030	H1025	H1023	40	H1055	H1049	H1048
3	H1033	H1066	H1025	50	H1058	H1052	H1049
4	H1036	H1029	H1028	60	---	H1052	H1050
5	H1040	H1034	H1032	75	---	H1055	H1052
7½	H1043	H1038	H1035	100	---	H1057	H1055

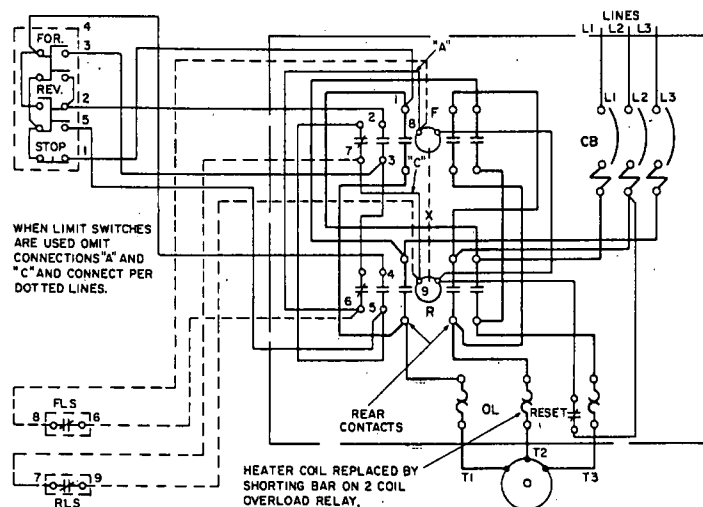
For more accurate selection and for other enclosures select heater coils by full load current. See index on page 279.

A-C FULL VOLTAGE-MAGNETIC



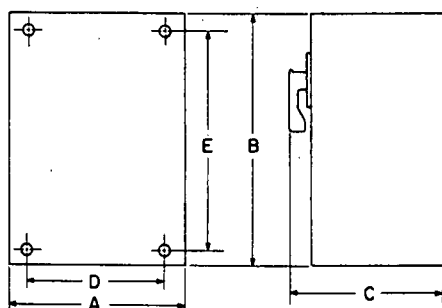
3 Phase Reversing Combination Starters with Circuit Breaker

TYPICAL WIRING DIAGRAM

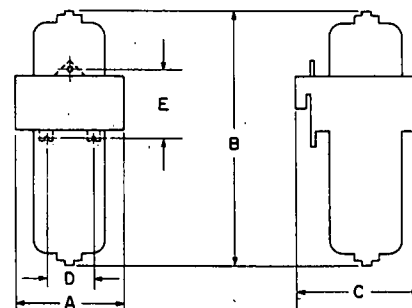


Combination Starter
in NEMA 1 Enclosure

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



NEMA 1, 3-4 or 5-12



NEMA 7D-9EFG

NEMA 1 Enclosed							NEMA 3-4 or 5-12 Enclosed						NEMA 7D-9EFG Enclosed					
NEMA Size	Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches					
	Wide A	High B	Deep C	Mounting			Wide A	High B	Deep C	Mounting			Wide A	High B	Deep C	Mounting		
				D	E					D	E					D	E	
0 & 1	16%	20%	9½	12½	16%	60	16%	22%	9½	13%	21%	60	12	35	16%	5%	9%	
2	20	25%	11	16	21%	75	20%	27%	11	17	26½	75	16%	45%	20%	5%	9%	
3	22%	30%	11½	19	26	135	23	32%	11½	19%	31%	135	16%	45%	20%	5%	11	
4 (F frame)	22½	30%	11½	19	26	210	23	32%	11½	19%	31%	210	16%	51½	20%	5%	11	
4 (JA frame)	18%	44%	12½	15	40	300	19	46%	13	15%	45%	300	16%	54%	20%	5%	11	
5	On Application					---	On Application					---	---	---	---	---	---	



A-C FULL VOLTAGE-MAGNETIC

Price Additions for Optional Features

Item	Description	NEMA SIZE							
		00	0	1	2	3	4	5	6-7-8
Enclosures									
1	Start, Stop Pushbutton or Run-Off-Auto Selector Switch in cover of NEMA 1.....	\$8.	\$8.	\$8.	\$8.	\$8.	\$8.	\$8.	\$33.
	All other enclosures.....	---	22.	22.	22.	22.	22.	22.	50.
2	Pilot light in cover of NEMA 1.....	---	15.	15.	15.	15.	15.	15.	27.
	All other enclosures.....	---	27.	27.	27.	27.	27.	27.	27.
3	Breather and Drain in NEMA 7 and 9.....	---	6.	6.	6.	6.	6.	6.	---
4	Forward, Reverse, Stop Pushbuttons in cover of NEMA 1.....	---	40.	40.	40.	40.	40.	40.	57.
	NEMA 4, 5-12 and 9.....	---	50.	50.	50.	50.	50.	50.	67.
5	Size 0, cast aluminum, NEMA 4; with 2 Coil Overload Relay:								
	Cat. No. 9586H6018—Reset Button in cover.....	---	N/C	---	---	---	---	---	---
	9586H6019—Start, Stop Pushbuttons in cover.....	---	N/C	---	---	---	---	---	---
	9586H6020—Run-Off-Auto Selector Switch in cover.....	---	N/C	---	---	---	---	---	---
	Size 1, cast aluminum, NEMA 4; with 2 Coil Overload Relay:								
	Cat. No. 9586H6131—Reset Button in cover.....	---	---	N/C	---	---	---	---	---
	9586H6132—Start, Stop Pushbutton in cover.....	---	---	N/C	---	---	---	---	---
	9586H6133—Run-Off-Auto Selector Switch in cover.....	---	---	N/C	---	---	---	---	---
Panel Equipment									
6	① Control Circuit Transformer—Single and Dual Voltage								
	Primary.....								
	60 or 50 cycles.....	---	27.	27.	38.	56.	68.	77.	77.
	25 cycles.....	---	41.	41.	57.	84.	102.	102.	102.
	With 100 watt extra capacity.....	---	48.	48.	62.	78.	88.	98.	98.
	60 or 50 cycles.....	---	72.	72.	93.	117.	132.	147.	147.
	25 cycles.....	---	65.	65.	81.	97.	107.	107.	---
	With 200 watt extra capacity.....	---	82.	82.	100.	116.	126.	126.	---
	With 300 watt extra capacity.....	---	---	---	---	---	---	---	---
7	Separate Control Circuit.....	---	---	N/C	N/C	N/C	N/C	N/C	N/C
8	Substitute Dual Voltage Coil — Per coil.....	---	2.	2.	2.	2.	2.	2.	---
9	Substitute Special Voltage or Frequency Magnet Coil — Per coil.....	3.	3.	4.	5.	7.	8.	10.	11.
	Standard Voltages								
	110, 115, 120, 208, 220, 230, 240, 277, 380 (50 cycles), 440, 460, 480, 550, 600								
	Standard Frequencies								
	25, 50, 60 cycles								
Overload Relay									
10	Standard Duty and Fast Trip Overload Heater Coils, Addition or								
	Deduction Each coil.....	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
11	3 Coil Overload Relay with Standard Trip Heater Coil.....	4.	4.	4.	4.	4.	4.	40.	70.
12	Substitute Fast Trip for Standard Trip Overload Relay.....	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C
13	Substitute Automatic Reset for Manual Reset.....	N/C	N/C	N/C	N/C	N/C	N/C	N/C	N/C
14	Thermal Overload Relay with Normally Open Contacts, or								
	Normally Open and Normally Closed Contacts.....	4.	4.	4.	4.	4.	4.	4.	4.
Auxiliary Contacts									
15	Auxiliary Contacts—For Field Installation.....				See Table Below				
16	Extra Auxiliary Contacts—Factory Installed								
	Normally Open or Normally Closed.....	---	11.	11.	11.	11.	11.	11.	33.
	Normally Open and Normally Closed.....	---	22.	22.	---	---	---	---	---

AUXILIARY CONTACT KITS

Contacts	Catalog Numbers					Price
	Size 0	Size 1	Size 2	Size 3	Size 4 & 5	
Normally Open.....	10933-H1	10933-H1	10933-H7	10933-H7	10933-H7	\$6.
Normally Closed.....	H2	H3	H8	H9	H21	6
Normally Closed Late Opening...	H4	H4	H10	H10	H10	6.
Normally Open & ③ Normally Closed.....	H5	H6	---	---	---	8.

MAXIMUM NUMBER OF EXTRA AUXILIARY CONTACTS PER CONTACTOR

Catalog No.	Size 0 & 1	Size 2 & 3	Size 4 & 5
9586	2	3	4
9589 & 9591	2	3	3
9656	1	2	3
9658 & 9659	1	2	2

A maximum of two normally closed contacts may be added per contactor. Only one normally closed late opening contact is permissible per contactor.

① Transformers in NEMA 1, 4, 5 or 12 enclosures have fused secondary.

③ Both normally open and normally closed contacts must be used on the same side of the line.

A-C FULL VOLTAGE-MANUAL

3 Phase Non-Reversing Starters



WHEN ORDERING SPECIFY

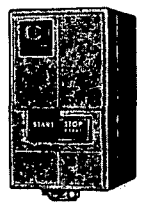
- Catalog number
- Heater coil number or full load current.



NEMA 1 Enclosed



Open Type



With Jog Feature

NON-REVERSING with OVERLOAD RELAY

Maximum Horsepower			NEMA Size	Type of Operator	General Purpose NEMA 1				Watertight Dusttight NEMA 4-5		Hazardous Locations NEMA 7-D & 9-EFG		Open Type				
110 Volts	220 Volts	440-550 Volts			Standard		With Jog Feature		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Standard Buttons	Long Buttons	Price
					Cat. No.	Price	Cat. No.	Price							Cat. No.	Cat. No.	
2 COIL OVERLOAD RELAY																	
1½	2	3	0	Pushbutton	9115-H171	\$25.	9115-H172	\$27.	---	---	---	---	9115-H167	9115-H168	\$23.		
3	5	7½	1	Pushbutton	H178	30.	H179	32.	---	---	---	---	H174	H175	28.		
3 COIL OVERLOAD RELAY																	
1½	2	3	0	Pushbutton Lever	9115-H171T	\$29.	9115-H172T	\$31.	2 H184 H107	\$57.57.	9115-H70 H108	\$71.71.	9115-H167T	9115-H168T	\$27.		
3	5	7½	1	Pushbutton Lever	H178T	34.	H179T	36.	2 H186 H109	69.69.	H99 H110	83.83.	H174T	H175T	32.		

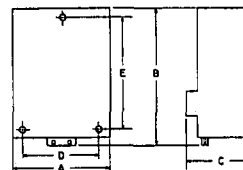
NON-REVERSING WITHOUT OVERLOAD RELAY

1½	2	2	0	Pushbutton Toggle	9115-H89 H87	\$10.50 10.50	---	---	---	---	---	---	9115-H90 W4	---	\$10. 10.
----	---	---	---	-------------------	-----------------	------------------	-----	-----	-----	-----	-----	-----	----------------	-----	--------------

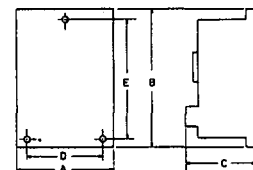
Prices include necessary heater coils at \$1.50 each.

- 1 NEMA 1 and Open Type starters may be Field Converted from 2 coil to 3 coil by using spindle kit 10176H151—\$2.50 and a heater coil—\$1.50.
- 2 Stainless steel enclosures. For cast enclosures order 9115H69—Size 0 or 9115H98—Size 1. No increase in price.
- 3 Includes flush mounting plate.

APPROXIMATE DIMENSIONS and SHIPPING WEIGHTS



Enclosed



Open

HEATER COILS for starters in NEMA 1 enclosure, for average 60 cycle 1800 R.P.M. motors.

H.P.	220 Volts	440 Volts	550 Volts
¼	10177-H1017	10177-H1010	10177-H1008
½	H1019	H1012	H1010
¾	H1023	H1017	H1015
1	H1026	H1020	H1018
	H1027	H1022	H1020
1½	H1030	H1025	H1023
2	H1033	H1066	H1025
3	H1036	H1029	H1026
5	H1040	H1034	H1032
7½	H1044	H1037	H1036

For more accurate selection and for other enclosures select heater coils by full load current. See index on page 279.

Size	Enclosure	Operator	Dimensions in Inches					Ship. Wt. Lbs.
			Wide A	High B	Deep C	Mounting		
						D	E	
WITH OVERLOAD RELAY								
0	1	Pushbutton	4½	8½	4½	3¾	6½	5½
	4-5	Pushbutton	6½	11¾	7¾	4	10¾	18
	7-9	Pushbutton	7¾	9¾	7¾	6¼	5¼	30
	4-5 & 7-9	Lever	5½	9¾	6¾	4¾	8¾	19
	Open	Pushbutton	3	5½	④ 3¾	2	5¼	3
1	1	Pushbutton	4½	8½	4½	3¾	6½	5½
	4-5	Pushbutton	6½	14¾	7¾	4	13¾	23
	7-9	Pushbutton	7½	13¾	7¾	4	12¾	35
	4-5 & 7-9	Lever	5½	9¾	6¾	4¾	8¾	19
	Open	Pushbutton	3	5½	④ 3¾	2	5¼	3
WITHOUT OVERLOAD RELAY								
0	1	Pushbutton or Toggle	2½	4¾	2¾	1½	3¼	2

④ This dimension is 4¼" with long (extended) buttons.

DISCOUNT SCHEDULE 1CD



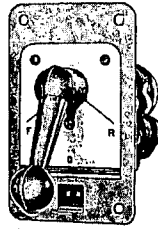
A-C FULL VOLTAGE-MANUAL

117

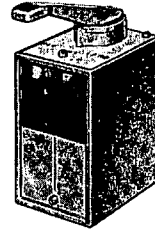
3 Phase Reversing Starters

WHEN ORDERING SPECIFY

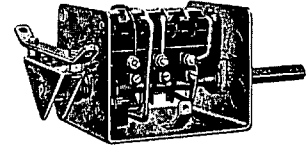
- Catalog number



Size 00 Flush Mounting



Size DR 1 Surface Mounting



Size 2 Rope Drive with Cover Removed

REVERSING DRUM TYPE without OVERLOAD RELAY

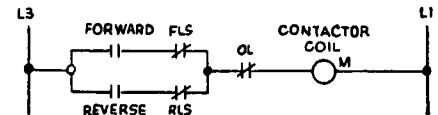
Maximum Horsepower				Size	Type of Operation	Surface Mounting General Purpose—NEMA 1					Flush or Cavity Mounting (Oiltight mounting on sizes DR 0 & DR 1)						
3 Phase		Single Phase				Catalog Numbers					Price	Catalog Numbers				Price	
208/220 Volts	440-550 Volts	115 Volts	230 Volts			Standard Lever	Large Lever	Knob	Adj. Operator	Rope Drive		Standard Lever	Large Lever	Knob	Adj. Operator		
3 POLE																	
1½ ¾	---	1 ¾	1½ ¾	00	Maintained	9441- H255-1	9441- ---	9441- ---	9441- ---	9441- ---	\$ 8.50 11.	9441- ---	9441- ---	9441- ---	9441- ---	---	\$15.
¾	¾	¾	¾		Momentary	H133	---	H32	---	---		11.	H135	---	H34			---	15.
2	2	1	1½	0	Momentary	---	---	---	---	H239	19.	---	---	---	---	---	---
2	2	1½	2	DR 0	② Maintained	H268	H279	H269	H270	---	11.	H274	H281	H275	W1	15.	
					③ Main.&Mom.	H271	H280	H272	H273	---		H276	H282	H277	W2		
5	7½	1½	3	1	Momentary	---	---	---	---	H195	36.	---	---	---	---	---	---
5	7½	1½	3	DR 1	② Maintained	H284	---	H285	W3	---	30.	H286	---	H287	W4	34.	
15	25	3	7½	2	Maintained	H211	---	---	---	---	96.	H214	---	---	---	106.	
					Momentary	H212	---	---	---	H213		H215	---	---	---		
④ 2 POLE WITH TYPE K AUXILIARY CONTACTS—ONE N.O. CONTACT PER DIRECTION																	
5	7½	1½	3	1	Maintained	9441- H187	---	---	---	---	53.	9441- H190	---	---	---	57.	
					Momentary	H188	---	---	---	---		H191	---	---	---		
5	7½	1½	3	1	Momentary	---	---	---	---	H189	59.	---	---	---	---	---	
15	25	3	7½	2	Maintained	H205	---	---	---	---	118.	H208	---	---	---	128.	
					Momentary	H206	---	---	---	H207		H209	---	---	---		

① For quantity prices in lots of 100 or more, refer to nearest C-H office.

② These devices are field convertible from maintained both positions to momentary both positions.

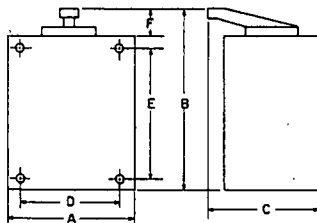
③ These devices are field convertible from maintained "Forward" — momentary "reverse" to momentary "forward" — maintained "Reverse".

④ Must be used with magnetic starter.

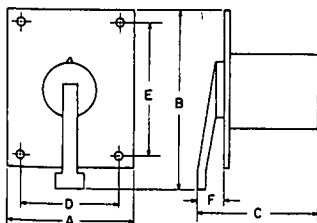


Type K Interlock

APPROXIMATE DIMENSIONS and SHIPPING WEIGHTS



Surface Mounting



Cavity Mounting

Size	Type of Operator	Surface Mounting						Cavity Mounting						Ship. Wt. Lbs.
		Dimensions in Inches						Dimensions in Inches						
		Wide A	High B	Deep C	Mounting		Lever F	Wide A	High B	Deep C	Mounting		Lever F	
D	E				D	E								
00	Std. lever (240V.)	2½	4¾	2½	1½	2	1½	---	---	---	---	---	---	1
	Std. lever (600V.)	2½	5¾	4	1½	3¾	1½	2½	4¾	4½	1½	3¾	1½	3
	Knob (600V.)	2½	5	2½	1½	3¾	1	2½	4	4	1½	3¾	1	3
DR 0	Std. lever	2½	5½	4	2	2½	1½	4	4¾	5	3½	4	1½	3
	Large lever	2½	6	4¾	2	2½	2	4	5½	5¾	3½	4	2	3
	Knob	2½	5¾	3	2	2½	1½	4	4½	4½	3½	4	1½	3
	Adjustable	2½	5¾	4¼-6¾	2	2½	1½	---	---	---	---	---	---	3
0	Rope drive	4¾	Ⓢ5¾	3	2½	2½	1½	---	---	---	---	---	---	5
DR 1	Std. lever	3¾	6¾	5	2½	2½	2	4½	5¾	5¾	4	4½	2	4
	Knob	3¾	6¾	3¾	2½	2½	1½	4½	5¾	4¾	4	4½	1½	4
1	Std. lever	3¾	8	4½	2½	4¾	2½	4½	5¾	8	3¾	5	2½	10
	Rope drive	4¾	Ⓢ7½	4½	2½	4¾	1½	---	---	---	---	---	---	10
2	Std. lever	5¾	8	5¾	4¾	4¾	2½	5¾	6¾	8¾	5	5½	2½	25
	Rope drive	7	Ⓢ7½	4½	4¾	4¾	1½	---	---	---	---	---	---	25

⑤ Shaft extension on end opposite operator is 2½" for size 0 and 4" for sizes 1 and 2

DISCOUNT SCHEDULE 16D

CUTLER-HAMMER

117

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS



3 Phase Reversing Starters

WHEN ORDERING SPECIFY DESCRIPTION

- Catalog number
- Optional features, if desired.

The PENDANT MOUNTING switches have two mechanically interlocked, momentary operation mechanisms and provide two button hold down control.

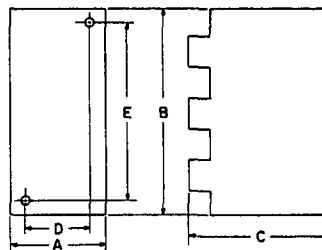
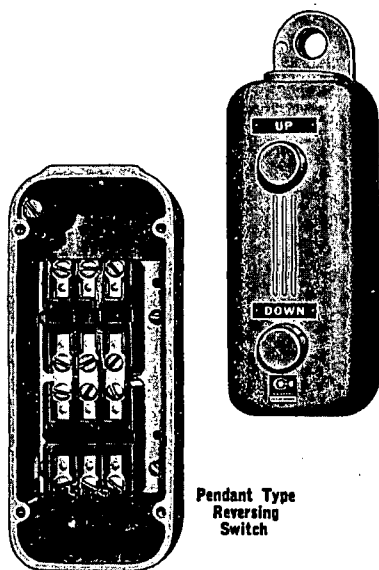
The SURFACE MOUNTING devices have a maintained contact type operation and a center "off" button which must be depressed before the directional buttons may be operated.

REVERSING PUSHBUTTON OPERATED without OVERLOAD RELAY

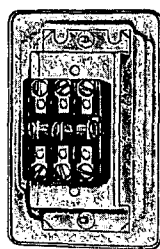
Maximum Horsepower					Size	General Purpose—NEMA 1				Optional Features	
3 Phase			Single Phase			Pendant Mounting Momentary Contact		Surface Mounting Maintained Contact		9109- Cable clamp for BX or Rubber cable— $\frac{1}{4}$ " O.D.	9122- Omission of box (Enclosure back) for flush mounting
110 Volts	208/220 Volts	440-550 Volts	115 Volts	230 Volts		Catalog Number	Price	Catalog Number	Price		
$\frac{1}{4}$	$\frac{1}{4}$	---	$\frac{1}{4}$	$\frac{1}{4}$		00	9109- H3	\$16.	9122- H4			$ 8.50
$1\frac{1}{2}$	2	2	1	$1\frac{1}{2}$	0	H1	19.	H3	12.50	No charge	.50

Special button markings available upon request.

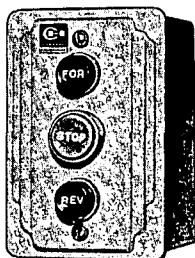
APPROXIMATE DIMENSIONS and SHIPPING WEIGHTS



NEMA Size	Pendant Mounting				Surface Mounting					
	Dimehnsions in Inches			Ship. Wt. Lbs.	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C		Wide A	High B	Deep C	Mounting		
								D	E	
00	2½	7½	3⅝	4	2⅞	4⅝	2¾	1¾	3¼	2
0	2½	7½	3¾	5	2½	6⅝	3⅝	1⅝	5¼	4



Size 00 Surface Mounting Type



Size 0 Surface Mounting Type





3 Phase Starter Description

REDUCED VOLTAGE STARTERS—Required under following conditions:

1. Power company (or system capacity) limitations on starting current:
 - a. Number of amperes drawn from line in steps limited within time interval.
 - b. Total amperes drawn per start limited.
 - c. Either "a." or "b." expressed as a per cent of full load current.
 - d. Maximum hp. of motor limited.
2. Mechanical restrictions on starting torque—reduced voltage provides "soft" start.

Magnetic Reduced Voltage Starters—Available in four basic forms:

1. Part winding—(increment type) Requires special motor—provides closed transition and definite time acceleration.
2. Wye Delta—Requires delta-wound stator (six leads)—provides open transition and definite time acceleration.
3. Primary Resistor—Used with any standard squirrel cage motor—provides closed transition and definite time acceleration.
4. Auto-Transformer—Used with any standard squirrel cage motor—provides closed transition and definite time acceleration. Taps connected to 80% line Voltage; 65% and 50% taps supplied. Duty cycle—15 seconds start each four minutes for one hour, under 200 hp. Above 200 hp. three 30-second starts with 30 off, then 60 off and recycle. All components used in reduced voltage magnetic starters are standard devices as described in sections of this catalog such as contactors, relays, etc.; except for auto-transformer.

Manual Reduced Voltage Starters—Available as oil-immersed contact auto-transformer and Wye-Delta for non-reversing or reversing and non-reversing drum-type primary resistor and Wye-Delta auto-transformer shipped with 65% tap connected—80% tap provided through 50 hp. Above 50 hp. additional 50% tap supplied. Duty cycle, one 15-second start every four minutes for four consecutive starts.

Multi-Speed Starter—Available in magnetic or manual types to control motors wound for two—three or four (fixed) speeds.

- a. Separate winding types—motors with stator winding for each speed.
- b. Reconnectable (consequent pole) type—motors with stator windings reconnectable externally to provide 2:1 ratio of speed for same winding.

Both types arranged to provide following characteristics:

1. Constant horsepower—change in speed does not change hp; torque varies inversely with speed.
2. Constant torque—change in speed does not change torque—hp. varies directly with speed.
3. Variable torque—change in speed varies torque directly proportional to speed and hp. as square of speed.

This Section Contains

Pages

A-c Reduced Voltage Magnetic	
3 Phase Primary Resistor	
Non-Reversing—9605	120
Reversing—9674	121
3 Phase Part Winding—Non-Reversing—9612	122
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Reversing—Primary Resistor—9445	128
A-c Multi-Speed Magnetic	
3 Phase Full Voltage Non-Combination Non-Reversing	
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2 speed 1 winding—9739	130-131
3 speed 2 winding—9741	130-131
4 speed 2 winding—9742	130-131
Form 1 Selective—Separate Winding	
2 speed 2 winding—9736	130
3 Phase Full Voltage Combination Non-Reversing	
Form 1 Selective with Motor Circuit Switch	
2 speed Reconnectable—9739	132
2 speed Separate Winding—9736	132
Form 1 Selective with Circuit Breaker	
2 speed Reconnectable—9739	133
2 speed Separate Winding—9736	133
3 Phase Reduced Voltage Primary Resistor Non-Reversing	
2 speed Reconnectable—9759	134-135
2 speed Separate Winding—9749	134-135
A-c Multi-Speed Manual	
3 Phase Full Voltage	
Non-Reversing and Reversing Drums—9402	136-137
Non-Reversing Pushbutton without Overload Relay—9216	138
Non-Reversing Pushbutton with Overload Relay—9219	138

Magnetic Multi-Speed—Available as:

- Form 1—Selective control—start any speed—increase at will—decrease through stop button to provide momentary slow-down.
- Form 2—Compelling—start at low speed only—increase from low to high in sequence only—down-stop transfer to all lower speeds to provide momentary slow-down.
- Form 3—Progressive—automatic timed acceleration to any speed selected—increase at will—down-stop transfer to provide momentary slow-down.

All components used same as described under contactors, relays, timers, etc.

Manual Multi-speed—Provided as drum type non-reversing and reversing without overload protection. Separate starters may be used with drum for overload protection (see contactor section). Pushbutton type for smaller motors provided with and without overload protection.

A-C REDUCED VOLTAGE-MAGNETIC

3 Phase Primary Resistance Starters

WHEN ORDERING SPECIFY

- Catalog number
- Heater coil number or full load current
- Voltage and frequency

NON REVERSING - 2 POINT - DEFINITE TIME ACCELERATION NEMA CLASS 116 RESISTORS

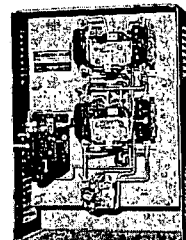
H.P. 60 Cycles	Volts	NEMA Size	General Purpose NEMA 1		Dusttight— Industrial NEMA 5-12	
			Cat. No.	Price	Cat. No.	Price
2 COIL OVERLOAD RELAY						
5	208/220 440 550	1	9605- H1493 H1498 H1504	\$286.	9605- W18 W19 W20	\$436.
7½	208/220 440 550	1	H1494 H1499 H1505	296.	W21 W22 W23	446.
10	208/220	2	H1460	420.	W26	600.
	440 550	1	H1500 H1506	316.	W24 W25	466.
15	208/220 440 550	2	H1461 H1462 H1465	450.	W27 W28 W29	630.
20	208/220	3	H1565	600.	W34	790.
	440 550	2	H1463 H1466	484.	W30 W31	664.
25	208/220	3	H1566	610.	W35	800.
	440 550	2	H1464 H1467	504.	W32 W33	684.
30	208/220 440 550	3	H1567 H1568 H1571	638.	W36 W37 W38	828.
40	208/220	4	H1601	1296.	W43	1536.
	440 550	3	H1569 H1572	662.	W39 W40	852.
50	208/220	4	H1602	1296.	W44	1536.
	440 550	3	H1570 H1573	684.	W41 W42	874.
60	208/220	5	H1628	2022.	W51	2472.
	440 550	4	H1603 H1606	1320.	W45 W46	1560.
75	208/220	5	H1629	2022.	W52	2472.
	440 550	4	H1604 H1607	1320.	W47 W48	1560.
100	208/220	5	H1630	2178.	W53	2628.
	440 550	4	H1605 H1608	1320.	W49 W50	1560.
125	208/220	6	W1	3740.	---	---
	440 550	5	H1631 H1634	2094.	W54 W55	2544.
150	208/220	6	W2	3902.	---	---
	440 550	5	H1632 H1635	2094.	W56 W57	2544.
200	208/220	6	W3	4044.	---	---
	440 550	5	H1633 H1636	2372.	W58 W59	2822.
250	208/220	7	W7	6948.	---	---
	440-550	6	W4	3934.	---	---
300	208/220	7	W8	7422.	---	---
	440-550	6	W5	4166.	---	---
400	208/220	7	W9	8396.	---	---
	440-550	6	W6	4288.	---	---
500	440-550	7	W10	7486.	---	---
600	440-550	7	W11	7620.	---	---

- ③ 50 and 25 cycle — use 60 cycle prices, 380 volts 50 cycle — use 440 volt prices.
 ④ 3 or more points of acceleration or high inertia starting on application.
 ⑤ For 3 coil overload relay: Factory assembled 3 coil starters add suffix "T" to catalog number, through size 4 add \$4., size 5 add \$40., size 6 and above add \$70.
 For field conversion from 2 coil to 3 coil, through size 4, use spindle kit 10176H150 — \$2.50 and heater coil — \$1.50.
 NOTE: Prices include necessary heater coils at \$1.50 each.

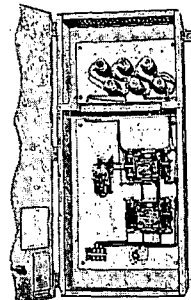
HEATER COILS for starters in NEMA 1 enclosure, for average 60 cycle 1800 R.P.M. motors.

H.P.	Catalog Numbers		
	208/220 Volts	440 Volts	550 Volts
2	10177- H1033	10177- H1027	10177- H1026
3	H1036	H1030	H1029
5	H1041	H1034	H1032
7½	H1044	H1038	H1036
10	H1046	H1040	H1038
15	H1049	H1043	H1041
20	H1050	H1045	H1044
25	H1052	H1047	H1045
30	H1055	H1048	H1046
40	H1056	H1050	H1048
50	H1058	H1052	H1050
60	H1025	H1052	H1050
75	H1066	H1055	H1052
100	H1029	H1058	H1056

For more accurate selection and for other enclosures select heater coils by full load current. See index on page 280.

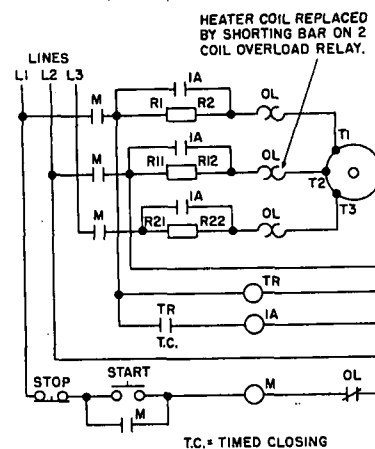


Size 1



Size 3

TYPICAL WIRING DIAGRAM



Non-Reversing

OPTIONAL FEATURES, page 129

DIMENSIONS, next page

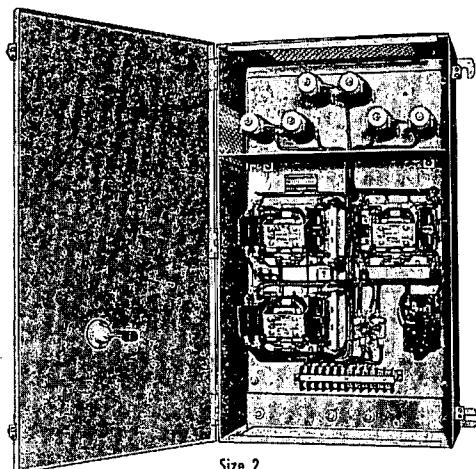
DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER



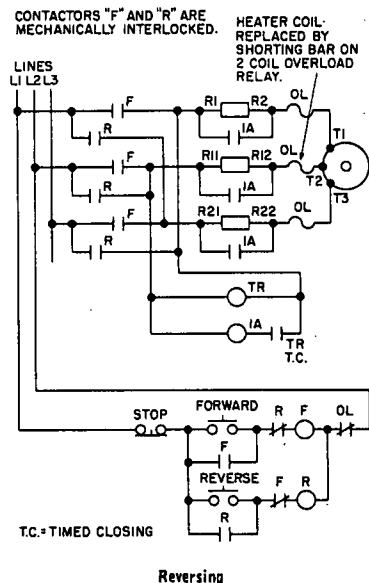
A-C REDUCED VOLTAGE-MAGNETIC

3 Phase Primary Resistance Starters



Size 2
Reversing Starter

TYPICAL WIRING DIAGRAM



REVERSING - 2 POINT - DEFINITE TIME ACCELERATION NEMA CLASS 116 RESISTOR

H.P. 60 Cycles ③	Volts	NEMA Size	General Purpose NEMA 1		Dusttight— Industrial NEMA 5-12	
			Cat. No.	Price	Cat. No.	Price
2 COIL OVERLOAD RELAY						
5	208/220 440 550	1	9674- W7 W8 W9	\$430.	9674- W46 W47 W48	\$580.
7½	208/220 440 550	1	W10 W11 W12	440.	W49 W50 W51	590.
10	208/220	2	W15	814.	W54	994.
	440 550	1	W13 W14	460.	W52 W53	610.
15	208/220 440 550	2	W16 W17 W18	844.	W55 W56 W57	1024.
	208/220	3	W23	1016.	W62	1206.
20	440 550	2	W19 W20	878.	W58 W59	1058.
	208/220	3	W24	1026.	W63	1216.
25	440 550	2	W21 W22	898.	W60 W61	1078.
	208/220 440 550	3	W25 W26 W27	1054.	W64 W65 W66	1244.
40	208/220	4	W32	2198.	W71	2438.
	440 550	3	W28 W29	1078.	W67 W68	1268.
50	208/220	4	W33	2198.	W72	2438.
	440 550	3	W30 W31	1113.	W69 W70	1303.
60	440 550	4	W34 W35	2222.	W73 W74	2462.
75	440 550	4	W36 W37	2222.	W75 W76	2462.
100	440 550	4	W38 W39	2222.	W77 W78	2462.

3 COIL OVERLOAD RELAY

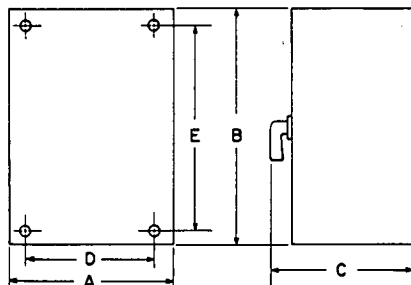
Factory Assembled 3 coil starters add suffix "T" to catalog number, through size 4 add \$4., size 5 add \$40., size 6 and above add \$70.

Field Conversion from 2 coil to 3 coil, through size 4, use spindle kit 10176-H150—\$2.50 and heater coil—\$1.50.

③ 50 and 25 cycle—use 60 cycle prices, 380 volts 50 cycle—use 440 volt prices.

Prices include necessary heater coils at \$1.50 each.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



NEMA Size	NON-REVERSING					REVERSING						
	Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches				Ship. Wt. Lbs.	
	Wide A	High B	③ Deep C	Mounting			Wide A	High B	Deep C	Mounting		
				D	E					D		E
NEMA 1 ENCLOSED												
1	20	32¾	10	18	28	90						
2	22	42¾	10	20	38	150						
3	26	50¾	14¾	24	46	300						
4	30	54¾	14¾	28	50	450						
① 5	28	75	22	---	---	615	On Application					
5	28	87	22	---	---	615						
6	32	96	28	---	---	1350						
② 7	50	83½	37¾	---	---	2300						

① 60 and 75 H.P. 220 volts only

② Size 7 has two doors.

③ Does not include ¾" lock hasp.

DISCOUNT SCHEDULE ICD

OPTIONAL FEATURES, page 129

CUTLER-HAMMER

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS



A-C REDUCED VOLTAGE-MAGNETIC

3 Phase Non-Reversing Part Winding Starters

WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency
- Heater Coil number or full load current.

FOR USE WITH WYE CONNECTED PART WINDING MOTORS ϕ

Maximum Horsepower 60-50-25 Cycles			NEMA Size	General Purpose NEMA 1		Watertight NEMA 4		Dusttight— Industrial NEMA 5-12		Hazardous Gas NEMA 7-D		Hazardous Dust NEMA 9-EFG	
208/220 Volts	440 Volts	550 Volts		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
TWO - 2 COIL OVERLOAD RELAYS - RESET ONLY													
15	20	20	1 PW	9612- H30	\$225.	9612- W3	\$345.	9612- W12	\$325.	9612- W21	\$455.	9612- W24	\$357.
30	50	50	2 PW	H32	318.	W4	453.	W13	443.	W22	660.	W25	516.
60	100	100	3 PW	H34	446.	W5	641.	W14	596.	W23	1008.	W26	710.
100	200	200	4 PW	H95	947.	W6	1254.	W15	1147.	W28	2130.	W27	1337.
200	---	---	5 PW	H121	1900.	W7	2470.	W16	2350.	---	---	---	---
---	400	---	5 PW	H122	1900.	W8	2470.	W17	2350.	---	---	---	---
---	---	400	5 PW	H123	1900.	W9	2470.	W18	2350.	---	---	---	---
400	800	800	6 PW	W1	4127.	W10	4627.	W19	4397.	---	---	---	---
600	1200	1200	7 PW	W2	6165.	W11	6665.	W20	6435.	---	---	---	---

TWO - 3 COIL OVERLOAD RELAYS - RESET ONLY

Factory Assembled 3 coil starter, add suffix "T" to catalog number, through size 4 add \$8., size 5 add \$80., size 6 and above add \$140.

Field Conversion from 2 coil to 3 coil, through size 4, use spindle kit 10176-H150—\$2.50 per relay, and heater coil—\$1.50 per overload relay.

For 380 volts 50 cycle use 440 volt prices
Prices include necessary heater coils at \$1.50 each.

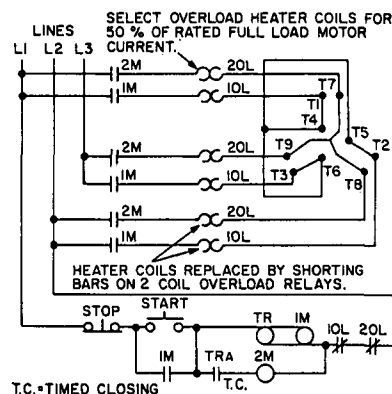
② Contact factory for delta connected motor starters.

HEATER COILS for starters in NEMA 1 enclosures, for average 60 cycle 1800 R.P.M. motors

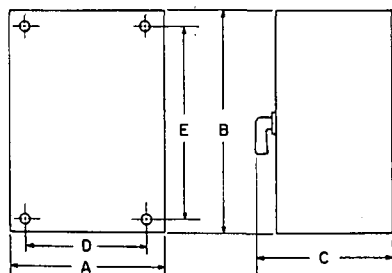
Horsepower	Catalog Numbers			Horsepower	Catalog Numbers		
	208/220 Volts	440 Volts	550 Volts		208/220 Volts	440 Volts	550 Volts
5	10177-H1034	10177-H1028	10177-H1066	30	10177-H1049	10177-H1043	10177-H1041
7½	H1038	H1032	H1030	40	H1050	H1045	H1043
10	H1040	H1034	H1032	50	H1052	H1047	H1045
15	H1043	H1037	H1036	60	H1054	H1047	H1046
20	H1045	H1040	H1038	75	H1055	H1049	H1047
25	H1047	H1041	H1039	100	H1058	H1052	H1049

For more accurate selection and for other enclosures select heater coils by full load current. See index on page 280.

TYPICAL WIRING DIAGRAM



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



NEMA Size	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	③ Deep C	Mounting		
				D	E	
NEMA 1 ENCLOSURE						
1 PW	16½	22¾	7¾	13½	20	50
2 PW	18½	30¾	9¾	15½	28	110
3 PW	22¾	30¾	9¾	19½	28	145
4 PW	26¾	34¾	9¾	23½	32	200
5 PW	28	60	21 1/8	Floor Mounting		470
6 PW	32	72	34½	Floor Mounting		1500
① 7 PW	48	72	40½	Floor Mounting		2500

① Size 7 PW has two doors

② Does not include ¾" lock hasp.

OPTIONAL FEATURES, page 129

CUTLER-HAMMER

DISCOUNT SCHEDULE 1CD



A-C REDUCED VOLTAGE-MAGNETIC

123

3 Phase Non-Reversing Wye-Delta Motor Starters

WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency
- Heater Coil number or full load current.

FOR USE WITH 6 LEAD WYE-DELTA MOTORS

Maximum Horsepower 60-50-25 Cycles		NEMA Size	General Purpose NEMA 1		Watertight NEMA 4		Dusttight—Industrial NEMA 5-12		Hazardous Gas NEMA 7-D		Hazardous Dust NEMA 9-EFG	
208/220 Volts	440-550 Volts		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
OPEN TRANSITION — 3 COIL OVERLOAD RELAY — RESET ONLY												
10	15	1 YD	9615-H1	\$348.	9615-W5	\$468.	9615-W13	\$448.	9615-W21	\$813.	9615-W24	\$508.
25	40	2 YD	H3	411.	W6	546.	W14	536.	W22	1011.	W25	636.
50	75	3 YD	H5	596.	W7	791.	W15	746.	W23	1253.	W26	906.
75	150	4 YD	H7	1238.	W8	1545.	W16	1438.	W27	1958.	W27	1683.
150	300	5 YD	W1	2222.	W9	2792.	W17	2672.	---	---	---	---
300	600	6 YD	W2	5089.	W10	5589.	W18	5359.	---	---	---	---
500	1000	7 YD	W3	7876.	W11	8376.	W19	8146.	---	---	---	---
750	1500	8 YD	W4	8990.	W12	9490.	W20	9260.	---	---	---	---

CLOSED TRANSITION — 3 COIL OVERLOAD RELAY — RESET ONLY																	
Max. H.P. 208/220 Volts	General Purpose NEMA 1		Max. H.P. 208/220 Volts	General Purpose NEMA 1		Max. H.P. 208/220 Volts	General Purpose NEMA 1		Max. H.P. 440-550 Volts	General Purpose NEMA 1		Max. H.P. 440-550 Volts	General Purpose NEMA 1		Max. H.P. 440-550 Volts	General Purpose NEMA 1	
	Cat. No.	Price		Cat. No.	Price		Cat. No.	Price		Cat. No.	Price		Cat. No.	Price		Cat. No.	Price
15	9615-W28	\$529.	60	9615-W33	\$1571.	300	9615-W38	\$6285.	15	9615-W43	\$529.	100	9615-W50	\$1683.	600	9615-W56	\$6541.
25	W29	598.	75	W34	1619.	400	W39	9492.	25	W44	598.	150	W51	1707.	750	W57	9660.
30	W30	802.	100	W35	2698.	500	W40	9608.	30	W45	598.	250	W52	2788.	800	W58	10203.
40	W31	824.	150	W36	2722.	600	W41	10930.	40	W46	620.	300	W53	2939.	1000	W59	10384.
50	W32	824.	250	W37	6150.	750	W42	11218.	50	W47	824.	400	W54	6406.	1250	W60	11578.
									60	W48	848.	500	W55	6485.	1500	W61	12716.
									75	W49	931.						

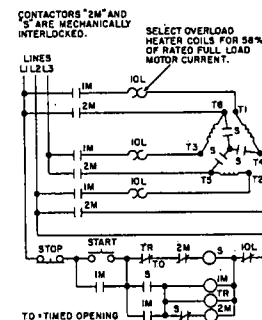
Prices include necessary heater coils at \$1.50 each. 3 coil overload Relays required for full Protection of Y-Δ motors.

HEATER COILS for starters in NEMA 1 enclosures, for average 60 cycle 1800 R.P.M. motors

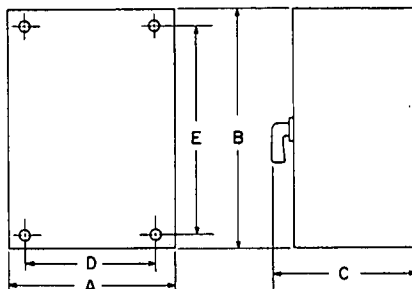
Horsepower	Catalog Numbers			Horsepower	Catalog Numbers		
	208/220 Volts	440 Volts	550 Volts		208/220 Volts	440 Volts	550 Volts
7½	10177-H1039	10177-H1033	10177-H1031	40	10177-H1052	10177-H1047	10177-H1044
10	H1041	H1035	H1033	50	H1054	H1047	H1045
15	H1044	H1038	H1036	60	H1054	H1048	H1047
20	H1047	H1041	H1038	75	H1056	H1050	H1048
25	H1048	H1042	H1040	100	---	H1052	H1050
30	H1049	H1044	H1042				

For more accurate selection and for other enclosures select heater coils by full load current. See index on page 280.

TYPICAL WIRING DIAGRAM



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



NEMA Size	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	⌀ Deep C	Mounting		
				D	E	
NEMA 1 ENCLOSURES						
1 YD	16½	22¼	7¼	13½	20	50
2 YD	22¾	30¾	9¼	19½	28	110
3 YD	26¾	34¾	9¼	23½	32	150
4 YD	26¾	42¾	9¼	23½	40	215
5 YD	32	84	26	Floor Mounting		500
6 YD	48	84	34	Floor Mounting		1650
7 YD	112	84	38	Floor Mounting		2510
8 YD	128	84	38	Floor Mounting		On Appl.

⊗ Does not include ¾" lock hasp.

DISCOUNT SCHEDULE 1C0

OPTIONAL FEATURES, page 129

CUTLER-HAMMER

123

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

A-C REDUCED VOLTAGE-MAGNETIC**3 Phase Non-Reversing Auto Transformer Motor Starters**

WHEN ORDERING SPECIFY:

• Catalog number

• Voltage and frequency

• Heater coil number or full load current.

CLOSED TRANSITION — 2 POINT ACCELERATION

Max. H.P. 60 Cycles	Volts	NEMA Size	General Purpose NEMA 1		Watertight NEMA 4		Dusttight— Industrial NEMA 5-12		Hazardous Gas NEMA 7-D		Hazardous Dust NEMA 9-EFG	
			Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
2 COIL OVERLOAD RELAY - RESET ONLY												
15	208/220 440 550	2	9621- H625 H627 H628	\$570.	9621- W9 W10 W11	\$880.	9621- W27 W28 W29	\$750.	9621- W45 W46 W47	\$1563.	9621- W57 W58 W59	\$880.
25	208/220	3	H631	670.	W12	980.	W30	860.	W48	1663.	W60	980.
	440 550	2	H627 H628	570.	W10 W11	880.	W28 W29	750.	W46 W47	1563.	W58 W59	880.
30	208/220 440 550	3	H632 H635 H637	698.	W13 W14 W15	1008.	W31 W32 W33	888.	W49 W50 W51	1691.	W61 W62 W63	1008.
50	208/220	4	H643	1296.	W18	1866.	W36	1536.	W54	2685.	W66	1866.
	440 550	3	H636 H638	722.	W16 W17	1032.	W34 W35	912.	W52 W53	1715.	W64 W65	1032.
75	208/220	5	H670	2022.	W21	2592.	W39	2472.	---	---	---	---
	440 550	4	H644 H645	1320.	W19 W20	1890.	W37 W38	1560.	W55 W56	2709.	W67 W68	1890.
100	208/220	5	H671	2178.	W22	2748.	W40	2628.	---	---	---	---
	440 550	4	H644 H645	1320.	W19 W20	1890.	W37 W38	1560.	W55 W56	2709.	W67 W68	1890.
125	208/220	6	H580	3740.	---	---	---	---	---	---	---	---
	440 550	5	H672 H674	2094.	W23 W24	2664.	W41 W42	2544.	---	---	---	---
150	208/220	6	H581	3902.	---	---	---	---	---	---	---	---
	440 550	5	H672 H674	2094.	W23 W24	2664.	W41 W42	2544.	---	---	---	---
200	208/220	6	H582	4044.	---	---	---	---	---	---	---	---
	440 550	5	H673 H675	2372.	W25 W26	2942.	W43 W44	2822.	---	---	---	---
250	208/220	7	W1	6948.	---	---	---	---	---	---	---	---
	440 550	6	H583 H586	3934.	---	---	---	---	---	---	---	---
300	208/220	7	W2	7422.	---	---	---	---	---	---	---	---
	440 550	6	H584 H587	4166.	---	---	---	---	---	---	---	---
400	208/220	8	W5	8396.	---	---	---	---	---	---	---	---
	440 550	6	H585 H588	4288.	---	---	---	---	---	---	---	---
450	208/220	8	W69	9028.	---	---	---	---	---	---	---	---
500	440-550	7	W3	7486.	---	---	---	---	---	---	---	---
600	440-550	7	W4	7620.	---	---	---	---	---	---	---	---
700	440-550	8	W6	8010.	---	---	---	---	---	---	---	---
800	440-550	8	W7	8112.	---	---	---	---	---	---	---	---
900	440-550	8	W8	8521.	---	---	---	---	---	---	---	---

3 COIL OVERLOAD RELAY—RESET ONLY

Factory Assembled 3 coil starter, add suffix "T" to catalog number, through Size 4, add \$4., Size 5 add \$40. Size 6 and above add \$70.

Field Conversion from 2 coil to 3 coil, through Size 4, use spindle kit 10176-H150—\$2.50 and heater coil—\$1.50.

50 cycle—use 60 cycle price. 380V. 50 cycle use 440 volt price.
25 cycle—prices on application.

Prices include necessary heater coils at \$1.50 each.

OPTIONAL FEATURES, page 129

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER



A-C REDUCED VOLTAGE-MAGNETIC

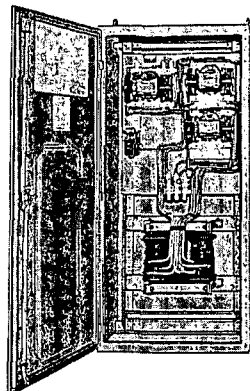
3 Phase Non-Reversing Auto Transformer Motor Starters

DESCRIPTION

GENERAL INFORMATION

Starters are closed transition with two point definite time acceleration.

Auto-transformers are tapped at 50%, 65% and 80% of full line voltage and are connected to the 80% tap at the factory unless otherwise specified.



Size 4—NEMA 1 Enclosed



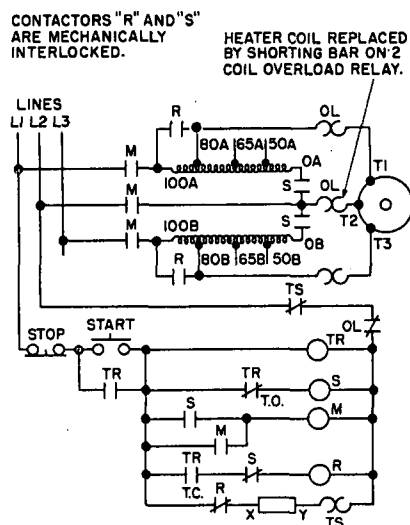
Size 5—NEMA 1 Enclosed

HEATER COILS for starters in NEMA 1 enclosure for average 60 cycle 1800 R.P.M. motors

Horse Power	CATALOG NUMBERS		
	208/220 Volts	440 Volts	550 Volts
5	10177-H1040	10177-H1034	10177-H1032
7½	H1044	H1038	H1036
10	H1045	H1040	H1038
15	H1049	H1043	H1041
20	H1050	H1045	H1044
25	H1052	H1047	H1045
30	H1054	H1048	H1046
40	H1056	H1050	H1048
50	H1058	H1052	H1050
60	H1025	H1052	H1050
75	H1066	H1055	H1052
100	H1029	H1058	H1056

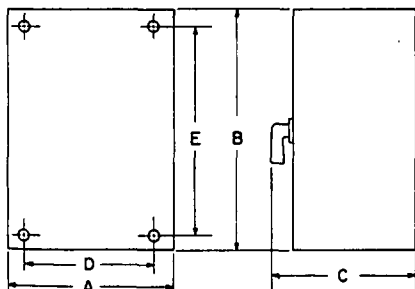
For more accurate selection, and for other enclosures, select heater coils by full load current. See index on page 280.

TYPICAL WIRING DIAGRAM



T.O. = TIMED OPENING
T.C. = TIMED CLOSING

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



NEMA Size	Dimensions in Inches					Ship. Wt. Lbs.	Number of Doors
	Wide A	High B	Deep C	Mounting			
				D	E		
NEMA 1 ENCLOSURE - WALL MOUNTED							
2	20%	47	9%	13	45	290	1
3	24%	48	11%	14	46	365	1
NEMA 1 ENCLOSURE - FLOOR MOUNTED							
4	28	60	21%	---	---	675	1
5	28	84	21%	---	---	940	1
6	48	84	34%	---	---	1800	2
7	84	84	38½	---	---	3000	3
8	112	84	38½	---	---	4500	4

A-C REDUCED VOLTAGE-MANUAL

3 Phase Non-Reversing Starters

WHEN ORDERING SPECIFY:

- Catalog number
- Heater coil number or full load current.
- Voltage and frequency

AUTO TRANSFORMER TYPE

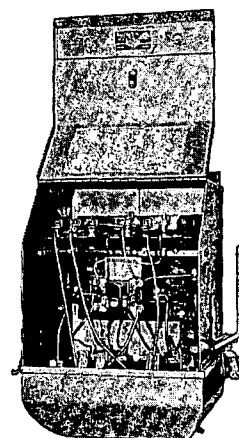
Ratings 60 Cycles		General Purpose Enclosure			Special Service Enclosures				
Horse Power	Volts	Size	NEMA 1		Size	Water — Dusttight NEMA 4-5		Hazardous Dust NEMA 9-EFG	
			Cat. No.	Price		Cat. No.	Price	Cat. No.	Price
10	208/220 440 550	A	9141- H2066 H2071 H2077	\$375.	B	9141- H2465 H2471 H2479	\$854.	9141- H2535 H2541 H2549	\$854.
15	208/220 440 550	A	H2067 H2072 H2078	375.	B	H2466 H2472 H2480	854.	H2536 H2542 H2550	854.
20	208/220 440 550	A	H2068 H2073 H2079	393.	B	H2467 H2473 H2481	872.	H2537 H2543 H2551	872.
25	208/220 440 550	A	H2069 H2074 H2080	393.	B	H2468 H2474 H2482	872.	H2538 H2544 H2552	872.
30	208/220 440 550	A	H2070 H2075 H2081	407.	B	H2469 H2475 H2483	886.	H2539 H2545 H2553	886.
40	208/220	B	H2303	710.	B	H2470	1480.	H2540	1480.
	440 550	A	H2076 H2082	429.	B	H2476 H2484	908.	H2546 H2554	908.
50	208/220	C	H2259	710.	C	H2620	1480.	H2640	1480.
	440 550	B	H2306 H2308	429.	B	H2477 H2485	908.	H2547 H2555	908.
60	208/220	C	H2261	765.	C	H2621	1535.	H2641	1535.
	440 550	B	H2307 H2309		B	H2478 H2486		H2548 H2556	
75	208/220	D	H2378	765.	① C	X12	1535.	X13	1535.
	440 550	C	H2264 H2266		C	H2622 H2624		H2642 H2644	
100	208/220	D	H2605	1155.	① C	X14	2045.	X15	2045.
	440 550	C	H2265 H2267	765.	C	H2623 H2625	1535.	H2643 H2645	1535.
125	208/220	D	H2606	1155.		---	---	---	---
	440 550	D	H2381 H2383	831.	① C	X16 H2660	1601.	X17 H2662	1601.
150	440 550	D	H2382 H2384	831.	① C	X18 X20	1601.	X19 X21	1601.
200	440 550	E	X24 X25	1265.	---	---	---	---	---
250	440 550	E	X24 X25	1265.	---	---	---	---	---

50 cycles—use 60 cycle prices, 25 cycles—prices on request, 380 volts 50 cycles—use 440 volt prices
Medium voltage (2200 volts) prices on request.
Prices include necessary heater coils at \$1.50 each.

① Requires a separate enclosure for the auto transformer

OPTIONAL FEATURES, page 129

CUTLER-HAMMER



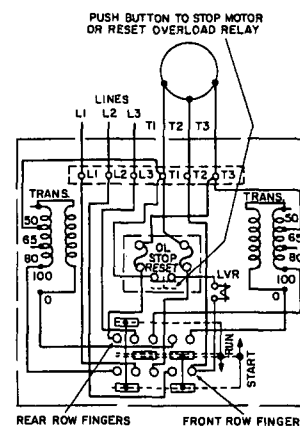
NEMA Type 1 with Door Open

HEATER COILS for Auto Transformer type in NEMA 1 enclosure for average 60 cycle 1800 R.P.M. motors

H.P.	208/220 Volts	440 Volts	550 Volts
5	9586- H1374	9586- H1366	9586- H1364
7½	H1378	H1370	H1368
10	H1380	H1373	H1370
15	H1384	H1377	H1374
20	H1387	H1379	H1377
25	H1389	H1382	H1379
30	H1800	H1384	H1381
40	H238	H1387	H1384
50	H239	H234	H54
60	H240	H235	H55
75	H242	H237	H235
100	H1355	H239	H237

For more accurate selection and for other enclosures, select heater coils by full load current. See index on page 280.

TYPICAL WIRING DIAGRAM



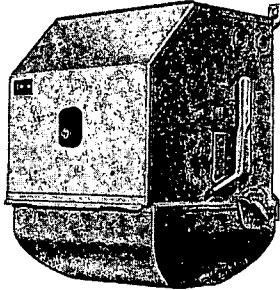
Auto Transformer Type

DISCOUNT SCHEDULE 1CD

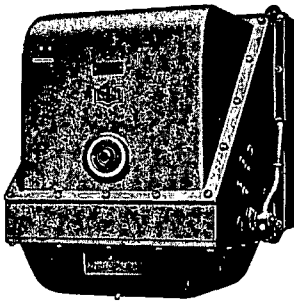


A-C REDUCED VOLTAGE-MANUAL

3 Phase Non-Reversing Starters

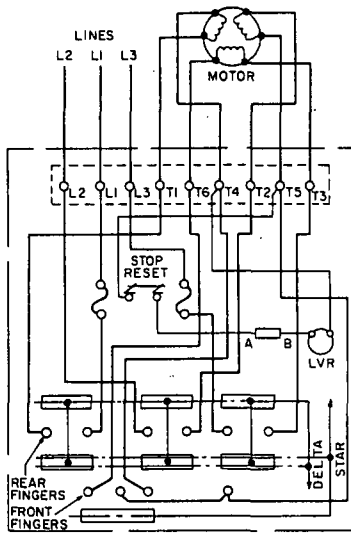


NEMA 1



NEMA 4-5, 9EFG

TYPICAL WIRING DIAGRAM



WYE-DELTA TYPE

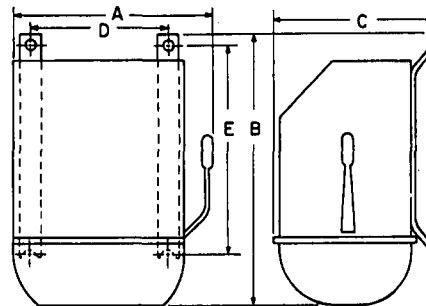
WYE - DELTA TYPE — For use with 6 lead motors.

Heater coil selection specify full load current

Ratings 60-50 Cycles		General Purpose Enclosure			Special Service Enclosures				
		Size	NEMA 1		Size	Water-Dusttight NEMA 4-5		Hazardous Dust NEMA 9-EFG	
Horse-power	Volts		Cat. No.	Price		Cat. No.	Price	Cat. No.	Price
10	208/220-440-550	A	9141-W1	\$300.	B	9141-W16	\$750.	9141-W28	\$750.
15	208/220-440-550	A	W2	300.	B	W17	750.	W29	750.
20	208/220-440-550	A	W3	300.	B	W18	750.	W30	750.
25	208/220-440-550	A	W4	300.	B	W19	750.	W31	750.
30	208/220-440-550	A	W5	300.	B	W20	750.	W32	750.
40	208/220	B	W6	300.	C	W21	1025.	W33	1025.
40	440-550	A	W7	300.	B	W22	750.	W34	750.
50	208/220	D	W8	430.	C	W23	1288.	W35	1288.
50	440-550	B	W9	300.	C	W24	750.	W36	750.
60	208/220-440-550	D	W10	430.	C	W25	1288.	W37	1288.
75	208/220	D	W11	484.	---	---	---	---	---
75	440-550	D	W12	430.	C	W26	1288.	W38	1288.
100	208/220	D	W13	640.	---	---	---	---	---
100	440-550	D	W14	430.	C	W27	1288.	W39	1288.
125	440-550	D	W15	484.	---	---	---	---	---

380 Volts 60 cycles—use 440 volt prices
Prices include necessary heater coils at \$1.50 each.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS OF AUTO TRANSFORMER AND WYE - DELTA TYPES



NEMA 1							
Size	Dimensions in Inches					Shipping Weight Lbs.	
	Wide A	High B	Deep C	Mounting			
				D	E	Auto Transf.	WYE-Delta
A	18%	22%	18	12	16	175	On Appli- cation
B	20%	25%	19%	13%	19	200	
C	22%	30%	20%	14%	24	325	
D	26%	33%	23%	19%	27	625	
E	28	44%	13	11%	32	400	
NEMA 4-5 & 9 E F G							
B	22	25%	22%	15	20%	450	On Appli- cation
C	25	27%	23%	16	22%	750	

A-C REDUCED VOLTAGE-MANUAL



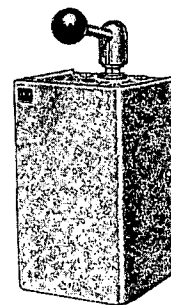
3 Phase-Non Reversing-Reversing-Drum Type

WHEN ORDERING SPECIFY

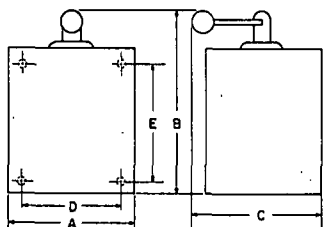
- Catalog number
- Wye-Delta type include voltage and frequency
- Primary resistor type include horsepower, voltage, locked rotor current and power factor.

NON-REVERSING WYE-DELTA— For use with 6 lead motors

Maximum Horsepower 60-50 Cycles		Size	General Purpose NEMA 1	
208/220 Volts	440-550 Volts		Cat. No.	Price
5	7½	1	9489- H5	\$25.
15	25	2	H11	72.
25	50	3	H12	110.



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Size	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting		
				D	E	
1	3¾	10½	4¾	2¾	6¾	5
2	6¼	9¾	6½	5	6	15
3	7¾	15½	7¾	5	11¾	20

REVERSING PRIMARY RESISTOR

Maximum Horsepower Intermittent Duty		Control Points	Type of Interlock ①	Surface Mounting—General Purpose NEMA 1			
220 Volts	380-550 Volts			Catalog Numbers			Price
				Standard Lever		Rope Drive Momentary	
				Maintained	Momentary		
DRUM SWITCH WITHOUT RESISTOR							
10	10	5	None L M	9445- H10 H13 H16	9445- H11 H14 H17	9445- H12 H15 H18	\$282.

RESISTORS FOR USE WITH PRIMARY RESISTOR TYPE

Horse- power	Mounting	NEMA Class	Price
1-3	Open	156	\$56.
5			74.
7½-10			92.

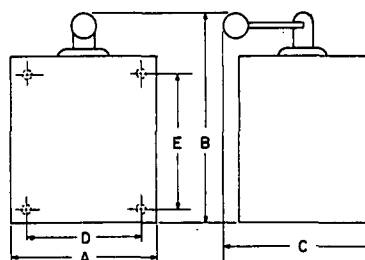
① DESCRIPTION OF INTER- LOCK TYPE

None—For use with series
limit switch connections

L— Requires magnetic starter,
provides pilot circuit limit
switch protection, drum pro-
tection and low voltage re-
lease

M— Requires magnetic starter,
provides low voltage protec-
tion, starter can only be
picked up on "off" position

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Type	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting		
				D	E	
Std. Lever Rope	7 7	13¾ 17¾	8¾ 7¾	5½ 5½	7¼ 7¼	35 50

Dimensions of separately mounted resistor on application.

Dimensions of separately mounted resistor
on application.



A-C REDUCED VOLTAGE—MAGNETIC and MANUAL

129

OPTIONAL FEATURES—MAGNETIC CONTROL

Item	Description	Addition or Deduction	Size					
			1	2	3	4	5	6-7-8
1	Start, Stop pushbutton or Run-Off-Auto selector switch in cover of NEMA 1.....	Addition	\$50.	\$50.	\$50.	\$50.	\$50.	\$50.
2	Separate control circuit.....		N/C	N/C	N/C	N/C	N/C	N/C
3	Control circuit transformer—single and dual primary— fused secondary.....	60-50 cycles	48.	62.	78.	88.	98.	98.
		25 cycles	72.	93.	117.	132.	147.	147.
4	Substitute magnetic overload relay— Automatic Reset.....	Addition	---	33.	33.	33.	N/C	N/C
		Hand Reset.....	Addition	---	38.	38.	5.	5.
		Instant Trip.....	Addition	---	44.	44.	11.	11.
5	Extra auxiliary contacts, normally open or normally closed, maximum of 3— Factory installed.....	Addition	11.	32.	32.	32.	32.	32.
6	Extra auxiliary contact kits—For field installation.....		See table below					
7	Omission of NEMA 1 enclosure—Catalog No. 9605 & 9674.....	Deduction	10.	24.	76.	110.	222.	500.
		Catalog No. 9612.....	Deduction	6.	16.	28.	52.	110.
		Catalog No. 9615.....	Deduction	10.	24.	76.	110.	222.
		Catalog No. 9621.....	Deduction	---	62.	76.	110.	222.

AUXILIARY CONTACT KITS (Field installation)

Contacts	Catalog Numbers				Price
	Size 1	Size 2	Size 3	Size 4 & 5	
Normally Open.....	10933-H1	10933-H7	10933-H7	10933-H7	\$6.
Normally Closed.....	H3	H8	H9	H21	6.

A maximum of 2 normally closed contacts may be added each contactor.

OPTIONAL FEATURES—MANUAL CONTROL

Maximum Horsepower 60-50 Cycles		Price Additions				
		Load Meter Attachment for NEMA 1	Gasketed or Drip Proof Construction	3 Coil Overload Relay	Extra Auxiliary Contacts	Time Delay Undervoltage Protection NEMA 1
208/220 Volts	440-550 Volts					
30	50	\$198.	\$66.	\$4.	\$35.	\$94.
50	100	198.	110.	4.	35.	94.
75	150	198.	110.	40.	35.	94.
125	---	198.	110.	40.	35.	Std.
---	250	198.	---	186.	35.	Std.

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

A-C MULTISPEED—MAGNETIC**3 Phase-Full Voltage-Non Reversing Starters****WHEN ORDERING SPECIFY**

- Catalog number
- Voltage and frequency
- Heater coil number, or full load current for each speed (see page 280.)

FORM 1 SELECTIVE—RECONNECTABLE

No. of Speeds	Maximum Horsepower 60-50-25 Cycles				NEMA Size	General Purpose NEMA 1			Watertight NEMA 4			Dusttight—Industrial NEMA 5-12		
	Constant or Variable Torque		Constant Horsepower			Constant or Variable Torque	Constant Horse- power	Price	Constant or Variable Torque	Constant Horse- power	Price	Constant or Variable Torque	Constant Horse- power	Price
	208/220 Volts	440-550 Volts	208/220 Volts	440-550 Volts										
	Cat. No.	Cat. No.	Cat. No.	Cat. No.		Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.	Cat. No.
SINGLE WINDING—TWO 2 COIL OVERLOAD RELAYS														
2 Speed	3 7½ 15	5 10 25	1½ 3 10	2 5 20	0 1 2	9739- H1091 H1083 H1097	9739- H1090 H1081 H1095	\$160. 172. 308.	9739- W1 W6 W10	9739- W80 W81 W82	\$256. 266. 424.	9739- W2 W7 W11	9739- W86 W87 W88	\$191. 203. 352.
	30 50 100	50 100 200	20 30 75	40 60 150	3 4 5	H1220 H1372 W22	H1218 H1371 W23	462. 1224. 2336.	W14 W18 W24	W83 W84 W85	634. 1576. 3159.	W15 W19 W25	W89 W90 W91	562. 1422. 3159.
① TWO WINDINGS—THREE 2 COIL OVERLOAD RELAY														
3 Speed	3 7½ 15 30 50	5 10 25 50 100	1½ 3 10 20 30	2 5 20 40 60	0 1 2 3 4	9741- W1 W5 W9 W13 W17	9741- W21 W22 W23 W24 W25	\$408. 430. 636. 914. 2214.	9741- W2 W6 W10 W14 W18	9741- W26 W27 W28 W29 W30	\$540. 562. 790. 1122. 2620.	9741- W3 W7 W11 W15 W19	9741- W31 W32 W33 W34 W35	\$484. 506. 722. 1028. 2442.
① TWO WINDING—FOUR 2 COIL OVERLOAD RELAYS														
4 Speed	3 7½ 15 30 50	5 10 25 50 100	1½ 3 10 20 30	2 5 20 40 60	0 1 2 3 4	9742- W1 W5 W9 W13 W17	9742- W21 W22 W23 W24 W25	\$606. 644. 954. 1420. 3342.	9742- W2 W6 W10 W14 W18	9742- W26 W27 W28 W29 W30	\$774. 814. 1146. 1666. 3786.	9742- W3 W7 W11 W15 W19	9742- W31 W32 W33 W34 W35	\$704. 744. 1064. 1562. 3628.

2 SPEED—FORM 1 SELECTIVE—SEPARATE WINDING

Maximum Horsepower 60-50-25 Cycles				NEMA Size	General Purpose NEMA 1		Watertight NEMA 4		Dusttight— Industrial NEMA 5-12		Hazardous Locations				Open Type—110V. Separate Control		
Constant or Variable Torque		Constant Horsepower									Gas NEMA 7-D		Dust NEMA 9-EFG		Horiz- ontal	Verti- cal	Price
208/220 Volts	440-550 Volts	208/220 Volts	440-550 Volts		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Cat. No.	
② TWO 2 COIL OVERLOAD RELAYS																	
3	5	1½	2	0	9736- H637	\$116.	9736- W1	\$212.	9736- W2	\$147.	9736- ---	---	9736- W3	\$248.	9736- W4	9736- W6	\$112.
7½	10	3	5	1	H638	130.	W8	224.	W9	161.	W10	\$323.	W11	262.	W12	W14	124.
15	25	10	20	2	H641	228.	W16	346.	W17	272.	W18	510.	W19	426.	H754	H755	212.
30	50	20	40	3	H693	354.	W24	526.	W25	454.	W26	773.	W27	618.	---	H753	326.
50	100	30	60	4	H748	860.	W30	1212.	W31	1058.	---	---	---	---	---	W32	808.
100	200	75	150	5	W34	1945.	W36	2768.	W37	2768.	---	---	---	---	---	W38	1824.

3 COIL OVERLOAD RELAYS

Option	Add Suffix Letter to Cat. No.	Price Addition		
		Two Speed	Three Speed	Four Speed
Factory Assembled NEMA Size 0-4 5	T T	\$8. 80.	\$12. ---	\$16. ---
Field Conversion NEMA Size 0-4	2 coil to 3 coil use spindle kit 10176H150—\$2.50 and Heater coil—\$1.50 for each overload relay.			

CONTROL CONVERSIONS

Option	Price Addition		
	2-Speed	3-Speed	4-Speed
Form 2 — Compelling	\$66.	\$66.	\$66.
Form 3 — Progressive	154.	308.	462.
Automatic Decelerating Relay	154.	308.	462.

① For motors with open delta windings, prices on application.

② For motors with open delta windings, order by description, use reconnectable price.

OPTIONAL FEATURES, page 134

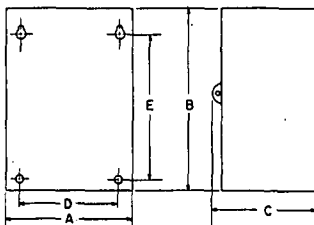
CUTLER-HAMMER

DISCOUNT SCHEDULE **ICD**

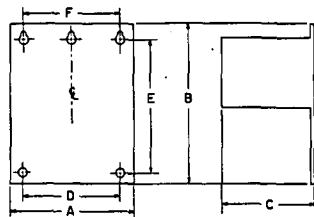
**A-C MULTISPEED—MAGNETIC****3 Phase-Full Voltage-Non Reversing Starters****FORM 1 SELECTIVE—RECONNECTABLE**

Hazardous Locations						Open Type—110V. Separate Control					
Gas NEMA 7-D			Dust NEMA 9-EFG			Horizontal		Vertical		Price	
Constant or Variable Torque	Constant Horsepower	Price	Constant or Variable Torque	Constant Horsepower	Price	Constant or Variable Torque	Constant Horsepower	Constant or Variable Torque	Constant Horsepower		
Cat. No.	Cat. No.		Cat. No.	Cat. No.		Cat. No.	Cat. No.	Cat. No.	Cat. No.		Cat. No.
Cat. No.	Cat. No.		Cat. No.	Cat. No.		Cat. No.	Cat. No.	Cat. No.	Cat. No.		Cat. No.
SINGLE WINDING—TWO 2 COIL OVERLOAD RELAYS											
9739- W8 W12	9739- W92 W93	--- \$382. 719.	9739- W3 W9 W13	9739- W95 W96 W97	\$292. 304. 506.	9739- H1394 H1404 H1400	9739- H1393 H1403 H1399	9739- W4 H1392 H1406	9739- W5 H1391 H1405	\$156. 166. 290.	
W16	W94	1126.	W17	W98	726.	H1410	H1409	H1227 W20 W26	H1225 W21 W27	434. 1114. 2119.	
① TWO WINDING—THREE 2 COIL OVERLOAD RELAYS											
		---			---	9741- W36 W37 W38 W39	9741- W41 W42 W43 W44	9741- W4 W8 W12 W16 W20	9741- W46 W47 W48 W49 W50	\$380. 398. 592. 848. 1994.	
① TWO WINDING—FOUR 2 COIL OVERLOAD RELAYS											
		---			---	9742- W36 W37 W38 W39	9742- W40 W41 W42 W43	9742- W4 W8 W12 W16 W20	9742- W44 W45 W46 W47 W48	\$574. 610. 888. 1320. 3012.	

① For motors with open Delta windings, prices on application.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

NEMA 1



OPEN TYPE

NEMA Size	Dimensions in Inches						Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting			
				D	E	F	
2 SPEED — NEMA 1							
0	14½	10½	7½	11½	8½	---	17
1	14½	10½	7½	11½	8½	---	22
2	18½	13½	9½	15	11	---	50
3	16½	27½	9½	13½	24½	---	85
② 4	22½	34½	9½	19½	32	---	170
③ 4	26½	34½	10½	23½	32	---	175
2 SPEED — OPEN TYPE — VERTICAL CONSTRUCTION							
1	9	12	5½	8	11½	8	15
2(9736)	9	17	6½	8	16½	7½	27
2(9739)	9	17	8½	8	16½	7½	27
3	13½	20	7½	11½	19½	---	48
2 SPEED — OPEN TYPE — HORIZONTAL CONSTRUCTION							
0	12½	7	4½	9½	6½	8	13
1	12½	7	5½	9½	6½	8	15
2(9736)	16½	9	6½	13	8	9½	27
2(9739)	16½	9	7½	13	8	9½	27
3	23	12	7½	11½	11	10½	48

② For separate winding

③ For reconnectable

A-C MULTISPEED—MAGNETIC



3 Phase-Full Voltage-Non Reversing Starters with Motor Circuit Switch Fusible and Non-Fusible

WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency
- Heater coil number, or full load current for each speed. (See page 280)
- For fusible, add fuse clip kit

2 SPEED - FORM 1 SELECTIVE NON-FUSIBLE for fusible add fuse clip kit

Maximum Horsepower 60-50-25 Cycles				NEMA Size	General Purpose— NEMA 1			General Purpose— NEMA 1 With Gasketed Cover			Weatherproof— Watertight NEMA 3-4			Dusttight — Industrial — NEMA 5-12 Internal Reset					
Constant or Variable Torque		Constant Horsepower			Constant or Variable Torque	Constant Horse- power	Price	Constant or Variable Torque	Constant Horse- power	Price	Constant or Variable Torque	Constant Horse- power	Price	Without Control Transformer			With 60 Cycle Control Transformer		
														Constant or Variable Torque	Constant Horse- power	Price	Constant or Variable Torque	Constant Horse- power	Price
208/220 Volts	440-550 Volts	208/220 Volts	440-550 Volts	Cat. No.	Cat. No.	Price	Cat. No.	Cat. No.	Price	Cat. No.	Cat. No.	Price	Cat. No.	Cat. No.	Price	Cat. No.	Cat. No.	Price	

RECONNECTABLE—SINGLE WINDING—TWO 2 COIL OVERLOAD RELAYS

3 7½	5 10	1½ 3	2 5	0 1	9739- W28 H1120	9739- W99 H1119	\$254. 266.	9739- W29 W31	9739- W105 W106	\$272. 284.	9739- W32 W111	9739- W112 W112	\$420. 620.	9739- H1152 H1280	9739- H1150 H1278	\$299. 480.	9739- H1156 H1284	9739- H1154 H1282	\$326. 518.
15	25	10	20	2	H1231	H1229	428.	H1232	H1230	454.	W37	W113	939.	W43	W118	725.	W44	W123	781.
30	50	20	40	3	W40	W102	611.	W41	W108	645.	W42	W114	1950.	W48	W119	1760.	W49	W124	1828.
50	100	30	60	4	W45	W103	1434.	W46	W109	1494.	W47								

Maximum Horsepower 60-50-25 Cycles				NEMA Size	General Purpose NEMA 1		General Purpose NEMA 1 With Gasketed Cover		Weatherproof Watertight NEMA 3-4		Dusttight — Industrial — NEMA 5-12					
Constant or Variable Torque		Constant Horsepower			Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Without Control Transformer			With 60 Cycle Control Transformer		
208/220 Volts	440-550 Volts	208/220 Volts	440-550 Volts								External Reset Cat. No.	Internal Reset Cat. No.	Price	External Reset Cat. No.	Internal Reset Cat. No.	Price

① SEPARATE WINDING—TWO 2 COIL OVERLOAD RELAYS

3 7½	5 10	1½ 3	2 5	0 1	9736- W40 H645	\$210. 224.	9736- W41 W43	\$228. 242.	9736- Use Size 1 W44	\$378. 542.	9736- Use Size 1 H661	9736- Use Size 1 H662	\$257. 400.	9736- Use Size 1 H663	9736- Use Size 1 H664	\$284. 438.
15	25	10	20	2	H696	348.	H697	374.	W49	831.	H720	H721	617.	H722	H723	673.
30	50	20	40	3	W52	503.	W53	537.	W54	831.	W55	W95	617.	W56	W97	673.
50	100	30	60	4	W57	1070.	W58	1130.	W59	1586.	W60	W96	1396.	W61	W98	1464.

FUSE CLIP KITS - 3 POLE (3 FUSE)

NEMA Size	② Maximum Horsepower			Fuse Clip Rating		Fuse Clip Kit Not Installed		Fuse Clip Kit Factory Installed	
	Volts	Constant or Variable Torque	Constant Horsepower	Amps.	Volts	Fuse Clip Catalog Number	Price	Add to Starter Cat. No.	Price Addition
0	208/220	3	1½	30	250	10982- H14	\$1.00	—81	\$3.00
	440/550	5	2	30	600	H15	1.50	—91	3.50
1	208/220	7½	3	30	250	H14	1.00	—81	3.00
	208/220	7½	3	60	250	H15	1.50	—82	3.50
2	208/220	15	10	60	250	H16	1.50	—82	4.00
	208/220	15	10	100	250	H18	10.50	—83	13.00
3	208/220	25	20	60	600	H17	3.00	—92	5.50
	208/220	25	20	100	600	H18	10.50	—93	13.00
4	208/220	30	20	200	250	H23	16.00	—84	20.50
	440/550	50	40	100	600	H24	10.50	—93	15.00
4	440/550	50	40	200	600	H25	16.00	—94	20.50
	440/550	100	60	400	250	H26	46.00	—85	51.00
4	440/550	100	60	200	600	H27	16.00	—94	21.00
	440/550	100	60	400	600	H28	46.00	—95	51.00

① For motors with open delta windings, order by description, use reconnectable price.

② Full load current rating must be within contactor rating range. See page 150 for comparable NEMA sizes.
Dimensions on application.

OPTIONAL FEATURES, page 134

CUTLER-HAMMER

3 COIL OVERLOAD RELAYS

Option	Add Suffix Letter to Cat. No.	Price Addition Two Speed
Factory Assembled NEMA Size 0-4	"T"	\$8.
Field Conversion from 2 coil to 3 coil, through size 4 use spindle kit 10176H150 - \$2.50 and Heater Coil—\$1.50 for each overload relay.		

CONTROL CONVERSIONS

Option	Price Addition
Form 2 — Compelling	\$66.
Form 3 — Progressive	154.
— Automatic Decelerating Relay	154.



A-C MULTISPEED—MAGNETIC

133

3 Phase Full Voltage Non-Reversing Starters with Circuit Breaker

WHEN ORDERING SPECIFY

- Catalog number
- Horsepower, voltage and frequency
- Heater coils—Factory selected—Furnish full load current for each speed.

DESCRIPTION

Circuit breakers are adjustable - instantaneous trip magnetic type.

2 SPEED - FORM 1 SELECTIVE

Maximum Horsepower 60-50-25 Cycles				NEMA Size	Circuit Breaker Frame Size	General Purpose NEMA 1		General Purpose NEMA 1 with Gasketed Cover		Weatherproof Watertight NEMA 3-4		Dusttight—Industrial NEMA 5-12				Hazardous Locations	
Constant or Variable Torque		Constant Horsepower										Without Control Transformer		With 60 Cycle Control Transformer		NEMA 7-D 9-EFG	
208/220 Volts	440-550 Volts	208/220 Volts	440-550 Volts			Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price

RECONNECTABLE—CONSTANT OR VARIABLE TORQUE SINGLE WINDING—TWO 2 COIL OVERLOAD RELAYS

3	5	---	---	0	F	9739- W55	\$301.	9739- W56	\$319.	9739- ---	---	9739- ---	---	9739- ---	---	9739- ---	---
7½	10	---	---	1	F	H1328	313.	W58	331.	W59	\$467.	W60	\$346.	W61	\$373.	W62	\$478.
15	25	---	---	2	F	W63	480.	W64	506.	W65	672.	W66	532.	W67	570.	W68	851.
30	50	---	---	3	F	W69	649.	W70	683.	W71	977.	W72	763.	W73	819.	W74	1247.
50	100	---	---	4	JA	W75	1566.	W76	1626.	W77	2074.	W78	1884.	W79	1952.	---	---

RECONNECTABLE—CONSTANT HORSEPOWER SINGLE WINDING—TWO 2 COIL OVERLOAD RELAYS

---	---	1½	2	0	F	9739- W126	\$301.	9739- W131	\$319.	9739- ---	---	9739- ---	---	9739- ---	---	9739- ---	---
---	---	3	5	1	F	H1327	313.	W132	331.	W136	\$467.	W140	\$346.	W144	\$373.	W148	\$478.
---	---	10	20	2	F	W128	480.	W133	506.	W137	672.	W141	532.	W145	570.	W149	851.
---	---	20	40	3	F	W129	649.	W134	683.	W138	977.	W142	763.	W146	819.	W150	1247.
---	---	30	60	4	JA	W130	1566.	W135	1626.	W139	2074.	W143	1884.	W147	1952.	---	---

① SEPARATE WINDING—TWO 2 COIL OVERLOAD RELAYS

3	5	1½	2	0	F	9736- W67	\$257.	9736- W68	\$275.	9736- ---	---	9736- ---	---	9736- ---	---	9736- ---	---
7½	10	3	5	1	F	H744	271.	W70	289.	W71	\$425.	W72	\$304.	W73	\$331.	W74	\$419.
15	25	10	20	2	F	W75	400.	W76	426.	W77	594.	W78	452.	W79	490.	W80	606.
30	50	20	40	3	F	W81	541.	W82	575.	W83	869.	W84	655.	W85	711.	W86	961.
50	100	30	60	4	JA	W87	1202.	W88	1262.	W89	1710.	W90	1520.	W91	1588.	W92	1905.

3 COIL OVERLOAD RELAYS

Factory Assembled 3 coil starter, add suffix "T" to catalog number and add \$8.

Field Conversion from 2 coil to 3 coil use spindle kit 10176H150—\$2.50 and heater coil—\$1.50 for each overload relay.

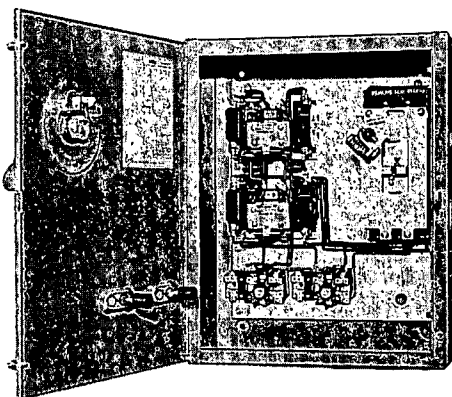
Prices include necessary heater coils at \$1.50 each.

① For motors with open Delta windings. Order by description, use reconnectable price.

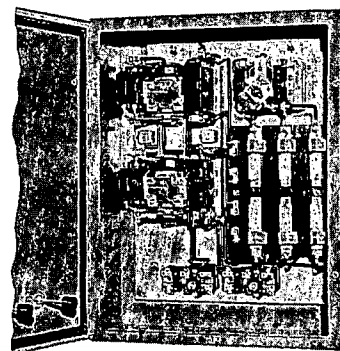
CONTROL CONVERSIONS

Option	Price Addition
Form 2—Compelling	\$66.
Form 3—Progressive	\$154.
automatic decelerating relay	\$154.

Dimensions on Application.



Circuit Breaker Type



Motor Circuit Switch Type

DISCOUNT SCHEDULE ICD

CUTLER-HAMMER

133

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

A-C MULTISPEED-MAGNETIC**3 Phase-Reduced Voltage-Primary Resistor-Non Reversing Starters****WHEN ORDERING SPECIFY**

- Catalog number
- Voltage and frequency
- Heater coils, select by full load current for each speed.
(See page 280.)
- Constant torque, variable torque or constant horsepower.

2 SPEED - FORM 1 SELECTIVE**NEMA CLASS 116 RESISTORS**

Maximum Horsepower 60-50-25 Cycles				NEMA Size	General Purpose NEMA 1		
Constant or Variable Torque		Constant Horsepower			Constant or Variable Torque	Constant Horsepower	Price
208/220 Volts	440-550 Volts	208/220 Volts	440-550 Volts		Cat. No.	Cat. No.	

① SEPARATE WINDING—TWO 2 COIL OVERLOAD RELAYS

15	15	10	10	2	9749-W1	9749-W1	\$762.
...	25	...	20	2	W2	W2	814.
30	30	20	...	3	W3	W3	1034.
...	50	...	40	3	W4	W4	1102.
50	...	30	...	4	W5	W5	1872.
...	100	...	60	4	W6	W6	2066.
75	...	60	...	5	W7	W7	3711.
100	...	75	...	5	W8	W8	3862.
...	125	...	75	5	W9	W9	3946.
...	150	...	100	5	W10	W10	4028.
...	200	...	150	5	W11	W11	4235.

RECONNECTABLE—SINGLE WINDING—TWO 2 COIL OVERLOAD RELAYS

15	15	10	10	2	9759-W1	9759-W12	\$778.
...	25	...	20	2	W2	W13	838.
30	30	20	...	3	W3	W14	1060.
...	50	...	40	3	W4	W15	1124.
50	...	30	...	4	W5	W16	2004.
...	100	...	60	4	W6	W17	2196.
75	...	60	...	5	W7	W18	4066.
100	...	75	...	5	W8	W19	4157.
...	125	...	75	5	W9	W20	4241.
...	150	...	100	5	W10	W21	4323.
...	200	...	150	5	W11	W22	4530.

3 COIL OVERLOAD RELAYS

Factory Assembled 3 coil starters, add suffix "T" to catalog number and add \$8.

Field Conversion from 2 coil to 3 coil use spindle kit 10176H150—\$2.50 and heater coil—\$1.50 for each overload Relay.

Prices include necessary heater coils at \$1.50 each.

CONTROL CONVERSIONS

Option	Price Addition
Form 2 — compelling	\$66.
Form 3 — progressive	\$154.
automatic decelerating relay	\$154.

**OPTIONAL FEATURES
AC MULTISPEED MAGNETIC STARTERS**

Item	Description	NEMA Enclosure Type	Price Addition					
			Starter Size					
			0	1	2	3	4	5
PANEL EQUIPMENT								
1	Additional Auxiliary Contact—Normally Open or Normally Closed.....	All	\$ 11	\$ 11	\$ 11	\$ 11	\$ 11	\$ 11
2	Conversion of Normally Open Auxiliary Contact to Normally Closed.....	All	11	11	11	11	11	11
3	Control Transformer, Fused Secondary							
	60 or 50 Cycle	1, 4, 5-12	27	27	38	56	68	77
	25 Cycle	1, 4, 5-12	41	41	57	84	102	102
ENCLOSURE MODIFICATION								
4	High-Low-Stop Pushbutton							
	in Cover.....	1	40	40	40	40	40	57
		4, 5-12	50	50	50	50	50	67

① For motors with open delta windings, order by description, use reconnectable price.
Dimensions on application.

DISCOUNT SCHEDULE 1C0

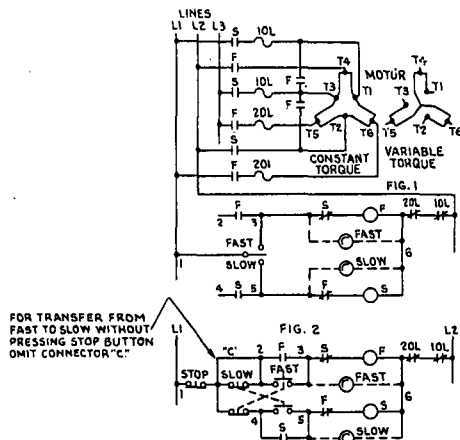
CUTLER-HAMMER



A-C MULTISPEED-MAGNETIC

Typical Connection Diagrams Multi Speed Control

FORM 1 SELECTIVE



Reconnectable Constant or Variable Torque

VARIABLE TORQUE, RECONNECTED WINDING TWO SPEED, SINGLE WINDING

	Speed	Connect Lines L1 L2 L3 To Motor Terminals			Connect Together
	1	T1	T2	T3	---
	2	T6	T4	T5	T1, T2, T3

Typical Speeds—600, 1200

CONSTANT HORSEPOWER, RECONNECTED WINDING TWO SPEED, SINGLE WINDING

	Speed	Connect Lines L1 L2 L3 To Motor Terminals			Connect Together
	1	T1	T2	T3	T6, T4, T5
	2	T6	T4	T5	---

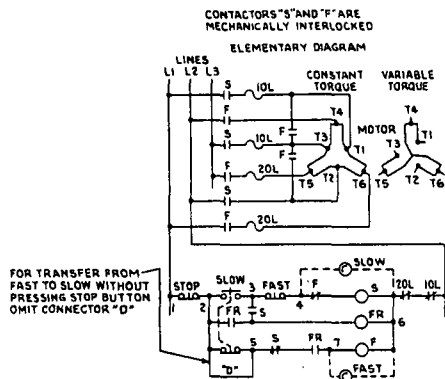
Typical Speeds—600, 1200

CONSTANT TORQUE, RECONNECTED WINDING TWO SPEEDS, SINGLE WINDING

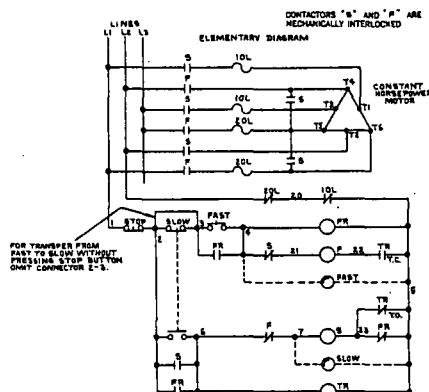
	Speed	Connect Lines L1 L2 L3 To Motor Terminals			Connect Together
	1	T1	T2	T3	---
	2	T6	T4	T5	T1, T2, T3

Typical Speeds—600, 1200

FORM 2 — COMPELLING



FORM 3 — PROGRESSIVE





A-C MULTISPEED-MANUAL

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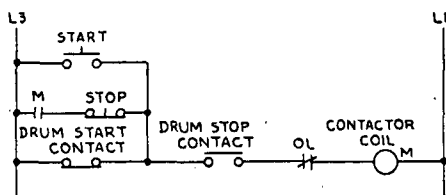
3 Phase-Full Voltage-Non Reversing and Reversing Drums

SEPARATE WINDING

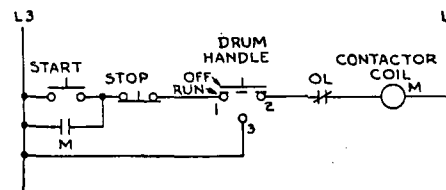
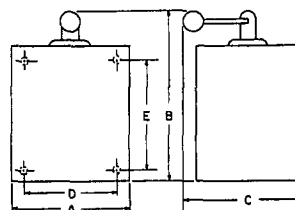
GENERAL PURPOSE NEMA 1 ENCLOSURE

Maximum Horsepower 60-50-25 Cycles				NEMA Size	Non-Reversing		1 Point Reversing		Full Reversing	
Constant or Variable Torque		Constant Horsepower								
208/220 Volts	440-550 Volts	208/220 Volts	440-550 Volts		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
2 SPEED — TWO WINDING — WITHOUT OVERLOAD RELAY										
¾	¾	¾	¾	00	9402- H277	\$11.	9402- ---	---	9402- H279	\$28.
2	2	1½	2	0	H273	16.50	H418	\$56.	H531	66.
5	7½	3	5	1	H431	53.	H421	74.	H443	78.
15	25	10	20	2	H450	90.	H480	112.	H510	116.
20	40	20	40	3	H135	156.	---	---	H142	226.
40	75	40	75	4	H147	178.	---	---	H154	234.
60	125	60	125	5	H159	248.	---	---	H166	266.
3 SPEED — THREE WINDING — WITHOUT OVERLOAD RELAY — STAR CONNECTED										
¾	¾	¾	¾	00	9402- H281	\$56.	9402- ---	---	9402- ---	---
2	2	1½	2	0	H369	72.	H381	\$96.	---	---
5	7½	3	5	1	H299	90.	H317	124.	W1	\$154.
15	25	10	20	2	H455	156.	H485	184.	W2	206.
20	40	20	40	3	H137	212.	---	---	H144	272.
40	75	40	75	4	H149	454.	---	---	H156	540.
60	125	60	125	5	H161	602.	---	---	H168	688.
4 SPEED — FOUR WINDING — WITHOUT OVERLOAD RELAY — STAR CONNECTED										
¾	¾	¾	¾	00	9402- H281	\$56.	9402- ---	---	9402- ---	---
2	2	1½	2	0	H375	72.	H387	\$96.	---	---
5	7½	3	5	1	H308	90.	H326	124.	W3	\$154.
15	25	10	20	2	H461	156.	H491	184.	W4	206.
20	40	20	40	3	H137	212.	---	---	H144	272.
40	75	40	75	4	H149	454.	---	---	H156	540.
60	125	60	125	5	H161	602.	---	---	H168	688.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Type A Interlock — Sizes 0, 1 & 2
(Size 00 has none)



Type B Interlock
Sizes 3, 4 & 5

NEMA Size	Description	Dimensions in Inches					Ship. Wt. Lbs.
		Wide A	High B	Deep C	Mounting		
					D	E	
GENERAL PURPOSE NEMA 1—SURFACE MOUNTING							
00	2 Speed—Separate Winding	2½	8¼	3¼	1¼	5½	4
00	2 Speed Reconnectable and 3 or 4 Speed	2½	10	3¼	1¼	7½	6
0	All Speeds	6¼	9¾	6	5	6	10
1	2 Speed—Non Rev. and Reversing	5¼	7½	4½	4¾	4¼	15
0	3 or 4 Speed—Non Reversing and 1 Point Rev.	6¼	9¾	6	5	6	15
1	3 or 4 Speed Full Reversing—2 Lever	6	11	6	5	6	20
2	2 Speed Non-Reversing	6	9¾	6	5	6	20
2	2 Speed Rev. and 3 or 4 Speed Non-Reversing and 1 Point Rev.	6	15½	6	5	11¼	25
2	3 or 4 Speed—Full Reverse—2 Lever	6	16½	6	5	11¼	30
3	All Speeds	10¼	27¾	17¼	7¼	8¾	130
4	All Speeds	10¼	27¾	17¼	7¼	8¾	140
5	All Speeds	13½	29¾	17¾	9½	9¼	175

1 Horsepower ratings shown apply only when drum used with separate magnetic contactor.
2 Full reversing drums, NEMA size 1 and 2, have 2 levers.

DISCOUNT SCHEDULE ICD

CUTLER-HAMMER

137

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS



3 Phase Full Voltage Non-Reversing Starters

WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency
- Heater coils select by full load current for each speed (see page 280.)

2 SPEED FORM 1 SELECTIVE

SEPARATE WINDING for star connected motors

Maximum Horsepower 60-50-25 Cycles Constant or Variable Torque			NEMA Size	General Purpose NEMA 1				Open Type	
				With Two 2 Coil Overload Relays		Without Overload Relay		With Two 2 Coil Overload Relays	
110 Volts	208/220 Volts	440-550 Volts		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
3/4	3/4	---	00	---	---	9216- H1	\$8.50	---	---
3/4	3/4	---	00	---	---	1 H8	7.50	---	---
1 1/2	2	2	0	---	---	H5	12.50	---	---
1 1/2	2	3	0	9219- H3	\$75.	---	---	9219- H11	\$69.
3	5	7 1/2	1	H4	90.	---	---	H12	84.

Prices include necessary heater coils at \$1.50 each.

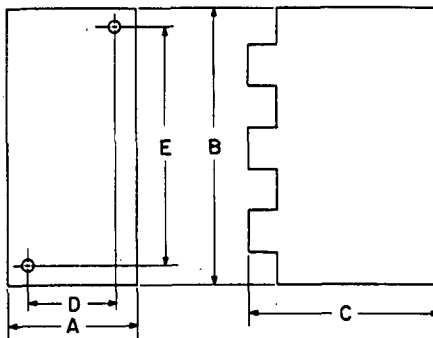
1 Toggle operated



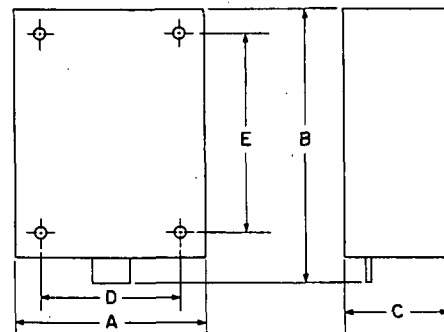
Without Overload
Relay



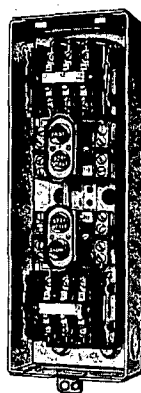
APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Without Overload Relay



With Overload Relay



With Overload Relay

Size	Enclosure	Dimensions in Inches					Ship. Wt. Lbs.
		Wide A	High B	Deep C	Mounting		
					D	E	
WITH OVERLOAD RELAYS							
0	NEMA 1 Open	4⅞ 4	14⅞ 11⅞	4 4	3½ 2	11½ 11½	15 10
1	NEMA 1 Open	5⅝ 4½	19 16⅞	4⅞ 4⅞	3½ 2	16½ 16	30 20
WITHOUT OVERLOAD RELAYS							
00 0	NEMA 1	2⅞ 2½	4⅞ 6⅞	2⅞ 3⅞	1⅞ 1⅞	1⅞ 5⅞	2 4

DISCOUNT SCHEDULE 1CD

CUTLER-HAMMER



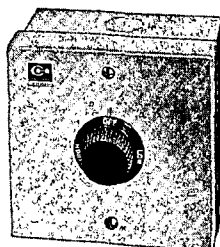
General Description

Manual—Full Voltage, Non-Reversing, Fractional HP—



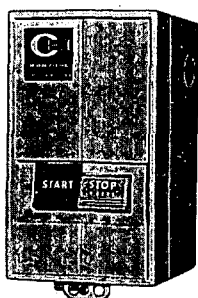
Single Speed—Single pole A-c and double pole A-c or D-c—Single or two starter combination—Toggle, removable key or lever operator—With or without pilot light (neon or incandescent), selector switch, padlock guard—Thermal overload relay—Heater coils rated in 10% increments—Nema type 1, 4, 5, 7 and 9 enclosed or open type with and without flush plate—Open type fits standard (Handy or Gem) outlet box.

Manual—Full Voltage, Non-Reversing, Fractional HP—



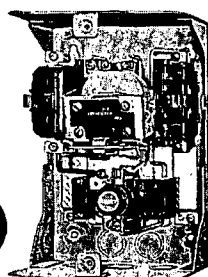
Two Speed—For two winding motor—Single pole A-c and double pole A-c or D-c—With or without neon pilot lights, one for each speed—Mechanically interlocked between speeds—Thermal overload relay for each speed—Heater coils rated in 10% increments—Nema type 1 enclosed or open type with flush plate—Open type fits 4 inch plaster wall box.

Manual—Full Voltage, Non-Reversing, Integral HP—Two



pole—With and without overload relay—Local cover control, pushbutton and toggle operated—Nema type 1, 4, 5, 7 and 9 enclosed or open type—Flush plate on open type without overload relay.

Magnetic—Full Voltage, Non-Reversing—Two pole with



maintaining interlock—Two or three wire control—Thermal overload relay, four position adjustable—Unit type auxiliary contacts—Reset button only or cover control, Start-Stop pushbutton and Run-Off-Auto selector switch—On the job conversion from reset button only to cover control with aid of conversion kit—Nema type 1, 3, 4, 5, 7, 9 and 12 enclosed on open type.

This Section Contains:

Page

MANUAL

Full Voltage, Non-Reversing, Fractional HP—
Single speed 140-141

Full Voltage, Non-Reversing, Fractional HP—
Two speed 141

Full Voltage, Non-Reversing, Integral HP 142

MAGNETIC

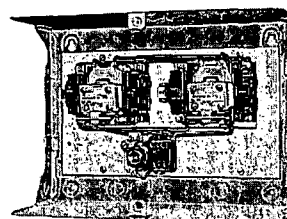
Full Voltage, Non-Reversing 143-144

Full Voltage, Reversing 144-145

Reduced Voltage, Primary Resistance,
Non-Reversing 145

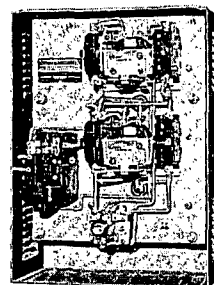
Optional Features 146

Magnetic—Full Voltage, Reversing—Two contactors, two



or three pole mechanically interlocked with maintaining interlocks—Vertical or horizontal construction—Two or three wire control—Thermal overload relay, four position adjustable—Unit type auxiliary contacts for size 0 and 1—Reset button only in cover—Nema type 1, 3, 4, 5, 7, 9 and 12 enclosed or open type.

Magnetic — Reduced Voltage, Primary Resistance, Non-



Reversing — Two point acceleration — Closed transition starting — 3 pole main and accelerating contactors with maintaining interlock — Pneumatic timer provides definite time acceleration, adjustable — Two or three wire control — Thermal overload relay — Integrally mounted starting resistor — Reset button only in cover — Nema type 1 enclosed.

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

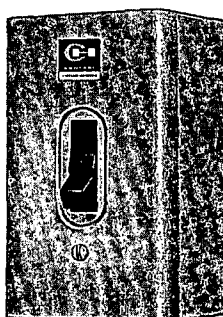
A-C SINGLE PHASE-MANUAL

Full Voltage Non-Reversing Starters

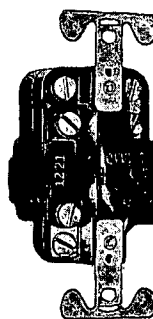


WHEN ORDERING SPECIFY

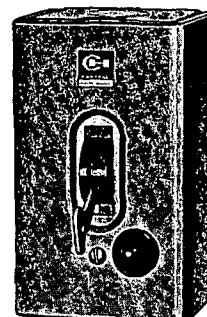
- Catalog Number
- Heater Coil number or full load current.



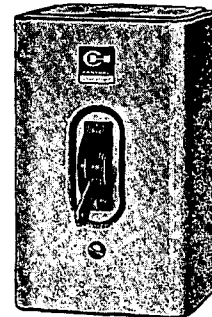
NEMA 1 enclosed



Open Type



With removable key — with pilot light



With lever operator

FOR SINGLE SPEED FRACTIONAL HORSEPOWER MOTORS

Ratings, 115-230 Volts—Single Pole 1 H.P. A-C—Two Pole 1 H.P. A-C and D-C

Operator	Feature	ENCLOSED TYPES						OPEN TYPES					
		General Purpose NEMA 1		Water-Dusttight ② NEMA 4-5		Hazardous Locations ② NEMA 7D-9-EFG		Flush Plate		Flush Plate (Stainless Steel)		Without Flush Plate	
		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
SINGLE POLE													
Toggle	Starter Only	9101- H74	\$7.50	9101- ---	---	9101- ---	---	9101- H82	\$7.00	9101- H90	\$7.50	9101- H72	\$6.50
	Pilot Light (Neon)	H76	13.	---	---	---	---	H84	12.50	H92	13.	---	---
	Padlock Guard	H108	8.50	H96	\$24.	H102	\$24.	H112	8.	---	---	---	---
	Pilot Light (Neon) and Padlock Guard	H110	14.	---	---	---	---	H114	13.50	---	---	---	---
Key	Starter Only	H169	9.50	---	---	---	---	H180	9.	H182	9.50	H165	8.50
	Pilot Light (Neon)	H173	15.	---	---	---	---	H184	14.50	H186	15.	---	---
Lever	Starter Only	H171	8.50	---	---	---	---	---	---	---	---	H167	7.50
TWO POLE													
Toggle	Starter Only	H75	8.50	---	---	---	---	H83	8.	H91	8.50	H73	7.50
	Pilot Light (Neon)	H77	14.	---	---	---	---	H85	13.50	H93	14.	---	---
	Pilot Light (115 Volts Incandescent)	H78	19.	H98	60.	H104	60.	H86	18.	H94	19.	---	---
	Pilot Light (230 Volts Incandescent)	H79	19.	H99	60.	① H105	60.	H87	18.	H95	19.	---	---
	Padlock Guard	H109	9.50	H97	25.	H103	25.	H113	9.	---	---	---	---
	Pilot Light (Neon) and Padlock Guard	H111	15.	---	---	---	---	H115	14.50	---	---	---	---
	Selector Switch	H80	18.	H100	60.	H106	60.	H88	17.	---	---	---	---
	Selector Switch and Pilot Light (Neon)	H117	24.	---	---	---	---	H118	23.	---	---	---	---
Duplex Starter	H81	20.	H101	60.	H107	60.	H89	19.	---	---	---	---	
Key	Starter Only	H170	10.50	---	---	---	---	H181	10.	H183	10.50	H166	9.50
	Pilot Light (Neon)	H174	16.	---	---	---	---	H185	15.50	H187	16.	---	---
	Pilot Light (115 Volts Incandescent)	H178	21.	---	---	---	---	H191	20.	H193	21.	---	---
	Pilot Light (230 Volts Incandescent)	H179	21.	---	---	---	---	H192	20.	H194	21.	---	---
	Selector Switch	H175	20.	---	---	---	---	H188	19.	---	---	---	---
	Selector Switch and Pilot Light (Neon)	H177	26.	---	---	---	---	H190	25.	---	---	---	---
	Duplex Starter	H176	24.	---	---	---	---	H189	23.	---	---	---	---
	Lever	Starter Only	H172	9.50	---	---	---	---	---	---	---	H168	8.50

NEMA 4 also available in Stainless Steel, order by description—no price addition.
Prices include necessary heater coils at \$1.00 each.

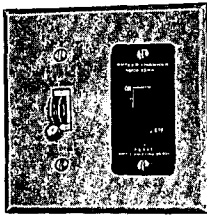
① 9101H105 is designed for a-c service only. For d-c service order by description.

② Padlock guard on all NEMA 4-5 and 7-9 enclosures.

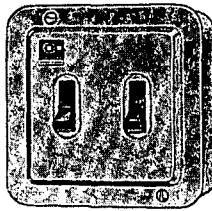


A-C SINGLE PHASE—MANUAL

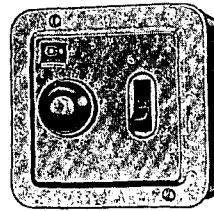
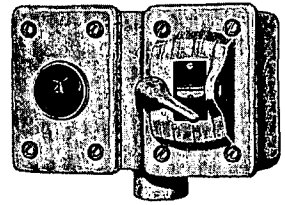
Full Voltage Non-Reversing Starters



Starter and selector switch



Duplex starter

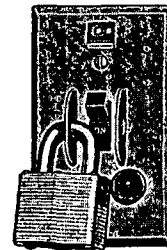
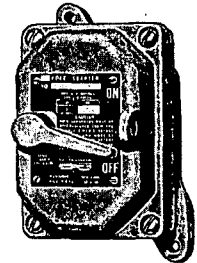
NEMA 1 enclosed
starter and lightNEMA 4-5 enclosed
starter and light

FOR TWO SPEED FRACTIONAL HORSEPOWER MOTORS

Ratings, 115-230 Volts—Single Pole 1 H.P.A -C—Two Pole 1 H.P.A -C & D.C.

Type	General Purpose NEMA 1		Open Type with Flush Plate	
	Cat. No.	Price	Cat. No.	Price
SINGLE POLE				
Without Pilot Lights	9106-H1	\$25.36.	9106-H3	\$24.35.
With Neon Pilot Lights	H2		H4	
TWO POLE				
Without Pilot Lights	H5	27.	H7	26.
With Neon Pilot Lights	H6	38.	H8	37.

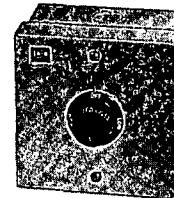
Prices include two heater coils at \$1.00 each.

With pilot light
and padlock guardNEMA 7D-9EFG
enclosed

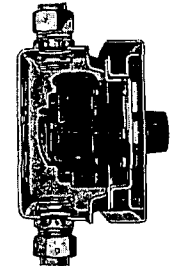
HEATER COILS for single speed in NEMA 1 enclosure for average 60 cycle motors.

H.P.	115 Volts	230 Volts	H.P.	115 Volts	230 Volts
1/8	10177-H1232	10177-H1225	3/4	10177-H1244	10177-H1236
1/4	H1235	H1227	1	H1246	H1237
1/2	---	H1228	---	---	H1237
3/4	H1237	H1230	---	---	H1238
1	H1239	H1233	---	---	---
1 1/2	H1240	---	---	---	---

For more accurate selection and other enclosures, select heater coils by full load current. See index on page 281.



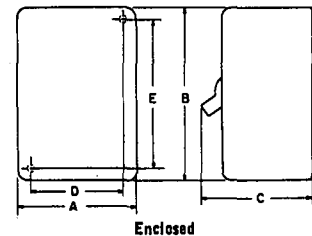
Two speed starter

Two speed starter
in standard outlet box

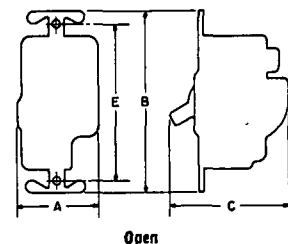
APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Type of Starter	NEMA Type Encl.	Dimensions in Inches					Ship. Wt. Lbs.
		Wide A	High B	Deep C	Mounting		
					D	E	
SINGLE SPEED							
1 or 2 pole starter with or without neon light or padlock guard	1	2½	4	3	1½	¾	1
	4-5	3½	6½	4½	2½	5½	2¼
	7-9	3½	6½	4½	2½	5½	2¼
	Open	1½	2½	2½	---	¾	½
2 pole with incandescent pilot, light, selector switch or duplex type starter	1	4½	4½	3½	3½	3½	2½
	4-5	6½	5½	4½	---	---	8
	7-9	7½	6½	4½	2½	5½	13
TWO SPEED							
1 or 2 pole starter with or without neon lights	1	4½	4½	3½	3	3	2½
	Open (with Flush Plate)	4½	4½	3½	---	¾	1¼

① For starters with incandescent pilot light.



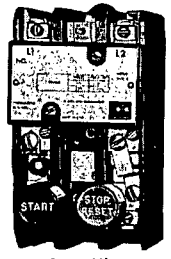
Enclosed



Open

A-C SINGLE PHASE-MANUAL

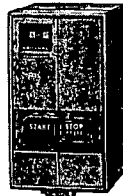
Full Voltage Non-Reversing Starters



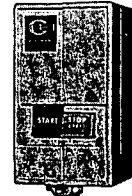
Open View

WHEN ORDERING SPECIFY

- Catalog Number
- Heater Coil number or full load current.



Size 0 NEMA 1



With Jogging Feature

FOR INTEGRAL HORSEPOWER MOTORS

Maximum Horsepower		Size	Type of Operator	General Purpose NEMA 1				Water-Dusttight (Stainless Steel) NEMA 4-5		Hazardous Locations NEMA 7D-9EFG		Open Type	
A-c				Standard		With Jog Feature		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
115 Volts	230 Volts			Cat. No.	Price	Cat. No.	Price						

SINGLE COIL OVERLOAD RELAY

1	1½	0	Pushbutton	9115-H169	\$20.	9115-H170	\$22.	9115-H183	\$52.	9115-H68	\$66.	9115-H166	\$18.
1½	3	1	Pushbutton	H176	25.	H177	27.	H185	64.	H96	78.	H173	23.
3	5	1½	Pushbutton	H181	36.	H182	38.	W1	78.	---	---	H180	34.

WITHOUT OVERLOAD RELAY

1	1½	0	Pushbutton	H83	4.50	---	---	---	---	---	---	① H160	4.00
1	1½	0	Toggle	H81	4.30	---	---	---	---	---	---	① W3	3.80

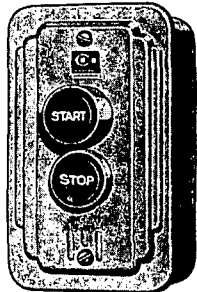
Prices of starters with overload relay include one heater coil at \$1.50.

① Includes flush mounting plate.

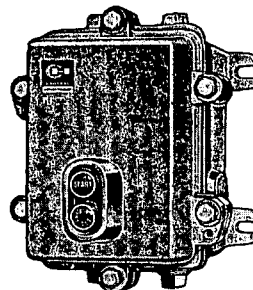
HEATER COILS for starters in NEMA 1 enclosure for average 60 cycle motors.

H.P.	115 Volts	230 Volts
1	10177-H1041	10177-H1035
1½	H1044	H1037
2	H1045	H1038
3	H1049	H1042
5	---	H1047

For more accurate selection and other enclosures, select heater coils by full load current. See index on page 281.

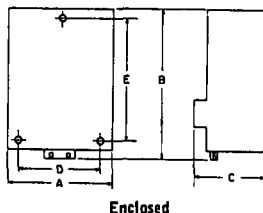


Without Overload Relay
Pushbutton and Toggle Operated

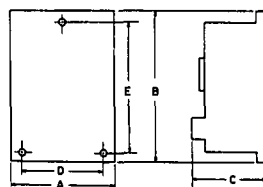


Size 0 NEMA 4-5

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Enclosed



Open

Size	NEMA Type Encl.	Dimensions in Inches					Ship. Wt. Lbs.
		Wide A	High B	Deep C	Mounting		
					D	E	
WITH OVERLOAD RELAY							
0	1	4½	8⅞	4⅞	3¼	6½	5½
	4-5	6½	11¼	7⅞	4	10¼	18
	7-9	7⅞	9⅞	7⅞	6¼	5¼	30
	Open	3	5⅞	4¼	2	5¼	3
1	1	4½	8⅞	4⅞	3¼	6½	5½
	4-5	6½	14¼	7⅞	4	13¼	23
	7	7½	13¼	7⅞	4	12¼	35
	9	7¼	11⅞	7½	6¼	7	28
	Open	3	5⅞	4¼	2	5¼	3
1½	1	4½	8⅞	4⅞	3¼	6½	5½
	Open	3	5⅞	4¼	2	5¼	3
WITHOUT OVERLOAD RELAY							
0	1	2⅞	4⅞	2⅞	1½	3¼	2
	Open	2⅞	4⅞	2½	---	3¼	1

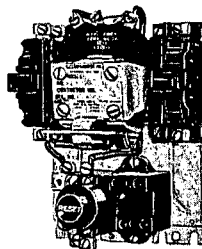


A-C SINGLE PHASE—MAGNETIC

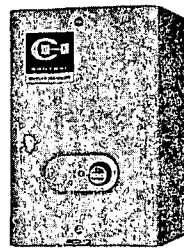
Full Voltage Non-Reversing Starters

WHEN ORDERING SPECIFY

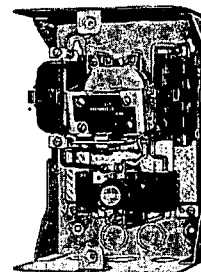
- Catalog Number
- Voltage and Frequency
- Heater Coil number or full load current.



Open Type



NEMA 1 Enclosed



Cover Removed

FOR REMOTE CONTROL—RESET ONLY

Maximum Horsepower 60-50-① 25 Cycles		Size	General Purpose NEMA 1		Weatherproof Watertight (Stainless Steel) NEMA 3-4		Dusttight— Industrial NEMA 5-12		Hazardous Gas NEMA 7-D		Hazardous Dust NEMA 9-EFG		Open Type	
② 115 Volts	② 230 Volts		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
1/3	1	00	9584-W1	\$30.50	9584-	---	9584-	---	9584-	---	9584-	---	9584-W2	\$28.50
1	2	0	H1000	34.	H1415	\$69.	H1421	\$46.	H1020	\$135.	H1012	\$69.	H1003	32.
2	3	1	H1121	39.	H1418	75.	H1424	51.	H1115	141.	H1118	75.	H1124	37.
3	5	1 1/2	H1200	50.	H1430	86.	H1427	62.	H1217	152.	H1220	86.	H1203	48.

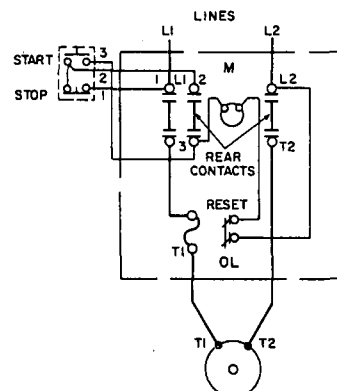
Prices include one heater coil at \$1.50.

HEATER COILS for starters in NEMA 1 enclosure for average 60 cycle motors.

H.P.	Catalog Number	
	115 Volts	230 Volts
1/3	10177-H1030	10177-H1025
1/4	H1033	H1066
1/2	H1035	H1028
1/2	H1037	H1031
3/4	H1041	H1034
1	H1042	H1036
1 1/2	H1045	H1038
2	H1046	H1039
3	H1048	H1043
5		H1046

For more accurate selection and other enclosures, select heater coils by full load current. See index on page 281.

TYPICAL WIRING DIAGRAM



CONVERSION KITS for local cover control in NEMA 1 enclosure.

Cover Control Kit	Size 00	Size 0, 1 & 1 1/2	Price
Start, Stop Pushbuttons	H1	H12	\$8.
Run-Off-Auto Selector Switch	H2	H13	8.
Neon Pilot Light 110-550V. (Red)	---	H37	15.

WITH LOCAL COVER CONTROL

Maximum Horsepower 60-50- 1 25 Cycles			Size	General Purpose NEMA 1		Weatherproof Watertight (Stainless Steel) NEMA 3-4		Dusttight— Industrial NEMA 5-12		Hazardous Gas NEMA 7-D		Hazardous Dust NEMA 9-EFG		Open Type	
115 Volts	230 Volts	Cat. No.		Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	
START, STOP PUSHBUTTONS															
1/3	1	00	9584- W3	\$38.50	9584- ---	---	9584- ---	---	9584- ---	---	9584- ---	---	9584- W4	\$36.50	
1	2	0	H1001	42.	H1416	\$91.	H1422	\$68.	H1021	\$157.	H1013	\$91.	H1004	40.	
2	3	1	H1122	47.	H1419	97.	H1425	73.	H1116	163.	H1119	97.	H1125	45.	
3	5	1 1/2	H1201	58.	H1431	108.	H1428	84.	H1218	174.	H1221	108.	H1204	56.	
RUN-OFF-AUTO SELECTOR SWITCH															
1/3	1	00	W5	38.50	---	---	---	---	---	---	---	---	W6	36.50	
1	2	0	H1002	42.	H1417	91.	H1423	68.	H1022	157.	H1014	91.	H1005	40.	
2	3	1	H1123	47.	H1420	97.	H1426	73.	H1117	163.	H1120	97.	H1126	45.	
3	5	1 1/2	H1202	58.	H1432	108.	H1429	84.	H1219	174.	H1222	108.	H1205	56.	

Prices include one heater coil at \$1.50.

① Size 00 for 50-60 cycle service only.

② Size 0 and larger have dual voltage (115/230 V.) magnet coils.

DISCOUNT SCHEDULE 1CD

OPTIONAL FEATURES, page 146

CUTLER-HAMMER

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

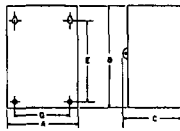
MISCELLANEOUS
ACCESSORIES &
COMPONENTS

A-C SINGLE PHASE-MAGNETIC

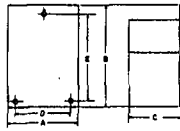
Full Voltage Non-Reversing Starters



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Enclosed



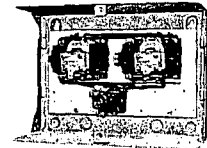
Open

Size	Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting			Wide A	High B	Deep C	Mounting		
				D	E					D	E	
NEMA 1							OPEN TYPE					
00	5%	7	4%	3½	5½	7	4%	5½	4%	2½	5	3¼
0	5%	8%	5	3½	6%	7½	4%	6%	4%	3%	5%	3¾
1 & 1½	6%	9½	5%	4%	7%	9½	5%	6%	5	4%	5%	5
NEMA 3-4							NEMA 5-12					
0	8	11¾	8%	4¼	10%	23	8	11¾	8	4¼	10%	22
1 & 1½	8	11¾	8%	4¼	10%	25	8	11¾	8	4¼	10%	24
NEMA 7							NEMA 9					
0	9%	11½	7%	8	9%	20	7½	10	7	5¼	9%	14
1 & 1½	9%	11½	7%	8	9%	22½	8½	10%	7½	6%	10	17

Full Voltage Reversing Starters

WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency
- Heater coil number or full load current



NEMA Type 1, Horizontal with Cover Removed

FOR REMOTE CONTROL

Non-Plugging Max. HP 60-50-25 Cycles		NEMA Size	Poles	General Purpose NEMA 1			Weatherproof-Watertight NEMA 3-4		Dusttight-Industrial NEMA 5-12		Hazardous Gas NEMA 7-D		Hazardous Dust NEMA 9-EFG		Open Types		
115 Volts	230 Volts			Vertical	Horiz.	Price	Vertical		Vertical		Vertical		Vertical		Vertical	Horiz.	Price
Cat. No.	Cat. No.			Cat. No.	Cat. No.		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Cat. No.	
1/2	---	2 00	2	---	9595-H2176	\$66.	9595-W9	\$112.	---	---	---	---	9595-W13	\$112.	---	9595-W17	\$62.
---	3/4		2	---	H2177	66.	W10	112.	---	---	---	---	W14	112.	---	W18	62.
1/2	---		3	---	W7	68.	W11	114.	---	---	---	---	W15	114.	---	W19	64.
---	3/4		3	---	W8	68.	W12	114.	---	---	---	---	W16	114.	---	W20	64.
1	2	0	2	9656-H18	9656-H25	78.	9656-W17	124.	9656-W21	\$96.	9656-W25	\$239.	9656-W31	124.	9656-H4	H11	74.
---	---		3	H46	H62	80.	W18	126.	W22	98.	W26	241.	W32	126.	W35	W37	76.
2	3	1	2	H118	H125	90.	W19	154.	W23	108.	W27	251.	W33	154.	H104	H111	84.
---	---		3	W13	W14	92.	W20	156.	W24	110.	W28	253.	W34	156.	W36	W38	86.

Prices include one heater coil at \$1.50.

PLUGGING AND JOGGING SERVICE HORSEPOWER RATINGS

Volts	Maximum horsepower where operation is interrupted more than five times per minute.		
	Size 00	Size 0	Size 1
115	1/4	1/2	1
230	1/8	3/4	2

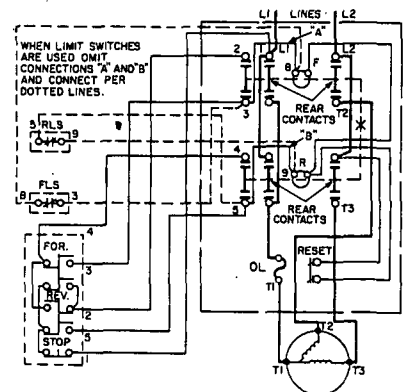
- 1/6 to 3/4 selection for 2 pole only.
- 60 cycle only. Order 50 or 25 cycle by description and complete motor data.
- Except size 00.

HEATER COILS for starters in NEMA 1 enclosures for average 60 cycle motors.

H.P.	Catalog Numbers	
	115 Volts	230 Volts
1/4	9104-H1361	9104-H1354
1/4	H1364	H1357
1/2	H1367	H1359
1/2	H1370	H1363
3/4	H1374	H1366
1	10177-H1041	10177-H1035
1 1/2	H1043	H1037
2	H1045	H1039
3	---	H1042

For more accurate selection and other enclosures, select heater coils by full load current. See index on page 281.

TYPICAL WIRING DIAGRAM



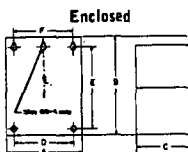
OPTIONAL FEATURES, page 146.

CUTLER-HAMMER

DISCOUNT SCHEDULE 1 CD



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Open

NEMA 1							OPEN TYPE							
Size	Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches						Ship. Wt. Lbs.	
	Wide A	High B	Deep C	Mounting			Wide A	High B	Deep C	Mounting				
				D	E					D	E	F		
VERTICAL CONSTRUCTION														
0	6½	15½	6¼	3½	13½	15½	4½	11¼	4¼	3¼	10½	---	8½	
1	7½	16½	6¾	4¼	14	19½	5½	12	4½	4¼	11½	---	11	
HORIZONTAL CONSTRUCTION														
00	7½	11½	5	5¼	9½	13	6	8½	4½	5¼	8¼	3	10	
0	14½	10½	7½	11¼	8½	26½	12½	7	4½	8	6¾	8	11	
1	14½	10½	7½	11¼	8½	28	12½	7	4½	8	6¾	8	13	

Reduced Voltage Primary Resistance Non-Reversing Starters

WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency
- Heater coil number or full load current.

FOR REMOTE CONTROL

Maximum Horsepower 60 cycles	Volts	Size	General Purpose NEMA 1		Maximum Horsepower 60 cycles	Volts	Size	General Purpose NEMA 1	
			Cat. No.	Price				Cat. No.	Price
¾	115 230	1	9605- H1547 H1551	\$202.	3	115 230	1½ 1	9605- W60 H1555	\$240. 202.
1	115 230	1	H1548 H1552	202.	5	230	1½	W61	240.
1½	115 230	1	H1549 H1553	202.	7½	230	2	H1486	429.
2	115 230	1	H1550 H1554	202.	10	230	3	W62	477.
					15	230	3	W63	492.

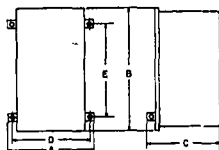
For use on 50 and 25 cycles, order by description and give complete motor date—Use above prices.
Prices include one heater coil at \$1.50.

HEATER COILS for starters in NEMA 1 enclosures for average 60 cycle motors.

H.P.	Catalog Numbers	
	115 Volts	230 Volts
	10177-	10177-
¼	H1032	H1066
⅓	H1034	H1028
½	H1037	H1030
¾	H1040	H1034
1	H1041	H1035
1½	H1043	H1037
2	H1045	H1039
3	---	H1042
7½	---	H1049

For more accurate selection select heater coils by full load current. See index on page 281.

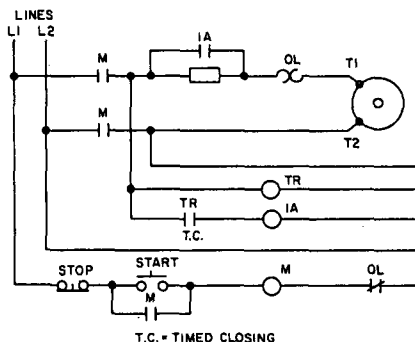
Approximate Dimensions and Shipping Weights



Size	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting		
				D	E	
1	20	32 $\frac{3}{4}$	10 $\frac{1}{8}$	18	28	90
2	22	42 $\frac{3}{4}$	10 $\frac{1}{8}$	20	38	150

Dimensions of NEMA size 1½ and 3 on application.

TYPICAL WIRING DIAGRAM



T.C. = TIMED CLOSING

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

**AC-DC CONTACTORS
RELAYS & TIMERS**

**PUSHBUTTONS & LIGHTS
LIMIT SWITCHES,
FOOT SWITCHES**

**MISCELLANEOUS
ACCESSORIES &
COMPONENTS**

A-C SINGLE PHASE—MAGNETIC

Price Additions for Optional Features

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

Item	Description	Catalog Number	NEMA Size					
			00	0	1	1½	2	3
1.	Forward, Reverse, Stop pushbuttons in cover of NEMA 1.....	9656	---	\$40.	\$40.	---	---	---
	NEMA 3-4, 5-12 and 9.....	9656	---	50.	50.	---	---	---
2.	Pilot in cover of NEMA 1.....	9584	---	15.	15	\$15.	---	---
3.	Reduced Voltage Primary Resistance Starters for 50 and 25 cycle service.....	9605	---	---	No price addition			
4.	Extra auxiliary contacts for field installation.....	9584, 9656, & 9605	---	See tables below				
5.	Extra auxiliary contacts—Factory installed:							
	Normally open or normally closed.....	9584, 9656 9605	---	11.	11.	11.	---	---
			---	---	11.	11.	\$32.	\$32.

AUXILIARY CONTACT KITS

Description	Catalog Numbers				Price
	Size 0	Size 1 & 1½	Size 2	Size 3	
Normally open.....	10933-H1	10933-H1	10933-H7	10933-H7	\$6.
① Normally closed.....	H2	H3	H8	H9	6.
② Normally closed late opening.....	H4	H4	H10	H10	6.

① A maximum of two normally closed contacts may be added per contactor.

② Only one normally closed late opening contact may be added per contactor.

Maximum Number of Extra Auxiliary Contacts per Starter

Catalog Number	Size 0 & 1	Size 1½	Size 2 & 3
9584	2	1	---
9605	3	3	3
9656	4	---	---



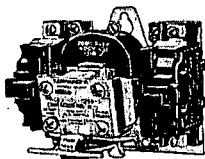
CONTACTORS, RELAYS AND TIMING DEVICES

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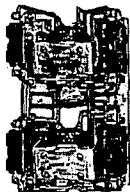
General Description

CONTACTORS

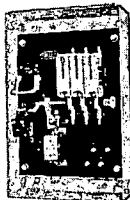
A-c Contactors, Magnetic Non-Reversing—Automatic closing on power circuits—1 through 4 pole—Full voltage motor loads without overload protection—Normally open auxiliary contact—Small size, a-c operating coils; size 6 and above, d-c coils with rectifier.



A-c Contactors, Magnetic Reversing—For starting, stopping, reversing and plugging—Two contactors mechanically and electrically interlocked—Vertically or horizontally arranged—2 through 4 pole—Small sizes, a-c operating coils; size 6 and 7, d-c coils with rectifier.



A-c Contactors, Mechanically Held—Electrically operated, mechanically latched—No drop out on power failure—Trip coil and opening mechanism—Freedom from coil hum.



D-c Contactors, Magnetic Non-Reversing—Unit design—1, 2 and 3 pole—Metal or insulated panel mounting—Front accessible components—Auxiliary contact units—Size 1 and 2, surface mounting front of panel wiring—Size 3 and larger (a) surface mounting, front wiring (b) surface mounting, rear of panel wiring (c) elevated mounting, front wiring.



This section contains:

	Pages
A-c Contactors	150-153
D-c Contactors	154-156
A-c and D-c Relays	157-172
A-c Timing Devices	173-175

GENERAL PURPOSE RELAYS—ELECTRICALLY HELD

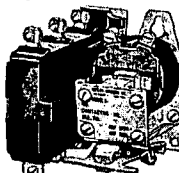
Type AA—Single Pole Relays—A-c and d-c relays—Panel mounted—Single pole single throw and single pole double throw—On the job convertible contacts on SPST relays—Visual identification of normally open and normally closed circuits—Horsepower and ampere rated except 30 ampere type—Screw or quick connect tab terminals.



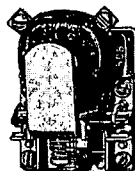
Type BG—Control Relays with Convertible Circuits—A-c relays—2 through 8 pole in any combination of normally open and normally closed contacts—Twin break—On the job convertible contacts—Pressure connectors—Three point mounting.



Type BC—Compact Control Relays with Convertible Circuits—A-c relays—2 through 4 poles in any combination of normally open and normally closed contacts—Twin break—On the job convertible contacts—Pressure connectors—Three point mounting.



Type AF—Double Pole Relays with Fixed Circuits—A-c and d-c relays—Panel mounted—Double pole single throw—Normally open or normally closed—Two wire separate control—Horsepower and ampere rated.



3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

CUTLER-HAMMER

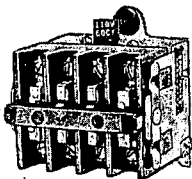
147



General Description

3 PHASE FULL VOLTAGE
MOTOR CONTROL

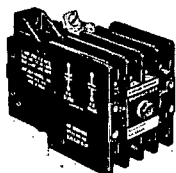
Type BJ—Control Relays with Fixed Circuits—A-c relays—2 through 5 poles with various combinations of normally open and normally closed contacts—Twin break—Front connected terminals—Three point mounting.



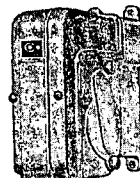
Type PR — Plugging Relays — Prevents reversal of a motor when a rapid stop is desired by means of plugging — Coupled to motor shaft — Requires special reversing magnetic starter.

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

Type CF—Multi-Pole Industrial Control Relays with Fixed Circuits—A-c relays—Fast operating— 2 to 8 poles in any combination of normally open and normally closed contacts—Contacts non-overlapping—Visual identification of normally open and normally closed circuits—Pressure or dual quick connector tab terminals.



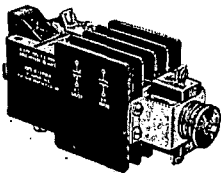
Type RP — A-c Open or Reverse Phase Relays — Pilot circuit rated — Stops motor on supply low voltage or phase reversal — Prevents motor restart until failure or reversal corrected — Prevents starting under single phase conditions.



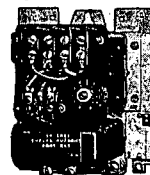
1 PHASE MOTOR CONTROL

GENERAL PURPOSE RELAYS
MECHANICALLY HELD

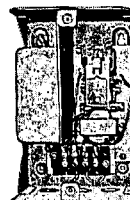
Type CF—Multi-Pole Industrial Control Relays with Mechanical Latch—Similar in design to type CF described above—Mechanical latch assembled on order or on the job—Electrically operated, mechanically held — Closing and tripping coil.



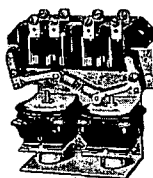
Type LR—A-c Load Current Relays—Current sensing load relays—Five current ranges, 1 ampere to 450 amperes—Adjustable range setting 7 to 1—High repeat accuracy—Indicating light—Pick up 50 milliseconds, drop out 16 milliseconds—Operating temperature range —20°C to +60°C.

AC-DC CONTACTORS,
RELAYS, & TIMERS

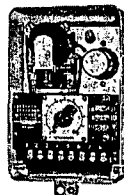
Type MX — Intrinsically Safe A-c Relays — Allows use of general purpose enclosed pilot devices in Class 1 Group C, D and Class II Group E, F, G hazardous locations — Relay to be suitably enclosed if mounted in a hazardous location — Pick up 9 to 15 milliseconds, drop out 16 to 20 milliseconds — Operating temperature range —50°C. to +75°C.

PUSHBUTTONS & LIGHTS,
LIMIT-SWITCHES,
FOOT-SWITCHES

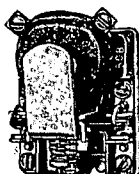
Type DM—Mechanically Held Multi-Pole Relays—A-c and d-c relays—Electrically operated, mechanically latched—Closing and tripping coils—1 to 6 poles in various combinations of normally open and normally closed contacts.



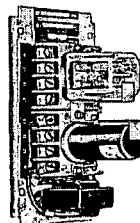
Type RS—Resistance Sensitive Electronic Relays—Adjustable sensitivity—Can be set for normally energized or normally de-energized operation—Used with liquid level probes, contact making instruments or sensitive circuit leads.

SPECIAL PURPOSE, ELECTRONIC
AND TRANSISTOR RELAYS

Type AG—Special Purpose Relays—A-c and d-c relays—Panel mounted—Double pole, single throw—Three wire gauge type thermostat or pushbutton control—Horsepower and ampere rated.



Type TF Standard Duty and TH Heavy Duty—Transistor sensitive relays—Set for normally de-energized or normally energized relay operation—Standard duty 115 volts—Heavy duty 600 volts—10 ampere relay contacts—High speed operation—Used with liquid level probes, photoelectric accessories or other sensing devices.

MISCELLANEOUS
ACCESSORIES &
COMPONENTS



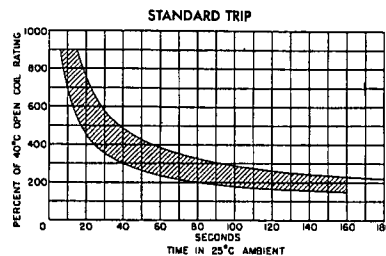
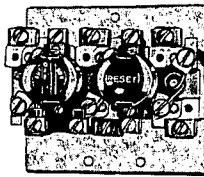
CONTACTORS, RELAYS AND TIMING DEVICES

149

General Description

OVERLOAD RELAYS

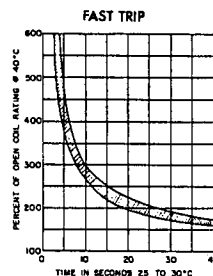
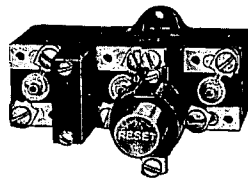
Type ST — Thermal Overload Relays — Overcurrent protection up to 150 amperes — Inverse time limit — One, two or three coil — Normally closed or normally closed and normally open contacts — Features precise current adjustment in 3% steps by utilizing four alternate heater coil positions — Reset button, start-stop pushbutton or run-off-auto selector switch — With or without mounting plate — See composite trip curve below.



NOTE: 40°C. open coil rating is approximately 1.25 times the minimum current listed for that heater coil.

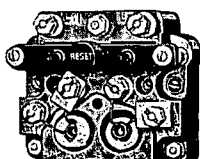
Type SW — Multi-Overload Relay Panels — For multi-speed or multi-motor applications — Two, three or four relays panel mounted — One, two or three coil types — Normally closed or normally closed and normally open contacts — Features precise current adjustment in 3% steps by utilizing four alternate heater coil positions — Reset button, start-stop pushbutton or run-off-auto selector switch.

Type TK — Fast Trip Overload Relays — Overcurrent protection up to 50 amperes — One, two or three coil — Reset button only — See composite trip curve below.



NOTE: 40°C. open coil rating is approximately 1.25 times the minimum current listed for that heater coil.

Type SR—Thermal Overload Switches—For a-c and d-c motors—Two coil type—Two pole, double break contacts—Switch contacts handle motor circuit—Quick break contact mechanism—Reset button only.



This section contains:

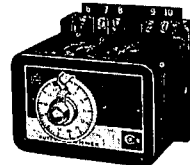
	Pages
A-c Contactors	150-153
D-c Contactors	154-156
A-c and D-c Relays	157-172
A-c Timing Devices	173-175

TIMING DEVICES

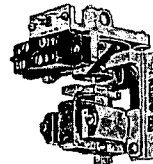
Type SP—Synchronous Motor Driven Reset Timer—For non-cyclic applications—Single pole double throw—Five available ranges cover timing periods of 2 seconds to 5 hours—Consists of plug-in timer unit and terminal block—Replacement or changeover (timer units interchangeable within each voltage range) a simple plug-in operation—Full timing cycle at all times.



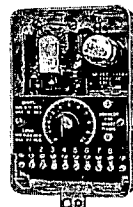
Type SM—Synchronous Motor Driven Reset Timer—For non-cyclic applications—Double pole double throw—Five available ranges cover timing periods of 2 seconds to 5 hours—One of three timing methods, "On Delay" time delay after energizing timer coil, "Off Delay" time delay after de-energizing timer coil and "Interval" immediate pick up timed drop out—Full timing cycle at all times.



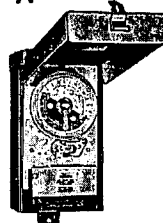
Type PT — A-c Pneumatic Timing Relay — For cyclic applications — Adjustable range from 0.2 to 60 seconds — High repeat accuracy — Two timing methods, "On Delay" time delay after energizing timer coil, "Off Delay" time delay after de-energizing timer coil — Timing method on the job convertible on types AE1 and BE1 — The BE1 has one or two timing steps, each individually adjustable — Auxiliary contact, normally open or normally closed.



Type ET—A-c Electronic Timer—For cyclic applications—Adjustable timing range from 0.15 to 60 seconds—Normally open and normally closed single pole double break relay contacts—Time setting knob and dial, external or internal—Dial control removable for remote mounting.



Type TC—24 Hour Programming Time Clock—Synchronous motor driven—96 pullout tabs on dial, each representing a 15 minute time interval—Day omission feature eliminates any day or days from program—Complete program flexibility.



3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

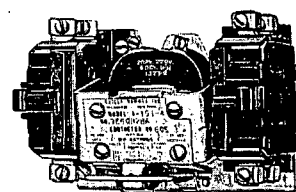
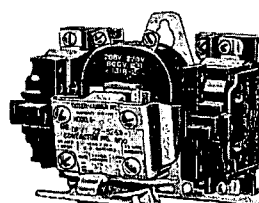
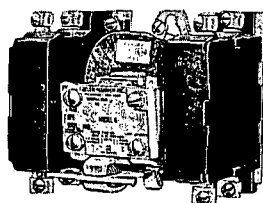
A-C CONTACTORS

Magnetic Non-Reversing



WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency



MAGNETICALLY HELD

Size 00

Size 0

Size 1

Maximum Horsepower 60-50-25 Cycles					Ampere Ratings		NEMA Size	No. of Poles	General Purpose		Watertight		Dusttight— Industrial		Hazardous Locations				Open Type				
2 or 3 Phase			Single Phase						NEMA 1		NEMA 4		NEMA 5-12		NEMA 7-D		NEMA 9-EFG						
208/220 Volts	440 Volts	550 Volts	115 Volts	230 Volts	En- closed	Open			Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price			
...	...	...	½	¾	9	10	00	1	9560- H13	\$19.	9560-	---	9560-	---	9560-	---	9560- H9	\$17.					
1½	2	2	½	¾					2	H14	22.	---	---	---	---	---	---	---	---	H10	20.		
1	1	1	⅓	1					3	H15	25.	---	---	---	---	---	---	---	---	H11	23.		
			...	...					4	H16	33.	---	---	---	---	---	---	---	---	H12	31.		
...	...	...	1	2	18	20	0	1	H8	25.	W1	\$60.	W2	\$37.	---	---	W3	\$60.	H7	23.			
3	5	5	1	2					2	H4	28.	X8	63.	X10	40.	X11	\$129.	X12	63.	H1	26.		
3	5	5	...	...					3	H5	31.	X13	66.	X15	43.	X16	132.	X17	66.	H2	29.		
			...	...					4	H6	39.	X18	75.	X20	51.	X21	143.	X22	78.	H3	37.		
...	...	...	2	3	27	30	1	1	H33	30.	W4	66.	W5	42.	W6	132.	W7	66.	H32	28.			
7½	10	10	2	3					2	H29	33.	X23	69.	X25	45.	X26	134.	X27	69.	H26	31.		
7½	10	10	...	...					3	H30	36.	X28	72.	X30	48.	X31	138.	X32	72.	H27	34.		
			...	...					4	H31	44.	X33	80.	X35	56.	X36	146.	X37	80.	H28	42.		
...	...	...	3	7½	45	50	2	2	H54	68.	X38	140.	X40	90.	X41	217.	X42	174.	H51	58.			
15	25	25	...	...					3	H55	72.	X43	144.	X45	94.	X46	222.	X47	178.	H52	62.		
15	25	25	...	...					4	H56	90.	X48	190.	X50	112.	X51	292.	X52	228.	H53	80.		
			...	...																			
...	...	...	7½	15	90	100	3	2	H79	112.	X53	214.	X55	138.	X56	324.	X57	258.	H76	92.			
30	50	50	...	...					3	H80	120.	X58	222.	X60	146.	X61	332.	X62	266.	H77	100.		
30	50	50	...	...					4	H81	148.	X63	278.	X65	174.	X66	426.	X67	322.	H78	128.		
			...	...																			
...	...	...	...	...	135	150	4	2	H105	264.	W8	438.	W9	350.	W10	519.	W11	512.	H101	222.			
50	100	...	...	...					3	H106	282.	W12	456.	W13	368.	W14	537.	W15	530.	H102	240.		
...	...	100	...	...					3	H107	282.	W16	456.	W17	368.	W18	537.	W19	530.	H103	240.		
50	...	...	...	...					4	H108	376.	W20	622.	W21	492.	---	---	W22	722.	H104	334.		
...	...	...	...	...	270	300	5	2	H130	558.	W23	778.	W24	778.	---	---	W25	927.	H126	481.			
100	200	...	...	...					3	H131	600.	W26	820.	W27	820.	---	---	---	---	W28	969.	H127	523.
...	...	200	...	...					3	H132	600.	W29	820.	W30	820.	---	---	---	---	W31	969.	H128	523.
100	...	...	...	...					4	H133	1115.	W32	1357.	W33	1357.	---	---	---	---	W34	1555.	H129	961.
...	...	...	...	...	540	600	6	2	H474	1461.	W35	2105.	W36	2105.	---	---	---	---	H461	1144.			
200	400	400	...	...					3	H500	1652.	W37	2297.	W38	2297.	---	---	---	---	---	---	H487	1335.
200	400	400	...	...					4	H526	2922.	---	---	---	---	---	---	---	---	---	---	H513	2288.
			...	...																			
...	...	...	...	...	810	900	7	2	H552	1987.	W39	2631.	W40	2631.	---	---	---	---	H539	1670.			
300	600	600	...	...					3	H578	2222.	W41	2867.	W42	2867.	---	---	---	---	---	---	H565	1905.
300	600	600	...	...					4	H604	3973.	---	---	---	---	---	---	---	---	---	---	H591	3340.
			...	...																			
...	...	...	...	...	1215	1350	8	2	H630	3200.	W43	3641.	W44	3641.	---	---	---	---	H617	2680.			
450	900	900	...	...					3	H656	3600.	W45	4042.	W46	4042.	---	---	---	---	---	---	H643	3080.
450	900	900	...	...					4	H682	6000.	---	---	---	---	---	---	---	---	---	---	H669	5360.
			...	...																			

Contactors for incandescent and infra red lamp load, see page 268.

AUXILIARY CONTACT KITS

Contacts	Catalog Numbers						Price
	Size 00	Size 0	Size 1	Size 2	Size 3	Size 4 & 5	
Normally Open	10933- H12	10933- H1	10933- H1	10933- H7	10933- H7	10933- H7	\$6.
Normally Closed	H12	H2	H3	H8	H9	H21	6.
Normally Closed Late Opening	---	H4	H4	H10	H10	H10	6.
Normally Open and Normally Closed	---	H5	H6	---	---	---	8.

① One, two and three pole sizes 00, 0 and 1 have an extra power pole used as a control circuit interlock.
When no interlock is required as on 2 wire control, select contactor with one less power pole.

② Both normally open and normally closed contacts must be on same polarity.

③ Packaged kit of contacts for size 00 contactors only; \$2.00.

OPTIONAL FEATURES, page 153

CUTLER-HAMMER

MAX. NO. OF EXTRA
AUXILIARY CONTACTS

No. of Poles	Contactor Size			
	00	0 and 1	2 and 3	4 and 5
1	2	2	---	---
2	1	2	3	3
3	0	2	3	4
4	1	1	3	3

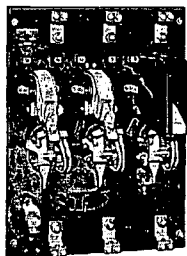
DISCOUNT SCHEDULE ICD



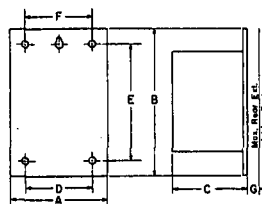
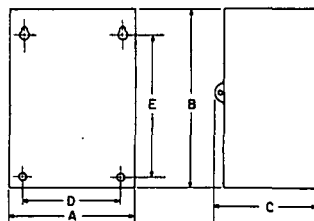
A-C CONTACTORS

Magnetic Non-Reversing

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Size 6 with two arc shields removed to show contact structure



OPEN TYPE

NEMA Size	Poles	Dimensions in Inches							Ship. Wt. Lbs.
		Wide	High	① Deep	Mounting			G	
					A	B	C			D	E	F
00	1, 2 and 3 4	4 3/8	3 3/4	3 3/8	1 1/4	3 3/8	---	---	3 3/4
		4 3/8	3 3/4	4 3/8	1 1/4	3 3/8	---	---	3 1/2
0	1, 2 and 3 4	4 3/8	3 3/4	3 3/8	1 1/4	3 3/8	---	---	3
		4 3/8	3 3/4	4	1 1/4	3 3/8	---	---	3 3/4
1	1, 2 and 3 4	5 3/8	4 3/8	3 3/8	1 1/4	3 3/8	---	---	4
		5 3/8	4 3/8	4 3/8	1 1/4	3 3/8	---	---	4 1/2
2	2 and 3 4	7 1/4	5 3/8	5 3/4	3	4 7/8	---	---	10 1/2
		7 1/4	5 3/8	6 1/4	3	4 7/8	---	---	11
3	2, 3 and 4	9 3/8	6 3/8	7 1/2	3	5 3/8	---	---	16
4	2	9 3/8	10 3/8	7	3 3/4	6 3/8	---	---	23
	3 (440V.)	9 3/8	10 3/8	5 3/8	3 3/4	6 3/8	---	---	23
	3 (550V.)	10	10 3/8	7	3 3/4	6 3/8	---	---	24
	4	10	10 3/8	7	3 3/4	6 3/8	---	---	24
5	2	13	12 3/4	6 3/8	12	6	4 1/2	---	35
	3 (440V.)	13	12 3/4	6 3/8	12	6	4 1/2	---	35
	3 (550V.)	13	12 3/4	7 1/2	12	6	4 1/2	---	36
	4	13	12 3/4	7 1/2	12	6	4 1/2	---	36
6	2	24	24	12 1/2	22	20	22	3 3/4	250
	3	24	26	12 1/2	22	22	22	3 3/4	350
	4	32	26	12 1/2	30	22	30	3 3/4	500
7	2	32	32	16 1/2	30	28	30	5 3/8	500
	3	44	32	16 1/2	42	28	42	5 3/8	700
	4	64	36 3/4	16 1/2	62	34	62	5 3/8	1000
8	2	32	36	16 1/2	30	32	30	5 3/8	525
	3	44	36	16 1/2	42	32	42	5 3/8	770
	4	64	40 3/4	16 1/2	62	38	62	5 3/8	1100

① Addition of extra auxiliary contacts could increase this dimension. See table page 225.

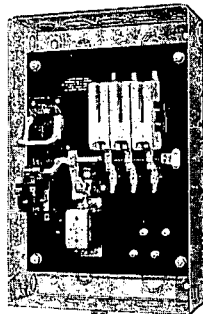
NEMA 1

NEMA Size	Poles	Dimensions in Inches					Ship. Wt. Lbs.
		Wide	High	Deep	Mounting		
					D	E	
00	All	5½	8	4½	3¾	5	6¾
0	All	5¾	6¾	4¾	3¾	4¾	6½
1	All	6¾	7¾	5	3¾	4¾	7¾
2	All	8¾	13¾	6¾	6¾	11¾	21
3	All	11¼	18¾	8	8	14½	37
4	All	13¾	23¾	8	10	18½	45
5	All	17	37¾	11½	14¾	36¾	80
6	2 & 3	28	60	28½	Floor Mtd.		700
	4	36	60	28½	Floor Mtd.		850
7 & 8	2	36	72	40¾	Floor Mtd.		800
	3	48	72	40¾	Floor Mtd.		1000
	4	72	72	40¾	Floor Mtd.		1350

② Double door construction.

WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency



Size 2

MECHANICALLY HELD

Maximum Horsepower 60-50-25 Cycles					Amperes		NEMA Size	No. of Poles	General Purpose NEMA 1		Open Type	
2 or 3 Phase			Single Phase		En- closed	Open			Cat. No.	Price	Cat. No.	Price
208/220 Volts	440 Volts	550 Volts	115 Volts	230 Volts								
---	---	---	½	¾	9	10	00	2	9560- W47	\$31.	9560- W60	\$29.
1	1	1	---	---				3	W48	34.	W61	32.
---	---	---	3	7½				2	W49	104.	W62	96.
15	25	25	---	---	45	50	2	3	W50	108.	W63	100.
15	25	25	---	---				4	W51	128.	W64	120.
---	---	---	7½	15				2	W52	146.	W65	128.
30	50	50	---	---	90	100	3	3	W53	154.	W66	136.
30	50	50	---	---				4	W54	184.	W67	166.
---	---	---	10	25				2	W55	374.	W68	316.
50	100	100	---	---	135	150	4	3	W56	422.	W69	342.
50	100	100	---	---				4	W57	516.	W70	436.
---	---	---	---	---	270	300	5	2	W58	654.	W71	530.
100	200	200	---	---				3	W59	718.	W72	548.

Contactors for incandescent lamp load, see page 268.

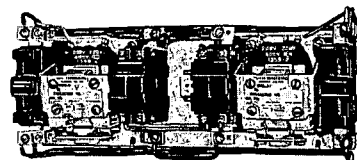
A-C CONTACTORS

Magnetic Reversing



WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency



Size 2 Horizontal, Open Type

MAGNETICALLY HELD

Maximum Horsepower 60-50-25 Cycle					NEMA Size	No. of Poles	General Purpose NEMA 1			Watertight NEMA 3-4	Dusttight— Industrial NEMA 5-12		Open Type Separate Control				
2 or 3 Phase			Single Phase				Ver- tical	Hori- zontal	Price		② Vertical				Ver- tical	Hori- zontal	Price
208/220 Volts	440 Volts	550 Volts	115 Volts	230 Volts							Cat. No.	Cat. No.	Cat. No.	Price			
---	---	---	½	---	00	2	---	9595- H2118	\$62.	9595- W21	\$108.	---	---	---	9595- W28	\$58.	
---	---	---	---	¾		2	---	H2119	62.	W22	108.	---	---	---	W29	58.	
---	---	---	½	---		3	---	H2112	64.	W23	110.	---	---	---	W30	60.	
---	---	---	---	¾		3	---	H2113	64.	W24	110.	---	---	---	W31	60.	
1	---	---	---	---		3	---	H2100	64.	W25	110.	---	---	---	H1869	60.	
---	1	---	---	---		3	---	H2101	64.	W26	110.	---	---	---	H1870	60.	
---	---	1	---	---		3	---	H2102	64.	W27	110.	---	---	---	H1871	60.	
---	---	---	1	2	0	2	9656- H15	9656- H22	74.	9656- W44	120.	9656- W45	\$92.	9656- H1	70.		
---	---	---	1	2		3	H43	H61	76.	W46	122.	W47	94.	H48	72.		
3	5	5	---	---		3	H16	H23	76.	H30	122.	H536	94.	H59	72.		
3	5	5	---	---		4	H17	H24	96.	H31	142.	H552	114.	H3	92.		
---	---	---	2	3	1	2	H115	H122	86.	W50	150.	W51	104.	H101	H108	80.	
7½	10	10	---	---		3	H116	H123	88.	H130	152.	H538	106.	H158	H159	82.	
7½	10	10	---	---		4	H117	H124	109.	H131	173.	H553	127.	H103	H110	105.	
15	25	25	---	---	2	3	H211	H216	172.	H221	276.	H226	202.	H244	H241	156.	
15	25	25	---	---		4	H212	H217	214.	H222	324.	H227	244.	H207	H202	198.	
30	50	50	---	---	3	3	H306	H316	287.	H331	441.	H336	353.	H341	H344	259.	
30	50	50	---	---		4	H307	H317	358.	H332	510.	H337	422.	H302	H312	328.	
50	100	---	---	---	4	3	H418	---	698.	H426	970.	H434	800.	H458	H464	646.	
---	---	100	---	---		3	H419	---	698.	H427	970.	H435	800.	H459	H465	646.	
50	---	---	---	---		4	H420	---	888.	H428	1162.	H436	992.	H404	H412	834.	
100	200	---	---	---	5	3	H498	---	1466.	H504	1818.	H501	1818.	H522	H524	1165.	
---	---	200	---	---		3	H499	---	1466.	H505	1818.	H502	1818.	H523	H525	1165.	
100	---	---	---	---		4	H500	---	1757.	H506	2327.	H503	2109.	H487	H474	1455.	
200	400	400	---	---	6	3	W52	---	3650.	W53	4150.	W54	4150.	W55	---	3150.	
300	600	600	---	---		3	W56	---	4543.	W57	5043.	W58	5043.	W59	---	4043.	

① 60 cycles only. Order 50 or 25 cycles by description and complete motor data.

② Except size 00.

AUXILIARY CONTACT KITS

Contacts	Catalog Numbers					Price
	Size 0	Size 1	Size 2	Size 3	Size 4 & 5	
Normally Open.....	10933- H1	10933- H1	10933- H7	10933- H7	10933- H7	\$6.
Normally Closed.....	H2	H3	H8	H9	H21	
Normally Closed Late Opening.....	H4	H4	H10	H10	H10	6.
⑤ Normally Open & Normally Closed.....	H5	H6	---	---	---	8.

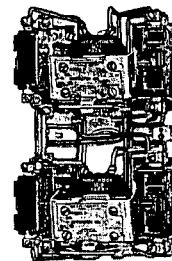
⑤ Both normally open and normally closed contacts must be of same polarity.

Plugging and Jogging Service Horsepower Ratings

Maximum horsepower where operation is interrupted more than five times per minute										
Phase	Volts	Size 00	Size 0	Size 1	Size 2	Size 3	Size 4	Size 5	Size 6	Size 7
2 or 3 Phase	208/220 440-550	1/2 1/2	1 1	3 5	10 15	20 30	30 60	75 150	150 300	225 450
Single Phase	115 230	1/4 1/3	1/2 1/4	1 2	---	---	---	---	---	---

MAX. NUMBER OF EXTRA AUXILIARY CONTACTS PER CONTACTOR

No. of Poles	Contactor Size		
	0 & 1	2 & 3	4 & 5
2	2	---	---
3	1	2	3
4	1	2	3



Size 1 Vertical, Open Type

DISCOUNT SCHEDULE 1 CD

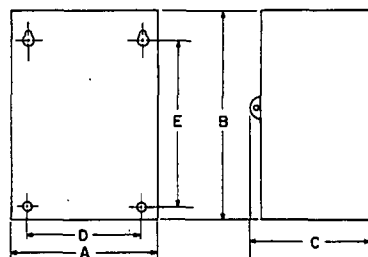
CUTLER-HAMMER



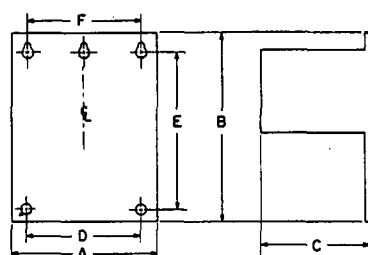
A-C CONTACTORS

Magnetic Reversing

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Enclosed Type



Open Type

Vertical Construction							Horizontal Construction						
NEMA Size	Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches						Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting			Wide A	High B	Deep C	Mounting			
				D	E					D	E	F	
NEMA 1													
00	---	---	---	---	---	---	7½	9	4½	5½	7½	---	12
0	6½	15½	6½	3½	13½	14½	14½	10½	7½	11½	8½	---	23
1	7½	16½	6½	4½	14	18	14½	10½	7½	11½	8½	---	24½
2	9½	22	9½	6½	18½	45	18½	13½	9½	15	11	---	44
3	12½	26½	8½	9	22½	73	21½	19	10½	18½	15½	---	72
4	14	31½	9½	10	27	95	---	---	---	---	---	---	---
5	19	49	12½	14½	47½	170	---	---	---	---	---	---	---
OPEN TYPE													
00	---	---	---	---	---	---	6	6½	4½	5½	4½	---	10
0	4½	8½	4½	1½	7½	7½	10½	3½	4½	7½	3½	6	7½
1	5½	9½	4½	1½	8½	9½	12½	4½	4½	8½	3½	7	9½
2	7½	13½	6½	3	12½	24	16½	6	6½	12½	5	9½	21
3	9	15½	7½	7	14½	39	19½	7½	7½	13½	6½	10½	35
4	10	20½	7½	7	18½	48	21	10½	7½	14½	6½	11	43
5	13½	22½	7½	12	19½	70	27½	12½	7½	26½	6½	19½	70
VERTICAL CONSTRUCTION ONLY													
NEMA 3-4							NEMA 5-12						
0 & 1	8½	16½	7	6½	15½	27	9½	18½	8	6½	17½	---	28
2	10½	23½	9½	7½	22½	52	10½	23½	9½	7½	22½	---	52
3	13½	29½	9½	9½	28½	84	13½	29½	9½	9½	28½	---	84
4	14½	34½	9½	11	33	98	14½	34½	9½	11	33	---	98
5	19	49	11½	14½	47½	180	19	49	11½	14½	47½	---	180

Price Additions for Optional Features for Contactors

Item	Description	NEMA Size							
		00	0	1	2	3	4	5	6-7-8
1	Start, Stop Pushbutton or Run-Off-Auto Selector Switch in cover of NEMA 1—Non-Reversing.....	\$8.	\$8.	\$8.	\$8.	\$8.	\$8.	\$8.	\$33.
	All other enclosures—Non-Reversing.....	---	22.	22.	22.	22.	22.	22.	50.
2	Pilot light in cover of NEMA 1—Non-Reversing and Reversing.....	---	15.	15.	15.	15.	15.	15.	27.
	All other enclosures—Non-Reversing and Reversing.....	---	27.	27.	27.	27.	27.	27.	27.
3	Forward, Reverse, Stop Pushbuttons in cover of NEMA 1—Reversing.....	---	40.	40.	40.	40.	40.	40.	57.
	NEMA 3-4 and 5-12—Reversing.....	---	50.	50.	50.	50.	50.	50.	67.
4	① Control Circuit Transformer—Single and Dual Voltage								
	Primary..... 60 or 50 cycles	---	27.	27.	38.	56.	68.	77.	77.
	25 cycles	---	41.	41.	57.	84.	102.	102.	102.
	With 100 watt extra capacity..... 60 or 50 cycles	---	48.	48.	62.	78.	88.	98.	98.
	25 cycles	---	72.	72.	93.	117.	132.	147.	147.
5	Substitute Dual Voltage Coil—Non-Reversing.....	---	2.	2.	2.	2.	2.	2.	---
6	Substitute Dual Voltage Coil—Reversing.....	---	4.	4.	4.	4.	4.	4.	---
7	Substitute Special Voltage or Frequency Magnet Coil—Non-Reversing.....	3.	3.	4.	5.	7.	8.	10.	11.
	Standard Voltages								
	110, 115, 120, 208, 220, 230, 240, 277, 380 (50 cycles), 440, 460, 480, 550, 600								
	Standard Frequencies								
	25, 50, 60 cycles								
8	Substitute Special Voltage or Frequency Magnet Coils (2)—Reversing.....	---	6.	8.	10.	14.	16.	20.	22.
9	Extra Auxiliary Contacts—For Field Installation.....								
	Listed on contactor pages								
10	Extra Auxiliary Contacts—Factory installed								
	Normally Open or Normally Closed	---	11.	11.	11.	11.	11.	11.	33.
	Normally Open and Normally Closed	---	22.	22.	---	---	---	---	---

① Transformers in NEMA 1, 3-4 and 5-12 enclosures have fused secondary.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

D-C CONTACTORS

Magnetic Non-Reversing



WHEN ORDERING SPECIFY

- Catalog number (Table 1).
- Voltage of coil.
- Mechanical interlocks if required, by catalog number (Table 5).
- Contactor Mounting Kit for size 3 and larger (Table 2). Sizes 1 and 2 are surface-mounted, front-of-panel wiring and do not require this information.
- Auxiliary contact number, if required (Table 3). Indicate factory installed, or if unit only, include mounting kit by catalog number (Table 4).

MAGNETICALLY HELD

Table 1

No. of Poles	Blow-out Coil Amp. Rating 120-240-550 V.	ENCLOSURE				No. of Poles	Blow-out Coil Amp. Rating 120-240-550 V.	ENCLOSURE				No. of Poles	Blowout Coil Amp. Rating 120-240-550 V.	ENCLOSURE						
		Open Type (Without Auxiliary Contact)		NEMA Type 1 (With 1 N.O. Auxiliary Contact)				Open Type (Without Auxiliary Contact)		NEMA Type 1 (With 1 N.O. Auxiliary Contact)				Open Type (Without Auxiliary Contact)		NEMA Type 1 (With 1 N.O. Auxiliary Contact)				
		Cat. No.	Price	Cat. No.	Price			Cat. No.	Price	Cat. No.	Price			Cat. No.	Price	Cat. No.	Price			
NEMA SIZE 1—1 25 AMPERES																				
Single Pole Normally Open	None	6002-H331	\$42.	6002-H383	\$71.	Two Pole Normally Open	None	6002-H458	\$59.	6002-H460	\$88.	Three Pole Normally Open 1 Normally Closed	None	6002-H480	\$110.	6002-H486	\$146.			
	1	H332	45.	H384	74.		1	H343	65.	H395	94.		1	H481	119.	H487	155.			
	2	H333	45.	H385	74.		2	H344	65.	H396	94.		2	H482	119.	H488	155.			
	5	H334	45.	H386	74.		5	H345	65.	H397	94.		5	H483	119.	H489	155.			
	10	H335	45.	H387	74.		10	H346	65.	H398	94.		10	H484	119.	H490	155.			
	25	H336	45.	H388	74.		25	H347	65.	H399	94.		25	H485	119.	H491	155.			
NEMA SIZE 2—1 50 AMPERES																				
Single Pole Normally Open	None	5	H337	\$49.	H389	\$98.	Two Pole Normally Open	None	5	H459	\$97.	H461	\$152.	Three Pole Normally Open 1 Normally Closed	5	5	H353	\$120.	H405	\$199.
	5	H338	53.	H390	102.	5		H348	105.	H400	162.	10	10		H354	120.	H406	199.		
	10	H339	53.	H391	102.	10		H349	105.	H401	162.	15	15		H355	120.	H407	199.		
	15	H340	53.	H392	102.	15		H350	105.	H402	162.	25	25		H356	120.	H408	199.		
	25	H341	53.	H393	102.	25		H351	105.	H403	162.	50	50		H357	120.	H409	199.		
	50	H342	53.	H394	102.	50		H352	105.	H404	162.	None	None		H502	116.	H507	195.		
NEMA SIZE 3—1 100 AMPERES																				
Single Pole Normally Open	None	5	H410	\$89.	H416	\$143.	Single Pole Normally Open	None	150	H452	\$104.	H454	\$183.	Single Pole Normally Open	None	---	H514	\$142.	H516	\$251.
	5	H411	94.	H417	148.	150		H453	114.	H455	193.	300	---		H515	152.	H517	261.		
	10	H412	94.	H418	148.															
	25	H413	94.	H419	148.															
	50	H414	94.	H420	148.															
	100	H415	94.	H421	148.															
Single Pole Normally Closed	None	5	H440	\$120.	H446	\$186.	Single Pole Normally Closed	None	150	H456	\$138.	H512	\$227.	Single Pole Normally Clos3d	---	None	H518	\$218.	H520	\$327.
	5	H441	125.	H447	191.	150		H457	148.	H513	237.	300	300		H519	228.	H521	337.		
	10	H442	125.	H448	191.															
	25	H443	125.	H449	191.															
	50	H444	125.	H450	191.															
	100	H445	125.	H451	191.															
NEMA SIZE 4—1 150 AMPERES																				
NEMA SIZE 5—1 300 AMPERES																				
NEMA SIZE 6—1 600 AMPERES																				
Single Pole N.O.	None	600	H522	\$289.	H524	\$428.	Single Pole Normally Open	810	H668	\$384.	W1	\$514.	---	---	---	---	---	---		
	600	H523	314.	H525	453.															
Single Pole N.C.	None	600	H670	499.	H672	638.	Single Pole Normally Open	810	H668	\$384.	W1	\$514.	---	---	---	---	---			
	600	H671	524.	H673	663.															

Prices include contactor and mounting material.

① Eight hour ampere rating.



D-C CONTACTORS

Magnetic Non-Reversing

1 CONTACTOR MOUNTING KITS

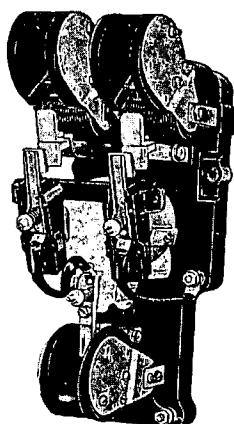
Table 2

NEMA Size	Type of Mounting	For Metal Panels		For Insulated Panels	
		Catalog Number	③ Price	Catalog Number	② Price
3	② Surface, Front-of-Panel Wiring.....	6002--	\$6.	6002--	\$6.
	Surface, Rear-of-Panel Wiring.....	H465		H474	
	Elevated, Front-of-Panel Wiring.....	H468		H477	
4	② Surface, Front-of-Panel Wiring.....	H630	6.	H631	6.
	Surface, Rear-of-Panel Wiring.....	H468		H477	
	Elevated, Front-of-Panel Wiring.....	H462		H471	
5	② Surface, Front-of-Panel Wiring.....	H466	12.	H475	12.
	Surface, Rear-of-Panel Wiring.....	H469		H478	
	Elevated, Front-of-Panel Wiring.....	H463		H472	
6 and 810 Ampere	② Surface, Front-of-Panel Wiring.....	H467	18.	H476	18.
	Surface, Rear-of-Panel Wiring.....	H470		H479	
	Elevated, Front-of-Panel Wiring.....	H464		H473	

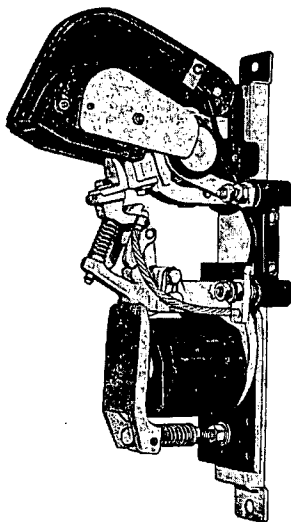
① Mounting kits include power studs and stud mounting as well as contactor mounting hardware.

② Lugs included.

③ Mounting Kit included in contactor price. Prices apply only when purchased separately.



Size 2
2 pole normally open



Size 4
1 Pole Normally Closed

AUXILIARY CONTACT UNITS

Table 3

Side Mounting Units for Size 1 and 2 Contactors				Bottom Mounting Units for All Contactors			
Contact Arrangement	Catalog Number	④ Price (Unit Only)	Price (Factory Installed)	Contact Arrangement	Catalog Number	④ Price (Unit Only)	Price (Factory Installed)
1 N.O.	10923-H6	\$6.	\$9.	1 N.O.	10923-H1	\$6.	\$9.
2 N.O.	H7	9.	12.	2 N.O.	H2	9.	12.
1 N.O.-1 N.C.	H8	9.	12.	1 N.O.-1 N.C.	H3	9.	12.
1 N.C.	H9	6.	9.	1 N.C.	H4	6.	9.
				2 N.C.	H5	9.	12.

AUXILIARY CONTACT MOUNTING KITS AND QUANTITY OF UNITS ACCEPTABLE PER CONTACTOR

Table 4

For Size and Type of Contactor		Location of Auxiliary Contacts on Contactor and Number of Units Kit Will Mount		Maximum Number of Units Acceptable per Contactor	Mounting KIT Catalog Number	Price
NEMA Size	Poles	Location	No. of Units			
1 and 2	1 N.O.	Bottom—Right and Left Side—Right or Left	2 1	2	10923-H11 H12	\$1.
	2 N.O.	Bottom—Right and Left Side—Left Only Side—Right Only	2 1 1	2	H14 H15 H16	
	2 N.O.—1 N.C.	Side—Left Only Side—Right Only	1 1	2	H15 H16	
3, 4 and 5	1 N.O.	Bottom—Left Only Bottom—Right and Left	1 2	2	H18 H19	1.
	⑤ 1 N.C.	Bottom—Right Only	1	1	H20	
6	1 N.O.	Bottom—Left Only Bottom—Right and Left	1 2	2	H18 H19	1.
	⑤ 1 N.C.	Bottom—Right Only	1	1	⑤	
810 Ampere	1 N.O.	Bottom—Left Only	1	2	H18 H19	1.
		Bottom—Right and Left	2			

④ Unit only without mounting hardware. Order mounting kit by catalog number.

⑤ 10923H19 supplied with contactor as standard. No charge.

⑥ When auxiliary contact is mounted on normally closed contactor the unit is actuated when the contactor is in the normal or closed position. Therefore a N.O. contact will become N.C. and a N.C. circuit will become N.O.

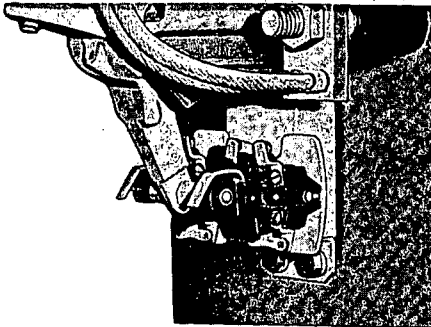
3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

D-C CONTACTORS**Magnetic Non-Reversing****MECHANICAL INTERLOCKS—FOR INTERLOCKING TWO CONTACTORS**

Table 5



Closeup of Auxiliary Contacts on Size 6 Contactor

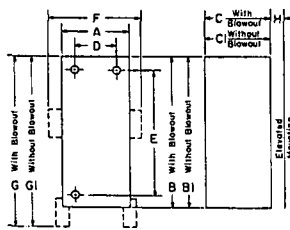
For Size and Type of Contactor		Type of Panel and Contactor Mounting		Catalog Number	Price
NEMA Size	Poles	Panel	Mounting		
1 and 2	1 2 and 3	Metal or Insulated	Surface	6002- H634 H635	\$16.50
3	1	Metal Insulated	Surface Elevated Surface Elevated	H636 H637 H638 H639	25.
4	1	Metal Insulated	Surface Elevated Surface Elevated	H640 H641 H642 H643	25.
5	1	Metal Insulated	Surface Elevated Surface Elevated	H644 H645 H646 H647	25.
6 and 810 Ampere	1	Metal Insulated	Surface Elevated Surface Elevated	H648 H649 H650 H651	25.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS**OPEN TYPE**

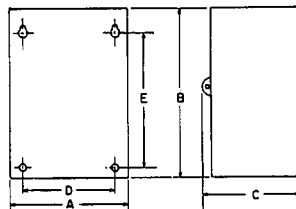
Size	Poles	Dimensions in Inches											Ship. Wt. Lbs.
		Wide	High		Deep		Mounting		With Auxiliary Contacts			H	
			A	B	B ¹	C	C ¹	D	E	F	G			G^{1}
1 and 2	1 N.O.	3	8¾	6½	6	5¾	2¼	4½	7¾	10¾	9¾	---	6
	2 N.O.	5¾	8¾	8¾	6¾	6½	5	4¾	10¾	11¾	11¾	---	10
	2 N.O.—1 N.C.	5¾	12¾	12¾	6¾	6½	5	8¾	10¾	---	---	---	13
3	1 N.O.	4¼	12¾	12¼	7¼	6¾	---	11¼	4½	12¾	12¾	1¾	11
	1 N.C.	4¼	13¾	13¾	7¼	5¾	---	12¾	5	13¾	13¾	1¾	13
4	1 N.O.	4¼	12¾	12¾	8	6¾	---	12½	4½	12¾	12¾	1¾	16
	1 N.C.	4¼	15¾	15¾	8	6½	---	15	5¾	15¾	15¾	1¾	18
5	1 N.O.	5¾	16¾	16¾	10	8	1¼	16	5¾	16¾	16¾	1¾	26
	1 N.C.	5¾	18¾	18¾	10	7½	1¼	18	6¾	18¾	18¾	1¾	34
6	1 N.O.	7¾	18¾	18¾	12¼	9½	1¼	17½	7¾	18¾	18¾	1¾	43
	1 N.C.	7¾	22¾	22¾	12¼	9¾	1¼	22	7¾	22¾	22¾	1¾	66
810 Amps.	1 N.O.	7¾	18¾	18¾	12¼	9½	1¼	17½	7¾	18¾	18¾	1¾	45

NEMA 1

Size	Poles	Dimensions in Inches					Ship. Wt. Lbs.
		Wide	High	Deep	Mounting		
					A	B		C	D	E
1 and 2	1 N.O.	7 $\frac{7}{8}$	14 $\frac{1}{8}$	9 $\frac{1}{8}$	5 $\frac{1}{2}$	12	21
	2 and 3	11 $\frac{1}{8}$	17 $\frac{3}{4}$	10 $\frac{3}{8}$	9	15	30
3 and 4	1 N.O.	8 $\frac{3}{8}$	18 $\frac{1}{4}$	12 $\frac{1}{8}$	6	15 $\frac{1}{2}$	46
	1 N.C.	9 $\frac{1}{4}$	20 $\frac{1}{4}$	12 $\frac{1}{8}$	7	18	50
5	All	12 $\frac{3}{8}$	24 $\frac{3}{8}$	15 $\frac{3}{8}$	9 $\frac{3}{8}$	22	65
6	All	14 $\frac{3}{8}$	30 $\frac{3}{8}$	19 $\frac{3}{8}$	12	28	96



Open Type



NEMA 1



A-C AND D-C RELAYS

D-c Heavy Duty Mill Relays

WHEN ORDERING SPECIFY

For Factory Assembled Relays:

- Relay Catalog number
- Coil Voltage suffix number
- Quantity and catalog number of unit circuit blocks

EXAMPLE: 6011H2103, three 6011H7, one 6011H8, Price \$88.00.

Example relay — 8 circuit frame relay, 230 volt coil, three (3) 2 normally open circuit blocks and one (1) 2 normally closed circuit block.

For Relay with Circuit Blocks unassembled:

- Add suffix, -1, to the combined relay-coil voltage ordering number.

EXAMPLE: 6011H2103-1, three 6011H7, one 6011H8, Price \$81.00.

DESCRIPTION

Basic relay supplied with armature and coil assembled. Operating coils interchangeable with sizes 2, 4 and 5 D-c contactor coils. For steel or insulated panel mounting, front or rear connection.

Unit circuit blocks each have 2 captivated mounting screws. Each circuit has double break contacts. Contact blocks convertible from normally open to normally closed and vice versa. Blocks interchangeable between relays. Rated 5 amps., 240 volts — 10 amps., 120 volts.

RELAYS

Maximum Circuit Capacity of Relay Frame	Catalog Number	Number of Circuits Assembled	Price
4 (2 double circuit blocks)	6011-H1	0	\$42.
		1	49.
		2	52.
		3	57.
		4	62.
8 (4 double circuit blocks)	H2	0	45.
		1	52.
		2	55.
		4	65.
		6	76.
18 (9 double circuit blocks)	H3	8	88.
		0	51.
		6	82.
		8	94.
		10	102.
		12	112.
		14	124.
		16	136.
		18	148.

UNIT CIRCUIT BLOCKS

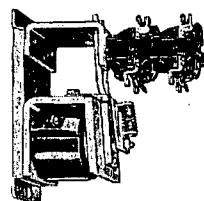
① Mounting screws included

Circuit Arrangement	Cat. No.	Price
1 N.O.	6011-H4	\$6.
1 N.C.	H5	6.
1 N.O.-1 N.C.	H6	9.
2 N.O.	H7	9.
2 N.C.	H8	9.

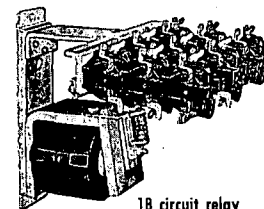
① When mounting circuit blocks, DO NOT exceed maximum capacity of relay frame.

COILS

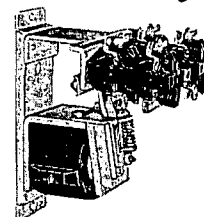
Coil Voltage	Coil Suffix No.
115 V.	101
230 V.	103
550 V.	109



4 circuit relay

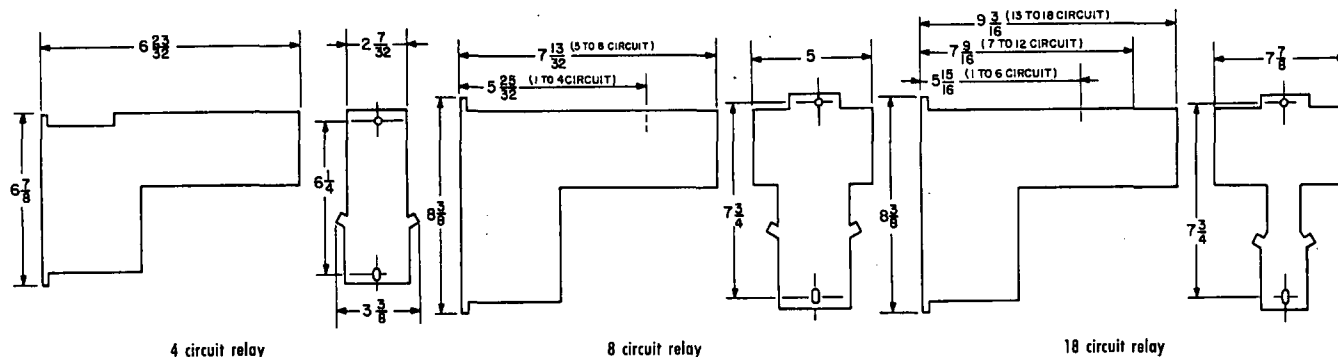


18 circuit relay



8 circuit relay

APPROXIMATE DIMENSIONS



A-C AND D-C RELAYS



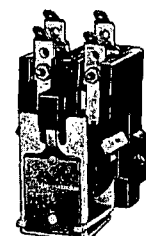
Type AA—Single Pole General Purpose Relays

WHEN ORDERING SPECIFY

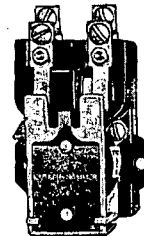
- Catalog number
- Voltage of magnet coil (and frequency for A-C)

DESCRIPTION

Type AA panel mounted relays are rated 600 volts maximum A-C, 230 volts maximum D-C. They are horsepower and current rated except the 30 ampere type. Single Pole Single Throw (SPST) Relays are field convertible. Screw or quick connect tab terminals are available on all except 30 ampere size.



With quick connect tabs



With screw type terminals

Magnet Coils										D-c—6, 12, 24, 48, 115 and 230 Volts					
A-c— 6, 12, 24, 32, 115, 230, 440, 550 Volts, 25, 50, 60 Cycles and 380 Volts, 50 Cycles.															
Poles, Throw and Terminals	Contacts	Rating				Open Type				Price	General Purpose NEMA 1 Enclosed				Price
						Catalog Numbers					Catalog Numbers				
		Current		Horsepower		Screw Terminals		Quick Connect Tabs			Screw Terminals		Quick Connect Tabs		
		Volts	Amps. Cont.	115 Volts	230 Volts	A-C Coil	D-C Coil	A-C Coil	D-C Coil		A-C Coil	D-C Coil	A-C Coil	D-C Coil	
A-C RELAYS															
SPST-2 Term.	N.O. N.C.	6 to 550	①16	1	2	9575- H2441 H2442	9575- H2521 H2522	9575- H2443 H2444	9575- H2523 H2524	\$5.50	9575- H2450 H2451	9575- H2546 H2547	9575- H2452 H2453	9575- H2548 H2549	\$8.
SPST-2 Term.	N.O.	250	②30	---	---	H2516	---	---	---	6.	H2545	---	---	---	8.50
SPDT-3 Term.	③N.O.-N.C.	6 to 550	①16	1	2	H2525 H2526	H2537 H2538	H2527 H2528	H2541 H2542	6.75 7.	H2529 H2530	H2539 H2540	---	---	9.25 9.50
SPDT-4 Term.															
D-C RELAYS															
SPST-2 Term.	N.O. N.C.	115-230	15	½	⅓	H2517 H2518	H2445 H2446	H2519 H2520	H2447 H2448	8.	W1 W2	H2454 H2455	W3 W4	H2456 H2457	10.50
SPDT-3 Term.	③N.O.-N.C.	115-230	10	④½	④⅓	W5 W6	H2531 H2532	W7 W8	H2533 H2534	9.25 9.50	W9 W10	H2535 H2536	---	---	11.75 12.
NEMA Type 1 Enclosure only—Cat. No. 9575H2449.															\$2.50
Quantity prices on application															

① Based on inductive load.

② Based on non-inductive (Resistive) load.

③ Normally open and normally closed (N.O. & N.C.) contacts must be on the same polarity.

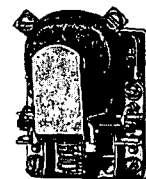
④ Horsepower rating applies to normally open (N.O.) contact only. Normally closed (N.C.) contact is not horsepower rated.

Type AG—Special Purpose Relays

WHEN ORDERING SPECIFY • Catalog number

DESCRIPTION

Type AG relays are horsepower and ampere rated at 230 volts maximum A-C and D-C. They are Double pole Single throw (DPST) with 3 wire thermostats or pushbutton control.



Poles, Throw and Terminals	Contacts	Contact Ratings				Cy.	3 Wire Pushbutton Control Circuit						3 Wire Thermostat Control Circuit					
		Amps. (Non-Inductive)		Horse-power			Open Type		Gen. Purpose NEMA 1		Open Type		Gen. Purpose NEMA 1					
							Cat. Nos.	Price	Cat. Nos.		Price	Cat. Nos.		Price	Cat. Nos.		Price	
		115 Volts	230 Volts	115 Volts	230 Volts				115 Volts	230 Volts		115 Volts	230 Volts					
A-C RELAY																		
DPST-4 Term.	N.O.	10	10	¼	¼	60 50 25	9575-H1726 H1728 H1730	9575-H1727 H1729 H1731	\$10.	9575-H776 H774 H772	9575-H777 H775 H773	\$12.50	9575-H1732 H1734 H1736	9575-H1733 H1735 H1737	\$11.	9575-H797 H795 H793	9575-H798 H796 H794	\$14.
D-C RELAY																		
DPST-4 Term.	N.O.	7	3	¼	¼	---	6001-W11	6001-W12	\$12.50	6001-H429	6001-H430	\$15.50	6001-W13	6001-W14	\$12.50	6001-H437	6001-H438	\$15.50

DIMENSIONS, page 169

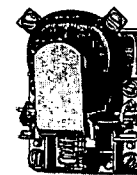
DISCOUNT SCHEDULE 1CD

CUTLER-HAMMER

**A-C AND D-C RELAYS****Type AF—Two Pole General Purpose Relays**

WHEN ORDERING SPECIFY • Catalog number

DESCRIPTION Type AF relays are horsepower and ampere rated at 230 volts maximum A-C and D-C. They are Double pole single throw (DPST) for general purpose applications.



Poles, Throw, and Terminals	Con-tacts	Contact Ratings						Cy.	Open Type					Price	General Purpose NEMA 1 Enclosed					Price
		Amps. (Non-Inductive)			Horse-power				Catalog Numbers						Catalog Numbers					
		6 to 24 Volts	115 Volts	230 Volts	115 Volts	230 Volts	6 Volts		12 Volts	24 Volts	115 Volts	230 Volts	6 Volts		12 Volts	24 Volts	115 Volts	230 Volts		
		A-C RELAYS																		
DPST-4 Term.	N.O.	10	10	10	¼	¼	60 50 25	9575-H676 H671 H666	9575-H677 H672 H667	9575-H678 H673 H668	9575-H679 H674 H669	9575-H680 H675 H670	\$8.50	9575-H752 H747 H742	9575-H753 H748 H743	9575-H754 H749 H744	9575-H755 H750 H745	9575-H756 H751 H746	\$11.	
DPST-4 Term.	N.C.	5	5	5	---	---	60 50 25	H691 H686 H681	H692 H687 H682	H693 H688 H683	H694 H689 H684	H695 H690 H685	10.	H767 H762 H757	H768 H763 H758	H769 H764 H759	H770 H765 H760	H771 H766 H761	12.50	
D-C RELAYS																				
DPST-4 Term.	N.O.	10	7	3	¼	¼	---	6001-H387	6001-H388	6001-H389	6001-H391	6001-H392	\$10.	6001-H417	6001-H418	6001-H419	6001-H421	6001-H422	\$12.50	
DPST-4 Term.	N.C.	10	5	3	---	---	---	H393	H394	H395	H397	H398	16.50	H423	H424	H425	H427	H428	19.	
Separate NEMA 1 Enclosure Only—Cat. No. 9575H2221																			\$2.50	

Separate NEMA 1 Enclosure Only—Cat. No. 9575H2221

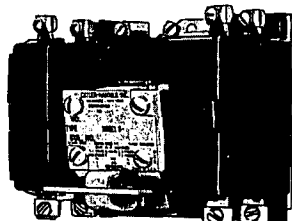
Type BG—Multi-pole Control Relays with Convertible Circuits

WHEN ORDERING SPECIFY

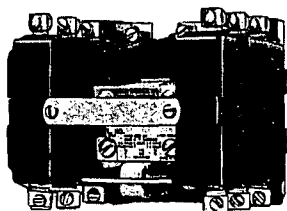
- Catalog number
- Voltage and frequency

DESCRIPTION

Type BG steel panel mounted relays are ampere rated at 600 volts maximum A-C. Contacts are field convertible and the relays are available in 2 to 8 pole construction. All terminals have pressure connectors.



4 Pole



6-Pole

Ratings—Continuous-Inductive or Non-Inductive Load 6, 12, 24, 32, 110, 208/220, 440, 550 Volts, 25, 50, 60 Cycles and 380 Volts, 50 Cycles										
Total	Poles		10 Ampere				15 Ampere			
			Open Type		General Purpose NEMA 1		Open Type		General Purpose NEMA 1	
			Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
2	2	0	9575-H2000	\$15.	9575-H2025	\$18.	9575-H1921	\$21.	9575-H1946	\$24.
	1	1	H2001	18.	H2026	21.	H1922	24.	H1947	27.
	0	2	H2002	18.	H2027	21.	H1923	24.	H1948	27.
3	3	0	H2003	18.	H2028	21.	H1924	24.	H1949	27.
	2	1	H2004	21.	H2029	24.	H1925	27.	H1950	30.
	1	2	H2005	21.	H2030	24.	H1926	27.	H1951	30.
4	4	0	H2007	20.	H2032	23.	H1928	26.	H1953	29.
	3	1	H2008	23.	H2033	26.	H1929	29.	H1954	32.
	2	2	H2009	23.	H2034	26.	H1930	29.	H1955	32.
5	5	0	H2010	23.	H2035	26.	H1931	29.	H1956	32.
	4	1	H2011	23.	H2036	26.	H1932	29.	H1957	32.
	3	2	---	---	---	---	H1933	35.	H1958	38.
6	6	0	---	---	---	---	H1934	38.	H1959	41.
	5	1	---	---	---	---	H1935	38.	H1960	41.
	4	2	---	---	---	---	H1936	38.	H1961	41.
7	7	0	---	---	---	---	H1937	38.	H1962	41.
	6	1	---	---	---	---	H1938	40.	H1963	43.
	5	2	---	---	---	---	---	---	---	---
8	8	0	H2018	30.	H2043	33.	H1939	40.	H1964	43.
	7	1	H2019	33.	H2044	36.	H1940	43.	H1965	46.
	6	2	H2020	33.	H2045	36.	H1941	43.	H1966	46.
9	9	0	H2021	33.	H2046	36.	H1942	43.	H1967	46.
	8	1	H2022	33.	H2047	36.	H1943	43.	H1968	46.
	7	2	H2023	35.	H2048	38.	H1944	45.	H1969	48.
10	10	0	H2024	35.	H2049	38.	H1945	45.	H1970	48.
	9	1	---	---	---	---	---	---	---	---
	8	2	---	---	---	---	---	---	---	---
11	11	0	H2086	36.	---	---	H2103	46.	---	---
	10	1	H2087	39.	---	---	H2104	49.	---	---
	9	2	H2088	39.	---	---	H2105	49.	---	---
12	12	0	H2089	39.	---	---	H2106	49.	---	---
	11	1	H2090	39.	---	---	H2107	49.	---	---
	10	2	H2091	41.	---	---	H2108	51.	---	---
13	13	0	H2092	41.	---	---	H2109	51.	---	---
	12	1	H2093	41.	---	---	H2110	51.	---	---
	11	2	H2094	41.	---	---	H2111	51.	---	---

Separate NEMA 1 enclosure only (max. of 6 poles)—Cat. No. 9575H2440

DISCOUNT SCHEDULE ICD

DIMENSIONS, page 169

CUTLER-HAMMER

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

A-C CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

A-C AND D-C RELAYS



Type CF — "Compact 300" A-C Multi-pole Industrial Control Relay

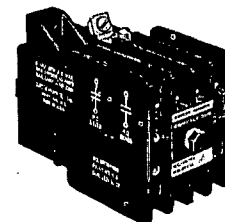
FIXED CIRCUITS WITH AND WITHOUT MECHANICAL LATCH

WHEN ORDERING SPECIFY

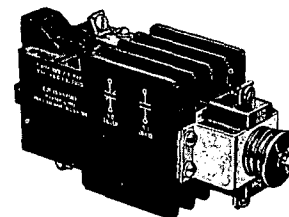
- Catalog number
- Voltage and frequency

DESCRIPTION

Type CF high speed relays have a maximum rating of 6 amperes 300 volts A-C. They are available with 2 to 8 poles in any combination of normally open and normally closed fixed circuit bifurcated contacts. Captivated pressure plates or dual quick connect tabs may be selected. A mechanical latch attachment can be factory or field installed.



Without Mechanical Latch



With Mechanical Latch

Ratings: 6 amperes, 300 volts maximum—40 amperes maximum inrush
Standard Coils: 6, 12, 24, 32, 110, 115, 115/120 (60 cycles), 208/220, 230 volts—25, 50 60 cycles

Poles			Relay Without Mechanical Latch						Relay With Mechanical Latch		
			Open Type			NEMA Type 1 Enclosed			Open Type		
Total	Normally Open	Normally Closed	With Pressure Connector Terminals	With Dual Quick Connect Tabs	Price	With Pressure Connector Terminals	With Dual Quick Connect Tabs	Price	With Pressure Connector Terminals	With Dual Quick Connect Tabs	Price
2	2	0	9575-H2242	9575-H2270	\$11.	9575-H2384	9575-H2412	\$14.	9575-H2459	9575-H2487	\$23.
2	1	1	H2243	H2271	10.50	H2385	H2413	13.50	H2460	H2488	22.50
2	0	2	H2244	H2272	11.	H2386	H2414	14.	H2461	H2489	23.
3	3	0	H2245	H2273	12.50	H2387	H2415	15.50	H2462	H2490	24.50
3	2	1	H2246	H2274	11.50	H2388	H2416	14.50	H2463	H2491	23.50
3	1	2	H2247	H2275	11.50	H2389	H2417	14.50	H2464	H2492	23.50
3	0	3	H2248	H2276	12.50	H2390	H2418	15.50	H2465	H2493	24.50
4	4	0	H2249	H2277	14.	H2391	H2419	17.	H2466	H2494	26.
4	3	1	H2250	H2278	13.	H2392	H2420	16.	H2467	H2495	25.
4	2	2	H2251	H2279	12.	H2393	H2421	15.	H2468	H2496	24.
4	1	3	H2252	H2280	13.	H2394	H2422	16.	H2469	H2497	25.
4	0	4	H2253	H2281	14.	H2395	H2423	17.	H2470	H2498	26.
6	6	0	H2254	H2282	17.	H2396	H2424	20.	H2471	H2499	29.
6	5	1	H2255	H2283	17.	H2397	H2425	20.	H2472	H2500	29.
6	4	2	H2256	H2284	15.	H2398	H2426	18.	H2473	H2501	27.
6	3	3	H2257	H2285	14.	H2399	H2427	17.	H2474	H2502	26.
6	2	4	H2258	H2286	15.	H2400	H2428	18.	H2475	H2503	27.
6	1	5	H2259	H2287	17.	H2401	H2429	20.	H2476	H2504	29.
6	0	6	H2260	H2288	17.	H2402	H2430	20.	H2477	H2505	29.
8	8	0	H2261	H2289	20.	H2403	H2431	23.	H2478	H2506	32.
8	7	1	H2262	H2290	20.	H2404	H2432	23.	H2479	H2507	32.
8	6	2	H2263	H2291	18.	H2405	H2433	21.	H2480	H2508	30.
8	5	3	H2264	H2292	18.	H2406	H2434	21.	H2481	H2509	30.
8	4	4	H2265	H2293	16.	H2407	H2435	19.	H2482	H2510	28.
8	3	5	H2266	H2294	18.	H2408	H2436	21.	H2483	H2511	30.
8	2	6	H2267	H2295	18.	H2409	H2437	21.	H2484	H2512	30.
8	1	7	H2268	H2296	20.	H2410	H2438	23.	H2485	H2513	32.
8	0	8	H2269	H2297	20.	H2411	H2439	23.	H2486	H2514	32.

Relay Accessories

Separate Mechanical latch with Screw Terminals.....	Catalog No.	Price
Separate Mechanical latch with Quick Connect Tabs.....	9575H2458	\$12.
NEMA 1 Enclosure Only (For Relay without Latch).....	9575H2515	12.
	9575H2440	3.

**A-C AND D-C RELAYS****Type CF—"Compact 300" D-c Multi-pole Industrial Control Relay
FIXED CIRCUIT**

WHEN ORDERING SPECIFY

• Catalog Number

• Voltage

DESCRIPTION

Type CF D-c relays are dimensionally identical to the Type CF A-c relays. The relays are available with 2 to 8 poles and with either captivated pressure plates or dual quick connect tab terminals. These D-c relays are not offered with 8 normally closed circuits or with the mechanical latch attachment.

D-c Ratings: **48 volts** **120 volts** **240 volts**
 Resistive 6 amps. 3 amps. 0.5 amps.
 Inductive 2.75 amps. 1.1 amps. ---
 Standard D-c Coils: 6, 12, 24, 48, 115 and 230 volts.

Poles			Open Type			NEMA 1 Enclosed		
Total	Normally Open	Normally Closed	Pressure Connector Terminals	Dual Quick Connect Tabs	Price	Pressure Connector Terminals	Dual Quick Connect Tabs	Price
2	2	0	9575- H2550	9575- H2577	\$16.	9575- W15	9575- W16	\$19.
2	1	1	H2551	H2578	15.50	W17	W18	18.50
2	0	2	H2552	H2579	16.	W19	W20	19.
3	3	0	H2553	H2580	17.50	W21	W22	20.50
3	2	1	H2554	H2581	16.50	W23	W24	19.50
3	1	2	H2555	H2582	16.50	W25	W26	19.50
3	0	3	H2556	H2583	17.50	W27	W28	20.50
4	4	0	H2557	H2584	19.	W29	W30	22.
4	3	1	H2558	H2585	18.	W31	W32	21.
4	2	2	H2559	H2586	17.	W33	W34	20.
4	1	3	H2560	H2587	18.	W35	W36	21.
4	0	4	H2561	H2588	19.	W37	W38	22.
6	6	0	H2562	H2589	22.	W39	W40	25.
6	5	1	H2563	H2590	22.	W41	W42	25.
6	4	2	H2564	H2591	20.	W43	W44	23.
6	3	3	H2565	H2592	19.	W45	W46	22.
6	2	4	H2566	H2593	20.	W47	W48	23.
6	1	5	H2567	H2594	22.	W49	W50	25.
6	0	6	H2568	H2595	22.	W51	W52	25.
8	8	0	H2569	H2596	25.	W53	W54	28.
8	7	1	H2570	H2597	25.	W55	W56	28.
8	6	2	H2571	H2598	23.	W57	W58	26.
8	5	3	H2572	H2599	23.	W59	W60	26.
8	4	4	H2573	H2600	21.	W61	W62	24.
8	3	5	H2574	H2601	23.	W63	W64	26.
8	2	6	H2575	H2602	23.	W65	W66	26.
8	1	7	H2576	H2603	25.	W67	W68	28.

NEMA 1 enclosure only 9575H2440 \$3.

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

A-C AND D-C RELAYS



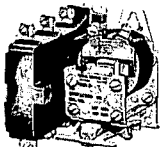
Type BC—Compact Control Relays with Convertible Circuits

WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency

DESCRIPTION

Type BC relays are similar to the type BG. They are dimensionally smaller and range from 2 to 4 poles.



3 Pole

Ratings—Continuous—Inductive or Non-Inductive Load 6, 12, 24, 32, 110, 208/220, 440, 550 Volts, 25, 50, 60 Cycles and 380 Volts, 50 Cycles.

Poles			Open Type			
			10 Amps.		15 Amps.	
Total	N.O.	N.C.	Cat. No.	Price	Cat. No.	Price
2	2	0	9575-		9575-	
	1	1	H2064	\$15.	H2071	\$21.
	0	2	H2065	18.	H2072	24.
3	3	0	H2066	18.	H2073	24.
	2	1	H2067	18.	H2074	24.
	1	2	H2068	21.	H2075	27.
	0	3	H2069	21.	H2076	27.
4	4	0	H2070	21.	H2077	27.
	3	1	H2211	20.	H2216	26.
	2	2	H2212	23.	H2217	29.
	1	3	H2213	23.	H2218	29.
	0	4	H2214	23.	H2219	29.
			H2215	23.	H2220	29.

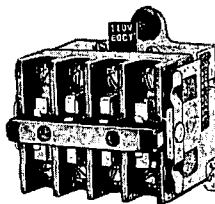
Type BJ—Control Relays with Fixed Circuits

WHEN ORDERING SPECIFY

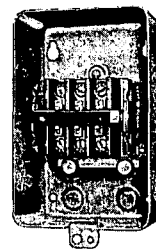
- Catalog number

DESCRIPTION

Type BJ relays have a maximum rating of 10 amperes 550 volts A-C. Available from 2 to 5 poles with various combinations of normally open and normally closed fixed circuits.



Open Type



NEMA 1

CONTACT RATINGS

Normally Open—10 Amperes

Normally Closed—5 Amperes

Poles			Open Type					General Purpose NEMA 1 Enclosed				
			Catalog Numbers				Price	Catalog Numbers				Price
Total	N.O.	N.C.	110 Volts	220 Volts	440 Volts	550 Volts		110 Volts	220 Volts	440 Volts	550 Volts	
60 CYCLES												
2	2	0	9575- H1817	9575- H1818	9575- H1819	9575- H1820	\$13.	9575- H1869	9575- H1870	9575- H1871	9575- H1872	\$16.
	1	1	H1830	H1831	H1832	H1833	16.	H1882	H1883	H1884	H1885	19.
	0	2	H1843	H1844	H1845	H1846	16.	H1895	H1896	H1897	H1898	19.
3	3	0	H1603	H1604	H1605	H1606	16.	H1642	H1643	H1644	H1645	19.
	2	1	H1395	H1396	H1397	H1398	19.	H1455	H1456	H1457	H1458	22.
	1	2	H1856	H1857	H1858	H1859	19.	H1908	H1909	H1910	H1911	22.
4	4	0	H1616	H1617	H1618	H1619	17.	H1655	H1656	H1657	H1658	20.
	3	1	H1419	H1420	H1421	H1422	20.	H1479	H1480	H1481	H1482	23.
	2	2	H1407	H1408	H1409	H1410	20.	H1467	H1468	H1469	H1470	23.
5	5	0	H1629	H1630	H1631	H1632	25.	H1668	H1669	H1670	H1671	28.
	4	1	H1443	H1444	H1445	H1446	28.	H1503	H1504	H1505	H1506	31.
	3	2	H1431	H1432	H1433	H1434	28.	H1491	H1492	H1493	H1494	31.
50 CYCLES												
2	2	0	H1821	H1822	H1824	H1825	\$13.	H1873	H1874	H1876	H1877	\$16.
	1	1	H1834	H1835	H1837	H1838	16.	H1886	H1887	H1889	H1890	19.
	0	2	H1847	H1848	H1850	H1851	16.	H1899	H1900	H1902	H1903	19.
3	3	0	H1607	H1608	H1610	H1611	16.	H1646	H1647	H1649	H1650	19.
	2	1	H1399	H1400	H1401	H1402	19.	H1459	H1460	H1461	H1462	22.
	1	2	H1860	H1861	H1863	H1864	19.	H1912	H1913	H1915	H1916	22.
4	4	0	H1620	H1621	H1623	H1624	17.	H1659	H1660	H1662	H1663	20.
	3	1	H1423	H1424	H1425	H1426	20.	H1483	H1484	H1485	H1486	23.
	2	2	H1411	H1412	H1413	H1414	20.	H1471	H1472	H1473	H1474	23.
5	5	0	H1633	H1634	H1636	H1637	25.	H1672	H1673	H1675	H1676	28.
	4	1	H1447	H1448	H1449	H1450	28.	H1507	H1508	H1509	H1510	31.
	3	2	H1435	H1436	H1437	H1438	28.	H1495	H1496	H1497	H1498	31.

DIMENSIONS, page 169

DISCOUNT SCHEDULE ICD

CUTLER-HAMMER

**A-C AND D-C RELAYS****Type DM—Mechanically Held Multi-pole Relays**

WHEN ORDERING SPECIFY

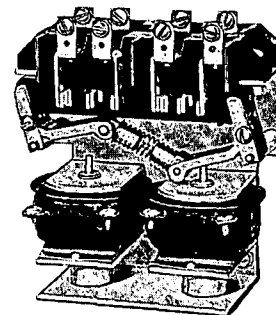
• Catalog number

DESCRIPTION

A-C Relays are rated 10 amperes, non-inductive, 550 volts maximum. These are multi-pole relays, one to six poles, available in various combinations of normally open and normally closed contacts. The relays have two coils, a "closing" and tripping coil. Either coil is momentarily energized and the relay is then mechanically held.

D-C Relays are similar to A-C relays but are rated 10 amperes 115 volts, 1.8 amperes 230 volts non-inductive.

7 amperes 115 volts, 1.1 amperes 230 volts inductive.



Open Type

A-C RELAYS

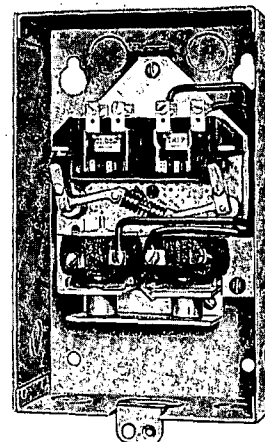
CONTACT RATING
10 Amperes, Non-Inductive

Contacts			Open Type					General Purpose NEMA 1 Enclosed				
Total	Nor- mally Open N.O.	Nor- mally Closed N.C.	Catalog Numbers				Price	Catalog Numbers				Price
			110 Volts	220 Volts	440 Volts	550 Volts		110 Volts	220 Volts	440 Volts	550 Volts	
60 CYCLES												
1	1	0	9575- H1195	9575- H1196	9575- H1197	9575- H1198	\$44.	9575- H1221	9575- H1222	9575- H1223	9575- H1224	\$46.
2	2	0	H1013	H1014	H1015	H1016	44.	H1104	H1105	H1106	H1107	46.
	1	1	H1208	H1209	H1210	H1211	48.	H1234	H1235	H1236	H1237	50.
3	3	0	H1052	H1053	H1054	H1055	48.	H1143	H1144	H1145	H1146	50.
	2	1	H1026	H1027	H1028	H1029	52.	H1117	H1118	H1119	H1120	54.
4	3	1	H1065	H1066	H1067	H1068	55.	H1156	H1157	H1158	H1159	57.
	2	2	H1039	H1040	H1041	H1042	55.	H1130	H1131	H1132	H1133	57.
5	3	2	H1078	H1079	H1080	H1081	70.	H1169	H1170	H1171	H1172	72.
6	3	3	H1091	H1092	H1093	H1094	70.	H1182	H1183	H1184	H1185	72.
50 CYCLES												
1	1	0	H1199	H1200	H1202	H1203	44.	H1225	H1226	H1228	H1229	46.
2	2	0	H1017	H1018	H1020	H1021	44.	H1108	H1109	H1111	H1112	46.
	1	1	H1212	H1213	H1215	H1216	48.	H1238	H1239	H1241	H1242	50.
3	3	0	H1056	H1057	H1059	H1060	48.	H1147	H1148	H1150	H1151	50.
	2	1	H1030	H1031	H1033	H1034	52.	H1121	H1122	H1124	H1125	54.
4	3	1	H1069	H1070	H1072	H1073	55.	H1160	H1161	H1163	H1164	57.
	2	2	H1043	H1044	H1046	H1047	55.	H1134	H1135	H1137	H1138	57.
5	3	2	H1082	H1083	H1085	H1086	70.	H1173	H1174	H1176	H1177	72.
6	3	3	H1095	H1096	H1098	H1099	70.	H1186	H1187	H1189	H1190	72.

D-C RELAYS

CONTACT RATING
10 Amperes 115 Volts, 1.8 Amperes 230 Volts—Non-Inductive
7 Amperes 115 Volts, 1.1 Amperes 230 Volts—Inductive

Contacts			Open Type			General Purpose NEMA 1 Enclosed		
Total	Normal- ly Open N.O.	Normal- ly Closed N.C.	Catalog Number		Price	Catalog Number		Price
			115 Volts	230 Volts		115 Volts	230 Volts	
1	1	0	6001- H599	6001- H600	\$46.	6001- H603	6001- H604	\$48.
2	2	0	H571	H572	46.	H585	H586	48.
	1	1	H601	H602	52.	H605	H606	54.
3	3	0	H577	H578	49.	H591	H592	51.
	2	1	H573	H574	57.	H587	H588	59.
4	3	1	H579	H580	60.	H593	H594	62.
	2	2	H575	H576	60.	H589	H590	62.
5	3	2	H581	H582	73.	H595	H596	75.
6	3	3	H583	H584	76.	H597	H598	78.



NEMA 1

DISCOUNT SCHEDULE ICD

DIMENSIONS, page 169

CUTLER-HAMMER

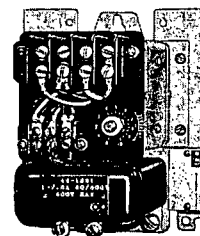
3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

A-C AND D-C RELAYS

Type LR-A-c Load Relays



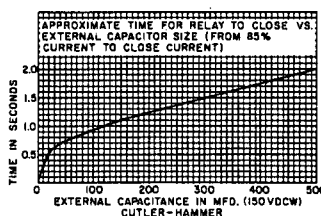
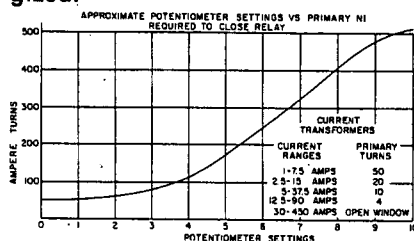
WHEN ORDERING SPECIFY

- Catalog number
- Current range number

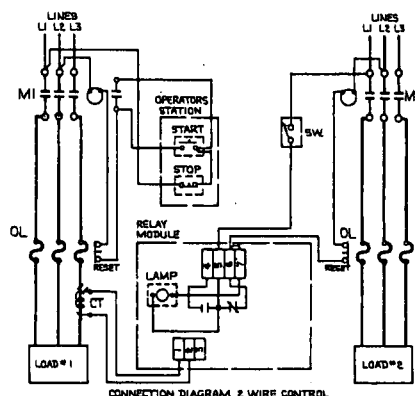
DESCRIPTION

Type LR relays are current sensing load relays. Five load ranges are available from 1 ampere minimum to 450 amperes maximum. Range setting is adjustable in a ratio of 7 to 1. Repeat accuracy is plus or minus 2% with maximum differential of 15%. A neon indicating light is used to show if relay is energized.

Tripping point is in ampere turns. Multiply current to be monitored by current transformer primary turns. Standard relay operation provides pick up in 50 milli-seconds, drop out 16 milli-seconds after deenergizing. Time delay pickup for current values between 85-100% of setting can be provided with external capacitance as shown below.



TYPICAL WIRING DIAGRAM



SPDT Contact Ratings, Inductive 600 Volts A-c Maximum Pilot Duty, 50-60 Cycles			
110-125 Volts	220-250 Volts	440-480 Volts	550-600 Volts
3.0	1.5	.75	.6
30.	15.	7.5	6.0

Continuous Amperes.....
Inrush Amperes.....

Complete Relay					Components				
Current Range No.	Open Type		NEMA Type 1		Current Range No.	Open Type		NEMA Type 1	
	Cat. No.	Price	Cat. No.	Price		Cat. No.	Price	Cat. No.	Price
With Local Current Transformer					Module Only				
#1 (1-7.5 Amps.)	13542H3	\$60.	13542H4	\$67.	---	13542H1	\$39.	13542H2	\$46.
#2 (2.5-15 Amps.)									
#3 (5-37.5 Amps.)									
#4 (12.5-90 Amps.)									
With Remote Current Transformer					Transformer Only				
#1 (1-7.5 Amps.)	13542H5	56.	13542H6	63.	#1 (1-7.5 Amps.)	13542H7	17	---	---
#2 (2.5-15 Amps.)					13542H8	---			
#3 (5-37.5 Amps.)					13542H9	---			
#4 (12.5-90 Amps.)					13542H10	---			
#5 (30-450 Amps.)					13542H11	---			

Optional Remote Potentiometer with Operator, Cat. No. 10250H4121.....

\$20.

① Module only is enclosed.

DIMENSIONS, page 169

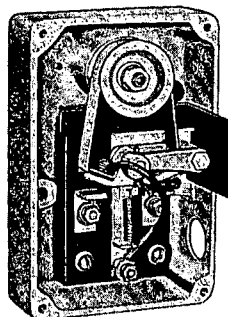
Type PR - Plugging Relay

WHEN ORDERING SPECIFY

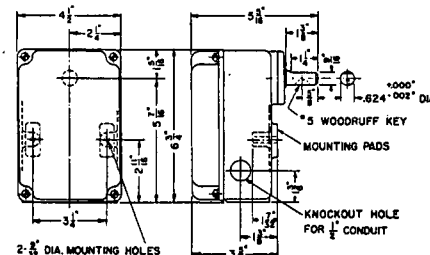
- Catalog number

DESCRIPTION

Type PR relay, for pilot circuits only, is rated 600 volts maximum. The relay is used to interrupt reverse power. The operating speeds are 50 to 1800 R.P.M. It is driven by the motor through a mechanical coupling.



General Purpose NEMA 1		Price
Catalog Number		
10256H1		\$112.

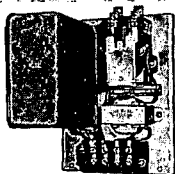


DISCOUNT SCHEDULE 1CD

CUTLER-HAMMER

**A-C AND D-C RELAYS****Type MX – Intrinsically Safe A-c Relay****WHEN ORDERING SPECIFY**

- Catalog number



Open Type

DESCRIPTION

U.L. listed Intrinsically Safe Relays allow use of General Purpose Nema 1 enclosed pilot devices in Class I, Group C and D, and Class II, Group E, F and G hazardous locations. Suitable for two or three wire control systems. If relay itself is mounted in a hazardous location it must be enclosed in an enclosure approved for the location. Maximum separation of Type MX Intrinsically Safe Relay from pilot devices is 5000 ft. as measured along connecting conduit or shielded cable.

Operating characteristics are pick up in 9 to 15 milli-seconds and drop out in 16 to 20 milli-seconds. Relay will operate in temperature range of -50°C. to $+75^{\circ}\text{C.}$

Poles, Throw and Terminals	① Contacts	Contact Amp. Rating 600 V. Max.	Supply Voltage 60 Cycles	③ Open Type		⑤ General Purpose NEMA 1		⑥ Hazardous Locations NEMA 7-D-9-EFG	
				Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
SPDT—4 Terms.	Normally Open Normally Closed (N.O.-N.C.)	② 16	115	13536-H23	\$61.	13536-H15	\$72.	13536-H19	\$182.
			230	H24	76.	H16	87.	H20	197.
			440	H25	76.	H17	87.	H21	197.
			550	H26	76.	H18	87.	H22	197.

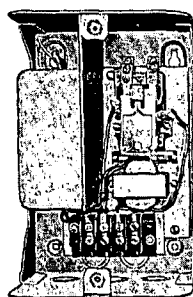
② Based on inductive load.

③ Contacts must be connected on same polarity.

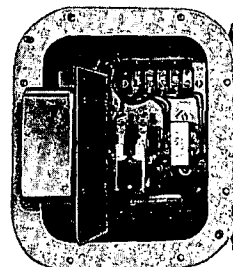
④ Recognized by U.L. for use in equipment where the suitability of the combination is determined by U.L. — File No. E33131, Guide No. 184N13.13C — Yellow card.

⑤ U.L. listed — File No. E33131, Guide No. 184N13.13 — Cherry card.

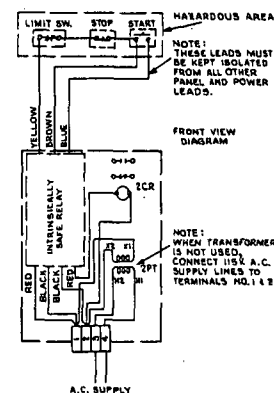
⑥ U.L. listed — File No. E10323, Guide No. 184N13.13 — Cherry card.



NEMA 1

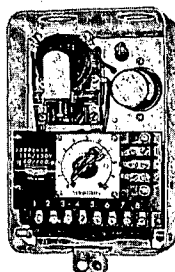
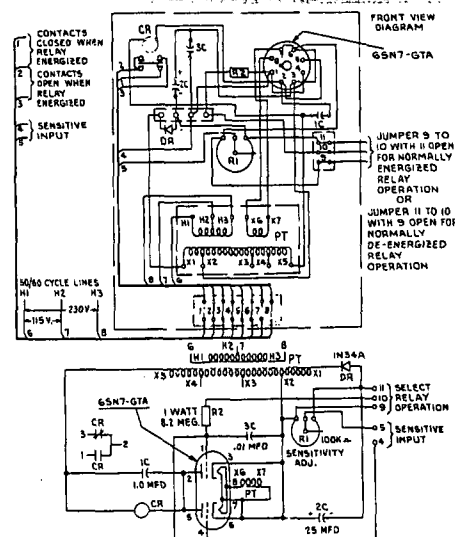


NEMA 7-9

TYPICAL WIRING DIAGRAM**Type RS – Resistance Sensitive Electronic Relay****WHEN ORDERING SPECIFY**

- Catalog number

For Transistor Sensitive Relays see next page

**TYPICAL WIRING DIAGRAM (115/230 Volts)****DESCRIPTION**

Type RS relays are resistance sensitive relays. Operation is determined by comparing an input signal to a preset resistor setting. Relay operation may be normally energized with drop out occurring at preset value (0-7 megohms) or de-energized with pick up at preset value (0-3 megohms).

Contact Rating—550 Volts Maximum
Normally Open—15 Amperes
Normally Closed—10 Amperes

Poles, Throw and Terminals	Volts 50-60 Cycles	General Purpose NEMA 1		Open Type	
		Cat. No.	Price	Cat. No.	Price
SPDT—4 Term.	115/230	13532-H1	\$80.	13532-W1	\$73.
	440	H2		W2	
	550	H3		W3	

3 PHASE FULL VOLTAGE MOTOR CONTROL

3 PHASE REDUCED VOLTAGE & MULTISPEED MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS, RELAYS & TIMERS

PUSHBUTTONS & LIMIT SWITCHES, FOOT SWITCHES

MISCELLANEOUS ACCESSORIES & COMPONENTS

A-C AND D-C RELAYS



Type TF and TH – Transistor Sensitive Relays

Standard and Heavy Duty

WHEN ORDERING SPECIFY

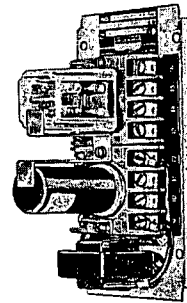
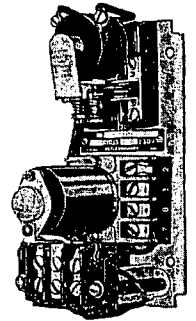
• Catalog number

DESCRIPTION

Type TF and TH relays are resistance sensitive relays. Operation of the control relay occurs when the resistance in the sensing circuit is low enough to permit transistor conduction. Standard or heavy duty relay contacts are available.

Standard duty relay is two pole double throw rated at 10 amperes 115 volts. Contact pick up is 10 milli-seconds, drop out 45 milli-seconds. Relay will operate in temperature range of -25°C to $+80^{\circ}\text{C}$.

Heavy duty relay is rated at 600 volts maximum, control circuit only. Contact pick up is 25 milli-seconds, drop out 20 milli-seconds. Relay will operate in temperature range of -30°C to $+50^{\circ}\text{C}$.

Type TF
Standard DutyType TH
Heavy Duty

TYPE TF STANDARD DUTY

Ratings		Contacts—2 PDT			
10 Amperes, 115 Volts, 60-50 Cycles					
Maximum Ambient Temperature	Type of Transistor	Open Type		General Purpose NEMA 1	
		Cat. No.	Price	Cat. No.	Price
80° C	NPN Silicon	13535-H87	\$37.	13535-H88	\$44.
80° C	PNP Silicon	H98	37.	H99	44.

TYPICAL OPERATIONAL DATA OF STANDARD DUTY

Cat. Nos.	External Terminal Connections Used	D-c Voltage			Current through terminal #11 (Milliamperes)			External Resistance (Ohms) between terminals affording operation	
		Open Circuit	Pick Up	Drop Out	Normal	Pick Up	Drop Out	Pick Up	Drop Out
13535-H87 & H88	#11 and #8	9-10V.	Closed Circuit	---	1.35	0.65	0.12	6,000	35,000
	#11 and #7	37V.	---	---	---	0.67	0.11	11,000	148,000
	#11 and #6	37V.	---	---	---	0.66	0.11	41,000	170,000
	#11 and #10	0	0.75V.	0.65V.	---	0.79	0.19	---	---
INVERSE OPERATION									
		With #8 and #11 shorted							
H98 & H99	#11 and #8	9-10V.	---	---	1.35	0.30	0.12	20,000	75,000
	#11 and #7	37V.	---	---	---	0.29	0.11	50,000	300,000
	#11 and #6	37V.	---	---	---	0.28	0.11	110,000	320,000
	#11 and #10	0	0.7V.	0.64V.	---	0.50	0.15	---	---
INVERSE OPERATION									
		With #8 and #11 shorted							
		#11 and #10						450	350

② To insure protection of the transistor a minimum resistance of 2000 ohms should always be in sensing circuit.

TYPICAL OPERATIONAL DATA OF HEAVY DUTY

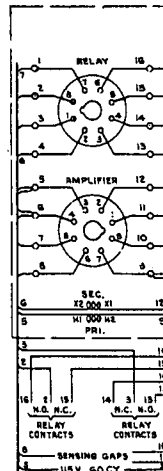
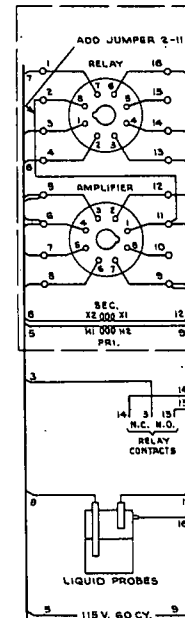
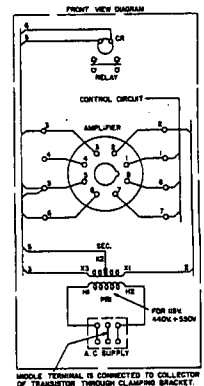
External Terminal Connections Used	D-c Voltage			Current Thru Term. #8 (Milliamperes)			External Resistance Between Terminals #8 and #7 Affording Operation (Ohms)	
	Open Circuit	Pick Up	Drop Out	Normal	Pick Up	Drop Out	Pick Up	Drop Out
#8 and #7	① 8	Closed Circuit	Open Circuit	4.3	2.0	1.0	3,000	6,000
#8 and #4	0	0.2	0.14	---	2.0	1.0	---	---

① #8 and #6—22 volts.

TYPE TH HEAVY DUTY

Ratings						
115, 208/220, 440 and 550 Volts—50, 60 Cycles						
Contact Data			Open Type		General Purpose	
Poles, Throw and Terminals	Contacts	Amperes Non-Inductive 550 Volts Max.			NEMA 1	
			Cat. No.	Price	Cat. No.	Price
S PST—2 Term.	N.O.	15	13535-H91	\$41.	13535-H92	\$48.
D PST—4 Term.	N.O.	10	H93	44.	H94	51.
D PST—4 Term.	N.C.	5	H95	45.	H96	52.
S PDT—4 Term.	N.O.—N.C.	10	H89	46.	H90	53.

TYPICAL WIRING DIAGRAMS

Type TF
Standard DutyStandard Duty With
Liquid ProbesType TH
Heavy Duty



A-C AND D-C RELAYS

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Type TF and TH—Transistor Sensitive Relays

LINE DIAGRAMS

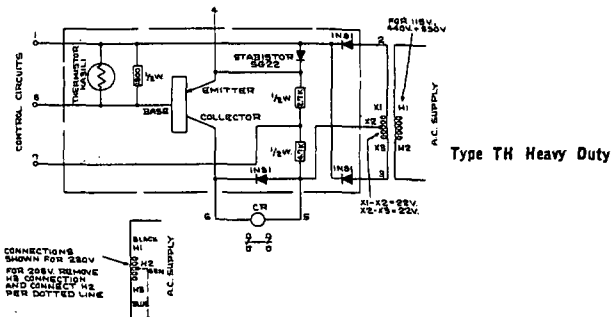
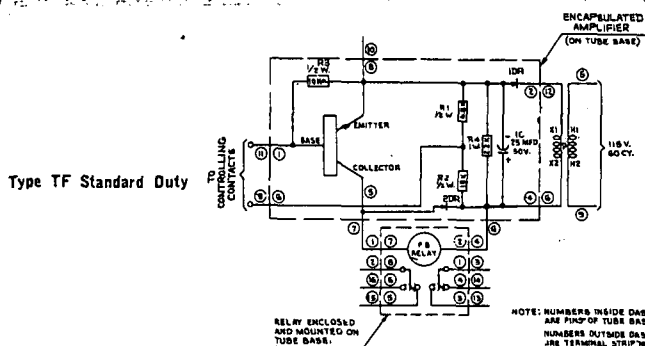


Photo-electric Accessories for Use with TF and TH Relays

WHEN ORDERING SPECIFY • Catalog number

LIGHT SOURCES 115/230 Volts 50-60 Cycles

Type of Beam	Normal or Low Voltage Connection	Foot Candles					① Standard		With Beam Intensity Adjustment		*With Filament Failure Relay		With Beam Intensity Adj. & Filament Failure Relay	
		20	10	5	2	½								
			at Distance in Feet					Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
WITH SELF CONTAINED HEAD														
Straight Fixed Beam ¾" outside dia.	Normal	8	12	15	18	30	13612-H1	\$23.	13612-H2	\$29.	13612-H3	\$38.	13612-H4	\$44.
Straight Fixed Beam 1½" outside dia.	Normal	13	20	30	45	60	H5	27.	H6	33.	H7	42.	H8	48.
Dual Filament Straight Fixed Beam 1½" outside dia.	Normal	7	12	15	18	20								
Beam 1½" outside dia.	Low Voltage	2	4	6	10	12	H13	61.	---	---	---	---	---	---
High Intensity Spot Beam	Normal	30	42	57	85	90								
	Low Voltage	18	25	31	40	60	H14	44.	---	---	---	---	---	---
Adjustable Focus Beam	Minimum	13	20	30	45	60	H9	36.	H10	42.	H11	51.	H12	57.
WITH REMOTE HEAD														
Straight Fixed Beam ¾" outside dia.	Normal	5	7	8	9	12	H15	\$36.	H16	\$42.	H17	\$51.	H18	\$57.
Dual Filament Straight Fixed Beam 1½" outside dia.	Normal	7	12	15	18	20								
Beam 1½" outside dia.	Low Voltage	2	4	6	9	12	H24	80.	---	---	---	---	---	---
Cable End Type Straight Fixed Beam ¼" outside dia.	Normal	.083	.667	.917	1.17	2	---	---	H23	42.	---	---	---	---
Adjustable Focus Beam	Minimum	13	20	30	45	60	H19	42.	H20	49.	H21	57.	H22	63.

Light Source Optional Features

Filter Holder 1 1/2" outside dia. Cat. No. 13612H29 Price \$3.00 Ea.
 Blacklight Filter 1 1/2" outside dia. Cat. No. 13612H30 Price 13.00 Ea.
 In a blacklight application the self contained light source Cat. No. 13612H5 must be used. The Blacklight filter 13612H30 is inserted into the Filter holder 13612H29 which is then placed over the lens of the light source 13612H5.

① Light source with beam intensity adjustment should be considered when light intensity is greater than required. Dimming the lamp increases the life of lamp and tube.

LIGHT RECEIVERS

Light Receiver Only			Selection Guide of a Transistor Sensitive Relay (Bul. 13535) For Use with Light Receiver as a Photo-Cell Relay		
Description	Catalog Number	Price	Relay Selection		Foot Candles of Light Required to Operate Relay
			Catalog Number	Terminal Connections	
Standard Enclosed Receiver 3/4" outside dia.	H25	\$25.	13535-H87, H88, H98, H99	#8 and #11 #7 and #11	2 0.5
			H89, H90	#7 and #8 #6 and #8	15 5
			H91, H92, H93, H94	#7 and #8 #6 and #8	35 15
			H95, H96	#7 and #8 #6 and #8	20 10
Cable End Receiver 1/4" outside dia.	H26	25.			
Sun Shield Receiver 1 1/4" outside dia.	H28	25.			
Light Shield 13" long, 1 1/4" outside dia.	H31	9.			
Receiver with Sun Shield	H32	34.			

③ When used with receivers 13612H25 and H32.

DISCOUNT SCHEDULE ICD

DIMENSIONS, next page

CUTLER-HAMMER

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3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

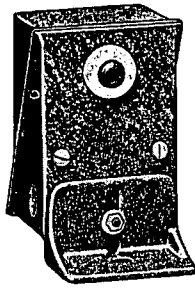
MISCELLANEOUS
ACCESSORIES &
COMPONENTS

A-C AND D-C RELAYS

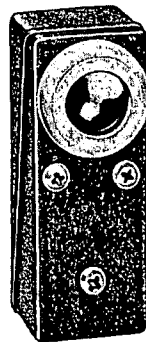


Photo-electric Accessories for Use with Type TF and TH Relays

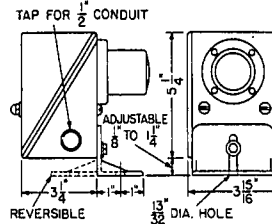
APPROXIMATE DIMENSIONS



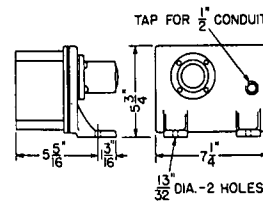
Light source with straight fixed beam.



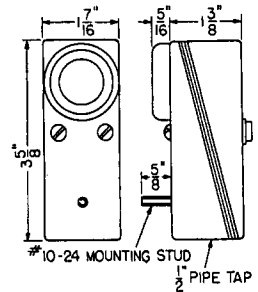
Remote head only or standard enclosed receiver.



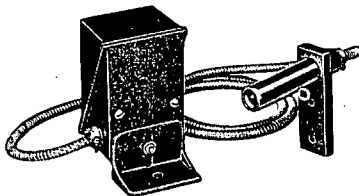
Light source with straight fixed beam or adjustable focus beam. (When used with remote head, lens assembly is omitted), or remote head only for dual element straight fixed beam.



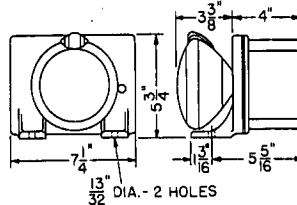
Light source with dual element straight fixed beam. (When used with remote head, lens assembly is omitted).



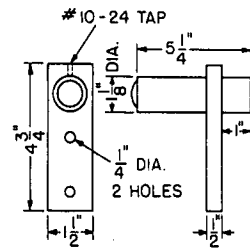
Remote head only with straight fixed beam or standard enclosed light receiver.



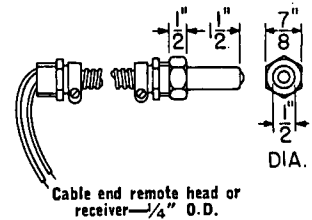
Remote light source with adjustable focus beam.



High intensity spot beam light source.



Remote head with adjustable focus beam.

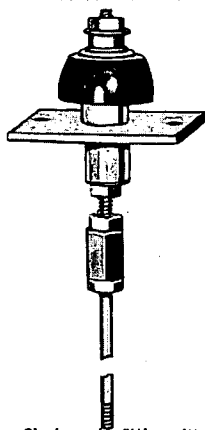


Cable end remote head or receiver—1/4" O.D.

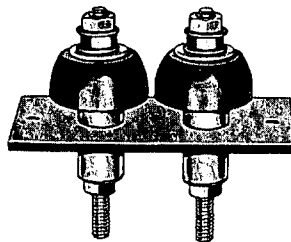
Liquid Level Probes for Use with Type TF and TH Relays

WHEN ORDERING SPECIFY

- Catalog number



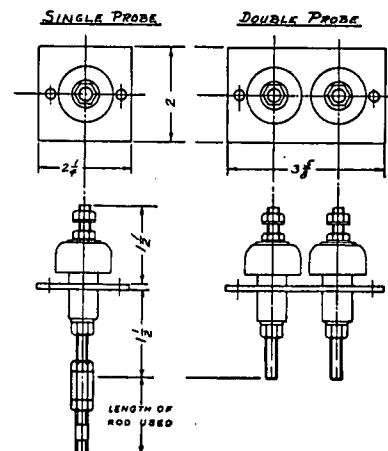
Single probe fitting with probe extension.



Dual probe fitting

Description	Catalog Number	Price
PROBE FITTINGS		
Single Probe.....	13653H1	\$7.00
Dual Probes.....	13653H2	13.00
PROBE EXTENSIONS		
12" Long.....	13653H3	\$2.50
36" Long.....	13653H4	4.00
60" Long.....	13653H5	5.00

APPROXIMATE DIMENSIONS

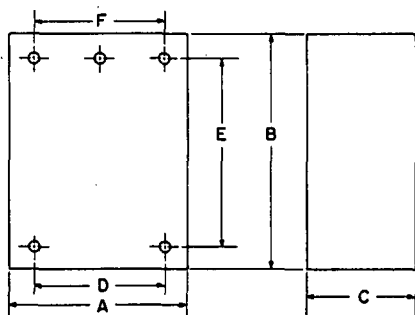




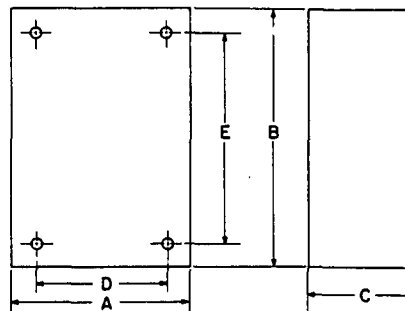
A-C AND D-C RELAYS

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APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Open



Enclosed

Description	Open Type							Enclosed NEMA 1						
	Dimensions in Inches						Ship. Wt. Lbs.	Dimensions in Inches					Ship. Wt. Lbs.	
	Wide A	High B	Deep C	Mounting				Wide A	High B	Deep C	Mounting			
				D	E	F					D	E		
TYPE AA														
With Screw Terminals	2¼	3¾	2¼	1⅞	---	---	1½	3½	5¾	3¼	2	4½	3	
With Quick Connect Tabs	2¼	4	2¼	1⅞	---	---	1½	3½	5¾	3¼	2	4½	3	
TYPE AF														
Two Pole N.O.	2	2⅝	2	1⅞	2	1⅞	1	4¼	6⅝	3	2½	5	5	
TYPE AG														
Two Pole N.C.	2	2⅝	2	1⅞	2	1⅞	1	5⅝	7⅞	3¼	4¼	6¼	6	
TYPE BC														
Two Pole	3⅝	3¾	3⅝	1¼	3⅝	---	3	---	---	---	---	---	---	
Three Pole	3⅝	3¾	4⅝	1¼	3⅝	---	3	---	---	---	---	---	---	
Four Pole	3⅝	3¾	5⅝	1¼	3⅝	---	3¼	---	---	---	---	---	---	
TYPE BG														
2, 3 and 4 Pole	4⅝	3¾	3⅝	1¼	3⅝	---	3¼	5⅝	8	5½	3⅝	5	6¾	
5 and 6 Pole	4⅝	3¾	4⅝	1¼	3⅝	---	3½	5⅝	8	5½	3⅝	5	7	
8 Pole	4⅝	3¾	5⅝	1¼	3⅝	---	3¾	---	---	---	---	---	---	
TYPE BJ														
2, 3 and 4 Pole	3⅝	3⅝	3½	2	3¼	---	3¼	4⅝	8	4	3½	5½	5	
5 Pole	4	3⅝	3½	2	3¼	---	3¾	4⅝	8	4	3½	5½	5	
TYPE CF														
Without Mechanical Latch	2	2¾	4	---	2⅝	---	1	5⅝	8	5⅝	3⅝	5	4½	
With Mechanical Latch	2	2¾	5⅝	---	2⅝	---	1	---	---	---	---	---	---	
TYPE DM														
1 N.O. and 1 N.C.	4¼	4⅝	2⅝	---	2	---	5	5⅝	9	4¼	4	6⅝	10	
All Others	4½	4⅝	4	3⅝	2	---	5	5⅝	9	5¼	4	6⅝	10	
TYPE LR														
Relay	5⅝	6⅝	4⅝	4¼	5¼	---	4¼	6⅝	9½	5⅝	4⅝	7⅝	9	
Module	4¼	3⅝	4	3⅝	2	3⅝	3	6⅝	9½	5⅝	4⅝	7⅝	7	
Transformer	3	2⅝	3⅝	2¼	---	---	2	---	---	---	---	---	---	
TYPE MX														
	5¼	7⅝	5½	4¼	6⅝	---	6	6⅝	9½	5⅝	4⅝	7⅝	10½	
TYPE RS														
	---	---	---	---	---	---	---	4¼	7⅝	4	3½	5½	6½	
TYPE TF														
	3⅝	6⅝	3½	2¼	4¼	2¼	3¼	5⅝	8¼	4⅝	3½	6¼	6¼	
TYPE TH														
	3⅝	7¼	3½	2¼	4¼	2¼	3¼	5⅝	8¼	4⅝	3½	6¼	6¼	

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

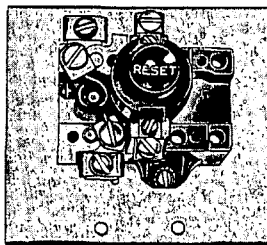
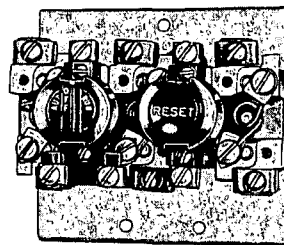
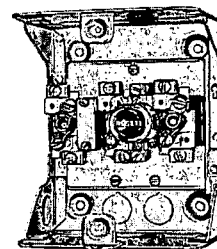
A-C AND D-C RELAYS



Type ST—Thermal Overload Relays

WHEN ORDERING SPECIFY

- Catalog number
- Heater coil number or full load current (see index page 281.)

Size 1
One CoilSize 1
Three Coil

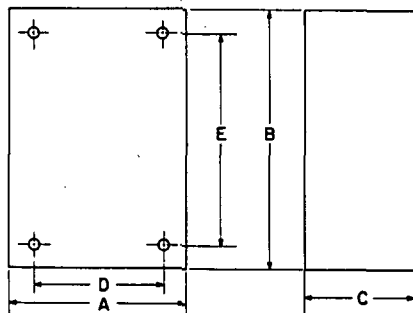
NEMA 1

INVERSE TIME LIMIT—MANUAL RESET TYPE

No. of Thermal Elements	Maximum Amperes	Size	Open Type										General Purpose NEMA 1		
			Without Mounting Plate					With Mounting Plate					Reset Only		
			Reset Only		Start-Stop Pushbutton and Reset	Run-Off-Auto. Sel. Sw. and Reset	Price	Reset Only		Start-Stop Pushbutton and Reset	Run-Off-Auto. Sel. Sw. and Reset	Price			
			Cat. No.	Price	Cat. No.	Cat. No.		Cat. No.	Price	Cat. No.	Cat. No.				
WITH NORMALLY CLOSED CONTACTS ON RESET BUTTON															
1	30	1	10176-H67	\$6.	10176-H73	10176-W5	\$14.	10176-H31	\$8.	10176-H37	10176-H43	\$16.	10176-H25	\$13.	
	50	2	H79	8.	H85	W6	16.	H52	10.	H58	H64	18.	H46	20.	
	100	3	W1	10.	W3	W7	18.	W9	12.	W11	W13	20.	W15	27.	
	150	4	W2	15.	W4	W8	23.	W10	19.	W12	W14	27.	W16	49.	
2	30	1	H71	12.	H77	W17	20.	H35	15.	H41	H45	23.	H27	20.	
	50	2	H83	16.	H89	W18	24.	H56	19.	H62	H66	27.	H48	29.	
	100	3	H93	20.	H97	W19	28.	H103	23.	H109	H113	31.	W20	38.	
	150	4	H116	30.	H120	H123	38.	H126	36.	H130	H133	44.	W21	66.	
3	Factory Assembled 3 coil relay, add suffix "T" to 2 element catalog number and add \$4. to price.										Field Conversion from 2 coil to 3 coil, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50.				
WITH NORMALLY CLOSED—NORMALLY OPEN CONTACTS ON RESET BUTTON															
1	30	1	H68	10.	H74	---	18.	H32	12.	H38	---	20.	H26	17.	
	50	2	H80	12.	H86	---	20.	H53	14.	H59	---	22.	H47	24.	
	100	3	W22	14.	W24	---	22.	W26	16.	W28	---	24.	W30	31.	
	150	4	W23	19.	W25	---	27.	W27	23.	W29	---	31.	W31	53.	
2	30	1	H72	16.	H78	---	24.	H36	19.	H42	---	27.	H28	24.	
	50	2	H84	20.	H90	---	28.	H57	23.	H63	---	31.	H49	33.	
	100	3	H94	24.	H98	---	32.	H104	27.	H110	---	35.	W32	42.	
	150	4	H117	34.	H121	---	42.	H127	40.	H131	---	48.	W33	70.	
3	Factory Assembled 3 coil relay, add suffix "T" to 2 element catalog number and add \$4. to price.										Field Conversion from 2 coil to 3 coil, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50.				

Prices include necessary heater coils at \$1.50 each.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Size	No. of Heater Coils	Operator	Dimensions in Inches					Ship. Wt. Lbs.
			Wide A	High B	Deep C	Mounting		
						D	E	
OPEN TYPE WITHOUT MOUNTING PLATE								
1	1	Reset Only	2½	2¾	4½	---	2	1
1	1	Start, Stop-Reset	3¾	2¾	4¾	---	2	1¼
1	2 or 3	Any	4½	2¾	4¾	---	2	1½
2	1	Reset Only	2¾	3¼	4½	---	2	1¼
2	1	Start, Stop-Reset	3¾	3¼	4¾	---	2	1½
2	2 or 3	Any	4½	3¼	4¾	---	2	1¾
3	2 or 3	Any	5¼	4¼	4¾	4¾	1	2¼
4	2 or 3	Any	5¼	7½	4¾	4¾	1	4
OPEN TYPE WITH MOUNTING PLATE								
1 and 2	1, 2 or 3	Any	4¾	3¾	4¾	1¼	3¾	1¾
3	2 or 3	Any	5¼	4¼	4¾	1¾	3½	2½
4	2 or 3	Any	5¼	7½	4¾	1¾	3½	4¼
NEMA 1								
1	1, 2 or 3	Reset Only	5¾	6¾	5	3¾	4¼	5
2	1, 2 or 3	Reset Only	6¾	7¾	5¾	3¾	4¼	7

**A-C AND D-C RELAYS****Type SW—Multi-Overload Relay Panels**

FOR MULTI-SPEED OR MULTI-MOTOR APPLICATIONS

WHEN ORDERING SPECIFY

- Catalog number
- Heater coils, specify full load current for each motor or speed

INVERSE TIME LIMIT—MANUAL RESET

No. of Overload Relays per Panel ①	Maximum Amperes	Size	Open Type				General Purpose NEMA 1			
			2 Coil Overload Relays		3 Coil Overload Relays		2 Coil Overload Relays		3 Coil Overload Relays	
			Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
NORMALLY CLOSED CONTACTS ON RESET BUTTON										
2 3 4	30	1	10176- W34	\$30. 45. 60.	10176- W37 W38 W39	\$38. 57. 76.	10176- W40 W41 W42	\$40. 60. 80.	10176- W43 W44 W45	\$48. 72. 96.
2 3 4	50	2	W46 W47 W48	38. 57. 76.	W49 W50 W51	46. 69. 92.	W52 W53 W54	58. 87. 116.	W55 W56 W57	66. 99. 132.
2 3 4	100	3	W58 W59 W60	46. 69. 92.	W61 W62 W63	54. 81. 108.	W64 W65 W66	76. 114. 151.	W67 W68 W69	84. 126. 167.
2 3 4	150	4	W70 W71 W72	72. 108. 144.	W73 W74 W75	80. 120. 160.	W76 W77 W78	111. 155. 199.	W79 W80 W81	119. 177. 205.

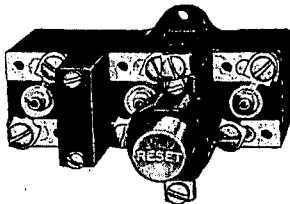
OPTIONAL FEATURES

① With Extra Normally Open Contacts, add per each Overload Relay.....	\$4.
① With Start and Stop-Reset Pushbuttons, add per each Overload Relay.....	8.
① With "Run-Off-Auto." Selector Switch, add per each Overload Relay.....	8.

Prices include necessary heater coils at \$1.50 each.

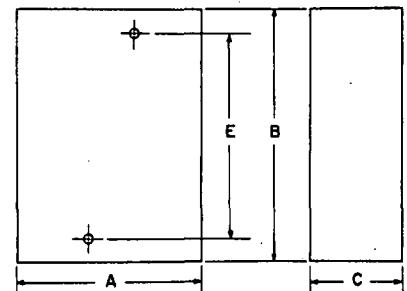
Type TK—Fast Trip Overload Relay—Manual Reset**WHEN ORDERING SPECIFY**

- Catalog number
- Heater coil number (see index, page 281.)



No. of Thermal Elements	Maximum Amperes	Size	Open Type	
			Reset Only	Price
1	30	1	10176-H135	\$6.
	50	2	H138	8.
2	30	1	H137	12.
	50	2	H140	16.
3	Factory Assembled 3 coil relay, add suffix "T" to catalog number and add \$1.50. Field Conversion from 2 coil to 3 coil, add heater coil—\$1.50.			

Prices include necessary heater coils at \$1.50 each.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Size	No. of Heater Coils	Dimensions in Inches				Ship. Wt. Lbs.
		Wide A	High B	Deep C	Mtg. E	
1	1	2 3/4	2 3/4	4 1/4	2	1 1/2
1	2 or 3	4 1/4	2 3/4	4 1/4	2	1 1/2
2	1	2 3/4	2 3/4	4 1/4	2	1 1/4
2	2 or 3	4 1/4	2 3/4	4 1/4	2	1 1/4

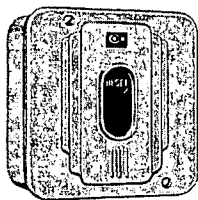
A-C AND D-C RELAYS



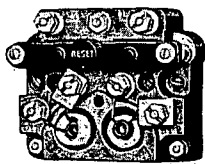
Type SR—Thermal Overload Switch—Two Pole

WHEN ORDERING SPECIFY

- Catalog number
- Heater coil number or full load current

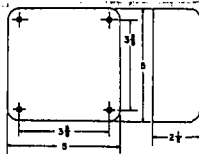


NEMA 1

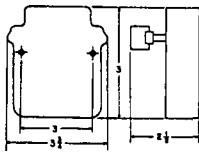


Open Type

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



NEMA 1—3 Lbs.



Open Type—2½ Lbs.

Maximum Horsepower Ratings					Open Type		General Purpose NEMA 1	
A-c Single Phase		A-c Polyphase		D-c	Cat. No.	Price	Cat. No.	Price
115V.	230-550V.	110V.	220-550V.	115-230V.				
1½	3	3	5	½	10172H2	\$14.	10172H1	\$16.

Prices include two heater coils at \$1.50 each.

HEATER COILS

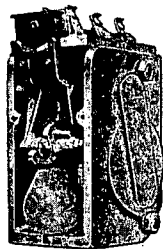
H.P.	Single Phase		Polyphase				Direct Current	
	110 Volts	220 Volts	110 Volts	220 Volts	440 Volts	550 Volts	120 Volts	240 Volts
1/8	9586-	9586-	9586-	9586-	9586-	9586-	9586-	9586-
1/8	---	---	---	---	---	---	---	---
1/8	H159	H152	---	---	---	---	H148	H141
1/4	H162	H155	H150	H143	H1470	H1468	H150	H143
1/4	H164	H157	H153	H145	H138	H1470	H153	H146
1/2	---	---	---	---	---	---	---	---
1/2	H167	H160	H157	H149	H142	H139	H160	H153
3/4	H171	H164	H160	H153	H146	H144	---	---
1	H172	H166	H163	H155	H149	H146	---	---
1½	H186	H168	H167	H153	H160	H150	---	---
2	---	H170	H170	H162	H155	H153	---	---
3	---	H173	H173	H166	H159	H157	---	---
5	---	---	---	H171	H164	H162	---	---

Heater coils listed are for average motors. For more accurate selections see index on page 281.

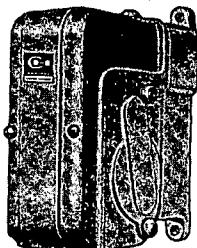
Type RP—A-c Open or Reverse Phase Relay

WHEN ORDERING SPECIFY

- Catalog number



Cover Removed

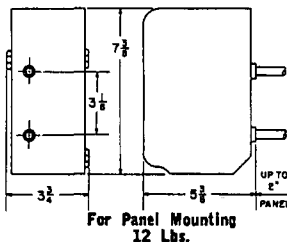
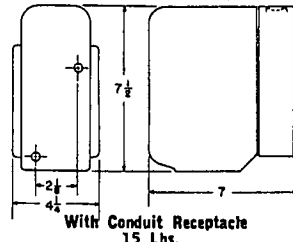


With Conduit Receptacle

THREE PHASE OR TWO PHASE, 3 OR 4 WIRE

Volts	Cycles	For Panel Mounting		With Conduit Receptacle	
		Cat. No.	Price	Cat. No.	Price
110	60	10182-H1	\$50.	10182-H13	\$58.
220	60	H2	50.	H14	58.
440	60	H3	50.	H15	58.
550	60	H4	50.	H16	58.
110	50	H5	50.	H17	58.
220	50	H6	50.	H18	58.
440	50	H7	50.	H19	58.
550	50	H8	50.	H20	58.
110	25	H9	50.	H21	58.
220	25	H10	50.	H22	58.
440	25	H11	50.	H23	58.
550	25	H12	50.	H24	58.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

For Panel Mounting
12 Lbs.With Conduit Receptacle
15 Lbs.



TIMING DEVICES

173

Type SP—Synchronous Motor Driven Reset Timer

WHEN ORDERING SPECIFY

- Catalog number



Open Type

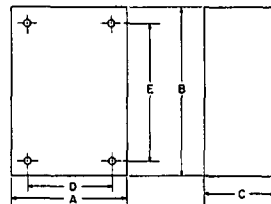
PLUG-IN STYLE—Single Pole Double Throw (SPDT) Contacts

Operation	Volts (60 Cycles)	Timing Range (All Timers Can Be Set to Zero Time)					Price
		2 Seconds to 60 Seconds	6 Seconds to 3 Minutes	10 Seconds to 5 Minutes	1 Minute to 30 Minutes	10 Minutes to 5 Hours	
On Delay	OPEN TYPE						
	110 220 440 550	10336- H1-1 H26-1 H3-1 H4-1	10336- H1-3 H26-3 H3-3 H4-3	10336- H1-5 H26-5 H3-5 H4-5	10336- H1-30 H26-30 H3-30 H4-30	10336- H1-300 H26-300 H3-300 H4-300	\$35. 35. 37. 37.
Time Delay After Energizing Timer Coil	GENERAL PURPOSE NEMA 1						
	110 220 440 550	H5-1 H27-1 H7-1 H8-1	H5-3 H27-3 H7-3 H8-3	H5-5 H27-5 H7-5 H8-5	H5-30 H27-30 H7-30 H8-30	H5-300 H27-300 H7-300 H8-300	41. 41. 43. 43.

For 50 cycle operation, specify on order and add.....\$3.00

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

CONTACT RATINGS			
Volts	Cycles	Amps. Break	Amps. Make
110	60	6	60
220	60	3	30
440	60	1.5	15
550	60	1.2	12

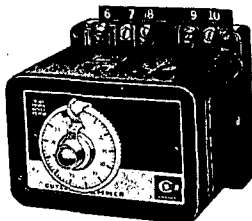


Type	Dimensions in Inches					Ship. Wt. Lbs.
	Wide	High	Deep	Mounting		
				D	E	
Open—110, 220V.	2¾	5½	4¾	2¾	5	3
Open—440, 550V.	4⅞	8½	5⅞	3¾	7½	6
NEMA 1	4⅞	9	5⅞	3¾	7½	10

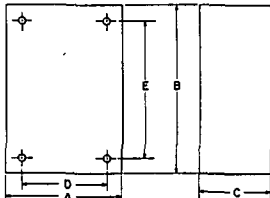
Type SM—Synchronous Motor Driven Reset Timer

WHEN ORDERING SPECIFY

- Catalog number



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Type	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting		
				D	E	
Open NEMA 1	4 1/8 5 3/8	4 1/4 8	4 3/8 5 1/2	3 3/4 3 3/8	3 1/2 5	2 1/2 5

NON-PLUG-IN STYLE—Double Pole Double Throw (DPDT) Contacts

CONTACT RATINGS: 690 VA Pilot Duty—110 V—600 V, A-c							
Operation	Volts (60 Cycles)	Timing Range (All Timers Can Be Set to Zero Time)					Price
		2 Seconds to 60 Seconds	6 Seconds to 3 Minutes	10 Seconds to 5 Minutes	2 Minutes to 60 Minutes	10 Minutes to 5 Hours	
On Delay ① Time Delay After Energizing Timer Coil	OPEN TYPE						\$35.
	110 220	10336- H30-1 H33-1	10336- H30-3 H33-3	10336- H30-5 H33-5	10336- H30-60 H33-60	10336- H30-300 H33-300	
Interval	GENERAL PURPOSE NEMA 1						41.
	110 220	H36-1 H39-1	H36-3 H39-3	H36-5 H39-5	H36-60 H39-60	H36-300 H39-300	
Timed Cycle of Contact Open or Close	OPEN TYPE						35.
	110 220	H29-1 H32-1	H29-3 H32-3	H29-5 H32-5	H29-60 H32-60	H29-300 H32-300	
Off Delay	GENERAL PURPOSE NEMA 1						41.
	110 220	H35-1 H38-1	H35-3 H38-3	H35-5 H38-5	H35-60 H38-60	H35-300 H38-300	
Time Delay After De-energizing Timer Coil	OPEN TYPE						35.
	110 220	H28-1 H31-1	H28-3 H31-3	H28-5 H31-5	H28-60 H31-60	H28-300 H31-300	
	GENERAL PURPOSE NEMA 1						41.
	110 220	H34-1 H37-1	H34-3 H37-3	H34-5 H37-5	H34-60 H37-60	H34-300 H37-300	

① Only one pole used for timing. Other pole instantaneous auxiliary contact.

DISCOUNT SCHEDULE ICD

CUTLER-HAMMER

173

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

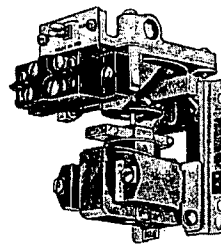
AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

TIMING DEVICES

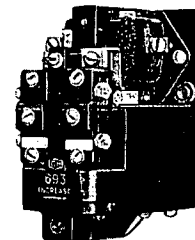
Type PT-A-c Pneumatic Timing Relays

WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency



Type AE1



TYPE BE2

CONTACT RATINGS

Contacts	A-c Pilot Duty Amperes				D-c Pilot Duty Amperes		
	110 Volts	220 Volts	440 Volts	550 Volts	120 Volts	240 Volts	600 Volts

TYPE AD1 AND AE1

Make Cont.	N.O. and N.C. N.O. and N.C.	40 15	20 10	10 6	8 5	--- 0.5	--- 0.2	--- .02
------------	--------------------------------	----------	----------	---------	--------	------------	------------	------------

TYPE BD1, BD2, BE1 AND BE2

Make Cont.	N.O. N.C. N.O. and N.C.	30 15 10	15 7.5 5	15 7.5 3	7.5 3 2	--- --- ---	--- --- ---	--- --- ---
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Range of Timing Adjustments
Types AD1 and AE1—0.2 to 60 Seconds
Types BD1, BD2, BE1 and BE2—0.3 to 60 Seconds

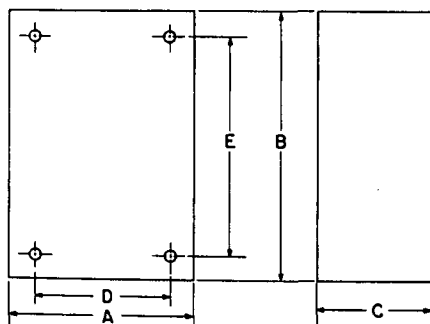
550 Volts Maximum
25-60 Cycles

Operation	Type	No. of Timing Steps (Each with NO-NC Contacts)	Aux. Contact	Open Type		General Purpose NEMA 1		Watertight NEMA 4		Dusttight NEMA 5		Hazardous Locations NEMA 7-D, 9-EFG	
				Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
Off Delay	① AD1	1	---	10337-H147	\$38.	10337-H149	\$41.	10337-X36	\$90.	10337-X37	\$90.	10337-X38	\$160.
	BD1	1	N.O.	H138	55.	H142	65.	W7	95.	W15	95.	W23	165.
	BD1	1	N.C.	H140	55.	H144	65.	W8	95.	W16	95.	W24	165.
	② BD1	1	---	W1	65.	W4	75.	W9	105.	W17	105.	W25	175.
Time Delay After De-energizing Timer Coil	② BD1	1	N.O.	W2	70.	W5	80.	W10	110.	W18	110.	W26	180.
	BD2	2	N.C.	W3	70.	W6	80.	W11	110.	W19	110.	W27	180.
	BD2	2	---	H118	100.	H120	120.	W12	180.	W20	180.	W28	320.
	BD2	2	N.O.	H139	105.	H143	125.	W13	185.	W21	185.	W29	325.
	BD2	2	N.C.	H141	105.	H145	125.	W14	185.	W22	185.	W30	325.
	① AE1	1	---	H146	38.	H148	41.	X33	90.	X34	90.	X35	160.
On Delay	BE1	1	N.O.	H130	55.	H134	65.	W37	95.	W45	95.	W53	165.
	BE1	1	N.C.	H132	55.	H136	65.	W38	95.	W46	95.	W54	165.
	② BE1	1	---	W31	65.	W34	75.	W39	105.	W47	105.	W55	175.
	② BE1	1	N.O.	W32	70.	W35	80.	W40	110.	W48	110.	W56	180.
	② BE1	1	N.C.	W33	70.	W36	80.	W41	110.	W49	110.	W57	180.
	BE2	2	---	H122	100.	H124	120.	W42	180.	W50	180.	W58	320.
	BE2	2	N.O.	H131	105.	H135	125.	W43	185.	W51	185.	W59	325.
	BE2	2	N.C.	H133	105.	H137	125.	W44	185.	W52	185.	W60	325.

Separate NEMA 1 enclosure only for type AD1 and AE1 relays, Cat. No. 9575H2240..... \$3.

- ① Field convertible from "Off Delay" to "On Delay" or vice-versa.
② This relay has 2 normally open - 2 normally closed time delay contacts.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Type	Aux. Contact	Dimensions in Inches					Ship. Wt. Lbs.
		Wide A	High B	Deep C	Mounting		
					D	E	
OPEN TYPE							
AD1 & AE1	None	2¾	4¾	3¾	2¼	2¼	2
BD1 & BD2	None	2¾	5¾	3¾	2¼	2¾	2
BD1 & BD2	N.O. or N.C.	2¾	5¾	4	2¼	2¾	2
BE1 & BE2	None	2¾	4¾	3¾	2¼	2¾	2
BE1 & BE2	N.O. or N.C.	2¾	5¾	4	2¼	2¾	2
NEMA 1							
AD1 & AE1	None	5¾	8	5½	3¾	5	6
BD1, BD2, BE1 & BE2	With or Without	4¾	7¾	4½	3½	5½	5½

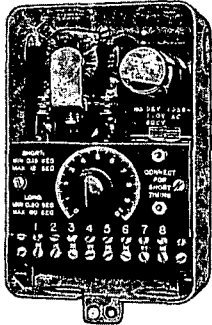


TIMING DEVICES

Type ET-A-c Electronic Timer

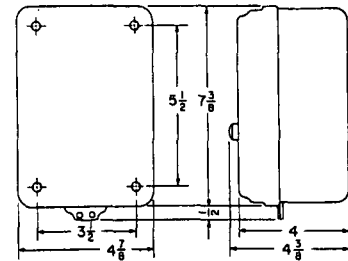
WHEN ORDERING SPECIFY

- Catalog number



Adjustable Timing Range 0.15 to 60 Seconds					
SPDT Contact Ratings Normally Open—15 Amperes Normally Closed—10 Amperes					
Timer Adjustment Knob	Volts (50-60 Cycles)	Open Type		General Purpose NEMA 1	
		Cat. No.	Price	Cat. No.	Price
External	115/230	13522	---	13522- H13	\$78.
	440	---	---	H15	80.
	550	---	---	H17	80.
Internal	115/230	X9	\$76.	H14	78.
	440	X10	78.	H16	80.
	550	X11	78.	H18	80.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



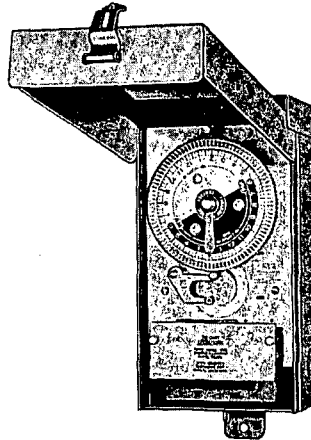
Shipping Weight—6½ Lbs. boxed

Type TC-24 Hour Programming Time Clock

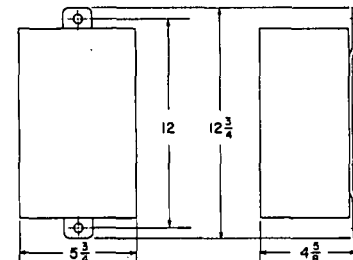
WHEN ORDERING SPECIFY

- Catalog number

With Day Omission Feature				
Volts (60 Cycles)	Switch	Contact Rating (Amps.)	Raintight NEMA 3	
			Cat. No.	Price
110	SPDT	10	10336- H22	\$35.
220	SPDT	5	H23	35.
440	SPDT	---	H24	45.



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Shipping Weight—8 Lbs. boxed.

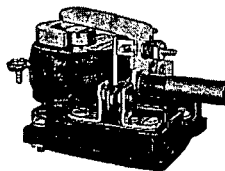
Single Cycle Lockout Relay

FOR INHERENTLY PROTECTED MOTORS

DESCRIPTION

SPDT—Normally closed contact protects motor against start-up until manually reset. Normally open contact actuates visual or audible alarm. (Contacts are not isolated.)

Type	60 Cycles, A-c				Price
	110 Volts	220 Volts	440 Volts	550 Volts	
Open	10191- W1	10191- W3	10191- W5	10191- W7	\$16.
NEMA 1 Enclosed	W2	W4	W6	W8	20.

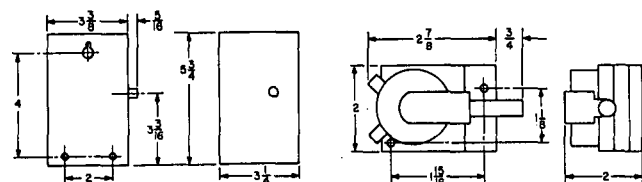


Open Type



NEMA 1

APPROXIMATE DIMENSIONS



DISCOUNT SCHEDULE ICD

CUTLER-HAMMER

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

RENEWAL PARTS



Contact Kits and Magnet Coils

WHEN ORDERING SPECIFY

- Contact kit or coil number



Contact Kit



Magnet Coil

A-C MANUAL — REDUCED VOLTAGE

Catalog Number	Contact Kit		Low Voltage Release Coil 50/60 Cycle	
	Number	Price	Number	Price
9141-H2066-H2070 H2071-H2076	21-699	\$23.15	9-464-130 9-464-131	\$8.
H2259, H2261 H2264, H2265	21-699-5	53.50	9-136-2 9-136-10	16.
H2303 H2306, H2307	21-699-3	26.75	9-136-2 9-136-10	16.
H2378 H2381, H2382	21-699-6	56.75	9-136-2 9-136-10	16.
H2605, H2606	21-699-6	56.75	9-136-2	16.

A-C MANUAL — FULL VOLTAGE — 9115

No. of Poles	NEMA Size	Contact Kit	
		Number	Price
2	0	6-200-2	\$3.
3	0	6-200	4.50
2	1	6-200-4	5.35
3	1	6-200-3	8.
2	1½	6-200-5	7.25

Catalog Number	NEMA Size	Contact Kit		Magnet Coil — 60 Cycle					Price
		Number	Price	115/230 V.	110 Volts	220 Volts	440 Volts		
A-C CONTACTORS NON-REVERSING									
9560-									
H1, H4	0	6-1-2	\$3.60	---	9-1318-1	9-1318-2	9-1318-3	\$6.60	
H2, H5	0	6-1-3	5.40	---	9-1318-1	9-1318-2	9-1318-3	6.60	
H3, H6	0	6-1-4	7.20	---	9-1318-1	9-1318-2	9-1318-3	6.60	
H10, H14	00	6-2-2	3.	---	9-1318-1	9-1318-2	9-1318-3	6.60	
H11, H15	00	6-2-3	4.50	---	9-1318-1	9-1318-2	9-1318-3	6.60	
H12, H16	00	6-2-4	6.	---	9-1318-1	9-1318-2	9-1318-3	6.60	
H26, H29	1	6-3-2	5.30	---	9-1323-1	9-1323-2	9-1323-3	7.	
H27, H30	1	6-3-3	7.95	---	9-1323-1	9-1323-2	9-1323-3	7.	
H28, H31	1	6-3-4	10.60	---	9-1323-1	9-1323-2	9-1323-3	7.	
H51, H54	2	6-10	15.	---	9-1359-1	9-1359-2	9-1359-3	10.	
H52, H55	2	6-10-2	23.	---	9-1359-1	9-1359-2	9-1359-3	10.	
H53, H56	2	6-10-3	31.	---	9-1359-1	9-1359-2	9-1359-3	10.	
H76, H79	3	6-16	26.	---	9-1360-1	9-1360-2	9-1360-3	16.	
H77, H80	3	6-16-2	40.	---	9-1360-1	9-1360-2	9-1360-3	16.	
H78, H81	3	6-16-3	52.	---	9-1360-1	9-1360-2	9-1360-3	16.	
H101, H105	4	6-14	33.	---	9-1360-1	9-1360-2	9-1360-3	16.	
H102, H106	4	6-14-2	50.	---	9-1360-1	9-1360-2	9-1360-3	16.	
H104, H108	4	6-14-3	67.	---	9-1360-1	9-1360-2	9-1360-3	16.	
H126, H127									
H128, H130	5	6-186-2	105.	---	9-1510-1	9-1510-2	9-1510-3	50.	
H131, H132									
A-C—SINGLE PHASE—FULL VOLTAGE—NON-REVERSING									
9564-									
H1000, H1001	0	6-1-2	\$3.60	9-1319-1	---	---	---	\$10.	
H1121, H1122	1	6-3-2	5.30	9-1324-1	---	---	---	11.50	
H1200, H1201	1½	6-3-4	10.60	9-1324-1	---	---	---	11.50	
A-C—THREE PHASE—FULL VOLTAGE—NON-REVERSING									
9566-									
H6902, H6903	00	6-172-9	\$5.	---	9-1639-1	9-1639-3	9-1639-5	\$6.	
H6045, H6046	0	6-1-3	5.40	---	9-1318-1	9-1318-2	9-1318-3	6.60	
H6170, H6171	1	6-3-3	7.95	---	9-1323-1	9-1323-2	9-1323-3	7.	
H6206, H6207	2	6-10-2	23.	---	9-1359-1	9-1359-2	9-1359-3	10.	
H6303, H6304	3	6-16-2	40.	---	9-1360-1	9-1360-2	9-1360-3	16.	
H6415, H6418	4	6-14-2	50.	---	9-1360-1	9-1360-2	9-1360-3	16.	
H6510, H6513	5	6-186-2	105.	---	9-1510-1	9-1510-2	9-1510-3	50.	
A-C—THREE PHASE—FULL VOLTAGE—NON-REVERSING—COMBINATION WITH MOTOR CIRCUIT SWITCH									
9569-									
H3503, H3504	0	6-1-3	\$5.40	---	9-1318-1	9-1318-2	9-1318-3	\$6.60	
H3539, H3540	1	6-3-3	7.95	---	9-1323-1	9-1323-2	9-1323-3	7.	
H3761, H3762	2	6-10-2	23.	---	9-1359-1	9-1359-2	9-1359-3	10.	
H4273, H4275	3	6-16-2	40.	---	9-1360-1	9-1360-2	9-1360-3	16.	
H4327, H4329	4	6-16-4	68.	---	9-1360-1	9-1360-2	9-1360-3	16.	
AC—THREE PHASE—FULL VOLTAGE—REVERSING									
9595-									
H2086	00	6-120	\$11.	---	9-508-5	---	---	\$7.50	
H2087	00	6-120	11.	---	---	9-508-6	---	7.50	
H2088	00	6-120	11.	---	---	---	9-508-7	7.50	
9568-									
H19, H26	0	6-1-3	5.40	---	9-1318-1	9-1318-2	9-1318-3	6.60	
H119, H126	1	6-3-3	7.95	---	9-1323-1	9-1323-2	9-1323-3	7.	
H213, H218	2	6-10-2	23.	---	9-1359-1	9-1359-2	9-1359-3	10.	
H308, H318	3	6-16-2	40.	---	9-1360-1	9-1360-2	9-1360-3	16.	
H421	4	6-16-2	40.	---	9-1360-1	9-1360-2	9-1360-3	16.	

① Two required.

CONTROL RELAYS

Relay Type	Relay Catalog Number	Contact Kit		Magnet Coil — 60 Cycle			
		Number	Price	110 Volts	220 Volts	440 Volts	Price
BJ	9575-						
	H1395-H1398, H1455-H1458	6-132	\$5.				
	H1407-H1410, H1467-H1470	6-132-4	5.75				
	H1419-H1422, H1479-H1482	6-132-2	6.50	9-694-1	9-694-2	9-694-3	\$6.60
	H1603-H1606, H1642-H1645	6-105-2	4.05				
	H1616-H1619, H1655-H1658	6-105-3	5.05				
BG	H1921-H1923, H1946-H1948	6-11-2	5.				
	H1924-H1927, H1949-H1952	6-11-3	7.50				
	H1928-H1932, H1953-H1957	6-11-4	10.	9-1318-1	9-1318-2	9-1318-3	6.60
	H1933-H1938, H1958-H1963	6-11-5	12.50				
	H1939-H1945, H1964-H1970	6-11-6	15.				
	H2000-H2002, H2025-H2027	6-2-2	3.				
BC	H2003-H2006, H2028-H2031	6-2-3	4.50	9-1318-1	9-1318-2	9-1318-3	6.60
	H2007-H2011, H2032-H2036	6-2-4	6.				
	H2018-H2024, H2043-H2049	6-2-6	9.				
	H2071-H2073	6-11-2	5.				
	H2074-H2077	6-11-3	7.50	9-1318-1	9-1318-2	9-1318-3	6.60
	H2064-H2066	6-2-2	3.				
	H2067-H2070	6-2-3	4.50				

CUTLER-HAMMER

DISCOUNT SCHEDULE 15 CD-1



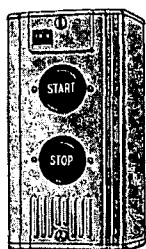
General Description

Pushbuttons—Master control stations for A-c or D-c magnetic controllers without local control—Auxiliary control for magnetic controllers with local cover control—Indicating light elements for function indication, machine position or controller state—Up to 25 elements in common enclosure—Centralization of varied or similar control functions—Operator convenience.



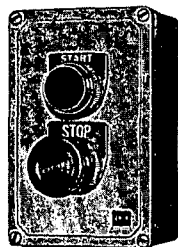
Shrouded in well to prevent accidental operation.

Type N — Standard (Normal) Duty Pushbuttons and Lights — For light, infrequent service — 1 to 3 element stations. Pushbutton, toggle or selector switch operators — Incandescent or neon pilot lights — NEMA 1, 1-B, 4-5, 7-D & 9-EFG enclosures — 1 or 2 elements with flush plate fit handy or gem outlet box — Large phenolic operating buttons —



Normally closed held open — 8 contact block circuit arrangements provide numerous possible combinations — NEMA 1, 1-B, 3, 4-5, 7-D & 9-EFG enclosures vertical mounting — NEMA 1 & 1-B also horizontal mounting — Components base, one hole or one hole oil tight mountable.

Type H — Heavy Duty Pushbuttons and Lights — Rugged, long life—For extremely heavy duty circuits — 1 to 8 element stations — Choice of 12 operators and indicating lights — Roto-Latch half-down latches contacts in intermediate or "safe" position — Roto-Latch full-down latches or holds contacts in full-down position — Normally open held closed —



Combinations — Special operators and lights — Roto-push® selector-pushbutton combines selector switch and pushbutton functions into one element — Prestest® indicating light has self contained bulb testing circuit — Illuminated pushbuttons combine pushbutton and indicating light functions — Selector switches, key, knob, lever or coin slot operated — 9 color caps — Cast enclosures, flush plates and pendant

Type T — Oil Tight Pushbuttons and Lights — Heavy duty ratings — High quality line — Corrosion resistant finish unharmed by normal tarnishing agents — Clean appearance — Compact size — building block components — 1 to 25 element stations — 14 operators and indicating lights, 9 standard colors, 7 contact block circuit arrangements — Unlimited

This section contains:

Pages

Pushbuttons and Lights

Type N—Standard (Normal) Duty 180-182

Type H—Heavy Duty 183-186

Type T—Oil Tight (Heavy Duty) 187-197

Limit Switches

General Purpose—Types D, E, F, G,

J & K 205-207

Special Purpose—Types A, B, C, H,

HA, HK, HRC, PS, RC & UG 208-211

Oil Tight—Types L, LD & LP 198-204

Foot Switches

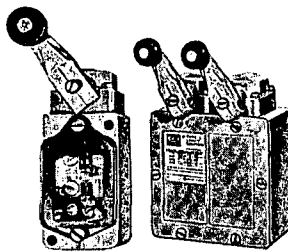
Types A, B, C & D 212-213

Master & Transfer Switches.....214

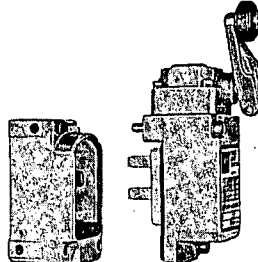
stations — Stainless steel or sheet steel enclosures and flush plates — In-line or multiple row.

Limit Switches—Pilot devices, when actuated by part of power driven machine, affect the electrical circuit controlling that machine. Prevents overtravel—Recycles—Transfers—Reverses.

Types L, LD & LP — Oil Tight — Designed specifically for demands of modern machine tools — Withstand severest service — Exclude oil, coolants, industrial liquids — Meet NEMA 4 requirements — 90° positioning of operating head — Operators 360° adjustable around operating shaft — 28 operators — 20 basic switches — Varied options — Accessories.



Type L—Single unit—Surface or flush mounting—Metal or transparent covers—Optional manifold or joy receptacle mounting, prewired "wet" type, 3/4" instead of 1/2" conduit entrance.



Type LD — Duplex—Two switches in common enclosure — Separate mechanisms —One conduit entrance—Surface mounting—Metal cover.

Type LP—Plug-in—Two components—Receptacle common to entire line—Interchangeable switch bodies allow quick replacement where minimum machinery down time is important—Receptacle contains terminal board and female plug-in clips—Switch body contains operating head assembly, contact mechanism and male plug-in prongs.

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

PUSHBUTTONS and LIGHTS, LIMIT SWITCHES, FOOT SWITCHES



General Description—Continued

This section contains:

Pages

Pushbuttons and Lights

Type N—Standard (Normal) Duty 180-182

Type H—Heavy Duty 183-186

Type T—Oil Tight (Heavy Duty) 187-197

Limit Switches

General Purpose—Types D, E, F, G,
J & K 205-207

Special Purpose—Types A, B, C, H,
HA, HK, HRC, PS, RC & UG 208-211

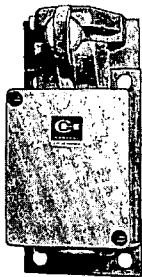
Oil Tight—Types L, LD & LP 198-204

Foot Switches

Types A, B, C & D 212-213

Master & Transfer Switches 214

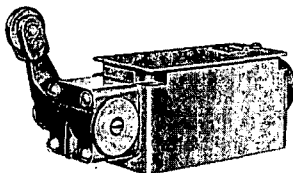
Types D, E, F, G, J and K—General purpose limit switches—Rotary lever, push rod or roller and rotating shaft types—Clockwise, counter clockwise, clockwise and counter clockwise spring return types—Maintained contact types.



Type D—Roller operated—Normally open, normally closed or normally open—normally closed contact arrangements—NEMA 1 or 7-D & 9-EFG enclosures. NEMA 1 push roller 90° positionable—Front or rear mounting.



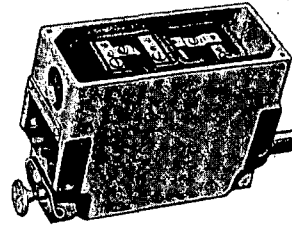
Type E—Pushbutton or Mushroom head button operated. Normally open, normally closed, 2 normally open or 2 normally closed contact arrangements. NEMA 1 or oil proof enclosures.



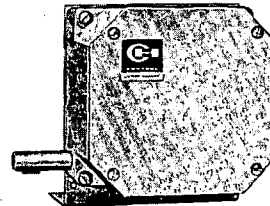
Type F—Pushbutton, push roller or roller lever operated—1, 2 or 3 normally open—normally closed contact arrangements—NEMA 1, 4 or NEMA 2, 4, 5 oiltight enclosures. Push roller 90° positionable. Roller lever operating head 90° positionable—Operator rotatable 360° for 90 positions—3 operating heads interchangeable.



Type G—Roller lever or cam operated—2 normally open—normally closed contact arrangement—NEMA 1 or splash proof enclosures—Interchangeable left-hand or right-hand operation—Operators positionable.

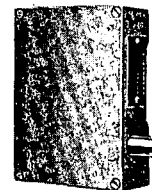


Type J—Rotating shaft—geared mechanism—103:1 shaft to cam ratio—1 or 2 normally open—normally closed, 2 or 4 normally open or normally closed contact arrangements—NEMA 1 or 4-5 enclosures—10 to 600 R.P.M. speed range—Externally adjustable trip points, 1/2 to 100 turns of shaft—6 position mountable.



Type K—Rotating shaft—geared mechanism—40:1 to 1080:1 shaft to cam ratios—2 or 4 normally open—normally closed contact arrangements—NEMA 1, 4-5 or 7-D & 9-EFG enclosures—Right or left-hand shaft extensions—Internal adjustment screws.

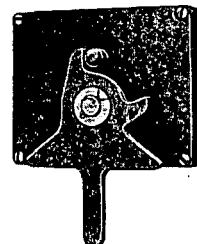
Types A, B, C, H and HK—Special purpose limit switches—Direct acting—NEMA 1 enclosure.



Type A—Pushbutton operated—left or right-hand mounting—Normally open or normally closed contact arrangement.



Type B—Roller lever operated—Right-hand mounting convertible to left-hand—Short or long lever—Normally open or normally closed circuit.



Type C—Gravity lever operated—Convertible right-hand mounting—Normally open circuit.



PUSHBUTTONS and LIGHTS, LIMIT SWITCHES, FOOT SWITCHES

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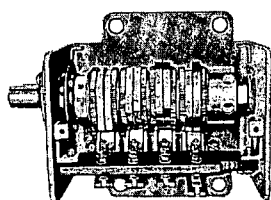
General Description—Continued



Type H — Roller lever operated — Rubber tired or cast iron wheels — Short or long lever — Normally open — Normally closed, 2 normally open or normally closed circuits.



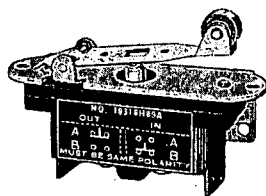
Type HK — Double roller lever operated — Mechanically interlocked — Adjustable rubber tired or non-adjustable cast iron wheels — 2 normally open circuits.



Type RC—Rotating cam Special Purpose Limit Switch—Cam opened, spring closed contacts—4 or 6 normally closed circuits—Single or double shaft extension—Choice of 8 cams for each circuit—NEMA 1 with gasket enclosure.

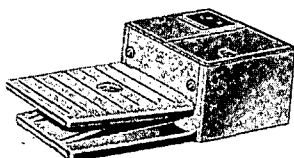


Types HA, HRC and UG Special Purpose Linear Control Limit Switches—2 to 18 circuits—4" to 43" stroke—Internal or external trip points—Single or double actuating rod extensions—Standard or micrometer adjustable strikers on type UG.

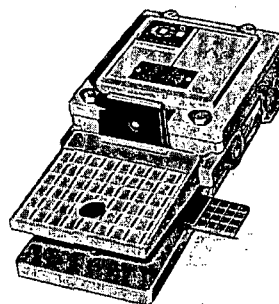


Type PS — Precision Switch Special Purpose Limit Switches — Normally open, normally closed or normally open — Normally closed circuits — 8 operators — Left or right-hand mounting — Roller operators — standard or oil tight plungers.

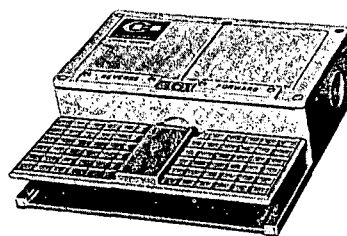
Foot Switches—Types A, B, C and D—Pilot circuit devices —Momentary operation—Quick make—Quick break contact mechanism.



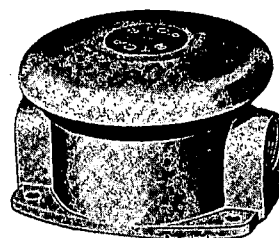
Type A—Standard Duty Front Treadle Operated—Cast enclosure and base—Formed steel treadle and cover—NEMA 1 enclosure—3 point mounting.



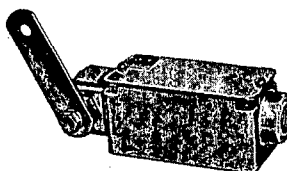
Type B—Heavy Duty Front Treadle Operated—Cast enclosure, treadle and base—NEMA 4 or 7-D & 9-EFG enclosures—With or without guard or shield—With or without treadle latch, full down or half down—1 or 2 circuits—2 or 3 position—3 point mounting.



Type C—Heavy Duty Side Treadle Operated—Cast enclosure, treadle and base—NEMA 4 enclosure—3 point mounting—2 circuit, 3 position spring return—Field convertible to 2 or 3 position maintained contact.



Type D—Foot or Palm Operated Mushroom Button—Cast enclosure and operating button—Button bright orange for identification—NEMA 1 enclosure with bellows type seal between case and button—1 or 2 circuits.



Lever Operated Master Switch—Provides low voltage protection—Normally open, time delay normally closed circuit—For use where machinery should not restart after return of voltage—For shipper rod or splined shaft operation.



Drum Master Switch — Provides low voltage protection when used with magnetic starter — Handle spring return to "Run" position from "Start" position — For use where drum operation is preferred to pushbutton operation.



Drum Transfer Switch — For transferring control or power circuits — Can be used for variety of applications.

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

PUSHBUTTONS and LIGHTS

Type N—Standard (Normal) Duty Control Stations

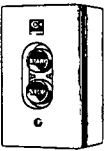
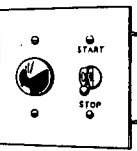
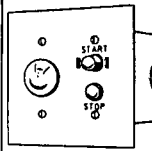
WHEN ORDERING SPECIFY

MAXIMUM AMPERE RATINGS

- Catalog number

Volts	A-c				D-c		
	110	220	440	550	120	240	600
Make & Interrupting Capacity	30.	15.	7.5	6.	1.0	0.5	0.1
Normal Load Break	3.	1.5	.75	0.6	1.0	0.5	0.1
Continuous Current	10.	10.	10.	10.	10.	10.	10.

GENERAL PURPOSE

Enclosure Size	Type of Element	Feature	Symbol	Legend	Flush Mounting—NEMA 1-B							
					Surface Mounting NEMA 1		Wall Type with Outlet Box				Steel Panel Mtg. Type without Outlet Box	
							Brass Flush Plate		Stainless Steel Flush Plate			
												
					Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
One Element	Pushbutton	Plain		Start	10250-H184	\$6.	10250-W39	\$11.	10250-W45	\$11.	10250-W52	\$7.50
				Stop	H119	6.	W40	11.	W46	11.	W53	7.50
		With Lock Hasp		Stop	H3483	9.	---	---	---	---	---	---
	Toggle	Maintained		Start-Stop	---	---	⑤ H2893	14.	W47	14.	---	---
	Selector Switch	3 Position		Run-Off-Auto	H289	6.	---	---	---	---	---	---
	Indicating Light	Inc. Red — 110V.		-----	H1813	14.	---	---	---	---	---	---
		Inc. Red — 220V.		-----	H1812	14.	---	---	---	---	---	---
Two Element	Pushbuttons	Plain		Start-Stop	H1956	6.	---	---	---	---	H2167	7.50
		Start-Stop		---	---	---	---	---	④ H2896	11.		
		With Lock Hasp		Start-Stop	H1947	9.	---	---	---	---	---	---
		Buttons Interlocked		Fast-Slow For-Rev	W38	7.50	---	---	---	---	---	---
				Up-Down Open-Close	H77 H172 H97	7.50 7.50 7.50	---	---	---	---	---	---
	Maintained		Start-Stop	H2979 ②	9.	---	---	---	---	H2980	10.50	
	Toggle and Indicating Light	Inc. Red — 110V.			Start-Stop	---	---	⑤ H2890	25.	W48	25.	---
Inc. Red — 220V.	Start-Stop	---		---	⑤ H2889	25.	W49	25.	---	---		
Three Element	Pushbuttons	Plain		Fast-Slow-Stop	H2988	12.	---	---	---	---	① H2984	13.50
				For-Rev-Stop	H2951	12.	---	---	---	---	① H2963	13.50
				Up-Down-Stop	H2959	12.	---	---	---	---	① H2971	13.50
				Open-Close-Stop	H2953	12.	---	---	---	---	① H2965	13.50
	With Lock Hasp		Fast-Slow-Stop	H2989	15.	---	---	---	---	① H2985	16.50	
			For-Rev-Stop	H2952	15.	---	---	---	---	① H2964	16.50	
			Up-Down-Stop	H2960	15.	---	---	---	---	① H2972	16.50	
			Open-Close-Stop	H2954	15.	---	---	---	---	① H2966	16.50	
Two Pushbuttons and Indicating Light	Neon Light 110/220V.		Start-Stop	H1935	22.	---	---	---	---	① H1939	18.50	
	Neon Light 110/220V. and Lock Hasp		Start-Stop	H1936	25.	---	---	---	---	① H1940	21.50	
	Inc. Red — 110V.		Start-Stop	⑤ H2884	22.	⑤ H2888	22.	W50	22.	---	---	
	Inc. Red — 220V.		Start-Stop	⑤ H2883	22.	⑤ H2887	22.	W51	22.	---	---	

① Pull box for 3 element station—10250H4006, \$3.50.

② 600 volts maximum; A-C only.

③ 250 volts maximum.

④ With pull box.

⑤ No legend on button but any standard legend may be specified. See page 184.

DIMENSIONS, page 182

DISCOUNT SCHEDULE 1 CD

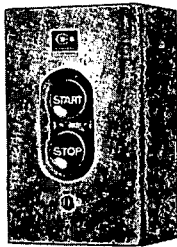
CUTLER-HAMMER



PUSHBUTTONS and LIGHTS

181

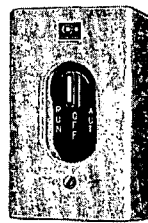
Type N—Standard (Normal) Duty Control Stations



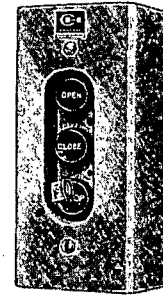
Two Pushbuttons
Surface Mounting
NEMA 1



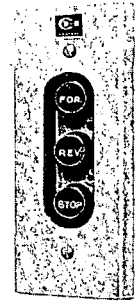
Two Pushbuttons
Flush Mounting
NEMA 1-B



3 Position Switch
Surface Mounting
NEMA 1

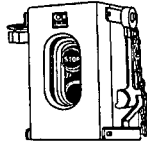
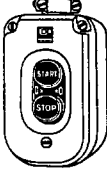
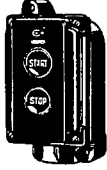
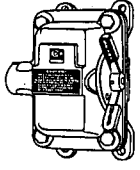


Three Pushbuttons
One with Lock Hasp

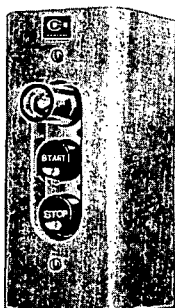


Three Pushbuttons
Flush Mounting
NEMA 1-B

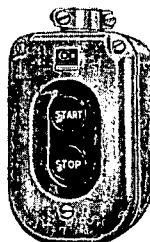
SPECIAL PURPOSE

Enclosure Size	Type of Element	Feature	Symbol	Legend	NEMA 1 Enclosures				Watertight—Dusttight NEMA 4-5		Hazardous Locations NEMA 7-D and 9-EFG	
					Break Glass		Pendant					
					Cat. No.	Price	Cat. No.	Price				
One Element	Pushbutton or Lever	Plain		Start	10250-H2992	\$18.	10250-H2102	\$8.	10250-H2738	\$19.	10250-H2734	\$23.
				Stop	H1943	18.	H2104	8.	H658	19.	H2733	23.
		With Lock Hasp		Stop	---	---	---	---	H665	19.	W56	23.
				Start-Stop	H2995	18.	H2107	8.	H364	19.	H1945	23.
Two Element	Pushbutton or Lever	Plain		Start-Stop	---	---	---	---	H671	19.	H1944	23.
		With Lock Hasp		Start-Stop	---	---	---	---	H2739	22.	---	---
		Maintained		Start-Stop	---	---	---	---	---	---	---	---
		Buttons Interlocked		Fast-Slow For-Rev Up-Down Open-Close	---	---	W54 H2156 H2158 H2157	8. 8. 8. 8.	W55 H2740 H2741 H2742	19. 19. 19. 19.	---	---

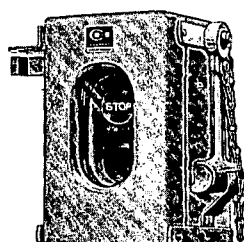
⑤ No legend on button but any standard legend may be specified. See page 184.



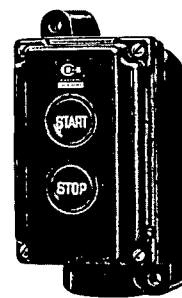
Indicating Light
and Two Pushbuttons



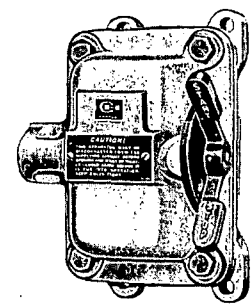
Pendant Type



Break Glass Type



Two Pushbuttons
NEMA 4-5



Two Element Lever Operated
NEMA 7-D and 9-EFG

DISCOUNT SCHEDULE 1 CD

DIMENSIONS, next page

CUTLER-HAMMER

181

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

PUSHBUTTONS and LIGHTS



Type N—Standard (Normal) Duty Control Components

WHEN ORDERING SPECIFY

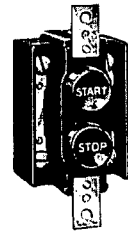
- Catalog number



One Button Unit



3 Position Selector Switch Unit



Two Button Unit

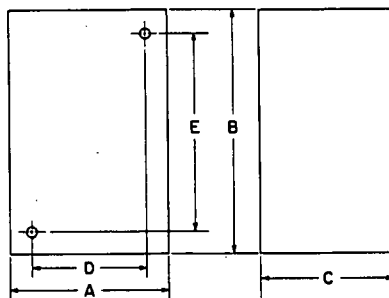
ONE BUTTON UNITS

	Symbol	Legend	Operator	Cat. No.	Price
		None	Pushbutton	10250-H2532	\$3.
		None	Pushbutton	H2533	3.
		None	Pushbutton	H2537	3.
		① None	Pushbutton	H2535	3.
		① None	Pushbutton	H2536	3.
		Run-Off-Auto.	3 Position Selector Switch	H2538	3.

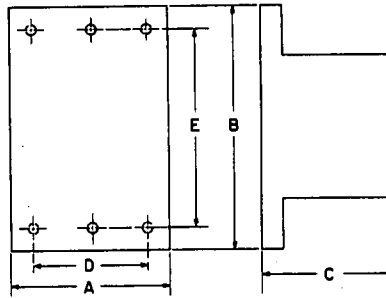
TWO BUTTON UNITS

	Symbol	Legend	Operator	Cat. No.	Price
		None	2 Pushbuttons	10250-H2540	\$4.
		None	2 Pushbuttons Mechanically Interlocked	H2543	5.50
		Start-Stop	2 Pushbuttons	H2747	4.
		① None	2 Pushbuttons Mechanically Interlocked	H2544	5.50

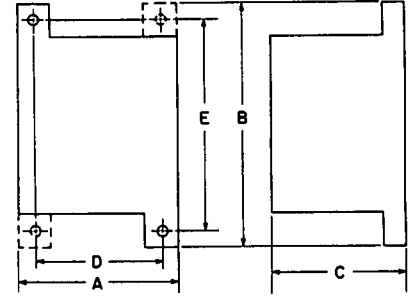
APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



NEMA 1 Surface



NEMA 1B Flush



NEMA 4-5 (7-9)

NEMA Type of Enclosure	1 or 2 Elements						3 Elements					
	Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches					Ship. Wt. Lbs.
	Wide	High	Deep	Mounting			Wide	High	Deep	Mounting		
				D	E					D	E	
1 Standard	2½	4¼	② 2¼	1½	3¾	1	2½	5½	③ 2½	1½	4½	2
1 Break Glass	3¾	4¼	2¼	1½	3¾	1¼	---	---	---	---	---	---
1 Pendant	2½	4½	2¾	---	---	2	---	---	---	---	---	---
1-B With Outlet Box	2¾	4½	3¾	---	---	1	4½	4½	4¾	3	3¾	3
1-B Without Outlet Box	2¾	4¼	④ 2¾	---	3¾	¾	2¾	5½	⑤ 1½	---	5	1
4-5	3¾	6¾	3¾	2½	5½	2½	---	---	---	---	---	---
7-D and 9-EFG	4	6½	4	2½	5½	11	---	---	---	---	---	---

① No legend on button, but any standard legend may be specified; see legends page 184.

② 2 1/4 for 10250H2979.

③ 2 1/4 for 10250H1935 or H1936.

④ 2 1/4 for 10250H2980.

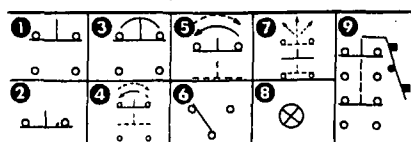
⑤ 2 1/4 for 10250H1939 or H1940.



PUSHBUTTONS and LIGHTS

Type H—Heavy Duty

CIRCUIT SYMBOLS

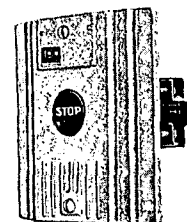


MAXIMUM AMPERE RATINGS

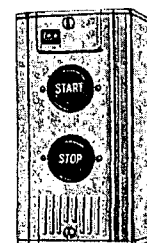
Volts	A-c				D-c		
	110	220	440	550	120	240	600
Make & Interrupting Capacity	60.	30.	15.	12.	1.5	0.75	0.33
Normal load break	6.	3.	1.5	1.2	1.5	0.75	0.33
Continuous Current	10.	10.	10.	10.	10.	10.	10.

ASSEMBLED STATIONS—For 4-8 element or custom built stations, see next page.

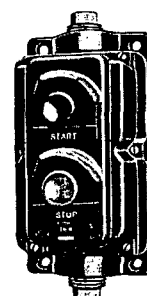
Type of Elements	Feature	Symbol	Legend	General Purpose				Special Service				
				Surface Mounting NEMA 1 Cat. No.	Flush Mounting NEMA 1-B Cat. No.	Price	Weather-proof NEMA 3 Cat. No.	Watertight Dusttight NEMA 4-5 Cat. No.	Price	Hazardous Location NEMA 7-D & 9-EGC		
				Cat. No.	Cat. No.		Cat. No.	Cat. No.		Cat. No.	Price	
ONE ELEMENT												
Pushbuttons	Plain	①	Start Stop Run Jog	10250-H1003 H1002 H1005 H1004	10250-H523 H524 --- H525	\$11. 11. 11. 11.	10250-H1880 H1957 H1882 H1881	10250-H1423 H1422 H1425 H1424	\$23. 23. 23. 23.	10250-H1573 H1572 H1575 H1574	\$27. 27. 27. 27.	
	Plain with Lock Hasp	②	Stop	H1011	---	14.	---	H1428	23.	H1578	27.	
	Mushroom Head	③	Start Stop	H1015 H1014	H526 H527	14. 14.	---	---	---	---	---	
	Roto-Latch Half-down	④	On-STOP-Jog	H1021	---	14.	---	---	---	---	---	
	Roto-Latch Full-down	⑤	On-STOP-Safe	H1020	---	14.	---	---	---	---	---	
	Roto-Latch Full-down with Lock Hasp	⑥	On-STOP-Safe	H1011	---	14.	---	---	---	---	---	
Knob Selector Switch	2 Position	⑦	Off-On	H1314	H531	12.	---	H1414	24.	H1592	28.	
	3 Position	⑧	Man-Off-Auto	H1027	H535	12.	---	H1415	24.	H1593	28.	
TWO ELEMENT												
Pushbuttons	Plain	① ①	Start-Stop For-Rev Raise-Lower Open-Close	H2978 H1055 H1056 H1057	H547 H549 --- H551	17. 17. 17. 17.	H1884 H1888 H1885 H1886	H1438 H1434 H1435 H1436	26. 26. 26. 26.	H1620 H1616 H1617 H1618	30. 30. 30. 30.	
	Plain and Plain with Lock Hasp	① ②	Start-Stop	H1044	---	20.	---	H2783	26.	H2781	30.	
	Plain with Maintained Contact	②	Start-Stop	H1119	---	17.	---	---	---	H1656	30.	
	Plain and Mushroom Head	① ③	Start-Stop	H1045	H548	20.	---	---	---	---	---	
	Plain and Roto-Latch Half-down	① ④	Start On-STOP-Jog	H1051	---	20.	---	---	---	---	---	
	Plain and Roto-Latch Full-down	① ⑤	Start On-STOP-Safe	H1050	---	20.	---	---	---	---	---	
THREE ELEMENT												
Pushbuttons	Plain	① ① ① ①	Start-Jog-Stop For-Rev-Stop Raise-Lower-Stop Open-Close-Stop Fast-Slow-Stop	H1135 H1131 H1132 H1133 H1134	--- H613 --- H615 H616	22. 22. 22. 22. 22.	H1894 H1890 H1891 H1893 H1892	H1474 H1470 H1471 H1472 H1473	44. 44. 44. 44. 44.	H1664 H1660 H1661 H1662 H1663	58. 58. 58. 58. 58.	
	2 Plain and Plain with Lock Hasp	①	Start-Jog-Stop For-Rev-Stop	H1141 H1137	--- ---	25. 25.	---	H1480 H1476	44. 44.	H1670 H1666	58. 58.	
	2 Plain and Roto-Latch Half-down	① ① ④	Forward Reverse On-STOP-Jog	H1376	---	25.	---	---	---	---	---	
			Up Down On-STOP-Safe	H3674	---	25.	---	---	---	---	---	
	2 Plain and Roto-Latch Full-down	① ① ⑤	Run Jog On-STOP-Safe	H1373	---	25.	---	---	---	---	---	
			Forward Reverse On-STOP-Safe	H1374	---	25.	---	---	---	---	---	
	Indicating Light and Pushbuttons	Light—Red Lens and 2 Plain	③	Motor Running 110V.	H1167	---	27.	H1913	H1488	49.	H1678	63.
			①	Start 220V.	H1168	---	27.	H1914	H1489	49.	H1679	63.
				Stop 440V.	H1169	---	29.	H1915	H1490	51.	H1680	65.
①			Stop 550V.	H1170	---	29.	H1916	H1491	51.	H1681	65.	



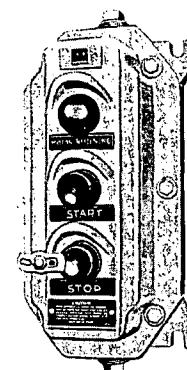
One Element Flush Mounting



**Two Element
NEMA Type 1
Enclosure**



**Two Element
NEMA Type 4-5
Enclosure**



Three Element
NEMA Type 7D-9EFG
Enclosure

3 PHASE FULL VOLTAGE
MOTOR CONTROL

**3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL**

I PHASE MOTOR CONTROL

AC-DC CONTACTORS
RELAYS & TIMERS

**PUSHBUTTONS & LIGHTS
LIMIT SWITCHES,
FOOT SWITCHES**

**MISCELLANEOUS
ACCESSORIES &
COMPONENTS**

PUSHBUTTONS and LIGHTS

Type H—Heavy Duty



WHEN ORDERING SPECIFY

- Enclosure catalog number.
- Individual element identification starting with top or left-hand unit —
 - A. Operator or indicating light code number.
 - B. Contact circuit suffix number.
 - C. Legend plate catalog number.

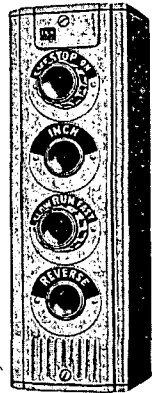
MAXIMUM AMPERE RATINGS

Volts	A-c				D-c		
	110	220	440	550	120	240	600
Make & Interrupting Capacity	60.	30.	15.	12.	1.5	0.75	0.33
Normal load break	6.	3.	1.5	1.2	1.5	0.75	0.33
Continuous Current	10.	10.	10.	10.	10.	10.	10.

ENCLOSURES

No. of Elements	Surface Mounting—NEMA 1			Flush Mounting—NEMA 1B Without Pull Box			Weather Resistant NEMA 3 Vertical		Watertight—Dusttight NEMA 4-5 Vertical		Hazardous Locations NEMA 7-D & 9-EFG Vertical	
	Vertical Cat. No.	Horizontal Cat. No.	Price	Vertical Cat. No.	Horizontal Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
1	10250-H1339	10250-W57	\$7.	10250-H522	10250-W65	\$7.	10250-H1918	\$19.	10250-H1558	\$19.	10250-H1750	\$23.
2	H1340	W58	9.	H546	W66	9.	H1919	19.	H1559	19.	H1751	23.
3	H1341	W59	10.	H612	W67	10.	H1920	32.	H1560	32.	H1752	46.
4	H1342	W60	11.	---	---	---	---	---	H1561	37.	H1753	74.
5	H1343	W61	12.	---	---	---	---	---	H1562	68.	H1754	98.
6	H1344	W62	13.	---	---	---	---	---	H1563	82.	H1755	122.
7	H1345	W63	15.	---	---	---	---	---	---	---	---	---
8	H1346	W64	16.	---	---	---	---	---	---	---	---	---
Lock Hasp	---	---	3.	---	---	---	---	N/C	---	N/C	---	N/C

① Pull box for 1 or 2 element stations, \$6.00—3 element, \$9.00.



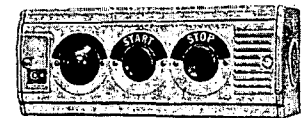
Four Element NEMA Type 1 Enclosure

STANDARD LEGEND PLATES

Price—\$.30							
Type of Element	Legend	One Hole Mounting Cat. No.	Base or Flush Mounting Cat. No.	Type of Element	Legend	One Hole Mounting Cat. No.	Base or Flush Mounting Cat. No.
Push-button	Blank	30-942	30-995	Main-tained Contact	Two legend plates required. Select from pushbutton group at left.		
	Close	30-942-9	30-995-9				
	Down	30-942-11	30-995-11				
	Emer. Stop	30-1352-123	30-995W5				
	Fast	30-942-12	30-995-12				
	Forward	30-942-6	30-995-6				
	High	30-1352-15	30-995-24				
	In	30-1352-13	30-995-29				
	Inch	30-1352-10	30-995-23				
	Jog	30-942-4	30-995-4				
	Jog-For.	30-1456-6	30-995W6	Two Position Knob Selector Switch	Blank	30-942	30-995
	Jog-Rev.	30-1456-7	30-995W7		For-Rev.	30-942-59	30-995-59
	Low	30-1352-17	30-995-25		High-Low	30-1353-12	30-995-W9
	Lower	30-1352-6	30-995-28		Man-Auto	30-942-50	30-995-50
	Off	30-942-19	30-995-19		Off-On	30-942-53	30-995-53
	On	30-942-18	30-995-18		Open-Close	30-942-57	30-995-57
	Open	30-942-8	30-995-8		Run-Jog	30-942-56	30-995-56
	Out	30-1352-14	30-995-30		Safe-Run	30-942-55	30-995-55
	Raise	30-1352-5	30-995-27		Slow-Fast	30-942-52	30-995-52
	Reset	30-1352-3	30-995-33		Stop-Run	30-942-51	30-995-51
	Reverse	30-942-7	30-995-7		Stop-Start	30-942-54	30-995-54
	Run	30-942-5	30-995-5		Up-Down	30-942-58	30-995-58
	Slow	30-942-13	30-995-13	Three Position Knob Selector Switch	Blank	30-942	30-995
	Start	30-942-3	30-995-3		For-Off-Rev.	30-942-73	30-995-73
	Stop	30-942-2	30-995-2		Hand-Off-Auto	30-1353-55	30-995W10
	Up	30-942-10	30-995-10		Jog-Safe-Run	30-942W2	30-995W11
					Man-Off-Auto	30-942-70	30-995-70
					Open-Off-Close	30-942-74	30-995-74
					Slow-Off-Fast	30-942-71	30-995-71
					Up-Off-Down	30-942-75	30-995-75
Mush-room Head	Off	These legends engraved on the mush-room head.		Indicating Lights	Blank	30-942-81	30-994-3
	Run				Light		
	Start				Indicates		
	Stop				Motor		
					Running		
					Motor		
Roto-Latch	Blank	30-938	30-996		Stopped		
	Jog-Stop-On	30-938-4	30-996-4		Power On		
	Jog-Stop-Run	30-938-6	30-996-6				
	On-Stop-Safe	30-938W1	30-996W8				
	Safe-Stop-On	30-938-3	30-996-3				
	Safe-Stop-Run	30-938-5	30-996-5				

Locking Ring, No. 17-1694, will be furnished "No Charge" on orders for elements without legend plates.

② For key operated selector switches order legend plates by complete description.



Three Element Horizontal Mounting

SPECIAL LEGEND PLATES

Limitations	Price
Plain buttons may be engraved with a maximum of 5 characters 1/4" high on one line or 1 1/4" high each on two lines.	
Mushroom heads may be engraved with a maximum of 7 characters.	
Legend plates for base mounted elements are round. They may be engraved with a maximum of 13 characters each on top and bottom except units with padlock hasp or indicating lights where the upper portion only may be engraved.	
One hole mounting legend plates can be engraved within the following limitations:	
Height of Character	Characters per line
3/32"	16
11/64"	10
5/16"	5
Number of Lines	
2	
2	
1	

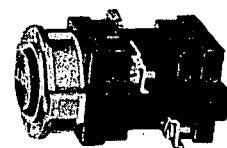


PUSHBUTTONS and LIGHTS

Type H—Heavy Duty

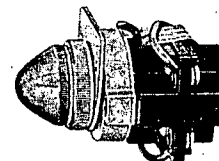
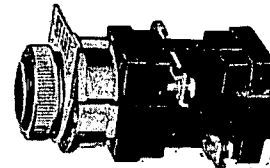
OPERATORS AND INDICATING LIGHTS

Type			For Custom Built Stations Only			Components					
						Base Mounting		One Hole Mounting		One Hole Mounting Oil Tight	
			En-closure Types	Code No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
	Pushbutton	Black	All	10250-W1	\$.70	10250-H479	\$.70	10250-H375	\$ 1.70	10250-H520	\$ 2.70
		Red		W2		H480		H376		H521	
	Long Pushbutton	Black	1, 1B	W3	.70	W68	.70	W69	1.70	W70	2.70
		Red		W4		W71		W72		W73	
	Mushroom Head Pushbutton	Black	1, 1B, 4-5, 7-9	W5	3.70	H481	3.70	H377	4.70	H417	5.70
		Red		W6		H482		H378		H418	
	Roto-Latch Half-down	Black-Horz.	1, 1B	W7	3.70	H2590	3.70	H2650	4.70	---	---
		Black-Vert.		W8		H2592		H2588		---	
		Red-Horz.		W9		H2591		H2587		---	
		Red-Vert.		W10		H2593		H2589		---	
	Roto-Latch Full-down	Black-Horz.	1, 1B	W11	3.70	H487	3.70	H383	4.70	---	---
		Black-Vert.		W12		H489		H385		---	
		Red-Horz.		W13		H488		H384		---	
		Red-Vert.		W14		H490		H386		---	
	Maintained Pushbuttons	Black and Red	All	W15	4.40	H491	4.40	H387	6.40	---	---
	2 Position Knob Selector Switch	Black-Horz.	All	W16	1.70	H494	1.70	H390	2.70	H421	3.70
		Black-Vert.		W17		H495		H391		H422	
	2 Position Key Selector Switch	Gray	1, 1B, 4-5	W18	6.70	---	---	H2723	7.70	H2719	8.70
		3 Position Knob Selector Switch	Black-Horz.	All	W19	1.70	H492	1.70	H388	2.70	H419	3.70
Black-Vert.	W20		H493		H389		H420				
	3 Position Key Selector Switch	Gray	1, 1B, 4-5	W21	6.70	---	---	H2724	7.70	H2720	8.70
	Resistor Indicating Light	Red 110V.	All	W22	8.70	H496	8.70	H392	8.70	H423	8.70
		Red 220V.		W23		H502		H398		H429	
		Green 110V.		W24		H497		H393		H424	
		Green 220V.		W25		H503		H399		H430	
	Transformer Indicating Light	Red 440V.	All	W26	10.70	H2871	10.70	H2879	10.70	H2817	10.70
		Red 550V.		W27		H2877		H2805		H2823	
		Green 440V.		W28		H2872		H2800		H2818	
		Green 550V.		W29		H2878		H2806		H2824	



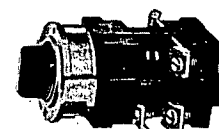
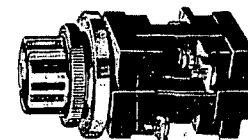
Base Mounting Plain Button Operator

One Hole Mounting Plain Button Operator



One Hole Mounting Transformer Type Indicating Light

One Hole Mounting Plain Button with Roto-Latch Full-Down



Base Mounting 2 or 3 Position Selector Switch

CONTACT CIRCUITS

Circuit	Suffix Number	Price
1 N.O.	-11	\$1.50
1 N.C.	-10	1.50
1 N.O.-1 N.C.	-12	3.00
2 N.O.	-15	3.00
2 N.C.	-14	3.00
2 N.O.-1 N.C.	-21	4.50
2 N.C.-1 N.O.	-20	4.50
2 N.O.-2 N.C.	-22	6.00

③ Also available in 110, 220, 440 or 550 volts—Red, Green, Amber, Clear, Blue or White lens—same price.

DISCOUNT SCHEDULE 1 CD

DIMENSIONS, next page.

CUTLER-HAMMER

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

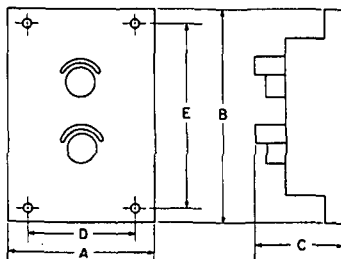
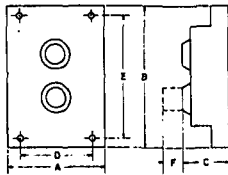
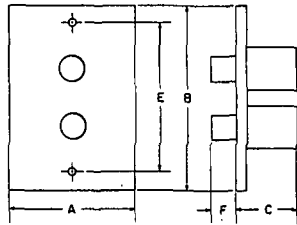
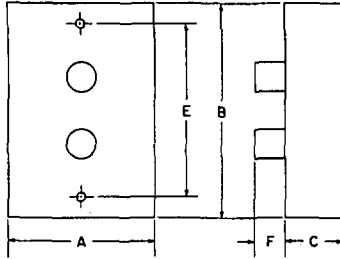
AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

PUSHBUTTONS and LIGHTS**Type H—Heavy Duty****APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS**3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

Number of Elements	Dimensions in Inches					Ship. Wt. Lbs.	Operator Extension	
	Wide A	High B	Deep C	Mounting			Type	F
				D	E			

NEMA 1

1	3 3/8	4 1/2	3 3/4	---	2 7/8	2	Short button	1/8
2	3 3/8	6 3/8	3 3/4	---	4 3/4	3	Long button	3/8
3	3 3/8	8 3/4	3 3/4	---	6 3/8	4	Roto Latch	3/8
4	3 3/8	10 1/8	3 3/4	---	8 1/2	5	Knob selector	1/2
5	3 3/8	12	3 3/4	---	10 3/8	6	Mushroom head	1 1/8
6	3 3/8	13 3/8	3 3/4	---	12 1/4	8	Indicating Light	3/8
7	3 3/8	15 3/8	3 3/4	---	14 3/8	9	Maintained contact	3/8
8	3 3/8	17 3/8	3 3/4	---	16	10	Key selector	3/8
							Lock hasp	3/8

NEMA 1B

1	4 1/4	4 1/2	3	---	3 3/4	2	Button	1/8
2	4 1/4	6 3/8	3	---	5 3/8	2 3/4	Mushroom head	1 3/8
3	4 1/4	8 3/4	3	---	7 1/2	3 1/2	Indicating light	1/2
							Knob selector	1/2
							Key selector	3/8
							Roto Latch	3/8

NEMA 3

1	4 1/2	8 3/4	4 3/4	3 1/2	7 3/8	3 3/4	Indicating light	3/8
2	4 1/2	8 3/4	4 3/4	3 1/2	7 3/8	4	Selector switch	1/2
3	4 1/2	10 3/8	4 3/4	3 1/2	9 3/8	5		

NEMA 4-5

1	4 3/8	8 3/4	4 3/4	3 1/2	7 3/8	3 1/2		
2	4 3/8	8 3/4	4 3/4	3 1/2	7 3/8	4		
3	4 3/8	10 3/8	4 3/4	3 1/2	9 3/8	5		
4	4 3/8	14 3/8	5	3 3/8	13 3/8	8		
5	4 3/8	18 3/8	5	3 3/8	16 3/8	10		
6	4 3/8	20 3/8	5	3 3/8	19 3/8	12		

NEMA 7-D AND 9-EFG

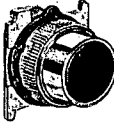
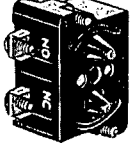
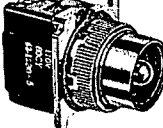
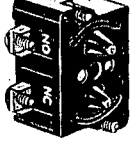
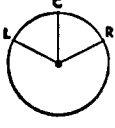
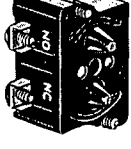
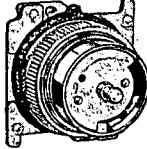
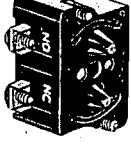
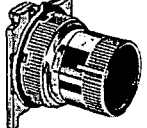
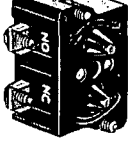
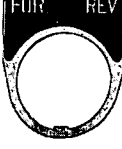
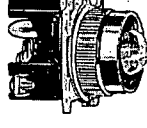
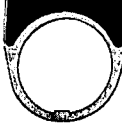
1	5 1/2	6 3/8	6 3/4	4 3/4	5 3/8	16		
2	5 1/2	9 3/8	6 3/4	4 3/4	8 3/8	25		
3	5 1/2	11 3/8	6 3/4	4 3/4	10 3/8	31		
4	5 1/2	14 3/8	6 3/4	4 3/4	13 3/8	40		
5	5 1/2	17 3/8	6 3/4	4 3/4	16 3/8	50		
6	5 1/2	19 3/8	6 3/4	4 3/4	18 3/8	60		

**PUSHBUTTONS and LIGHTS****Type T—Oil Tight****WHEN ORDERING SPECIFY****For Individual Components:**

- Catalog and code numbers from tables. Example — 10250T101.

For Complete Control Units:

- Combination of catalog number and code numbers per examples below. For factory assembled units, add an "X" to the completed number plus contact block assembly instructions for selector switches. (No charge for factory assembly of up to 4 contact blocks.)

Operator Catalog and Code Number	Cam Code Number (Selector Switches Only)	Key Removal or Color Cap Code Number (Selector Switches Only)	Contact Block Code Number	Lens Code Number (Lights Only)	Legend Plate Code Number	Control Unit Complete Number
Pushbuttons or Pushbuttons with Cylinder Lock						
10250T101	---	---	-1	---	M81	10250T101-1M81 (Unassembled) 10250T101-1M81X (Assembled)
	---	---		---		
Illuminated Pushbuttons						
10250T411	---	---	-1	C21	M81	10250T411-1C21M81 (Unassembled) 10250T411-1C21M81X (Assembled)
	---	---				
Key Operated Selector Switch						
10250T151	1	3	-1	---	M38	10250T15113-1M38 (Unassembled) 10250T15113-1M38X (Assembled)
				---		
Knob, Lever or Coin Operated Selector Switch						
10250T131 10250T401	1 1	(Cap assembled—Black only) KB	-1 -1	---	M38 M38	10250T1311-1M38 or 10250T4011KB-1M38 (Unassembled) 10250T1311-1M38X or 10250T4011KB-1M38X (Assembled)
				---		
Roto-Push® Selector-Pushbutton						
10250T241	1	---	-1	---	M38	10250T2411-1M38 (Unassembled) 10250T2411-1M38X (Assembled)
		---		---		
Indicating Lights						
10250T203	---	---	---	C1	M81	10250T203C1M81 (Unassembled) 10250T203C1M81X (Assembled)
	---	---	---			

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

PUSHBUTTONS and LIGHTS



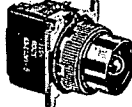
Type T—Oil Tight

FOR ORDERING INFORMATION, see page 187.

PUSHBUTTON OPERATORS

Vertical or Horizontal Mounting			
	Button Color	Cat. & Code No.	Price
	Standard Button		\$2.70
	Black	10250T 101	
	Red	102	
	Green	103	
	Yellow	104	
	Gray	105	
	White	106	
	Brown	107	
	Blue	108	
	Orange	109	
	Long Button		\$2.70
	Black	111	
	Red	112	
	Mushroom Head		\$5.70
	Black	121	
	Red	122	
	Green	123	
	Yellow	124	
	Jumbo Mushroom Head		\$6.70
	Black	171	
	Red ①	172	
	Green	173	
	Yellow	174	

ILLUMINATED PUSHBUTTONS

			
Operator without Lens (50 and 60 Cycles) Vertical or Horizontal Mounting			
Type	Volts	Cat. & Code No.	Price
Resistor A-c or D-c	6	10250T	10250T
		417	427
Transformer A-c only	24	416	426
	110	411	421
	220	412	422
	380	413	423
	440	414	424
	550	415	425
Lens Button			
Lens Button	Color	Cat. and Code No.	Price
	Red	10250T	\$0.70
	Green	C21	
	Amber	C22	
	Blue	C23	
	Clear	C24	
	White	C25	

① For button engraved "Emerg. Stop" use code number T17213 —\$7.00.

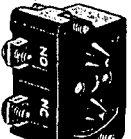
② Use amber or clear lens only. Preferably clear.

③ Limit of one per operator. Minimum spacing 2 1/4" centers for adequate electrical clearance of terminals. Cannot be assembled in standard Type T enclosures.

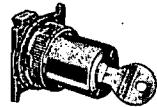
MAXIMUM AMPERE RATINGS

Volts	A-C				D-C		
	110	220	440	550	120	240	600
Make & Interrupting Capacity	60.	30.	15.	12.	2.2	0.5	0.2
Normal Load Break	6.	3.	1.5	1.2	2.2	0.5	0.2
Continuous Current	10.	10.	10.	10.	10.	10.	10.

CONTACT BLOCKS

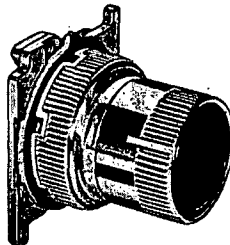
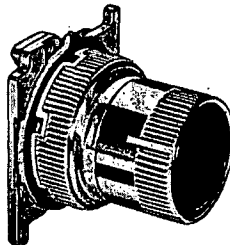
	Catalog and Code Number		Price	Catalog and Code Number						Price
				 	 	 	 	 		
	1 N.O.	1 N.C.		1 N.C. 1 N.O.	2 N.O.	2 N.C.	5 1 L.O.N.C. 1 E.C.N.O.	5 1 E.C.N.O. 1 N.O.		
	10250T	10250T		10250T	10250T	10250T	10250T	10250T		
One Hole Mounting— Pressure Terminal	-53	-51	\$1.50	-1	-2	-3	-55	-57	\$3.	
Base Mounting— Pressure Terminal	-54	-52	1.50	-6	-7	-8	-56	-58	3.	
One Hole Mounting— ④ Spade Terminal	---	---	---	-40	-41	-42	---	---	3.	
N.O. = Normally Open N.C. = Normally Closed				E.C.N.O. = Early closing Normally Open L.O.N.C. = Late opening Normally Closed						

PUSHBUTTON OPERATORS WITH CYLINDER LOCK

	Key Position and Pushbutton Operation			Key Removal Positions	Cat. & Code No.	Price
	L	C	R			
These units are push-buttons which can be locked in various positions or locked to prevent operation.	Lock Up	Free	Lock Down	All	10250T	\$8.70
	Lock Up	Free	Lock Down	L and R	430	
	Lock Up	Free	Lock Down	C and R	431	
	Lock Up	Free	Blocked	L and C	432	
	Lock Up	Free	Blocked	L	433	
	Blocked	Free	Blocked	C and R	434	
	Blocked	Free	Lock Down	R	435	
	Blocked	Free	Lock Down	C and R	436	
	Blocked	Free	Push to Lock	R	437	
	Blocked	Free	Push to Lock	R	438	

Listed operators have identical locks. For dissimilar lock and key combinations see page 191.

ROTO-PUSH® OPERATORS

	Color and Type of Button	Catalog and Code No.		Cam Code No.	Price
		Vertical Mounting	Horizontal Mounting		
	Black Flush	10250T 241	10250T 251	1 to 11	\$5.70
	Red Flush	- 242	252		
	Red Long	262	272		

⑤ Rated A-c only. Do not combine with cam codes

6, 7 and 8 or use with padlocking assembly.

⑥ Limited to maximum of 2 contact blocks.

DIMENSIONS, pages 196-197.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER



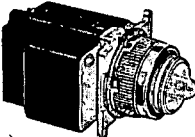
PUSHBUTTONS and LIGHTS

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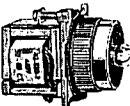
Type T—Oil Tight

PRESTEST® INDICATING LIGHTS

STANDARD INDICATING LIGHTS

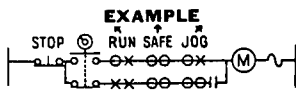
	Basic Unit Vertical or Horizontal Mounting			
	Volts	Catalog and Code No.		Price
		One Hole Mounting	Base Mounting	
Transformer Type 50 or 60 Cycles 6 Volt Bulb A-c Only	110	10250T- 221	10250T- 321	\$13.
	220	222	322	
	380	223	323	
	440	224	324	
	550	225	325	
Resistor Type A-c or D-c	110	231	---	11.

Lens	Color	Cat. and Code No.	Price
	Red	10250T-C13	\$0.70
	Green	C14	
	Amber	C15	
	Blue	C16	
	Clear	C17	
	White	C18	

	Basic Unit Vertical or Horizontal Mtg.					Lens		
	Volts	Catalog and Code No.		Price		Price \$0.70		
		1 Hole Mtg.	Base Mtg.			Color	Catalog and Code No.	
							Std. Plastic Lens	Glass Lens
Transformer Type 50 or 60 Cycles 6 Volt #44 Lamp A-c Only	110 220 380 440 550	10250T 181 182 183 184 185	10250T 191 192 193 194 195	\$10.				
 Resistor Type with GE 6S6 Lamp A-c or D-c	6 14 18 24 32 48 110 220	203 204 205 206 207 208 201 202	213 214 215 216 217 218 211 212	8.	Red Green Amber Blue	10250T C1 C2 C3 C4	10250T C7 C8 C9 C10	
	⊕ Neon Type— Similar to Resistor Type. With NE45 Lamp. (Resistant to Shock and Vibration)	110 220 440 A-c 550 A-c 440 D-c 550 D-c	226 227 228 229 236 237	326 327 328 329 336 337	8.	Clear White	C5 C6	C11 C12

ROTO-PUSH® CAM AND CONTACT BLOCK SELECTION

1. Circuit Analysis—Represent the circuit, showing open and closed contact sequence as in the example below.



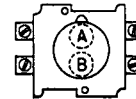
2. Cam Selection—Locate the circuit sequences which correspond to the circuit requirements in the charts below. Refer to the vertical columns and select a

single cam which lists a contact combination for all of the functions to be performed by the Roto-Push operator. If there is no cam which will fill all conditions the combination cannot be accomplished. It may be possible to achieve the function by reversing the sequence. (i.e. "Jog Safe-Run" cannot be accomplished while "Run-Safe-Jog" can be.)

3. Contact Block Selection—Tabulate the N.O. and N.C. contacts required and group them according to their "A" and "B" positions. For every "A" and "B" pair order the required double circuit contact block from the table on opposite page (i.e. For N.O.-N.C. order T1 block). For extra "A" or "B" circuits order a single circuit contact block such as

a T51. Note: An "A"-A" combination requires two single circuit blocks.

"A" and "B", in the tables, orient the contact block circuits in relation to the Roto-Push operator. The diagram below shows the position of these two circuits as related to the locating nib on the operator. The dashed circles around the letters represent the contact block plungers as viewed from the top.



										Three Position					
Collar Position		Cam Code No. 1	Cam Code No. 2	Cam Code No. 3	Cam Code No. 4	Cam Code No. 5	Cam Code No. 6	Cam Code No. 10	Cam Code No. 11	Collar Position			Cam Code No. 7	Cam Code No. 8	Cam Code No. 9
Circuit Sequence										Circuit Sequence					
N	D	N	D	N	D	N	D	N	D	N	D	N	N	D	N
O	O	O	X	A 	A 	-----	-----	A 	-----	-----	-----	A 	B 	-----	B 
O	O	X	O	-----	-----	-----	A 	A 	-----	-----	-----	A 	B 	-----	-----
O	O	X	X	-----	-----	-----	B 	B 	-----	-----	-----	B 	-----	-----	-----
X	X	O	X	A 	A 	-----	-----	A 	-----	-----	-----	-----	-----	-----	-----
X	X	O	O	-----	-----	-----	B 	A 	B 	B 	-----	-----	-----	-----	-----
O	X	O	X	-----	B 	-----	A 	-----	-----	-----	A 	-----	A 	-----	-----
O	X	O	O	B 	A 	-----	-----	A 	A 	A 	-----	-----	A 	-----	-----
O	X	X	X	-----	A 	B 	-----	B 	-----	-----	-----	-----	A 	-----	-----
X	O	X	O	A 	B 	-----	A 	-----	-----	A 	-----	-----	A 	-----	-----
X	O	O	O	-----	-----	A 	B 	-----	B 	A 	A 	-----	B 	-----	-----
X	O	X	X	B 	-----	-----	-----	-----	A 	-----	-----	-----	-----	-----	B 

DISCOUNT SCHEDULE 1 CD

DIMENSIONS, pages 196-197.

CUTLER-HAMMER

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3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

PUSHBUTTONS and LIGHTS



Type T—Oil Tight

MAXIMUM AMPERE RATINGS

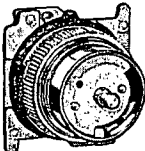
FOR ORDERING INFORMATION, see page 187.

Volts	A-C				D-C		
	110	220	440	550	120	240	600
Make & Interrupting Capacity	60.	30.	15.	12.	2.2	0.5	0.2
Normal Load Break	6.	3.	1.5	1.2	2.2	0.5	0.2
Continuous Current	10.	10.	10.	10.	10.	10.	10.

SELECTOR SWITCH OPERATORS—BLACK

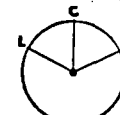
Operation	Operator Cam Code Numbers	Knob Operator			Lever Operator			Coin Slot Operator			Key Operator		
		Cat. & Code Nos.		Price	Cat. & Code Nos.		Price	Cat. & Code Nos.		Price	Cat. & Code Nos.		Price
		Vertical Mounting	Horizontal Mounting		Vertical Mounting	Horizontal Mounting		Vertical Mounting	Horizontal Mounting		Vertical Mounting	Horizontal Mounting	
2 Position Maintained	1	10250T 131	10250T 141	\$3.70	10250T 301	10250T 311	\$3.70	10250T 281	10250T 291	\$5.70	10250T 151	10250T 161	\$9.70
3 Position Maintained	2, 3, 4, 5, 6	132	142	3.70	302	312	3.70	282	292	5.70	152	162	9.70
3 Position—Spring Return from Left and Right	2, 3	134	144	5.70	304	314	5.70	284	294	7.70	154	164	11.70
3 Position—Spring Return from Left—Maintained Right	2, 3	133	143	5.70	303	313	5.70	283	293	7.70	153	163	11.70
3 Position—Spring Return from Right—Maintained Left	2, 3	135	145	5.70	305	315	5.70	---	---	---	---	---	---
4 Position Maintained	7, 8	136	146	3.70	306	316	3.70	---	---	---	---	---	---

SELECTOR SWITCH MECHANISMS AND COLORED OPERATING CAPS

Mechanism				Operating Caps							
	Operator Cam Code No.	Uni- versal Mtg. Cat. and Code No.	Price	Color							
					Knob	Lever	1 Coin Slot				
Operation					Cat. & Code No.	Price	Cat. & Code No.	Price	Cat. & Code No.	Price	
2 Position Maintained	1	10250T 401	\$3.		10250T		10250T		10250T		
3 Position Maintained	2, 3, 4, 5, 6	402	3.	Black	KB		LB		CB		
				Red	KR		LR		CR		
3 Position—Spring Return from Left and Right	2, 3	404	5.	Green	KG		LG		CG		
				Yellow	KY		LY		CY		
3 Position—Spring Return from Left— Maintained Right	2, 3	403	5.	White	KW	\$.70	LW	\$.70	CW	\$2.70	
				Gray	KA		LA		CA		
3 Position—Spring Return from Right— Maintained Left	2, 3	405	5.	Brown	KN		LN		CN		
				Blue	KL		LL		CL		
4 Position Maintained	7, 8	406	3.	Orange	KO		LO		CO		

① Supplied with extended retaining nut to provide flush operation.

KEY REMOVAL POSITIONS



Select One Code No. only.

Code No.	Positions
1	Right
2	Left
3	Right and Left
4	Center
5	Right and Center
6	Left and Center
7	All Positions

NOTES: When key is removed in spring return position, that position is then maintained. Listed operators have identical locks. For dissimilar lock and key combinations see page 191.



PUSHBUTTONS and LIGHTS

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Type T—Oil Tight

SELECTOR SWITCH CAM AND CONTACT BLOCK SELECTION

To select proper cam and contact block:

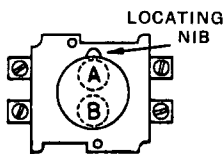
1—Select the contact sequence desired in the table at right.
O = Contacts open.
X = Contacts closed.

2—The cam code number is shown at the top of that column.

3—The number of operating positions (2, 3 or 4) is shown at the top of the table.

4—Contact block number is shown in the column at the extreme left.

NOTE—Each contact block contains two (2) contact circuits. The top set of contacts is identified as "Circuit A" and the lower set as "Circuit B" as indicated in the sketch below and in the selection table. The chart shows the contact arrangements with the three contact blocks available and in each knob position. Additional contact combinations are obtainable by stacking contact blocks in tandem.



Catalog No. of Contact Block	Circuit of Contact Block	2-Pos. Sel. Sw.	3 Position Selector Switch					4 Position Selector Switch			
		Cam Code #1	Cam Code #2	Cam Code #3	Cam Code #4	Cam Code #5	②Cam Code #6	②Cam Code #7	②Cam Code #8		
Knob or Key Position →		↖	↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗	↖↗↖↗	↖↗↖↗
10250 T1, T6 or T40	N O R M A L	NC—A	X 0	0 X 0	0 X X	X 0 0	0 X X	X 0 0	X 0 0 0	X 0 0 0	
		NO—B	0 X	0 0 X	0 0 X	0 X 0	X X 0	0 X 0	0 X 0 0	0 X 0 0	
	I N V E R T E D	NO—A	0 X	X 0 X	X 0 0	0 X X	X 0 0	0 0 X	0 0 X 0	0 0 0 X	
		NC—B	X 0	X X 0	X X 0	X 0 X	0 0 X	0 0 X	0 0 0 X	0 0 0 X	
10250 T2, T7 or T41	NO—A	0 X	X 0 X	X 0 0	0 X X	X 0 0	0 0 X	0 0 X 0	0 0 0 X		
	NO—B	0 X	0 0 X	0 0 X	0 X 0	X X 0	0 X 0	0 X 0 0	0 X 0 0		
10250 T3, T8 or T42	NC—A	X 0	0 X 0	0 X X	X 0 0	0 X X	X 0 0	X 0 0 0	X 0 0 0		
	NC—B	X 0	X X 0	X X 0	X 0 X	0 0 X	0 0 X	0 0 0 X	0 0 0 X		

CONTACT BLOCKS

Contact Block with Pressure Terminals	Catalog and Code Number		Catalog and Code Number					Price
	1 N.O.	1 N.C.	1 N.C. 1 N.O.	2 N.O.	2 N.C.	1 L.O.N.C. 1 E.C.N.O.	1 E.C.N.O. 1 N.O.	
One Hole Mounting—Pressure Terminal	10250T-53	10250T-51	10250T-1	10250T-2	10250T-3	10250T-55	10250T-57	\$3.
Base Mounting—Pressure Terminals	-54	-52	-6	-7	-8	-56	-58	3.
One Hole Mounting—4 Spade Terminal	---	---	---	-40	-41	-42	---	3.

N.O. = Normally Open
N.C. = Normally Closed

E.C.N.O. = Early closing Normally Open
L.O.N.C. = Late opening Normally Closed

- ② Rated A-c only.
- ④ Limit of one per operator. Minimum spacing 2 1/2" centers for electrical clearances. Cannot be assembled in standard enclosure.
- ⑤ Rated A-c only. Do not combine with cam codes 6, 7 and 8 or use with padlocking assembly.

DISSIMILAR LOCKS AND KEYS

Standard cylinder lock and key selector operators all have a common lock and key combination. Listed below are 26 dissimilar combinations which may be selected to provide individual or group station control. Stocked items are readily available—Non-stocked have slightly longer shipping times.

Stocked		
Code No. H620 H621 H634 H635 H639 H643	Code No. H654 H663 H675 H683 H688	
Non-Stocked		
Code No. H693 H705 H715 H716 H728	Code No. H747 H751 H764 H774 H775	Code No. H783 H784 H795 H797 H817

EXAMPLE: 10250T430 except with Lock and Key code number H620.
Dissimilar locks with a master key system can be built special on order at \$6.00 additional per unit.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

191

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS



Type T—Oil Tight

FOR ORDERING INFORMATION, see page 187.

LEGEND PLATES

WITH STANDARD MARKINGS
(AND BLANK PLATES)

Price.....\$0.30 Each

Standard Marking	Color of Field	Cat. No. for Standard Size	Cat. No. for Large Size
------------------	----------------	----------------------------	-------------------------

FOR PUSHBUTTON OPERATORS AND INDICATING LIGHTS

		10250T	10250T
Blank.....	Black	P36	M36
Blank.....	Red	P37	M37
Close.....	Black	P11	M11
Down.....	Black	P12	M12
Emerg. Stop.....	Red	P13	M13
Fast.....	Black	P14	M14
Forward.....	Black	P15	M15
High.....	Black	P16	M16
In.....	Black	P17	M17
Inch.....	Black	P18	M18
Jog.....	Black	P19	M19
Jog For.....	Black	P20	M20
Jog Rev.....	Black	P21	M21
Low.....	Black	P22	M22
Lower.....	Black	P23	M23
Motor Run.....	Black	P81	M81
Motor Stop.....	Black	P82	M82
Off.....	Red	P24	M24
On.....	Black	P25	M25
Open.....	Black	P26	M26
Out.....	Black	P27	M27
Power On.....	Black	P80	M80
Raise.....	Black	P28	M28
Reset.....	Black	P29	M29
Reverse.....	Black	P30	M30
Run.....	Black	P31	M31
Slow.....	Black	P32	M32
Start.....	Black	P33	M33
Stop.....	Red	P34	M34
Up.....	Black	P35	M35

FOR SELECTOR SWITCH AND ROTO-PUSH OPERATORS

For. Rev.....	Black	P38	M38
Hand Auto.....	Black	P39	M39
High Low.....	Black	P40	M40
Jog Run.....	Black	P41	M41
Man. Auto.....	Black	P67	M67
Off On.....	Black	P42	M42
Open Close.....	Black	P43	M43
Run Jog.....	Black	P44	M44
Safe Run.....	Black	P45	M45
Start Jog.....	Black	P46	M46
Start Stop.....	Black	P47	M47
Up Down.....	Black	P48	M48
Auto Off Hand.....	Black	P49	M49
For. Off Rev.....	Black	P50	M50
For. Safe Rev.....	Black	P69	M69
Hand Off Auto.....	Black	P51	M51
Man Off Auto.....	Black	P68	M68

FOR SELECTOR SWITCH AND ROTO-PUSH OPERATORS—(Cont'd)

Standard Marking	Color of Field	Cat. No. for Standard Size	Cat. No. for Large Size
Open Off Close.....	Black	10250T-P53	10250T-M53
Run Safe Jog.....	Black	P70	M70
Up Off Down.....	Black	P54	M54
On Stop Safe.....	Red	P71	M71
Blank.....	Black	P36	M36
Blank (Four position only).....	Black		M72

JUMBO SIZE

(Not available with "Standard" Markings)

Black Field—Blank.....	Cat. No. 10250T-J36
Red Field—Blank.....	Cat. No. 10250T-J37

When ordering legend plates, specify basic catalog number (10250T) plus suffix code number from table above.

EXAMPLES—10250TP33 (Price \$0.30)
10250TM50 (Price 0.30)
10250TJ36 (Price 0.30)

WITH NON-STANDARD MARKINGS

Price.....\$1.30 Each

INSTRUCTIONS FOR ORDERING SPECIALLY MARKED LEGEND PLATES

- Step No.
- Determine the size of legend plate required (standard, large, or jumbo) and the color of field (red or black).
 - Locate the catalog number for such a blank legend plate and specify accordingly. EXAMPLE: 10250TM36 (Blank large legend plate with black field).
 - Follow the catalog number by the word STYLE and then the style number of the marking required. (See at right for styles). EXAMPLE: 10250TM36 Style 3.
 - Follow the style number with a slant bar and then the markings required separating each marking with a dash. EXAMPLE: 10250TM36 Style 3/Start-Run-Stop.
 - If a heading is required follow the markings with another slant bar followed by the heading required. EXAMPLE: 10250TM36 Style 3/Start-Run-Stop/Discharge.

If no heading is required step number 5 should be omitted. One line of heading can be added to a large legend plate and up to three lines of heading can be added to a jumbo legend plate. No heading can be added to a standard legend plate.

The legend plate ordered in the five step example given above would look like this.



Style No. 1



Style No. 1 with Heading



Style No. 2



Style No. 2 with Heading



Style No. 3



Style No. 3 with Heading

MAXIMUM LETTERS AND SPACES PER LEGEND PLATE

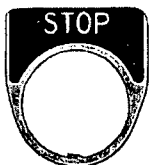
Letter Height	Standard Plate 1 Line	Large Plate		Jumbo Plate Per Line
		1 Line	2 Lines	
3/32"	15	15	30	20
1/32"	9	9	---	12

③ Jumbo size plate will take 4 lines of 3/32" high letters or 3 lines of 1/32" high letters.

For possible deviations from the letter limitations indicated, contact nearest Cutler-Hammer District Office.



Standard Size

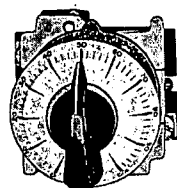


Large Size



② Jumbo Size

② Jumbo size legend plates are larger than standard spacing between mounting holes—should be used on top row only of enclosures or provide special spacing between units.

**PUSHBUTTONS and LIGHTS****Type T—Oil Tight****POTENTIOMETERS—Vertical or Horizontal One Hole Mounting**

Pot. Ohms	① 2 Watt Single Potentiometer		2 Watt Dual Potentiometer		25 Watt Single Potentiometer	
	Catalog Number	Price	Catalog Number	Price	Catalog Number	Price
1000	10250T		10250T		10250T	
2500	331		341		351	
10000	332		342		352	
25000	333	\$20.	343	\$28.	353	\$35.
50000	334		344		354	
Operator Only	335		345		355	
	330	14.	340	15.	350	17.

① Can be converted to base mounting per instructions included with unit.

ACCESSORIES

Description		Catalog Number	Price
	Maintained contact attachment—mechanically interlocks two buttons and provides position indication for one—Use with two pushbutton operators and a contact block	10250T	
		A1	\$3.
	Maintained contact attachment with indicating button—mechanically interlocks provided button with another and both pushbuttons provide position indication—Use with a pushbutton and a contact block.	Black Red Green Yellow Brown	A17 A18 A19 A20 A21
			5.70
	Padlock attachment complete with red flush pushbutton operator. Permits locking NC contacts in open position or vice versa	A16	5.70
	Locking attachment for Knob Selector Switches—provision for up to 5 padlocks.....	A11	5.
	Wobble stick complete with retaining nut.....	A5	3.
	Plug—for unused holes.....	A7	1.
	Spacer ring—Used when legend plate is not required.....	A8	0.30
	Retaining nut wrench.....	A9	3.
	Flexible weather resistant boot for flush or long button operators.....	Black Red Green	A3 A4 A10
			2.
	Extended retaining nut—Replaces standard nut and provides guard for flush head pushbutton operators..	A12	1.
	Standard Flush pushbuttons with extended retaining nut substituted for standard nut — Includes operator and nut.	Black Red	114 115
			2.70

Description		Catalog Number	Price
	Roto-Push Lever operator—Used to provide lever operation for Roto-Push operators.....	10250T A13	\$3.
	Lever operator for use with two vertically mounted flush pushbuttons	A14	6.
	Shroud for mushroom head operator—prevents accidental operation..	A6	4.
	Guard for Illuminated Pushbutton...	A15	1.
	Intermittent Flashing Bulb for use with transformer type, pilot or Prestest® indicating lights—10250-T181-T185, T191-T195, T221-T225 and T321-T325 EXAMPLE: 10250 T181 except G.E. lamp #455.....		1.
	Base Mounting Spacers—Equivalent to contact block in depth — Complete with screws, washers, etc.	1 Block Deep 2 Block Deep	A22 A23
			0.30
	Special Retaining Nut for Thick Panel Mounting—Not to be supplied separately—Part No. 15-837 for Indicating Lights—Part No. 15-837-2 for all other elements except Potentiometers. EXAMPLE: 10250 T181 except Retaining Nut 15-837..		N/C
	Indicating Light Lens Shade — Affords better indication as to whether pilot light is on when subjected to bright external illumination.....	A24	2.

- **Catalog number**

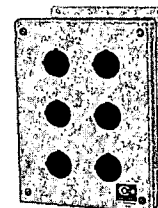


Two Contact Block Depth Enclosure

Number of Elements	Flush Mounting							
	Cast Covers				In Line Stainless Steel Flush Plates			
	In Line		Multiple Row	Price	With Pullbox		Without Pullbox	
	Deep Cover	Flat Cover			Catalog Number	Price	Catalog Number	Price
1	10250T-F11	10250T-F1	---	\$6.	10250T-W30	\$14.	10250T-W31	\$10.
2	F12	F2	---	6.	W32	15.	W33	10.
3	F13	F3	---	7.	W34	18.	W35	12.
4	F14	F4	---	10.	W36	20.	W37	14.
6	F17	F15	F5	14.	---	---	---	---
7	F18	F16	---	16.	---	---	---	---
9	---	---	F6	19.	---	---	---	---
12	---	---	F7	27.	---	---	---	---
16	---	---	F8	37.	---	---	---	---
20	---	---	F9	47.	---	---	---	---
25	---	---	F10	60.	---	---	---	---

Flat
Cover

Deep Cover



**Sheet Steel
Enclosure**

Number of Elements	Surface Mounting											Pendant—Cast—In Line			
	Cast						① Stainless Steel			Sheet Steel— Multiple ① Row	② Price	Without Wobble Stick	With Wobble Stick and Contact Block	Price	
	In Line		Multiple Row			Price	In Line	Multiple Row	Price						
	1 Contact Block Depth	2 Contact Block Depth		3 Contact Block Depth	4 Contact ① Block Depth					2 Contact Block Depth			1 Contact Block Depth	2 Contact Block Depth	
1	10250T-N1	10250T-N11	10250T----	10250T----	10250T----	\$10.	10250T-X407	10250T----	\$18.	10250T----	---	10250T----	10250T----	---	
2	N2	N12	---	---	---	11.	X408	---	19.	---	---	---	---	---	
3	N3	N13	---	---	---	13.	X409	---	26.	---	---	---	---	---	
4	N4	N14	---	---	---	16.	W74	---	34.	---	---	---	---	---	
6	N6	N21	N15	---	---	20.	---	W75	50.	N25	\$13.	---	N6P	N21P	\$76.
7	N7	N22	---	---	---	22.	---	---	---	---	---	N7P	---	---	77.
9	---	---	N16	---	---	26.	---	W76	62.	N26	16.	---	---	---	---
12	---	---	---	N17	---	35.	---	W77	75.	N27	20.	---	---	---	---
16	---	---	---	N18	---	45.	---	W78	99.	N28	25.	---	---	---	---
20	---	---	---	---	N19	56.	---	W79	110.	N29	30.	---	---	---	---
25	---	---	---	---	N20	69.	---	W80	140.	N30	35.	---	---	---	---

← TOP FOR VERTICAL MOUNTING →

OIL TIGHT ENCLOSURE LAYOUTS

“CAST-IN” Knockout Plugs on 6 to 16 unit and drill centers on 20 and 25 unit enclosures
—When full complement of buttons is not required.

"CAST-IN" Knockout Plugs on 6 to 16 unit and drill centers on 20 and 25 unit enclosures
—When full complement of buttons is not required.

To Order a Factory Assembled Station (other than the popular stations listed on page 195) select and list by Catalog Number the proper size enclosure or flush mounting cover. Then select and list by Catalog Number, controls desired in proper sequence according to one of the sketches above. The total price of the listed parts is the price of the complete station.

EXAMPLE:	Cat. No. 10250TN2 Cast Enclosure.....	\$11.00
①	Cat. No. 10250T101-1M33 Pushbutton Unit.....	6.00
②	Cat. No. 10250T102-1M34 Pushbutton Unit.....	6.00
	Total price of assembled station.....	\$23.00

NOTE—Control units are base mounted in 1 to 16 unit enclosed stations and are one hole mounted in 20 to 25 unit stations.

① Arranged for one hole mounting of elements.
② Prices as components only. Not to be used for custom built (factory assembled) stations.

DIMENSIONS. pages 196-197.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

194

3 PHASE FULL VOLTAGE MOTOR CONTROL

**3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL**

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

**PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES**

**MISCELLANEOUS
ACCESSORIES &
COMPONENTS**



PUSHBUTTONS and LIGHTS

195

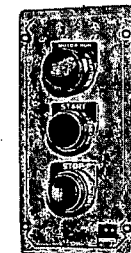
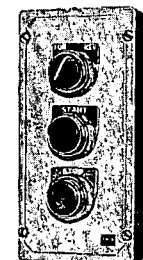
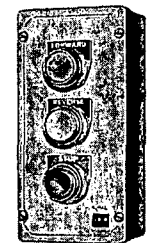
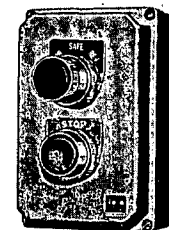
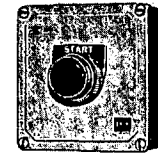
Type T—Oil Tight

ASSEMBLED CONTROL STATIONS

No. of Elements	Type of Elements	Feature	Symbol	Legend	Surface Mtg.		Flush Mtg.	
					Catalog No.	Price	Catalog No.	Price
One	Push-button	Standard		Start Stop	10250-H3516 H3518	\$16.16	10250-H3573 H3575	\$12.12
		Mushroom Head		Start Stop	H3517 H3519	19.19	H3574 H3576	15.15
		With Lock Hasp		Stop	H3520	19.	H3577	15.
	Selector Switch	2 Position		Start-Stop Off-On	H3521 H3523	17.17	H3578 H3580	13.13
		3 Position Spring Return from Left		Start-Stop	H3522	19.	H3579	15.
		3 Position		Man-Off-Auto	H3524	17.	H3581	13.
Two	Push-buttons	Standard		Start-Stop Raise-Lower	H3525 H3672	23.23	H3582 H3673	18.18
		With Lock Hasp		Start-Stop	H3527	26.	H3584	21.
		Standard and Mushroom Head		Start-Stop	H3526	26.	H3583	21.
		Standard with Maintained Contact Attachment		Start-Stop	H3528	23.	H3585	18.
	Selector-Push-button and Push-button	Roto-Push® and Standard		For-Safe-Rev., Stop High-Low, Stop	H3529 H3531	29.29	H3586 H3588	24.24
				Run-Safe-Jog, Stop	H3530	26.	H3587	21.
Three	Push-buttons	Standard		For., Rev., Stop High, Low, Stop Up, Down, Stop Open, Close, Stop	H3532 H3533 H3615 H3614	31.31. 31.31.	H3589 H3590 W81 W82	25.25. 25.25.
		2 Standard and With Lock Hasp		Open, Close, Stop	H3616	34.	W83	28.
	Selector Switch and Push-buttons	2 Position and Standard		For-Rev, Start, Stop Run-Jog, Start, Stop	H3534 H3535	32.32.	H3591 H3592	26.26.
				Motor Run, Start, Stop	H3536 H3537 H3538 H3539	36.36. 36.36.	H3593 H3594 H3595 H3596	30.30. 30.30.
	Indicating Light and Push-buttons	Red lens—110V. Red lens—220V. Red lens—440V. Red lens—550V.						

MAXIMUM AMPERE RATINGS

Volts	A-C			
	110	220	440	550
Make & Interrupting Capacity	60.	30.	15.	12.
Normal Load Break	6.	3.	1.5	1.2
Continuous Current	10.	10.	10.	10.
Volts	D-C			
	120	240	600	
Make & Interrupting Capacity	2.2	0.5	0.2	
Normal Load Break	2.2	0.5	0.2	
Continuous Current	10.	10.	10.	



3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

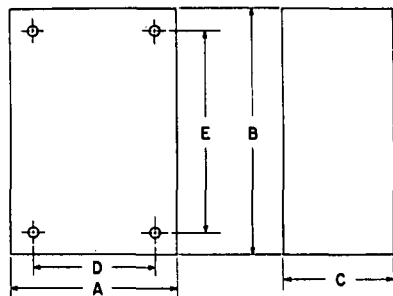
MISCELLANEOUS
ACCESSORIES &
COMPONENTS

PUSHBUTTONS and LIGHTS

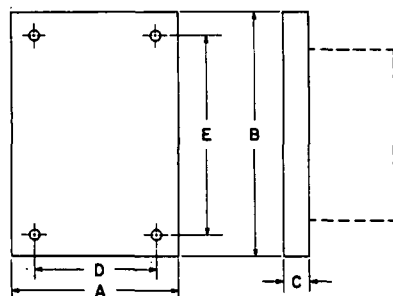


Type T—Oil Tight

APPROXIMATE DIMENSIONS



Surface or Pendant



Flush Mounting

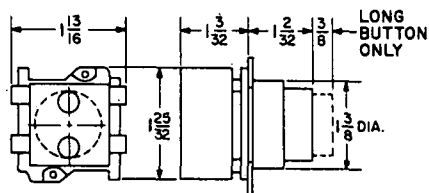
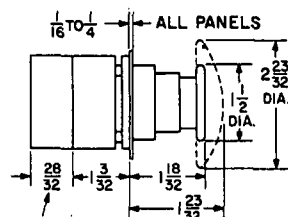
ENCLOSURES

Number of Units	Element Arrangement	Surface Mounting					Flush Mounting				
		Dimensions in Inches					Dimensions in Inches				
		Wide A	High B	Deep C	Mounting		Wide A	High B	Deep C	Mounting	
					D	E				D	E
CAST											
1	In Line	3 3/8	4	1 1/2	2 1/4	3 1/4	3 3/8	4	1 1/4	3 1/2	3 3/8
2	In Line	3 3/8	5 1/8	1 1/2	2 1/4	5 1/8	3 3/8	5 1/8	1 1/4	3 1/2	5 1/2
3	In Line	3 3/8	7 1/4	1 1/2	2 1/4	7 1/4	3 3/8	7 1/4	1 1/4	3 1/2	6
4	In Line	3 3/8	9 1/8	1 1/2	2 1/4	8 3/8	3 3/8	9 1/8	1 1/4	3 1/2	9 1/4
6	In Line	4 1/8	16 1/8	1 1/2	2 1/4	15 1/8	4 1/8	16 1/8	1 1/2	3 3/4	14 1/8
6	Multiple Row	7 3/8	8 3/8	3 1/4	6 3/8	7 3/8	7 3/8	8 3/8	1 1/2	6 3/4	8 3/8
7	In Line	4 1/8	16 1/8	1 1/2	2 1/4	15 1/8	4 1/8	16 1/8	1 1/2	3 3/4	14 1/8
9	Multiple Row	9 1/8	8 3/8	3 1/4	8 3/8	7 3/8	9 1/8	8 3/8	1 1/2	9 3/8	8 3/8
12	Multiple Row	9 1/8	10 1/8	4 1/8	8 3/8	9 1/8	9 1/8	10 1/8	1 1/2	9 3/8	10 1/8
16	Multiple Row	12 1/8	10 1/8	4 1/8	11 1/8	9 1/8	12 1/8	10 1/8	1 1/2	11 1/8	10 1/8
20	Multiple Row	12 1/8	13 1/8	5 1/8	11 1/8	11 1/8	12 1/8	13 1/8	1 1/2	12 1/8	12 1/8
25	Multiple Row	15 1/8	13 1/8	5 1/8	13 1/8	11 1/8	15 1/8	13 1/8	1 1/2	14 1/8	12 1/8
STAINLESS STEEL											
1	In Line	4 1/2	8	3 3/8	---	5	5	2 1/2	3 1/4	1 1/8	---
2	In Line	4 1/2	10 3/8	3 3/8	---	9 1/4	5	6 3/8	2 1/2	3 1/4	3 3/8
3	In Line	4 1/2	12 1/2	3 3/8	---	11 1/2	5	8 3/8	2 1/2	3 1/4	5 1/2
4	In Line	---	---	---	---	---	5	10 1/2	2 1/2	3 1/4	7 1/4
SHEET STEEL											
6	Multiple Row	6 1/4	9	3 3/8	5 1/8	8 1/2	---	---	---	---	---
9	Multiple Row	8 1/4	9	3 3/8	7 1/8	8 1/2	---	---	---	---	---
12	Multiple Row	8 1/4	11	3 3/8	7 1/8	10 1/2	---	---	---	---	---
16	Multiple Row	10 1/4	13	3 3/8	9 1/8	12 1/2	---	---	---	---	---
20	Multiple Row	10 1/4	15	3 3/8	9 1/8	14 1/2	---	---	---	---	---
25	Multiple Row	12 1/4	15	3 3/8	11 1/8	14 1/2	---	---	---	---	---

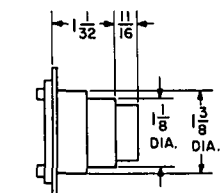
① Depth given is for one contact block deep stations. Two contact block deep stations 3/4" deeper.

② Pendant type with wobble stick assembled 2 1/8".

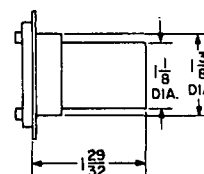
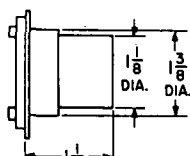
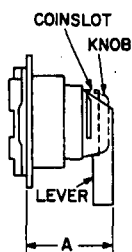
③ Pendant type with cable clamp 18 3/8".

Flush and Long Pushbutton
(Showing contact block detail)FOR EACH
ADDITIONAL
CONTACT BLOCKMushroom and Jumbo Head
Pushbutton

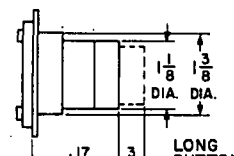
(Showing length of each tandem unit)



Illuminated Pushbutton

Pushbutton With
Cylinder LockKey Operated
Selector Switch

Operator	Dim. "A"
Knob	1 3/8
Lever	1 1/2
Coin Slot	1 3/8

Knob, Coin slot and Lever
Operated Selector Switches

Roto-Push

LONG
BUTTON
ONLY



PUSHBUTTONS and LIGHTS

Type T—Oil Tight

197

3 PHASE FULL VOLTAGE
MOTOR CONTROL

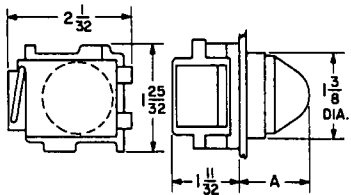
3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

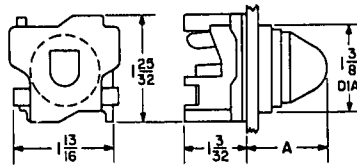
AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

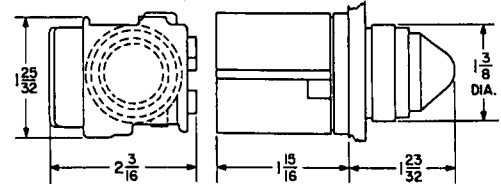
MISCELLANEOUS
ACCESSORIES &
COMPONENTS



Indicating Light - Transformer Type

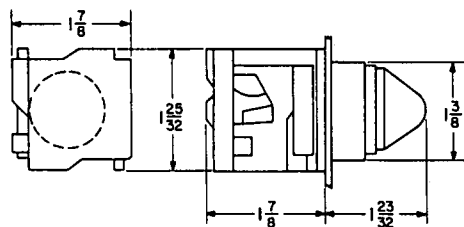


Indicating Light -
Resistor and Neon Type

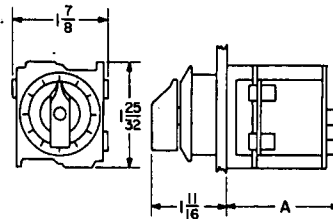


PresTest Indicating Light - Transformer Type

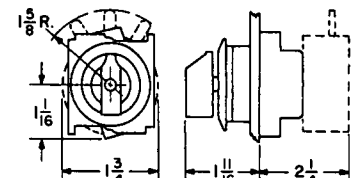
Lens	Dim. "A"
Plastic	1 7/8
Glass	1 3/4



PresTest Indicating Light - Resistor Type

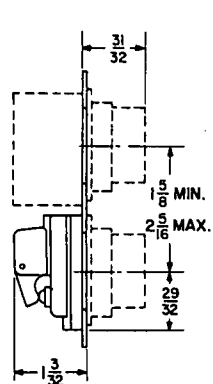


2 Watt Potentiometers

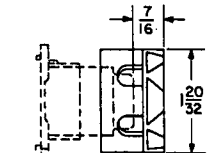


25 Watt Potentiometer

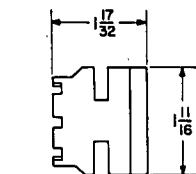
Potentiometer	Dim. "A"
Single	1 3/8
Dual	2 17/32



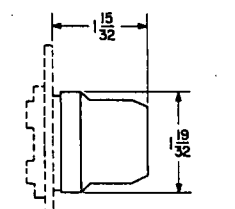
Maintained
Contact Attachment



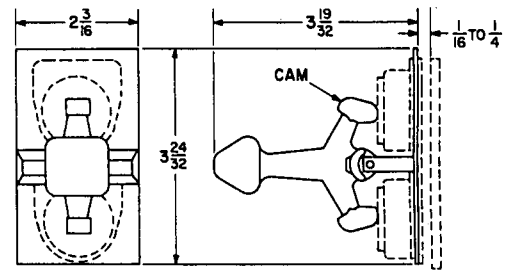
Padlock Attachment
for Selector Switch



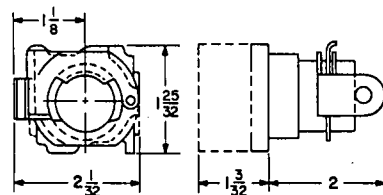
Protecting Shroud
for Mushroom Head Button



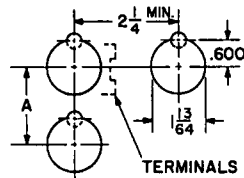
Flexible Boot
for Protecting Flush or Long
Pushbutton



Lever Operator
(for use with two vertically mounted
flush pushbuttons)

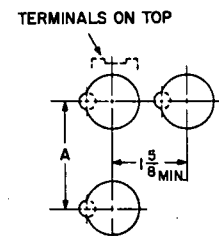


Padlock Attachment



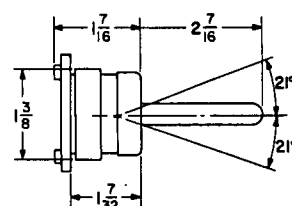
Drilling for one hole mounting
and dimensions for minimum
spacing in vertical rows.

A	Legend Plate
1 5/8	Standard
1 7/8	Large
2 3/8	Jumbo

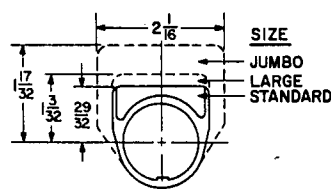


Drilling for one hole mounting
and dimensions for minimum
spacing in horizontal rows.

A	Legend Plate
2 1/4	Standard and Large
2 3/8	Jumbo



Wobble Stick



Legend Plates

CUTLER-HAMMER

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LIMIT SWITCHES

Types L and LD—Oil Tight



WHEN ORDERING SPECIFY

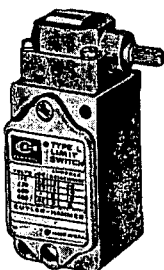
- Catalog number

OPERATING DATA—Nominal

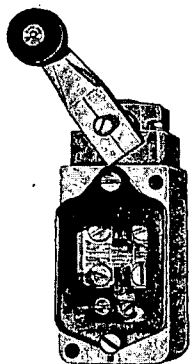
Operation	Degrees Travel to Operate Contacts	Lbs. Force to Trip at 1.5 inch Radius	Total Travel	Degrees Travel to Reset Contacts
Spring Return	5	4	50°	2
Spring Return	10	2	50°	4
Maintained	50	1	90°	50

ROTARY LEVER OPERATORS

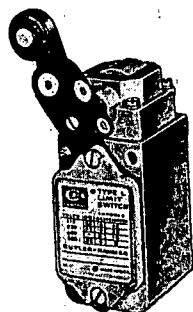
Operator		Degrees Travel to Operate Contacts	TYPE L									
			Surface Mounting Metal Cover					Surface Mounting Transparent Cover				
			Spring Return			Main-tained Contact	Price	Spring Return			Main-tained Contact	Price
Type	Style		Clock-wise	Counter Clock-wise	Clockwise & Counter Clockwise			Clock-wise	Counter Clock-wise	Clockwise & Counter Clockwise		
None	---	5	10316	10316	10316	10316	\$15.50	10316	10316	10316	10316	\$17.
		10	H191	H192	H193	---	14.50	H205	H206	H207	---	16.
		50	H185	H186	H187	H197	17.50	H208	H209	H210	H198	19.
Roller	Nylon	5	H239	H240	H241	---	17.	H248	H249	H250	---	18.50
		10	H211	H212	H213	---	16.	H220	H221	H222	---	17.50
		50	---	---	---	H266	19.	---	---	---	H271	20.50
	Metal	5	H359	H360	H361	---	17.	H365	H366	H367	---	18.50
		10	H356	H357	H358	---	16.	H362	H363	H364	---	17.50
		50	---	---	---	H374	19.	---	---	---	H375	20.50
Ball Bearing	---	5	W1	W2	W3	---	19.	W8	W9	W10	---	20.50
		10	W4	W5	W6	---	18.	W11	W12	W13	---	19.50
		50	---	---	---	W7	21.	---	---	---	W14	22.50
1" Wide Roller	Nylon	5	H381	H382	H383	---	18.	H387	H388	H389	---	19.50
		10	H378	H379	H380	---	17.	H384	H385	H386	---	18.50
		50	---	---	---	H396	20.	---	---	---	H397	21.50
Adjustable Roller	Nylon	5	H242	H243	H244	---	18.	H251	H252	H253	---	19.50
		10	H214	H215	H216	---	17.	H223	H224	H225	---	18.50
		50	---	---	---	H267	20.	---	---	---	H272	21.50
	Metal	5	W36	W37	W38	---	18.	W43	W44	W45	---	19.50
		10	W39	W40	W41	---	17.	W46	W47	W48	---	18.50
		50	---	---	---	W42	20.	---	---	---	W49	21.50
Precision Adjustable Roller	Nylon	5	H325	H326	H327	---	27.50	H331	H332	H333	---	29.
		10	H322	H323	H324	---	26.50	H328	H329	H330	---	28.
		50	H469	H470	H471	---	27.50	H475	H476	H477	---	29.
	Metal	10	H466	H467	H468	---	26.50	H472	H473	H474	---	28.
		5	W72	W73	W74	---	29.50	W78	W79	W80	---	31.
		10	W75	W76	W77	---	28.50	W81	W82	W83	---	30.
Adjustable 1½" Dia. Roller	Nylon	5	H447	H448	H449	---	19.	H453	H454	H455	---	20.50
		10	H444	H445	H446	---	18.	H450	H451	H452	---	19.50
		50	---	---	---	H462	21.	---	---	---	H463	22.50
	Metal	5	H403	H404	H405	---	18.	H409	H410	H411	---	19.50
		10	H400	H401	H402	---	17.	H406	H407	H408	---	18.50
		50	---	---	---	H418	20.	---	---	---	H419	21.50
Adjustable Rod	Nylon	5	H245	H246	H247	---	18.	H254	H255	H256	---	19.50
		10	H217	H218	H219	---	17.	H226	H227	H229	---	18.50
		50	---	---	---	H268	20.	---	---	---	H273	21.50
	Metal	5	W103	W104	W105	---	18.	W110	W111	W112	---	19.50
		10	W106	W107	W108	---	17.	W113	W114	W115	---	18.50
		50	---	---	---	W109	20.	---	---	---	W116	21.50
Spring Rod	Nylon	5	H425	H426	H427	---	18.	H431	H432	H433	---	19.50
		10	H422	H423	H424	---	17.	H428	H429	H430	---	18.50
		50	---	---	---	H440	20.	---	---	---	H441	21.50
	Metal	5	---	---	---	---	---	---	---	---	---	---
		10	---	---	---	---	---	---	---	---	---	---
		50	---	---	---	---	---	---	---	---	---	---
Fork—One Roller Front One Back	Nylon	50	---	---	---	H269	20.	---	---	---	H274	21.50
		50	---	---	---	---	---	---	---	---	---	---
		50	---	---	---	---	---	---	---	---	---	---
	Metal	50	---	---	---	---	---	---	---	---	---	---
		50	---	---	---	---	---	---	---	---	---	---
		50	---	---	---	---	---	---	---	---	---	---
Fork—Rollers on Front	Nylon	50	---	---	---	---	---	---	---	---	---	---
		50	---	---	---	---	---	---	---	---	---	---
		50	---	---	---	---	---	---	---	---	---	---
	Metal	50	---	---	---	---	---	---	---	---	---	---
		50	---	---	---	---	---	---	---	---	---	---
		50	---	---	---	---	---	---	---	---	---	---



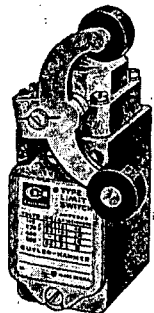
Limit Switch Without Lever



With Roller Lever and Transparent Cover



With Precision Adjustment Roller Lever



With Fork Lever Mounted on Front and One Roller on Each Side of Fork

OPTIONAL FEATURES, page 203.

DIMENSIONS, page 204.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER



LIMIT SWITCHES

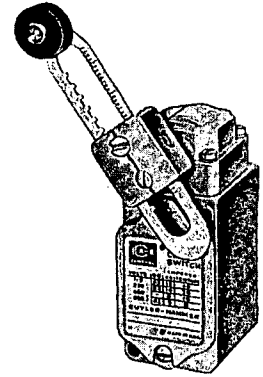
Types L and LD—Oil Tight

MAXIMUM AMPERE RATINGS

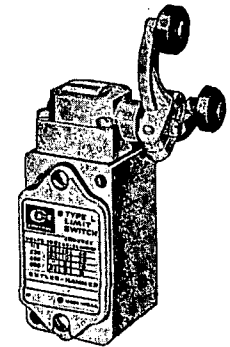
Volts	A-c				D-c		
	110	220	440	550	120	240	600
Make	40	20	10	8	---	---	---
Continuous	15	10	6	5	0.5	0.2	.02

ROTARY LEVER OPERATORS

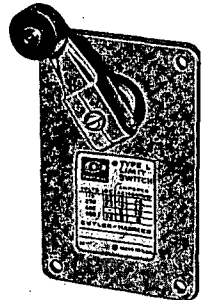
Flush Mounting					TYPE LD—DUPLEX					Operators Only	
Spring Return					Spring Return					Catalog Number	Price
Clock-wise	Counter Clock-wise	Clockwise & Counter Clockwise		Price	Clock-wise	Counter Clock-wise	Clockwise & Counter Clockwise		Price		
10316-H194 H188	10316-H195 H189	10316-H196 H190	10316-H199	\$14.50 13.50 16.50	10316-H352 H349	10316-H353 H350	10316-H354 H351	10316-W172	\$35.33 39.	10316- ---	---
H257 H230	H258 H231	H259 H232	H276	16. 15. 18.	H346 H343	H347 H344	H348 H345	W173	38. 36. 42.	H200	\$1.50
H371 H368	H372 H369	H373 H370	H376	16. 15. 18.	W174 W177	W175 W178	W176 W179	W180	38. 36. 42.	H355	1.50
W15 W18	W16 W19	W17 W20	W21	18. 17. 20.	W181 W184	W182 W185	W183 W186	W187	42. 40. 46.	H531	3.50
H393 H390	H394 H391	H395 H392	H398	17. 16. 19.	W188 W191	W189 W192	W190 W193	W194	40. 38. 44.	H377	2.50
H260 H233	H261 H234	H262 H235	H277	17. 16. 19.	W195 W198	W196 W199	W197 W200	W201	40. 38. 44.	H201	2.50
W51 W54	W52 W55	W53 W56	W57	17. 16. 19.	W202 W205	W203 W206	W204 W207	W208	40. 38. 44.	X31	2.50
H337 H334	H338 H335	H339 H336	---	26.50 25.50	W209 W212	W210 W213	W211 W214	---	59. 57.	H340	12.
H481 H478	H482 H479	H483 H480	---	26.50 25.50	W215 W218	W216 W219	W217 W220	---	59. 57.	H465	12.
W84 W87	W85 W88	W86 W89	---	28.50 27.50	W221 W224	W222 W225	W223 W226	---	63. 61.	W102	14.
H459 H456	H460 H457	H461 H458	H464	18. 17. 20.	W227 W230	W228 W231	W229 W232	W233	42. 40. 46.	H443	3.50
H415 H412	H416 H413	H417 H414	H420	17. 16. 19.	W234 W237	W235 W238	W236 W239	W240	40. 38. 44.	H399	2.50
H263 H236	H264 H237	H265 H238	H278	17. 16. 19.	W241 W244	W242 W245	W243 W246	W247	40. 38. 44.	H202	2.50
W117 W120	W118 W121	W119 W122	W123	17. 16. 19.	W248 W251	W249 W252	W250 W253	W254	40. 38. 44.	H556	2.50
H437 H434	H438 H435	H439 H436	H442	17. 16. 19.	W255 W258	W256 W259	W257 W260	W261	40. 38. 44.	H421	2.50
---	---	---	H279	19.	---	---	---	W262	44.	H203	2.50
---	---	---	W129	19.	---	---	---	W263	44.	W132	2.50
---	---	---	H280	19.	---	---	---	W264	44.	H204	2.50
---	---	---	W135	19.	---	---	---	W265	44.	W138	2.50



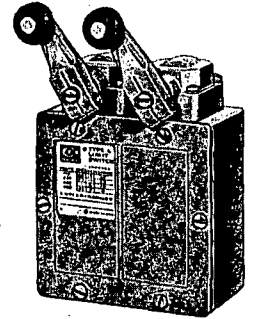
With Adjustable Roller Lever



With Fork Lever Mounted on Side and Both Rollers on Same Side of Fork



Front View Flush Type



Duplex Switch

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

LIMIT SWITCHES

Type LP—Oil Tight



WHEN ORDERING SPECIFY

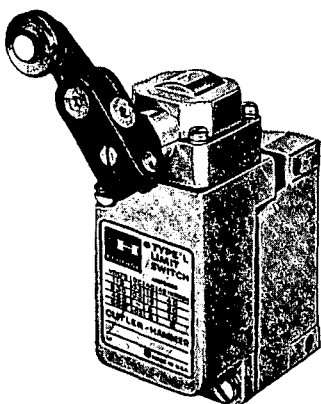
- Catalog number

OPERATING DATA—Nominal

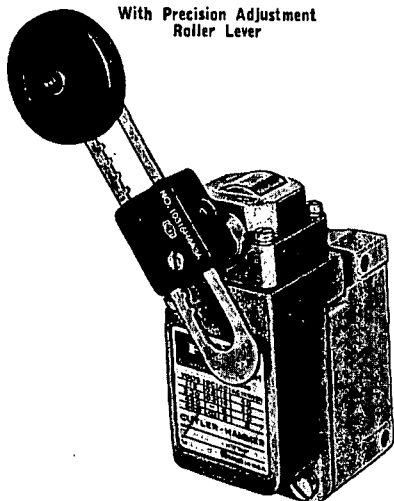
Operation	Degrees Travel to Operate Contacts	Lbs. Force to Trip at 1.5 inch Radius	Total Travel	Degrees Travel to Reset Contacts
Spring Return	5	4	50°	2
Spring Return	10	2	50°	4
Maintained	50	1	90°	50

ROTARY LEVER OPERATORS

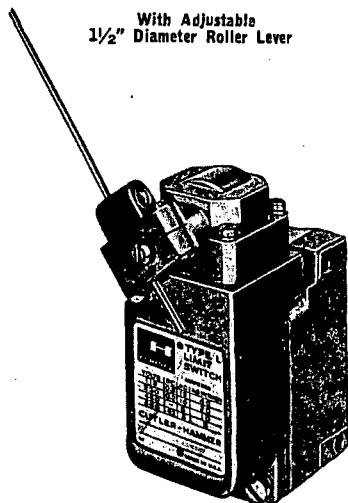
Operator		Degrees Travel to Operate Contacts	TYPE LP—PLUG-IN				
			Complete Switch				Price
			Spring Return			Maintained Contact	
Type	Style		Clockwise	Counter Clockwise	Clockwise & Counter Clockwise		
None	---	5	10316-	10316-	10316-	10316-	\$15.50
		10	H591	H592	H593	---	14.50
		50	H585	H586	H587	H597	17.50
Roller	Nylon	5	H639	H640	H641	---	17.
		10	H611	H612	H613	---	16.
		50	---	---	---	H666	19.
	Metal	5	H759	H760	H761	---	17.
		10	H756	H757	H758	---	16.
		50	---	---	---	H774	19.
Ball Bearing	---	5	W22	W23	W24	---	19.
		10	W25	W26	W27	---	18.
		50	---	---	---	W28	21.
1" Wide Roller	Nylon	5	H781	H782	H783	---	18.
		10	H778	H779	H780	---	17.
		50	---	---	---	H796	20.
Adjustable Roller	Nylon	5	H642	H643	H644	---	18.
		10	H614	H615	H616	---	17.
		50	---	---	---	H667	20.
	Metal	5	W58	W59	W60	---	18.
		10	W61	W62	W63	---	17.
		50	---	---	---	W64	20.
Precision Adjustable Roller	Nylon	5	H725	H726	H727	---	27.50
		10	H722	H723	H724	---	26.50
		50	---	---	---	---	---
	Metal	5	H869	H870	H871	---	27.50
		10	H866	H867	H868	---	26.50
		50	---	---	---	---	---
Ball Bearing	---	5	W90	W91	W92	---	29.50
		10	W93	W94	W95	---	28.50
		50	---	---	---	---	---
Adjustable 1 1/2" Dia. Roller	Nylon	5	H847	H848	H849	---	19.
		10	H844	H845	H846	---	18.
		50	---	---	---	H862	21.
Adjustable Rod	Nylon	5	H803	H804	H805	---	18.
		10	H800	H801	H802	---	17.
		50	---	---	---	H818	20.
	Metal	5	H645	H646	H647	---	18.
		10	H617	H618	H619	---	17.
		50	---	---	---	H668	20.
Spring Rod	Nylon	5	H560	H561	H562	---	18.
		10	H557	H558	H559	---	17.
		50	---	---	---	H563	20.
	Metal	5	H825	H826	H827	---	18.
		10	H822	H823	H824	---	17.
		50	---	---	---	H840	20.
Fork—One Roller Front, One Back	Nylon	50	---	---	---	H669	20.
		---	---	---	---	---	---
		---	---	---	---	---	---
Fork—Rollers on Front	Nylon	50	---	---	---	H670	20.
		---	---	---	---	---	---
		---	---	---	---	---	---
Metal	---	50	---	---	---	W130	20.
		---	---	---	---	---	---
		---	---	---	---	---	---
Metal	---	50	---	---	---	W136	20.
		---	---	---	---	---	---
		---	---	---	---	---	---



With Precision Adjustment Roller Lever



With Adjustable 1 1/2" Diameter Roller Lever



With Adjustable Metal Rod Actuator

DIMENSIONS, page 204.

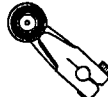
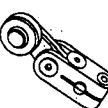
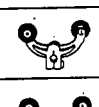
DISCOUNT SCHEDULE 1 CD

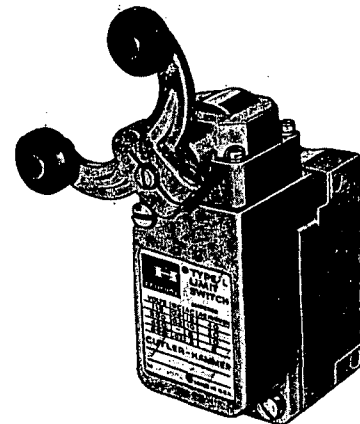
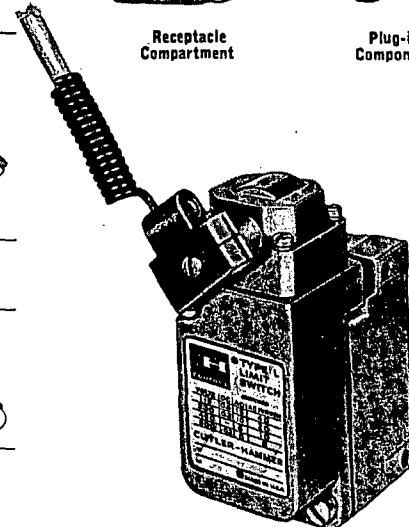
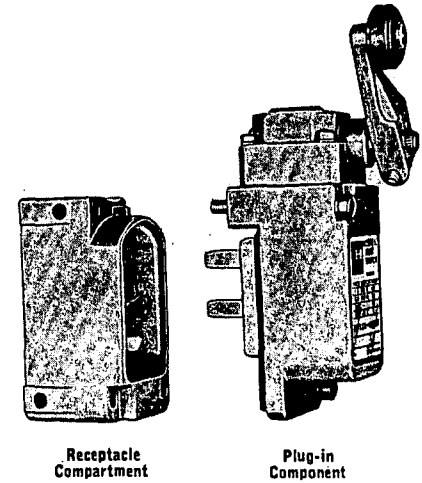
CUTLER-HAMMER

**LIMIT SWITCHES****Type LP—Oil Tight****MAXIMUM AMPERE RATINGS**

Volts	A-c				D-c		
	110	220	440	550	120	240	600
Make	40	20	10	8	---	---	---
Continuous	15	10	6	5	0.5	0.2	.02

ROTARY LEVER OPERATORS

Surface Mounting, Metal Cover					Plug-in Component		Operators Only	
							Operators Only	
Spring Return				Maintained Contact	Price	Catalog Number	Price	
Clock-wise	Counter Clock-wise	Clockwise & Counter Clockwise						
10316-H5915-H5855	10316-H5925-H5865	10316-H5935-H5875	10316-H5975	---	\$13.50 12.50 15.50	10316- ---	---	
H6395 H6115	H6405 H6125	H6415 H6135	---	H6665	15. 14. 17.	H200	\$1.50	
H7595 H7565	H7605 H7575	H7615 H7585	---	H7745	15. 14. 17.	H355	1.50	
W29 W32	W30 W33	W31 W34	---	W35	17. 16. 19.	H531	3.50	
H7815 H7785	H7825 H7795	H7835 H7805	---	---	16. 15. 18.	H377	2.50	
H6425 H6145	H6435 H6155	H6445 H6165	---	H6675	16. 15. 18.	H201	2.50	
W65 W68	W66 W69	W67 W70	---	W71	16. 15. 18.	X31	2.50	
H7255 H7225	H7265 H7235	H7275 H7245	---	---	25.50 24.50	H340	12.	
H8695 H8665	H8705 H8675	H8715 H8685	---	---	25.50 24.50	H465	12.	
W96 W99	W97 W100	W98 W101	---	---	27.50 26.50	W102	14.	
H8475 H8445	H8485 H8455	H8495 H8465	---	H8625	17. 16. 19.	H443	3.50	
H8035 H8005	H8045 H8015	H8055 H8025	---	H8185	16. 15. 18.	H399	2.50	
H6455 H6175	H6465 H6185	H6475 H6195	---	H6685	16. 15. 18.	H202	2.50	
H5605 H5575	H5615 H5585	H5625 H5595	---	H5635	16. 15. 18.	H556	2.50	
H8255 H8225	H8265 H8235	H8275 H8245	---	H8405	16. 15. 18.	H421	2.50	
---	---	---	---	H6695	18.	H203	2.50	
---	---	---	---	W131	18.	W132	2.50	
---	---	---	---	H6705	18.	H204	2.50	
---	---	---	---	W137	18.	W138	2.50	

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

LIMIT SWITCHES



Types L, LD and LP—Oil Tight

WHEN ORDERING SPECIFY

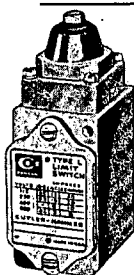
OPERATING DATA—Nominal

- Catalog number

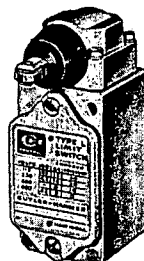
Type of Switch	Force to Trip	Travel to Operate Contacts	Total Travel	Travel to Reset Contacts
Top push.....	4 lbs.	.04 inches	.28 inches	.02 inches
Side push spring return.....	4 lbs.	.07 inches	.29 inches	.03 inches
Side push maintained.....	5 lbs.	.20 inches	.32 inches	.13 inches
Wobble stick.....	2 lbs. at 1 inch	10°	15°	6°
Cat whisker.....	10 ozs. at 1 inch	15°	30°	5°



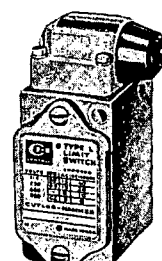
With Top Push Roller



With Top Pushbutton



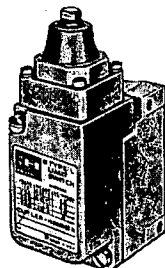
With Side Push Horizontal Roller



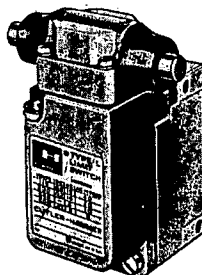
With Side Pushbutton

PUSH TYPE OPERATORS

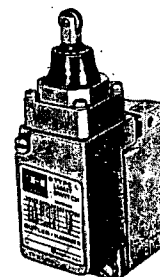
Type of Operation				Type L				Type LD—Duplex				Type LP—Plug-In			
				Surface Mounting				Flush Mounting		Surface Mounting Metal Cover		Surface Mounting—Metal Cover			
				Metal Cover		Transparent Cover						Complete Switch		Plug-in Component	
				Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
SPRING RETURN															
Top Push		Button	10316-H281	\$16.	10316-H286	\$17.50	10316- ---	---	10316-W139	\$36.	10316-H681	\$16.	10316-H6815	\$14.	
		Roller	H283	17.	H288	18.50	---	---	W140	38.	H683	17.	H6835	15.	
Side Push		Button	H282	17.	H287	18.50	H291	\$16.	W141	38.	H682	17.	H6825	15.	
		Vertical Roller	H284	19.	H289	20.50	H292	18.	W142	42.	H684	19.	H6845	17.	
		Horizontal Roller	H285	19.	H290	20.50	H293	18.	W143	42.	H685	19.	H6855	17.	
MAINTAINED															
Side Push Buttons			H294	\$20.	H295	\$21.50	H298	\$19.	W144	\$44.	H694	\$20.	H6945	\$18.	



With Top Pushbutton



With Maintained Contacts Side Pushbutton



With Top Push Roller

DIMENSIONS, page 204.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER



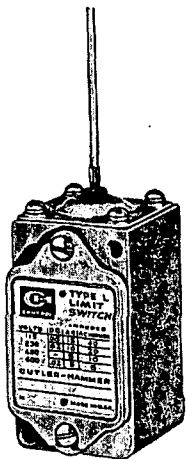
LIMIT SWITCHES

203

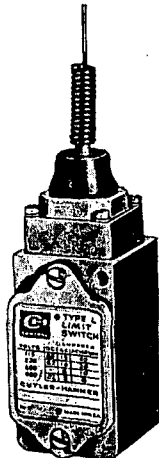
Types L, LD and LP—Oil Tight

MAXIMUM AMPERE RATINGS

Volts	A-c				D-c		
	110	220	440	550	120	240	600
Make.....	40	20	10	8	---	---	---
Continuous.....	15	10	6	5	0.5	0.2	.02



With Cat Whisker

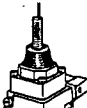
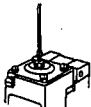


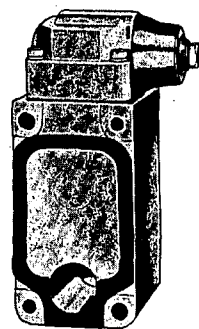
With 12 Inch Wire Extension

OPTIONS—Type L Surface Mounting

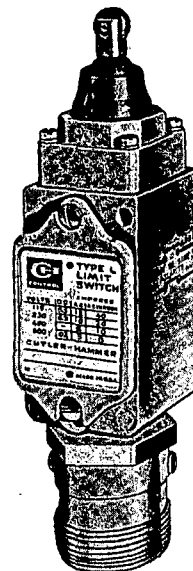
For option add suffix to selected basic catalog number. Example: 10316H2961		Suffix Number	Price Addition
	For Manifold Mounting	1	\$2.
	3/4" conduit entrance instead of 1/2" standard	2	N/C
	Joy Receptacle	3	6.
	Non-Removable Cover	4	6.
	Removable Cover	5	6.

SPECIAL OPERATORS—Spring Return

Type of Operation	Type L				Type LD—Duplex		Type LP—Plug-In			
	Surface Mounting				Surface Mounting Metal Cover		Surface Mounting—Metal Cover			
	Metal Cover		Transparent Cover				Complete Switch		Plug-in Component	
	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
 Nylon Wobble Stick	10316-H296	\$16.	10316-H297	\$17.50	10316-W145	\$36.	10316-H696	\$16.	10316-H6965	\$14.
 Wire Wobble Stick	H484	16.	H485	17.50	W146	36.	H884	16.	H8845	14.
 Nylon Cat Whisker	H341	12.	H342	13.50	W171	32.	H741	12.	H7415	10.



For Manifold Mounting



With Joy Receptacle



"Wet" Limit Switch

ACCESSORIES

Mounting Adapter Kits		Reversed Roller Lever		Conduit Bushing		Receptacle Compartment			
	Style 1 10316H311 \$1.00		Style 2 10316H307 \$1.00		10316H310 \$1.50		1/2"—Oil Tight 10316H486 \$.50		Type LP—Plug-in 10316H555 \$2.00

DISCOUNT SCHEDULE 1 CD

DIMENSIONS, next page

CUTLER-HAMMER

203

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

LIMIT SWITCHES

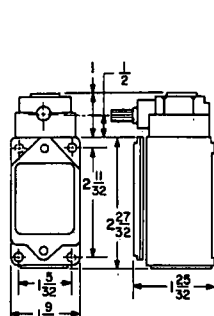
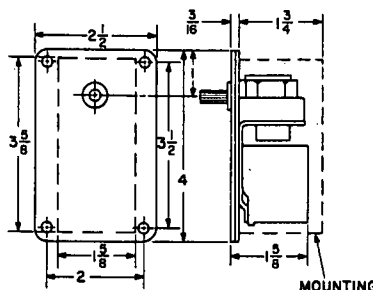
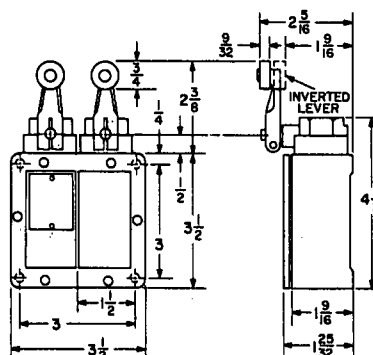
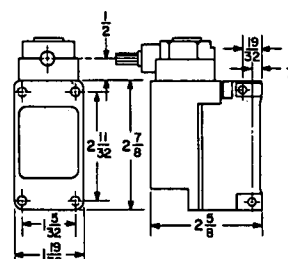
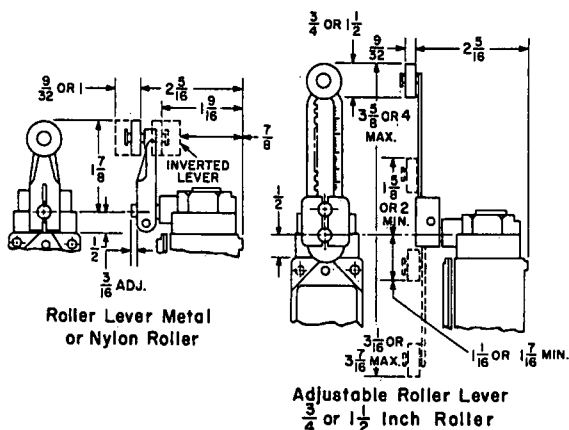
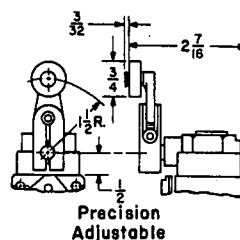
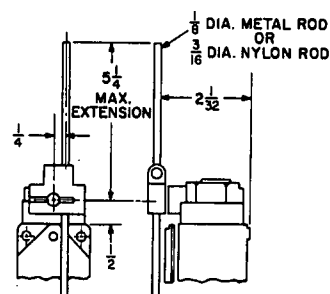
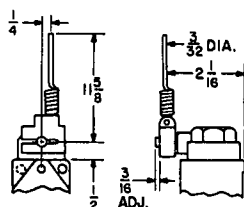
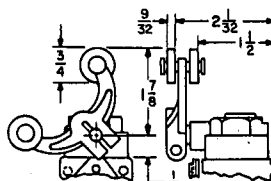


Types L, LD and LP—Oil Tight

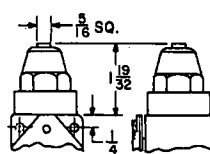
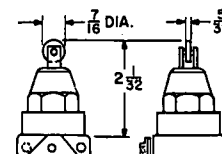
APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

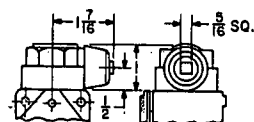
1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTSType L Surface Mtg.
Switch without LeverType L Flush Mtg.
Switch without LeverType LD
Duplex SwitchType LP
Switch without LeverRoller Lever Metal
or Nylon RollerPrecision
AdjustableAdjustable Rod Actuator
Metal or Nylon RodAdjustable Spring Rod
Actuator

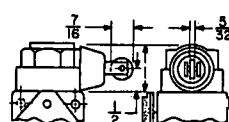
Forked Lever Roller

Switch with Top
Pushbutton

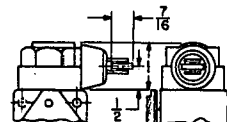
Top Push Roller



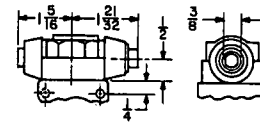
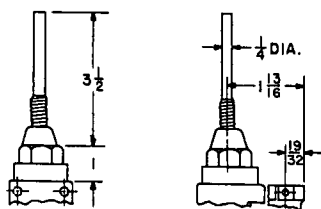
Side Pushbutton



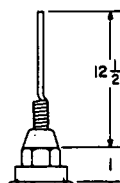
Side Push Vertical Roller



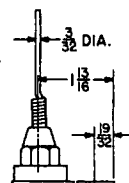
Side Push Horizontal Roller

With Side Pushbuttons
Maintained Contacts

With Wobble Stick (Nylon)



With Wobble Rod (Steel)



With Cat Whisker



LIMIT SWITCHES

205

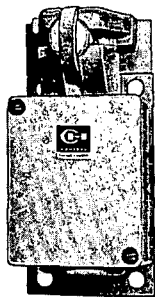
Types D, E, F and G—General Purpose

WHEN ORDERING SPECIFY

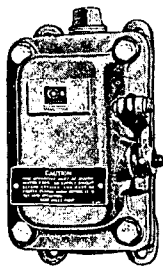
MAXIMUM AMPERE RATINGS

- Catalog number

Types	Volts	A-C				D-C		
		110	220	440	550	120	240	600
D, E, G	Make	20	8	4	4	---	---	---
	Continuous	5	2	1	1	0.6	0.3	---
F (Single Pole)	Make	60	30	20	15	---	---	---
	Continuous	6	3	1.5	1.2	2.2	1.1	0.4
F (Double Pole)	Make	40	20	10	8	---	---	---
	Continuous	15	10	6	5	0.5	0.2	0.02



Type D
NEMA 1



Type D
NEMA 7-D & 9-EFG



Type E
NEMA 1



Type E
Oil Proof



Type G
Lever Operated



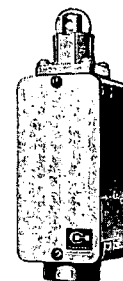
Type G
Cam Operated

ROTARY LEVER TYPES—D, F and G

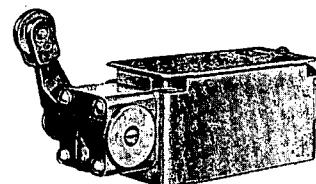
Operator	Circuits	Type	General Purpose NEMA 1		Watertight NEMA 4		Oil Proof		Splash Proof		Hazardous Locations NEMA 7-D & 9-EFG	
			Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
CLOCKWISE OPERATION—SPRING RETURN												
Roller Lever	1 N.O. 1 N.C.	D	10316- ---	---	10316- ---	---	10316- ---	---	10316- ---	---	10316- H7 H6	\$35. 35.
	1 N.O.—1 N.C. 2 N.O.—2 N.C.	F	H21 W147	\$19. 27.	H22 H318	\$22. 30.	H22 H318	\$22. 30.	---	---	---	---
	2 N.O.—2 N.C.	G	H28	30.	---	---	---	---	H31.	\$30.	---	---
COUNTER CLOCKWISE OPERATION—SPRING RETURN												
Roller Lever	1 N.O.—1 N.C. 2 N.O.—2 N.C.	F	H19 W148	19. 27.	H20 H319	22. 30.	H20 H319	22. 30.	---	---	---	---
	2 N.O.—2 N.C.	G	W149	30.	---	---	---	---	W150	30.	---	---
	CLOCKWISE AND COUNTER CLOCKWISE OPERATION—SPRING RETURN											
Roller Lever	1 N.O.—1 N.C. 2 N.O.—2 N.C.	F	H17 W151	19. 27.	H18 H320	22. 30.	H18 H320	22. 30.	---	---	---	---
MAINTAINED CONTACT												
Cam	2 N.O.—2 N.C.	G	H27	30.	---	---	---	---	H30	30.	---	---

PUSH OPERATOR TYPES—D, E and F

Operator	Circuits	Type	General Purpose NEMA 1		Watertight NEMA 4		Oil Proof	
			Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
Pushbutton	1 N.O. 1 N.C.	E	10316- H43	\$11.	10316- ---	---	10316- ---	---
	1 N.O.—1 N.C.		H41	11.	---	---	---	---
	2 N.O.		H46	16.	---	---	---	---
	2 N.O.—2 N.C.		H45	16.	---	---	---	---
			H47	16.	---	---	---	---
	1 N.O.—1 N.C. 2 N.O.—2 N.C.	F	H13 W152	16. 24.	H14 W153	\$19. 27.	H14 W154	\$19. 27.
Push Roller	1 N.O. 1 N.C.	D	H3 H4	16. 16.	---	---	---	---
	1 N.O.—1 N.C.		H10	16.	---	---	---	---
	1 N.O.—1 N.C. 2 N.O.—2 N.C.		H15 W155	19. 27.	H16 W156	22. 30.	H16 W157	22. 30.
	2 N.O.—2 N.C. 3 N.O.—3 N.C.	F	---	---	H88	48.	---	---
Mushroom Head Plunger	1 N.O.—1 N.C. 2 N.O.	E	---	---	---	---	H49 W158	17. 17.
	2 N.C.		---	---	---	---	H87	17.
			---	---	---	---	---	---



Type F
NEMA 1
Push Roller



Type F
NEMA 1
Roller Lever

DISCOUNT SCHEDULE 1 CD

DIMENSIONS, page 207.

CUTLER-HAMMER

205

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

LIMIT SWITCHES



Types J and K—General Purpose

WHEN ORDERING SPECIFY

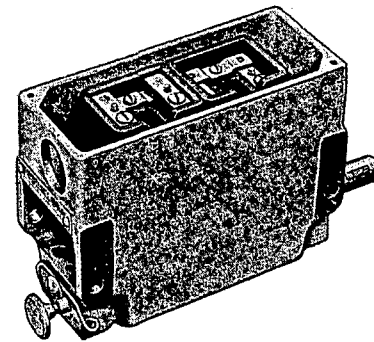
MAXIMUM AMPERE RATINGS

- Catalog number

Type	Volts	A-c				D-c		
		110	220	440	550	120	240	550
J	Make	20	8	4	4	---	---	---
	Continuous	5	2	1	1	0.6	0.3	---
K	Make	40	20	10	8	---	---	---
	Continuous	15	10	6	5	0.5	0.2	0.02

OPERATING DATA

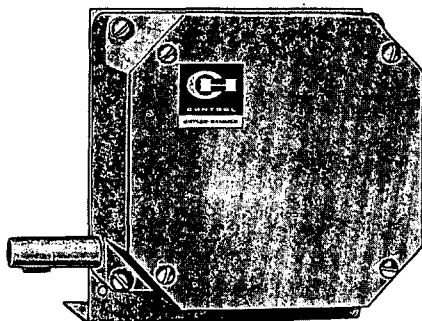
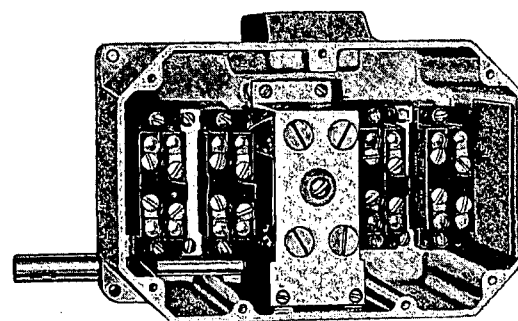
Type	Shaft to Cam Ratio	Input Shaft Turns			
		Maximum to Trip Contacts	Minimum to Trip Contacts	Maximum Overtravel before Resetting Contacts	Maximum Reversal after Tripping to Reset Contacts
J	103:1	100	1/2	103	1/8
K	40:1	35	1	1	1/2
	60:1	53	2	2	3/4
	120:1	108	4	4	1 1/2
	360:1	320	9	9	5
	540:1	480	18	18	6
	1080:1	970	36	36	13



Type J—NEMA 1

ROTATING SHAFT TYPES—J AND K

Input Shaft to Cam Ratio	Circuits	Type	General Purpose NEMA 1			Watertight—Dusttight NEMA 4-5			Hazardous Locations NEMA 7-D and 9-EFG		
			Left- hand Shaft	Right- hand Shaft	Price	Left- hand Shaft	Right- hand Shaft	Price	Left- hand Shaft	Right- hand Shaft	Price
103:1	1 N.O.—1 N.C. 2 N.O. 2 N.C. 2 N.O.—2 N.C. 4 N.O. 4 N.C.	J	10316-	10316-		10316-	10316-		10316-	10316-	
			---	H77	\$38.	---	W161	\$88.	---	---	---
			---	W159	38.	---	W160	88.	---	---	---
			---	H50	38.	---	H51	88.	---	---	---
			---	---	---	---	H54	106.	---	---	---
			---	---	---	---	H53	106.	---	---	---
---	---	---	---	H52	106.	---	---	---			
40:1	2 N.O.—2 N.C. 4 N.O.—4 N.C.	K	H154	H178	38.	H157	H181	45.	H161	H182	\$100.
---	---		72.	H160	---	79.	---	---	---	---	
60:1	2 N.O.—2 N.C. 4 N.O.—4 N.C.		H153	H177	38.	H156	H180	45.	H162	H183	100.
---	---		72.	H159	---	79.	---	---	---	---	
120:1	2 N.O.—2 N.C. 4 N.O.—4 N.C.		H152	H176	38.	H155	H179	45.	H163	H184	100.
---	---		72.	H158	---	79.	---	---	---	---	
360:1	2 N.O.—2 N.C. 4 N.O.—4 N.C.	H164	W162	72.	H167	W163	79.	H170	W164	134.	
---	---	H306	---	106.	H175	---	113.	---	---	---	
540:1	2 N.O.—2 N.C. 4 N.O.—4 N.C.	H165	W165	72.	H168	W166	79.	H171	W167	134.	
---	---	H305	---	106.	H174	---	113.	---	---	---	
1080:1	2 N.O.—2 N.C. 4 N.O.—4 N.C.	H166	W168	72.	H169	W169	79.	H172	W170	134.	
---	---	H304	---	106.	H173	---	113.	---	---	---	

Two Element Type K
NEMA 1Four Element Type K
NEMA 4-5 without cover

CUTLER-HAMMER

DISCOUNT SCHEDULE 1 CD

LIMIT SWITCHES



Types A, B, C, H and HK—Special Purpose

WHEN ORDERING SPECIFY

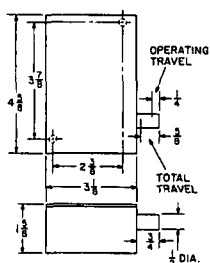
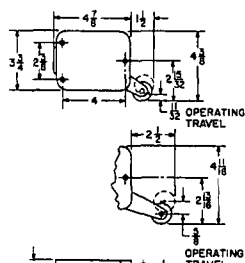
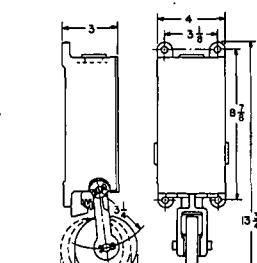
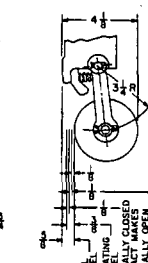
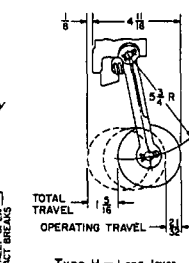
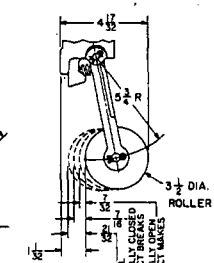
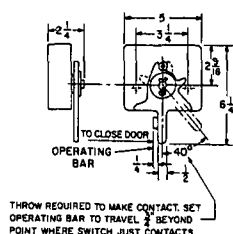
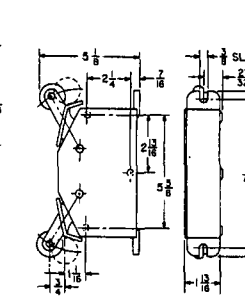
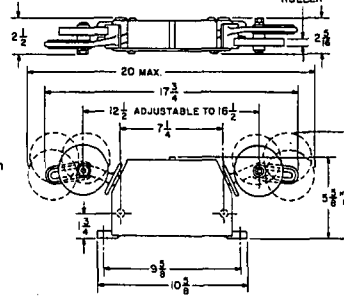
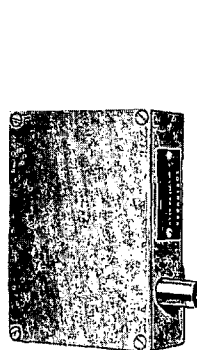
- Catalog number

DIRECT ACTING—Slow Make, Slow Break

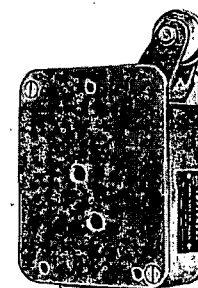
Description	Circuits	General Purpose NEMA 1	
		Cat. No.	Price
Type A Pushbutton Operated— Right or Left-hand mounting	1 N.O.	10316-H55	\$16.
	1 N.C.	H56	16.
Type B Roller Operated— Right-hand mounting convertible to Left-hand	Short (1½") Lever	1 N.O.	H57 16.
		1 N.C.	H58 16.
	Long (2½") Lever	1 N.O.	H59 16.
		1 N.C.	H60 16.
Type C Gravity Lever Operated— Right-hand mounting convertible to Left-hand	1 N.O.	H63	24.
Type H Roller Lever Switch with Rubber Tired Wheel	Short (¾") Lever	1 N.O.-1 N.C. ① H68	49.
		2 N.C.	H66 33.
	Long (5¾") Lever	1 N.O.-1 N.C. ① H73	49.
		2 N.O. H67	33.
Type H Roller Lever Switch with Cast Iron Wheel	Short (¾") Lever	1 N.O.-1 N.C. ① H71	49.
		2 N.C.	H69 33.
	Long (5¾") Lever	1 N.O.-1 N.C. ① H74	49.
		2 N.O. H70	33.
Type HK Double Roller Lever Switch with Non-Adjustable Steel Rollers	2 N.O. Mechanically interlocked	H64	84.
		H65	84.

① With overlapping contacts.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Type A
Lbs. Boxed—3Type B
Lbs. Boxed—3½Type H—Hatchway switch
Lbs. Boxed—10Type H—Short lever
with normally open
and normally closed contacts.Type H—Long lever
with 2 N.O. and 2 N.C.
contacts.Type H—Long lever
with normally open
and normally closed contacts.Type C
Lbs. Boxed—3½Double Throw Limit Switch with
Non-Adjustable Steel Wheels
Lbs. Boxed—5¾Double Throw
Limit Switch with Adjustable
Rubber Tired Wheels
Lbs. Boxed—13½

Type A



Type B



Type C



Type H



Type HK



LIMIT SWITCHES

Type RC – Special Purpose

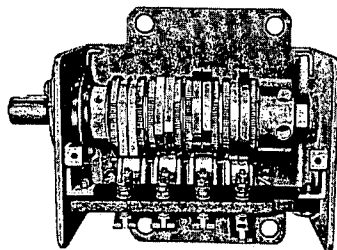
WHEN ORDERING SPECIFY

- Catalog number
- Cam selection numbers ①
- Example: 10310H9-712568

ROTATING CAM TYPE

Circuits	Shaft Extensions	General Purpose—NEMA 1 with Gasketed Cover		Price
		1 1/4" Shaft Extension	2" Shaft Extension	
4	Single Double	10310-H7 H8	10310- H9 H10	\$124. 152.
6	Single Double	H9 H10	H21 H22	188. 216.

① Selected cams will be installed in switch from left to right in order in which selection numbers are received.



Type RC—Open View

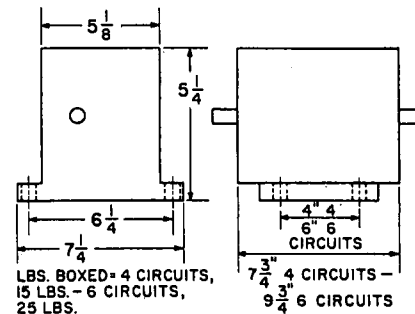
CAM SELECTION

① Cam Selection Number	Adjustment Range of Open Contact Period	
	Minimum	Maximum
1	17°	17°
2	33 1/2°	37°
3	37°	45°
4	45°	60°
5	57 1/2°	85°
6	82°	134°
7	125°	220°
8	195°	360°

Note: Cams are not pre-set. Factory set cam arrangements are available at no extra cost upon submission of complete specifications.

MAXIMUM AMPERE RATINGS

Volts	A-c				D-c	
	110	220	440	550	120	240
Make.....	20.	8.	4.	4.	---	---
Continuous...	5.	2.	1.	1.	0.6	0.3



3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

LIMIT SWITCHES

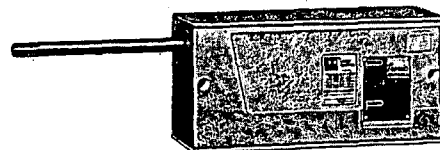
Types HA, HRC and UG—Special Purpose

WHEN ORDERING SPECIFY

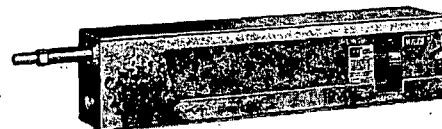
MAXIMUM AMPERE RATINGS

- Catalog number

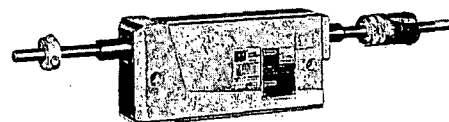
Volts	A-c				D-c		
	110	220	440	550	120	240	600
Make..	40.	20.	10.	8.	---	---	---
Continuous..	15.	10.	6.	5.	0.5	0.2	0.02



Type HRC



Type HA

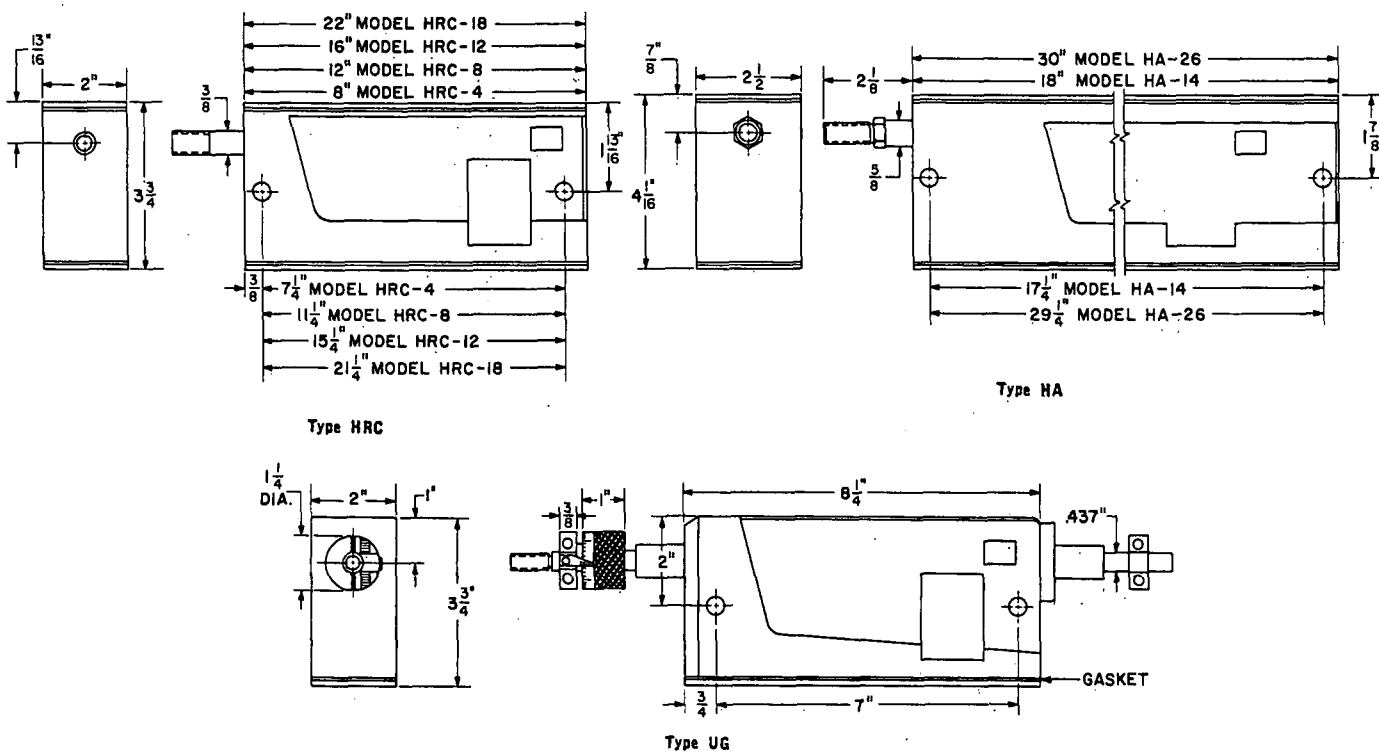


Type UG

LINEAR CONTROL

Description	Type	Catalog Number	Price
Complete switch—4" maximum stroke.....	HRC-4	10316-H4416	\$97.50
Complete switch—8" maximum stroke.....	HRC-8	H4417	104.
Complete switch—12" maximum stroke.....	HRC-12	H4418	111.
Complete switch—18" maximum stroke.....	HRC-18	H4419	123.50
Basic switch with two end contact blocks—drilled to accommodate up to 7 intermediate blocks.....	HA-14	H4425	143.
Basic switch with two end contact blocks—drilled to accommodate up to 16 intermediate blocks.....	HA-26	H4426	172.
Intermediate contact block kits.....	HA-1S	H4427	15.50
Basic switch less actuating rod and strikers.....	UG	H4420	142.
40" Cam actuating rod—23" maximum stroke.....	UGR-23	H4423	10.
60" Cam actuating rod—43" maximum stroke.....	UGR-43	H4424	13.
Adjustable striker.....	UGP	H4421	5.25
Micrometer adjustable striker.....	UGM	H4422	20.

APPROXIMATE DIMENSIONS

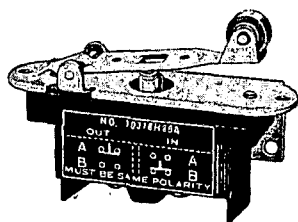




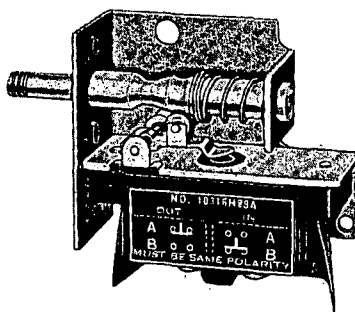
LIMIT SWITCHES **Type PS—Special Purpose**

WHEN ORDERING SPECIFY

- Catalog number



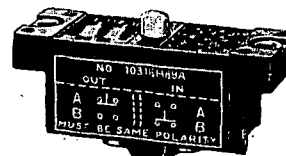
Roller Lever
Type



Cabinet Door Type with One Switch

MAXIMUM AMPERE RATINGS

Volts	A-c				D-c		
	110	220	440	550	120	240	600
Make	40.	20.	10.	8.	---	---	---
Continuous ..	15.	10.	6.	5.	0.5	0.2	0.02

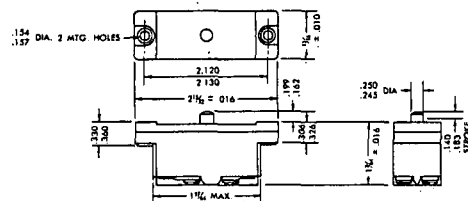


Contact Block
Mechanism

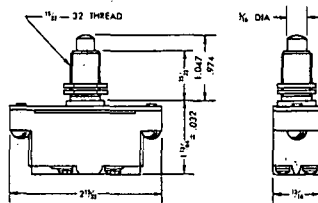
PRECISION TYPES

Operator	Circuits			Price	Operator Only	
	1 N.O.-1 N.C.	1 N.O.	1 N.C.		Catalog Number	Price
None	10316-H89	10316-H91	10316-H90	\$3.	10316-...	---
Pushbutton	H95	H96	H97	7.40	H137	\$4.40
Pushbutton with oil tight plunger	H98	H99	H100	7.90	H138	4.90
Roller perpendicular to mounting holes	H101	H102	H103	8.00	H139	5.00
Roller with oil tight plunger perpendicular to mounting holes	H104	H105	H106	8.50	H140	5.50
Roller in line with mounting holes	H107	H108	H109	8.00	H141	5.00
Roller with oil tight plunger in line with mounting holes	H110	H111	H112	8.50	H142	5.50
6" Lever with top and right-hand mounting bracket	H113	H114	H115	5.20	H143	2.20
6" Lever with top and left-hand mounting bracket	H116	H117	H118	5.20	H144	2.20
Roller lever with top and right-hand mounting bracket	H119	H120	H121	5.00	H145	2.00
Roller lever with top and left-hand mounting bracket	H122	H123	H124	5.00	H146	2.00
One way roller lever with top and right-hand mounting bracket	H125	H126	H127	6.00	H147	3.00
One way roller lever with top and left-hand mounting bracket	H128	H129	H130	6.00	H148	3.00
Cabinet door interlock operator with two contact blocks	H131	H132	H133	13.40	H149	7.40
Cabinet door interlock operator with one contact block	H134	H135	H136	8.70	H150	5.70

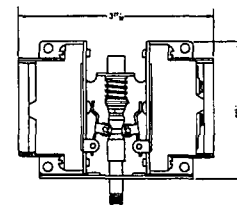
APPROXIMATE DIMENSIONS



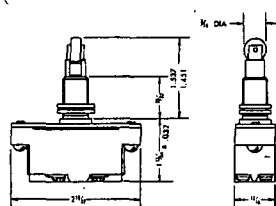
Contact Block Mechanism



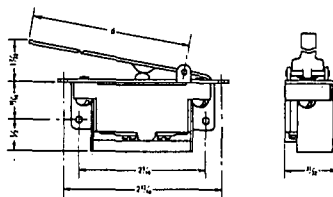
Pushbutton Type



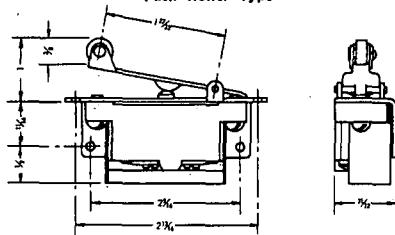
Cabinet Door Type
Two Contact Blocks



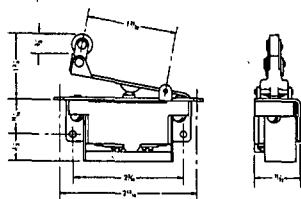
Push Roller Type



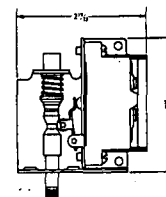
6" Lever Type



Roller Lever Type



One Way Roller Type



Cabinet Door Type
One Contact Block

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

FOOT SWITCHES

Types A, B, C and D



WHEN ORDERING SPECIFY

- Catalog number

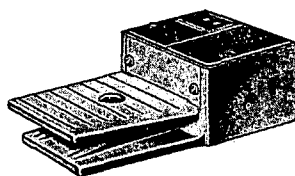
OPERATIONAL DATA

MAXIMUM AMPERE RATINGS

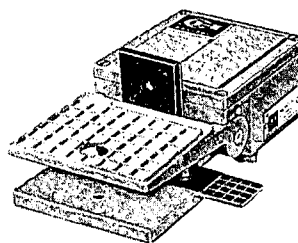
Volts	A-c				D-c		
	110	220	440	550	120	240	600
Make..	40.	20.	10.	8.	---	---	---
Continuous..	15.	10.	6.	5.	0.5	0.2	0.02

Circuit Symbol	Treadle Operation			Description
	Up	Half Down	Full Down	
X		---		1 Contact Block 2 Position
Y		---		2 Contact Blocks 2 Position
Z				2 Contact Blocks 3 Position
Q	Left	Center	Right	2 Contact Blocks 3 Position—Field convertible to maintained left and right or maintained 3 position.

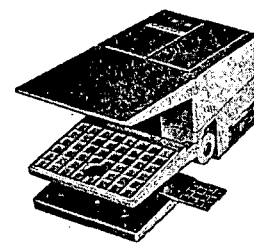
③ Factory assembled with light spring to give half down position indication—second stage feel. Medium—10251H75 or heavy—10251H76 duty springs will be assembled no charge when specified.



Type A—NEMA 1



Type B—NEMA 4
Without Guard or Shield
with Latch

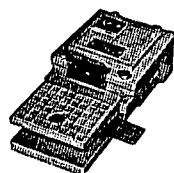


Type B—NEMA 4
With Guard and Latch

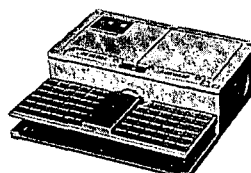
TYPES A, B, C and D

Circuit Arrangement Symbol	Legend	Without Guard or Shield					With Guard					With Shield				
		Without Latch		Half Down Latch	Full Down Latch	Price	Without Latch		Half Down Latch	Full Down Latch	Price	Without Latch		Half Down Latch	Full Down Latch	Price
		Cat. No.	Price				Cat. No.	Price				Cat. No.	Price			
TYPE A - TREADLE OPERATED - GENERAL PURPOSE NEMA 1																
X	---	10251- H25	\$11.	---	---	---	---	---	---	---	---	---	---	---	---	---
TYPE B - TREADLE OPERATED - WATERTIGHT AND OILTIGHT NEMA 4																
X	---	H33	15.	10251- H36	\$22.	10251- H34	\$16.	10251- H37	\$23.	10251- H35	\$20.	10251- H38	\$27.			
Y	---	H39	22.	H42	29.	H40	23.	H43	30.	H41	27.	H44	34.			
Z	---	H45	23.	H48	30.	H46	24.	H49	31.	H47	28.	H50	35.			
TYPE B - TREADLE OPERATED - HAZARDOUS LOCATIONS NEMA 7-D AND 9-EFG																
X	---	H54	31.	H57	37.	H55	33.	H58	39.	H56	35.	H59	41.			
Y	---	H60	44.	H63	50.	H61	46.	H64	52.	H62	48.	H65	54.			
Z	---	H66	44.	H69	50.	H67	46.	H70	52.	H68	48.	H71	54.			
TYPE C - SIDE TREADLE OPERATED - WATERTIGHT AND OILTIGHT NEMA 4																
Q	①	H26	29.	---	---	---	---	---	---	---	---	---	---			
	② Blank	H27	29.	---	---	---	---	---	---	---	---	---	---			
TYPE D - PALM OR FOOT OPERATED - GENERAL PURPOSE NEMA 1																
X	Start	H29	14.	---	---	---	---	---	---	---	---	---	---			
	Stop	H28	14.	---	---	---	---	---	---	---	---	---	---			
	② Blank	H30	14.	---	---	---	---	---	---	---	---	---	---			
Y	Start	H31	18.	---	---	---	---	---	---	---	---	---	---			
	② Blank	H32	18.	---	---	---	---	---	---	---	---	---	---			

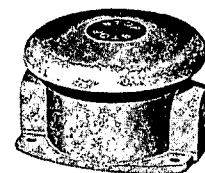
① Supplied with four plates—Start, Stop, Forward and Reverse—and mounting hardware.
② Will be stamped with legend if specified. Maximum of 6 characters on type D switches.



Type B—NEMA 7D-9EFG
with Latch



Type C—NEMA 4



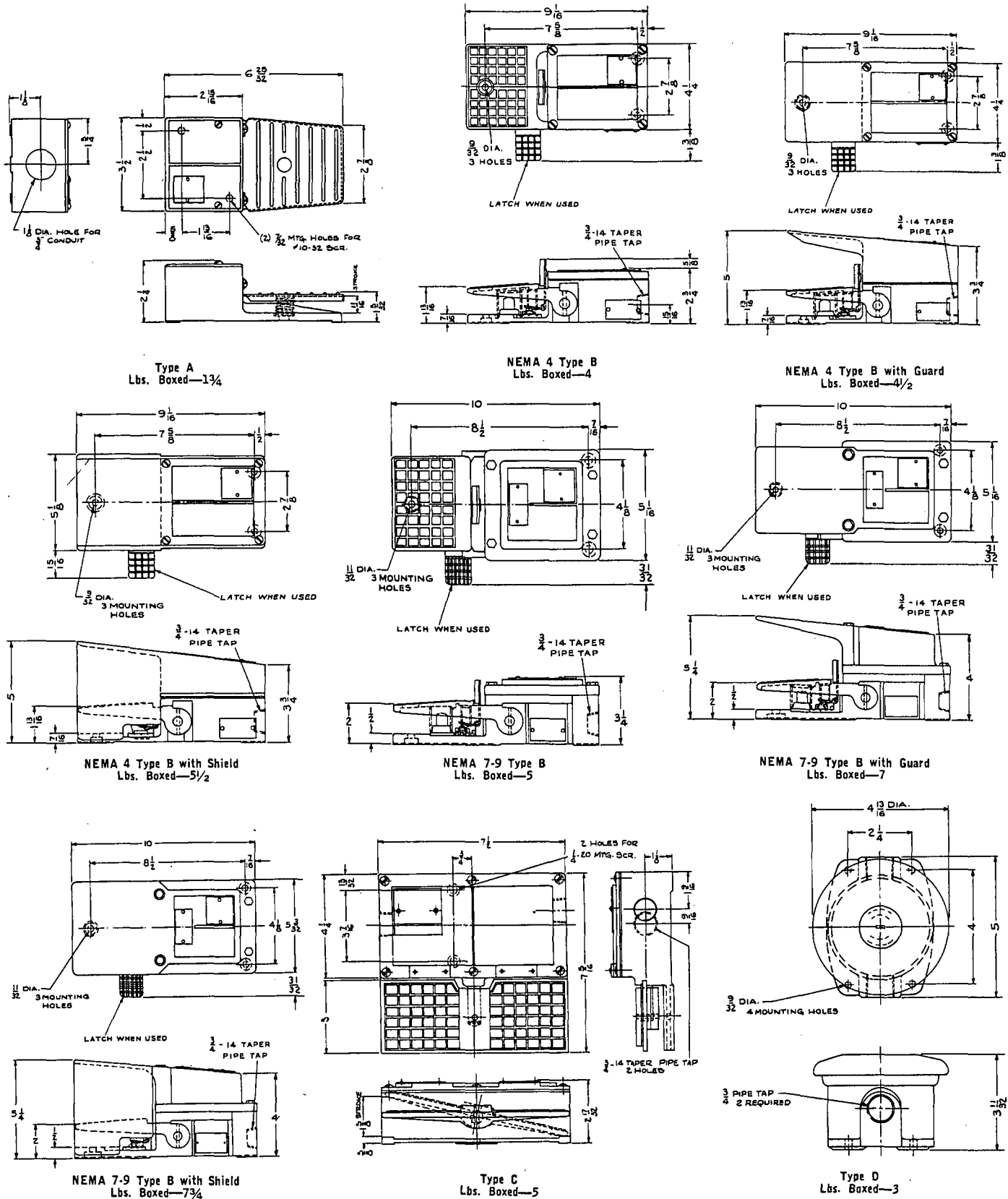
Type D—NEMA 1



FOOT SWITCHES

Types A, B, C and D

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

MASTER and TRANSFER SWITCHES

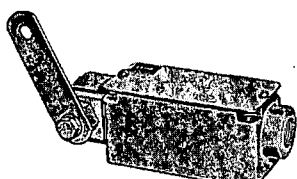


Lever Operated and Drum Types

WHEN ORDERING SPECIFY

LEVER OPERATED MASTER SWITCH

- Catalog number



Lever Operated Master Switch

Volts	Maximum Ampere Ratings							3 Wire Control— Low Voltage Protection		
	A-c				D-c			Contacts	General Purpose NEMA 1	
	110	220	440	550	120	240	600		Cat. No.	Price
Make Continuous	60. 6.	30. 3.	20. 1.5	15. 1.2	--- 2.2	--- 1.1	--- 0.4	1 Normally Open and 1 Normally Closed with Time Delay Opening	10252- H4	\$22.

DRUM MASTER SWITCHES

Equivalent to 2 or 3 Element, Momentary Type, Pushbutton Station

Maximum Ampere Ratings								Size	Surface Mounting General Purpose—NEMA 1			Flush or Cavity Mounting			
Volts	A-c				D-c				Knob Operator	Lever Operator	Price	Knob Operator	Lever Operator	Price	
	110	220	440	550	120	240	600								
Make	25.	12.	6.	5.	—	—	—	00	10260- H52	10260- H115	\$22.	10260- H53	10260- H116	\$22.	
Break	2.	1.	0.5	0.4	1.	0.5	0.1								
Continuous ...	10.	10.	10.	10.	10.	10.	10.								

Shipped for use with non-reversing starters. For use with reversing starters, stop post is readily removable.

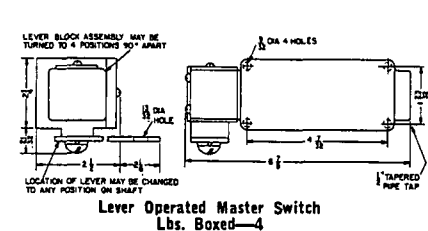
DRUM TRANSFER SWITCHES

NEMA Size	Max. Amps. 600V. A-c	Number of Poles	No. of Switch Positions Including "Off"	Type of Operation	Surface Mounting General Purpose NEMA 1			Flush or Cavity Mounting		
					Knob Operator	Lever Operator	Price	Knob Operator	Lever Operator	Price
00	10	2	3	Maintained Momentary	10260- H2 H153	10260- H109 H151	\$11. 11.	10260- H3 H154	10260- H110 H152	\$15. 15.
		4	3	Maintained	H8	H111	28.	H9	H112	32.
		6	3	Maintained	H14	H113	56.	H15	H114	60.
0	15	3	3	Maintained Momentary	H25 H24	H118 H117	16. 16.	H27 H26	H120 H119	20. 20.
		3	2	Maintained	H36	H129	16.	H37	H130	20.
		6	3	Maintained Momentary	H39 H38	H121 H122	42. 42.	H41 H40	H123 H124	46. 46.
1	25	2	3	Maintained	---	H147	33.	---	H149	37.
		5	3	Maintained	---	H159	60.	---	H160	64.

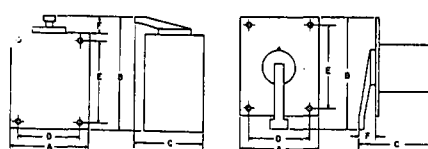
① No "Off" position. A 3 pole circuit is closed in each position.

② In addition to 2 pole, double throw contacts one common single contact closes in both switch positions.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Lever Operated Master Switch
Lbs. Boxed—4



Surface Mounting
Drum Type

Flush or Cavity Mounting
Drum Type

Size	Poles	Surface Mounting						Flush or Cavity Mounting					
		Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches					Ship. Wt. Lbs.
		Wide	High	Deep	Mounting			Wide	High	Deep	Mounting		
		A	B	C	D	E		A	B	C	D	E	
MASTER SWITCHES													
00	---	2½	③ 5½	④ 4¾	1¾	3¾	2	2½	③ 4¾	③ 3¾	1¾	3¾	1¾
TRANSFER SWITCHES													
00	2	2½	③ 5½	⑤ 4¾	1¾	3¾	1¾	2½	③ 4¾	③ 5½	1¾	3¾	1½
	4	2¾	③ 8¼	⑤ 4¾	1¾	5¾	3	2¾	③ 5½	③ 8¼	2½	4	2¾
	6	2¾	③ 10	⑤ 4¾	1¾	7¾	5	2¾	③ 5½	③ 10	2½	4	4½
0	3	2¾	③ 6½	⑦ 5½	2¼	2¾	3	3¼	⑦ 5½	⑥ 6½	2¾	3½	2¾
	6	3¾	④ 10½	⑦ 5½	2¼	6¾	5	3¼	⑦ 5½	⑥ 10½	3¾	3½	4½
1	2	3¾	8	7	2¾	4¾	5	4¾	5¾	8	3¾	5	4½
	5	5¼	8	7¾	4¾	4¾	6	5¼	6¼	8	5	5½	5

③ 3/4" less with knob operator.

⑤ 1 1/2" less with knob operator.

⑦ 1 3/4" less with knob operator.

④ 1 3/4" less with knob operator.

⑥ 9/8" less with knob operator.



MISCELLANEOUS ACCESSORIES and COMPONENTS

General Description



A-c and D-c Solenoid Operated Magnetic Shoe Brakes

—Stops and holds loads—Electrically released, spring applied—Usually operates on an extended shaft of the motor but may be applied to intermediate shafts of the transmission system—Simple adjustments for torque, lining wear and equalizing shoe clearance.

A-c and D-c Solenoids—Continuous or intermittent duty

—Push and pull types—Floor or wall mounting—D-c with or without protecting switch.

Pressure and Vacuum Switches, Heavy Duty, Diaphragm Type

—Horsepower rated—Single and double pole—Range and differential adjustment—Cat. 10007, on air systems, may have unloader valve which releases air pressure for starting without load—Pulsation plug dampens pressure surges so they will not cause false contact operation.

Float Switches—Horsepower rated or control circuit

—Two pole—Rod or chain operated—Standard or heavy duty—Tank or sump operation, catalog numbers 10036, 10037, 10038 and 10045 are on the job convertible.

Fuse Clip Kits—Six clips plus mounting hardware

—For use in converting non-fusible combination starters to fusible—Also for changing fuse clip ratings of starters.



Auxiliary Contact Kits—For use with magnetic a-c con-

tactors—Size 00 contact kit, size 0 thru 5 assembled contact units—Normally open, normally closed, normally open and normally closed or normally closed late opening.

Cover Control Conversion Kits—For changing remote con-

trol A-c Full Voltage NEMA 1 enclosed starters to local control—Start, Stop pushbuttons or 3 position selector switch.

External Cover Operators for Type ST and SW Overload

Relays—Reset button operators—Adjustable from 4 1/8 to 4 11/16 inches long—Other lengths on special order—For NEMA type 1, 3, 4 and 5 enclosures.

Control Circuit Transformers—For magnet coil loads and

pilot devices—Diagramatic nameplate with terminals identification—Screw type terminals.

Fuse Blocks—1, 2 or 3 pole blocks—200 amperes maxi-

mum—With or without control fuse clips—Assembled or fuse blocks and clips separate.

Terminal Blocks—Control circuit 4 to 12 poles—Power

circuit 3 poles—White marking strip—With or without cover—Screw type or pressure type terminals.



Water Immersion Heaters with Thermostat—Single or

dual element—Thermostat range setting 60° to 250°F.—1, 1 1/4 or 2 inch tapered pipe thread mounting.

This Section Contains:

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Water Immersion Heaters, Bottom Outlet Mounting—

Double or triple element—Bottom mounting on 2 1/8 inch diameter hole—One bolt mounting—Minimum liquid level, 2 1/2 inches single phase, 3 1/2 inches three phase.

Strip Heaters—One terminal at each end or both termi-

nals at one end—Steel for sheath temperatures up to 750°F., monel metal for sheath temperatures up to 1200°F.

Domestic Water Heater Elements Copper Sheathed—

One unit assembly—Single element, single, double or triple loop—Four bolt mounting.

Motor Circuit Switches—3 pole—30 and 60 ampere, non-

fusible—100 and 200 ampere, fusible or non-fusible—Provision for padlocking, up to 3 padlocks in "Lock" position which locks cover closed and switch in "Off" position.

Circuit Breaker Operating Mechanisms—External oper-

ating lever and cover parts—Internal disconnecting mechanism (circuit breaker not included).

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

MISCELLANEOUS ACCESSORIES AND COMPONENTS



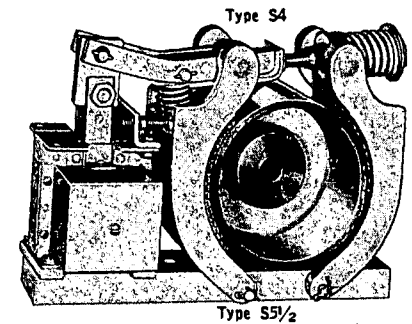
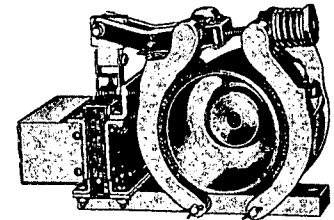
A-c and D-c Solenoid Operated Magnetic Shoe Brakes

WHEN ORDERING SPECIFY

- Catalog number of brake
- Catalog number of wheel

TYPE S BRAKES—Price Includes Wheel

Torque—Ft. Lbs.		Brake Size	60 Cycle A-c ⊗					D-c			
Contin-uous	Inter-mittent		Catalog Number					Price	Catalog Number		Price
			110 V.	208 V.	220 V.	440 V.	550 V.		120 V.	240 V.	
3	3	S-4	511- H583	511- H608	511- H584	511- H585	511- H586	\$78.	511- H691	511- H692	\$86.
10	10	S-4	H647	H664	H648	H649	H650	86.	H693	H694	144.
---	15	S-4	H723	H704	H724	H725	H726	86.	H695	H696	144.
25	25	S-5½	H754	H803	H755	H756	H757	148.	H827	H828	180.
---	35	S-5½	H766	---	H767	H768	H769	148.	H829	H830	180.
50	50	S-7	H833	H882	H834	H835	H836	238.	H902	H903	256.
---	75	S-7	H845	---	H846	H847	H848	238.	H904	H905	256.
125	125	S-10	H909	---	H910	H911	H912	806.	---	---	---
---	160	S-10	H922	---	H923	H924	H925	806.	---	---	---



STANDARD WHEELS ③

4" Brake Wheels—Price \$18.50 ⑦				5½" Brake Wheels—Price \$30.00 ⑦				7" Brake Wheels—Price \$50.00 ⑦				10" Brake Wheels—Price \$124.00 ⑦			
Bore (Inches)	Keyway (Inches)	Set Screw	Catalog Number	Bore (Inches)	Keyway (Inches)	Set Screw	Catalog Number	Bore (Inches)	Keyway (Inches)	Set Screw	Catalog Number	Bore (Inches)	Keyway (Inches)	Set Screw	Catalog Number
.499-.500	None	None	511- H1101-1	.749-.750	None	None	511- H1102-1	.749-.750	None	None	511- H1103-1	1½ to 3 inches	To Suit	To Suit	Order Wheel By Description
.499-.500	⅜x⅜	¼-20	H1101-2	.749-.750	⅜x⅜	¼-20	H1102-2	.9365-.9375	⅜x⅜	¼-20	H1103-2				
.624-.625	⅜x⅜	¼-20	H1101-3	.936-.937	⅜x⅜	¼-20	H1102-3	.999-1.000	⅜x⅜	¼-20	H1103-3				
.749-.750	⅜x⅜	¼-20	H1101-4	.999-1.000	⅜x⅜	¼-20	H1102-4	1.061-1.062	⅜x⅜	¼-20	H1103-4				
.749-.750	⅜x⅜	¼-20	H1101-5	1.124-1.125	⅜x⅜	¼-20	H1102-5	1.124-1.125	⅜x⅜	¼-20	H1103-5				
.749-.750	None	None	H1101-6	1.186-1.187	⅜x⅜	¼-20	H1102-6	1.186-1.187	⅜x⅜	¼-20	H1103-6				
.874-.875	⅜x⅜	¼-20	H1101-7	1.249-1.250	⅜x⅜	¼-20	H1102-7	1.249-1.250	⅜x⅜	¼-20	H1103-7				
.874-.875	⅜x⅜	¼-20	H1101-8	1.374-1.375	⅜x⅜	¼-18	H1102-8	1.249-1.250	⅜x⅜	¼-18	H1103-8				
.999-1.000	⅜x⅜	¼-20	H1101-9	1.436-1.437	⅜x⅜	¼-20	H1102-9	1.436-1.437	⅜x⅜	¼-18	H1103-9				
.999-1.000	⅜x⅜	¼-20	H1101-10	1.499-1.500	⅜x⅜	¼-20	H1102-10	1.499-1.500	⅜x⅜	¼-20	H1103-10				
.999-1.000	None	None	H1101-11	1.574-1.575	½x½	½-13	H1102-11	1.499-1.500	⅜x⅜	¼-18	H1103-11				
1.124-1.125	⅜x⅜	¼-20	H1101-12	1.574-1.575	½x½	½-16	H1102-12	1.624-1.625	⅜x⅜	¼-18	H1103-12				
1.186-1.187	⅜x⅜	¼-20	H1101-13	1.624-1.625	⅜x⅜	¼-18	H1102-13	1.749-1.750	⅜x⅜	¼-18	H1103-13				
1.249-1.250	⅜x⅜	¼-20	H1101-14	1.686-1.687	⅜x⅜	¼-18	H1102-14	1.874-1.875	½x½	½-16	H1103-14				
1.374-1.375	⅜x⅜	¼-18	H1101-15	1.749-1.750	⅜x⅜	¼-20	H1102-15	1.936-1.937	½x½	½-16	H1103-15				
1.374-1.375	None	None	H1101-16	1.936-1.937	½x½	½-16	H1102-16	1.999-2.000	½x½	½-16	H1103-16				
1.374-1.375	⅜x⅜	¼-20	H1101-17	1.999-2.000	½x½	½-16	H1102-17	2.124-2.125	½x½	½-16	H1103-17				
								2.249-2.250	½x½	½-13	H1103-18				

⑦ When purchased separately. Brake price includes wheel.

③ WR² of wheels: 4"—.057; 5½"—.26; 7"—.77; 10"—3.1.

OPTIONAL FEATURES ①

Brake Size	Torque—Ft. Lbs.		Non-Corrosible Fittings	Drip-proof Cover	Manual Release ②	Tapered Bore In Standard Wheel ③	Charge For Special Wheel	Watertight or Dusttight NEMA 4 and 5 Enclosure ④	Omission Price of Wheel	Class B Insulation A-c Only	⑤ For Voltage or Frequency Other Than Shown
	Contin-uous	Inter-mittent									
S-4	3	3	\$9.	\$64.	\$46.	\$26.	\$26.	\$100.	\$18.50	---	\$6.
S-4	10	15	12.	64.	46.	26.	26.	100.	18.50	⑥	7.
S-5½	25	35	19.	74.	46.	33.	37.	120.	30.	\$12.	12.
S-7	50	75	40.	74.	46.	37.	44.	120.	50.	19.	19.
S-10	125	160	88.	94.	---	---	62.	282.	124.	35.	35.

① Other optional features: D-c series wound brakes, prices on application.

② Non-automatic reset manual release can be provided on bulletin S11 brakes with water tight or dust tight covers. Add \$44. to manual release prices to cover necessary stuffing box.

③ These are price additions to price of brake with standard wheel.

④ When ordering NEMA 4 or 5 enclosure, specify shaft size.

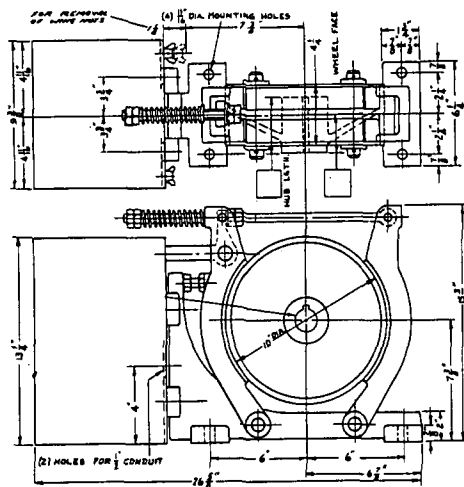
⑤ Minimum voltage on D-c, 24 volts.

⑥ Class B coil available on 15 lb. ft. S-4 brake all models and 10 lb. ft. on 25 cycle only at \$7.00 list.

⑦ For 50 or 25 cycles, consult factory.

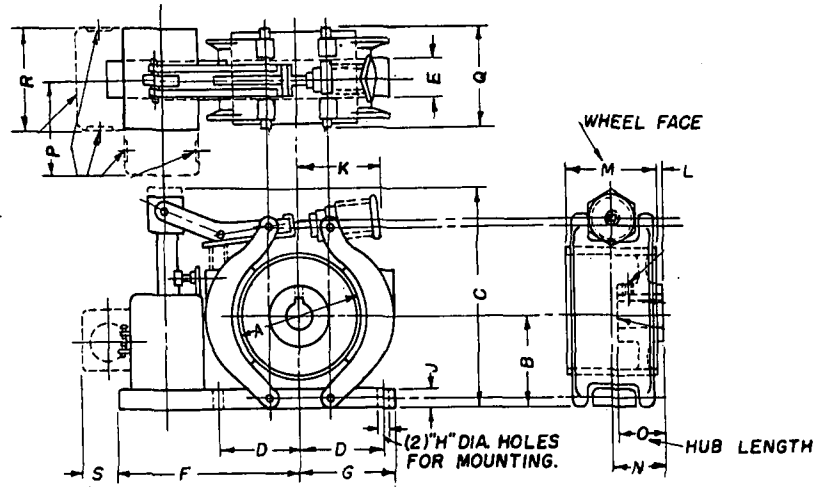
DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

**MISCELLANEOUS ACCESSORIES AND COMPONENTS****A-c and D-c Solenoid Operated
Magnetic Shoe Brakes****APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS**

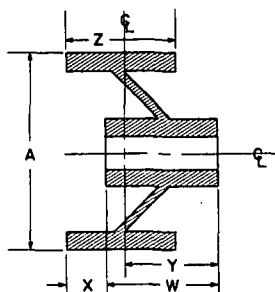
Type S10

WEIGHTS—Brake, 180 lbs.—Wheel, 36 lbs.—Boxed, Brake & Wheel, 230 lbs.



Types S4, S5 1/2 and S7

Brake Size	Cycles	Torque Rating Ft.Lbs.	Dimensions in Inches																	Weight in Lbs.				
			A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	Net—Brake W/Wheel	Net—Wheel Only	Boxed—Brake With Wheel	
TYPE "S" A-C SHOE BRAKES																								
S-4	25 to 60	3	4	2½	7	2½	1¼	5½	3⅜	⅜	⅝	2½	¼	2¾	1⅝	1⅝	---	3	3⅜	1¾	14	3.6	19	
S-4	25 to 60	10	4	2½	---	2½	1¼	5½	3⅜	⅜	⅝	2½	¼	2¾	---	1⅝	---	3	3⅜	---	15	3.6	20	
S-4	25 to 60	15	4	2½	7½	2½	1¼	7½	3⅜	⅜	⅝	2½	¼	2¾	1⅝	1⅝	2½	3	3⅜	---	15	3.6	20	
S-5½	25 to 60	25	5½	4	9½	3½	2	8½	4⅜	½	1	4⅜	⅜	3¼	2	2	3¼	3¼	3¼	---	29	8	36	
S-5½	25 to 60	35	5½	4	9½	3½	2	8½	4⅜	½	1	4⅜	⅜	3¼	2	2	3¼	3¼	3¼	---	29	8	36	
S-7	25 to 60	50	7	5	11½	4⅜	2½	9½	5	⅝	1	6	---	4¼	2⅝	3	3⅜	4¼	3⅜	---	52	20	65	
S-7	25 to 60	75	7	5	11½	4⅜	2½	9½	5	⅝	1	6	---	4¼	2⅝	3	3⅜	4¼	3⅜	---	52	20	65	
TYPE "S" D-C SHOE BRAKES																								
S-4	---	3	4	2½	7½	2½	1¼	7½	3⅜	⅜	⅝	2½	¼	2¾	1⅝	1⅝	---	3	4⅝	---	14	3.6	19	
S-4	---	10	4	2½	7½	2½	1¼	7½	3⅜	⅜	⅝	2½	¼	2¾	1⅝	1⅝	---	3	4⅝	---	15	3.6	20	
S-4	---	15	4	2½	7½	2½	1¼	7½	3⅜	⅜	⅝	2½	¼	2¾	1⅝	1⅝	---	3	4⅝	---	15	3.6	20	
S-5½	---	25	5½	4	9½	3½	2	8½	4⅜	½	1	4⅜	⅜	3¼	2	2	---	3¼	4¼	---	29	8	36	
S-5½	---	35	5½	4	9½	3½	2	8½	4⅜	½	1	4⅜	⅜	3¼	2	2	---	3¼	4¼	---	29	8	36	
S-7	---	50	7	5	11½	4⅜	2½	10	5	⅝	1	6	---	4¼	2⅝	3	4⅝	4¼	4¼	---	52	20	65	
S-7	---	75	7	5	11½	4⅜	2½	10	5	⅝	1	6	---	4¼	2⅝	3	4⅝	4¼	4¼	---	52	20	65	

STANDARD BRAKE WHEEL SIZES

Dimensions in Inches					Bore	
A	Z	W	X	Y	Maximum	Minimum
4	2 3/4	1 1/8	1 3/8	1 1/8	1 3/8	1/2
5 1/2	3 1/4	2	1 1/8	2	2	3/4
7	4 1/4	3	1 1/4	2 1/8	2 1/4	3/4
10	4 1/4	3 1/4	1 1/4	2 3/8	3	1 1/8

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

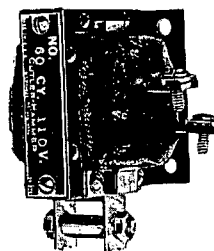
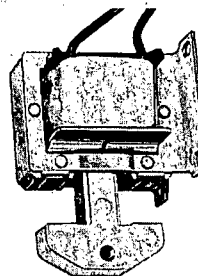
MISCELLANEOUS ACCESSORIES AND COMPONENTS



A-c Solenoids

WHEN ORDERING SPECIFY

- Catalog number



SMALL SIZE—60 CYCLE—CONTINUOUS DUTY

Size	Voltage	② Operating Data										Pull Type					Push Type				
		Magnetic Force in Lbs.						Maximum Stroke in Inches	Current		Catalog Numbers										
		Horizontal Position		With Gravity		Against Gravity			Inrush	Sealed	Without Conduit Box			With Conduit Box		Without Conduit Box			With Conduit Box		
		At 100% Voltage	At 85% Voltage	At 100% Voltage	At 85% Voltage	At 100% Voltage	At 85% Voltage				Floor Mounting	Wall Mounting	Price	Mounting ①	Price	Floor Mounting	Wall Mounting	Price	Mounting ①	Price	
AA	115	1.80	1.30	1.97	1.47	1.63	1.13	½	1.340	.190	10370-	10370-	\$4.50	10370-	---	10370-	10370-	---	10370-	---	
	230	1.80	1.30	1.97	1.47	1.63	1.13	½	.667	.095	---	H950	4.50	---	---	---	---	---	---		
	460	1.80	1.30	1.97	1.47	1.63	1.13	½	.334	.047	---	H951	4.50	---	---	---	---	---	---		
	575	1.80	1.30	1.97	1.47	1.63	1.13	½	.268	.038	---	H953	4.50	---	---	---	---	---	---		
A	110	.72	.50	.895	.675	.545	.325	1	1.83	.34	---	H1	8.	H610	\$10.50	---	H13	\$9.	H25	\$11.50	
	220	.72	.50	.895	.675	.545	.325	1	.92	.168	---	H2	8.	H611	10.50	---	H14	9.	H26	11.50	
	440	.72	.50	.895	.675	.545	.325	1	.45	.084	---	H3	8.	H612	10.50	---	H15	9.	H27	11.50	
	550	.72	.50	.895	.675	.545	.325	1	.36	.064	---	H4	8.	H613	10.50	---	H16	9.	H28	11.50	
B	110	4.2	3.	4.5	3.3	3.9	2.7	1	5.4	.87	H57	H694	15.	H69	17.50	H81	H708	16.	H93	18.50	
	220	4.2	3.	4.5	3.3	3.9	2.7	1	2.6	.42	H58	H696	15.	H70	17.50	H82	H710	16.	H94	18.50	
	440	4.2	3.	4.5	3.3	3.9	2.7	1	1.29	.197	H59	H697	15.	H71	17.50	H83	H711	16.	H95	18.50	
	550	4.2	3.	4.5	3.3	3.9	2.7	1	1.06	.162	H60	H698	15.	H72	17.50	H84	H712	16.	H96	18.50	
C	110	7.	5.25	8.	6.25	6.	4.25	1¼	10.4	1.07	H244	H758	19.	H256	22.	H268	H772	21.	H280	24.	
	220	7.	5.25	8.	6.25	6.	4.25	1¼	5.2	.52	H245	H760	19.	H257	22.	H269	H774	21.	H281	24.	
	440	7.	5.25	8.	6.25	6.	4.25	1¼	2.5	.26	H246	H761	19.	H258	22.	H270	H775	21.	H282	24.	
	550	7.	5.25	8.	6.25	6.	4.25	1¼	1.94	.21	H247	H762	19.	H259	22.	H271	H776	21.	H283	24.	
D	110	12.4	10.	13.65	11.25	11.15	8.75	1¼	18.	1.58	H356	H814	32.	H368	35.50	H380	H828	35.	H392	38.50	
	220	12.4	10.	13.65	11.25	11.15	8.75	1¼	9.3	.81	H357	H816	32.	H369	35.50	H381	H830	35.	H393	38.50	
	440	12.4	10.	13.65	11.25	11.15	8.75	1¼	4.4	.40	H358	H817	32.	H370	35.50	H382	H831	35.	H394	38.50	
	550	12.4	10.	13.65	11.25	11.15	8.75	1¼	3.6	.32	H359	H818	32.	H371	35.50	H383	H832	35.	H395	38.50	

① Mounting of solenoids "with conduit box"—size A are for wall mounting—sizes B, C and D are for floor mounting.

② Recommended selection of solenoids on basis of 85% voltage values.

③ For 50 and 25 cycle, consult factory.

LARGE SIZE—60 CYCLE—PULL TYPE

Size	Voltage	Operating Data							Catalog Numbers			
		Magnetic Force in Inches				Maximum Stroke in Inches	Current		Wall Mounting		Floor Mounting	
		With Gravity		Against Gravity			Inrush	Sealed				
		At 100% Voltage	At 85% Voltage	At 100% Voltage	At 85% Voltage				Catalog Number	Price	Catalog Number	Price
CONTINUOUS DUTY												
3rd	110	38.	29.	28.	19.	2½	82.	5.2	10370-H537	\$74.	10370-H555	\$79.
	220	38	29.	28.	19.	2½	41.	2.4	H538	74.	H556	79.
	440	38.	29.	28.	19.	2½	20.	1.27	H539	74.	H557	79.
	550	38.	29.	28.	19.	2½	16.5	1.08	H540	74.	H558	79.
4th	110	73.5	60.5	46.5	33.5	3	180.	9.2	---	---	H573	141.
	220	73.5	60.5	46.5	33.5	3	91.	4.6	---	---	H574	141.
	440	73.5	60.5	46.5	33.5	3	48.	2.4	---	---	H575	141.
	550	73.5	60.5	46.5	33.5	3	38.	1.78	---	---	H576	141.
INTERMITTENT DUTY												
3rd	110	50.	40.	40.	30.	2½	117.	9.7	10370-H548	\$74.	10370-H566	\$79.
	220	50.	40.	40.	30.	2½	63.	5.1	H549	74.	H567	79.
	440	50.	40.	40.	30.	2½	31.	2.5	H550	74.	H568	79.
	550	50.	40.	40.	30.	2½	26.	2.04	H539	74.	H557	79.
4th	110	99.5	80.5	72.5	53.5	3	300.	22.	---	---	H581	141.
	220	99.5	80.5	72.5	53.5	3	157.	11.4	---	---	H582	141.
	440	99.5	80.5	72.5	53.5	3	79.	5.8	---	---	H583	141.
	550	99.5	80.5	72.5	53.5	3	63.	4.3	---	---	H575	141.

DISCOUNT SCHEDULE 1 CD

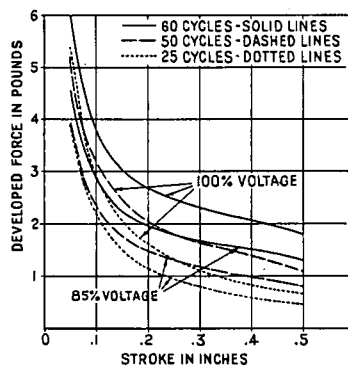
CUTLER-HAMMER



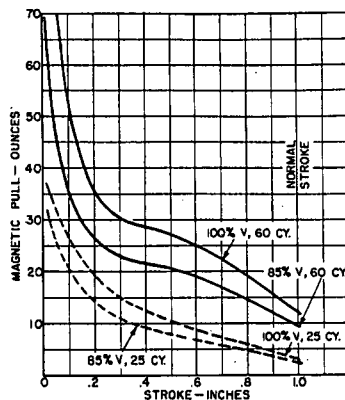
A-c Solenoids—Pull Curves

Pull Curve Data based on maximum temperature rise as specified in NEMA specifications.

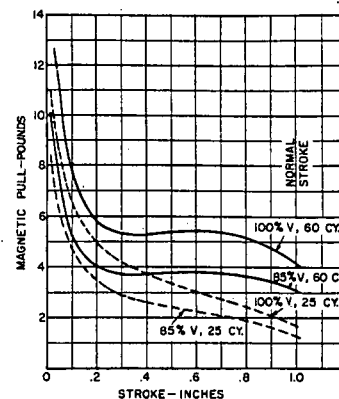
It is recommended that solenoids be selected on basis of 85% voltage applied. To obtain net pull, deduct weight of plunger if acting against gravity—add weight of plunger if acting with gravity.



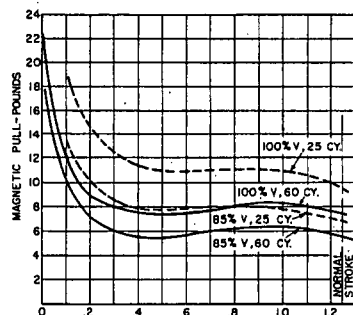
Size AA—Plunger .17 lbs.
Continuous Duty



Size A—Plunger 2.8 ozs.
Continuous Duty

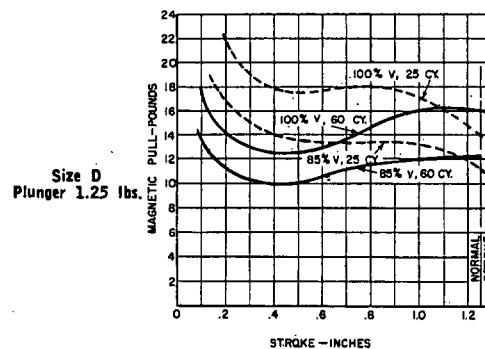


Size B—Plunger .3 lbs.
Continuous Duty



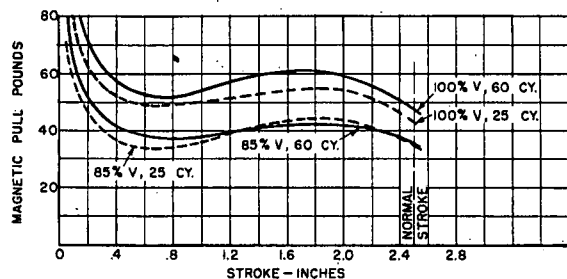
Size C
Plunger 1 lb.

Continuous Duty



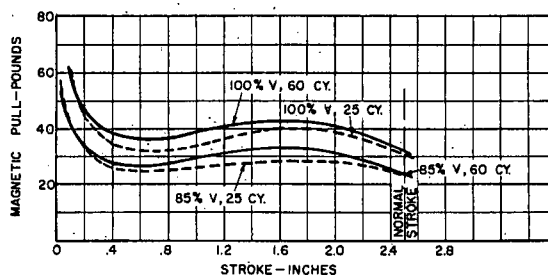
Size D
Plunger 1.25 lbs.

Continuous Duty

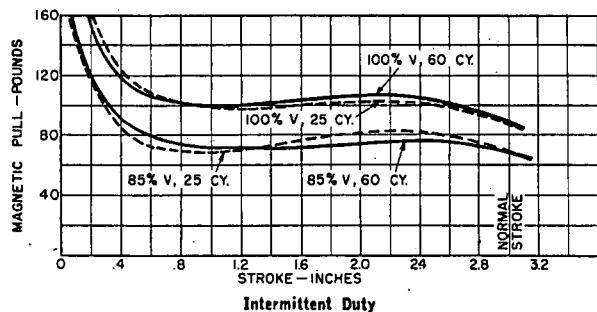


Third Size
Plunger 5 lbs.

Intermittent Duty

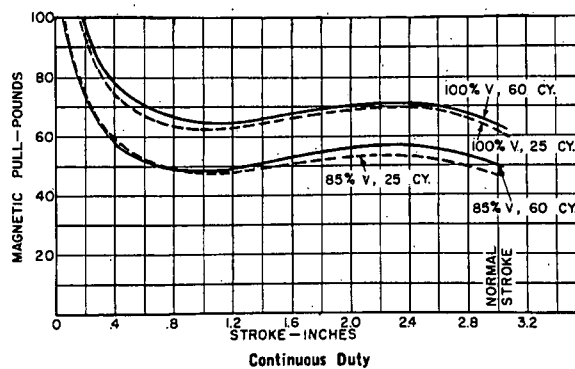


Continuous Duty



Fourth Size
Plunger 13.5 lbs.

Intermittent Duty



Continuous Duty

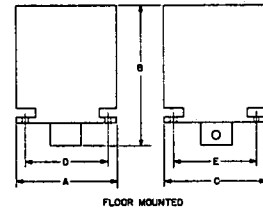
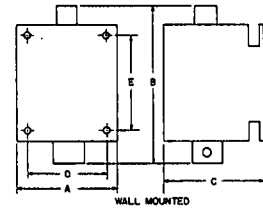
MISCELLANEOUS ACCESSORIES AND COMPONENTS



A-c Solenoids

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

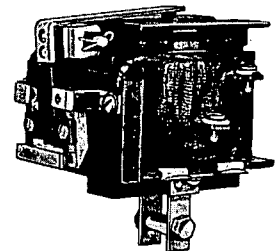
Size	Push Type						Pull Type					
	Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches					Ship. Wt. Lbs.
	Wide	High B	Deep	Mounting			Wide	High B	Deep	Mounting		
				D	E					D	E	
A	A	B	C	D	E		A	B	C	D	E	
WALL MOUNTED												
AA	---	---	---	---	---	---	1½	2¼	2½	1½	1¼	2
A	2½	3¾	2¼	1½	1½	2	2½	2½	2¼	1½	1¼	2
B	2½	4¾	3	2½	2	2½	2½	3½	3	2½	2	2½
C	3	6¾	4½	3¾	2½	5	3	4¾	4½	3¾	2½	5
D	4	6¾	4½	3¾	2¾	7	4	4¾	4½	3¾	2¾	7
FLOOR MOUNTED												
B	3¾	4¾	3	2¼	1½	2½	3¾	3¾	3	2¼	1½	2½
C	3½	6¾	3¾	3¾	1¾	5	3½	4¾	3¾	3¾	1¾	5
D	3¾	6¾	3¾	3¾	2¼	7	3¾	4¾	3¾	3¾	2¼	7
3rd	---	---	---	---	---	---	6¾	15	7¼	5¾	5½	48
4th	---	---	---	---	---	---	7¼	20	9¾	7¾	6	100



D-c Solenoids

WHEN ORDERING SPECIFY

- Catalog number



SMALL SIZES—CONTINUOUS AND INTERMITTENT DUTY—WITH PROTECTING SWITCH

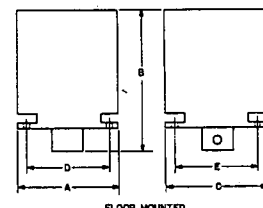
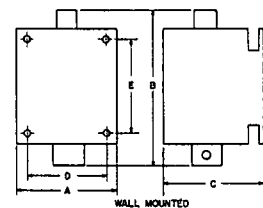
Size	Voltage	Operating Data									Pull Type				Push Type			
		② Magnetic Force in Lbs.						Maximum Stroke In Inches	Current		Catalog Numbers							
		Horiz. Position		With Gravity		Against Gravity			Inrush	Sealed	Floor Mounting		Wall Mounting		Floor Mounting		Wall Mounting	
		At 100% Voltage	At 89% Voltage	At 100% Voltage	At 89% Voltage	At 100% Voltage	At 89% Voltage				Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price				Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
B	115	3.5	2.5	3.8	2.8	3.2	2.2	1	3.8	.102	10360-H57	\$24.	10360-H93	\$24.	10360-H60	\$25.	10360-H96	\$25.
	230	3.5	2.5	3.8	2.8	3.2	2.2	1	1.9	.050	H58	24.	H94	24.	H61	25.	H97	25.
	550	3.5	2.5	3.8	2.8	3.2	2.2	1	.75	.020	H59	24.	H95	24.	H62	25.	H98	25.
C	115	7.	6.	8.	7.	6.	5.	1¼	5.9	.157	H63	29.	H99	29.	H66	31.	H102	31.
	230	7.	6.	8.	7.	6.	5.	1¼	3.24	.078	H64	29.	H100	29.	H67	31.	H103	31.
	550	7.	6.	8.	7.	6.	5.	1¼	1.68	.0323	H65	29.	H101	29.	H68	31.	H104	31.
D	115	12.5	10.	13.75	11.25	11.25	8.75	1¼	8.5	.172	H69	43.	H105	43.	H72	46.	H108	46.
	230	12.5	10.	13.75	11.25	11.25	8.75	1¼	4.8	.085	H70	43.	H106	43.	H73	46.	H109	46.
	550	12.5	10.	13.75	11.25	11.25	8.75	1¼	2.56	.0353	H71	43.	H107	43.	H74	46.	H110	46.

② Recommended selection of solenoid on basis of 89% voltage values.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Size	Push Type						Pull Type					
	Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches					Ship. Wt. Lbs.
	Wide	High B	Deep	Mounting			Wide	High B	Deep	Mounting		
				D	E					D	E	
A	B	C	D	E	A	B	C	D	E			
WALL MOUNTED												
B	2 3/4	4 3/4	4 1/4	2 1/8	2	4	2 3/4	3 3/4	4 1/4	2 1/4	2	4
C	3	6 1/4	5 1/4	3 3/4	2 3/8	5	3	4 1/4	5 1/4	3 3/4	2 3/8	5
D	3 3/4	6 1/4	5 1/4	3 3/4	2 3/4	7	3 3/4	4 1/4	5 1/4	3 3/4	2 3/4	7
FLOOR MOUNTED												
B	3 1/4	4 1/4	4	2 1/4	1 1/2	4	3 1/4	3 3/4	4	2 1/4	1 1/2	4
C	3 3/4	5 1/4	4 3/4	3 3/4	1 1/4	5	3 3/4	4 1/4	4 3/4	3 3/4	1 1/4	5
D	3 3/4	5 1/4	4 3/4	3 3/4	2 1/4	7	3 3/4	4 1/4	4 3/4	3 3/4	2 1/4	7

① In sealed state.



DISCOUNT SCHEDULE 1 CD

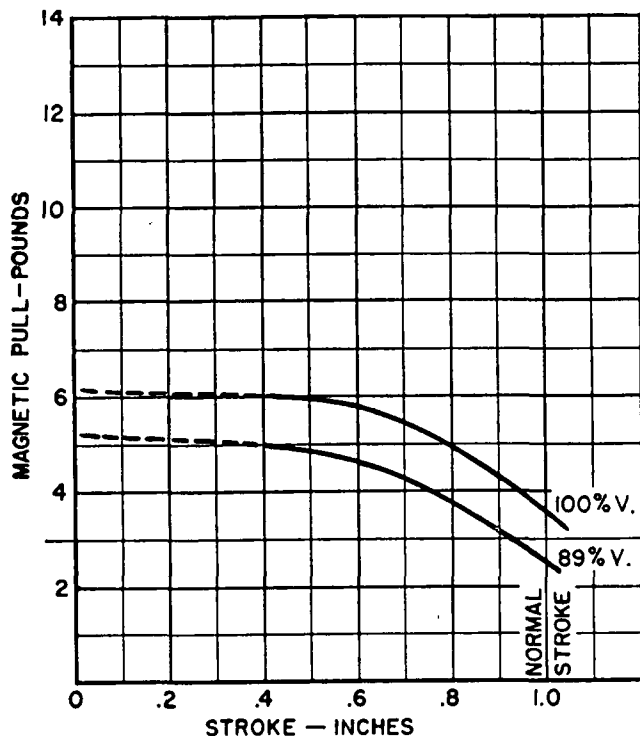


MISCELLANEOUS ACCESSORIES AND COMPONENTS

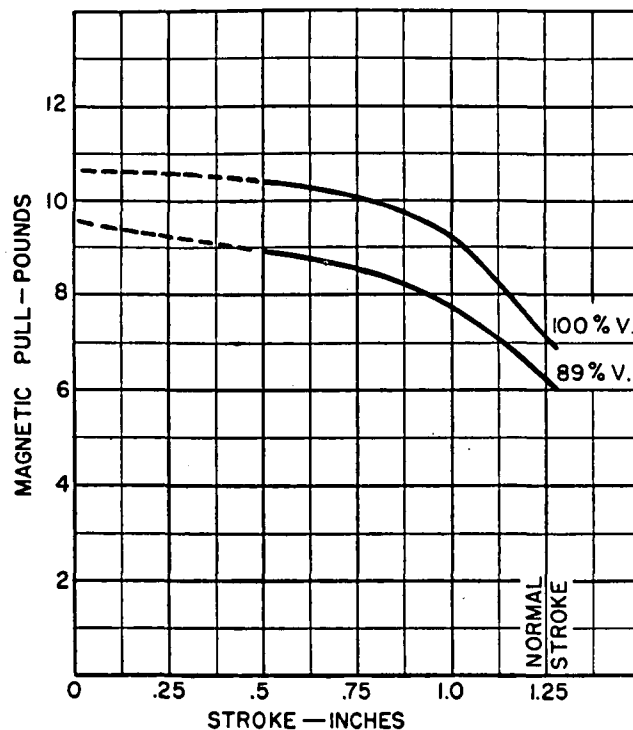
D-c Solenoids—Pull Curves

Pull Curve Data Based on maximum temperature rise as specified in NEMA specifications.

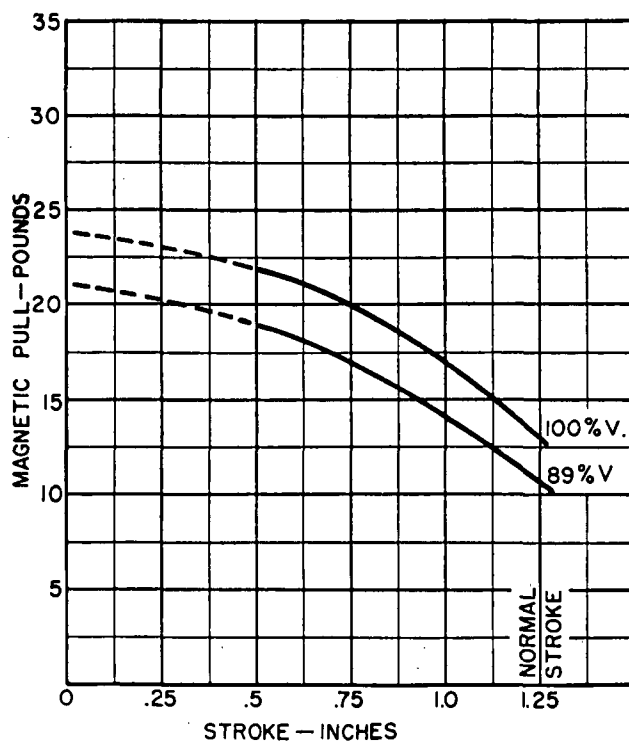
It is recommended that solenoids be selected on basis of 85% or 89% voltage applied. To obtain net pull, deduct weight of plunger if acting against gravity—add weight of plunger if acting with gravity.



Size B—Continuous
Plunger .3 lbs.



Size C—Continuous
Plunger 1 lb.



Size D—Continuous
Plunger 1.25 lbs.

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

MISCELLANEOUS ACCESSORIES AND COMPONENTS

Pressure Switches Heavy Duty—Diaphragm Type

WHEN ORDERING SPECIFY

- Catalog number
- Cut-in, cut-out pressure settings ⑤

HORSEPOWER RATINGS

Switch Pressure Range	Single Phase			Poly Phase			D-c		
	115V.	230V.	440-550V.	110V.	220V.	440-550V.	32V.	120V.	240V.
5 to 80 p.s.i.	1½	2	3	2	3	3	¼	½	½
50 to 200 p.s.i.	2	3	5	3	5	5	½	1	1

Pilot Duty and Gasoline Engine Cutout Duty—600V. A-c Maximum.

STANDARD OPERATION—2 POLE—Open at high pressure, close at low pressure

Pressure Ratings Lbs. Per Square Inch				Pressure Fitting	General Purpose NEMA 1 Enclosure Catalog Numbers					
Min. Pres- sure To Operate	Max. Pres- sure To Operate	Differential			With Unloader Valve			Without Unloader Valve		
		Mini- mum	Maxi- mum		Without Mounting Bracket	With Mounting Bracket	Price	Without Mounting Bracket	With Mounting Bracket	Price
5	80	10	35	¼" Female	10007-	10007-	---	10007-	10007-	\$15. 15 15. 15.
				¼" Female	---	---	---	① H14	---	
				¾" Female	---	---	---	H15	---	
				---	---	---	H16	---		
50	200	18	50	¼" Female	H59	H75	\$20.70	H18	H43	15.
				¼" Female	---	---	---	② H60	② H76	15.
				¾" Female	H61	---	20.70	H21	---	15.
				---	---	---	---	② H62	---	15.
				¾" Female	---	---	---	---	---	---

REVERSE OPERATION—SINGLE POLE—Open at low pressure, close at high pressure

5	80	10	35	¼" Female	---	---	---	① W1	---	15.
				¼" Female	---	---	---	W2	---	15.
				¾" Female	---	---	---	W3	---	15.
50	200	18	50	¼" Female	---	---	---	H30	---	15.
				¾" Female	---	---	---	H33	---	15.

① Supplied with Pulsation Plug.

② These switches have mounting holes for unloader valve.

③ If settings are not specified on order, switches will be shipped with settings as follows: 80 lb. switch—close—20, open—40. 200 lb. switch—close—145, open—175.

Vacuum Switches Heavy Duty—Diaphragm Type

WHEN ORDERING SPECIFY

- Catalog number
- Close and open settings ⑤

HORSEPOWER RATINGS

Polyphase		Single Phase			D-c	
110V.	220 440-550V.	115V.	230V.	440- 550V.	32V.	120- 240V.
3	5	2	3	5	½	1

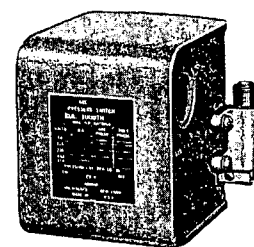
HEAVY DUTY—2 POLE

Range Inches of Mercury		Differential Inches of Mercury		Pipe Fitting	3 Position Selector Switch		⑥ Mounting Bracket		Catalog Number	Price
Minimum Close	Maximum Open	Minimum	Maximum		With	Without	With	Without		
0	28	3-4	10-18	¼" Female	---	X	---	X	10027- H1	\$28.40
					X	---	---	X	H2	34.20
					---	X	X	---	H3	28.40
					X	---	X	---	H4	34.20

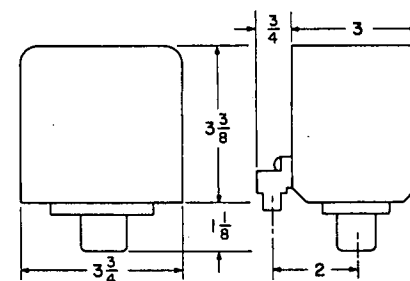
⑤ If no setting is specified on order, switches will be shipped with settings as follows: Close at 5 and open at 8 inches of mercury.

⑥ Mounting bracket provides for interchangeability with other designs on existing installation.

CUTLER-HAMMER



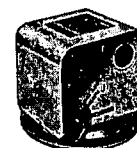
APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



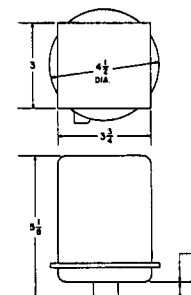
Lbs Boxed — 4

OPTIONAL FEATURES

1. ¼" or ¾" Male Fittings—No price addition.
2. NEMA 4-5 or NEMA 7-9 Enclosures—Prices On Application



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Lbs Boxed—5

DISCOUNT SCHEDULE 2 CD



Float Switches

WHEN ORDERING SPECIFY

- Catalog number

HEAVY DUTY—2 POLE ①

Horsepower Ratings						Type of Mtg.	Type of Operation	☉ Weatherproof NEMA 3 Encl.			
Single Phase A-c		Three Phase A-c		D-c				Cold Water ☉ Service		Hot Water Service	
Volts	Max. Hp	Volts	Max. Hp	Volts	Max. Hp			Cat. No.	Price	Cat. No.	Price
								10036-		10036-	
						Wall	Basic Sw. w/o Access. Rod Chain	H15 H17 H22	\$41.30 80. 80.	H15 H31 H36	\$41.30 116. 116.
115 230 ---	2 3 ---	110 208/220 440-550	3 5 7½	120 240 600	1 1 1	Floor	Rod Chain	H19 H20	94. 94.	H33 H34	130. 130.

DISCOUNT SCHEDULE 1 CD

- ① Furnished with 5 ft. rods or 15 ft. chains except basic switch.
- ② Float switch with accessories for cold liquid can be used where the temperature does not exceed 100°F, where the temperature is likely to exceed this, the switch with stainless steel accessories for hot liquid should be used.
- ③ NEMA 4 and 9EFG enclosures also available.

OPTIONAL FEATURES

Description	Cold Water Service (Bronze)	Hot Water Service (Stainless Steel)
1. Additional Length of Rod	\$3.10/5 ft. length	\$15.50/5 ft. length
2. Additional Length of Chain	.28/ft.	1.70/ft.

HEAVY DUTY—2 POLE —Open Tank Type—Without Float and Float Rod

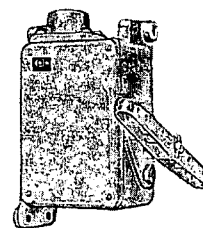
Horsepower Ratings							Operation	Catalog Number	Price
Polyphase		Single Phase			D-c				
110V.	220-440-550V.	115V.	230V.	440-550V.	32V.	120-240V.			
3	5	2	3	5	½	1	Sump Tank	10037-H8 H9	\$15.15.

DISCOUNT SCHEDULE 2 CD

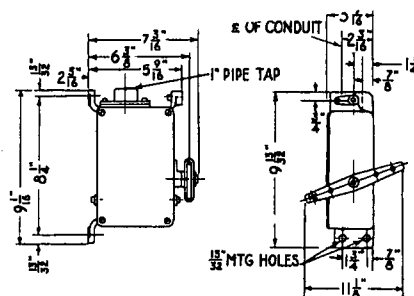
STANDARD DUTY—2 POLE—Open Tank Type—Without Float and Float Rod

Maximum Volts	Horsepower Rating			Operation	Catalog Number	Price
	Polyphase		Single Phase			
	110-220V.	440-550V.	115-230V.			
250	1	---	1	Sump Tank	10038- H23 H24	\$8.95 8.95
600	1	1	1	Sump Tank	H25 H26	11.25 11.25

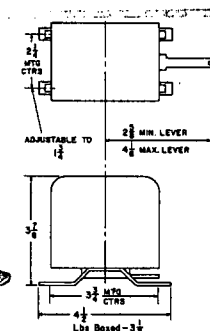
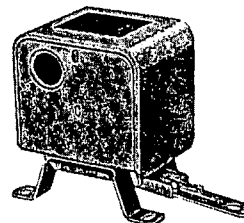
DISCOUNT SCHEDULE 2 CD



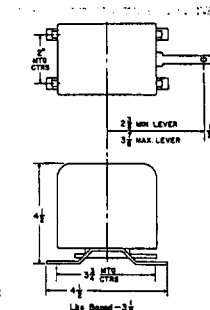
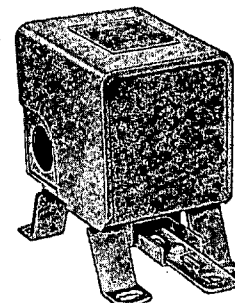
APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

MISCELLANEOUS ACCESSORIES AND COMPONENTS



Float Switches

WHEN ORDERING SPECIFY

- Catalog number

THRU-THE-TANK TYPE—2 POLE—With Float and Rod ①

Maximum Volts	Horsepower Ratings			Mounting	Catalog Number		Price
	Polyphase		Single Phase		Sump Type	Tank Type	
	110-220 V.	440 V.	115-230 V.				
FLANGE MOUNTED—5 3/4" DIAMETER							
250	1	---	1	Top Side	10045- H20 H22	10045- H21 H23	\$36.50 36.50
PIPE PLUG MOUNTED							
250	1	---	1	Side Side	H11	H12	27.40
600	1	1	1		H13	H14	28.90

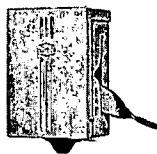
① Max. liquid temp. 250°F.—Max. internal tank pres. 50 psi.—Max. liquid level change—4 3/4".

OPTIONAL FEATURES

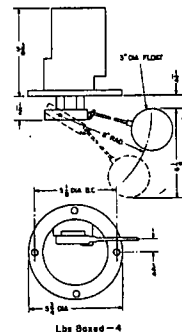
1. Omit Float, deduct.....	\$4.50
2. Omit Rod, deduct.....	.70
3. Rubber Bushing for Conduit Hole (Part No. 29-885), add.....	.30

SMALL SUMP PUMP SWITCHES—2 POLE—Without Float and Rod

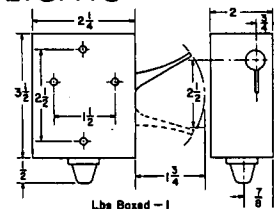
Volts	Horsepower Ratings		Catalog Number	Price
	Single Phase	D-c		
115-230	1/2 1/3	1/2 1/3	10059-H3 H4	\$3.70 3.10



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



DISCOUNT SCHEDULE 2 CD

WHEN ORDERING SPECIFY Fuse Clip Kits—3 Pole

- Catalog number

FOR MOTOR CIRCUIT SWITCH COMBINATION STARTERS ONLY

—Kit contains 6 clips plus mounting hardware—For use with Cat. No. 9589, 9658, 9736 & 9739 combination starters.

Starter NEMA Size	Fuse Clip Rating		Fuse Clip Kit		Starter NEMA Size	Fuse Clip Rating		Fuse Clip Kit	
	Amps.	Volts	Cat. No.	Price		Amps.	Volts	Cat. No.	Price
0	30 30	250 600	10982-H14 H15	\$1.00 1.50	3	200 100 200	250 600 600	10982-H23 H24 H25	\$16. 10.50 16.
1	30 60 30 30	250 250 600 600	H14 H15 H15 H15	1.00 1.50 1.50 1.50	4	400 200 400	250 600 600	H26 H27 H28	46. 16. 46.
2	60 100 60 100	250 250 600 600	H16 H18 H17 H18	1.50 10.50 3.00 10.50					

DISCOUNT SCHEDULE 1CD

CUTLER-HAMMER



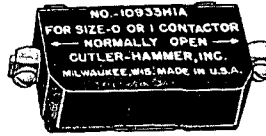
MISCELLANEOUS ACCESSORIES AND COMPONENTS

225

Auxiliary Contact Kits

WHEN ORDERING SPECIFY

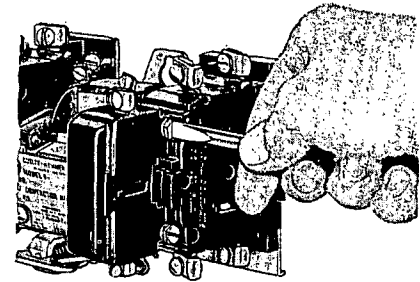
- Catalog number



AUXILIARY CONTACT KITS

Contacts	Catalog Number						Price
	① Size 00	Size 0	Size 1	Size 2	Size 3	Size 4 & 5	
Normally Open	10933-H12	10933-H1	10933-H1	10933-H7	10933-H7	10933-H7	\$6.
Normally Closed	H12	H2	H3	H8	H9	H21	6.
Normally Closed Late Opening	---	H4	H4	H10	H10	H10	6.
② Normally Open and Normally Closed	---	H5	H6	---	---	---	8.

NOTE—For Type and Quantity of auxiliary contacts which can be used refer to individual starter and contactor sections.



APPROXIMATE DIMENSIONS

AUXILIARY CONTACTS

CONTACTOR

C

(The only dimension which can be affected by the addition of extra auxiliary contacts is the depth of the contactor. Comparative depths are shown.)

Type of Contactor and Aux. Contact			Contactor Depth "C" in Inches													
Number of Poles	Number of Auxiliary Contacts	Type of Auxiliary Contact	Size 00		Size 0		Size 1		Size 2		Size 3		Size 4		Size 5	
			Without Extra Auxiliary Contacts	With Extra Auxiliary Contacts	Without Extra Auxiliary Contacts	With Extra Auxiliary Contacts	Without Extra Auxiliary Contacts	With Extra Auxiliary Contacts	Without Extra Auxiliary Contacts	With Extra Auxiliary Contacts	Without Extra Auxiliary Contacts	With Extra Auxiliary Contacts	Without Extra Auxiliary Contacts	With Extra Auxiliary Contacts	Without Extra Auxiliary Contacts	With Extra Auxiliary Contacts
1	1	N.O. or N.C.	3 3/8	3 3/8	3 3/8	3 3/8	3 3/8	3 3/8	---	---	---	---	---	---	---	---
	2	N.O. or N.C.	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2	1	Combination N.O. and N.C.	---	---	3 3/8	3 3/8	3 3/8	4	---	---	---	---	---	---	---	---
	2	Combination N.O. and N.C.	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3	1	N.O. or N.C.	3 3/8	3 3/8	3 3/8	3 3/8	3 3/8	3 3/8	5 1/4	5 1/4	7 1/2	7 1/2	7	7	6 1/8	7 1/2
	2	N.O. or N.C.	---	---	3 3/8	4	3 3/8	4 3/8	5 1/4	5 1/4	7 1/2	7 1/2	7	7	6 1/8	7 1/2
4	1	Combination N.O. and N.C.	---	---	3 3/8	4 3/8	3 3/8	4 3/8	---	---	---	---	---	---	---	---
	2	Combination N.O. and N.C.	---	---	---	---	---	---	---	---	---	---	---	---	---	---
5	1	N.O. or N.C.	---	---	3 3/8	4	3 3/8	4 3/8	5 1/4	5 1/4	7 1/2	7 1/2	5 3/4	7	6 1/8	7 1/2
	2	N.O. or N.C.	---	---	---	---	---	---	---	---	---	---	---	---	---	---
6	1	Combination N.O. and N.C.	---	---	3 3/8	4 3/8	3 3/8	4 3/8	---	---	---	---	---	---	---	---
	2	Combination N.O. and N.C.	---	---	---	---	---	---	---	---	---	---	---	---	---	---
7	1	N.O. or N.C.	4 3/8	4 3/8	4	4	4 3/8	4 3/8	6 3/8	6 3/8	7 1/2	7 1/2	7	7	7 1/2	7 1/2
	2	N.O. or N.C.	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8	1	Comb. N.O. and N.C.	---	---	4	4 3/8	4 3/8	4 3/8	---	---	---	---	---	---	---	---
	2	Comb. N.O. and N.C.	---	---	---	---	---	---	---	---	---	---	---	---	---	---

N0=normally open, NC=normally closed.

- ① Packaged kit of contacts for bulletin 9560, size 00 contactors only (Not starters.) Price \$2.
- ② Both normally open and normally closed contacts must be used on the same polarity.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

225

3 PHASE FULL VOLTAGE MOTOR CONTROL

3 PHASE REDUCED VOLTAGE & MULTISPEED MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS, RELAYS & TIMERS

PUSHBUTTONS & LIGHTS, LIMIT SWITCHES, FOOT SWITCHES

MISCELLANEOUS ACCESSORIES & COMPONENTS

MISCELLANEOUS ACCESSORIES AND COMPONENTS



Cover Control Conversion Kits

WHEN ORDERING SPECIFY

- Catalog number



FOR ADDITION OF PUSHBUTTON OR SELECTOR SWITCH

NEON PILOT LIGHT, see pages 99 or 143.

NEMA Size	For Cat. No. 9584 Single Phase and 9586 Three Phase, Full Voltage—Non-Reversing Starters—NEMA 1 Enclosures				For Cat. No. 9589 & 9591 Three Phase, Full Voltage, Non-Reversing, Combination Starter, Type A—NEMA 1 and NEMA 1 Gasketed Enclosures		For Cat. No. 9589 Three Phase, Full Voltage, Non-Reversing, Combination Starter, Type SF— NEMA 1 Enclosures		Price
	Kit for Converting to "Start-Stop-Reset"		Kit for Converting to 3 Pos. Sel. Sw.						
	Standard	With Control Transformer	Standard	With Control Transformer	Kit for Converting to "Start-Stop-Reset"	Kit for Converting to 3 Position - Selector Switch	Kit for Converting to "Start-Stop-Reset"	Kit for Converting to 3 Position Selector Switch	
00	10935- H1	10935- ---	10935- H2	10935- ---	10935- ---	10935- ---	10935- ---	10935- ---	\$8.
0	H12	H29	H13	H30	H20	H21	---	---	8.
1	H12	H29	H13	H30	H20	H21	H24	H31	8.
2	H14	H32	H15	H33	H22	H31	H25	H31	8.
3	H16	H27	H17	H28	H22	H31	---	---	8.
4	H18	---	H19	---	① H23	H31	---	---	8.
5	H26	---	H31	---	---	---	---	---	8.

① For bulletin 9591, size 4, use conversion kit 10935H22.

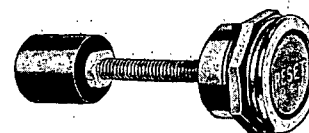
External Cover Operators For Type ST and SW Overload Relays

WHEN ORDERING SPECIFY

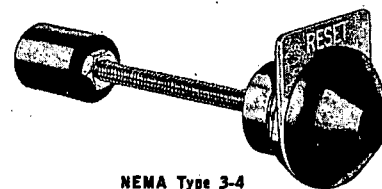
- Catalog number

EXTERNAL COVER OPERATORS

Marking	NEMA 1		NEMA 3-4		NEMA 5	
	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
Reset	10935-H3	\$1.75	10935-H6	\$4.00	10935-H9	\$2.00
Start	H4	1.75	H7	4.00	H10	2.00
Stop—Reset	H5	1.75	H8	4.00	H11	2.00

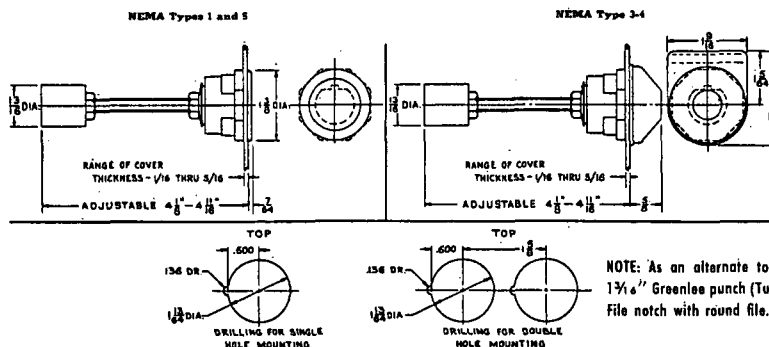


NEMA Type 1 and 5



NEMA Type 3-4

APPROXIMATE DIMENSIONS





MISCELLANEOUS ACCESSORIES AND COMPONENTS

227

Control Circuit Transformers

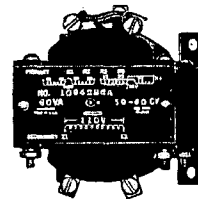
WHEN ORDERING SPECIFY

- Catalog number

CONTROL CIRCUIT TRANSFORMERS

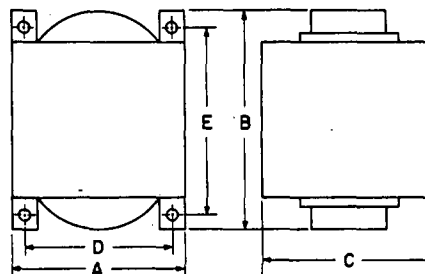
Continuous Volt — Amperes	Frequency (Cycles)	Voltage		Open Type		General Purpose NEMA 1	
		Primary	Secondary	Cat. No.	Price	Cat. No.	Price
60	50/60	220/440	110	10942-H6	\$12.	10942-W8	\$18.
		220/440	110/95	H25	17.50	W9	23.50
		550	110	H5	12.	W10	18.
140	50/60	220/440	110	H12	14.	W11	22.
		220/440	110/95	H16	20.	W12	28.
		550	110	H11	14.	W13	22.
200	50/60	220/440	110	H38	21.	W14	29.
		220/440	110/95	H39	29.50	W15	37.50
		550	110	H35	21.	W16	29.
250	50/60	220/440	110	H55	25.	W17	33.
		550	110	W1	25.	W18	33.
350	60	220/440	110	H57	32.	W19	40.
		550	110	W2	32.	W20	40.
500	60	220/440	110	H59	38.	W21	54.
		550	110	W3	38.	W22	54.
750	60	220/440	110	H61	58.	W23	74.
		550	110	W4	58.	W24	74.
1000	60	220/440	110	H63	65.	W25	81.
		550	110	W5	65.	W26	81.
1500	60	220/440	110	H48	100.	W27	130.
		550	110	W6	100.	W28	130.
2000	60	220/440	110	H50	125.	W29	155.
		550	110	W7	125.	W30	155.
3000	60	220/440	110	H52	175.	W31	235.
5000	60	220/440	110	H54	260.	W32	320.

NOTES: 220/440V. primary — 24V. secondary — Use 220/440V. — 110V. prices.
Other voltages, consult factory.



APPROXIMATE DIMENSIONS — Open Type

Continuous Volt Amperes	Dimensions in Inches				
	Wide A	High B	Deep C	Mounting	
				D	E
60	3	3½	3¼	2½	2½
140	3½	4½	3¼	3½	3½
200	4½	4½	3½	3½	3½
250	4½	5½	3½	3	3½
350	4½	6¼	3½	3¼	3½
500	5½	6¼	4½	4¼	4½
750	5½	7½	4½	5¼	4½
1000	6½	7	5½	5	5½
1500	6½	8¼	6¼	6½	5½
2000	6¼	10	6¼	7¼	5½
3000	9	9¾	8	6	8
5000	9	12	8	8¼	8

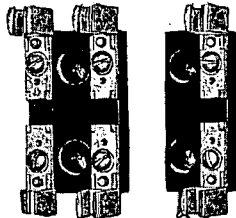


Fuse Blocks

WHEN ORDERING SPECIFY

- Catalog number

FUSE BLOCKS (Type A and B—For Types C, D, E and F see next page)

Typical Illustration	Size of Base (Inches)	Poles	Main Fuse Clip Ratings		⑤ Fuse Clips Supplied		Catalog Number	④ Price
			Amps.	Volts	Main Fuse Clips	Control Fuse Clips 30A-250V.		
TYPE A—30 AMP., 250 VOLT								
	1½ x 2½	1	30	250	X	---	10982-H1	\$1.85
	TYPE B—30-60 AMP., 250 AND 600 V							
	1¾ x 4	1	② 30	② 250	---	---	H2-1	1.75
			30	250	X	---	H2-2	2.05
			30	600	X	---	H2-3	2.35
			60	250	X	---	H2-4	2.35
			60	600	X	---	H2-5	2.75
2¾ x 4	2	② 30	② 250	---	---	H3-1	2.50	
		30	250	X	---	H3-2	3.10	
		30	600	X	---	H3-3	3.70	
		60	250	X	---	H3-4	3.70	
		60	600	X	---	H3-5	5.50	
Consists of (1) Single and (1) Double Pole Block	3	② 30	② 250	---	---	H4-1	4.20	
		30	250	X	---	H4-2	5.10	
		30	600	X	---	H4-3	6.00	
		60	250	X	---	H4-4	6.00	
		60	600	X	---	H4-5	7.20	

③ Fuse clips for these blocks are available and may be selected from table of fuse clip kits, next page.

④ Fuses are not included in list prices.

⑤ When marked with X, clip supplied.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

227

3 PHASE FULL VOLTAGE
MOTOR CONTROL3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERSPUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHESMISCELLANEOUS
ACCESSORIES &
COMPONENTS

MISCELLANEOUS ACCESSORIES AND COMPONENTS

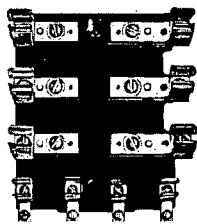
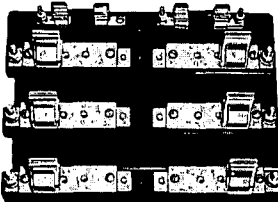


Fuse Blocks

WHEN ORDERING SPECIFY

• Catalog number

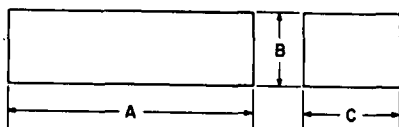
FUSE BLOCKS—(Types C, D, E and F—For Types A & B, see previous page)

Typical Illustration	Size of Base (Inches)	Poles	Main Fuse Clip Ratings		Fuse Clips Supplied		Catalog Number	① Price
			Amps.	Volts	Main Fuse Clips	Control Fuse Clips 30A-250V.		
TYPE C—30-60 AMP., 250 AND 600 V.								
	5 x 6½	3	②	②	---	---	10982-	
			30	250	X	---	H5-1	\$4.20
			30	600	X	---	H5-2	5.10
			60	250	X	---	H5-3	6.00
			60	600	X	---	H5-4	6.00
			60	600	X	---	H5-5	7.20
			②	②	---	X	H6-1	6.20
			30	250	X	X	H6-2	7.10
			30	600	X	X	H6-3	8.00
			60	250	X	X	H6-4	8.00
			60	600	X	X	H6-5	9.20
			TYPE D—60-200 AMP., 250 V.—60-100 AMP., 600 V.					
	7½ x 10½	3	60	250	X	---	H7-1	12.00
			60	600	X	---	H7-2	13.80
			100	250	X	---	H7-3	15.00
			100	600	X	---	H7-4	22.50
			200	250	X	---	H7-5	22.50
			200	250	X	---	H7-6	30.00
			60	250	X	X	H8-1	14.00
			60	600	X	X	H8-2	15.80
			100	250	X	X	H8-3	17.00
			100	600	X	X	H8-4	24.50
			200	600	X	X	H8-5	24.50
			200	250	X	X	H8-6	32.00
TYPE E—60-200 AMP., 250 V.—60-100 AMP., 600 V.								
	5½ x 7½	3	60	250	X	---	H10-2	17.80
			60	600	X	---	H10-3	19.00
			100	250	X	---	H10-4	26.50
			100	600	X	---	H10-5	26.50
			200	250	X	---	H10-6	34.00
			200	250	X	---	H10-6	34.00
TYPE F—200 AMP., 250 AND 600 V.								
	(2) Blocks Each 7 x 2½	3	200	250/600	X	---	H9	33.00

① Fuses are not included in list price.

② Fuse clips for these blocks are available and may be selected from table of fuse clips.

APPROXIMATE DIMENSIONS



FUSE CLIPS FOR TYPE B, C AND D FUSE BLOCKS

Fuse Clip Rating		④ Catalog Number			Price
Amps.	Volts	For Use With Fuse Blocks—10982H-			
		2-1, 3-1, 4-1,	5-1-6-1	7-1-8-1	
		10982-	10982-	10982-	
30	250	H11-1	H12-1	---	\$.30
30	600	H11-2	H12-2	---	.60
60	250	H11-2	H12-2	H13-1	.60
60	600	H11-3	H12-3	H13-2	1.00
100	250	---	---	H13-3	3.50
100	600	---	---	H13-3	3.50
200	250	---	---	H13-4	6.00

APPROXIMATE DIMENSIONS

Ratings		Type A—1 Pole			Type B—1, 2 and 3 Pole			Type C—3 Pole			Type D—3 Pole			Type E—3 Pole			Type F—3 Pole		
		Dimensions in Inches																	
Amps.	Volts	Wide A	High B	Deep C	Wide A	High B	Deep C	Wide A	High B	Deep C	Wide A	High B	Deep C	Wide A	High B	Deep C	Wide A	High B	Deep C
30	250	2½	2½	1½	5	1¼	2½	5½	6½	2½	---	---	---	---	---	---	---	---	---
30	600	---	---	---	5	1½	2½	5½	6½	2½	---	---	---	---	---	---	---	---	---
60	250	---	---	---	5	1½	2½	5½	6½	2½	10½	7½	2½	8	5½	5	---	---	---
60	600	---	---	---	5¼	1½	3	5½	6½	2½	10½	7½	3	8	5½	5¼	---	---	---
100	250	---	---	---	---	---	---	---	---	---	10½	7½	3¼	8	5½	5¼	---	---	---
100	600	---	---	---	---	---	---	---	---	---	10½	7½	3¼	8	5½	5¼	---	---	---
200	250-600	---	---	---	---	---	---	---	---	---	10½	7½	3¼	8	5½	5¼	9½	7	3¾

③ Single pole fuse blocks only. For two pole devices add approximately 1/2". A three pole device consists of (1) single pole and (1) two pole fuse block.

④ Kit contains 2 clips and mounting material for one fuse.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER



Terminal Blocks

WHEN ORDERING SPECIFY

- Catalog number
- Unit or bulk packed

FOR CONTROL CIRCUITS—30 AMPS., 600 VOLTS

Wire Size: Screw Type Terminals—Max. No. 8 Solid.
Pressure Type Terminals—Max. No. 8 Solid or Stranded; Min. No. 13 Solid, No. 14 Stranded.

Typical Illustration	Description	Number of Poles	Catalog Number	Price Each	
				① Unit Pack Any Quantity	② Bulk Pack Minimum Quantity-25
	With screw type connectors and marking strip—without cover.	4	10987-H4	\$1.35	\$.75
		6	H5	1.70	1.10
		8	H6	2.00	1.40
		12	H7	2.60	2.00
	With screw type connectors, marking strip and screw-down cover.	4	H8	1.55	.95
		6	H9	1.90	1.30
		8	H10	2.20	1.60
		12	H11	2.80	2.20
	With screw type connectors, marking strip and hinged cover.	4	H12	2.10	1.50
		6	H13	2.45	1.85
		8	H14	2.75	2.15
		12	H15	3.35	2.75
	With pressure connectors and marking strip—without cover.	4	H16	1.85	1.25
		6	H17	2.45	1.85
		8	H18	3.00	2.40
		12	H19	4.10	3.50
	With pressure connectors, marking strip and screw-down cover.	4	H20	2.05	1.45
		6	H21	2.65	2.05
		8	H22	3.20	2.60
		12	H23	4.30	3.70
	With pressure connectors, marking strip and hinged cover.	4	H24	2.60	2.00
		6	H25	3.20	2.60
		8	H26	3.75	3.15
		12	H27	4.85	4.25
	Pull Apart Type—With pressure connectors and marking strip.	8	H28	6.60	6.00

① Unit pack—consists of one to the carton with the block, marking strip, cover and screws (in a small inner envelope) unassembled.

② Bulk pack—available only on quantities of 25 or more of one type—packed together with all parts unassembled.

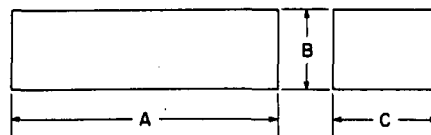
FOR POWER CIRCUITS—600 VOLTS

3 Pole with Pressure Connectors and Marking Strip

Typical Illustration	Ampere Rating	Maximum Wire Size	Catalog Number	Price	Typical Illustration	Ampere Rating	Maximum Wire Size	Catalog Number	Price
	70	#4	10987-H1	\$5.50		225	250 MCM	10987-H3	\$12.50
	125	#1/0	H2	8.30					

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Number of Circuits	Dimensions in Inches			Ship. Wt. Ozs.	Ampere Rating	Dimensions in Inches			Ship. Wt. Ozs.
	Wide A	High B	Deep C			Wide A	High B	Deep C	
For Control Circuits—Screw and Pressure Connectors					For Power Circuits—3 Pole				
4	3¾	1¼	1⅝	5	70 125 225	3⅝ 4⅞ 4⅞	2⅞ 3 3	1⅝ 2 2	8 16 21
6	4½	1¼	1⅝	6					
8	5¼	1¼	1⅝	8					
12	8¼	1¼	1⅝	11					
Pull Apart Type									
8	5½	1½	1¼	16					



DISCOUNT SCHEDULE ICD

CUTLER-HAMMER

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

MISCELLANEOUS ACCESSORIES AND COMPONENTS



Water Immersion Heaters

WHEN ORDERING SPECIFY • Catalog number
WITH THERMOSTAT

Watts	Catalog Number		Maximum Extension Inches	Price	Watts	Catalog Number		Maximum Extension Inches	Price
	120 V.	240 V.				120 V.	240 V.		
1" Standard Pipe Thread—Single Element					1½" Standard Pipe Thread—Dual Element				
750	15054-H1	15054-H5	7¼	\$33.25	2000 3000	15054-H13	15054-H13	9%	\$39.75
1000	H2	H6	9%	33.75		H14	H14	13%	42.75
1500	H3	H7	13%	34.75					
2000	H4	H8	17%	35.75					
1½" Standard Pipe Thread—Single Element					2" Standard Pipe Thread—Dual Element				
1000	H9	H11	9%	34.75	3000	H15	H15	9%	55.90
1500	H10	H12	13%	35.50	5000	H16	H16	15%	64.50

① Contactor must be used.

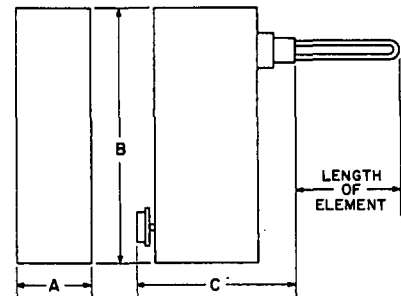
OPTIONAL FEATURES

1. Special Wattages or Voltages—Add \$50. list engineering charge per item, per order.
2. Special Lengths—Use price of next longer heater and add a \$50. list engineering charge per item, per order.

② For combination of optional features for special devices, only one engineering and set up charge is to apply, per item, per order.

APPROXIMATE DIMENSIONS

Watts	Dimensions in Inches				Watts	Dimensions in Inches			
	Wide A	High B	Deep C	Length of Element		Wide A	High B	Deep C	Length of Element
1" Standard Thread					1½" Standard Thread				
750	2¾	5½	12	6¾	2000	3¾	6¾	15½	8¾
1000	2¾	5½	14	8¾	3000	3¾	6¾	19¾	12¾
1500	2¾	5½	17¾	12¾					
2000	2¾	5½	21¾	16¾					
1½" Standard Thread					2" Standard Thread				
1000	2¾	5½	14	8	3000	3¾	6¾	15¾	8¾
1500	2¾	5½	18	12	5000	3¾	6¾	21¾	14¾



BOTTOM OUTLET TYPE

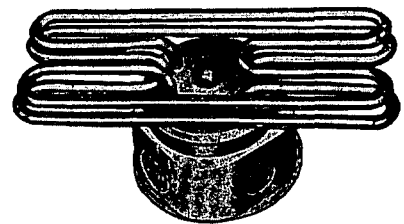
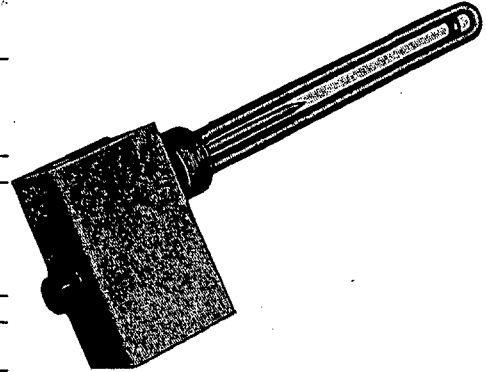
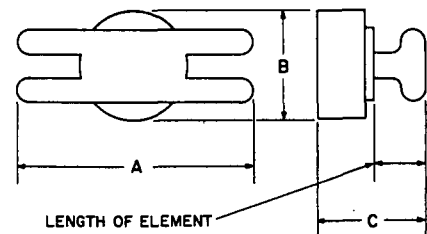
Single Phase—2 Element				3 Phase—3 Element					
Watts	Catalog Number			Price	Watts	Catalog Number			Price
	208 V.	120 V.	240 V.			208 V.	120 V.	240 V.	
	15055-	15055-	15055-			15055-	15055-	15055-	
1500	H1	H33	H29	\$19.50	6000	H17	H21	---	\$36.50
2000	H2	H34	H30	21.00	7500	H18	H22	---	41.00
2500	H3	H35	H31	22.50	9000	H19	H23	---	45.50
3000	H4	H36	H32	24.00	12000	H20	H24	---	54.50
4000	H5	---	H9	27.00	6000	---	---	H25	41.50
5000	H6	---	H10	30.50	7500	---	---	H26	46.00
6000	H7	---	H11	34.00	9000	---	---	H27	50.50
7000	H8	---	H12	37.50	12000	---	---	H28	59.00

OPTIONAL FEATURES

1. Special Wattages or Voltages—Add \$50. list engineering charge per item, per order.
2. Alloy Sheath Heaters—on application.
3. Single (on-off) heat or 3-heat switch—add \$7.50 list each to list prices.

APPROXIMATE DIMENSIONS

Single Phase—2 Element					3 Phase—3 Element				
Dimensions in Inches					Dimensions in Inches				
Watts	Wide A	High B	Deep C	Depth of Element	Watts	Wide A	High B	Deep C	Depth of Element
1500	3¾	3½	4½	2	6000	8	3½	5½	2¾
2000	4¾	3½	4½	2	7500	9¾	3½	5½	2¾
2500	5	3½	4½	2	9000	11¾	3½	5½	2¾
3000	6¾	3½	4½	2	12000	14¾	3½	5½	2¾
4000	7¾	3½	4½	2	6000	8¾	4½	6	3¾
5000	9¾	3½	4½	2	7500	10¾	4½	6	3¾
6000	10¾	3½	4½	2	9000	12	4½	6	3¾
7000	12¾	3½	4½	2	12000	15¾	4½	6	3¾



DISCOUNT SCHEDULE 14 CD

CUTLER-HAMMER



MISCELLANEOUS ACCESSORIES AND COMPONENTS

Strip Heaters

WHEN ORDERING SPECIFY
STRIP HEATERS

• Catalog number

Watts	Volts	Length in Inches	Steel Sheath 750° F.			Monel Sheath 1200° F.		Watts	Volts	Length in Inches	Steel Sheath 750° F.			Monel Sheath 1200° F.	
			Catalog Number		Price	Cat. No.	Price				Catalog Number		Price	Cat. No.	Price
			Both Term. One End	One Term. Each End							Both Term. One End	One Term. Each End			
100	120	11 ¹ / ₈	15510- H62	15510- H3	\$3.75	15510- ---	---	350	120	17 ¹ / ₈	15510- H83	15510- H71	\$4.15	15510- ---	---
200	120		H65	H6	3.75	---	---	350	240		H113	H75	4.15	---	---
200	240		H98	H34	3.75	---	---	500	120		① H85	① H22	4.15	H131	\$7.50
250	120		H66	H7	3.75	---	---	500	208		---	---	---	H136	7.50
250	240		H99	H35	3.75	---	---	500	240		① H115	① H50	4.15	H141	7.50
350	120		---	---	---	H145	\$6.60	750	120		---	---	---	H132	7.50
350	240		---	---	---	H147	6.60	750	208		---	---	---	H137	7.50
500	120		---	---	---	H146	6.60	750	240		---	---	---	H142	7.50
500	240		---	---	---	H148	6.60	1000	120		---	---	---	H133	7.50
								1000	208		---	---	---	H138	7.50
							1000	240	---	---	---	H143	7.50		
300	120	14 ¹ / ₈	H76	H14	4.00	---	---	250	120	23 ³ / ₈	H89	H26	4.40	---	---
300	240		H106	H42	4.00	---	---	250	240		H119	H54	4.40	---	---
500	120		---	---	---	H149	7.10	500	120		H92	H1	4.40	H151	8.40
500	240		---	---	---	H150	7.10	500	240		H122	H2	4.40	H154	8.40
								500	250		H128	H73	4.40	---	---
								750	120		---	---	---	H152	8.40
							750	240	---	---	---	H155	8.40		
							1000	120	---	---	---	H153	8.40		
							1000	240	---	---	---	H156	8.40		

DISCOUNT SCHEDULE 14 CD

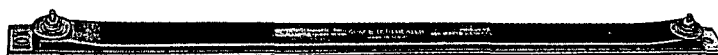
① For conduction heating service only.

OPTIONAL FEATURES

- Special Wattage or Voltages—Refer to the length required and add
 - 10% to the list price shown for that length.
 - A \$15. list minimum charge is added for any item on any order in addition to the unit price where the additional 10% does not by itself exceed \$15.00.
 - No additional 10% applies for any billing in excess of \$200. list for an item on order.
- Secondary insulating bushings—add \$.1 per heater.
- Omission of Mounting Tabs—add \$.30 per heater.

APPROXIMATE DIMENSIONS

Length	Dimensions in Inches			
	Wide A	Length B	Deep C	Mounting Holes
11 $\frac{1}{8}$	1 $\frac{1}{2}$	11 $\frac{1}{8}$	1	10%
14 $\frac{1}{8}$	1 $\frac{1}{2}$	14 $\frac{1}{8}$	1	13%
17 $\frac{1}{8}$	1 $\frac{1}{2}$	17 $\frac{1}{8}$	1	16%
23 $\frac{1}{8}$	1 $\frac{1}{2}$	23 $\frac{1}{8}$	1	22%



Domestic Water Heater Elements—Copper Sheathed

WHEN ORDERING SPECIFY

• Catalog number

STANDARD WATT DENSITY HEATERS WITH ANTI-CORROSION RESISTORS

Single Element—Single Loop					Single Element—Double Loop				Single Element—Triple Loop			
Watts	Catalog Number		Max. Ex- tension Inches	② Price	Watts	Cat. No.	Max. Ex- tension Inches	② Price	Watts	Cat. No.	Max. Ex- tension Inches	② Price
	115/ 120 V.	230/ 240 V.				230/ 240 V.						
600	15064-H303	15064-H209	4¾	\$4.50	2500	15064-H215	8%	\$5.85	5000	15064-H318	11¾	\$8.00
750	H304	H210	5%	4.60	3000	H216	10%	6.30	6000	H319	13%	8.80
1000	H305	H211	7¼	4.75	3500	H313	12	6.60				
1250	H306	H212	8¾	4.90	4000	H217	13½	6.90				
1500	H307	H213	10%	5.05	4500	H243	13½	7.20				
2000	H308	H214	13½	5.35								



DISCOUNT SCHEDULE 14 CD-1

② For bulk packing, deduct \$.50 list each.

MISCELLANEOUS ACCESSORIES AND COMPONENTS



Domestic Water Heater Elements Copper Sheathed

APPROXIMATE DIMENSIONS

Dimensions in Inches			
Wide A	High B	Deep ① C	4 Hole Flange Mounted Mounting Centers
3	3	7/8	2 1/2

① Add length of element, from price table, to this dimension.

APPROXIMATE SHIPPING WEIGHTS—50 Units Per Carton

Catalog Number	Weight Per Carton	Catalog Number	Weight Per Carton	Catalog Number	Weight Per Carton	Catalog Number	Weight Per Carton
15064-H209	31	15064-H214	47	15064-H303	31	15064-H308	47
H210	32	H215	53	H304	32	H313	61
H211	35	H216	58	H305	35	H318	70
H212	38	H217	65	H306	38	H319	78
H213	41	H243	65	H307	41		

Motor Circuit Switches 30 and 60 Ampere Sizes

WHEN ORDERING SPECIFY

- Catalog number

MAXIMUM HORSEPOWER RATING—3 PHASE

Ampere Size	Voltage			
	110	220	440	550
30 Ampere	5	10	20	25
60 Ampere	7 1/2	15	30	50

30 AND 60 AMPERE SIZES—Includes Switch and Operating Mechanism

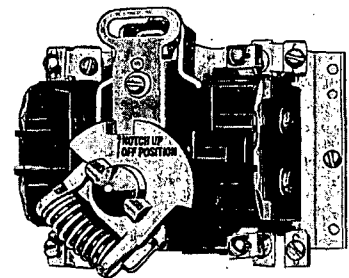
③ Cover To Panel Depth	Contact Case Cover Material	Cover Gasket	30 Ampere		60 Ampere	
			Cat. No.	Price	Cat. No.	Price
5 3/4"	Glass	Without	10904-H1	\$29.	10904-H9	\$36.
		With	H2	29.	H10	36.
to 13 3/4"	Phenolic	Without	H3	29.	H11	36.
		With	H4	29.	H12	36.
13 3/4"	Glass	Without	H5	33.	H13	40.
		With	H6	33.	H14	40.
to 20 3/4"	Phenolic	Without	H7	33.	H15	40.
		With	H8	33.	H16	40.

APPROXIMATE DIMENSIONS

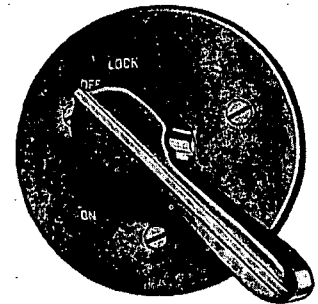
Size	Dimensions in Inches		
	② Wide A	High B	Cover to Panel Depth ③
30 Amp.	5 3/8	5 1/8	②
60 Amp.	6 3/8	5 3/8	③

② Includes space required to remove slider bars.

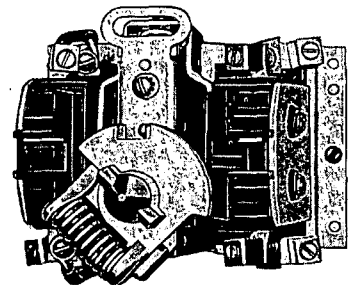
③ See cover to panel depth on price table.



30 Amp. Switch



External Operating Handle



60 Amp. Switch

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER



MISCELLANEOUS ACCESSORIES AND COMPONENTS

233

Motor Circuit Switches 100 and 200 Ampere Sizes

WHEN ORDERING SPECIFY

- Catalog number of basic switch
- Catalog number of cover operating mechanism
- Catalog number of fuse or no-fuse kits

MAXIMUM HORSEPOWER RATINGS

Size	A-c Ratings				D-c Ratings
	120 V.	240 V.	480 V.	600 V.	250 V.
100 Amp.	15	30	60	75	20
200 Amp.	30	60	125	150	40

BASIC SWITCH—100 AND 200 AMPERE SIZES—3 POLE VISI-FLEX ①

100 Ampere Size		200 Ampere Size	
Catalog Number	Price	Catalog Number	Price
10904-H17	\$52.	10904-H18	\$106.

COVER OPERATING MECHANISM

Panel To Cover Range Inches	Cover Gasket	100 Ampere Size		200 Ampere Size	
		Catalog Number	Price	Catalog Number	Price
7 $\frac{3}{8}$ — 11 $\frac{3}{8}$	Without	10904-H19	\$11.00	---	---
	With	H20	13.00	---	---
9 $\frac{1}{16}$ — 14 $\frac{1}{8}$	Without	---	---	H23	\$11.00
	With	---	---	H24	13.00
12 $\frac{1}{8}$ — 16 $\frac{1}{8}$	Without	H21	13.00	---	---
	With	H22	15.00	---	---
13 $\frac{1}{4}$ — 18 $\frac{1}{16}$	Without	---	---	H25	13.00
	With	---	---	H26	15.00

FUSE AND NO FUSE KITS

② Fuse Type	Amperes	Volts	100 Ampere Size		200 Ampere Size	
			Catalog Number	Price	Catalog Number	Price
No-Fuse Kit	---	---	10904-H27	\$1.25	10904-H38	\$5.70
NEC	60	250	H28	2.10	---	---
NEC	100	250	H29	14.00	H39	14.00
NEC	200	250	H30	24.80	H40	9.20
NEC	400	250	---	---	H41	65.00
NEC	60	600	H31	3.50	---	---
NEC	100	600	H32	16.00	H42	16.00
NEC	200	600	H33	30.00	H43	15.10
NEC	400	600	---	---	H44	76.00
C.L.	100	250	H34	16.00	H45	16.00
C.L.	200	250	H35	29.00	H46	13.00
C.L.	400	250	---	---	H47	72.00
C.L.	100	600	H36	19.20	H48	19.20
C.L.	200	600	H37	34.00	H49	19.00
C.L.	400	600	---	---	H50	85.00

① These switches are inoperable without the addition of an operating mechanism and a fuse or no-fuse kit.

② Fuse kits for (C.L.) current limiting, Rejection type Chase-Shawmut, form 600, type 4 Amp.-Trap.

DISCOUNT SCHEDULE 8 CD

DIMENSIONS, next page

CUTLER-HAMMER

233

3 PHASE FULL VOLTAGE
MOTOR CONTROL

3 PHASE REDUCED
VOLTAGE & MULTISPEED
MOTOR CONTROL

1 PHASE MOTOR CONTROL

AC-DC CONTACTORS,
RELAYS & TIMERS

PUSHBUTTONS & LIGHTS,
LIMIT SWITCHES,
FOOT SWITCHES

MISCELLANEOUS
ACCESSORIES &
COMPONENTS

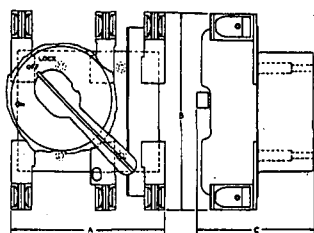
MISCELLANEOUS ACCESSORIES AND COMPONENTS



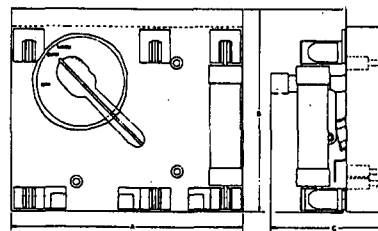
Motor Circuit Switches

100 and 200 Ampere Sizes

APPROXIMATE DIMENSIONS



100 ampere size



200 ampere size

Motor Circuit Switch Description — with fuse or no-fuse kit assembled	100 Ampere			200 Ampere		
	Dimensions in Inches			Dimensions in Inches		
	Wide A	High B	Deep C	Wide A	High B	Deep C
No-Fuse Kit	7	5½	5½	13¼	10½	7½
60 Amp. 250 V. NEC	7	6½	5½	---	---	---
100 Amp. 250 V. NEC	7½	6½	5½	13¼	11½	7½
200 Amp. 250 V. NEC	8½	7½	5½	13¼	11½	7½
400 Amp. 250 V. NEC	---	---	---	13¼	11½	7½
60 Amp. 600 V. NEC	7	6½	5½	---	---	---
100 Amp. 600 V. NEC	7½	7½	5½	13¼	11½	7½
200 Amp. 600 V. NEC	8½	9½	5½	13¼	11½	7½
400 Amp. 600 V. NEC	---	---	---	14¼	12	7½
100 Amp. 250 V. Current Limit	7½	6½	5½	13¼	11½	7½
200 Amp. 250 V. Current Limit	8½	7½	5½	13¼	11½	7½
400 Amp. 250 V. Current Limit	---	---	---	13¼	11½	7½
100 Amp. 600 V. Current Limit	7½	7½	5½	13¼	11½	7½
200 Amp. 600 V. Current Limit	8½	9½	5½	13¼	11½	7½
400 Amp. 600 V. Current Limit	---	---	---	13¼	11½	7½

Circuit Breaker Operating Mechanisms

WHEN ORDERING SPECIFY

- Catalog number

CIRCUIT BREAKER OPERATING MECHANISMS

Ampere Rating	① Frame Size	② Cover To Panel Depth	Cover Gasket	Catalog Number	Price
100	E	7½" — 15"	Without	10908-H1	\$10.80
			With	H2	10.80
	F	7½" — 15"	Without	H3	10.80
			With	H4	10.80
225	JA and KA	7¾" — 15"	Without	H18	13.00
			With	H17	13.00
225- 400	JK, JKL and LA	7¾" — 15"	Without	H13	29.00
			With	H14	29.00
800	MA	10¼" — 15"	Without	H16	29.00
			With	H15	29.00

① Mechanism set up for use with Westinghouse Deion type circuit breaker—3 pole only.

② Operating mechanisms also available for deeper cases. On application.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

WOUND ROTOR — MANUAL

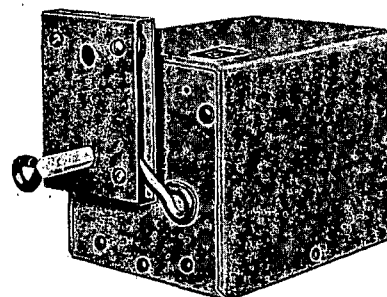
Reversing Primary, Secondary Resistor Type

WHEN ORDERING SPECIFY

- Drum and resistor catalog numbers
- Secondary open circuit voltage
- Primary voltage and frequency
- Secondary full load current

DESCRIPTION

Reversing or non-reversing—Lever operator, momentary or maintained or rope drive, momentary operation—Two or three primary contacts—Anti-plugging feature on self-returning drums—With or without magnetic starter—Resistor, separately mounted open type, up to 50% speed reduction—50% initial torque, 6 control points—100% initial torque, 5 control points.



Rope Drive Drum

DRUM SWITCH

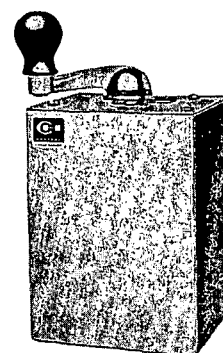
Maximum Secondary Current—50 Amperes Intermittent
6 Control points at 50% Initial Torque—5 Control points at 100% Initial Torque

Power Supply	Maximum Horsepower Intermittent Duty 220-550 Volts A-c	Type of Operation	Type of Auxiliary Circuits							
			For Series Limit Switch Connections			Off Position Interlock and Series Limit Switch Connections		For Pilot Circuit Limit Switch Connections		
			3 Primary Power Poles Magnetic Starter Not Necessary			2 Primary Power Poles Magnetic Starter Required				
			Lever Operator	Rope Drive	Price	Lever Operator	Price	Lever Operator	Rope Drive	Price
3 Phase 3 or 4 Wire or 2 Phase 3 Wire	5	Maintained Momentary	9447-H64 H65	9447- --- H66	\$185. 185.	9447-H67 ---	\$185. ---	9447-H61 H62	9447- --- H63	\$185. 185.
	10	Maintained Momentary	H37 H38	--- H39	218. 218.	H68 ---	218. ---	H40 H41	--- H42	218. 218.

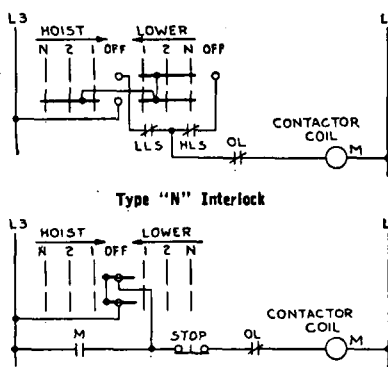
NON-BREAKABLE RESISTORS

Open Type—Separate Mounting

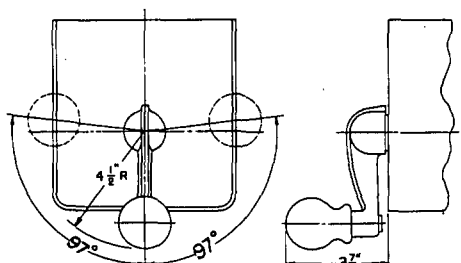
Horsepower	NEMA Class 152—50% Initial Torque	NEMA Class 154—100% Initial Torque	Price	NEMA Class 162—50% Initial Torque	NEMA Class 164—100% Initial Torque	Price
1	9447-W1	9447-W7	\$64.	9447-W13	9447-W19	\$64.
2	W2	W8	64.	W14	W20	64.
3	W3	W9	64.	W15	W21	64.
5	W4	W10	64.	W16	W22	86.
7½	W5	W11	121.	W17	W23	121.
10	W6	W12	143.	W18	W24	161.



Lever Operator Drum

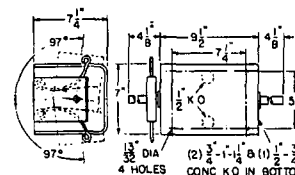


Type "P" Interlock



HANDLE CAN BE ASSEMBLED AT 90° OR 180° FROM POSITION SHOWN

Lever Operated—Lbs. Boxed—35



Rope Drive—Lbs. Boxed—50

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

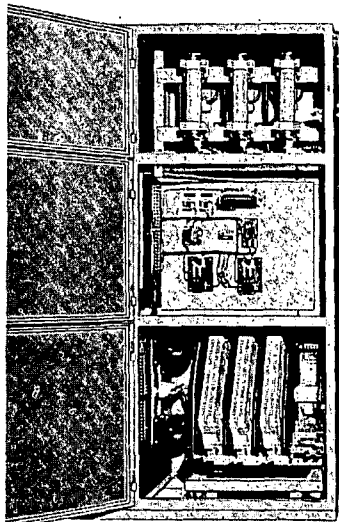
DISCOUNT SCHEDULE ICD



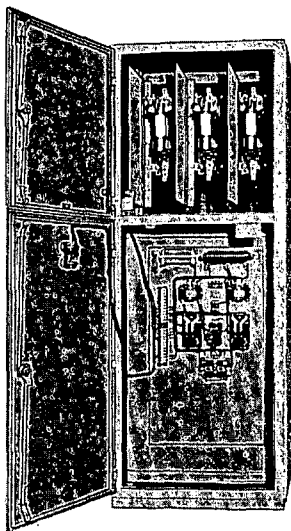
DESCRIPTION

Medium Voltage — Nema Class E2 — Full Voltage Starting, Non-Reversing — For squirrel cage motors — gang operated disconnect switch on 30" deep completely front accessible design — Hook stick operated disconnect on 60" deep design — high interrupting capacity current limiting power fuses — 30" deep enclosure with air-break magnetic contactor — 60" deep enclosure with air-break or oil immersed magnetic contactor — 3 pole magnetic contactor with maintaining interlock — control circuit transformer with current limiting primary fuses, 220 volt control circuit — adjustable duplex thermal overload relay — instantaneous undervoltage protection — start-stop pushbutton in door — on 30" deep design, mechanical door interlocks and electrical interlocking between disconnect switch and main contactor compartment doors, as well as main contactor itself — on 60" deep design, electrical door interlock on fuse compartment door to open main line contactor control circuit — on 60" deep design with air-break contactor, mechanical interlocking between fuse compartment door and contactor — for wound rotor motors use as a magnetic primary with suitable secondary controller.

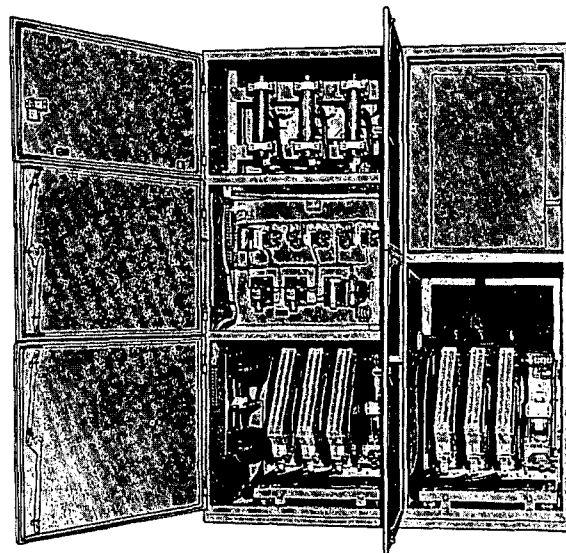
Medium Voltage — Nema Class E2 — Reduced Voltage Starting, Primary Reactor Type, Non-Reversing — For squirrel cage motors — gang operated disconnect switch on 30" deep completely front accessible design — hook stick operated disconnect on 60" deep design — high interrupting capacity current limiting power fuses — 30" deep enclosure with air-break magnetic contactors — 60" deep enclosure with air break or oil immersed magnetic contactors — 3 pole main and 3 pole accelerating magnetic contactors with maintaining interlocks — integrally mounted primary reactor provides 50%, 65%, and 80% voltage on starting — control circuit transformer with current limiting primary fuses, 220 volt control circuit — adjustable duplex thermal overload relay — instantaneous undervoltage protection — pneumatic timer, definite time acceleration — start-stop pushbutton in door — on 30" deep design, mechanical door interlocks and electrical interlocking between disconnect switch and main contactor compartment doors, as well as main contactor itself — on 60" deep design, electrical door interlocks on fuse compartment door to open main line contactor control circuit — on 60" deep design with air-break contactors mechanical interlocking between fuse compartment door and main contactor.



30" Deep Design
Full Voltage Starting
Completely Front Accessible



60" Deep Design
Full Voltage Starting



30" Deep Design
Reduced Voltage Starting
Completely Front Accessible

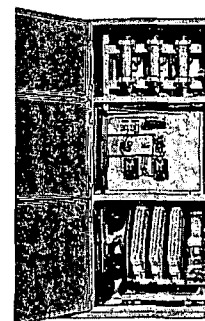


MEDIUM VOLTAGE

NEMA Class E2 — With High Interrupting Capacity Current Limiting Fuses — For Squirrel Cage Motors

WHEN ORDERING SPECIFY

- Catalog number
- Voltage and frequency
- Number of phases
- Full load current
- Lock rotor current at full voltage
- For full voltage use as wound rotor primary controller—break-down torque in percent of full load

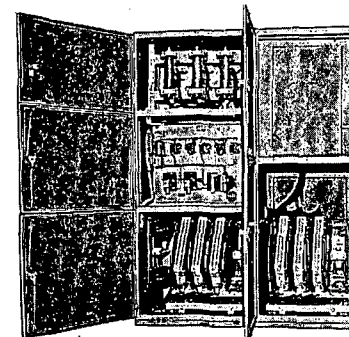


Full Voltage Type

FULL VOLTAGE NON-REVERSING—3 Pole with 2 Coil Overload Relay

Max. Horse- power 60-50 Cycles	General Purpose—NEMA 1 Enclosed									
	Oil-Immersed Main Contactor					Air-Break Main Contactor				
	2000-2400 Volts		4000-4800 Volts				2000-2400 Volts		4000-4800 Volts	
	60" Deep	Price	60" Deep	Price	30" Deep	60" Deep	Price	30" Deep	60" Deep	Price
	9957- W1		9957- W4		9957- W7	9957- W12		9957- W17	9957- W23	
350	W1	\$4400.	W4	\$5000.	W7	W12	\$4400.	W17	W23	\$5000.
700	W2	4400.	W5	5000.	W8	W13	4400.	W18	W24	5000.
1000	W3	5000.	W6	5000.	W9	W14	5000.	W19	W25	5000.
1250	---	---	---	---	W10	W15	5600.	W20	W26	5000.
1500	---	---	---	---	W11	W16	5600.	W21	W27	6200.
2500	---	---	---	---	---	---	---	W22	W28	6200.

Prices include necessary heater coils and door mounted pushbuttons.



Reduced Voltage Type

REDUCED VOLTAGE, PRIMARY REACTOR TYPE
NON-REVERSING—3 Pole with 2 Coil Overload Relay

Max. Horse- power 60-50 Cycles	General Purpose—NEMA 1 Enclosed									
	Oil-Immersed Main Contactor					Air-Break Main Contactor				
	2000-2400 Volts		4000-4800 Volts				2000-2400 Volts		4000-4800 Volts	
	60" Deep	Price	60" Deep	Price	30" Deep	60" Deep	Price	30" Deep	60" Deep	Price
	9966- W1		9966- W19		9966- W37	9966- W57		9966- W77	9966- W101	
50	W1	\$8400.	W19	\$9100.	W37	W57	\$8400.	W77	W101	\$9100.
60	W2	8500.	W20	9100.	W38	W58	8500.	W78	W102	9100.
75	W3	8500.	W21	9100.	W39	W59	8500.	W79	W103	9100.
100	W4	8500.	W22	9300.	W40	W60	8500.	W80	W104	9300.
125	W5	8600.	W23	9300.	W41	W61	8600.	W81	W105	9300.
150	W6	8800.	W24	9500.	W42	W62	8800.	W82	W106	9500.
200	W7	9000.	W25	9800.	W43	W63	9000.	W83	W107	9800.
250	W8	9200.	W26	9800.	W44	W64	9200.	W84	W108	9800.
300	W9	9200.	W27	9800.	W45	W65	9200.	W85	W109	9800.
350	W10	9400.	W28	10300.	W46	W66	9400.	W86	W110	10300.
400	W11	9400.	W29	10300.	W47	W67	9400.	W87	W111	10300.
450	W12	9500.	W30	10600.	W48	W68	9500.	W88	W112	10600.
500	W13	9500.	W31	10600.	W49	W69	9500.	W89	W113	10600.
600	W14	9700.	W32	10600.	W50	W70	9700.	W90	W114	10600.
700	W15	9900.	W33	11300.	W51	W71	9900.	W91	W115	11300.
800	W16	11000.	W34	11500.	W52	W72	11000.	W92	W116	11500.
900	W17	11000.	W35	12200.	W53	W73	11000.	W93	W117	12200.
1000	W18	11000.	W36	12200.	W54	W74	11000.	W94	W118	12200.
1250	---	---	---	---	W55	W75	12700.	W95	W119	12800.
1500	---	---	---	---	W56	W76	12900.	W96	W120	14700.
1750	---	---	---	---	---	---	---	W97	W121	15200.
2000	---	---	---	---	---	---	---	W98	W122	15700.
2250	---	---	---	---	---	---	---	W99	W123	16300.
2500	---	---	---	---	---	---	---	W100	W124	16800.

Prices include necessary heater coils and door mounted pushbuttons.

① Subject to limitations of fuses.

DISCOUNT SCHEDULE 1 CD-3

DIMENSIONS, next page

FUSE LIMITATIONS

The size of motors with which these controllers may be used are limited by the ability of the fuses to withstand locked rotor current. These starters are not to be used with motors having full load and locked rotor currents in excess of those given in the fuse selection tables.

Interrupting Capacity 150,000 Kva at 2300 volts— 250,000 Kva at 4000-5000 volts					
Motor Full Load Cur- rent Amps.	Maximum Locked Rotor Current—Amps.				
	Size 2R, 3R or 4R Fuses	Size 6R or 9R Fuses	Size 12R Fuses	Size 18R Fuses	Size 24R Fuses
10	100	---	---	---	---
20	200	---	---	---	---
30	300	---	---	---	---
40	380	400	---	---	---
50	380	500	---	---	---
60	370	600	---	---	---
70	360	700	---	---	---
80	350	800	---	---	---
90	340	900	---	---	---
100	340	880	1000	---	---
125	---	850	1170	1250	---
150	---	840	1160	1500	---
175	---	830	1150	1710	1750
200	---	800	1140	1700	2000
250	---	750	1100	1700	2370
300	---	---	1050	1640	2310
350	---	---	980	1600	2280
400	---	---	---	1560	2250

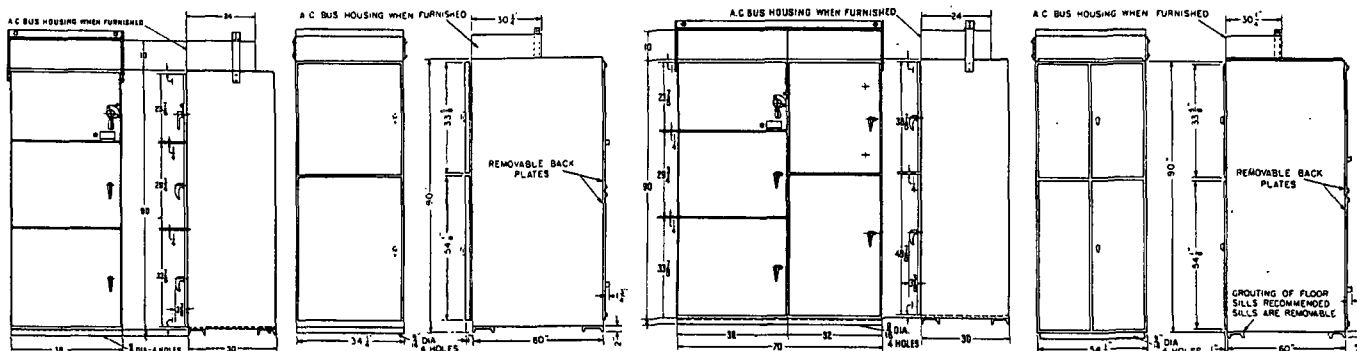
OPTIONAL FEATURES, next page

CUTLER-HAMMER

MEDIUM VOLTAGE



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Full Voltage—30" Deep
Lbs. Boxed—2400

Full Voltage—60" Deep
Up to 1000 Hp—2600 Lbs. Boxed
Over 1000 Hp—3000 Lbs. Boxed

Reduced Voltage—30" Deep

Reduced Voltage—60" Deep

Max. Hp.	150	400	1000	2500
Lbs. Boxed. . .	3900	4100	4600	6600

OPTIONAL FEATURES

1. Bus Work

- A. Power bus, a-c, 3 phase, 4800 volts maximum
 - 1. Full voltage, non-reversing and reversing
 - a. 1000 amp., add \$220.
 - b. 2000 amp., add 380.
 - 2. Reduced voltage and wound rotor
 - a. 1000 amp., add 440.
 - b. 2000 amp., add 760.
- B. Control Bus, including 60 amp. fused disconnect switch, add 145.
- C. Potential Bus
 - 1. A-c two wire, add 128.
 - 2. A-c three wire, add 218.
- D. Ground Bus
 - 1. Full voltage, non-reversing and reversing, add 38.
 - 2. Reduced voltage and wound rotor, add 76.

2. Meters and Instruments

- A. A-c ammeter \$198.
- B. A-c voltmeter (① See note below) 198.
- C. Indicating wattmeter (② See note below) 400.

Note—2 current transformers, suitable for metering are included in the basic controller. Price additions for current transformers need not be made unless a third current transformer is required. The circled numbers above indicate the number of potential transformers required for each type of meter. Price addition must be made for potential transformers. A maximum of 2 potential transformers are required for any one panel. For example: If a-c voltmeter only is being used, an addition for one potential transformer is required; if a-c voltmeter with three phase transfer switch and wattmeter, are being used, an addition for two potential transformers is required. If two or more controllers with instruments are mounted together, only one set of potential transformers is required providing potential bus is added.

- D. 3-phase ammeter transfer switch 102.
- E. 3-phase volt meter transfer switch 102.
- F. Current transformer 166.
- G. Potential transformer
 - 1. 2000-2500 volts, 50-60 cycles 288.
 - 2. 2500-5000 volts, 50-60 cycles 388.

- 3. Extra Start-Stop Pushbutton Stations mounted in door of controller, add \$50. Each

4. Run-Off-Automatic-Selector Switch, in place of Start-Stop Pushbutton

- A. Pushbutton type No Charge
- B. Drum type, add \$45. Each

5. Run-Off-Automatic Selector Switch, in addition to standard start-stop pushbutton

- A. Pushbutton type, add \$30.
- B. Drum type, add 95.

6. Indicating lights, add 30. Each

7. Extra Electrical Interlocks wired to terminal board:

- A. Maximum of 3 (in addition to maintaining interlock) No Charge
- B. More than 3 interlocks, add \$ 64. Each

8. 110 Volt Pushbutton Circuit including necessary control transformer and relays, add \$149.

9. Control Relays:

- A. 1-4 poles, add 74.
- B. 5-8 poles, add 116.
- C. Enclosed switchboard type, 4 pole maximum, add 100.

10. Timing Relays

- A. Pneumatic type, add 100.
- B. Motor driven, add 176.

11. Under Voltage Protection:

- A. Time-delay, when specified No Charge

12. 3-Phase Overload Protection, including third current transformer \$186.

13. Incomplete Sequence Relay, add 182.

Used on reduced voltage starters to disconnect from line, if run contactor fails to close in prescribed length of time.

14. Instantaneous Phase Reverse and Open Phase Relay, add 430.

15. Ground Fault Relaying Equipment, add 530.

Includes hand reset instantaneous type ground relay and window type current transformer.

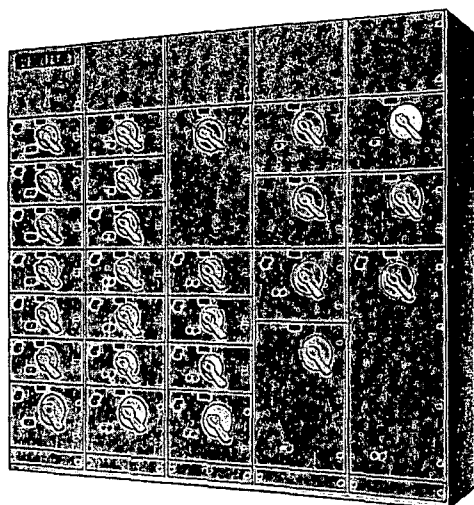
16. Extra Control Transformer Capacity, up to 2 kva, add 274.

17. Switch Hook (hook stick and fuse tong) each 48.

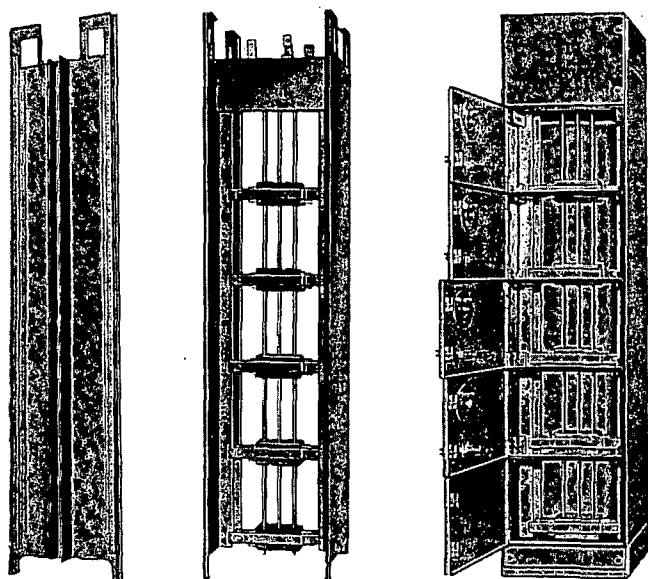


A-C MOTOR CONTROL CENTERS—UNITROL®

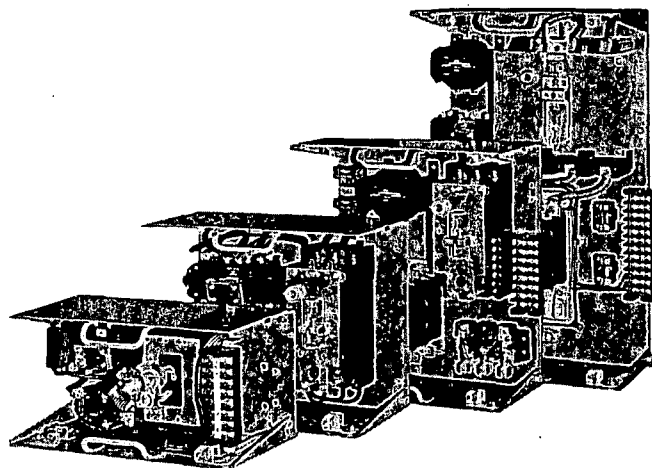
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Typical Motor Control Center



1. Side Panels. 2. Side Panels Assembled to Cross Bracing. 3. Section Complete Without Units.



Variety of Typical Control Center Motor Starter Units in Different Sizes.

This Section Contains:

Page

Motor Circuit Switch Types

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Reversing — Full Voltage — For Single Speed Motors	243
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Non-Reverse — Full Voltage — For Two Speed Separate Winding Motors	243
Non-Reverse — Full Voltage — For Two Speed Single Winding Motors	243

Circuit Breaker Types

Main or Feeder Circuit Breaker Only	242
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INTRODUCTION

Good electrical practice, as well as national and local codes, requires the use of a number of components for the control and protection of any electric motor and its feeder circuit. A circuit breaker or fusible safety switch is used in the feeder circuit. The branch circuit contains a circuit breaker or fusible safety switch and motor controller with thermal overload relays. Where multiple motors are involved in a process or on a number of machines, this control equipment can be combined in a single structure known as a motor control center. This arrangement takes motor starters and disconnecting means away from the machines and places them all together in one location for ease of maintenance. Other advantages are simplification of feeder and branch circuit conduit runs, saving of space and neatness of appearance.

Special functions other than motor starters may also be included in a unitrol motor control center. A few of these options are Lighting Circuit Panelboards, a variety of metering and operator's stations with selector switches, pushbuttons and pilot lights.

DESCRIPTION

Control Center—One or more sections—Straight line, L-shape, U-shape or E-shape—floor type structure mounted on four inch channel iron sills—Nema Class I or II, Types A,

WOUND ROTOR
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL

MOTOR CONTROL
CENTERS
—UNITROL®

DC MOTOR CONTROL

MOTOR CONTROL
FOR
SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

HEATER COILS
FOR
OVERLOAD RELAYS



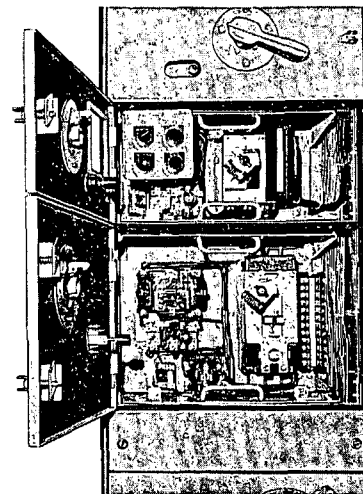
DESCRIPTION (continued)

B or C—Enclosure Nema Type 1—Nema Type 3, 5 and 12 optional at additional cost—Bonderized, medium light gray baked enamel finish, inside and out.

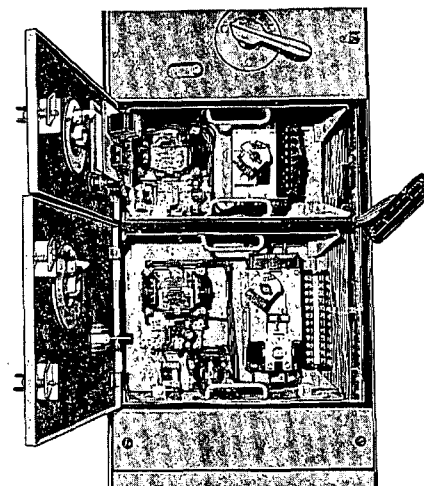
Section—Overall height 90"—width 20" (except large reduced voltage starters or special panels which may be 30" in width)—Depth 20", 15" or 12"—Back to back mounting in 20" depth—Removable top plates—Pan type doors pin hinged— $\frac{1}{4}$ turn pressure type fasteners on doors—Padlocking provision on doors—Disconnect or circuit breaker operators in doors—Padlocking (up to 3 padlocks) provision for operators—Door openings gasketed—Three horizontal copper feeder bus bars in top—Horizontal bus bars braced to withstand 25000 amperes RMS fault current—Three vertical copper bus bars, silver plated, running the full working height—Vertical bus braced to withstand 25000 amperes RMS fault current—Horizontal wireway with cable supports—Vertical wireway with cable tie clamps—Unit support brackets movable to accommodate all sizes of control units.

Control Unit—Standardized combination starter units (with either fusible motor circuit switch or circuit breaker)—Seven modular heights $9\frac{1}{8}"$, 14", $18\frac{1}{2}"$, 28", 42", 56" and 70". Semi-enclosed and electrically isolated—Equipped with handles for removal from section—Cam type latches hold units in operating or test positions—Padlocking provisions for both positions—Pushbuttons and indicating lights on hinged plate assembled to unit—Silver plated stab-on power plug connectors on the back to connect line side of unit to vertical bus bars—Line and load have pressure connectors.

Control Circuit Terminal Blocks—Rated at 30 amperes—Pull-apart construction allows removal of control unit without disturbing control circuit wiring—Male portion removable for wiring outside the structure—Female portion mounted in control unit—Pressure connectors on all terminals—Holes through terminal cover for test probes.



Pushbutton and pilot light mounting plate and pull apart terminal block in a Unitrol unit.



Pushbutton and pilot light mounting plate opened for inspection and pull apart terminal block separated for wiring or unit removal.

Pricing of a UNITROL Motor Control Center Class I and II

All Prices are for 3 Phase 60 Cycle Equipment

PRICING FORMULA

Determine whether Class I or Class II Unitrol is required.

CLASS I—This classification includes control centers which are essentially a mechanical grouping of motor starters and/or control assemblies, and which can be handled without systems analysis, and/or systems engineering. Individual diagrams of the units only are provided. No interlocking between units or with outside devices. In order to be a Class I motor control center the entire center must meet the above definition.

CLASS II—This classification includes control centers which are basically designed as a complete control system, which requires system analysis and engineering, including electrical interlocking between units within the control center or with outside devices, where required by the particular installation.

A suitable diagram shall be provided to illustrate operation of the control associated with the control center. If any part of the Unitrol control center falls under this definition the entire center must be considered as Class II.

Select Type of Wiring Arrangement Desired—

Type A, B or C (various types of wiring cannot be mixed in the same controller). The controller price always includes a wired motor controller plus its own portion of the supporting Unitrol structure.

Type A (Without Terminal Boards) Class I Only.

1. No terminal boards for the load or control connections.
2. Connection diagrams only for each starter or control assembly.
3. Sketches of the overall dimensions of the control center.



A-C MOTOR CONTROL CENTERS—UNITROL®

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Pricing of a UNITROL Motor Control Center Class I and II (continued) All Prices are for 3 Phase 60 Cycle Equipment

Type B (With Unit Terminal Boards) Class I or II.

1. Type B is similar to Type A, except that a unit control terminal board is provided. Unit load terminal boards are also provided for size 3 starters or smaller. These terminal boards are mounted on or adjacent to each unit. No load terminal boards for branch circuit breakers and branch fusible switches. (Class I and II).
2. Connection diagrams only for each starter or control assembly. (Class I only).
3. The necessary interconnecting wiring between starters and control assemblies in the same or other sections. (Class II only).
4. A connection diagram of the complete control assembly. (Class II only).
5. Sketches of the overall dimensions of the control centers. Class I and II).

Type C (With Master Terminal Boards) Class I or II.

1. Master section terminal boards including load terminals for size 3 starters or smaller, and all control terminals for all starters or control assemblies in each vertical section are mounted on the stationary structure; also complete wiring between starters or control assemblies and their master terminal boards. No load terminal boards for branch circuit breakers and branch fusible switches. (Class I and II).
2. No wiring between sections or between any master terminals. (Class I only).
3. No interconnecting between any starters or control assemblies. All outgoing wires from any unit will be carried to the master terminal board, except wiring for size 4 starters or larger. (Class I only).
4. Connection diagrams for each starter or control assembly. (Class I only).
5. Sketch of main terminal boards showing general location of terminals. (Class I only).
6. The necessary interconnecting wiring between starters and control assemblies in the same or other sections. (Class II only).
7. A connection diagram of the complete control center. (Class II only).
8. Sketches of the overall dimensions of the control centers. (Class I and II).

Select Main or Feeder Switch—Fusible disconnect or circuit breaker (if wanted).

Tabulate Quantity of Controllers of various types and rating.

Tabulate Optional Features desired if any.

Future Space

This price applies when space only is to be provided for adding units to the Unitrol in the future. Space only provides a blank door, unit supports, cross channel and all provisions for adding a unit later. The fundamental construction of Unitrol is such that units and sections can be added at a future date.

Unit Only

"Units only" for installing in blank or spare spaces of existing Unitrol centers, refer to nearest C-H office.

Back to Back Construction

Where floor space is at a premium and where access can be gained to both the front and the rear of the control center, certain NEMA sizes of controllers can be mounted back to back in the 20 inch depth section (see plug-in units only). Price

the Unitrol motor control center in the same manner as outlined above and back to back construction will be supplied when specified at no increase in price.

Minimum Charge for Motor Control Center

Total of space factors for control center must be five or more. If space factors total less than five, add to price a charge of \$80. for each factor to total a minimum of five.

These minimum charges apply to each group of sections designated as a control center whether physically connected or not. No allowance is made for combining control centers on the same order.

EXAMPLES OF PRICING UNITROL EXAMPLE—CLASS I

Quan.	Description	Type A		Type B		Type C	
		Each	Total	Each	Total	Each	Total
2	Bul. 9818 Size 1—440 V. Controller Reset Only 10 Hp	\$248.	\$496.	\$282.	\$564.	\$327.	\$634.
1	Bul. 9818 Size 2—440 V. Controller Reset Only 15 Hp	308.	308.	344.	344.	399.	399.
	Sub Total		\$804.		\$908.		\$1033.
	Add \$160. (Two Space Factor Since Space Factors Total Only Three)		160.		160.		160.
	Total Price of Unitrol Motor Control Center		\$964.		\$1068.		\$1193.

EXAMPLE—CLASS II

Quan.	Description	Type B		Type C	
		Each	Total	Each	Total
20	Bul. 9814—Size 1—440 V. Controller—Reset Only 10 Hp.....	\$227.	\$5540.	\$322.	\$6440.
5	Bul. 9814—Size 2—440 V. Controller Reset Only 25 Hp.....	354.	1770.	509.	2045.
1	Bul. 9808 Main or Incoming Line Circuit Breaker 600 A.....	859.	859.	859.	859.
	Total Price of Unitrol Motor Control Center....		\$8169.		\$9344.

DISCOUNT SCHEDULE 1CD

CUTLER-HAMMER

241

WOUND ROTOR,
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROLMOTOR CONTROL
CENTERS
—UNITROL®

DC MOTOR CONTROL

MOTOR CONTROL
FOR
SPECIFIC APPLICATIONSMOTOR & WIRE
RATING DATAHEATER COILS
FOR
OVERLOAD RELAYS

A-C MOTOR CONTROL CENTERS—UNITROL®



WHEN ORDERING SPECIFY

- Class of construction and type of wiring
- Motor control center layout
- Catalog number, voltage, frequency and horsepower of individual units
- Heater coils for individual units see index on page 281.

CONTROL CENTER Layout

A convenient printed form for preparing motor control center layouts and presenting ordering information, may be obtained from your Cutler-Hammer office.

(For checking list, see page 248.)

FUSIBLE MAIN OR FEEDER DISCONNECT SWITCHES—3 POLE
CLASS I OR II, TYPE A, B & C

Cat. No.	Switch and Fuse Clip Rating in Amperes ①	250 Volts Maximum		600 Volts Maximum		Dimensions in Inches		Space Factor	BLANK FUTURE SPACES Includes door and unit mounting hardware for the addition of a unit at a later date.	
		Maximum Fuse Clip Size	Price	Maximum Fuse Clip Size	Price				Unit Size	Price
			Type A Wiring		Type A Wiring	W	H			
9804	30	100A	\$154.	60A	\$169.	20	9 1/2	1	9 1/2" or 14"	\$ 80.
	30	200A	154.	100A	169.	20	14	1	18 1/2" or 28"	160.
	60	200A	165.	100A	171.	20	14	1	42"	240.
	100	400A	270.	200A	279.	20	28	2	56"	320.
	200	400A	320.	400A	351.	20	28	2	70"	400.

① Continuous full load current rating should not exceed the listed switch ampere ratings.
Oversize fuse clips, where required, will be supplied at no price addition.

MAIN OR FEEDER CIRCUIT BREAKERS
CLASS I OR II, TYPE A, B & C

Cat. No.	Max. Amp. Rating	Circuit Breaker Type	Price		Dimensions in Inches		Space Factor	A-C Interrupting Capacity RMS Amperes		
			Type A Wiring	Extra Space	W	H		240 V.	241-480 V.	481-600 V.
2-POLE										
9808	30	EH	\$190.	\$80.	20	9½	1	15,000	15,000	② ---
	50	③ FA	190.	80.	20	9½	1	20,000	15,000	15,000
	50	F	190.	80.	20	14	1	20,000	15,000	15,000
	100	EH	207.	80.	20	9½	1	10,000	10,000	② ---
	100	③ FA	207.	80.	20	9½	1	20,000	15,000	15,000
	100	F	207.	80.	20	14	1	20,000	15,000	15,000
	225	JA	407.	80.	20	14	1	25,000	20,000	15,000
	225	KA	445.	80.	20	14	1	30,000	25,000	25,000
	3-POLE									
9808	30	EH	\$203.	\$80.	20	9½	1	15,000	15,000	② ---
	50	③ FA	203.	80.	20	9½	1	20,000	15,000	15,000
	50	F	203.	80.	20	14	1	20,000	15,000	15,000
	100	EH	219.	80.	20	9½	1	10,000	10,000	② ---
	100	③ FA	219.	80.	20	9½	1	20,000	15,000	15,000
	100	F	219.	80.	20	14	1	20,000	15,000	15,000
	225	JA	439.	80.	20	⑤ 14	1	25,000	20,000	15,000
	225	④ KA	483.	180.	20	⑤ 14	1	30,000	25,000	25,000
	400	④ LA	711.	160.	20	28	2	50,000	35,000	25,000
	600	④ MA	859.	160.	20	28	2	50,000	35,000	25,000
800	④ MA	1033.	160.	20	28	2	50,000	35,000	25,000	
	④ LM	1300.	240.	20	28	2	50,000	35,000	25,000	

- ② EH Breaker 480 volts maximum.
 ③ FA Breaker supplied with magnetic trip only.
 ④ LM Breaker, requires full 20 inch depth.
 KA, LA, MA & LM supplied with interchangeable trip.
 LA, MA & LM are stationary not plug-in type.
 ⑤ Requires 28" unit when used as main breaker.

DISCOUNT SCHEDULE ICD-2

CUTLER-HAMMER



A-C MOTOR CONTROL CENTERS-UNITROL®

243

3 Pole Fusible Combination Starters with Motor Circuit Switch

FULL VOLTAGE - NON-REVERSING AND REVERSING - SINGLE SPEED

Type and Cat. No.	Max. H. P. Ratings 3 Phase, 60 Cycles		NEMA Size	① Price						Dimensions in Inches		Space Factor
	208/220 Volts	440-550 Volts		CLASS I			CLASS II		Extra Space			
				Type A	Type B	Type C	Type B	Type C		W	H	
Non- Reversing 9814	7½ ---	--- 10	1	\$216. 218.	\$250. 252.	\$295. 297.	\$275. 277.	\$320. 322.	\$80.	20	9½ or 14	1
	15 ---	--- 25	2	289. 286.	325. 322.	380. 377.	358. 354.	413. 409.	80.	20	14	1
	30 ---	--- 50	3	513. 484.	555. 526.	630. 601.	611. 579.	686. 654.	160.	20	28	2
	50 ---	--- 100	4	844. 849.	② 920. ② 926.	② 995. ② 1001.	② 1012. ② 1019.	② 1087. ② 1094.	240.	20	42	3
	100 ---	--- 200	⑤ 5	1692. 1663.	② 1772. ② 1744.	② 1847. ② 1819.	② 1949. ② 1918.	② 2024. ② 1993.	400.	20	70	5
Reversing, 9824	7½ ---	--- 10	1	\$359. 361.	\$403. 405.	\$478. 480.	\$443. 446.	\$518. 521.	\$160.	20	18½ or 28	2
	15 ---	--- 25	2	486. 483.	532. 529.	617. 614.	585. 582.	670. 667.	160.	20	28	2
	30 ---	--- 50	3	780. 751.	832. 803.	927. 898.	915. 883.	1010. 978.	240.	20	42	3
	50 ---	--- 100	4	1384. 1366.	② 1470. ② 1452.	② 1565. ② 1547.	② 1617. ② 1597.	② 1712. ② 1692.	320.	20	56	4
	100 ---	200	⑤ 5	2520. 2520.	② 2610. ② 2610.	② 2705. ② 2705.	② 2886. ② 2886.	② 2981. ② 2981.	400.	20	70	5

REDUCED VOLTAGE - TWO STEP - PART WINDING - STAR CONNECTED MOTORS

Type and Cat. No.	Max. H.P. Ratings 3 Phase, 60 Cycles		NEMA Size	① Price						Dimensions in Inches		Space Factor
	208/220 Volts	440-550 Volts		CLASS I			CLASS II		Extra Space			
				Type A	Type B	Type C	Type B	Type C		W	H	
Non-Reversing 9832	15 ---	--- 20	1PW	\$561. 550.	\$621. 610.	\$701. 690.	\$683. 671.	\$763. 751.	\$160.	20	28	2
	30 ---	--- 50	2PW	805. 785.	871. 851.	971. 951.	958. 936.	1058. 1036.	240.	20	42	3
	60 ---	--- 100	3PW	1282. 1132.	1358. 1208.	1478. 1328.	1494. 1329.	1614. 1449.	320.	20	56	4
	100 ---	--- 200	4PW	② 2166. ② 1984.	② 2292. ② 2110.	② 2412. ② 2230.	② 2521. ② 2321.	② 2641. ② 2441.	400.	20	70	5

FULL VOLTAGE - NON-REVERSING TWO-SPEED

Type and Cat. No.	Max. H.P. Ratings				NEMA Size	① Price						Dimensions in Inches		Space Factor
	Constant or Variable Torque		Constant Horsepower			CLASS I			CLASS II		Extra Space			
	208/- 220V	440- 550V	208/- 220V	440- 550V		Type A	Type B	Type C	Type B	Type C				
	W	H												
Separate Winding Type Motors 9852	7½	10	5	5	1	\$433.	\$493.	\$573.	\$542.	\$622.	\$160.	20	28	2
	15 ---	--- 25	10 ---	--- 20	2	578. 568.	644. 634.	744. 734.	708. 697.	808. 797.	160.	20	28	2
	30 ---	--- 50	20 ---	--- 40	3	882. 823.	958. 899.	1078. 1019.	1054. 989.	1174. 1109.	240.	20	42	3
	50 ---	--- 100	30 ---	--- 60	4	1613. 1559.	② 1739. ② 1685.	② 1859. ② 1805.	② 1913. ② 1854.	② 2033. ② 1974.	400.	20	56	4
Recon- nectable Winding Type Motors 9862	7½	10	5	5	1	\$475.	\$535.	\$615.	\$589.	\$669.	\$160.	20	28	2
	15 ---	--- 25	10 ---	--- 20	2	658. 648.	724. 714.	824. 814.	796. 785.	896. 885.	160.	20	28	2
	30 ---	--- 50	20 ---	--- 40	3	990. 931.	1066. 1007.	1186. 1127.	1173. 1108.	1293. 1228.	240.	20	42	3
	50 ---	--- 100	30 ---	--- 60	4	1977. 1923.	② 2103. ② 2049.	② 2223. ② 2169.	② 2313. ② 2254.	② 2433. ② 2374.	400.	20	70	5

① Prices do not include fuses. Select fuse size from actual motor current and Article 430 of N.E.C.

② Load terminals not provided.

③ Stationary unit, not plug-in.

DISCOUNT SCHEDULE ICD-2

CUTLER-HAMMER

243

MOTOR CONTROL:
CENTERS
- UNITROL®

DC MOTOR CONTROL

MOTOR CONTROL
FOR
SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

HEATER COILS
FOR
OVERLOAD RELAYS

WOUND ROTOR,
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL

A-C MOTOR CONTROL CENTERS—UNITROL®



3 Pole Combination Starters with Circuit Breakers

WHEN ORDERING SPECIFY

- Class of construction and type of wiring
- Motor control center layout
- Catalog number, voltage frequency and horsepower of individual units
- Heater coils for individual units, see index page 281.

CONTROL CENTER Layout

A convenient printed form for preparing motor control center layouts and presenting ordering information may be obtained from your Cutler-Hammer office.

(For checking list, see page 248.)

SINGLE SPEED

Type and Cat. No.	Maximum H.P. Ratings 3 Phase, 60 Cycles		NEMA Size	Circuit Breaker Type	Price						Dimensions in Inches		Space Factor
	208/220 Volts	440-550 Volts			CLASS I			CLASS II		Extra Space			
					Type A	Type B	Type C	Type B	Type C				
FULL VOLTAGE													
Non-Reversing 9818	7½	10	1	F, FA or EH ①	\$248.	\$282.	\$327.	\$310.	\$355.	\$80.	20	9½ or 14	1
	15	25	2	F	308.	344.	399.	378.	433.	80.	20	14	1
	30	50	3	F	477.	519.	594.	571.	646.	160.	20	18½ or 28	2
	50	100	4	JA or KA	911.	② 987.	② 1062.	② 1086.	② 1161.	160.	20	28	2
	100	200	① 5	LA	1846.	② 1926.	② 2001.	② 2119.	② 2194.	240.	20	42	3
	200	400	① 6	MA	3177.	② 3323.	② 3443.	② 3655.	② 3775.	400.	30	70	5
Reversing 9828	7½	10	1	F, FA or EH	\$387.	\$431.	\$506.	\$474.	\$549.	\$160.	20	18½ or 28	2
	15	25	2	F	509.	555.	640.	611.	696.	160.	20	28	2
	30	50	3	F	744.	796.	891.	876.	971.	240.	20	42	3
	50	100	4	JA or KA	1427.	② 1513.	② 1608.	② 1664.	② 1759.	320.	20	42	3
	100	200	① 5	LA	2674.	② 2764.	② 2859.	② 3031.	② 3126.	320.	20	70	5
REDUCED VOLTAGE—TWO STEP—PART WINDING—STAR CONNECTED MOTORS													
Non-Reversing 9836	15	20	1PW	F	\$594.	\$654.	\$734.	\$719.	\$799.	\$160.	20	28	2
	30	50	2PW	F	788.	854.	954.	939.	1039.	240.	20	28	2
	60	100	3PW	JA or KA	1166.	1242.	1362.	1366.	1486.	320.	20	42	3
	100	200	4PW	LA	2096.	① 2222.	① 2342.	① 2444.	① 2564.	400.	20	56	4
REDUCED VOLTAGE—AUTO TRANSFORMER TYPE													
Non-Reversing Closed Transition 9838	15	25	2	F	\$1027.	\$1069.	\$1144.	\$1176.	\$1251.	\$320.	20	42	3
	25	---	---	---	1127.	1169.	1244.	1286.	1361.	320.	20	56	4
	30	30	3	F	1170.	1212.	1287.	1333.	1408.	320.	20	56	4
	---	50	---	---	1194.	1236.	1311.	1360.	1435.	320.	20	56	4
	50	---	① 4	JA or KA	2029.	② 2105.	② 2180.	② 2316.	② 2391.	400.	20	70	5
	---	100	---	---	2053.	② 2129.	② 2204.	② 2342.	② 2417.	400.	20	70	5
	75	---	---	---	3184.	② 3264.	② 3339.	② 3590.	② 3665.	400.	30	70	5
	100	---	① 5	LA	3340.	② 3420.	② 3495.	② 3762.	② 3837.	400.	30	70	5
	---	150	---	3256.	② 3336.	② 3411.	② 3670.	② 3745.	400.				
	---	200	---	3534.	② 3614.	② 3689.	② 3975.	② 4050.	400.				

TWO SPEED - FULL VOLTAGE NON-REVERSING

Type and Cat. No.	Max. H.P. Ratings 3 Ph. 60 Cy.				NEMA Size	Circuit Breaker Type	Price						Dimensions in Inches		Space Factor
	Constant or Variable Torque		Constant Horsepower				Class I			Class II		Extra Space			
	208/220 Volts	440-550 Volts	208/220 Volts	440-550 Volts			Type A	Type B	Type C	Type B	Type C				
	W	H													
Separate Winding Type Motors 9857	7½	10	3	5	1	F	\$464.	\$524.	\$604.	\$576.	\$656.	\$160.	20	28	2
	15	25	10	20	2	F	601.	667.	767.	734.	834.	160.	20	28	2
	30	50	20	40	3	F	826.	902.	1022.	992.	1112.	240.	20	42	3
	50	100	30	60	4	JA or KA	1593.	② 1719.	② 1839.	② 1891.	② 2011.	400.	20	42	3
	100	200	75	150	① 5	LA	3107.	② 3241.	② 3361.	② 3564.	② 3685.	400.	20	70	5
Reconnectable Winding Type Motors 9866	7½	10	3	5	1	F	\$506.	\$566.	\$646.	\$623.	\$703.	\$160.	20	28	2
	15	25	10	20	2	F	681.	747.	847.	822.	922.	160.	20	28	2
	30	50	20	40	3	F	934.	1010.	1130.	1111.	1231.	240.	20	42	3
	50	100	30	60	4	JA or KA	1957.	② 2083.	② 2203.	② 2291.	② 2411.	400.	20	56	4
	100	200	75	150	① 5	LA	3496.	② 3632.	② 3752.	② 3995.	② 4115.	400.	30	70	5

① Stationary units, not plug-in type.

② Load terminal blocks not provided.

③ Type EH circuit breaker in 480 volts max.; type FA circuit breaker magnetic trip only



A-C MOTOR CONTROL CENTERS—UNITROL®

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OPTIONAL FEATURES

1—SINGLE PHASE TRANSFORMER—(See Note) ② ③

④ VA Rating	Price	Space Required			Space Factor	Recommended Size of Primary Circuit Breaker Trip Amps.	
	60 Cycles						
	Type A, B & C	Width Inches	Height Inches	Depth Inches		220 Volts	440 Volts
200	\$162.	20	14	10	1	15	15
300	173.	20	14	10	1	15	15
500	179.	20	14	10	1	15	15
750	185.	20	14	10	1	15	15
1000	191.	20	14	10	1	15	15
1500	201.	20	14	10	1	15	15
2000	215.	20	14	10	1	15	15
3000	234.	20	14	10	1	20	15
5000	361.	20	14	20	1	30	15
7500	408.	20	14	20	1	50	25
10000	525.	20	14	20	1	70	30
15000	674.	20	28	20	2	90	50
25000	931.	20	28	20	2	150	90

NOTE—When used as common control transformer adding Electrical Interlock on Disconnect Device is recommended.

- ② Single phase transformers—240 or 480 volts two wire primary, 115 volts two wire or 115/230 volts 3 wire secondary.
- ③ Three phase transformers—440 volts or 550 volts primary, 120/208 volts secondary.
- ④ Transformers from 2000 VA size and up to 25000 VA will be mounted in bottom unit space of sections only because of weight.
- ⑤ Lighting panelboard prices apply to types A-B-C—Price does not include wiring to terminal boards—incoming connections only included as lugs on mains.
- ⑥ Transformers requiring primary protection such as 2 pole fusible disconnect or circuit breaker—Select from 9804 or 9808.

2—THREE PHASE TRANSFORMERS ③ ③

④ VA Rating	Price	Space Required			Space Factor	Recommended Size of Primary Circuit Breaker Trip Amps.	
	60 Cycles						
	Type A, B & C	Width Inches	Height Inches	Depth Inches		220 Volts	440 Volts
6000	\$580.	20	28	20	2	20	15
9000	629.	20	28	20	2	40	20
15000	779.	20	28	20	2	50	30
20000	887.	---	---	---	3	70	40
25000	959.	---	---	---	3	100	50
30000	1053.	---	---	---	3	100	50
37500	1247.	---	---	---	3	150	70
45000	1376.	---	---	---	4	200	100
50000	1517.	---	---	---	4	225	100

3—LIGHTING PANELBOARDS—SAFETYBREAKER TYPE 115/230 V., 3 Phase 3 Wire or 3 Phase 4 Wire

No. of Single Pole Circuits	⑤ Price	Space Required			Space Factor
		Width Inches	Height Inches	Depth Inches	
6	\$143.	20	9½ or 14	10	1
12	262.	20	18½ or 14	10	1
18	298.	20	18½ or 28	10	2
24	335.	20	28	10	2
30	372.	20	28	10	2

NOTE—15 to 50 amps in single pole—15-70 amps in 2 pole. 2 Pole may be substituted for 2-single pole.

Item	Applying to Unitrol Types	Description	Price Additions				
			NEMA Size				
			1	2	3	4	5
CONTROLLER							
4	All	Start-Stop Pushbutton in door.....	\$22.	\$22.	\$22.	\$22.	\$22.
5	All	Run-Off-Automatic 3 Position Pilot Switch in Door.....	22.	22.	22.	22.	22.
6	All	Indicating Light Mounted in Door—Includes Auxiliary Contact on Contactor if Required.....	27.	27.	27.	27.	27.
7	All	Forward-Reverse-Stop Pushbuttons in Door Bul. 9824-9828.....	45.	45.	45.	45.	45.
8	All	High-Low-Stop Pushbuttons in Door Bul. 9852-9862-9857-9866.....	45.	45.	45.	45.	45.
PANEL EQUIPMENT							
9	All	Control Circuit Transformer, 60 Cy. with Fused or Unfused Secondary.....	27.	38.	56.	68.	77.
① 10	Class I	Extra Auxiliary Contacts Norm. Open or Norm. Closed—Each	11.	11.	11.	11.	33.
	B	Extra Auxiliary Contacts Norm. Open or Norm. Closed—Each	21.	21.	21.	21.	43.
	C	Extra Auxiliary Contacts Norm. Open or Norm. Closed—Each	27.	27.	27.	27.	49.
11	Class II	Extra Auxiliary Contacts Norm. Open or Norm. Closed—Each	23.	23.	23.	23.	47.
	C	Extra Auxiliary Contacts Norm. Open or Norm. Closed—Each	29.	29.	29.	29.	53.
12	All	Auxiliary Contact for Fusible Motor Circuit Switch (Recommended when separate control is used).....	20.	20.	20.	20.	33.
13	All	Wiring to Common Control Circuit Transformer or for Separate Control Circuit, per Starter Unit (Recommend adding Electrical Interlock on Disconnect Device).....	10.	10.	10.	10.	10.
14	All	Fused Control Circuit (One or Two Fuses). Recommended where Separate Control or Single Control Transformer for Entire Center is Used (0-30 Amp.).....	22.	22.	22.	22.	22.
15	Class I	Control Relay Max. 4 Pole (One per Unit).....	51.	51.	51.	51.	51.
	B	Control Relay Max. 4 Pole (One per Unit).....	80.	80.	80.	80.	80.
	C	Control Relay Max. 4 Pole (One per Unit).....	115.	115.	115.	115.	115.
16	Class II	Control Relay Max. 4 Pole (One per Unit).....	88.	88.	88.	88.	88.
	C	Control Relay Max. 4 Pole (One per Unit).....	123.	123.	123.	123.	123.
17	All	3 Coil Overload Relay in Place of 2 Coil.....	4.	4.	4.	4.	40.
18	All	Omit 2 Coil Overload Relay.....	12.	20.	50.	80.	140.

- ① NEMA size 1 will accommodate 2 extra auxiliary contact units, either N.O., N.C. or combination N.O. and N.C. types. Where one N.O. and one N.C. auxiliary contact is required a combination type is used with both contacts on the same side of the line. NEMA sizes 2, 3, 4 and 5 will accommodate 3 extra auxiliary contacts, either N.O. or N.C.

DISCOUNT SCHEDULE ICD-2

Continued next page

CUTLER-HAMMER

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WOUND ROTOR,
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL

MOTOR CONTROL
CENTERS
—UNITROL®

DC MOTOR CONTROL

MOTOR CONTROL
FOR
SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

HEATER COILS
FOR
OVERLOAD RELAYS

A-C MOTOR CONTROL CENTERS—UNITROL®



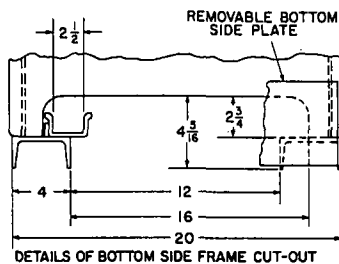
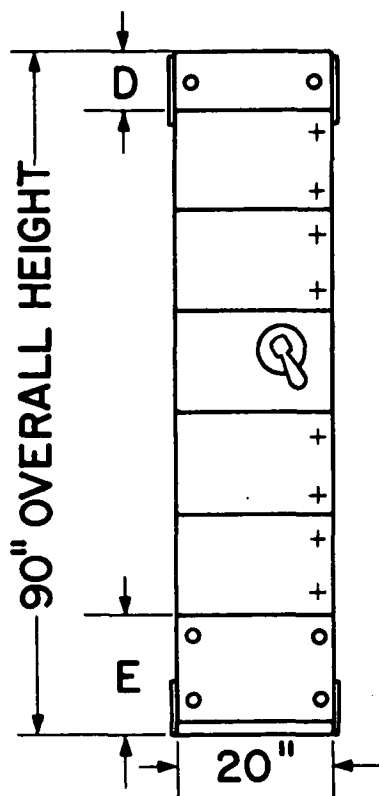
OPTIONAL FEATURES (Continued)

Item	Applying to Unitrol Types	Description																																		
19	Class I A B C	Pneumatic Timer (One per Unit) with Timed Contact Only..... \$ 84. Pneumatic Timer (One per Unit) with Timed Contact Only..... 104. Pneumatic Timer (One per Unit) with Timed Contact Only..... 124.																																		
20	Class II B C	Pneumatic Timer (One per Unit) with Timed Contact Only..... 114. Pneumatic Timer (One per Unit) with Timed Contact Only..... 134.																																		
21	Class I A B C	Pneumatic Timer (One per Unit) with Timed Contact & Instantaneous Interlock..... 95. Pneumatic Timer (One per Unit) with Timed Contact & Instantaneous Interlock..... 125. Pneumatic Timer (One per Unit) with Timed Contact & Instantaneous Interlock..... 151.																																		
22	Class II B C	Pneumatic Timer (One per Unit) with Timed Contact and Instantaneous Interlock..... 154. Pneumatic Timer (One per Unit) with Timed Contact and Instantaneous Interlock..... 180.																																		
CIRCUIT BREAKERS																																				
23	All	Dual Mounting—Two Circuit Breakers of 50 or 100 Amp. Rating Mounted Side by Side on one Unit Panel: Add Prices of Individual Breakers and deduct \$80.																																		
24	All	Single Pole Electrical Interlock for All Sizes of Circuit Breakers (Recommend when Separate Control is Used)..... 29.																																		
25	Class I A B C	Shunt Trip on Circuit Breaker, All Sizes..... 79. Shunt Trip on Circuit Breaker, All Sizes..... 90. Shunt Trip on Circuit Breaker, All Sizes..... 99.																																		
26	Class II B C	Shunt Trip on Circuit Breaker, All Sizes..... 90. Shunt Trip on Circuit Breaker, All Sizes..... 99.																																		
27	All	Non-Automatic Circuit Breaker..... No Deduction																																		
28	All	Large Air Circuit Breakers in Unitrol Construction, Stationary Type 3 Pole																																		
<table><tr><th rowspan="2">Max. Amp. Rating</th><th colspan="2">Interrupting Capacity in Amperes</th><th rowspan="2">SWBD. Type</th><th colspan="2">① Wiring A, B or C</th><th colspan="3">Space Required</th></tr><tr><th>240 Volts</th><th>480 Volts</th><th>Manual</th><th>Electrical</th><th>Width Inches</th><th>Height Inches</th><th>Depth Inches</th></tr><tr><td>600</td><td>50,000</td><td>35,000</td><td>KB</td><td>\$1587.</td><td>\$1947.</td><td>30</td><td>70</td><td>20</td></tr><tr><td>1600</td><td>75,000</td><td>60,000</td><td>KC</td><td>3359.</td><td>4199.</td><td>30</td><td>70</td><td>30</td></tr></table>			Max. Amp. Rating	Interrupting Capacity in Amperes		SWBD. Type	① Wiring A, B or C		Space Required			240 Volts	480 Volts	Manual	Electrical	Width Inches	Height Inches	Depth Inches	600	50,000	35,000	KB	\$1587.	\$1947.	30	70	20	1600	75,000	60,000	KC	3359.	4199.	30	70	30
Max. Amp. Rating	Interrupting Capacity in Amperes			SWBD. Type	① Wiring A, B or C		Space Required																													
	240 Volts	480 Volts	Manual		Electrical	Width Inches	Height Inches	Depth Inches																												
600	50,000	35,000	KB	\$1587.	\$1947.	30	70	20																												
1600	75,000	60,000	KC	3359.	4199.	30	70	30																												
METERING																																				
29	All	Ammeter—Panel type self contained (No current transformer) 0-100A or 5A movement requiring current transformer \$116.																																		
30	All	Current transformer if required for 5A movement panel type ammeter 82.																																		
31	All	Voltmeter—Panel type—600 volts maximum 118.																																		
32	All	Ammeter or Voltmeter switch (10260 type) 93.																																		
33	All	Elapsed time meter 135.																																		
NOTE: Metering may require additional space.																																				
BUS BAR																																				
34	All	Vertical and Horizontal bus bars are braced for 25,000A. RMS fault currents. For 50,000A. RMS bus bracing Per Unit 8.																																		
35	All	Ground bus Per Unit 3.																																		
36	All	Plated bus joints—When specified N/C																																		
37	All	Oversize bus bar—Horizontal bus bar will be sized in accordance with the load (600A. minimum). 800A. total capacity Per Unit 4. 1000A. total capacity Per Unit 8. 1200A. total capacity Per Unit 10. NOTE: Additions ONLY when capacity of horizontal bus required is in excess of loading.																																		
SPECIAL SERVICE ENCLOSURES																																				
38	All	NEMA 3 Weather Resistant: Non-walk-in Per space factor 120. Minimum per Control Center—\$600.00 Walk-in (Including inside light and switch) Per space factor 140. Minimum per Control Center—\$2000.00																																		
39	All	NEMA 5-12 Dusttight Per space factor 100. Minimum per Control Center—\$500.00																																		
40	All	Automotive Type (All removable plates and doors gasketed neoprene—Oiltight control units—Bottom plates if required) Per space factor 20. Minimum per Control Center—\$100.00																																		
INCOMING CABLE OR BUS DUCT ENTRY PROVISIONS																																				
41	All	Line connection lugs, when specified, on incoming terminal board. May require blank unit or space to rear of unit N/C																																		
42	All	Top conduit entry box with vertical stubs and lugs from main bus bars 100.																																		
43	All	10" width conduit entry section full height with main bus bars terminated in section and lugs. Top or bottom entry 242.																																		
44	All	20" width conduit entry section full height with downward extension of main bus bars with lugs 363.																																		
45	All	Provision for connection to busway (Uni-bus®)—May require external conduit entry box 242.																																		

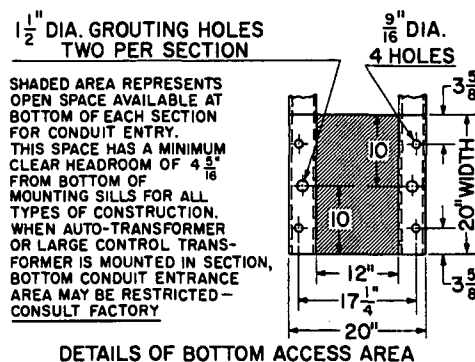
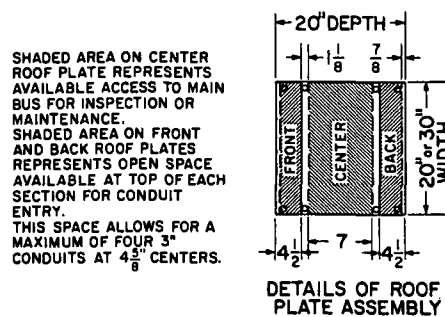
① When total load exceeds 1000 amps. recommend Circuit Breaker Bus at center of Unitrol to divide load.

DISCOUNT SCHEDULE ICD-2

APPROXIMATE DIMENSIONS AND GENERAL LAYOUT—20" Depth Only

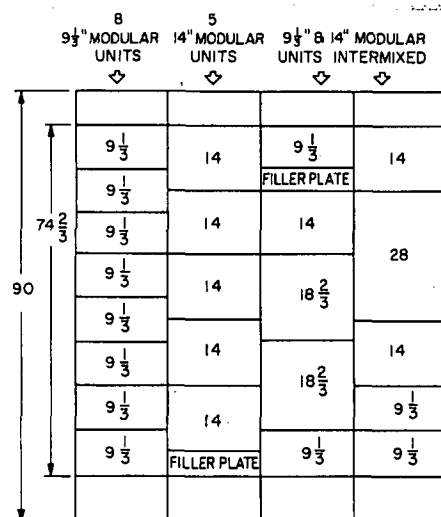
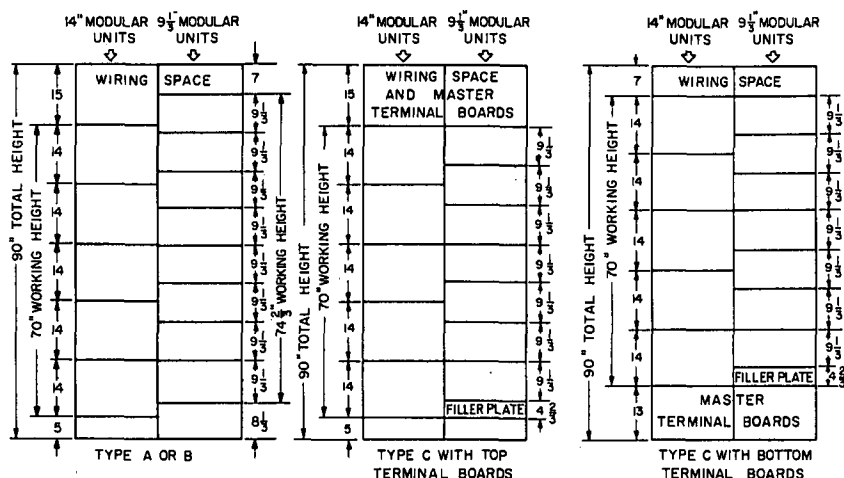


Dimension in Inches		
Type of Control Center	D	E
Type A & B—9½" Modular	7	8½
Type A & B—14" Modular Wiring Space At Top	15	5
Type A & B—14" Modular Wiring Space At Bottom	7	13
Type C—Boards At Top	15	5
Type C—Boards At Bottom	7	13



HOW TO LAYOUT A UNITROL—15" or 20" Depth Only

UNITROL LAYOUT SKETCHES WITH HORIZONTAL LINES
INDICATING PERMITTED LOCATIONS FOR BOTTOMS OF UNITS



Draw a simple layout as above or use a printed form available from your Cutler-Hammer office. Intermixing of standard 14 inch modules and 9½ inch modules is allowed, but the bottom of a unit must always fall on a dimension center line as shown in the sketches above. Individual unit dimensions are shown in pricing tables. When an incoming line breaker is used it should be located in the top of the incoming line section.

**WOUND ROTOR,
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL**

**MOTOR CONTROL
CENTERS
—UNITROL®**

DC MOTOR CONTROL

**MOTOR CONTROL
FOR
SPECIFIC APPLICATIONS**

**MOTOR & WIRE
RATING DATA**

HEATER COILS FOR OVERLOAD RELAYS



ORDERING INFORMATION

Complete and accurate ordering information is essential. Clear and complete information saves time, and eliminates costly mistakes and misunderstanding. It assures the job will arrive at the site as specified. A little time in the beginning making sure that all information is included, will save much time and cost at a later date.

Many things which are not in the original specifications must be included with the order to obtain a properly engineered motor control.

Data for Each Motor Starter Unit

Motor Horsepower_____

Full Load Amps_____

Volts, Phase, Frequency_____

Fuse Clip Sizes or Circuit
Breaker Trip Element Sizes_____

Nameplate Nomenclature for each Unit_____

Data for General Construction and Wiring

a. Incoming Feeder

Cable Size_____No. per phase_____Entry Section No._____

☐ Not Specified☐ Bottom Entry☐ Top Entry☐ Entry Option No._____

b. Main Disconnect

☐ None Required☐ Circuit Breaker

_____Frame

_____Trip Amps

☐ Fused Disconnect☐ NEC Fuses☐ Current Fuses☐ Type 4 Clips☐ Type 5 Clips

c. Main Bus

_____Silver Plate (1/4" x 2"—600 Amp., Nominal Size)

☐ Bus Capacity

Sufficient for Load

☐ Brace for 50,000-RMS

Amps Available Fault

Current

☐ 200 Amps extra capacity
above nominal☐ 400 Amps extra capacity
above nominal☐ 600 Amps extra capacity
above nominal

d. Vertical Bus

☐ Standard, Not
insulated☐ Insulated

e. Ground Bus

☐ None Required☐ 1/2" x 1"

_____Special Size

f. Control Circuits

Control Volts_____

☐ Common Control

(Control voltage

same as line voltage)

☐ One Control Fuse☐ Two Control Fuses☐ Individual Control Circuit

Transformers

☐ Group Control

Transformer

f. Control Circuits (continued)

☐ Separate Control☐ Interlock on dis-
connect to open
control circuit.☐ Not Required(Recommended when
separate and/or group
control is used)

g. Combination Starter Fuse Clips for:

☐ NEC Fuses☐ Dual Element Fuses☐ Current Limiting
Fuses☐ Type 4 AMPTRAP☐ Other_____

i. Supply

_____Volts, _____Phase, _____Cycles

j. Construction:

☐ NEMA Class I☐ NEMA Class II

k. Enclosure:

☐ NEMA I General
Purpose☐ NEMA V—XII Dust-
tight☐ Automotive☐ NEMA III Weather
Resistant☐ Walk in☐ Non walk in

l. Arrangement:

☐ Straight☐ L Shaped☐ U Shaped☐ Accessible From Rear☐ Not Accessible From
Rear

m. Finish:

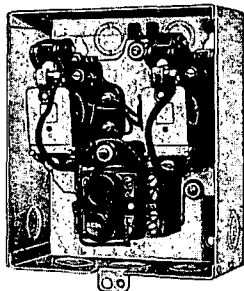
☐ Standard ASA #49 (Medium Light Grey, Bond-
erized, Baked Enamel)☐ Special Finish—ASA #_____Primer_____A Layout Showing Preferred Location and Sizes of Units
Diagram

Showing required electrical circuitry (if other than
standard wiring as illustrated under unit description.)

Detailed Information on any other Special Units or
Features Required.

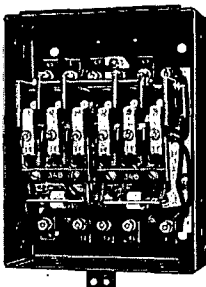
General Description

Full Voltage—Magnetic Non-Reversing—Constant Speed



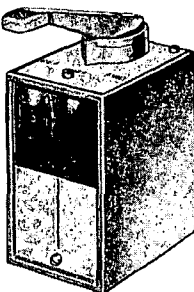
—For series, shunt or compound wound motors—Two pole contactor—Operating coil with protective resistance unit for continuous duty—Two or three wire control—Single coil overload relay—Reset button only or Start-Stop pushbuttons in cover—Nema type 1, 4, 5, 7, 9 and 12 enclosed or open type.

Full Voltage—Magnetic Reversing—Constant Speed—For



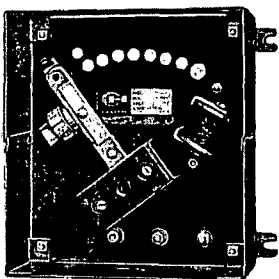
series, shunt or compound wound motors—Two contactors mechanically interlocked—Operating coils with protective resistance units for continuous duty service—Two or three wire control—With and without overload relay—Nema type 1 enclosed or open type.

Full Voltage—Manual Reversing Drum Switch—Constant Speed—Size DRO and DRI, choice of



operators, large or small lever, knob or adjustable lever—360° positioning of operator in 22½° increments—On the job convertible from maintained to momentary operation. Size 2, ball type operating lever—60° throw from "Off" position—Maintained or momentary operation. All Sizes, Nema type 1 surface mounted or oil tight cavity mounting.

Reduced Voltage—Manual Non-Reversing—Constant

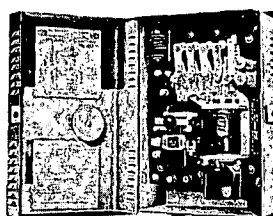


Speed—Face plate construction—Standard duty with starting resistor class AS115—Heavy duty with starting resistor class AS133-134-135—For series, shunt or compound wound motors—Moving operating lever to right cuts out successive steps of armature resistance—At extreme right hand position lever is held by electro-magnet—Low voltage protection.

This Section Contains:

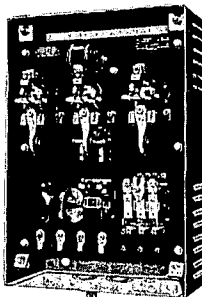
	Page
FULL VOLTAGE	
Magnetic Non-Reversing—Constant Speed	250
Magnetic Reversing—Constant Speed	250
Manual Reversing Drum Switch—Constant Speed	251
REDUCED VOLTAGE	
Manual Non-Reversing—Constant Speed	251-252
Magnetic Non-Reversing—Constant Speed	252
Magnetic Reversing and Non-Reversing—Constant Speed (Heavy Duty)	253
Magnetic Reversing and Non-Reversing—Adjustable Speed (Heavy Duty)	254
Field Rheostats	256

Reduced Voltage—Magnetic Non-Reversing—Constant



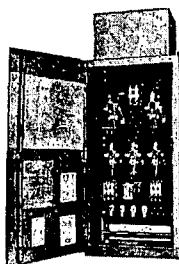
Speed—General purpose with starting resistor class AS115—Multi-fingered accelerating contactor cuts out starting resistance in armature circuit—Time limit acceleration by oil dashpot—Adjustable timing—Adjustable thermal overload relay—Nema type 1, 4, 5 or 7 enclosed.

Reduced Voltage—Magnetic Reversing and Non-Reversing—Constant Speed—Heavy duty



with starting resistor class AS136—Main line, reversing and accelerating contactors—Definite timed accelerating with timing relay—Time period for each acceleration step is adjustable—Field discharge resistor—Two or three wire control—Thermal overload relay—Nema type 1 enclosed.

Reduced Voltage—Magnetic Reversing and Non-Reversing—Adjustable Speed—Heavy



duty with starting resistor class AS135—Main line, reversing and accelerating contactors—Definite time acceleration with timing relay—Time period for each accelerating step is adjustable—Field discharge resistor—Speed control from separately mounted field rheostat—Two or three wire control—Thermal overload relay—NEMA type 1 enclosed.

D-C MOTOR CONTROL

Full Voltage — Magnetic — Constant Speed



WHEN ORDERING SPECIFY • Catalog number • Heater coil number
 NON-REVERSING — With One Coil Overload Relay

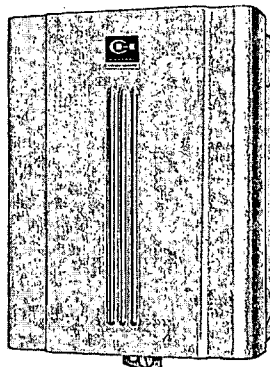
Max. Hp.	Volt- age	General Purpose NEMA 1		Watertight NEMA 4		Dusttight — Industrial NEMA 5-12		Hazardous Gas NEMA 7-D		Hazardous Dust NEMA 9-EFG		Open Type	
		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
FOR REMOTE CONTROL — RESET ONLY													
1½ 2	120	6101- H17	\$62.	6101- H21	\$104.	6101- W1	\$104.	6101- W2	\$172.	6101- W3	\$104.	6101- W4	\$58.
	240	H18	62.	H22	104.	W5	104.	W6	172.	W7	104.	W8	58.
COVER CONTROL — START, STOP PUSHBUTTONS IN COVER													
1½ 2	120	H19	66.	H23	139.	W9	139.	—	—	W10	139.	W11	62.
	240	H20	66.	H24	139.	W12	139.	—	—	W13	139.	W14	62.

Prices include necessary heater coils at \$1.50 each.

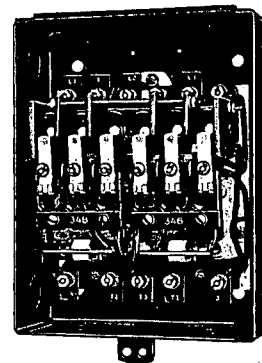
REVERSING — For Remote Control

Max. Hp.	Volt- age	General Purpose Enclosure NEMA 1		Open Type	
		Cat. No.	Price	Cat. No.	Price
WITH ONE COIL OVERLOAD RELAY					
1	120	6103- H69	\$110.	6103- H67	\$104.
1	240	H70	110.	H68	104.
1½	120	H77	124.	H75	117.
2	240	H78	124.	H76	117.
WITHOUT OVERLOAD RELAY					
1	120	H71	99.	H91	93.
1	240	H72	99.	H92	93.
1½	120	H79	117.	H93	110.
2	240	H80	117.	H94	110.

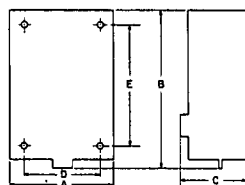
Prices include necessary heater coils at \$1.50 each.



Size 00 Reverser Without Overload Relay



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Enclosure	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting		
				D	E	
NON-REVERSING						
NEMA 1	7 1/4	9	4 1/4	4 1/4	6 1/4	10
NEMA 4-5-9	9 1/4	11 1/4	8 1/4	6 1/4	10 1/4	45
NEMA 7	10 1/4	12 1/4	7 1/4	5 1/4	11 1/4	55
REVERSING						
Open	6	8 1/4	4 1/4	5 1/4	8 1/4	10
Enclosed	7 1/4	11 1/4	5	5 1/4	9 1/4	12

⊕ This dimension is 8" with overload relay.

HEATER COILS for average D-c motors.

Horsepower	Catalog Number	
	120 V.	240 V.
1/4	9104-H1346	9104-H1342
1/2	H1352	H1345
3/4	H1355	H1348
1	H1362	H1355
1 1/2	H1366	H1358
2	H1369	H1361
	H1373	H1365
		H1368

For more accurate selection, select heater coil by full load current. See index on page 282.

Full Voltage — Manual — Constant Speed

WHEN ORDERING SPECIFY • Catalog number • Heater coil number

FULL VOLTAGE — NON REVERSING

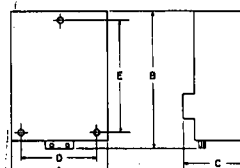
Horse-power	Size	Type of Enclosure					
		NEMA 1		Open with Std. Pushbutton		Open with Long Pushbutton	
		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
120 V.	240 V.						
1	1 1/2	0					
1 1/2	2	1					
		9115-H191	\$20.	9115-H189	\$18.	9115-H190	\$18.
		H194	25.	H192	23.	H193	23.

Price includes heater coil. \$1.50.



APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Dimensions in Inches					Ship. Wt. Lbs.
Wide A	High B	Deep C	Mounting		
			D	E	
4½	8½	4½	3½	6½	5½



HEATER COILS for average D-c motors.

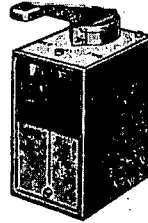
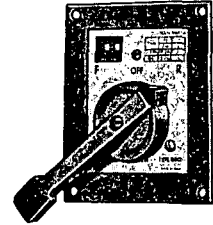
Horse-power	Catalog Number	
	120 V.	240 V.
1/4	10177-H1031	10177-H1026
1/2	H1034	H1028
1	H1036	H1030
1 1/2	H1039	H1033
2	---	H1035

For more accurate selection, select heater coil by full load current. See index on page 282.

**D-C MOTOR CONTROL****Full Voltage Manual Reversing Drum Switch—Constant Speed**

WHEN ORDERING SPECIFY

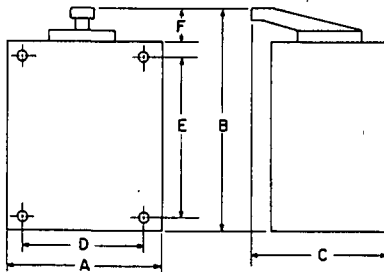
- Catalog number

Surface Mounting
Size DR 1Cavity Mounting
Standard Lever

Maximum Horsepower		Size	Type of Operation	Surface Mounted—General Purpose NEMA 1—Enclosure						Oiltight Cavity Mounting					
				Lever		Knob		Adjustable Lever		Lever		Knob		Adjustable Lever	
				Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
120 V.	240 V.														
1/4	1/4	DR 0	Maintained—Convertible to Momentary	9441-H268	\$11.	9441-H269	\$11.	9441-H270	\$11.	9441-H274	\$15.	9441-H275	\$15.	9441-W6	\$15.
1/4	1/4	DR 0	Maintained "Forward"—Momentary "Reverse" ②	H271	11.	H272	11.	H273	11.	H276	15.	H277	15.	W8	15.
3	5	DR 1	Maintained—Convertible to Momentary	H284	30.	H285	30.	W5	30.	H286	34.	H287	34.	W7	34.
5	10	2	Maintained	H211	96.	---	---	---	---	H214	106.	---	---	---	---
			Momentary	H212	96.	---	---	---	---	H215	106.	---	---	---	---

① Applications above 2 H.P. require a ballast resistor. For ballast resistor, class AS-136, size DR-1 add \$31; size 2 add \$42.

② Convertible to Momentary "Forward"—Maintained "Reverse".

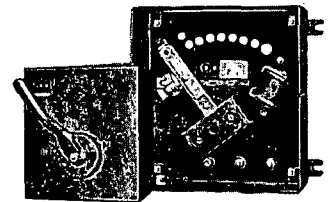
APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Size	Operator	Surface Mounting						Cavity Mounting					
		Dimensions in Inches						Dimensions in Inches					
		Wide A	High B	Deep C	Mounting		Ship. Wt. Lbs.	Wide A	High B	Deep C	Mounting		Ship. Wt. Lbs.
DR 0	Standard Lever	2 1/2	5 1/2	4	2	2 1/4	3	4	4 1/2	5	3 1/2	4	3
DR 0	Knob	2 1/2	5 1/2	3	2	2 1/4	3	4	4 1/2	4 1/2	3 1/2	4	3
DR 0	Adjust. Lever	2 1/2	5 1/2	4 1/4-6 1/4	2	2 1/4	3	4	4 1/2	5	3 1/2	4	3
DR 1	Standard Lever	3 3/8	6 1/2	5	2 3/8	2 3/4	4	4 1/2	5 1/2	5 1/4	4	4 1/2	4
DR 1	Knob	3 3/8	6 1/2	3 3/8	2 3/8	2 3/4	4	4 1/2	5 1/2	4 3/8	4	4 1/2	4
DR 1	Adjust. Lever	3 3/8	6 1/2	5	2 3/8	2 3/4	4	4 1/2	5 1/2	5 1/4	4	4 1/2	4
2	Standard Lever	5	8 1/2	5 1/2	4 3/8	4 1/4	25	5 1/2	6 1/2	8 1/2	5	5 1/2	25

Reduced Voltage Manual Non-Reversing Armature Resistor—Constant Speed

WHEN ORDERING SPECIFY

- Catalog number
- Type of motor (series, shunt or compound)
- Shunt field current or speed of motor



STANDARD DUTY—Resistor Class AS 115							STANDARD DUTY—Resistor Class AS 115						
Horse-power	Accelerating Points		120 Volts		240 Volts		Horse-power	Accelerating Points		120 Volts		240 Volts	
	120 V.	240 V.	Cat. No.	Price	Cat. No.	Price		120 V.	240 V.	Cat. No.	Price	Cat. No.	Price
¼	7	7	2111-H51	\$57.	2111-H64	\$57.	5	10	8	2111-H57	\$103.	2111-H69	\$103.
½	7	7	H52	57.	H65	57.	7½	10	10	H58	167.	H70	106.
1	7	7	H53	57.	H66	57.	10	10	10	H59	207.	H71	185.
2	8	8	H54	83.	H67	83.	15	10	10	H60	224.	H72	215.
3	8	8	H55	83.	H203	83.	20	10	10	H61	289.	H73	215.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

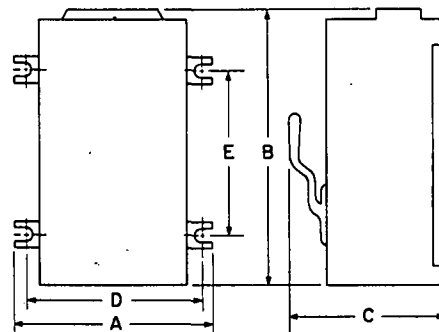
D-C MOTOR CONTROL



Reduced Voltage Manual Non-Reversing—Constant Speed

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Horsepower		Dimensions in Inches					Ship. Wt. Lbs.
		Wide A	High B	Deep C	Mounting		
					D	E	
120 V.	240 V.						
¼-1	½-1	8	8½	5½	7¾	5¾	11
1½-2	1½-2	9½	10¾	8	8¾	7¾	20
2½-3	2½-5	9½	10¾	8¾	8¾	7¾	20
5-7½	7½	14¼	15	10½	13¼	11¼	45
10-15	---	14¼	15	12¾	13¾	11¼	55
---	10-15	14¼	15	12¾	13¾	11¼	55
20	20	14¼	15	14½	13¾	11¾	90



Reduced Voltage Magnetic Non-Reversing—Constant Speed

WHEN ORDERING SPECIFY

- Catalog number
- Heater coil, see page 282.

WITH OVERLOAD RELAY

Resistor Class AS 115

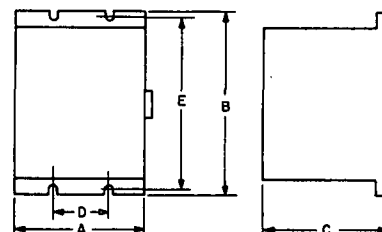
Max. Horsepower	Voltage	General Purpose NEMA 1		Watertight NEMA 4		Dusttight NEMA 5		Hazardous Gas NEMA 7-D	
		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
1	120	6106-H139	\$141.	6106-W1	\$317.	6106-W2	\$317.	6106-W3	\$409.
	240	H160	141.	W4	317.	W5	317.	W6	409.
1 1/2	120	H284	141.	W7	317.	W8	317.	W9	409.
	240	H295	141.	W10	317.	W11	317.	W12	409.
2	120	H140	141.	W13	317.	W14	317.	W15	409.
	240	H161	141.	W16	317.	W17	317.	W18	409.
3	120	H141	141.	W19	317.	W20	317.	W21	409.
	240	H162	141.	W22	317.	W23	317.	W24	409.
5	120	H143	256.	W25	432.	W26	432.	W27	524.
	240	H164	159.	W28	335.	W29	335.	W30	427.
7 1/2	240	H165	185.	W31	361.	W32	361.	W33	453.
	240	X-1	256.	W34	432.	W35	432.	W36	524.

Price includes Heater Coil at \$1.50.

① Drip proof hood \$33.—Omission of NEMA 1 enclosure \$9.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Horse- power	Voltage	Dimensions in Inches					Ship. Wt. Lbs.
		Wide A	High B	Deep C	Mounting		
					D	E	
1-5	120-240	10½	15	10%	5½	14	35
7½	240	10%	15	10%	5½	14	35
10	240	17½	26	14%	12	21½	70

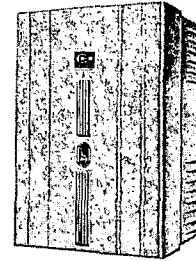
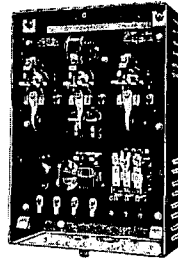


General Purpose Starter

DISCOUNT SCHEDULE 1 CD

**D-C MOTOR CONTROL****Reduced Voltage—Magnetic—Constant Speed****WHEN ORDERING SPECIFY**

- Catalog number
- Full load current
- Heater coil, see page 282.

Size 3 Controller
Type A1**WITH OVERLOAD RELAY —NEMA 1 enclosed—Heavy Duty ①**

Resistor Class AS 136

Max. Horse- power	Size	NEMA Recom- mended No. of Accel- erating Points	Pushbutton Master Type (Price does not include pushbutton station)												Drum Master Type			
			Type A1 Non-Reversing Without Dynamic Braking				Type A2 Non-Reversing With Dynamic Braking				Type A3 Reversing with Dynamic Braking				Type A4 Reversing with Dynamic Braking			
			Catalog Number			Price	Catalog Number			Price	Catalog Number			Price	Catalog Number			Price
			120V.	240V.	550V.		120V.	240V.	550V.		120V.	240V.	550V.		120V.	240V.	550V.	
1/2	1	2	6130- H144	6130- H149	---	\$258.	6130- H156	6130- H161	---	\$333.	6130- H168	6130- H173	---	\$559.	6130- W1	6130- W2	---	\$711.
1	1	2	H145	H150	---	258.	H157	H162	---	333.	H169	H174	---	559.	W3	W4	---	711.
1 1/2	1	2	H146	H151	---	258.	H158	H163	---	333.	H170	H175	---	559.	W5	W6	---	711.
2	1	2	H147	H152	---	258.	H159	H164	---	333.	H171	H176	---	559.	W7	W8	---	711.
3	1	2	---	H153	---	258.	---	H165	---	333.	---	H177	---	559.	---	W9	---	711.
3	1	2	H148	---	---	264.	H160	---	---	346.	H172	---	---	575.	W10	---	---	726.
5	1	2	---	H155	---	264.	---	H167	---	346.	---	H179	---	575.	---	W11	---	726.
5	1	2	---	---	W12	280.	---	---	W13	359.	---	---	W14	608.	---	---	W15	759.
5	2	3	H208	---	---	341.	H212	---	---	425.	H216	---	---	652.	W16	---	---	803.
7 1/2	2	3	---	H209	---	333.	---	H213	---	414.	---	H217	---	636.	---	W17	---	790.
7 1/2	2	3	---	---	W18	357.	---	---	W19	438.	---	---	W20	680.	---	---	W21	832.
7 1/2	3	3	H55	---	---	515.	H61	---	---	680.	H67	---	---	1136.	W22	---	---	1287.
10	2	3	---	H210	---	341.	---	H214	---	425.	---	H218	---	652.	---	W23	---	803.
10	2	3	---	---	W24	363.	---	---	W25	456.	---	---	W26	696.	---	---	W27	847.
10	3	3	H56	---	---	531.	H62	---	---	711.	H68	---	---	1166.	W28	---	---	1320.
15	2	3	---	---	W29	381.	---	---	W30	484.	---	---	W31	726.	---	---	W32	878.
15	3	3	---	H58	---	500.	---	H64	---	652.	---	H70	---	1105.	---	---	W33	1257.
15	4	3	H74	---	---	826.	H78	---	---	1100.	H82	---	---	1512.	---	W34	---	1650.
20	2	3	---	---	W35	293.	---	---	W36	515.	---	---	W37	755.	---	---	W38	909.
20	3	3	---	H59	---	515.	---	H65	---	680.	---	H71	---	1136.	---	W39	---	1287.
20	4	3	H120	---	---	854.	H122	---	---	1156.	H118	---	---	1567.	W40	---	---	1708.
25	3	3	---	H60	---	531.	---	H66	---	711.	---	H72	---	1166.	---	W41	---	1320.
25	3	3	---	---	W42	621.	---	---	W43	803.	---	---	W44	1314.	---	---	W45	1468.
25	5	4	H86	---	---	1294.	H94	---	---	1708.	H102	---	---	2310.	W46	---	---	2448.
30	3	3	---	---	W47	636.	---	---	W48	832.	---	---	W49	1347.	---	---	W50	1499.
30	4	3	---	H75	---	826.	---	H79	---	1100.	---	H83	---	1512.	---	W51	---	1650.
30	5	4	H87	---	---	1322.	H95	---	---	1762.	H103	---	---	2366.	W52	---	---	2504.
40	3	3	---	---	W53	663.	---	---	W54	891.	---	---	W55	1406.	---	---	W56	1558.
40	4	3	---	H121	---	854.	---	H123	---	1156.	---	H119	---	1567.	---	W57	---	1708.
40	5	4	W58	---	---	1362.	W59	---	---	1842.	W60	---	---	2448.	W61	---	---	2588.
50	3	3	---	---	W62	696.	---	---	W63	951.	---	---	W64	1468.	---	---	W65	1620.
50	5	4	---	H90	---	1294.	---	H98	---	1708.	---	H106	---	2310.	---	W66	---	2448.
50	6	4	W67	---	---	1926.	W68	---	---	2612.	W69	---	---	3714.	W70	---	---	3852.
60	4	4	---	---	W71	1016.	---	---	W72	1322.	---	---	W73	1816.	---	---	W74	1954.
60	5	4	---	H91	---	1322.	---	H99	---	1762.	---	H107	---	2366.	---	W75	---	2504.
60	6	4	W76	---	---	1994.	W77	---	---	2750.	W78	---	---	3850.	W79	---	---	3988.
75	4	4	---	---	W80	1060.	---	---	W81	1402.	---	---	W82	1896.	---	---	W83	2032.
75	5	4	---	H92	---	1362.	---	H100	---	1842.	---	H108	---	2448.	---	W84	---	2588.
75	6	4	W85	---	---	2064.	W86	---	---	2888.	W87	---	---	3988.	W88	---	---	4128.
100	5	5	---	---	W89	1526.	---	---	W90	2008.	---	---	W91	2696.	---	---	---	2834.
100	6	5	---	W92	---	1926.	---	W93	---	2612.	---	W94	---	3714.	---	W95	---	3852.
125	5	5	---	---	W96	1596.	---	---	W97	2148.	---	---	W98	2834.	---	---	W99	2972.
125	6	5	---	W100	---	1994.	---	W101	---	2750.	---	W102	---	3850.	---	W103	---	3988.
150	5	5	---	---	W104	1664.	---	---	W105	2282.	---	---	W106	2972.	---	---	W107	3110.
150	6	5	---	W108	---	2064.	---	W109	---	2888.	---	W110	---	3988.	---	W111	---	4128.

① Standard Bulletin 6130 controllers may be used with adjustable speed motors having a maximum speed range of not more than 2 to 1 by field weakening provided motor produces sufficient starting and accelerating torque under weakened field conditions. This practice is not recommended on heavy or high inertia load applications. Motor field rheostat prices are listed on page 256.

DIMENSIONS, page 255
DISCOUNT SCHEDULE 1 CD

SPECIAL FINISHES, page 256

OPTIONAL FEATURES, pages 255-256

CUTLER-HAMMER

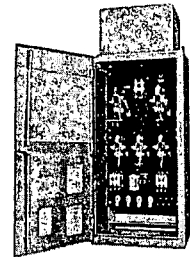
D-C MOTOR CONTROL



Reduced Voltage—Magnetic—Adjustable Speed

WHEN ORDERING SPECIFY

- Catalog number
- Full load current
- Normal speed of motor
- Heater coil, see page 282
- Maximum speed of motor
- Field resistance cold
- Field current at maximum speed
- Field Rheostat, see page 256



Size 5 Controller

WITH OVERLOAD RELAY—NEMA 1 enclosed—Heavy Duty

Resistor Class AS 135

Horse-power	Size	NEMA Recommended No. of Accelerating Points	Pushbutton Master Type (Price does not include pushbutton station)												Drum Master Type			
			Type B1 Non-Reversing Without Dynamic Braking				Type B2 Non-Reversing With Dynamic Braking				Type B3 Reversing with Dynamic Braking				Type B4 Reversing with Dynamic Braking			
			Catalog Number			Price	Catalog Number			Price	Catalog Number			Price	Catalog Number			Price
			120V.	240V.	550V.		120V.	240V.	550V.		120V.	240V.	550V.		120V.	240V.	550V.	
1/2	1	2	6230-H159	6230-H164	6230-...	\$341.	6230-H171	6230-H176	6230-...	\$416.	6230-H183	6230-H188	6230-...	\$645.	6230-W1	6230-W2	6230-...	\$797.
1	1	2	H160	H165	...	341.	H172	H177	...	416.	H184	H189	...	645.	W3	W4	...	797.
1 1/2	1	2	H161	H166	...	341.	H173	H178	...	416.	H185	H190	...	645.	W5	W6	...	797.
2	1	2	H162	H167	...	341.	H174	H179	...	416.	H186	H191	...	645.	W7	W8	...	797.
3	1	2	...	H168	...	341.	...	H180	...	416.	...	H192	...	645.	...	W9	...	797.
3	1	2	H163	...	...	348.	H175	...	...	432.	H187	...	...	658.	W10	...	...	812.
5	1	2	...	H170	...	348.	...	H182	...	432.	...	H194	...	658.	...	W11	...	812.
5	1	2	...	...	W12	363.	...	...	W13	443.	...	...	W14	693.	...	...	W15	845.
5	2	3	H44	...	...	493.	H48	...	...	577.	H52	...	...	803.	...	W16	...	957.
7 1/2	2	3	...	H45	...	480.	...	H49	...	566.	...	H53	...	790.	...	W17	...	942.
7 1/2	2	3	...	...	W18	509.	...	...	W19	590.	...	...	W20	832.	...	...	W21	986.
7 1/2	3	3	H55	...	...	669.	H61	...	...	832.	H67	...	...	1287.	...	W22	...	1441.
10	2	3	...	H46	...	493.	...	H50	...	577.	...	H54	...	803.	...	W23	...	957.
10	2	3	...	...	W24	515.	...	...	W25	608.	...	...	W26	847.	...	...	W27	999.
10	3	3	H56	...	...	682.	H62	...	...	865.	H68	...	...	1320.	...	W28	...	1472.
15	2	3	...	...	W29	533.	...	...	W30	636.	...	...	W31	878.	...	...	W32	1032.
15	3	3	...	H58	...	652.	...	H64	...	803.	...	H70	...	1257.	...	W33	...	1408.
15	4	3	H74	...	...	964.	H78	...	...	1238.	H82	...	...	1650.	...	W34	...	1790.
20	2	3	...	...	W35	546.	...	...	W36	669.	...	...	W37	909.	...	...	W38	1061.
20	3	3	...	H59	...	669.	...	H65	...	832.	...	H71	...	1287.	...	W39	...	1441.
20	4	3	H157	...	...	992.	H155	...	...	1294.	H153	...	...	1708.	...	W40	...	1846.
25	3	3	...	H60	...	682.	...	H66	...	865.	...	H72	...	1320.	...	W41	...	1472.
25	3	3	...	...	W42	773.	...	...	W43	957.	...	...	W44	1468.	...	...	W45	1620.
25	5	4	H86	...	...	1432.	H94	...	...	1846.	H102	...	...	2448.	...	W46	...	2588.
30	3	3	...	...	W47	790.	...	...	W48	986.	...	...	W49	1499.	...	...	W50	1650.
30	4	3	...	H75	...	964.	...	H79	...	1238.	...	H83	...	1650.	...	W51	...	1790.
30	5	4	H87	...	...	1460.	H95	...	...	1900.	H103	...	...	2504.	...	W52	...	2642.
40	3	3	...	...	W53	817.	...	...	W54	1043.	...	...	W55	1558.	...	...	W56	1712.
40	4	3	...	H158	...	992.	...	H156	...	1294.	...	H154	...	1708.	...	W57	...	1846.
40	5	4	W58	...	...	1500.	W59	...	...	1980.	W60	...	...	2588.	...	W61	...	2726.
50	3	3	...	...	W62	847.	...	...	W63	1105.	...	...	W64	1620.	...	...	W65	1771.
50	5	4	...	H90	...	1432.	...	H98	...	1846.	...	H106	...	2448.	...	W66	...	2588.
50	6	4	W67	...	...	2172.	W68	...	...	2858.	W69	...	...	3960.	...	W70	...	4098.
60	4	4	...	...	W71	1156.	...	...	W72	1460.	...	...	W73	1954.	...	...	W74	2092.
60	5	4	...	H91	...	1460.	...	H99	...	1900.	...	H107	...	2504.	...	W75	...	2642.
60	6	4	W76	...	...	2240.	W77	...	...	2996.	W78	...	...	4096.	...	W79	...	4236.
75	4	4	...	...	W80	1182.	...	...	W81	1540.	...	...	W82	2032.	...	...	W83	2174.
75	5	4	...	H92	...	1500.	...	W84	...	1980.	...	W85	...	2588.	...	W86	...	2726.
75	6	4	W87	...	...	2310.	W88	...	...	3136.	W89	...	...	4236.	...	...	...	4374.
100	5	5	...	...	W91	1664.	...	...	W92	2148.	...	...	W93	2934.	...	...	W94	2972.
100	6	5	...	W95	...	2172.	...	W96	...	2858.	...	W97	...	3960.	...	W98	...	4098.
125	5	5	...	...	W99	1734.	...	...	W100	2286.	...	...	W101	2972.	...	...	W102	3110.
125	6	5	...	W103	...	2240.	...	W104	...	2996.	...	W105	...	4096.	...	W106	...	4236.
150	5	5	...	...	W107	1802.	...	...	W108	2420.	...	...	W109	3110.	...	...	W110	3250.
150	6	5	...	W111	...	2310.	...	W112	...	3136.	...	W113	...	4236.	...	W114	...	4374.

SPECIAL FINISHES, page 256

DISCOUNT SCHEDULE 1 CD



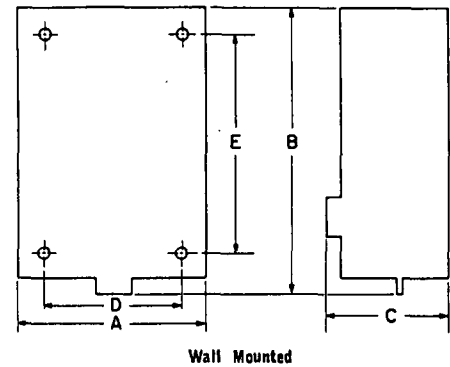
D-C MOTOR CONTROL

255

Reduced Voltage—Magnetic

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS—CONSTANT SPEED

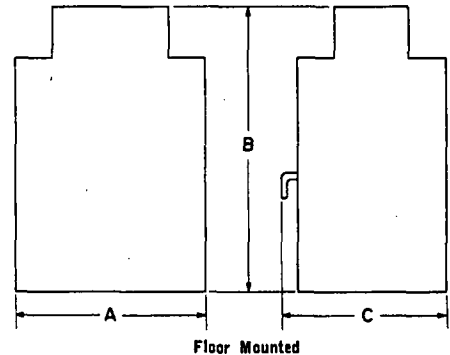
Size	Type of Con- troller	Maximum Horsepower			Dimensions in Inches					Ship. Wt. Lbs.
					Wide A	High B	Deep C	Mounting		
		120 V.	240 V.	550 V.				D	E	
1	A1	3	5	5	12½	21½	9¾	10	18	75
	A2				14¾	25½	9¾	12	22	80
	A3-A4				20¾	31½	9¾	18	28	120
2	A1	5	10	20	14¾	25½	9¾	12	22	75
	A2				14¾	25½	11½	12	22	80
	A3-A4				20¾	31½	11½	18	28	120
3	A1	10	25	50	17½	26	14¼	12	21½	150
	A2				17½	30	14¼	12	25½	190
	A3-A4				21½	34	14¼	16	29½	255
4	A1	20	40	75	17½	31	15¼	12	26½	210
	A2	20	---	---	21½	34	14¼	16	29½	235
	A2	---	40	75	24	62½	19¾	Floor	Mounting	235
	A3-A4	20	40	75	28	62¾	19¾	Floor	Mounting	600
5	A1	40	60	---	22	62½	19¾	Floor	Mounting	470
	A1	---	75	150	22	72¼	19¾	Floor	Mounting	540
	A2	30	---	---	24	62½	19¾	Floor	Mounting	580
	A2	40	75	150	24	72¼	19¾	Floor	Mounting	580
	A3	40	60	---	32	72¾	23¾	Floor	Mounting	700
	A3-A4	---	75	150	32	82¼	23¾	Floor	Mounting	700
6	Dimensions on application									



Wall Mounted

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS—ADJUSTABLE SPEED

Size	Type of Con- troller	Maximum Horsepower			Dimensions in Inches					Ship. Wt. Lbs.
					Wide A	High B	Deep C	Mounting		
		120 V.	240 V.	550 V.				D	E	
1	B1	3	5	5	12½	21½	9¾	10	18	65
	B2				14½	25½	9¾	12	22	80
	B3-B4				20½	31½	9¾	18	28	115
2	B1	5	10	20	15½	25½	12¾	10	21	120
	B2				15½	25½	12¾	10	21	125
	B3-B4				19½	29½	12¾	14	25	180
3	B1	10	25	50	17½	30	14¾	12	25½	185
	B2				17½	34	14¾	12	29½	215
	B3-B4				21½	38	14¾	16	33½	235
4	B1	20	40	75	17½	35	15¾	12	30½	235
	B2	20	---	---	21½	34	14¾	16	29½	235
	B2	---	40	75	24	62⅞	19¾	Floor	Mounting	490
	B3-B4	20	40	75	28	62½	19¾	Floor	Mounting	600
5	B1	40	75	150	24	62⅞	19¾	Floor	Mounting	545
	B2	40	50	---	24	62⅞	19¾	Floor	Mounting	580
	B2	---	75	150	24	72¼	19¾	Floor	Mounting	580
	B3-B4	40	75	150	32	72½	23¾	Floor	Mounting	600
6	Dimensions on application									



Floor Mounted

OPTIONAL FEATURES, PRICE ADDITIONS AND DEDUCTIONS—MAGNETIC CONSTANT AND ADJUSTABLE SPEED

Size	PRICE ADDITIONS															Deduction
	Drip-proof Hood	②Field Economizing Relay	Control or Brake Relay	Field Failure Relay	Jog Relay When Separate Jog Button is Employed		Heavy Duty Resistor AS 155 or AS 156	Extra Electrical Interlock N.O. or N.C.	Floor Mounting Stand	Control Circuit Fuses	Decelerating Relay	Special Enclosures				Omission of NEMA 1 Enclosure
												①NEMA 1 with Gasketed Cover		NEMA 4, 5, 12		
					Types							Types				
					A1-A2 B1-B2	A3-A4 B3-B4						A1-A2 B1-B2	A3-A4 B3-B4			
1	\$37.	\$121.	\$97.	\$97.	\$97.	\$146.	\$46.	\$25.	\$37.	\$32.	\$121.	\$36.	\$77.	\$176.	\$212.	\$9.
2	37.	121.	97.	97.	97.	146.	62.	25.	37.	32.	121.	36.	77.	176.	212.	12.
3	73.	121.	97.	97.	97.	146.	104.	25.	37.	32.	121.	73.	81.	264.	315.	48.
4	73.	121.	97.	97.	97.	146.	138.	33.	---	32.	121.	88.	178.	314.	382.	74.
5	88.	121.	97.	97.	97.	146.	234.	62.	---	32.	121.	161.	235.	446.	540.	148.
6	88.	121.	97.	97.	97.	146.	440.	84.	---	32.	121.	194.	268.	550.	686.	314.

② Field economizing relay not required on Types A1 and B1.

③ For sizes 1, 2, 3 (all types) and 4 (types A1, A2, B1 and B2), the enclosure may be furnished with a hinged door - fixed panel construction rather than the standard NEMA 1 hook on cover-tilting panel construction.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

255

WOUND ROTOR,
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL

MOTOR CONTROL
CENTERS
—UNITROL®

DC MOTOR CONTROL
FOR
SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

HEATER COILS
FOR
OVERLOAD RELAYS

D-C MOTOR CONTROL



Reduced Voltage

FIELD RHEOSTATS—RATED FOR USE WITH MAGNETIC—ADJUSTABLE SPEED

① For Use with D-c Motors Having Basic Speeds of More Than 300 R.P.M.

Type A is Plate Type, Open Construction, General Purpose
Type B is Plate Type, Enclosed Construction, General Purpose

Horsepower of Motor	② Price											
	Motor Speed Range 1.25 to 1		Motor Speed Range 1.5 to 1		Motor Speed Range 2 to 1		Motor Speed Range 3 to 1		Motor Speed Range 4 to 1		Motor Speed Range 5 or 6 to 1	
	Type A	Type B	Type A	Type B	Type A	Type B	Type A	Type B	Type A	Type B	Type A	Type B
2	\$24.	\$41.	\$24.	\$41.	\$24.	\$41.	\$24.	\$41.	\$24.	\$41.	\$36.	\$53.
3	24.	41.	24.	41.	24.	41.	24.	41.	36.	53.	36.	53.
5	24.	41.	24.	41.	24.	41.	36.	53.	36.	53.	36.	53.
7½	24.	41.	24.	41.	36.	53.	36.	53.	36.	53.	53.	70.
10	24.	41.	24.	41.	36.	53.	36.	53.	36.	53.	53.	70.
15	24.	41.	24.	41.	36.	53.	36.	53.	53.	70.	53.	70.
20	24.	41.	36.	53.	36.	53.	36.	53.	53.	70.	53.	70.
25	36.	53.	36.	53.	36.	53.	53.	70.	53.	70.	53.	70.
30	36.	53.	36.	53.	36.	53.	53.	70.	53.	70.	53.	70.
40	36.	53.	36.	53.	36.	53.	53.	70.	53.	70.	103.	139.
50	36.	53.	53.	70.	53.	70.	53.	70.	103.	139.	103.	139.
60	53.	70.	53.	70.	53.	70.	53.	70.	103.	139.	103.	139.
75	53.	70.	53.	70.	53.	70.	103.	139.	103.	139.	103.	139.
100	53.	70.	53.	70.	103.	139.	103.	139.	152.	188.	152.	188.
125	53.	70.	103.	139.	103.	139.	103.	139.	152.	188.	---	---
150	53.	70.	103.	139.	103.	139.	152.	188.	---	---	---	---
200	103.	139.	103.	139.	103.	139.	152.	188.	---	---	---	---

① For Rheostats to be used with motors having basic speeds of less than 300 R.P.M., information on application.

② Prices apply only when rheostats are ordered with 6130 and 6230 controllers. Prices for separate rheostats on application.

DISCONNECT SWITCHES AND CIRCUIT BREAKERS—FOR MAGNETIC CONTROL

For NEMA 1, 4 or 5 Enclosures Only						
③ Fuse Amps.	Voltage	NEMA Size Starter				
		1	2	3	4	5
NON-FUSIBLE DISCONNECT SWITCH (2 Pole Only)						
---	---	\$121.	\$176.	\$225.	\$377.	\$634.
FUSIBLE DISCONNECT SWITCH (2 Pole Only)						
30	240 575	137. 137.	---	---	---	---
60	240 575	137. ---	207. 207.	---	---	---
100	240 575	---	207. 207.	---	---	---
200	240 575	---	207. ---	291. 291.	---	---
400	240 575	---	---	372. ---	526. 526.	---
600	240 575	---	---	---	---	821. 821.
800	240	---	---	---	---	1103.

CIRCUIT BREAKER
(2 Pole Only)

Type	⑤ Trip Amps.	Voltage					
F	15-50	600	172.	218.	---	---	---
F or G	70-100	600	---	260.	304.	---	---
K	125-225	600	---	---	469.	590.	---
L	250-600	600	---	---	---	---	1224.

③ Fuses to be selected on the basis of actual F.L. motor current X3.

⑤ Breaker size to be selected as follows: circuit breaker type F - maximum full load motor amps 57.6, breaker type G-82.3 amps. max, type K - 150 amps. max and type L - 400 amps. max.

SPECIAL FINISHES—FOR MAGNETIC CONTROL

Corrosion Resistant Finish			Special—Other Than Corrosion Resisting		
Lots of	④ Set Up Charge	Unit Price	Lots of	④ Set Up Charge	Unit Price
1-9	\$33.	\$22.	1-9	\$33.	\$11.
10-24	33.	18.	10-24	33.	9.
25-49	33.	14.	25-49	33.	7.
50-99	33.	9.	50-99	33.	5.
100-499	33.	5.	100-499	33.	3.
500 or More	33.	3.	500-999	33.	1.
			1000 or More	33.	No Charge

④ Prorated over quantity.

MOTOR CONTROL FOR SPECIFIC APPLICATIONS

General Description

A-c Magnetic Duplex Pump Controllers—Three pole—Two full voltage starters or two combination starters each with motor circuit switch or circuit breaker—Standard operation by two 2 pole pilot devices—Can be modified to operate with two single pole pilot devices—With or without alternator—Alternator provides automatic alternation, for succeeding cycles—If one pump cannot handle load, other pump will automatically be started and both pumps will complete cycle.

A-c Oil Well Pumping Control with Supertimer—Automatic starting and stopping of pumping operations set to a predetermined 24 hour schedule—Day omission feature shuts down pumping operations for any day or days of the week—Protection to motor and controller against lightning surges, overloads, single phasing and power failures—Supertimer allows programming in any combination of 15

minute increments and instant or time delay sequence starting or restarting of a series of pumps—Lightning arresters, one for each phase—Control relay, undervoltage release—"Manual-Off-Automatic" selector switch on inner door—Padlock provisions, on outer door, inner door, motor circuit switch, supertimer—Nema type 3 enclosure, protection against weather hazards—Options include automatic pump off control that on completion of a time cycle will keep the pump running until the well "pumps-off"—single cycle lockout protection for inherently protected motors, installed or far on the job installation.

A-c Pumping Plant Control—3 pole with maintaining interlock—Non-reversing—With motor circuit switch or circuit breaker—Start, stop pushbutton in cover, low voltage protection—Four position adjustable overload relay, 2 or 3 coil—Reset button in cover—Nema type 3 weatherproof ventilated enclosure, aluminum finish.

Explosion Proof Enclosures and Motor Control Components, Nema 7D and 9EFG—Starters, 3 pole non-reversing, reversing or multi-speed—Four position adjustable overload relay, 2 or 3 coil—Reset button only on overload relay—Circuit Breakers, Westinghouse De-ion type—Adjustable, instantaneous trip, magnetic—Non-adjustable thermal magnetic trip type also available for 110/220 volt size 0, 1 and 2 controllers—Enclosures, threaded aluminum alloy type—Three sections, body and two single piece covers.

This Section Contains:

	Page
Magnetic Duplex Pump Controllers, A-c	258-259
Oil Well Pumping Control with Supertimer, A-c	260-261
Pumping Plant Control, A-c	262
Explosion Proof Enclosures and Motor Control Components NEMA 7D and 9EFG	263-264
Textile Loom Switches	265
Textile Card Starters	265-266
Textile Automatic Starters, Reduced Voltage, A-c	266
Automatic Transfer Panels, A-c or D-c	267-268
Lighting Contactors, A-c	268

Textile Loom Switches—A-c Manual—3 pole non-reversing—Pushbutton operated—Padlock provision for Stop button—Overload protection—Mechanism mounted on rubber bushings, vibration protected—Lint tight gasketed or Nema 1 lint safe enclosure—Group fusing for group installations.

Textile Card Starters—Manual, group fusing type—Magnetic, non-combination and combination with fusible motor circuit switch or circuit breaker—3 pole—Pushbutton operated—Overload protection—Reversing drum type selector switch with off position, reverse for grinding card—Nema type 12 enclosure, lint tight gasketed cover.

Textile A-c Automatic Starters, Reduced Voltage—Smooth automatic acceleration to full speed—3 pole non-reversing—Primary resistor type, single step—30 resistor taps for fine adjustment—Adjustable pneumatic timer, definite time acceleration—Two or three wire control—Thermal overload protection—Nema type 1 enclosure or with gasketed cover.

A-c and D-c Automatic Transfer Panels Magnetically Held—On failure of main power supply, load is automatically transferred to the emergency power supply—Load is automatically transferred back to the main power supply on resumption of voltage—2, 3 or 4 pole—Two magnetic contactors mechanically interlocked—Nema type 1 general purpose enclosure or open type.

A-c Lighting Contactors—For lighting loads of either tungsten filament, fluorescent or mercury arc lamps—2, 3 or 4 pole—Magnetically held—Auxiliary contact optional—Nema type 1 general purpose enclosure or open type.

WOUND ROTOR
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL

MOTOR CONTROL
CENTERS
—UNITROL®

DC MOTOR CONTROL

MOTOR CONTROL
FOR
SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

HEATER COILS
FOR
OVERLOAD RELAYS

MOTOR CONTROL FOR SPECIFIC APPLICATIONS



A-c Full Voltage Magnetic 3 Phase-Duplex Pump Controllers

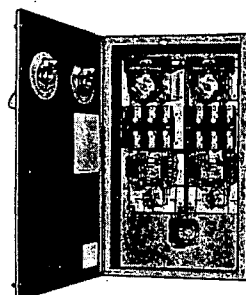
WHEN ORDERING SPECIFY

- Catalog number
- Horsepower
- Heater coil number for H No. controllers, full load current for W No. controllers
- Voltage
- Frequency

NON-COMBINATION—For remote control

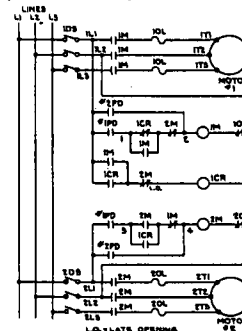
Maximum Horsepower 60-50-25 Cycles			NEMA Size	General Purpose NEMA 1		Weatherproof Water Tight NEMA 3-4		Dusttight— Industrial NEMA 5-12		Open Type	
208/220 Volts	440 Volts	550 Volts		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
WITHOUT AUTOMATIC ALTERNATOR - 2 COIL OVERLOAD RELAY - RESET ONLY											
3	5	5	0	9586- W39	\$98.	9586- W40	\$148.	9586- W41	\$114.	9586- W42	\$86.
7½	10	10	1	W43	108.	W44	160.	W45	124.	W46	96.
15	25	25	2	W47	188.	W48	296.	W49	228.	W50	160.
30	50	50	3	W51	276.	W52	480.	W53	328.	W54	236.
50	100	100	4	W55	616.	W56	964.	W57	788.	W58	532.
WITH AUTOMATIC ALTERNATOR - 2 COIL OVERLOAD RELAY - RESET ONLY											
3	5	5	0	W59	153.	W60	203.	W61	169.	W62	141.
7½	10	10	1	W63	163.	W64	215.	W65	179.	W66	151.
15	25	25	2	W67	243.	W68	351.	W69	283.	W70	215.
30	50	50	3	W71	331.	W72	535.	W73	383.	W74	291.
50	100	100	4	W75	671.	W76	1019.	W77	843.	W78	587.

3 COIL OVERLOAD RELAY - RESET ONLY
 Factory Assembled 3 coil starter, add suffix "T" Field Conversion from 2 coil to 3 coil, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50. (2 each required for duplex starter)



TYPICAL WIRING DIAGRAM

(Combination duplex with alternator.)



NON-FUSIBLE WITH MOTOR CIRCUIT SWITCH—For remote control (For Fusible add Fuse Clip Kit)

Max. Hp. 60-50-25 Cycles		NEMA Size	Without Alternator						With Alternator					
208/220 Volts	440/550 Volts		NEMA 1		NEMA 3-4		NEMA 5-12		NEMA 1		NEMA 3-4		NEMA 5-12	
			Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
2 COIL OVERLOAD RELAY - RESET ONLY														
3	5	0	9589- H4702	\$188.	9589- W36	\$380.	9589- W37	\$236.	9589- H4703	\$243.	9589- W48	\$435.	9589- W49	\$291.
7½	10	1	H4054	198.	W38	390.	W39	246.	H4053	253.	W50	445.	W51	301.
15	25	2	H4199	310.	W40	606.	W41	378.	H4200	365.	W52	661.	W53	433.
30	50	3	W42	512.	W43	1028.	W44	600.	W54	567.	W55	1083.	W56	655.
50	100	4	W45	982.	W46	1642.	W47	1226.	W57	1037.	W58	1697.	W59	1281.

3 COIL OVERLOAD RELAY - RESET ONLY
 Factory Assembled 3 coil starter, add suffix "T" to catalog number and add \$8. (\$4. per starter) Field Conversion from 2 coil to 3 coil, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50. (2 each required for duplex starter)

3 POLE FUSE CLIP KITS (3 FUSE)

NEMA Size	Volts	Maximum Horsepower		Fuse Clip Rating		Fuse Clip Kits Not Installed		Fuse Clip Kits Factory Installed	
		Std. Fuses	Dual Element Fuses	Amps.	Volts	Fuse Clip Cat. No.	Price	Add to Starter Number	Price
0	208/220	3	3	30	250	10982- H14	\$2.	—81	\$6.
	440/550	5	5	30	600	H15	3.	—91	7.
1	208/220	3	7½	30	250	H14	2.	—81	6.
	208/220	7½	---	60	250	H15	3.	—82	7.
	440	7½	10	30	600	H15	3.	—91	7.
	550	10	10	30	600	H15	3.	—91	7.
2	208/220	7½	15	60	250	H16	3.	—82	8.
	208/220	15	---	100	250	H18	21.	—83	26.
	440/550	15	25	60	600	H17	6.	—92	11.
	440/550	25	---	100	600	H18	21.	—93	26.
3	208/220	30	30	200	250	H23	32.	—84	41.
	440/550	30	50	100	600	H24	21.	—93	30.
	440/550	50	---	200	600	H25	32.	—94	41.
4	208/220	50	50	400	250	H26	92.	—85	102.
	440/550	60	100	200	600	H27	32.	—94	42.
	440/550	100	---	400	600	H28	92.	—95	102.

① Price includes two fuse clip kits. (2 required for duplex alternators.)

HEATER COILS for starters in NEMA 1 enclosure for average 60 cycle 1800 R.P.M. motors.

Horse- power	Catalog Number		
	220 V.	440 V.	550 V.
¼	10177- H1017	10177- H1010	10177- H1008
½	H1019	H1012	H1010
¾	H1022	H1016	H1014
1	H1025	H1019	H1017
	H1027	H1021	H1020
1½	H1030	H1025	H1023
2	H1032	H1066	H1025
3	H1036	H1029	H1028
5	H1040	H1034	H1032
7½	H1043	H1037	H1035
10	H1045	H1039	H1037
15	H1049	H1043	H1041
20	---	H1045	H1043
25	---	H1047	H1045

For more accurate selection, and for other enclosures select heater coils by full load current. See index on page 282.



MOTOR CONTROL FOR SPECIFIC APPLICATIONS

A-c Full Voltage Magnetic 3 Phase-Duplex Pump Controllers

WITH CIRCUIT BREAKER—For remote control.

Maximum Horsepower 60-50-25 Cycles			NEMA Size	② Type of Circuit Breaker	Without Alternator						With Alternator					
208/220 Volts	440 Volts	550 Volts			NEMA 1		NEMA 3-4		NEMA 5-12		NEMA 1		NEMA 3-4		NEMA 5-12	
					Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
2 COIL OVERLOAD RELAY - RESET ONLY																
3	---	---	0	E	9591- W35	\$202.	9591- W36	\$394.	9591- W37	\$250.	9591- W62	\$257.	9591- W63	\$449.	9591- W64	\$305.
3	5	5	0	F	W38	260.	W39	452.	W40	308.	W65	315.	W66	507.	W67	363.
7½	---	---	1	E	W41	212.	W42	404.	W43	260.	W68	267.	W69	459.	W70	315.
7½	10	10	1	F	W44	270.	W45	462.	W46	318.	W71	325.	W72	517.	W73	373.
15	---	---	2	E	W47	322.	W48	618.	W49	390.	W74	377.	W75	673.	W76	445.
15	25	25	2	F	W50	380.	W51	676.	W52	448.	W77	435.	W78	731.	W79	503.
30	50	50	3	F	W53	550.	W54	1066.	W55	638.	W80	605.	W81	1121.	W82	693.
---	60	75	4	F	W56	1200.	W57	1860.	W58	1444.	W83	1255.	W84	1915.	W85	1499.
50	100	100	4	JA	W59	1200.	W60	1860.	W61	1444.	W86	1255.	W87	1915.	W88	1499.

3 COIL OVERLOAD RELAY - RESET ONLY

Factory Assembled 3 coil starter, add suffix "T" to catalog number and add \$8. (\$4. per starter.)

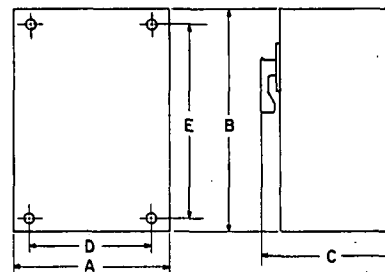
Field Conversion from 2 coil to 3 coil, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50. (2 each required for duplex starter.)

② E Frames breakers are non-adjustable. F frames and larger have adjustable trip.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

—For Motor Circuit Switch Combination Type Duplex Pump Controllers only.

NEMA Size	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting		
				D	E	
NEMA 1 ENCLOSED						
0-1	16%	28	9%	14	25	80
2	20%	37%	10½	14	34%	150



OPTIONAL FEATURES③ FOR DUPLEX PUMP CONTROLLERS—Additional Optional Features, See Page 115.

Description	Enclosure Type	NEMA Size			
		0-1	2	3	4
1. Local Cover Control— "Start-Stop" pushbutton, ④ "On-Auto," or "Run-Off-Auto" Selector Switch	Open or NEMA 1 NEMA 4, 5 or 12	\$16. 44.	\$16. 44.	\$16. 44.	\$16. 44.
2. Control Transformer (50 and 60 Cycles), Single or dual voltage primary	Any	54.	76.	112.	136.
3. Four Pole Double Throw Transfer Switch for Manual Alternation (for use on controllers without automatic alternator, only one required)	NEMA 1 NEMA 1 NEMA 4, 5 or 12	32. 16. 44.	32. 16. 44.	32. 16. 44.	32. 16. 44.
4. Test Pushbutton					
5. Pressure Switch, Bulletin 10007H15, ¼" Female Pipe Tap (Supplied separately when alternator is used. Also supplied separately on 9586 with control transformer)	Any Any Any	48. 50. 33.	48. 50. 33.	48. 50. 33.	48. 50. 33.
6. Modified Controller For Operation with Single Pole Pilot Devices					
7. Floor Mounting Stand (One required)					
8. Pilot lights in cover	NEMA 1 NEMA 3-4, 5-12	30. 54.	30. 54.	30. 54.	30. 54.

③ Prices shown include two each of the accessories listed, one for each motor, mounted and wired except where noted.

④ "Start-Stop" pushbuttons are not for use on controllers with automatic alternator.

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

WOUND ROTOR,
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL

MOTOR CONTROL
CENTERS
—UNITROL®

DC MOTOR CONTROL

MOTOR CONTROL
FOR
SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

HEATER COILS
FOR
OVERLOAD RELAYS

MOTOR CONTROL FOR SPECIFIC APPLICATIONS

A-c 3 Phase Oil Well Pumping Control with Supertimer
600 Volts Maximum

WHEN ORDERING SPECIFY

- Catalog number
- Heater coil number or full load current
- Fuse clip kit for starters with motor circuit switch

NON-FUSIBLE—With 3 Coil Overload Relay
(for fusible add fuse clip kit)

Max. H.P. 60 Cycles			NEMA Size	NEMA 3 Enclosure	
220 Volts	440/550 Volts			Cat. No.	Price
3	5		0	9593- H182	\$282.
7½	10		1	H183	287.
10	25		2	H184	382.
30	50		3	H185	497.
---	50		3	① H186	517.
50	100		4	H187	781.

① This controller is factory assembled with special 600 volt, 200 amp. fuse clips.

CIRCUIT BREAKER TYPE—With 3 Coil Overload Relay

Max. H.P. 60 Cycles			Type of Breaker Frame②	NEMA Size	NEMA 3 Enclosure	
220 Volts	440 Volts	550 Volts			Cat. No.	Price
3	5	5	F	0	9594- H239	\$330.
7½	10	10	F	1	H240	335.
15	25	25	F	2	H241	420.
30	50	50	F	3	W1	524.
50	---	---	JA	4	W2	871.
---	60	75	F	4	W3	871.
---	100	100	JA	4	W4	871.

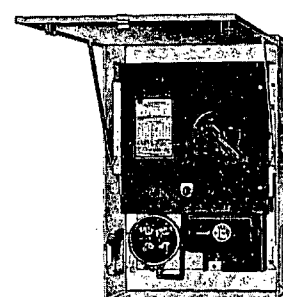
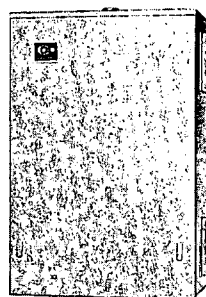
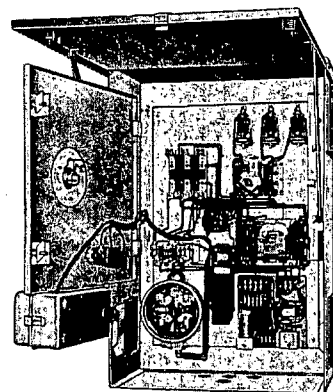
② Instantaneous trip-adjustable

3 POLE FUSE CLIP KIT (3 FUSE)

NEMA Size	Volts	Maximum Horsepower		Fuse Clip Ratings		Fuse Clip Kit Catalog Number	Fuse Clip Kit Not Installed Price	Fuse Clips Factory Installed Price
		Standard Fuses	Dual Ele- ment Fuses	Volts	Amps.			
0	220	3	3	250	30	10982- H14	\$1.00	\$3.00
	440/550	5	5	600	30	H15	1.50	3.50
1	220	3	7½	250	30	H14	1.00	3.00
	220	7½	---	250	60	H15	1.50	3.50
	440	7½	10	600	30	H15	1.50	3.50
	550	10	---	600	30	H15	1.50	3.50
	440/550	10	---	600	60	H19	3.00	5.00
2	220	7½	15	250	60	H16	1.50	4.00
	220	10	---	250	100	H18	10.50	13.00
	440/550	15	25	600	60	H17	3.00	5.50
	440/550	25	---	600	100	H29	10.50	13.00
3	220	30	30	250	200	H20	16.00	20.50
	440/550	30	50	600	100	H29	10.50	15.00
4	220	50	---	250	400	H21	46.00	51.00
	440/550	60	100	600	200	H22	16.00	21.00
	440/550	100	---	600	400	H21	46.00	51.00

OPTIONAL FEATURES

Without Time Clock.....	—deduct	\$35.00
Without Lightning Arrestors.....	—deduct	25.00
With Bulletin 13659 Pump Off Control—Sizes 0, 1 and 2.....	—add	140.00
—Sizes 3 and 4 (pump "off" control separately enclosed).....	—add	150.00
Dual Voltage Control Transformer (for starters through 600 V.).....	—add	27.00
Single Cycle Lockout Relay for Inherently Protected Motors.....	—add	30.00

HEATER COILS for average 1800
R.P.M., 60 Cycle motors (H No. controllers only)

③ Horse- power	Catalog Number		
	220 V.	440 V.	550 V.
¼	10177- H1016	10177- H1010	10177- H1008
½	H1018	H1012	H1010
¾	H1022	H1015	H1013
1	H1025	H1019	H1017
	H1066	H1021	H1019
1½	H1029	H1024	H1022
2	H1032	H1026	H1024
3	H1035	H1029	H1027
5	H1039	H1033	H1031
7½	H1043	H1037	H1035
10	H1045	H1039	H1037
15	H1047	H1042	H1040
20	H1049	H1044	H1043
25	H1051	H1046	H1044
30	H1054	H1047	H1045
40	H1055	H1049	H1047
50	H1057	H1051	H1049
60	---	H1051	H1049
75	---	H1054	H1051
100	---	H1057	H1054

For more accurate selection, select heater coil
by full load current. See index on page 282.③ For controllers with circuit breaker over 30 H.P.
specify full load current.

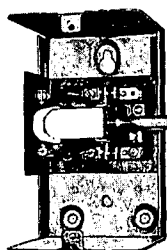
**MOTOR CONTROL FOR SPECIFIC APPLICATIONS****A-c 3 Phase Oil Well Pumping Control with Supertimer
762 Volts Maximum****WHEN ORDERING SPECIFY**

- Catalog number
- Full load current

MOTOR CIRCUIT SWITCH AND CIRCUIT BREAKER TYPES

Maximum Horsepower 60 Cycles		Motor Circuit Switch Type				Circuit Breaker Type		
		Size	Fuse Clip Rating Amperes	Weather Resistant NEMA 3		Type of Breaker Frame	Weather Resistant NEMA 3	
				Cat. No.	Price		Cat. No.	Price
440 V.	762 V.							
10	15	AA	① 30	9593- X15 X14	\$275. 320.	--- F	9594- --- X3	--- --- \$370.
25	40	A	① 30 60	X18 X16 X17	362. 415. 420.	--- F ---	--- X4 ---	--- 462. ---
50	75	B	① 60	X20 X19	496. 569.	--- F	--- X6	--- 576.

① Without disconnect switch or fuse clips.



Open View



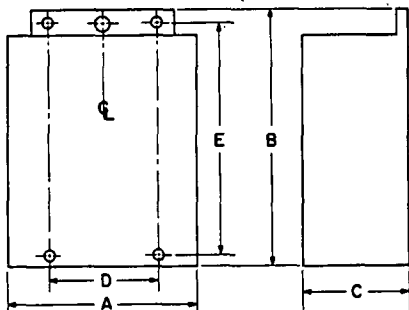
Enclosed View

Single Cycle Lockout Relay

SINGLE CYCLE LOCKOUT RELAY for inherently protected motors

Poles, Throw and Terminals	General Purpose NEMA 1 Enclosure				Price
	60 Cycles				
	110 V.	220 V.	440 V.	550 V.	
SPST 2 Terminals	10191-	10191-	10191-	10191-	\$20.
	H1	H2	H3	H4	

NOTE: Leads for connection to oilwell controller included.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS—Cat. Nos. 9593 and 9594

NEMA Size	NEMA 3 Enclosure					Ship. Wt. Lbs.
	Dimensions in Inches					
	Wide A	High B	Deep C	Mounting		
				D	E	
0	23½	38¾	11¾	7	37¼	150
1	23½	38¾	11¾	7	37¼	150
2	23½	38¾	11¾	7	37¼	158
3	25½	46¾	14¾	7	45¼	185
4	29¾	50	15½	24½	48	210

MOTOR CONTROL FOR SPECIFIC APPLICATIONS

A-c 3 Phase Full Voltage Pumping Plant Control

WHEN ORDERING SPECIFY

• Catalog number

• Heater coil catalog number, see page 282.

WITH "START, STOP-RESET" BUTTONS

② Maximum Horsepower 60 Cycles	NEMA Size	Fusible Motor Circuit Switch Type				Circuit Breaker Type			
		Fuse Clip Rating		Weatherproof NEMA 3 ③ Enclosure		Type of Breaker Frame	Weatherproof NEMA 3 ③ Enclosure		Price
		Amps.	Volts	Cat. No.	Price		Cat. No.	Price	
220 V.	440 V.								
2 COIL OVERLOAD RELAY									
3(7½)	---	30	250	9589- P121	\$104.	E-20A	9591- P1212	\$108.	
5	---	60	250	P122	106.	E-40A	P1214	108.	
7½	---	60	250	P122	106.	E-50A	P1215	108.	
---	7½(10)	30	600	P141	106.	EH-30A	P1423	135.	
---	10	60	600	P142	108.	EH-40A	P1424	135.	
7½(15)	---	60	250	P222	172.	E-50A	P2215	163.	
15	---	100	250	P223	172.	E-90A	P2217	163.	
---	15(25)	60	600	P242	164.	EH-50A	P2425	190.	
---	25	100	600	P243	173.	EH-70A	P2426	190.	
30	---	200	250	P324	284.	E-100A	P3218	① 273.	
---	30(50)	100	600	P343	268.	EH-100A	P3428	273.	
---	50	200	600	P344	287.	EH-100A	P3428	① 273.	
40	---	200	250	P424	485.	JA-150A	P4232	570.	
50	---	400	250	P425	530.	JA-200A	P4234	570.	
---	75(100)	200	600	P444	488.	JA-175A	P4433	570.	
---	100	400	600	P445	535.	JA-200A	P4434	570.	
75	---	400	250	P525	1105.	LA-300A	P5242	1215.	
100	---	600	250	P526	1129.	LA-400A	P5243	1215.	
---	150(200)	400	600	P545	1035.	LA-300A	P5442	1270.	
---	200	600	600	P546	1170.	LA-400A	P5443	1270.	

3 COIL OVERLOAD RELAY

Factory Assembled 3 coil starters, add suffix "T" to catalog number and through size 4, add \$4., for size 5 add \$40.

Field conversion from 2 coil to 3 coil through size 4, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50.

① For normal starting duty only. For long time acceleration, JA frame breakers are provided at \$105. extra.

② Cat. No. 9589 dual element fuse ratings shown in parentheses.

③ Standard enclosure is aluminum finished, ventilated, and without door gasket. For gray finish, non-ventilated or gasketed enclosure, see optional features or specify desired enclosure features on order.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

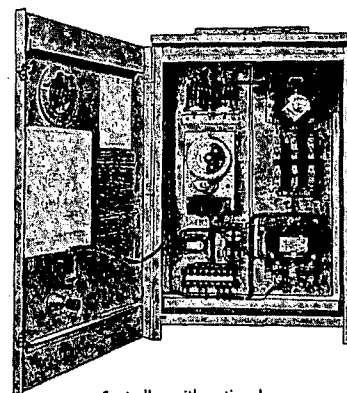
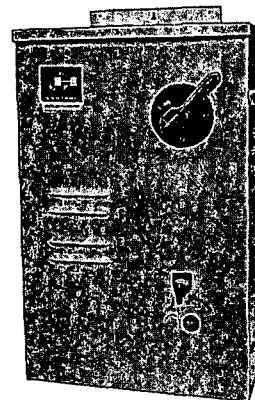
NEMA Size	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting		
				D	E	
1	19	31½	9½	10	30½	70
2	19	31½	9½	10	30½	80
3	21	41½	10½	10	40½	125
4	24½	48	12	32	42	185
5	26½	60	12	32	56	280

OPTIONAL FEATURES—Add dash(—) to above Cat. Nos. and follow with code number of features selected.

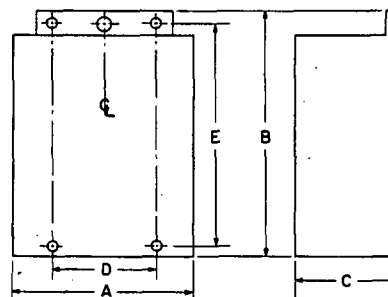
Code No.	Description	Price Addition
1	Substitute "Run-Off-Auto" selector switch for "Start-Stop"	No Charge
2	Add phase reversal relay	\$118.
3	Add time delay relay timed after Stop—3 min. max.	84.
4	Add time delay relay timed before Start—3 min. max.	84.
6	Substitute gray finished, non-ventilated, gasketed enclosure for standard enclosure	No Charge
7	Add single cycle lockout relay for inherent protected motors	30.
8	Add "Run-Off-Auto" Switch—Start button to operate in "Run" position	No Charge
9	Add 3 single phase lightning arrestors	40.
---	Open type Water Flood Panel with programming timer, 3 single phase lightning arrestors and terminal board—Catalog Number 9589P60	90.
---	Above Water Flood Panel with time delay under voltage release—Catalog Number 9589P61	110.

SELECTOR SWITCH CONVERSION KIT

Size	Cat. No.	Description	Price
1	P1001-S	Kit for field conversion—"Start-Stop" to "Run-Off-Auto"	\$11.40
2	P2001-S		11.40
3	P3001-S		11.40



Controller with optional
P61 panel installed.





MOTOR CONTROL FOR SPECIFIC APPLICATIONS

263

Explosion Proof Enclosures and Motor Control Components NEMA 7-D and 9-EFG

WHEN ORDERING SPECIFY

- Starter catalog number
- Condulet catalog number
- Circuit breaker catalog number
- Voltage and frequency
- Heater coil catalog number, see index page 282

3 PHASE, 60-50-25 CYCLES

Components For Following Across-the-Line Controllers	Open Type Starter with Overload Relay					Assembled Enclosure W/Reset Button Only		Circuit Breaker	
	NEMA Size	Maximum Horsepower		Catalog Number	Price	EPC Condulet Without Starter or Circuit Breaker	Frame Size (Select by Cat. No. from Table on next page)		
		220 Volts	440/550 Volts				Cat. No.	Price	
WITH 2 COIL OVERLOAD RELAY									
Non- Reversing with Circuit Breaker	0	3	5	9586- H6009	\$37.	10997- H1	\$175.	E or F	
	1	7½	10	H6752	42.	H1	175.	E or F	
	2	15	25	H6209	74.	H2	220.	E or F	
	3	30	50	H6361	118.	H3	400.	F	
	4	---	60	H6495	266.	H4	475.	F	
	4	50	100	H6495	266.	H5	475.	JA	
	5	75	200	H6504	607.	H40	950.	JA	
	5	100	200	H6504	607.	H40	950.	LA	
Reversing with Circuit Breaker	0	3	5	9586- H6	80.	10997- H6	210.	E or F	
	1	7½	10	H106	90.	H7	210.	E or F	
	2	15	25	H209	168.	H8	290.	E or F	
	3	30	50	H349	277.	H9	520.	F	
	4	---	60	H471	672.	H10	540.	F	
	4	50	100	H471	672.	H11	540.	JA	
Non- Reversing without Circuit Breaker	0	3	5	9586- H6009	37.	10997- H13	110.	None	
	1	7½	10	H6752	42.	H13	110.	None	
	2	15	25	H6209	74.	H14	160.	None	
	3	30	50	H6361	118.	H15	225.	None	
	4	50	100	H6495	266.	H16	290.	None	
	5	75	200	H6504	607.	H39	630.	None	
	5	100	200	H6504	607.	H39	630.	None	
	Two Speed with Circuit Breaker Separate Winding (Two Winding)	① 1	3	5	9736- W93	124.	10997- W1	210.	E or F
② 1		7½	10	W94	124.	W2	210.	E or F	
Two Speed Reconnectable (One Winding)	① 1	3	5	9739- W151	166.	10997- W3	210.	E or F	
	② 1	7½	10	W152	166.	W4	210.	E or F	

Factory Assembled 3 coil starters, add suffix "T" to catalog number and through size 4 add \$4., for size 5 add \$40.

Field conversion from 2 coil to 3 coil through size 4, use spindle kit 10176H150—\$2.50 and heater coil—\$1.50.

- ① Constant horsepower.
- ② Constant or variable torque.

OPTIONAL ACCESSORIES KITS —For use with Condulets listed above

Description	Cat. No.	Price
"Start-Stop" Pushbuttons.....	10997-H17	\$18.
Two position Selector Switch "On-Off".....	H18	18.
Three position Selector Switch "Hand-Off-Auto".....	H19	18.
Breather.....	H21	3.30
Drain.....	H22	3.30
Universal Breather Drain.....	H23	3.30

Discount Schedules—Starters 1 CD, Enclosures and Accessories 1 CD-4

CUTLER-HAMMER

263

WOUND ROTOR
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL

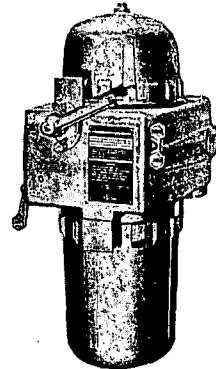
MOTOR CONTROL
CENTERS
—UNITROL®

DC MOTOR CONTROL

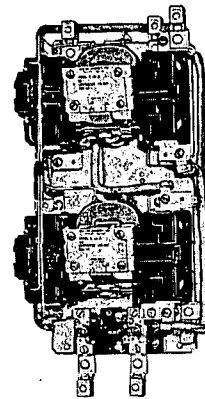
MOTOR CONTROL
FOR
SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

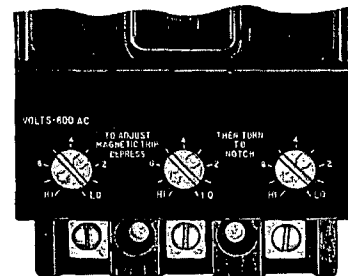
HEATER COILS
FOR
OVERLOAD RELAYS



Size 1, NEMA 7-9 Enclosure



Size 4, Vertical Reversing Contactor



External Adjustment for Magnetic Trip

MOTOR CONTROL FOR SPECIFIC APPLICATIONS

Explosion Proof Enclosures and Motor Control Components NEMA 7-D and 9-EFG



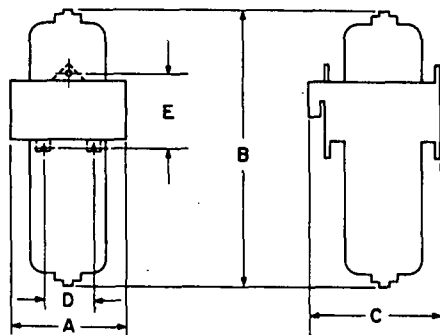
CIRCUIT BREAKER SELECTION TABLE

NEMA Size	Maximum Horsepower			Non-Adjustable Thermal Magnetic Trip Type—240 Volts A-c Maximum				Adjustable Instantaneous Trip Magnetic Type—600 Volts A-c Maximum			
	220 Volts	440 Volts	550 Volts	Frame Size	Amp. Rating	Catalog Number	Price	Frame Size	Amp. Rating	Catalog Number	Price
0	1/3	1/4	1	E	15	10997-H24	\$41.	F	3	10997-H31	\$77.
	1/2	1 1/2	2	E	15	H24	41.	F	5	H32	77.
	1 1/2	3	5	E	15	H24	41.	F	10	H33	77.
	2	---	---	E	20	H25	41.	F	10	H33	77.
	3	5	---	E	30	H26	41.	F	25	H34	77.
1	5	10	10	E	40	H27	41.	F	25	H34	77.
	7 1/2	---	---	E	50	H28	41.	F	50	H35	77.
2	10	25	25	E	70	H29	60.	F	50	H35	77.
	15	---	---	E	100	H30	60.	F	50	H35	77.
3	---	30	40	---	---	---	---	F	50	H35	77.
	30	50	50	---	---	---	---	F	100	H36	93.
4	---	60	75	---	---	---	---	F	100	H36	93.
	50	100	100	---	---	---	---	JA	225	H41	210.
5	75	150	200	---	---	---	---	JA	225	H41	210.
	100	200	---	---	---	---	---	LA	400	H38	400.

CIRCUIT BREAKER INTERRUPTING CAPACITY

Frame Size	220 Volts	440/550 Volts
E	7,500 Amperes	---
F	20,000 Amperes	15,000 Amperes
JA	25,000 Amperes	20,000 Amperes
LA	50,000 Amperes	35,000 Amperes

APPROXIMATE DIMENSIONS—CONDULETS



NEMA Size	Dimensions in Inches				
	Wide A	High B	Deep C	Mounting	
				D	E
NON-REVERSING WITH CIRCUIT BREAKER					
0 and 1	10 1/8	25 3/8	14 1/4	5 1/4	9 3/8
2	12	30	16 1/4	5 1/4	9 3/8
3	16 1/8	36 1/2	20 1/8	5 1/2	11
② 4	16 1/8	36 1/2	20 3/8	5 1/2	11
③ 4	16 1/8	44 1/2	20 1/4	5 1/2	11
5	23	53	25 1/2	8	17
REVERSING WITH CIRCUIT BREAKER					
0	10 1/8	35 3/8	14 1/4	5 1/4	9 3/8
1	12	35	16 1/4	5 1/4	9 3/8
2	16 1/8	45 1/2	20 1/8	5 1/2	11
3	16 1/8	45 1/2	20 1/8	5 1/2	11
② 4	16 1/8	51 1/2	20 3/8	5 1/2	11
③ 4	16 1/8	54 1/2	20 1/4	5 1/2	11
NON-REVERSING WITHOUT CIRCUIT BREAKER					
0 and 1	10 1/8	19 3/8	14 1/4	5 1/4	9 3/8
2	12	22 3/8	16 1/4	5 1/4	9 3/8
3	16 1/8	25 1/4	20 1/8	5 1/2	11
4	16 1/8	31 1/4	20 1/8	5 1/2	11
5	23	28 1/2	25 1/2	8	17
TWO SPEED WITH CIRCUIT BREAKER					
1	12	35	16 1/4	5 1/4	9 3/8

② Dimensions of 60 H.P., 440 V. and 75 H.P., 550 V. size.

③ Dimensions of 50 H.P., 220 V. and 100 H.P., 440/550 V. size.

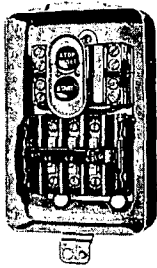


Textile Industry Equipment

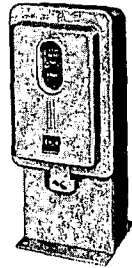
WHEN ORDERING SPECIFY

• Catalog number

• Heater coil number, see index page 282.



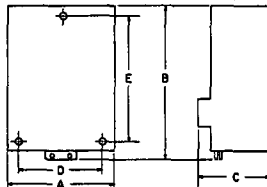
Open View

Lint-Tight Enclosure
With Pedestal

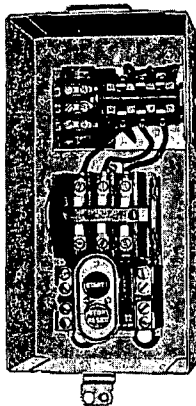
TEXTILE LOOM SWITCHES—3 Phase ①

Maximum Horsepower 25-50-60 Cycles			NEMA Size	Location of Line Terminals	General Purpose NEMA 1 Enclosure		Lint-tight Enclosure	
110 Volts	220 Volts	440/550 Volts			Cat. No.	Price	Cat. No.	Price
1½	2	3	0	Top	9115- H36	\$25.	9115- ---	---
1½	2	3	0	Bottom	H38	25.	H159	\$32.
MOUNTING PEDESTALS FOR TEXTILE LOOM SWITCHES								
Pedestal for mounting one switch							H111	\$6.
Pedestal for mounting two switch							H112	12.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS



Catalog Number	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting		
				D	E	
9115- H36 or H38	4⅞	7⅞	4	3½	5½	4½
H159	5	8½	4⅞	3½	5½	5
H111	4⅞	10⅞	4½	3⅞	3⅞	7
H112	9½	10⅞	4½	3⅞	8⅞	13

Manual Starter
Open ViewManual Starter
Enclosed View

① NEMA standard IC1-21.28 states that the horsepower rating of manual across-the-line (full voltage) starters designed for group fusing shall be 2HP at 440-550 volts, 3 phase. The size of fuses to be used shall be:

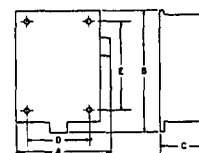
Motor Full Load Amps.	Maximum Fuse Size-Amps. 110-220V.	440-550V.
3.4 or less	60	30
above 3.4	100	30

TEXTILE CARD STARTERS—3 Phase

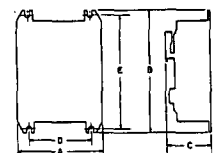
Maximum Horsepower			NEMA Size	Fuse Clip Rating or Circuit Breaker Frame	Lint-tight Enclosure	
220 Volts	440 Volts	550 Volts			Cat. No.	Price
① MANUAL STARTER						
2	2	2	0	---	9115- H165	\$52.
MAGNETIC STARTER - NON COMBINATION TYPE						
3 7½	5 10	5 10	0 1	---	9599- H31 H33	82. 105.
COMBINATION STARTER WITH FUSIBLE MOTOR CIRCUIT SWITCH						
3 --- 3 7½ ---	--- 5 --- --- 7½	--- 5 --- --- 10	0 0 1 1 1	30A 30A 30A 60A 30A	9599- H41 H43 H47 H48 H49	158. 158. 180. 180. 180.
COMBINATION STARTER WITH CIRCUIT BREAKER						
3 7½	5 10	5 10	0 1	F F	9599- H51 H53	183. 206.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Type of Starter	Dimensions in Inches					Ship. Wt. Lbs.
	Wide A	High B	Deep C	Mounting		
				D	E	
Manual	6½	11½	4	3¾	9¾	10
Magnetic	8½	13	7¾	---	---	30
Combination-Fusible	10¾	26¾	10¾	7¾	25½	55
Comb.-Circuit Breaker	10¾	26¾	10¾	7¾	25½	55



Manual



Magnetic

DISCOUNT SCHEDULE 1 CD



MOTOR CONTROL FOR SPECIFIC APPLICATIONS

Reduced Voltage—A-c Automatic Starters

Primary Resistor Type with Definite Time Acceleration

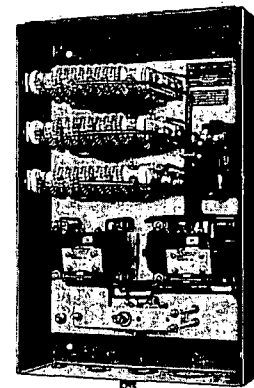
WHEN ORDERING SPECIFY

- Catalog number
- Heater coil number
- Full load current

NON-REVERSING LOW TORQUE TEXTILE STARTER — 2 coil overload relay — Reset only.

Horse- power 60 Cycles	Volts	General Purpose NEMA 1 Enclosure		Lint Tight Enclosure	
		Cat. No.	Price	Cat. No.	Price
2	220	9605- H1404	\$286.	9605- H1432	\$314.
	440	H1408	286.	H1436	314.
	550	H1412	286.	H1440	314.
3	220	H1405	286.	H1433	314.
	440	H1409	286.	H1437	314.
	550	H1413	286.	H1441	314.
5	220	H1406	286.	H1434	314.
	440	H1410	286.	H1438	314.
	550	H1414	286.	H1442	314.
7½	220	H1407	296.	H1435	324.
	440	H1411	296.	H1439	324.
	550	H1415	296.	H1443	324.

Price includes heater coils at \$1.50 each. Select heater coil by full load current. See index on page 282.

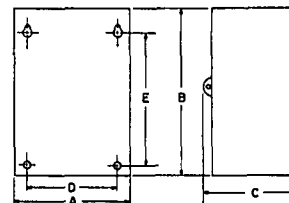


OPTIONAL FEATURES

Description	Price Addition
1. Non-Fused Disconnect Switch.....	\$121.
2. Fused Disconnect Switch.....	137.
3. Circuit Breaker.....	172.
4. 3 Coil Overload Relay.....	30.

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Dimensions in Inches					Ship. Wt. Lbs.
Wide A	High B	Deep C	Mounting		
			D	E	
16¼	22¾	9¾	13½	20	90



WOUND ROTOR,
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL

MOTOR CONTROL
CENTERS
— UNITROL®

DC MOTOR CONTROL

MOTOR CONTROL
FOR
SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

HEATER COILS
FOR
OVERLOAD RELAYS



MOTOR CONTROL FOR SPECIFIC APPLICATIONS

267

Automatic Transfer Panels

WHEN ORDERING SPECIFY

- Catalog number

A-C NORMAL POWER SUPPLY—Magnetically held

No. of Poles	Maximum Ampere Rating			NEMA Size	A-c Emergency Supply 110 to 600 Volts						D-c Emergency Supply 120 or 240 Volts					
	③ Tungsten Incandescent Lamp Loads Open or Enclosed	Open	Enclosed		Open		General Purpose Enclosure NEMA 1		Watertight Enclosure NEMA 4		Open		General Purpose Enclosure NEMA 1		Watertight Enclosure NEMA 4	
					Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
2	8	20	18	0	9576-W1	\$124.	9576-W2	\$128.	9576-W3	\$174.	9576-W61	\$146.	9576-W62	\$148.	9576-W63	\$194.
	12	30	27	1	W4	132.	W5	138.	W6	202.	W64	154.	W65	161.	W66	225.
	12	① 30	① 30	1	W7	138.	W8	146.	W9	210.	W67	152.	W68	161.	W69	225.
	30	50	45	2	W10	204.	W11	220.	W12	324.	W70	238.	W71	256.	W72	360.
	60	100	90	3	W13	300.	W14	330.	W15	484.	W73	346.	W74	379.	W75	533.
	120	150	135	4	W16	658.	W17	710.	W18	982.	W76	742.	W77	799.	W78	1071.
	240	300	270	5	W19	1014.	W20	1316.	W21	1668.	W79	1141.	W80	1472.	W81	1824.
	480	600	540	6	W22	1791.	W23	2072.	W24	3907.	W82	2050.	W83	2360.	W84	4195.
3	8	20	18	0	W25	130.	W26	132.	W27	178.	W85	152.	W86	154.	W87	200.
	12	30	27	1	W28	138.	W29	144.	W30	208.	W88	161.	W89	168.	W90	232.
	30	50	45	2	W31	216.	W32	232.	W33	336.	W91	249.	W92	267.	W93	371.
	60	100	90	3	W34	316.	W35	348.	W36	502.	W94	363.	W95	396.	W96	550.
	120	150	135	4	W37	690.	W38	744.	W39	1016.	W97	777.	W98	836.	W99	1108.
	240	300	270	5	W40	1098.	W41	1401.	W42	1753.	W100	1232.	W101	1566.	W102	1918.
	480	600	540	6	W43	1960.	W44	2275.	W45	4110.	W103	2236.	W104	2583.	W105	4418.
4	8	20	18	0	W46	146.	W47	150.	W48	196.	W106	170.	W107	172.	W108	218.
	12	30	27	1	W49	156.	W50	162.	W51	226.	W109	183.	W110	190.	W111	254.
	30	50	45	2	W52	256.	W53	272.	W54	376.	W112	293.	W113	313.	W114	417.
	60	100	90	3	W55	380.	W56	410.	W57	564.	W115	434.	W116	467.	W117	621.
	120	150	135	4	W58	880.	W59	932.	W60	1204.	W118	988.	W119	1043.	W120	1315.

③ For fluorescent lamp loads 300 volts and less it is not necessary to derate contactors below their normal ratings. Tungsten lamp load ratings are for 250 volts or less only.

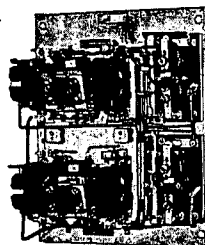
OPTIONAL FEATURES

—A-c Power Supply Only

Description	Price Addition
1. Pneumatic Timer.....	\$84.
2. Phase Failure Protection—3 Phase.....	63.
3. Voltage Sensitive Relay —1 Phase.....	80.
—2 Phase.....	160.
—3 Phase.....	240.
4. Test Switch.....	16.
5. Electrical Interlock.....	11.
6. Pilot Light In Cover.....	27.
7. Battery Charger.....	On Appl.
8. Exerciser.....	On Appl.
9. Three Position Selector Switch.....	54.



Enclosed View
Size 2



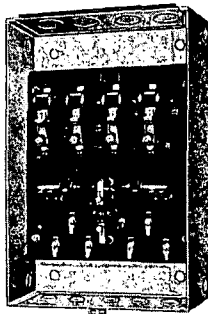
Open Type
3 Pole—Size 2

D-C NORMAL POWER SUPPLY—Magnetically held

No. of Poles	Maximum Amps. 120/240 Volts		NEMA Size	A-c Emergency Supply				D-c Emergency Supply			
	Open	Enclosed		Open		General Purpose Enclosure NEMA 1		Open		General Purpose Enclosure NEMA 1	
				Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
2	15	13.5	0	6007-W1	\$146.	6007-W2	\$148.	6007-W26	\$154.	6007-W27	\$159.
	25	22	1	W3	154.	W4	161.	W28	165.	W29	170.
	30	30	1	W5	121.	H1②	141.	W30	121.	W31	141.
	50	45	2	W6	238.	W7	256.	W32	249.	W33	267.
	100	90	3	W8	346.	W9	379.	W34	361.	W35	394.
	150	135	4	W10	674.	W11	726.	W36	690.	W37	744.
	300	270	5	W12	942.	W13	1216.	W38	960.	W39	1234.
3	15	13.5	0	W14	152.	W15	154.	W40	161.	W41	165.
	25	22	1	W16	161.	W17	168.	W42	170.	W43	176.
	50	45	2	W18	249.	W19	267.	W44	262.	W45	280.
	100	90	3	W20	363.	W21	396.	W46	379.	W47	412.
	150	135	4	W22	706.	W23	760.	W48	724.	W49	776.
	300	270	5	W24	1018.	W25	1294.	W50	1036.	W51	1312.

① Rated 15 amps.—240 V., 30 amps.—120 V.

② 120 V. applications only. For 240 V. Order 6007H2.



2 Pole—Size 3
NEMA 1 Enclosure

DISCOUNT SCHEDULE 1 CD

DIMENSIONS, next page

CUTLER-HAMMER

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WOUND ROTOR,
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL.

MOTOR CONTROL
CENTERS
—UNITROL ③

DC MOTOR CONTROL

MOTOR CONTROL
FOR
SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

HEATER COILS
FOR
OVERLOAD RELAYS

MOTOR CONTROL FOR SPECIFIC APPLICATIONS

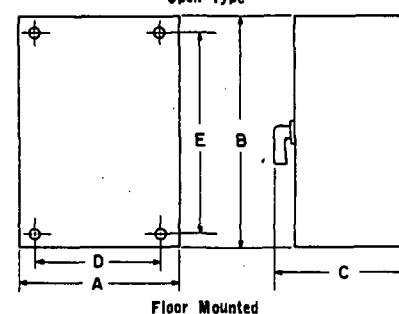
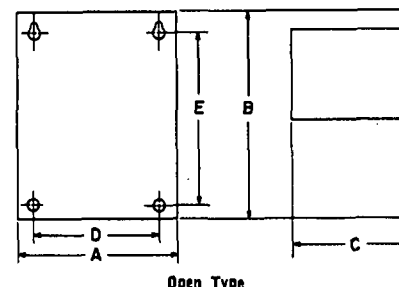
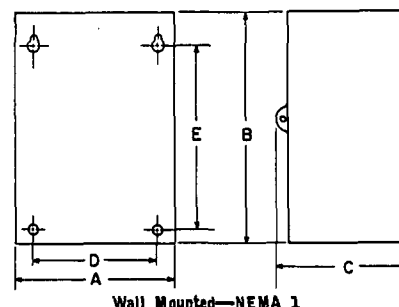


Automatic Transfer Panels

APPROXIMATE DIMENSIONS AND SHIPPING WEIGHTS

Size	Number of Poles	General Purpose Enclosure—NEMA 1						Open Type						Ship. Wt. Lbs.
		Dimensions in Inches					Ship. Wt. Lbs.	Dimensions in Inches						
		Wide A	High B	Deep C	Mounting			Wide A	High B	Deep C	Mounting			
					D	E					D	E		
A-C NORMAL POWER SUPPLY														
0	2, 3 & 4	16½	22½	8½	13½	20	25	14	18	4½	12½	16	15½	
1	2, 3 & 4	16½	22½	8½	13½	20	25	14	18	4½	12½	16	19	
2	2, 3 & 4	16½	22½	8½	13½	20	60	14	18	6½	12½	16	35½	
3	2, 3 & 4	18½	24½	10½	15½	22	90	16	20	7½	14½	18	50	
4	2, 3 & 4	22½	30½	10½	19½	28	120	20	24	7½	18½	22	60	
5	2 & 3	26½	34½	10½	23½	32	200	24	28	7½	22½	26	80	
6	2	32	72	26	Floor Mtd.	1000	28	48	1½	26	22	600		
6	3	32	72	26	Floor Mtd.	1150	28	48	1½	26	22	650		
D-C NORMAL POWER SUPPLY														
D-c To A-c														
0-1	2 & 3	12½	17½	8½	10	15	27	12	13	5	10½	11	21	
2	2 & 3	17	24½	13½	14	22	45	16	20	5	14½	18	32½	
3	2	17	30½	13½	14	28	70	16	24	6	14½	22	53	
3	3	21	30½	13½	18	28	80	20	24	6	18½	22	60	
4	2	21	30½	13½	18	28	190	20	24	7	18½	22	175	
4	3	21	34½	13½	18	32	220	20	28	7	18½	26	200	
5	2	28	72	24	Floor Mtd.	280	24	48	12	22	44	250		
5	3	32	72	24	Floor Mtd.	315	28	48	12	26	44	285		
D-c To D-c														
0-1	2	12½	21	10½	10	18	25	12	16	6	10½	14	20	
0-1	3	21	30½	10½	18	28	28	20	24	5	18½	22	22	
2	2	12½	20½	10½	10	18	40	12	16	6	10½	14	30	
2	3	21	30½	10½	18	28	50	20	24	5	18½	22	35	
3	2	17	30½	10½	14	28	70	16	24	6	14½	22	53	
3	3	21	30½	10½	18	28	80	20	24	6	18½	22	60	
4	2	25	34½	13½	22	28	190	24	28	7	22½	26	175	
4	3	25	38½	13½	22	32	220	24	32	7	22½	30	200	
5	2	28	72	24	Floor Mtd.	280	24	40	9	22	36	250		
5	3	32	72	24	Floor Mtd.	315	28	40	9	26	36	285		

① Dimension is maximum extension of contactors from front of panel.



A-c Lighting Contactors

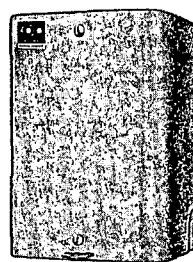
WHEN ORDERING SPECIFY

• Catalog number • Voltage and frequency

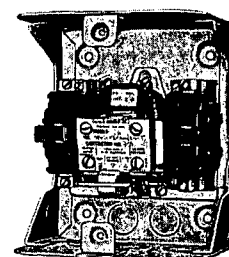
Maximum Line Voltage—480 V., 25-50-60 Cycles
Maximum Load Voltage—277 V., 25-50-60 Cycles

Maximum Ampere Rating	No. of Poles	Electrically Held				Mechanically Held			
		Open Type		General Purpose NEMA 1		Open Type		General Purpose NEMA 1	
		Cat. No.	Price	Cat. No.	Price	Cat. No.	Price	Cat. No.	Price
30	2	9560-W73	\$31.	9560-W74	\$33.	9560-...	...	9560-...	...
	3	W75	34.	W76	36.	...	...	...	...
	4	W77	42.	W78	44.	...	...	...	...
60	2	W79	58.	W80	68.	W103	\$96.	W104	\$104.
	3	W81	62.	W82	72.	W105	100.	W106	108.
	4	W83	80.	W84	90.	W107	120.	W108	128.
100	2	W85	92.	W86	112.	W109	128.	W110	146.
	3	W87	100.	W88	120.	W111	136.	W112	154.
	4	W89	128.	W90	148.	W113	166.	W114	184.
200	2	W91	222.	W92	264.	W115	316.	W116	374.
	3	W93	240.	W94	282.	W117	342.	W118	422.
	4	W95	334.	W96	376.	W119	436.	W120	516.
300	2	W97	481.	W98	558.	W121	530.	W122	654.
	3	W99	523.	W100	600.	W123	548.	W124	718.
	4	W101	961.	W102	1115.	---	---	---	---

Dimensions and Weights on Request.



NEMA Type 1 Enclosure



30 Amp. Contactor

OPTIONAL FEATURES

Description	Price Addition
Auxiliary Contact—Either Normally Open or Normally Closed.....	—For Field Installation \$6. —Factory Installation 11.
On-Off Pushbutton in cover NEMA 1 Enclosure (includes auxiliary contact).....	19.
Pilot Light in cover of NEMA 1 Enclosure.....	15.



MOTOR and WIRE RATING DATA

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MAGNET COIL SUFFIX NUMBERS — Apply to Catalog Numbers 9560 9575, 9584, 9586, 9589, 9594, 9656, 9658, 9736 and 9739 only.

Voltage	Frequency		
	60 cycles	50 cycles	25 cycles
6	-26	-30	-34
12	-27	-31	-35
24	-28	-32	-36
32	-29	-33	-37
110	-1	-5	-10
115	-14	-16	-18
115/120	-46	---	---
115/230	-20	-21	-22
120	-39	-43	-44
208	-45	---	---
208/220	-2	---	---
220	-42	-6	-11
220/240	-23	-24	-25
230	-15	-17	-19
240	-40	---	---
380	---	-7	---
440	-3	-8	-12
480	-41	---	---
500	---	-38	---
550	-4	-9	-13

This section contains:

Pages

Magnet coil suffix numbers	269
Average motor ampere ratings	272-273
Motor branch circuit fuse, wire and circuit breaker selection	271
Relay operating times	278
Resistors — service classifications and recommendations	276-278
Transformer selection for control circuits	274-275
Wire:	
Current-carrying capacities	270
Motor branch circuit selection	271
Number per conduit or raceway	269
Voltage drop	270

WIRE and CONDUIT TABLES — Based on 1962 N.E.C.

MAXIMUM NUMBER OF CONDUCTORS IN CONDUIT OR TUBING — Types RF-2, RFH-2, R, RH, RW, RH-RW, RHW, RHH, RU, RUH, RUW, SF, SFF, TF, T, TW, THW and THWN (See sections 300-17, 300-18, 346-6 and 348-6 of 1962 N.E.C.) — Derating factor for more than three conductors in raceways, see Note 8 on next page.

Wire Size AWG or MCM	Maximum Number of Conductors in Conduit or Tubing (Based upon % conductor fill, Table 3, Chap. 9, for new work)											
	½ Inch	¾ Inch	1 Inch	1¼ Inch	1½ Inch	2 Inch	2½ Inch	3 Inch	3½ Inch	4 Inch	5 Inch	6 Inch
18	7	12	20	35	49	80	115	176				
16	6	10	17	30	41	68	98	150				
14	4	6	10	18	25	41	58	90	121	155		
12	3	5	8	15	21	34	50	76	103	132	208	
10	1	4	7	13	17	29	41	64	86	110	173	
8	1	3	4	7	10	17	25	38	52	67	105	152
6	1	1	3	4	6	10	15	23	32	41	64	93
4	1	1	1	3	5	8	12	18	24	31	49	72
3		1	1	3	4	7	10	16	21	28	44	63
2		1	1	3	3	6	9	14	19	24	38	55
1		1	1	1	3	4	7	10	14	18	29	42
0			1	1	2	4	6	9	12	16	25	37
00			1	1	1	3	5	8	11	14	22	32
000			1	1	1	3	4	7	9	12	19	27
0000			1	1	1	2	3	6	8	10	16	23
250				1	1	1	3	5	6	8	13	19
300				1	1	1	3	4	5	7	11	16
350				1	1	1	1	3	5	6	10	15
400					1	1	1	3	4	6	9	13
500					1	1	1	3	4	5	8	11
600						1	1	1	3	4	6	9
700						1	1	1	3	3	6	8
750						1	1	1	3	3	5	8
800						1	1	1	2	3	5	7
900						1	1	1	1	3	4	7
1000						1	1	1	1	3	4	6
1250							1	1	1	1	3	5
1500								1	1	1	3	4
1750								1	1	1	2	4
2000								1	1	1	1	3

① Where an existing service run of conduit or electrical metallic tubing does not exceed 50 ft. in length and does not contain more than the equivalent of two quarter bends from end to end, two No. 4 insulated and one No. 4 bare conductors may be installed in 1-inch conduit or tubing.

CUTLER-HAMMER

269

WOUND ROTOR,
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL

MOTOR CONTROL
CENTERS
— UNITROL ®

DC MOTOR CONTROL

MOTOR CONTROL
FOR
SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

HEATER COILS
FOR
OVERLOAD RELAYS

MOTOR and WIRE RATING DATA

Wire and Conduit Tables (Continued) — Based on 1962 N.E.C.

TABLES 310-12, 310-14 ALLOWABLE CURRENT-CARRYING CAPACITIES OF INSULATED COPPER (Cu.) AND ALUMINUM (Al.) CONDUCTORS IN AMPERES — Not more than three conductors in raceway or cable or direct burial — Based on room temperature of 30°C., 86°F.

APPROXIMATE VOLTAGE DROP
(Copper Conductor)

Wire Size AWG or MCM	Rubber Type R Type RW		Rubber Type RH Type RH-RW (See Note 9 below)		Paper Thermo-plastic Asbestos Type TA		Asbestos Var-Cam Type V		Asbestos Type AVA Type AVL		Impregnated Asbestos Type AI (14-8) Type AIA		Asbestos Type AA (14-8) Type AA	
	Type RU, Type RUW, (14-2)		Type RH-RW (See Note 9 below)		Thermo-plastic Type TBS		Asbestos Var-Cam Type V		Asbestos Type AVA Type AVL		Impregnated Asbestos Type AI (14-8) Type AIA		Asbestos Type AA (14-8) Type AA	
	Type RH-RW (See Note 9 below)		Type THW		MI Cable Type RH		Asbestos Type AVA Type AVL		Asbestos Type AVA Type AVL		Impregnated Asbestos Type AI (14-8) Type AIA		Asbestos Type AA (14-8) Type AA	
	Cu.	Al.	Cu.	Al.	Cu.	Al.	Cu.	Al.	Cu.	Al.	Cu.	Al.	Cu.	Al.
14	15	---	15	---	25	---	30	---	30	---	30	---	30	---
12	20	15	20	15	30	25	35	25	40	30	40	30	40	30
10	30	25	30	25	40	30	45	35	50	40	55	45	55	45
8	40	30	45	40	50	40	60	45	65	50	70	55	70	55
6	55	40	65	50	70	55	80	60	85	65	95	75	95	75
4	70	55	85	65	90	70	105	80	115	90	120	95	120	95
3	80	65	100	75	105	80	120	95	130	100	145	115	145	115
2	95	75	115	90	120	95	135	105	145	115	165	130	165	130
1	110	85	130	100	140	110	160	125	170	135	190	150	190	150
0	125	100	150	120	155	125	190	150	200	160	225	180	225	180
00	145	115	175	135	185	145	215	170	230	180	250	200	250	200
000	165	130	200	155	210	165	245	195	265	210	285	225	285	225
0000	195	155	230	180	235	185	275	215	310	245	340	270	340	270
250	215	170	255	205	270	215	315	250	335	270	---	---	---	---
300	240	190	285	230	300	240	345	275	380	305	---	---	---	---
350	260	210	310	250	325	260	390	310	420	335	---	---	---	---
400	280	225	335	270	360	290	420	335	450	360	---	---	---	---
500	320	260	380	310	405	330	470	380	500	405	---	---	---	---
600	355	285	420	340	455	370	525	425	545	440	---	---	---	---
700	385	310	460	375	490	395	560	455	600	485	---	---	---	---
750	400	320	475	385	500	405	580	470	620	500	---	---	---	---
800	410	330	490	395	515	415	600	485	640	520	---	---	---	---
900	435	355	520	425	555	455	---	---	---	---	---	---	---	---
1000	455	375	545	445	585	480	680	560	730	600	---	---	---	---
1250	495	405	590	485	645	530	---	---	---	---	---	---	---	---
1500	520	435	625	520	700	580	785	650	---	---	---	---	---	---
1750	545	455	650	545	735	615	---	---	---	---	---	---	---	---
2000	560	470	665	560	775	650	840	705	---	---	---	---	---	---

CORRECTION FACTORS, ROOM TEMPERATURES OVER 30°C. or 86°F.

C.	F.						
40	104	.82	.88	.90	.94	.95	---
45	113	.71	.82	.85	.90	.92	---
50	122	.58	.75	.80	.87	.89	---
55	131	.41	.67	.74	.83	.86	---
60	140	---	.58	.67	.79	.83	.91
70	158	---	.35	.52	.71	.76	.87
75	167	---	---	.43	.66	.72	.86
80	176	---	---	.30	.61	.69	.84
90	194	---	---	---	.50	.61	.80
100	212	---	---	---	---	.51	.77
120	248	---	---	---	---	---	.69
140	284	---	---	---	---	---	.59

① For AWG sizes 12, 10 and 8 use capacities listed for Type RH.

② For 3 wire, single phase service and sub-service circuits capacities of conductors RH, RH-RW, RHH, RHW and THW shall be: #2-100A, #1-110A, #0-125A, #00-150A, #000-170A and #0000-200A.

NOTES TO TABLES 310-12, 310-14

8. More Than Three Conductors in a Raceway or Cable. Tables 310-12 and 310-14 give the allowable current-carrying capacities for not more than three conductors in a raceway or cable. Where the number of conductors in a raceway or cable exceeds three, the allowable current-carrying capacity of each conductor shall be reduced as shown in the following Table:

Number of Conductors	Per Cent of Values in Tables 310-12 and 310-14
4 to 6	80
7 to 24	70
25 to 42	60
43 and above	50

Exception — When conductors of different systems, as provided in Section 300-3, are installed in a common raceway the derating factors shown above apply to the number of Power and Lighting (Articles 210, 215, 220 and 230) conductors only.

Where single conductor or multi-conductors cables are stacked or bundled without maintaining spacing and are not installed in raceways, the individual current-carrying capacity of each conductor shall be reduced as shown in the above table.

9. Where Type RH-RW rubber insulated wire is used in wet locations the allowable current-carrying capacities shall be that listed in columns 2 or 3.

Where used in dry locations the allowable current-carrying capacities shall be that listed in columns 4 or 5.

10. Overcurrent Protection. Where the standard ratings and setting of overcurrent devices do not correspond with the ratings and settings allowed for conductors, the next higher standard rating and setting may be used.

Except as limited in Section 240-5.

11. Neutral Conductor. A neutral conductor which carries only the unbalanced current from other conductors, as in the case of normally balanced circuits of

three or more conductors, shall not be counted in determining current-carrying capacities as provided for in Note 8.

In a 3-wire circuit consisting of two phase wires and the neutral of a 4-wire, 3-phase WYE connected system, a common conductor carries approximately the same current as the other conductors and is not therefore considered as a neutral conductor.

12. Voltage Drop. The allowable current-carrying capacities in Tables 310-12 and 310-14 are based on temperature alone and do not take voltage drop into consideration. (See table above — right.)

14. Aluminum Sheathed Cable. The current-carrying capacities of Type ALS cable are determined by the temperature limitation of the insulated conductors incorporated within the cable. Hence the current-carrying capacities of aluminum sheathed cable may be determined from the columns in Tables 310-12 and 310-14 applicable to the type of insulated conductors employed within the cable.



MOTOR and WIRE RATING DATA

Wire, Fuse and Circuit Breaker Selection Tables FOR MOTOR BRANCH CIRCUITS—ADOPTED FROM 1962 N. E. CODE

For exceptions, see note at head of table 430-146, 1962 N. E. C., also see paragraphs 430-22, 430-24, 430-34, and 430-59 of 1962 N. E. C.

Full load current rating of motor Amps.	Min. allowable size of copper conductor A.W.G. or Cir. Mil. for four conductors in raceways.		For running protection of motors		Maximum Allowable Rating of Setting of Branch Circuit Protective Devices					
	Type R, RW, RU, RUW	Type RH	Max. setting non-adjustable protective devices	Max. setting adjustable protective devices	② Single phase, squirrel-cage, and synchronous, (full voltage, reactor and resistor starting)		② Squirrel cage and synchronous (auto-transformer starting)		D.C. and Wound Rotor A.C. (Without code letters)	
					① Max. allowable rating of br. circuit fuses	③ Max. allowable circuit breaker rating	① Max. allowable rating of br. circuit fuses	③ Max. allowable circuit br. rating squirrel cage and synchronous (auto-transformer starting)	① Max. allowable rating of branch circuit fuses	③ Max. allowable circuit breaker rating
					Amps.	Amps.	Amps.	Amps.	Amps.	Amps.
1	14	14	5	2	15	15	15	15	15	15
2	14	14	5	3	15	15	15	15	15	15
3	14	14	5	4	15	15	15	15	15	15
4	14	14	5	6	15	15	15	15	15	15
5	14	14	5	8	15	15	15	15	15	15
6	14	14	5	10	20	15	15	15	15	15
7	14	14	5	12	25	20	20	15	15	15
8	14	14	5	15	25	20	20	20	15	15
9	14	14	5	18	30	30	25	20	15	15
10	14	14	5	20	30	30	25	20	15	15
12	14	14	5	25	40	30	30	30	20	20
14	12	12	5	30	45	40	35	30	25	30
16	12	12	5	35	50	40	40	40	25	30
18	10	10	25	40	60	50	45	40	30	30
20	10	10	25	45	60	50	50	40	30	30
22	10	10	30	50	70	70	60	50	35	40
24	10	10	30	55	80	70	60	50	40	40
26	8	8	35	60	80	70	70	70	40	40
28	8	8	35	65	90	70	70	70	45	50
30	8	8	40	70	90	100	80	70	45	50
32	8	8	40	75	100	100	70	70	50	50
34	6	6	45	80	110	100	70	70	60	70
36	6	6	45	85	110	100	80	100	60	70
38	6	6	50	90	125	100	80	100	60	70
40	6	6	50	95	125	100	80	100	60	70
42	6	6	50	100	125	125	90	100	70	70
44	6	6	60	105	125	125	90	100	70	70
46	4	6	60	110	150	125	100	100	70	70
48	4	6	60	115	150	125	100	100	80	100
50	4	6	60	120	150	125	100	100	80	100
52	4	6	70	125	175	150	110	125	80	100
54	4	4	70	130	175	150	110	125	90	100
56	4	4	70	135	175	150	125	125	90	100
58	3	4	70	140	175	150	125	125	90	100
60	3	4	80	145	200	150	125	125	90	100
62	3	4	80	150	200	175	125	125	100	100
64	3	4	80	155	200	175	150	150	100	100
66	2	4	80	160	200	175	150	150	100	100
68	2	4	90	165	225	175	150	150	110	125
70	2	3	90	170	225	175	150	150	110	125
72	2	3	90	175	225	200	150	150	110	125
74	2	3	90	180	225	200	150	150	125	125
76	2	3	100	185	250	200	175	175	125	125
78	1	3	100	190	250	200	175	175	125	125
80	1	3	100	195	250	200	175	175	125	125
82	1	2	110	200	250	225	175	175	125	125
84	1	2	110	205	250	225	175	175	150	150
86	1	2	110	210	300	225	175	175	150	150
88	1	2	110	215	300	225	200	200	150	150
90	0	2	110	220	300	225	200	200	150	150
92	0	2	125	225	300	250	200	200	150	150
94	0	1	125	230	300	250	200	200	150	150
96	0	1	125	235	300	250	200	200	150	150
98	0	1	125	240	300	250	200	200	150	150
100	0	1	125	245	300	250	200	200	150	150
105	00	1	150	250	350	300	225	225	175	175
110	00	0	150	255	350	300	225	225	175	175
115	00	0	150	260	350	300	250	250	175	175
120	000	0	150	265	400	300	250	250	200	200
125	000	00	175	270	400	350	250	250	200	200
130	000	00	175	275	400	350	300	300	200	200
135	0000	00	175	280	450	350	300	300	225	225
140	0000	00	175	285	450	350	300	300	225	225
145	0000	000	200	290	450	400	300	300	225	225
150	0000	000	200	295	450	400	300	300	225	225

① Adopted from Table 430-146, N. E. C. Code.

② The N. E. C. classifies motors by code letters. The values shown are for motors with code letters F to Y inclusive and motors without code letters. For motors with code letters A to E inclusive refer to N. E. Code, Tables 430-146 and 430-152.

③ Adopted from Table 430-153, N. E. C. Code.

④ For the grouping of small motors under the protection of a single set of fuses see Section 430-53 N. E. Code.

⑤ For the running protection of motors of 1 H.P. and less see Section 430-32 N. E. Code.

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MOTOR & WIRE
RATING DATA

HEATER COILS
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MOTOR and WIRE RATING DATA **Ampere Rating of A-c and D-c Motors**



The ampere ratings of motors vary somewhat, depending upon the type of motor. The values given below can be considered average for the various types and are to be used only when the actual full load current is not known. In the case of high torque squirrel cage motors, the ampere ratings will be at least 10% greater than the values given below:

For 25 cycle motors the current in most cases will be equivalent to the current

of a 60 cycle motor having the same number of poles, i.e., for 1500 R.P.M., 25 cycles, use data for 3600 R.P.M., 60 cycles; for 750 R.P.M., 25 cycles, use data for 1800 R.P.M., 60 cycles; etc. This rule will be found quite accurate for 25 cycle motors above 500 R.P.M. For motors 500 R.P.M. or less, particularly the smaller sizes below 20 Hp, the current will be somewhat higher (5% to 15%) than the equivalent 60 cycle motor.

AMPERE RATINGS OF THREE PHASE, 60 CYCLE, A-C INDUCTION MOTORS

Hp	Syn. Speed RPM	Current in Amperes					
		110 Volts	220 Volts	380 Volts	440 Volts	550 Volts	2200 Volts
1/4	1800	1.9	.95	.55	.48	.38	
	1200	2.8	1.40	.81	.70	.56	
	900	3.2	1.60	.93	.80	.64	
1/2	1800	2.38	1.19	.69	.60	.48	
	1200	3.18	1.59	.92	.80	.64	
	900	3.60	1.80	1.04	.90	.72	
3/4	1800	3.36	1.68	.973	.84	.67	
	1200	4.14	2.07	1.20	1.04	.83	
	900	5.80	2.90	1.68	1.45	1.16	
1	1800	4.66	2.33	1.35	1.17	.93	
	1200	5.70	2.85	1.66	1.43	1.14	
	900	6.90	3.45	2.00	1.73	1.38	
1 1/2	3600	5.50	2.75	1.60	1.38	1.10	
	1800	6.10	3.05	1.77	1.53	1.22	
	1200	7.08	3.54	2.05	1.77	1.42	
	900	7.48	3.74	2.17	1.87	1.50	
2	3600	8.34	4.17	2.42	2.09	1.67	
	1800	8.56	4.28	2.48	2.14	1.71	
	1200	9.70	4.85	2.81	2.43	1.94	
	900	11.60	5.81	3.37	2.91	2.32	
3	3600	11.1	5.56	3.22	2.78	2.22	
	1800	11.5	5.76	3.34	2.88	2.30	
	1200	12.7	6.35	3.68	3.18	2.54	
	900	14.4	7.21	4.18	3.61	2.88	
5	3600	15.7	7.87	4.56	3.94	3.14	
	1800	16.6	8.29	4.79	4.14	3.32	
	1200	17.8	8.92	5.16	4.46	3.56	
	900	20.4	10.20	5.89	5.09	4.08	
7 1/2	3600	25.4	12.7	7.34	6.34	5.08	
	1800	26.4	13.2	7.64	6.60	5.28	
	1200	28.2	14.1	8.16	7.05	5.64	
	900	31.2	15.6	9.03	7.80	6.24	
10	3600	38.4	19.2	11.1	9.6	7.68	
	1800	38.6	19.3	11.2	9.7	7.72	
	1200	40.6	20.3	11.8	10.2	8.12	
	900	47.6	23.8	13.8	11.9	9.51	
15	3600	49.0	24.5	14.2	12.3	9.8	
	1800	50.4	25.2	14.6	12.6	10.1	
	1200	53.2	26.6	15.4	13.3	10.6	
	900	57.8	28.9	16.8	14.5	11.6	
20	3600	67.6	33.8	19.6	16.9	13.5	
	1800	73.4	36.7	21.3	18.4	14.7	
	1200	76.2	38.1	22.1	19.1	15.2	
	900	79.8	39.9	23.2	20.0	16.0	
25	3600	83.8	41.9	24.3	21.0	16.8	
	1800	88.3	44.3	26.0	22.4	18.3	
	1200	98.	49.0	28.4	24.5	19.6	5.2
	900	101.	50.5	29.3	25.3	20.2	5.3
30	3600	103.	51.7	30.0	25.9	20.6	5.4
	1800	109.	54.6	31.6	27.3	21.8	5.8
	1200	123.	61.5	35.7	30.8	24.6	6.4
	900	123.	61.5	35.7	30.8	24.6	6.4

Hp	Syn. Speed RPM	Current in Amperes					
		110 Volts	220 Volts	380 Volts	440 Volts	550 Volts	2200 Volts
40	1800	196.	98.	56.7	49.0	39.2	10.0
	1200	198.	99.	57.3	49.5	39.6	10.3
	900	208.	104.	60.2	52.0	41.6	10.6
	600	226.	113.	65.4	56.5	45.2	11.5
50	1800	242.	121.	70.0	60.5	48.4	12.3
	1200	244.	122.	70.6	61.0	48.8	12.4
	900	254.	127.	73.5	63.5	50.8	13.1
	600	276.	138.	79.9	69.0	55.2	14.2
60	1800	286.	143.	82.8	71.5	57.2	14.6
	1200	296.	148.	85.7	74.0	59.2	14.9
	900	302.	151.	87.4	75.5	60.4	15.4
	600	324.	162.	93.8	81.0	64.8	16.7
75	1800	356.	178.	103.	89.0	71.2	18.0
	1200	362.	181.	105.	90.5	72.4	18.2
	900	374.	187.	108.	93.5	74.8	19.0
	600	398.	199.	115.	99.5	79.6	21.0
100	1800	466.	233.	134.	116.	93.2	23.6
	1200	478.	239.	139.	120.	95.6	24.2
	900	490.	245.	142.	123.	98.0	24.8
	600	514.	257.	148.	128.	103.	26.4
125	450	580.	290.	168.	145.	116.	29.8
	1800	578.	289.	167.	144.	115.	29.2
	1200	596.	298.	173.	149.	119.	29.9
	900	610.	305.	177.	153.	122.	30.9
150	720	628.	314.	182.	157.	126.	31.3
	600	640.	320.	185.	160.	128.	32.8
	450	702.	351.	203.	175.	140.	36.0
	1800	692.	346.	200.	173.	138.	34.8
200	1200	700.	350.	203.	175.	140.	35.5
	900	726.	363.	211.	182.	145.	37.0
	720	752.	376.	218.	188.	150.	37.0
	600	756.	378.	219.	189.	151.	38.8
250	450	836.	418.	242.	209.	166.	42.0
	1800	920.	460.	266.	230.	184.	46.7
	1200	932.	466.	270.	233.	186.	47.0
	900	980.	490.	284.	245.	196.	49.4
300	720	988.	494.	286.	247.	197.	49.0
	600	996.	498.	288.	249.	199.	50.9
	450	1060.	528.	306.	264.	211.	53.7
	1800	1140.	572.	331.	286.	229.	57.5
400	1200	1160.	580.	336.	290.	232.	58.5
	900	1210.	604.	350.	302.	242.	61.5
	720	1250.	625.	361.	312.	250.	61.5
	600	1260.	630.	365.	315.	252.	61.0
500	450	1260.	630.	365.	315.	252.	65.3
	360	1350.	676.	391.	338.	270.	70.0
	1800	1370.	685.	396.	342.	274.	69.0
	1200	1390.	696.	403.	348.	278.	70.0
600	900	1440.	722.	418.	361.	289.	73.5
	720	1440.	722.	418.	361.	289.	72.3
	450	1520.	760.	440.	380.	304.	76.0
	360	1660.	830.	481.	415.	332.	82.8
800	1800	1820.	910.	527.	455.	364.	91.8
	1200	1870.	933.	540.	466.	373.	93.5
	900	1910.	955.	552.	477.	382.	96.0
	450	2000.	1000.	579.	500.	400.	100.
1000	360	2090.	1050.	606.	523.	418.	105.
	1800	2310.	1160.	669.	578.	462.	116.
	1200	2240.	1120.	648.	560.	448.	113.
	900	2360.	1180.	683.	590.	472.	118.
1200	450	2410.	1200.	697.	602.	482.	124.
	360	2630.	1320.	762.	658.	526.	132.

**MOTOR and WIRE RATING DATA****Ampere Rating of A-c and D-c Motors****AMPERE RATINGS OF TWO PHASE, 60 CYCLE, A-C INDUCTION MOTORS**

For 2 phase, 4 wire motors, multiply the current rating in amperes given for 3 phase motors by 0.866.

For 2 phase, 3 wire motors, multiply the current rating in amperes given for 3 phase motors by 0.866 for the outside lines. The current in the common line will be 1.4 times the current in the outside lines.

AMPERE RATINGS OF SINGLE PHASE A-C MOTORS

The following table of full load current values conforms with Table 430-148 N. E. Code. Different types and makes of motors may vary considerably above or below the current values given in this table. Selection of overload relay coils, whenever possible, should be made from actual motor current as shown on the motor nameplate or as obtained from the motor manufacturer.

Hp	① Full Load Current		
	115 Volts	230 Volts	440 Volts
1/8	4.4	2.2	---
1/4	5.8	2.9	---
1/2	7.2	3.6	---
3/4	9.8	4.9	---
1	13.8	6.9	---
1 1/2	16.	8.	---
2	20.	10.	---
3	24.	12.	---
5	34.	17.	---
7 1/2	56.	28.	---
10	80.	40.	21.
	100.	50.	26.

To obtain full-load currents of 208- and 200-volt motors, increase corresponding 230-volt motor full-load current by 10 and 15 per cent, respectively.

① These values of full-load current are for motors running at usual speeds and motors with normal torque characteristics. Motors built for especially low speeds or high torques may have higher full-load currents in which case the nameplate current ratings should be used.

AMPERE RATINGS OF THREE PHASE SYNCHRONOUS MOTORS

Hp	Assumed Efficiency	Amperes at 100% Power Factor				
		220 Volts	440 Volts	550 Volts	2200 Volts	4000 Volts
25	87.0	56	28	22.5	---	---
30	88.0	67	33.5	27	---	---
40	89.0	88	44	35	9	---
50	89.5	110	55	44	11	---
60	90.0	131	66	53	13.1	---
75	91.0	162	81	65	16.2	---
100	91.5	214	107	86	21.4	12
125	91.5	268	134	107	27	15
150	92.0	320	160	128	32	17.5
200	92.0	426	213	171	43	24
250	92.5	526	263	212	53	29
300	92.5	636	318	255	64	35
350	93.5	734	372	298	74	41
400	93.5	840	420	336	84	46
450	93.5	942	471	378	94	52
500	94.0	1045	523	418	105	58
550	94.0	1148	574	460	115	63
600	94.0	1250	625	500	125	69
650	94.5	1350	675	540	135	75
700	94.5	1450	725	580	145	80
750	94.5	1560	780	625	156	86
800	95.0	1660	830	665	166	91
900	95.0	1860	930	745	186	102
1000	95.0	2060	1030	825	206	113

Amperes given above are based on an average efficiency for given H.P. at all speeds. For instance, 25 H.P. amperes are based on 87% efficiency for all speeds and 1000 H.P. on 95% efficiency for all speeds.

For 2 Phase Amperes multiply values in table by .866.

For 80% P. F. amperes multiply 100% P. F. values by 1.29.

D-C MOTORS—AMPERE RATINGS AND FUSE SIZES

Hp	Ratings of D-c Motors		Amp. Cap. of Fuses for Motors	
	Full-Load Amperes		Recommended Values	
	120 Volts	240 Volts	120 Volts	240 Volts
1/8	1.4	.7	3	3
1/4	1.8	.9	3	3
1/2	2.9	1.5	5	3
3/4	3.6	1.8	5	3
1	5.2	2.6	7	3
1 1/2	7.4	3.7	10	5
2	9.4	4.7	15	7
3	13.2	6.6	20	10
5	17.	8.5	25	12
7 1/2	25.	12.2	30	15
10	40.	20.	50	25
15	58.	29.	80	40
20	76.	38	100	50
25	---	55	---	75
30	---	72	---	100
40	---	89	---	125
50	---	106	---	150
60	---	140	---	200
75	---	173	---	250
100	---	206	---	275
125	---	255	---	350
150	---	341	---	500
200	---	425	---	600
	---	506	---	---
	---	675	---	---

MOTOR and WIRE RATING DATA

Control Circuit Transformer Selection



A control circuit transformer will not overheat when operated at its maximum continuous volt-ampere (VA) rating, nor will its secondary output voltage fall below 95% of rated output voltage when selected according to the following recommendations:

- The continuous VA capacity of the transformer should be equal to or greater than any continuous maximum VA requirement of the controller.
- The inrush VA capacity of the transformer should be equal to or greater than maximum VA inrush which can occur for any combination of sealed and inrush VA requirements of the controller.

The VA values which fulfill these requirements may be readily calculated:

- The continuous sealed VA requirement is found by combining with the aid of the chart on page 275 the total sealed WATTS with the total sealed VAR. These two totals may be obtained from the Component VA Table. Tentatively choose a transformer with a VA or (KVA) rating equal to or greater than this value.
- The maximum VA inrush is similarly found by combining the maximum inrush WATTS which can occur with the corresponding maximum inrush VAR again with the aid of the chart on Page 275 and the Table. It may be necessary to use inrush values for all devices or a combination of inrush and sealed values depending upon what condition produces the maximum VA inrush for the specific controller.

The Percent Load Power Factor is found as follows:

$$\%PF = \frac{\text{Maximum Inrush WATTS}}{\text{Maximum Inrush VA}} \times 100$$

This maximum VA inrush at the calculated PF must be less than the value allowable on the inrush curve for the transformer selected according to (A).

Example: Assume that in a given circuit one size 1 starter, one type BG relay, and one type PT timer are energized. After an interval of time, one type DM, 2 N.O. relay and one size 5 starter are energized.

Select the transformer as follows:

(A) Continuous VA requirement:

Device	VAR	Watts
1 Size 1 starter sealed	43	16
1 Type BG relay sealed	40	14
1 Type PT—on delay timer sealed	25	8
1 Type DM relay sealed	---	(Latched)
1 Size 5 starter sealed	120	50
TOTAL SEALED	228 (VAR)	88 (Watts)

From Chart (Nomograph) Total Sealed
VA = 243.

Tentatively select a .25KVA transformer.

Percent Load Power Factor:

$$\text{Max. Inrush Watts} \times 100 = 653 \times 100 = 28.4\%$$

$$\text{PF in \%} = \frac{\text{Max. Inrush VA}}{2300}$$

The inrush (selection) curve for the .25 KVA transformer shows that 2300 VA at 28% power factor is higher than the inrush availability.

Therefore, the secondary voltage would drop below 95% (NEMA STD.) with this inrush, and the next larger, or .35 KVA transformer must be selected.

(B) Maximum VA inrush requirements:

Device	VAR	Watts
1 Size 1 starter sealed	43	16
1 Type BG relay sealed	40	14
1 Type PT—on delay timer sealed	25	8
1 Type DM relay inrush	210	255
1 Size 5 starter inrush	1894	360
TOTAL MAXIMUM INRUSH	2212 (VAR)	653 (Watts)

From Chart (Nomograph) Total Max. Inrush
VA = 2300.

COMPONENT VA TABLE

Component	Inrush			Sealed		
	VAR	Watts	VA	VAR	Watts	VA
Relays						
Type AA	18	8	20	8	7	10
Type BG and BC	102	21	105	40	14	42
Type CF	42	15	45	14	3	14
Type CF with latch	10	9	15	4	4	6
Type BJ	8	6	10	5	6	8
Type AF	8	6	10	5	6	8
Type DM — 1 N.O. or 1 N.O. and 1 N.C.	73	98	122	---	---	---
— All others	210	255	330	---	---	---
Type ET	---	4	---	---	4	---
Type MX	18	8	20	8	7	10
Type RS	---	4	---	---	4	---
Type TF	3	3	4	3	3	4
Type TH	4	4	5	4	4	5

Component	Inrush			Sealed		
	VAR	Watts	VA	VAR	Watts	VA
Timers						
Type SP — Motor	3	3	4	3	3	4
— Solenoid	57	50	76	13	2	13
Type PT — AD and AE	97	94	135	19	7	20
— BD off Delay	74	64	98	24	8	25
— BE on Delay	87	88	124	25	8	26
Contactors and Starters						
Size 0	102	24	105	40	14	42
Size 1	151	33	154	43	16	46
Size 2	532	136	550	83	21	86
Size 3	844	150	900	86	24	110
Size 4	946	164	960	83	26	87
Size 5	1894	360	1925	120	50	132



MOTOR and WIRE RATING DATA

Control Circuit Transformers Calculation Chart and Inrush Curves

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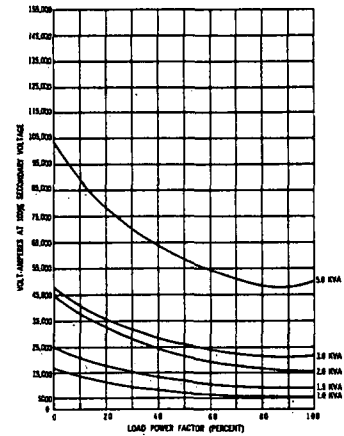
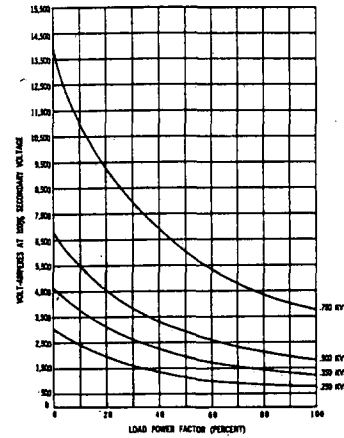
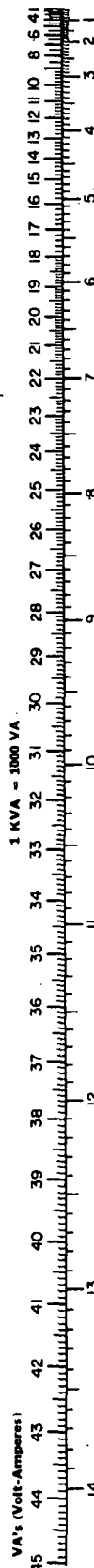
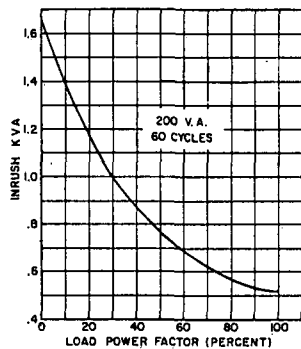
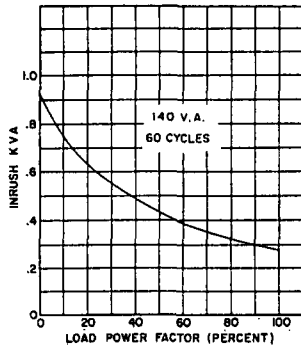
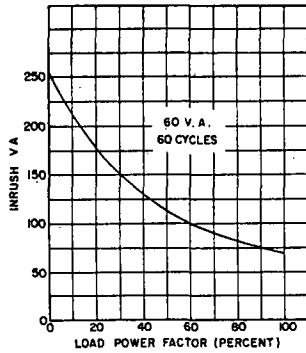
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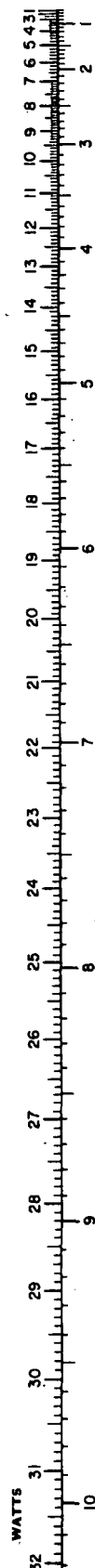
INSTRUCTIONS FOR CHART

The chart consists of the three scales on this page. To calculate VA place one end of a straight edge on the VAR scale (left) and the other end on the WATTS scale (right). Read VA where the straight edge intersects the VA scale* (center). Read numbers from either the left of each scale or the right. Do not use both left and right figures for a single calculation. Scales may be multiplied by 10 or 100, etc.

*This chart solves the equation

$$VA = \sqrt{(VAR^2) + (WATTS^2)}$$

Note: (A) If these curves are used for 50 cycles, secondary voltage drop will be 5% or less. (B) All transformers listed through 5 KVA include 5% voltage compensation at No Load in accordance with NEMA standards.



MOTOR and WIRE RATING DATA



Resistors — Service Classifications and Recommendations

SERVICE CLASSIFICATION OF RESISTORS

A. Resistors shall be designated by class numbers in accordance with Tables 1, 2, 3 and 4.

B. Starting- and intermittent-duty resistors are primarily designed for use with motors which require an initial torque corresponding to the stated per cent of full-load current on the first point and which require an average accelerating current (rms value) of 125 per cent of full-load current.

With a secondary-resistor alternating-current controller, the figures given in the tables for the per cent of full-load current on the first point, starting from rest, apply to rotor (secondary) current and to torque. The primary current will, in general, be a higher percentage of the full-load current.

C. Starting- and intermittent-duty primary resistors which are designed for use with squirrel-cage motors and which meet the test described in IC 1-13.42 (temperature test) are included in the tables.

D. Continuous-duty resistors shall be capable of carrying continuously the current for which they are designed.

E. An adjustable-speed motor having a given horsepower rating, when started with full field, generally requires a resistor having a larger ohmic value than does a constant-speed motor of the same horsepower rating. For this reason, the current on the first point and the capacity of the complete resistor of the same NEMA classification for an adjustable-speed motor may be different from that for a constant-speed motor of the same horsepower.

Note—A continuous-duty resistor shall be so designed that the controller may be operated continuously on any point when the load follows its normal speed-torque curve, except that it must not be operated continuously below the minimum speed specified.

TABLE 1 — Class Numbers of Resistors for Non-Reversing Service and Reversing Non-Plugging Service Without Armature Shunt or Dynamic Braking

Approximate Per Cent of Full-Load Current on First Point Starting from Rest	Class Numbers						
	Duty Cycles						
	5 Sec. On 75 Sec. Off	10 Sec. On 70 Sec. Off	15 Sec. On 75 Sec. Off	15 Sec. On 45 Sec. Off	15 Sec. On 30 Sec. Off	15 Sec. On 15 Sec. Off	*Continuous Duty
25	111	131	141	151	161	171	91
50	112	132	142	152	162	172	92
70	113	133	143	153	163	173	93
100	114	134	144	154	164	174	94
150	115	135	145	155	165	175	95
200 or over	116	136	146	156	166	176	96

*For speed-regulating duty, see Table 4.

When an armature shunt resistor is added, the class number shall include the suffix "AS". Example—Class 155-AS is a resistor which includes an armature shunt and which will allow an initial inrush of 150 per cent with the armature shunt open.

When a dynamic braking resistor is added, the class number shall include the suffix "DB". Example—Class 155-DB.

TABLE 2 — Class Numbers of Resistors for Reversing Plugging Service Without Armature Shunt or Dynamic Braking

Approximate Per Cent of Full-Load Current on First Point Starting from Rest with All Resistance in Circuit	Class Numbers			
	Duty Cycles			
	15 Seconds On 45 Seconds Off	15 Seconds On 30 Seconds Off	15 Seconds On 15 Seconds Off	Continuous Duty
25	151P	161P	171P	91P
50	152P	162P	172P	92P
70	153P	163P	173P	93P
100	154P	164P	174P	94P

Note—The class numbers apply to the complete resistor, but the duty cycles apply to the accelerating resistor only.

When an armature shunt resistor is added, the class number shall include the suffix "AS". Example—Class 153P-AS is a plugging resistor which includes an armature shunt and which will allow an initial inrush of 70 per cent with the armature shunt open.

When a dynamic braking resistor is added, the class number shall include the suffix "DB". Example—Class 153P-DB.

TABLE 3 — Class Numbers of Resistors for Dynamic Lowering Crane and Hoist Controllers

Approximate Per Cent of Full-Load Current on First Point Hoisting Starting from Rest without Armature Shunt	Class Numbers			
	Duty Cycles			
	15 Seconds On 45 Seconds Off	15 Seconds On 30 Seconds Off	15 Seconds On 15 Seconds Off	Continuous Duty
50	152DL	162DL	172DL	92DL
70	153DL	163DL	173DL	93DL

TABLE 4 — Class Numbers of Resistors for Continuous-Duty Speed-Regulating Services with Direct-Current Shunt Motors and Alternating-Current Wound Rotor Motors

Per Cent Speed Reduction	Class Numbers						
	Per Cent of Rated Motor Torque at Reduced Speed						
	40	50	60	70	80	90	100
5	405	505	605	705	805	905	1005
10	410	510	610	710	810	910	1010
15	415	515	615	715	815	915	1015
20	420	520	620	720	820	920	1020
25	425	525	625	725	825	925	1025
30	430	530	630	730	830	930	1030
35	435	535	635	735	835	935	1035
40	440	540	640	740	840	940	1040
45	445	545	645	745	845	945	1045
50	450	550	650	750	850	950	1050

Note I—See IC 1-2.04. NEMA standards for Industrial Control.

Note II—The stability of the motor speed obtained by simple rheostatic control is dependent upon the stability of the load on the motor. The degree of instability is directly proportional to the amount of speed reduction. Variations in load have a greater proportional effect on the speed when the load is light. For these reasons, Table 4 has not been carried beyond a speed reduction of 50 per cent and a load torque of 40 per cent.

Note III—With a direct-current shunt motor, the per cent of rated motor current which is obtained at the reduced speed is assumed to be the same as the per cent of rated torque.

With a wound-rotor motor and resistor in the motor circuit, the per cent of rated rotor (secondary) current which is obtained at the reduced speed is assumed to be the same as the per cent of rated torque.

Note IV—A speed-regulating resistor is so designed that it may be operated continuously at any point in the speed-regulating range when the load follows its normal speed-torque curve. When additional resistance is required to obtain the starting current specified, the additional portion of the resistor shall be designed for a duty cycle selected from Table 1. The resulting resistor may be completely specified by a compound number.

For example, 154/850 designates a resistor which is designed for starting and speed-regulating duty. The starting section is designed to allow 100 per cent of full-load current on the first point, starting from rest, and a duty cycle of 15 seconds on and 45 seconds off. The regulating section is designed to give 50 per cent speed reduction at 80 per cent of rated torque and for continuous duty when the load follows its normal speed-torque curve.

Note V—If the speed-regulating resistor alone is used, the approximate per cent of rated current which will be obtained on the first point of the controller, starting from rest, may be determined from the equation:

$$\text{Per Cent Current} = \frac{\text{Per cent torque at reduced speed}}{\text{Per cent speed reduction}} \times 100$$

**MOTOR and WIRE RATING DATA****Resistors — Service Classifications and Recommendations****RESISTOR APPLICATION TABLE**

The following table taken from NEMA rule IC1-13.80 is intended as a guide in specifying and designing resistors. The classifications recommended are those which experience has shown to be correct for the average installation. It is recognized that there will be exceptions.

Application	NEMA Class	Application	NEMA Class
BLOWERS		HOISTS — Winch	153
Centrifugal.....	133-93	Mine Slope.....	172 ①
Constant Pressure.....	135-95	Mine Vertical.....	162 ①
		Contractors Hoists.....	152
BRICK PLANTS		LARRY CARS	153
Augers.....	135		
Conveyors.....	135	LIFT BRIDGES	152
Dry Pans.....	135		
Pug Mills.....	135	MACHINE TOOLS	
BY PRODUCTS COKE PLANTS		Bending Rolls.....	163-164
Door Machine.....	153	Boring Mills.....	135
Leveler Ram.....	153	Bull Dozers.....	135
Pusher Bar.....	153	Drills.....	115
Valve Rev. Machines.....	153	Gear Cutters.....	115
CEMENT MILLS		Grinders.....	135
Conveyors.....	135	Hobbing Machines.....	115
Crushers.....	145	Lathes.....	115
Elevators.....	135	Milling Machines.....	115
Grinders—Pulverizers.....	135	Presses.....	135
Kilns.....	135-95	Punches.....	135
Rotary Dryers.....	145-95	Saws.....	115
COAL AND ORE BRIDGES		Shapers.....	115
Bridge (C-H Recommends 162).....	153	METAL MINING	
Closing.....	162	Ball—Rod—Tube Mills.....	135
Holding.....	162	Car Dumpers—Rotary.....	153
Trolley (C-H Recommends 162).....	162 and 163	Converters—Copper.....	154
COAL MINES		Conveyors.....	135
Car Hauls.....	162	Crushers.....	145
Conveyors.....	135-155	Tilting Furnace.....	153
Cutters.....	135	PAPER MILLS	
Crushers.....	145	Beaters.....	135
Fans.....	134-93	Calenders.....	154-92
Hoists—slope.....	172	PIPE WORKING	
vertical.....	162	Cutting and Threading.....	135
Jigs.....	135	Expanding and Flanging.....	135-95
Picking Tables.....	135	POWER PLANTS	
Rotary Car Dumpers.....	153	Clinker Grinders.....	135
Shaker Screens.....	135	Coal Crushers.....	135
COMPRESSORS		Conveyors—Belt.....	135
Constant Speed.....	135	Screw.....	135
Varying Speed.....		Pulverized Fuel Feeders.....	135
Centrifugal.....	93	Pulverizers—Ball Type.....	135
Plunger Type.....	95	Centrifugal.....	134
CONCRETE MIXERS	135	Stokers.....	135-93
CRANES — GENERAL PURPOSE — SERVICE CLASS II ②		PUMPS	
Bridge or Trolley — Sleeve Bearings.....	153	Centrifugal.....	134-93
Roller Bearings.....	152	Plunger.....	135-95
Hoist (C-H Recommends 152).....	152 and 153	RUBBER MILLS	
FLOUR MILLS		Calendars.....	155
Line Shafting.....	135	Crackers.....	135
FOOD PLANTS		Mixing Mills.....	135
Butter Churns.....	135	Washers.....	135
Dough Mixers.....	135		

① See NEMA Standard IC 1-45.60.

② See NEMA Standard IC 1-42.01.

MOTOR and WIRE RATING DATA



Resistors — Service Classifications and Recommendations

RESISTOR APPLICATION TABLE—Continued

Application	NEMA Class	Application	NEMA Class
STEEL MILLS		Screw Downs 153-163	
Accumulators.....	153	Shears.....	155
Casting Machines—Pig.....	153	Shuffle Bars.....	155
Charging Machines		Side Guards.....	153-163
Bridge.....	153-163	Sizing Rolls.....	155
Peel.....	153-163	Slab Buggy.....	155
Trolley.....	153-163	Soaking Pit Covers.....	155
Coiling Machines.....	135	Straighteners.....	153
Converters—Metal.....	154	Tables—Approach.....	153
Conveyors.....	135-155	Lift.....	153-163
Cranes — Service Class I, III, IV and V ①		Main Roll.....	153-163
Bridge or Trolley — Sleeve Bearings.....	153-163	Roll.....	153
Roller Bearings.....	152-162	Shear Approach.....	153-163
Hoist (C-H Recommends 152-162).....	152-153, 162-163	Transfer.....	153
Crushers.....	145	Tilting Furnace.....	153
Furnace Doors.....	155	Wire Stranding Machine.....	153
Gas Valves.....	155	WOOD WORKING PLANTS	
Gas Washers.....	155	Boring Machines.....	115
Hot Metal Mixers.....	163	Lathe.....	115
Ingot Buggy.....	153	Mortiser.....	115
Kickoff.....	153	Moulder.....	115
Levelers.....	153	Planers.....	115
Manipulator Fingers.....	153-163	Power Trimmer and Mitre.....	115
Pickling Machine.....	153	Sanders.....	115
Pilers—Slab.....	153	Saws.....	115
Racks.....	153	Shapers.....	115
Reelers.....	135	Shingle Machine.....	115
Saws—Hot or Cold.....	155		

① See NEMA Standard IC 1-42.01.

Operating Time of Relays

TYPE AA—Single Pole General Purpose Relays

OPERATING TIME IN MILLISECONDS

	Single Pole Single Throw		Single Pole Double Throw	
	A-c	D-c	A-c	D-c
Pick up (time for normally open contacts to close).....	11.0	26.	9.0	19.6
Pick up (time for normally closed contacts to open).....	8.4	17.	8.1	16.6
Drop out (time for normally open contacts to open).....	11.0	12.	10.2	14.8
Drop out (time for normally closed contacts to close).....	15.3	16.	13.1	17.2

TYPE CF—"Compact 300" Multi-Pole Industrial Control Relay

OPERATING TIME IN MILLISECONDS

	Relay Without Latch	Relay With Latch
Pick up (time for normally open contacts to close).....	8.1	8.1
Drop out (time for normally closed contacts to close).....	9.0	11.5

TYPE LR—A-c Load Current Relays

Pick up.....	50 Milliseconds
Drop out.....	16 Milliseconds

TYPE MX—Intrinsically Safe A-c Relays

Pick up.....	9 to 15 Milliseconds
Drop out.....	16 to 20 Milliseconds

TYPE TF—Standard Duty Transistor Sensitive Relays

Pick up.....	10 Milliseconds
Drop out.....	45 Milliseconds

TYPE TH—Heavy Duty Transistor Sensitive Relays

Pick up.....	25 Milliseconds
Drop out.....	20 Milliseconds



HEATER COILS FOR OVERLOAD RELAYS

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WHEN ORDERING SPECIFY

- **Heater Coil Catalog Number.**
- **To obtain Heater Coil Cat. Number,** determine selection table from index, Pages 279-282. Find selection table, pages 283-290 (see page guide). Use full load motor current to select heater coil within the correct current range.
- **Example.** Heater coil for size 0, Nema 1 enclosed, Full voltage non-reversing starter. Motor full load current—7.42 amps. From index—selection table is 20A; Selection table—page 284. Correct Heater Coil is—10177 H1035.

Select Heater Coils:

- To match actual full load motor current.
- To match average full load values, pages 272-273, if actual full load motor current is unknown.

Heater coils are rated to protect standard 40°C rise motors at approximately 125% of rated motor current, and where controller and motor are at same ambient.

Heater coil ranges provide for variations in all enclosure sizes and designs, including internal heating. Selection tables are not compromises or averaged values thereby providing maximum motor output and life.

For other conditions:

- 50° or 55°C rise motor with protection at 115% of rated current, use one size smaller coil.
- 40°C rise motor with protection at 140% of rated current, use one size larger coil.
- Ambient Temperature of controller lower than motor by: 8.5—16.7°C (16—30°F) use one size smaller coil.
16.8—27.8°C (31—50°F) use two sizes smaller coil.
- Ambient Temperature of controller higher than motor by: 8.5—16.7°C (16—30°F) use one size larger coil.
16.8—27.8°C (31—50°F) use two sizes larger coil.

Ultimate tripping current of heater coil approximately 1.25 times minimum current rating listed.

HEATER COIL SELECTION TABLE—PAGE GUIDE

Table No.	Page No.	Table No.	Page No.
2A—17A	283	53A—59A	287
18A—29A	284	60A—65A	288
30A—39A	285	66A—71A	289
40A—52A	286	72A—74A	290

INDEX OF THERMAL OVERLOAD RELAY HEATER COIL SELECTION TABLES

Controller Description				Catalog Number	Size	Selection Table Numbers									
						Enclosure—NEMA Type									
						Open	1	1 With gasketed Cover	3	4	5	7-D	9-EFG	12	
POWER CENTERS—UNIBUS®															
Saf-Key Combination Motor Starter Plugs	With Motor Circuit Switch or Circuit Breaker	Reversing or Non-Reversing	4642 or 4652	0-4	Use NEMA 1, 3 Phase Full Voltage Magnetic Selection										
3 PHASE FULL VOLTAGE MOTOR CONTROL															
Magnetic	Non-Reversing	Non-Combination	Standard	9586	00	8A	18A	---	---	---	---	---	---	---	---
					0	8A	20A	---	5A	2A	2A	5A	5A	2A	
					1	8A	24A	---	5A	2A	2A	5A	5A	2A	
					2	36A	38A	---	38A	38A	38A	37A	37A	38A	
					3	40A	41A	---	42A	42A	42A	42A	42A	42A	
					4	45A	46A	---	46A	46A	46A	46A	46A	46A	
					5	26A	28A	---	28A	28A	28A	27A	27A	28A	
					6	11A	12A	---	---	☆	☆	---	---	☆	
		7	16A	17A	---	---	☆	☆	---	---	☆				
		8	14A	15A	---	---	☆	☆	---	---	☆				
		With Control Transformer	9586	0 & 1	---	5A	---	---	---	---	---	---	---		
				2	---	34A	---	---	---	---	---	---			
	3			---	42A	---	---	---	---	---	---				
	With Fast Trip Overload Relays	9586	0	49A	48A	---	---	---	---	---	---	---			
			1	49A	50A	---	---	---	---	---	---				
			2	51A	52A	---	---	---	---	---	---				
	Combination	With Motor Circuit Switch or Circuit Breaker	9589 or 9591	0 & 1	---	22A	22A	22A	22A	22A	2A	2A	22A		
				2	---	37A	37A	37A	37A	35A	35A	37A			
				3	---	25A	25A	25A	25A	25A	25A				
				4	---	44A	44A	44A	44A	44A	44A				
				5	---	28A	28A	28A	28A	27A	28A				
				6	---	☆	☆	---	---	---	---	☆			
With Control Transformer		9656	0 & 1	---	8A	7A	---	7A	7A	2A	7A	2A			
			2	---	36A	37A	---	37A	37A	37A	37A	37A			
			3	---	40A	42A	---	42A	42A	42A	42A	42A			
			4	---	45A	46A	---	46A	46A	46A	46A	46A			
			5	---	26A	28A	---	28A	28A	---	---	28A			
			6-8	---	☆	☆	---	☆	☆	---	---	☆			
Reversing	Non-Combination	Standard	9595	00	74A	74A	---	☆	☆	---	---	☆	---		
				0 & 1	---	8A	7A	---	7A	7A	2A	7A	7A	2A	
				2	---	36A	37A	---	37A	37A	37A	37A	37A	37A	
	With Control Transformer	9656	0 & 1	---	2A	---	---	---	---	---	---	---	---		
			2	---	35A	35A	---	35A	35A	---	---	---	---		
			3	---	25A	25A	---	25A	25A	---	---	---	---		
Combination	With Motor Circuit Switch or Circuit Breaker	9658 or 9659	4	---	44A	44A	---	44A	44A	---	---	---	---		
			5	---	☆	☆	---	☆	☆	---	---	---	---		
			0 & 1	---	23A	23A	---	23A	23A	---	---	---	---		
			2	---	35A	35A	---	35A	35A	---	---	---	---		
			3	---	25A	25A	---	25A	25A	---	---	---	---		
			4	---	44A	44A	---	44A	44A	---	---	---	---		
Manual	Non-Reversing	Pushbutton Operated	9115	0	32A	30A	---	---	65A	65A	65A	65A	---		
		Lever Operated	9115	0 & 1	---	---	---	---	65A	65A	65A	65A	---		

☆ Supply actual ampere rating of motor and heater coil(s) will be selected at factory.

CUTLER-HAMMER

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WOUND ROTOR
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL

MOTOR CONTROL
CENTERS
—UNIBUS®

DC MOTOR CONTROL

MOTOR CONTROL
FOR
SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

HEATER COILS
FOR
OVERLOAD RELAYS

HEATER COILS FOR OVERLOAD RELAYS



INDEX—Continued—Before selecting heater coils, see ordering instructions page 279.

Controller Description					Catalog Number	Size	Selection Table Numbers												
							Enclosure—NEMA Type												
							Open	1	1 With gasketed Cover	3	4	5	7-D	9-EFG	12				
3 PHASE REDUCED VOLTAGE AND MULTISPEED MOTOR CONTROL																			
Single Speed	Reduced Voltage	Magnetic	Non-Reversing	Primary Resistor		9605	1 2 3 4 5 6 & 7	---	2A 35A 25A 44A 27A ☆	---	---	---	☆ ☆ ☆ ☆ ☆ ---	---	---	☆ ☆ ☆ ☆ ☆ ---			
			Reversing	Primary Resistor		9674	All	---	☆	---	---	---	☆	---	---	☆			
			Non-Reversing	①	Part Winding	9612	1 2 3 4 5 6 & 7	---	2A 35A 25A 44A 27A ☆	---	---	☆ ☆ ☆ ☆ ☆ ---	☆ ☆ ☆ ☆ ☆ ---	☆ ☆ ☆ ☆ ☆ ---	☆ ☆ ☆ ☆ ☆ ---				
							②	Wye Delta	Open Transition	9615	1 2 3 4 5-8	---	2A 35A 25A 44A ☆	---	---	☆ ☆ ☆ ☆ ☆	☆ ☆ ☆ ☆ ---	☆ ☆ ☆ ☆ ---	☆ ☆ ☆ ☆ ---
											Closed Transition	9615	All	---	☆	---	---	---	---
				Auto Transformer	9621	2 3 4 5 6 7 & 8	---	35A 25A 44A 27A 13A ☆	---	---	☆ ☆ ☆ ☆ ---	☆ ☆ ☆ ☆ ---	☆ ☆ ☆ ☆ ---	☆ ☆ ☆ ☆ ---	☆ ☆ ☆ ☆ ---				
						Manual	Non-Reversing	Auto Trans-former	All except H2605 & H2606 H2605 & H2606	9141	A	---	69A	---	---	---	---	---	---
											B, C & D D	---	68A 61A	---	---	68A ---	68A ---	68A ---	68A ---
		Star Delta		9141	All	---	☆	---	---	☆	☆	---	☆	☆					
		Multi-Speed	Full Voltage	Magnetic	Non-Reversing	Separate Winding	2 Speed	Non-Com-bination	9736	0 & 1 2 3 4 5	☆ 36A 40A ☆ ☆	7A 34A 25A 44A ☆	---	---	☆ ☆ ☆ ☆ ☆	☆ ☆ ☆ ☆ ☆	☆ ☆ ☆ ☆ ☆		
										With Motor Circuit Switch	9736	0 1 2 3-5	☆ 23A 35A ☆	☆ ☆ ☆ ☆	---	---	☆ ☆ ☆ ☆	---	---
With Circuit Breaker	9736											0 1 2-4	☆ 23A ☆	☆ ☆ ☆	---	---	☆ ☆ ☆	☆ ☆ ☆	
Non-Com-bination	9739							0 & 1 2 3 4 5	8A 36A 40A ☆ ☆	7A 34A 25A 44A ☆	---	---	☆ ☆ ☆ ☆ ☆	☆ ☆ ☆ ☆ ☆	☆ ☆ ☆ ☆ ☆	☆ ☆ ☆ ☆ ☆			
								With Motor Circuit Switch	9739	0 1 2 3-5	☆ 23A 35A ☆	☆ ☆ ☆ ☆	---	---	☆ ☆ ☆ ☆	---	---	23A 35A ☆	
										With Circuit Breaker	9739	0 1 2-4	☆ 23A ☆	☆ ☆ ☆	---	---	☆ ☆ ☆	☆ ☆ ☆	
3 Speed						9741	All	☆	☆	---	---	☆	---	---	---	---			
4 Speed						9742	All	☆	☆	---	---	☆	---	---	---	---			
Reduced Voltage	Magnetic					Non-Reversing	Separate Winding—Primary Resistor		9749	All	---	☆	---	---	---	---	---	---	
							Reconnectable Winding—Primary Resistor		9759	All	---	☆	---	---	---	---	---	---	
Full Voltage	Manual					Non-Reversing	Separate Winding		9219	0 1	62A 63A	62A 63A	---	---	---	---	---	---	---

☆ Supply actual ampere rating of motor and heater coil(s) will be selected at factory.

① Select heater coils on the basis of 50% of full load current.

② Select heater coils on the basis of 58% of full load current.

CUTLER-HAMMER



HEATER COILS FOR OVERLOAD RELAYS

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INDEX—Continued —Before selecting heater coils, see ordering instructions page 279.

Controller Description	Catalog Number	Size	Selection Table Numbers									
			Enclosure—NEMA Type									
			Open	1	1 With gasketed Cover	3	4	5	7-D	9-EFG	12	

SINGLE PHASE MOTOR CONTROL

Manual	Full Voltage	Non-Reversing	Fractional Horsepower	Single Speed	All except with Incan. P. L.	9101	All	53A	54A	---	---	54A	54A	54A	54A	---
					With Incandescent Pilot Light	9101	All	53A	55A	---	---	54A	54A	54A	54A	---
				2 Speed		9106	All	54A	54A	---	---	---	---	---	---	---
			Integral Horsepower		9115	0 1 1½	32A 32A 32A	33A 33A 33A	---	---	---	58A 59A ☆	58A 59A ☆	58A 59A ---	58A 59A ---	---
Magnetic	Full Voltage			Non-Reversing		9584	00 0 & 1 1½	☆ 8A 8A	☆ 6A 9A	---	---	---	---	2A 2A 4A 9A	4A 9A 4A 9A	2A 2A
				Reversing	2 Pole	9595	00 00	56A ☆	56A ☆	---	☆ ☆	☆ ☆	---	---	☆ ☆	---
					3 Pole			☆	☆	---	☆	☆	---	---	☆	---
					2 or 3 pole, Vert. 2 or 3 pole, Horiz. 2 pole 3 pole	9656	0 0 1 1	8A 8A 8A ☆	7A 3A 3A ☆	---	☆ ☆ ☆ ☆	☆ ☆ ☆ ☆	☆ ☆ ☆ ☆	☆ ☆ ☆ ☆	☆ ☆ ☆ ☆	☆ ☆ ☆ ☆
	Reduced Voltage		Non-Reversing	Primary Resistor	9605	1 1½ 2 3	---	2A ☆ 35A ☆	---	---	---	---	---	---	---	---
									---	---	---	---	---	---	---	---
										---	---	---	---	---	---	---
											---	---	---	---	---	---

THERMAL OVERLOAD RELAYS AND SWITCHES

Type ST Relay	1 coil	10176	1	8A	3A	---	---	---	---	---	---	---	---
	2 or 3 coils		1	8A	4A	---	---	---	---	---	---	---	---
	1-3 coils		2	36A	35A	---	---	---	---	---	---	---	---
	1 coil		3	☆	☆	---	---	---	---	---	---	---	---
	2 or 3 coils		3	40A	☆	---	---	---	---	---	---	---	---
	1 coil		4	☆	☆	---	---	---	---	---	---	---	---
Type SW Relay		4-9 coils	10176	All	☆	☆	---	---	---	---	---	---	---
Type TK Relay		Fast Trip—3 coils	10176	1 2	49A 51A	---	---	---	---	---	---	---	---
Type SR Thermal Overload Switch—2 Pole			10172	All	71A	71A	---	---	---	---	---	---	---

MEDIUM VOLTAGE MOTOR CONTROL

Magnetic	Full Voltage		Non-Reversing		9957	All	---	☆	---	---	---	---	---	---	---	---
	Reduced Voltage	Non-Reversing	Primary Reactor		9966	All	---	☆	---	---	---	---	---	---	---	---

MOTOR CONTROL CENTERS—UNITROL®

Magnetic	Full or Reduced Voltage	Reversing or Non-Reversing	With Disconnect	All	All	1	---	---	21A	---	---	---	---	---	---	---
				All		2	---	---	39A	---	---	---	---	---	---	---
				All		3	---	---	43A	---	---	---	---	---	---	---
				All		4	---	---	47A	---	---	---	---	---	---	---
				2 coil overload		5	---	---	10A	---	---	---	---	---	---	---
				3 coil overload		5	---	---	29A	---	---	---	---	---	---	---

☆ Supply actual ampere rating of motor and heater coil(s) will be selected at factory.

HEATER COILS FOR OVERLOAD RELAYS



INDEX—Continued—Before selecting heater coils, see ordering instructions page 279.

Controller Description					Catalog Number	Size	Selection Table Numbers									
							Enclosure—NEMA Type									
							Open	1	1 With gasketed Cover	3	4	5	7-D	9-EFG	12	
D-C MOTOR CONTROL																
Constant Speed Motors	Magnetic		Full Voltage		Non-Reversing	6101	All	☆	56A	---	---	56A	☆	☆	☆	☆
	Manual		Full Voltage		Reversing	6103	All	56A	56A	---	---	---	---	---	---	---
					Non-Reversing	9115	0 & 1	32A	33A	---	---	---	---	---	---	---
	Magnetic	Reduced Voltage	Non-Reversing		Time Limit Acceleration	6106	All	---	60A	---	---	☆	☆	☆	---	---
			Re-versing or Non-Re-versing	Definite Time Accel-eration	A1-A3 (120 & 240 volts)	1	---	57A	---	---	---	---	---	---	---	
					A4 & all 550 volts	1	---	☆	---	---	---	---	---	---	---	
					A1-A3 (120 & 240 volts)	2-5	---	60A	---	---	---	---	---	---	---	
A4 & all 550 volts	2-5	---			☆	---	---	---	---	---	---	---				
All	6	---	☆	---	---	---	---	---	---	---	---					
Ad-justable Speed Motors	Magnetic	Reduced Voltage	Re-versing or Non-Re-versing	Definite Time Accel-eration	B1-B3 (120 & 240 volts)	1	---	57A	---	---	---	---	---	---	---	
					B4 & all 550 volts	1	---	☆	---	---	---	---	---	---	---	
					B1-B3 (120 & 240 volts)	2-5	---	60A	---	---	---	---	---	---	---	
					B4 & all 550 volts	2-5	---	☆	---	---	---	---	---	---	---	
					All	6	---	☆	---	---	---	---	---	---	---	
MOTOR CONTROLS FOR SPECIFIC APPLICATIONS																
Duplex Pump Controllers		Non-combination			9586	0-4	☆	☆	---	---	☆	☆	---	---	☆	
		With Motor Circuit Switch			9589	0 & 1 2 3 & 4	---	2A 35A ☆	---	☆ ☆ ☆	☆ ☆ ☆	---	---	---	☆ ☆ ☆	
		With Circuit Breaker			9591	0-4	---	☆	---	☆	☆	☆	---	---	☆	
Oil Well Pumping Controllers		600 volts Maximum	With Motor Circuit Switch		9593	0 & 1 2 3 4	---	---	---	8A 36A 40A 45A	---	---	---	---	---	
			With Circuit Breaker		9594	0 & 1 2 3 & 4	---	---	---	8A 36A ☆	---	---	---	---	---	
		762 volts Maximum	With Motor Circuit Switch or Circuit Breaker		9593 or 9594	0 & 1 2 3 4	---	---	---	☆ ☆ ☆ ☆	---	---	---	---	---	---
Pumping Plant Control		With Motor Circuit Switch or Circuit Breaker			9589 or 9591	1 2 3 4 5	---	---	---	2A 35A 25A 44A 27A	---	---	---	---	---	
Control Components for use in Explosion Proof Enclosures		3 Phase Full Voltage Magnetic—Single or Multispeed	Reversing or Non-Reversing	9586, 9656, 9736 or 9739	0 & 1 2 3 4 5	---	---	---	---	---	---	8A 36A 25A 44A 27A	8A 36A 25A 44A 27A	---	---	
Textile Industry	Full Voltage	Loom Switch		Manual	9115	0	---	① 67A	① 67A	---	---	---	---	---	---	
		Card Starter	Manual	9115	0	---	① 66A	---	---	---	---	---	---	① 66A		
			Magnetic	9599	0 & 1	---	---	---	---	---	---	---	---	70A		
		Reduced Voltage	Magnetic	Primary Resistor	9605	1	---	2A	2A	---	---	---	---	---	---	

☆ Supply actual ampere rating of motor coil(s) will be selected at factory.

① Indicated tables for group fusing. For standard application use table 63A for selection.



HEATER COILS FOR OVERLOAD RELAYS

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Selection Tables

TABLES 2A to 9A

Price \$1.50 Each

2A	3A	4A	5A	6A	7A	8A	9A	Heater Coil Cat. No.
Heater Coil Ampere Range								
.157-.173	.160-.176	.153-.169	.148-.164	.158-.175	.158-.175	.167-.184	.160-.177	10177-
.174-.194	.177-.199	.170-.190	.165-.185	.176-.197	.176-.197	.185-.207	.178-.199	H1001
.195-.216	.200-.221	.191-.211	.186-.204	.198-.218	.198-.218	.208-.229	.200-.221	H1002
.217-.239	.222-.244	.212-.234	.205-.226	.219-.241	.219-.241	.230-.254	.222-.244	H1003
.240-.270	.245-.276	.235-.264	.227-.256	.242-.273	.242-.273	.255-.287	.245-.276	H1004
.271-.306	.277-.313	.265-.300	.257-.289	.274-.310	.274-.310	.288-.325	.277-.313	H1005
.307-.341	.314-.349	.301-.333	.290-.323	.311-.345	.311-.345	.326-.363	.314-.349	H1006
.342-.389	.350-.397	.334-.381	.324-.368	.346-.393	.346-.393	.364-.413	.350-.397	H1007
.390-.439	.398-.449	.382-.429	.369-.416	.394-.444	.394-.444	.414-.467	.398-.449	H1008
.440-.495	.450-.506	.430-.485	.417-.469	.445-.500	.440-.495	.468-.527	.450-.506	H1009
.496-.546	.507-.558	.486-.535	.470-.517	.501-.552	.496-.546	.528-.581	.507-.558	H1010
.547-.610	.559-.623	.536-.597	.518-.577	.553-.609	.547-.609	.582-.649	.559-.623	H1011
.611-.676	.624-.690	.598-.661	.578-.639	.610-.675	.610-.675	.650-.719	.624-.691	H1012
.677-.751	.691-.767	.662-.735	.640-.711	.676-.751	.676-.751	.720-.799	.692-.767	H1013
.752-.823	.768-.847	.736-.807	.712-.783	.752-.823	.752-.823	.800-.879	.768-.844	H1014
.824-.919	.848-.935	.808-.895	.784-.871	.824-.919	.824-.919	.880-.975	.845-.935	H1015
.920-1.01	.936-1.03	.896-.991	.872-.959	.920-1.01	.920-1.01	.976-1.07	.936-1.03	H1016
1.02-1.12	1.04-1.14	.992-1.09	.960-1.06	1.02-1.12	1.02-1.12	1.08-1.19	1.04-1.14	H1017
1.13-1.25	1.15-1.28	1.10-1.23	1.07-1.19	1.13-1.25	1.13-1.25	1.20-1.33	1.15-1.28	H1018
1.26-1.41	1.29-1.45	1.24-1.38	1.20-1.33	1.26-1.41	1.26-1.41	1.34-1.50	1.29-1.44	H1019
1.42-1.60	1.46-1.63	1.39-1.55	1.34-1.52	1.42-1.60	1.42-1.60	1.51-1.70	1.45-1.63	H1020
1.61-1.80	1.64-1.83	1.56-1.73	1.53-1.70	1.61-1.80	1.61-1.80	1.71-1.91	1.64-1.84	H1021
1.81-2.02	1.84-2.07	1.74-1.96	1.71-1.91	1.78-2.00	1.81-2.02	1.92-2.15	1.85-2.06	H1022
2.03-2.25	2.08-2.29	1.97-2.17	1.92-2.13	2.01-2.22	2.03-2.25	2.16-2.39	2.07-2.29	H1023
2.26-2.52	2.30-2.57	2.18-2.44	2.14-2.36	2.23-2.49	2.26-2.52	2.40-2.68	2.30-2.57	H1024
2.53-2.84	2.58-2.86	2.45-2.74	2.37-2.66	2.50-2.81	2.53-2.83	2.69-3.02	2.58-2.89	H1025
2.85-3.17	2.87-3.20	2.75-3.06	2.67-2.97	2.82-3.10	2.84-3.17	3.03-3.37	2.90-3.23	H1026
3.18-3.47	3.21-3.50	3.07-3.35	2.98-3.25	3.11-3.39	3.18-3.46	3.38-3.69	3.24-3.54	H1066
3.48-3.93	3.51-3.98	3.36-3.81	3.26-3.69	3.40-3.85	3.47-3.93	3.70-4.19	3.55-4.03	H1027
3.94-4.35	3.99-4.40	3.82-4.17	3.70-4.07	3.86-4.26	3.94-4.35	4.20-4.63	4.04-4.44	H1028
4.36-4.92	4.41-4.97	4.18-4.71	4.08-4.60	4.27-4.76	4.36-4.91	4.64-5.23	4.45-5.02	H1029
4.93-5.53	4.98-5.60	4.72-5.30	4.61-5.12	4.77-5.36	4.92-5.54	5.24-5.89	5.03-5.66	H1030
5.54-6.09	5.61-6.16	5.31-5.84	5.13-5.64	5.37-5.84	5.55-6.10	5.90-6.49	5.67-6.23	H1031
6.10-6.83	6.17-6.91	5.85-6.55	5.65-6.32	5.85-6.54	6.11-6.83	6.50-7.27	6.24-6.98	H1032
6.84-7.59	6.92-7.67	6.56-7.19	6.33-7.02	6.55-7.19	6.84-7.51	7.28-8.07	6.99-7.75	H1033
7.60-8.47	7.68-8.47	7.20-8.07	7.03-7.76	7.20-8.07	7.52-8.39	8.08-9.03	7.76-8.68	H1034
8.48-9.51	8.48-9.51	8.08-9.03	7.77-8.71	8.08-8.95	8.40-9.43	9.04-10.1	8.69-9.75	H1035
9.52-10.6	9.52-10.6	9.04-10.1	8.72-9.83	8.96-9.91	9.44-10.5	10.2-11.3	9.76-10.9	H1036
10.7-11.9	10.7-11.9	10.2-11.2	9.84-10.8	9.92-10.9	10.6-11.7	11.4-12.7	11.0-12.2	H1037
12.0-13.4	12.0-13.3	11.3-12.5	10.9-12.1	11.0-12.3	11.8-13.2	12.8-14.3	12.3-13.7	H1038
13.5-14.9	13.4-14.8	12.6-14.0	12.2-13.3	12.4-13.5	13.3-14.5	14.4-15.9	13.8-15.3	H1039
15.0-16.5	14.9-16.3	14.1-15.4	13.4-14.7	13.6-14.7	14.6-15.7	16.0-17.5	15.4-16.8	H1040
16.6-18.2	16.4-17.9	15.5-16.9	14.8-16.1	14.8-16.1	15.8-17.5	17.6-19.4	16.9-18.6	H1041
18.3-20.8	18.0-20.4	17.0-19.3	16.2-18.4	16.2-18.1	17.6-19.7	19.5-22.1	18.7-21.3	H1042
20.9-23.3	20.5-22.8	19.4-21.3	18.5-20.3	18.2-19.8	19.8-21.8	22.2-24.8	21.4-23.5	H1043
---	22.9-25.5	21.4-24.1	20.4-22.7	19.9-22.1	21.9-24.1	24.9-28.1	23.6-26.6	H1044
---	25.6-27.0	24.2-27.1	22.8-25.0	22.2-24.4	24.2-26.6	28.2-30.6	26.7-29.5	H1045
---	---	---	25.1-27.3	24.5-27.3	26.7-29.5	30.7-34.7	29.6-33.0	H1046
---	---	---	---	---	29.6-33.1	34.8-39.3	33.1-36.2	H1047
---	---	---	---	---	---	39.4-44.0	36.3-40.6	H1048
---	---	---	---	---	---	---	---	H1049

TABLES 10A to 17A

Price \$1.50 Each

10A	11A	12A	13A	14A	15A	16A	17A	Heater Coil Cat. No.
Heater Coil Ampere Range								
60.1-65.6	---	---	---	---	---	---	---	10177-
65.7-72.2	140.-153.	132.-144.	---	---	---	---	---	H1017
72.3-79.7	154.-168.	145.-158.	136.-150.	---	---	---	---	H1018
79.8-88.7	169.-187.	159.-176.	151.-169.	402.-452.	378.-425.	268.-300.	252.-283.	H1019
88.8-99.1	188.-211.	177.-198.	170.-192.	453.-512.	426.-482.	301.-341.	284.-321.	H1020
99.2-111.	212.-236.	199.-223.	193.-216.	513.-575.	483.-542.	342.-383.	322.-361.	H1021
112.-123.	237.-264.	224.-248.	217.-242.	576.-647.	543.-608.	384.-430.	362.-405.	H1022
124.-137.	265.-293.	249.-276.	243.-270.	648.-719.	609.-677.	431.-480.	406.-453.	H1023
138.-153.	294.-328.	277.-309.	271.-302.	720.-806.	678.-758.	481.-536.	454.-501.	H1024
154.-173.	329.-369.	310.-348.	303.-341.	807.-908.	759.-854.	537.-605.	502.-569.	H1025
174.-193.	370.-413.	349.-388.	342.-381.	909.-1013.	855.-953.	606.-676.	570.-636.	H1026
194.-213.	414.-452.	389.-425.	382.-417.	1014.-1109.	954.-1043.	677.-739.	637.-694.	H1027
214.-239.	453.-508.	426.-476.	418.-472.	1110.-1259.	1044.-1181.	740.-839.	695.-786.	H1028
240.-265.	509.-562.	477.-528.	473.-523.	1260.-1350.	1182.-1200.	840.-900.	787.-800.	H1029
266.-298.	563.-600.	529.-540.	524.-540.	---	---	---	---	H1030

DISCOUNT SCHEDULE 1 CD

CUTLER-HAMMER

WOUND ROTOR,
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL

MOTOR CONTROL
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SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

HEATER COILS
FOR
OVERLOAD RELAYS

HEATER COILS FOR OVERLOAD RELAYS

Selection Tables—Continued



TABLES 18A to 25A

Price \$1.50 Each

18A	19A	20A	21A	22A	23A	24A	25A	Heater Coil Cat. No.
Heater Coil Ampere Range								
.153-.169	.151-.167	.145-.160	.150-.166	.158-.175	.159-.177	.150-.166	.164-.181	10177-
.170-.190	.168-.189	.161-.180	.167-.186	.176-.197	.178-.199	.167-.186	.182-.204	H1001
.191-.210	.190-.209	.181-.199	.187-.207	.198-.218	.200-.220	.187-.206	.205-.226	H1002
.211-.233	.210-.231	.200-.221	.208-.229	.219-.242	.221-.244	.207-.229	.227-.250	H1003
.234-.264	.232-.261	.222-.249	.230-.257	.243-.273	.245-.276	.230-.258	.251-.282	H1004
.265-.299	.262-.297	.250-.283	.258-.293	.274-.310	.277-.313	.259-.293	.283-.322	H1005
.300-.334	.298-.330	.284-.316	.294-.327	.311-.346	.314-.349	.294-.326	.323-.357	H1006
.335-.380	.331-.368	.317-.360	.328-.373	.347-.393	.350-.397	.327-.372	.358-.407	H1007
.381-.429	.369-.425	.361-.406	.374-.420	.394-.444	.398-.448	.373-.420	.408-.459	H1008
.430-.484	.426-.479	.407-.458	.421-.475	.445-.500	.449-.506	.421-.474	.460-.519	H1009
.485-.534	.480-.529	.459-.506	.476-.524	.501-.551	.507-.557	.475-.522	.520-.572	H1010
.535-.596	.530-.591	.507-.564	.525-.583	.552-.616	.558-.623	.523-.583	.573-.639	H1011
.597-.661	.592-.655	.565-.625	.584-.647	.617-.683	.624-.690	.584-.647	.640-.707	H1012
.662-.735	.656-.727	.626-.695	.648-.719	.684-.759	.691-.767	.648-.719	.708-.798	H1013
.736-.807	.728-.799	.696-.763	.720-.799	.760-.855	.768-.847	.720-.791	.799-.863	H1014
.808-.895	.800-.887	.764-.847	.800-.879	.856-.919	.848-.935	.792-.879	.864-.959	H1015
.896-.991	.888-.983	.848-.935	.880-.975	.920-1.01	.936-1.03	.880-.975	.960-1.05	H1016
.992-1.09	.984-1.09	.936-1.02	.976-1.07	1.02-1.12	1.04-1.14	.976-1.07	1.06-1.17	H1017
1.10-1.23	1.10-1.21	1.03-1.15	1.08-1.20	1.13-1.25	1.15-1.28	1.08-1.20	1.18-1.31	H1018
1.24-1.37	1.22-1.37	1.16-1.29	1.21-1.35	1.26-1.41	1.29-1.44	1.21-1.35	1.32-1.48	H1019
1.38-1.55	1.38-1.55	1.30-1.46	1.36-1.53	1.42-1.60	1.45-1.63	1.36-1.53	1.49-1.67	H1020
1.56-1.73	1.56-1.73	1.47-1.64	1.54-1.72	1.61-1.80	1.64-1.81	1.54-1.72	1.68-1.87	H1021
1.74-1.96	1.74-1.96	1.65-1.85	1.73-1.94	1.81-2.02	1.82-2.04	1.73-1.94	1.88-2.12	H1022
1.97-2.17	1.97-2.17	1.86-2.05	1.95-2.15	2.03-2.25	2.05-2.27	1.95-2.15	2.13-2.35	H1023
2.18-2.44	2.18-2.41	2.06-2.30	2.16-2.41	2.26-2.52	2.28-2.54	2.16-2.38	2.36-2.64	H1024
2.45-2.74	2.42-2.71	2.31-2.59	2.42-2.71	2.53-2.84	2.55-2.86	2.39-2.68	2.65-2.97	H1025
2.75-3.06	2.72-3.03	2.60-2.89	2.72-3.03	2.85-3.16	2.87-3.16	2.69-3.00	2.98-3.31	H1026
3.07-3.39	3.04-3.31	2.90-3.13	3.04-3.32	3.17-3.46	3.17-3.47	3.01-3.28	3.32-3.61	H1066
3.40-3.77	3.32-3.77	3.14-3.56	3.33-3.77	3.47-3.89	3.48-3.94	3.29-3.73	3.62-4.12	H1027
3.78-4.17	3.78-4.16	3.57-3.94	3.78-4.17	3.90-4.30	3.95-4.35	3.74-4.12	4.13-4.56	H1028
4.18-4.71	4.17-4.71	3.95-4.44	4.18-4.71	4.31-4.86	4.36-4.86	4.13-4.60	4.57-5.18	H1029
4.72-5.30	4.72-5.30	4.45-5.00	4.72-5.30	4.87-5.48	4.87-5.48	4.61-5.19	5.19-5.87	H1030
5.31-5.77	5.31-5.83	5.01-5.45	5.31-5.84	5.49-6.03	5.49-5.97	5.20-5.71	5.88-6.47	H1031
5.78-6.47	5.84-6.54	5.46-6.10	5.85-6.54	6.04-6.76	5.98-6.68	5.72-6.32	6.48-7.28	H1032
6.48-7.10	6.55-7.26	6.11-6.78	6.55-7.25	6.77-7.43	6.69-7.35	6.33-7.02	7.29-8.15	H1033
7.11-7.95	7.27-8.15	6.79-7.59	7.26-8.14	7.44-8.31	7.36-8.15	7.03-7.86	8.16-9.11	H1034
7.96-8.79	8.16-9.03	7.60-8.39	8.15-9.15	8.32-9.35	8.16-9.11	7.87-8.87	9.12-10.2	H1035
8.80-9.84	9.04-10.1	8.40-9.51	9.16-10.2	9.36-10.3	9.12-10.1	8.88-9.99	10.3-11.6	H1036
---	10.2-11.3	9.52-10.4	10.3-11.4	10.4-11.6	10.2-11.2	10.0-11.0	11.7-13.1	H1037
---	11.4-12.7	10.5-11.7	11.5-12.9	11.7-13.0	11.3-12.5	11.1-12.3	13.2-14.8	H1038
---	12.8-14.1	11.8-12.9	13.0-14.3	13.1-14.3	12.6-14.0	12.4-13.7	14.9-16.5	H1039
---	14.2-15.3	13.0-14.0	14.4-15.7	14.4-15.7	14.1-15.3	13.8-15.0	16.6-18.3	H1040
---	15.4-17.1	14.1-15.3	15.8-17.5	15.8-17.3	15.4-17.1	15.1-16.7	18.4-20.4	H1041
---	17.2-19.3	15.4-17.0	17.6-19.9	17.4-19.4	17.2-19.4	16.8-19.0	20.5-23.5	H1042
---	---	17.1-19.1	20.0-22.3	19.5-21.3	19.5-21.3	19.2-21.0	23.6-26.8	H1043
---	---	---	22.4-25.3	21.4-23.6	21.4-23.6	21.1-23.0	26.9-30.5	H1044
---	---	---	25.4-27.0	23.7-25.3	23.7-25.3	23.1-25.0	30.6-34.0	H1045
---	---	---	---	25.4-27.0	25.2-27.0	25.1-28.0	34.1-38.7	H1046
---	---	---	---	---	---	---	38.8-44.0	H1047
---	---	---	---	---	---	---	44.1-49.8	H1048
---	---	---	---	---	---	---	49.9-55.0	H1049
---	---	---	---	---	---	---	55.1-60.3	H1050
---	---	---	---	---	---	---	60.4-65.1	H1051
---	---	---	---	---	---	---	65.2-78.0	H1052
---	---	---	---	---	---	---	78.1-87.9	H1053
---	---	---	---	---	---	---	88.0-97.6	H1054
---	---	---	---	---	---	---	---	H1055
---	---	---	---	---	---	---	---	H1056

TABLES 26A to 29A

Price \$1.50 Each

26A	27A	28A	29A	Heater Coil Cat. No.
Heater Coil Ampere Range				
90.4-101.	84.8-95.9	83.2-92.7	---	10177-
102.-114.	96.0-107.	92.8-103.	---	H1021
115.-129.	108.-121.	104.-114.	109.-121.	H1022
130.-143.	122.-134.	115.-127.	122.-134.	H1023
144.-161.	135.-151.	128.-145.	135.-151.	H1024
162.-181.	152.-169.	146.-161.	152.-170.	H1025
182.-202.	170.-189.	162.-180.	171.-189.	H1026
203.-221.	190.-208.	181.-198.	190.-209.	H1066
222.-251.	209.-236.	199.-223.	210.-236.	H1027
252.-281.	237.-261.	224.-247.	237.-261.	H1028
---	262.-292.	248.-277.	262.-270.	H1029
---	---	---	---	H1030



HEATER COILS FOR OVERLOAD RELAYS

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Selection Tables—Continued

TABLES 30A to 37A

Price \$1.50 Each

30A	31A	32A	33A	34A	35A	36A	37A	Heater Coil Cat. No.
Heater Coil Ampere Range								
.160-.178	.163-.180	.167-.184	.165-.181	---	---	---	---	10177-
.179-.201	.181-.203	.185-.207	.182-.205	---	---	---	---	H1001
.202-.222	.204-.225	.208-.229	.206-.219	---	---	---	---	H1002
.223-.246	.226-.249	.230-.254	.220-.252	---	---	---	---	H1003
.247-.278	.250-.281	.255-.287	.253-.284	---	---	---	---	H1004
								H1005
.279-.316	.282-.319	.288-.325	.285-.322	---	---	---	---	H1006
.317-.352	.320-.356	.326-.363	.323-.359	---	---	---	---	H1007
.353-.401	.357-.405	.364-.413	.360-.409	---	---	---	---	H1008
.402-.453	.406-.458	.414-.467	.410-.462	---	---	---	---	H1009
.454-.511	.459-.516	.468-.527	.463-.522	---	---	---	---	H1010
.512-.564	.517-.569	.528-.581	.523-.569	---	---	---	---	H1011
.565-.629	.570-.635	.582-.649	.570-.635	---	---	---	---	H1012
.630-.697	.636-.712	.650-.719	.636-.712	---	---	---	---	H1013
.698-.775	.713-.783	.720-.799	.713-.783	---	---	---	---	H1014
.776-.855	.784-.863	.800-.879	.784-.863	---	---	---	---	H1015
.856-.943	.864-.959	.880-.975	.864-.959	---	---	---	---	H1016
.944-1.04	.960-1.05	.976-1.07	.960-1.05	---	---	---	---	H1017
1.05-1.15	1.06-1.17	1.08-1.19	1.06-1.17	---	---	---	---	H1018
1.16-1.29	1.18-1.31	1.20-1.33	1.18-1.31	---	---	---	---	H1019
1.30-1.45	1.32-1.47	1.34-1.50	1.32-1.47	---	---	---	---	H1020
1.46-1.66	1.48-1.60	1.51-1.70	1.48-1.60	---	---	---	---	H1021
1.67-1.86	1.61-1.87	1.71-1.91	1.61-1.87	---	---	---	---	H1022
1.87-2.06	1.88-2.09	1.92-2.15	1.88-2.02	---	---	---	---	H1023
2.07-2.29	2.10-2.32	2.16-2.39	2.03-2.34	---	---	---	---	H1024
2.30-2.57	2.33-2.60	2.40-2.68	2.35-2.62	---	---	---	---	H1025
2.58-2.89	2.61-2.92	2.69-3.02	2.63-2.95	---	---	---	---	H1026
2.90-3.23	2.93-3.26	3.03-3.37	2.96-3.30	---	---	---	---	H1066
3.24-3.54	3.27-3.57	3.38-3.69	3.31-3.61	3.18-3.47	3.25-3.55	3.46-3.78	3.28-3.59	H1027
3.55-4.02	3.58-4.07	3.70-4.19	3.62-4.11	3.48-3.95	3.56-4.03	3.79-4.29	3.60-4.09	H1028
4.03-4.40	4.08-4.44	4.20-4.63	4.12-4.54	3.96-4.36	4.04-4.46	4.30-4.75	4.10-4.51	H1029
4.41-4.97	4.45-5.03	4.64-5.23	4.55-5.11	4.37-4.93	4.47-5.03	4.76-5.36	4.52-5.09	H1030
4.98-5.60	5.04-5.65	5.24-5.89	5.12-5.78	4.94-5.56	5.04-5.68	5.37-6.04	5.10-5.74	H1031
5.61-6.16	5.66-6.23	5.90-6.49	5.79-6.35	5.57-6.11	5.69-6.24	6.05-6.64	5.75-6.32	H1032
6.17-6.83	6.24-6.91	6.50-7.27	6.36-7.12	6.12-6.86	6.25-6.99	6.65-7.45	6.33-7.00	H1033
6.84-7.59	6.92-7.67	7.28-8.07	7.13-7.91	6.87-7.63	7.00-7.82	7.46-8.31	7.01-7.81	H1034
7.60-8.47	7.68-8.47	8.08-9.03	7.92-8.87	7.64-8.55	7.83-8.71	8.32-9.27	7.82-8.71	H1035
8.48-9.43	8.48-9.51	9.04-10.1	8.88-9.99	8.56-9.59	8.72-9.75	9.28-10.3	8.72-9.75	H1036
9.44-10.5	9.52-10.5	10.2-11.3	10.0-11.1	9.60-10.6	9.76-11.0	10.4-11.7	9.76-10.9	H1037
10.6-11.7	10.6-11.8	11.4-12.7	11.2-12.5	10.7-11.9	11.1-12.3	11.8-13.1	11.0-12.1	H1038
11.8-13.2	11.9-13.2	12.8-14.3	12.6-13.9	12.0-13.4	12.4-13.9	13.2-14.8	12.2-13.7	H1039
13.3-14.5	13.3-14.5	14.4-15.9	14.0-15.4	13.5-14.9	14.0-15.5	14.9-16.5	13.8-15.3	H1040
14.6-15.7	14.6-15.9	16.0-17.5	15.5-16.9	15.0-16.6	15.6-17.0	16.6-18.1	15.4-16.9	H1041
15.8-17.3	16.0-17.5	17.6-19.4	17.0-18.6	16.7-18.1	17.1-18.9	18.2-20.1	17.0-18.5	H1042
17.4-18.0	17.6-19.5	19.5-22.1	18.7-21.0	18.2-20.4	19.0-21.3	20.2-22.7	18.6-20.9	H1043
---	19.6-21.5	22.2-24.8	21.1-23.3	20.5-23.1	21.4-24.1	22.8-25.7	21.0-23.3	H1044
---	21.6-23.0	24.9-28.1	23.4-25.8	32.2-26.0	24.2-27.4	25.8-29.2	23.4-26.6	H1045
---	---	28.2-30.6	25.9-27.8	26.1-28.2	27.5-29.8	29.3-31.8	26.7-28.6	H1046
---	---	30.7-34.7	27.9-30.5	28.3-32.1	29.9-33.9	31.9-36.1	28.7-32.5	H1047
---	---	34.8-38.0	30.6-33.4	32.2-36.1	34.0-38.5	36.2-41.0	32.6-36.5	H1048
---	---	---	33.5-36.7	36.2-40.4	38.6-43.6	41.1-46.5	36.6-40.9	H1049
---	---	---	36.8-38.0	40.5-45.2	43.7-48.9	46.6-50.0	41.0-45.0	H1050

TABLES 38A and 39A

Price \$1.50 Each

38A	39A	Heater Coil Cat. No.	38A Continued	39A Continued	Heater Coil Cat. No.
Heater Coil Ampere Range			Heater Coil Ampere Range		
3.07-3.36	---	10177-	13.1-14.5	13.4-14.8	10177-
3.37-3.82	---	H1027	14.6-16.0	14.9-16.5	H1040
3.83-4.23	---	H1028	16.1-17.7	16.6-18.1	H1041
4.24-4.76	4.28-4.82	H1029	17.8-20.0	18.2-20.4	H1042
4.77-5.38	4.83-5.43	H1030	20.1-22.3	20.5-23.1	H1043
5.39-5.92	5.44-5.98	H1031	22.4-25.3	23.2-26.3	H1044
5.93-6.63	5.99-6.70	H1032	25.4-27.6	26.4-28.6	H1045
6.64-7.39	6.71-7.48	H1033	27.7-31.0	28.7-32.5	H1046
7.40-8.23	7.49-8.31	H1034	31.1-35.2	32.6-36.9	H1047
8.24-9.27	8.32-9.33	H1035	35.3-39.5	37.0-41.8	H1048
9.28-10.4	9.34-10.5	H1036	39.6-43.1	41.9-45.0	H1049
10.5-11.5	10.6-11.7	H1037	43.2-48.3	---	H1050
11.6-13.0	11.8-13.3	H1038			H1051
		H1039			

DISCOUNT SCHEDULE 1CD

CUTLER-HAMMER

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WOUND ROTOR,
SYNCHRONOUS & MEDIUM
VOLTAGE MOTOR CONTROL

MOTOR CONTROL
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SPECIFIC APPLICATIONS

MOTOR & WIRE
RATING DATA

HEATER COILS
FOR
OVERLOAD RELAYS

HEATER COILS FOR OVERLOAD RELAYS

Selection Tables—Continued



TABLES 40A to 47A

Price \$1.50 Each

40A	41A	42A	43A	44A	45A	46A	47A	Heater Coil Cat. No.
Heater Coil Ampere Range								
9.68-10.9	8.88-10.0	9.12-10.2	---	---	---	---	---	10177-
11.0-12.3	10.1-11.3	10.3-11.6	---	---	---	---	---	H1036
12.4-13.9	11.4-12.8	11.7-13.0	11.2-12.5	---	---	---	---	H1037
14.0-15.7	12.9-14.5	13.1-14.8	12.6-14.1	---	---	---	---	H1038
15.8-17.5	14.6-16.1	14.9-16.4	14.2-15.7	16.4-18.1	17.3-19.3	15.8-17.5	---	H1039
17.6-19.5	16.2-17.9	16.5-18.3	15.8-17.5	18.2-20.1	19.4-21.4	17.6-19.3	---	H1040
19.6-21.7	18.0-20.0	18.4-20.4	17.6-19.5	20.2-22.4	21.5-23.9	19.4-21.5	---	H1041
21.8-25.0	20.1-23.0	20.5-23.4	19.6-22.5	22.5-26.0	24.0-27.8	21.6-24.7	---	H1042
25.1-28.5	23.1-26.1	23.5-26.7	22.6-25.7	26.1-29.7	27.9-31.6	24.8-28.1	---	H1043
28.6-32.4	26.2-29.8	26.8-30.5	25.8-29.2	29.8-33.8	31.7-35.9	28.2-31.6	28.5-32.3	H1044
32.5-36.2	29.9-33.3	30.6-34.0	29.3-32.6	33.9-38.3	36.0-40.7	31.7-35.8	32.4-36.6	H1045
36.3-41.1	33.4-37.3	34.1-38.6	32.7-37.0	38.4-43.1	40.8-46.1	35.9-40.1	36.7-41.5	H1046
41.2-46.8	37.4-42.6	38.7-44.0	37.1-42.1	43.2-49.6	46.2-52.8	40.2-45.4	41.6-47.5	H1047
46.9-53.0	42.7-48.2	44.1-49.8	42.2-47.7	49.7-56.3	52.9-59.9	45.5-51.5	47.6-53.9	H1048
53.1-58.4	48.3-53.1	49.9-54.4	47.8-52.5	56.4-62.1	60.0-66.1	51.6-56.8	54.0-59.5	H1049
58.5-64.2	53.2-58.4	54.5-59.7	52.6-57.8	62.2-68.7	66.2-73.1	56.9-62.1	59.6-65.8	H1050
64.3-69.2	58.5-62.3	59.8-64.4	57.9-62.3	68.8-75.9	73.2-80.7	62.2-68.6	65.9-72.7	H1051
69.3-83.1	62.4-74.8	64.5-77.2	62.4-74.8	76.0-88.7	80.8-94.3	68.7-79.9	72.8-84.8	H1052
83.2-93.5	74.9-83.9	77.3-84.7	74.9-84.0	88.8-98.3	94.4-104.	80.0-87.9	84.9-94.4	H1054
93.6-104.0	84.0-94.0	84.8-94.9	84.1-90.0	98.4-109.	105-116.	88.0-99.1	94.5-104.9	H1055
---	---	---	---	110-119.	117-127.	99.2-108.9	105.0-115.9	H1056
---	---	---	---	120-137.	128-145.	109-125.	116.0-130.9	H1057
---	---	---	---	---	146-150.	126-135.	131.0-135.0	H1058
								H1059

TABLES 48A to 52A (Fast Trip)

Price \$1.50 Each

48A	49A	50A	51A	52A	Heater Coil Cat. No.
Heater Coil Ampere Range					
1.84-2.03	2.09-2.31	1.86-2.05	---	---	10177-
2.04-2.19	2.32-2.51	2.06-2.22	---	---	H10
2.20-2.38	2.52-2.71	2.23-2.41	---	---	H11
2.39-2.58	2.72-2.94	2.42-2.61	---	---	H12
2.59-2.84	2.95-3.24	2.62-2.88	---	---	H13
2.85-3.08	3.25-3.51	2.89-3.12	---	---	H14
3.09-3.31	3.52-3.81	3.13-3.39	---	---	H15
3.32-3.57	3.82-4.11	3.40-3.61	---	---	H16
3.58-3.87	4.12-4.45	3.62-3.92	4.22-4.52	3.83-4.11	H17
3.88-4.19	4.46-4.83	3.93-4.24	4.53-4.89	4.12-4.44	H18
4.20-4.70	4.84-5.41	4.25-4.76	4.90-5.44	4.45-4.95	H19
4.71-4.99	5.42-5.74	4.77-5.04	5.45-5.84	4.96-5.32	H20
5.00-5.41	5.75-6.23	5.05-5.48	5.85-6.29	5.33-5.72	H21
5.42-5.76	6.24-6.63	5.49-5.82	6.30-6.75	5.73-6.13	H22
5.77-6.16	6.64-7.03	5.83-6.24	6.76-7.29	6.14-6.64	H23
6.17-6.88	7.04-7.91	6.25-6.95	7.30-8.16	6.65-7.41	H24
6.89-7.43	7.92-8.63	6.96-7.51	8.17-8.96	7.42-8.07	H25
7.44-8.07	8.64-9.44	7.52-8.23	8.97-9.67	8.08-8.71	H26
8.08-8.63	9.45-10.0	8.24-8.79	9.68-10.4	8.72-9.43	H27
8.64-9.43	10.1-10.9	8.80-9.51	10.5-11.3	9.44-10.1	H28
9.44-10.2	11.0-12.1	9.52-10.5	11.4-12.6	10.2-11.3	H29
10.3-11.2	12.2-13.2	10.6-11.4	12.7-13.8	11.4-12.4	H30
11.3-11.8	13.3-13.9	11.5-12.1	13.9-14.9	12.5-13.3	H31
11.9-12.8	14.0-15.1	12.2-13.1	15.0-15.7	13.4-14.1	H32
12.9-13.7	15.2-16.4	13.2-14.2	15.8-17.3	14.2-15.6	H33
13.8-15.0	16.5-17.9	14.3-15.6	17.4-19.0	15.7-17.1	H34
15.1-16.6	18.0-20.1	15.7-17.4	19.1-21.1	17.2-18.9	H35
16.7-18.4	20.2-22.3	17.5-19.4	21.2-23.6	19.0-21.2	H36
---	22.4-25.1	19.5-21.5	23.7-26.3	21.3-23.7	H37
---	25.2-27.8	21.6-23.9	26.4-29.1	23.8-25.9	H38
---	---	24.0-26.5	29.2-32.7	26.0-28.8	H39
---	---	26.6-28.4	32.8-36.7	28.9-31.9	H40
---	---	---	36.8-40.5	32.0-34.4	H41
---	---	---	40.6-43.7	34.5-36.7	H42
---	---	---	43.8-48.6	36.8-39.8	H43
---	---	---	---	---	H44
---	---	---	48.7-53.2	39.9-42.5	H45
---	---	---	---	42.6-45.3	H46



HEATER COILS FOR OVERLOAD RELAYS

Selection Tables—Continued

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TABLES 53A to 55A

Price \$1.50 Each

53A	54A	55A	Heater Coil Cat. No.
Heater Coil Ampere Range			
.229-.251	.220-.242	.206-.226	10177- H1201
.252-.276	.243-.265	.227-.248	H1202
.277-.304	.266-.292	.249-.273	H1203
.305-.337	.293-.325	.274-.303	H1204
.338-.371	.326-.356	.304-.334	H1205
.372-.414	.357-.397	.335-.372	H1206
.415-.449	.398-.433	.373-.405	H1207
.450-.499	.434-.478	.406-.449	H1208
.500-.543	.479-.521	.450-.489	H1209
.544-.587	.522-.563	.490-.527	H1210
.588-.646	.564-.620	.528-.581	H1211
.647-.706	.621-.677	.582-.635	H1212
.707-.769	.678-.738	.636-.692	H1213
.770-.831	.739-.800	.693-.748	H1214
.832-.911	.801-.876	.749-.820	H1215
.912-.991	.877-.953	.821-.892	H1216
.992-1.10	.954-1.06	.893-.999	H1217
1.11-1.22	1.07-1.17	1.00-1.09	H1218
1.23-1.33	1.18-1.28	1.10-1.20	H1219
1.34-1.50	1.29-1.44	1.21-1.35	H1220
1.51-1.66	1.45-1.60	1.36-1.49	H1221
1.67-1.87	1.61-1.80	1.50-1.68	H1222
1.88-2.09	1.81-2.01	1.69-1.88	H1223
2.10-2.28	2.02-2.19	1.89-2.05	H1224
2.29-2.55	2.20-2.45	2.06-2.30	H1225
2.56-2.84	2.46-2.73	2.31-2.56	H1226
2.85-3.11	2.74-2.98	2.57-2.80	H1227
3.12-3.40	2.99-3.26	2.81-3.06	H1228
3.41-3.74	3.27-3.59	3.07-3.37	H1229
3.75-4.11	3.60-3.94	3.38-3.70	H1230
4.12-4.55	3.95-4.36	3.71-4.10	H1231
4.56-5.01	4.37-4.81	4.11-4.51	H1232
5.02-5.54	4.82-5.31	4.52-4.98	H1233
5.55-6.02	5.32-5.79	4.99-5.43	H1234
6.03-6.79	5.80-6.45	5.44-6.11	H1235
6.80-7.56	6.46-7.17	6.12-6.72	H1236
7.57-8.47	7.18-8.03	6.73-7.55	H1237
8.48-9.44	8.04-8.91	7.56-8.40	H1238
9.45-10.4	8.92-9.87	8.41-9.38	H1239
10.5-11.8	9.88-10.9	9.39-10.4	H1240
11.9-12.7	11.0-11.8	10.5-11.3	H1241
12.8-13.9	11.9-12.8	11.4-12.2	H1242
14.0-15.1	12.9-13.7	12.3-13.3	H1243
15.2-16.0	13.8-14.7	13.4-13.8	H1244
---	14.8-15.7	13.9-15.5	H1245
---	15.8-16.0	15.6-16.0	H1246

TABLES 56A to 59A

Price \$1.50 Each

56A	57A	58A	59A	Heater Coil Cat. No.
Heater Coil Ampere Range				
.175-.191	.177-.195	.181-.199	.182-.201	9104- H1328
.192-.211	.196-.213	.200-.218	.202-.220	H1329
.212-.233	.214-.236	.219-.241	.221-.244	H1330
.234-.257	.237-.260	.242-.265	.245-.268	H1331
.258-.281	.261-.285	.266-.291	.269-.293	H1332
.282-.308	.286-.311	.292-.317	.294-.321	H1333
.309-.338	.312-.342	.318-.348	.322-.352	H1334
.339-.371	.343-.375	.349-.383	.353-.387	H1335
.372-.407	.376-.412	.384-.425	.388-.426	H1336
.408-.449	.413-.453	.426-.464	.427-.469	H1337
.450-.497	.454-.502	.465-.514	.470-.519	H1338
.498-.556	.503-.562	.515-.575	.520-.579	H1339
.557-.616	.563-.623	.576-.637	.580-.649	H1340
.617-.676	.624-.682	.638-.698	.650-.699	H1341
.677-.744	.683-.751	.699-.767	.700-.779	H1342
.745-.817	.752-.823	.768-.844	.780-.859	H1343
.818-.899	.824-.911	.845-.929	.860-.939	H1344
.900-.999	.912-1.01	.930-1.03	.940-1.04	H1345
1.00-1.07	1.02-1.09	1.04-1.11	1.05-1.13	H1346
1.08-1.18	1.10-1.21	1.12-1.24	1.14-1.25	H1347
1.19-1.29	1.22-1.32	1.25-1.35	1.26-1.37	H1348
1.30-1.43	1.33-1.46	1.36-1.50	1.38-1.51	H1349
1.44-1.55	1.47-1.58	1.51-1.62	1.52-1.64	H1350
1.56-1.72	1.59-1.76	1.63-1.79	1.65-1.81	H1351
1.73-1.90	1.77-1.94	1.80-1.99	1.82-2.01	H1352
1.91-2.10	1.95-2.14	2.00-2.19	2.02-2.21	H1353
2.11-2.27	2.15-2.32	2.20-2.37	2.22-2.40	H1354
2.28-2.52	2.33-2.58	2.38-2.63	2.41-2.66	H1355
2.53-2.79	2.59-2.84	2.64-2.91	2.67-2.93	H1356
2.80-3.05	2.85-3.15	2.92-3.21	2.94-3.25	H1357
3.06-3.31	3.16-3.43	3.22-3.49	3.26-3.53	H1358
3.32-3.63	3.44-3.75	3.50-3.83	3.54-3.87	H1359
3.64-4.03	3.76-4.16	3.84-4.25	3.88-4.29	H1360
4.04-4.43	4.17-4.57	4.26-4.67	4.30-4.73	H1361
4.44-4.85	4.58-5.06	4.68-5.17	4.74-5.23	H1362
4.86-5.28	5.07-5.51	5.18-5.57	5.24-5.69	H1363
5.29-5.82	5.52-6.07	5.58-6.15	5.70-6.28	H1364
5.83-6.37	6.08-6.71	6.16-6.72	6.29-6.93	H1365
6.38-6.97	6.72-7.36	6.73-7.44	6.94-7.60	H1366
6.98-7.69	7.37-8.15	7.45-8.20	7.61-8.39	H1367
7.70-8.37	8.16-8.95	8.21-9.04	8.40-9.19	H1368
8.38-9.21	8.96-9.82	9.05-9.95	9.20-10.1	H1369
9.22-10.1	9.83-10.9	9.96-11.0	10.2-11.3	H1370
10.2-11.0	11.0-12.1	11.1-12.1	11.4-12.5	H1371
11.1-12.2	12.2-13.3	12.2-13.4	12.6-13.8	H1372
12.3-13.3	13.4-14.7	13.5-14.6	13.9-15.0	H1373
13.4-14.3	14.8-16.0	14.7-15.8	15.1-16.3	H1374
14.4-15.8	16.1-17.9	15.9-17.6	16.4-18.3	H1375
15.9-16.9	18.0-19.4	17.7-19.0	18.4-19.9	H1376
---	19.5-21.7	19.1-21.0	20.0-22.1	H1377
---	21.8-23.6	21.1-22.7	22.2-24.1	H1378
---	23.7-26.2	22.8-24.8	24.2-26.5	H1379
---	---	24.9-26.7	26.6-29.2	H1380
---	---	26.8-28.5	29.3-31.1	H1381
---	---	28.6-31.3	31.2-33.9	H1382
---	---	---	34.0-36.6	H1383

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FOR
SPECIFIC APPLICATIONSMOTOR & WIRE
RATING DATAHEATER COILS
FOR
OVERLOAD RELAYS

HEATER COILS FOR OVERLOAD RELAYS



Selection Tables—Continued

TABLE 60A

Price \$1.50 Each

Heater Coil Ampere Range	Heater Coil Cat. No.
.310-.349	9104-
.350-.409	H3681
.410-.469	H3682
.470-.539	H3359
.540-.619	H3360
	H3361
.620-.709	H3362
.710-.819	H3363
.820-.939	H203
.940-1.08	H204
1.09-1.22	H205
1.23-1.46	H206
1.47-1.63	H207
1.64-1.87	H208
1.88-2.20	H209
2.21-2.53	H210
2.54-2.95	H211
2.96-3.58	H3364
3.59-3.96	H3365
3.97-4.41	H3366
4.42-5.06	H215
5.07-5.80	H216
5.81-6.70	H217
6.71-7.68	H218
7.69-8.99	H219
9.00-10.5	H220
10.6-11.4	H221
11.5-13.1	H222
13.2-15.6	H223
15.7-17.5	H224
17.6-21.3	H3368
21.4-24.2	H3369
24.3-26.7	H3370
26.8-30.5	H228
30.6-35.0	H229
35.1-39.5	H3371
39.6-44.7	H231
44.8-51.1	H232
51.2-59.6	H233
59.7-67.0	H234
67.1-76.8	H235
76.9-88.2	H236
88.3-101.	H237
102-116.	H238
117-134.	H239
135-155.	H240
156-179.	H241
180-203.	H242
204-236.	H243
237-269.	H244
270-312.	H245

TABLE 61A

Price \$3.00 (Two Per Carton)

Heater Coil Ampere Range	Heater Coil Cat. No.
163-171.	9586-
172-184.	H1350
185-199.	H1351
200-216.	H1352
217-231.	H1353
232-252.	H1354
	H1355
253-270.	H1356
271-290.	H1357
291-306.	H1358
307-329.	H1359
330-345.	H1360
346-361.	H1361

TABLES 62A to 65A

Price \$3.00 (Two Per Carton)

62A	63A	64A	65A	Heater Coil Cat. No.
Heater Coil Ampere Range				
.170-.186	.188-.207	.182-.201	.181-.199	9586-
.187-.205	.208-.227	.202-.220	.200-.218	H1328
.206-.226	.228-.251	.221-.244	.219-.241	H1329
.227-.249	.252-.276	.245-.268	.242-.265	H1330
.250-.273	.277-.303	.269-.293	.266-.291	H1331
				H1332
.274-.298	.304-.331	.294-.321	.292-.317	H1333
.299-.327	.332-.363	.322-.352	.318-.348	H1334
.328-.359	.364-.395	.353-.387	.349-.383	H1335
.360-.390	.396-.435	.388-.426	.384-.425	H1336
.391-.430	.436-.478	.427-.469	.426-.464	H1337
.431-.476	.479-.529	.470-.519	.465-.514	H1338
.477-.539	.530-.589	.520-.579	.515-.575	H1339
.540-.589	.590-.659	.580-.649	.576-.637	H1340
.590-.649	.660-.719	.650-.699	.638-.698	H1341
.650-.709	.720-.789	.700-.779	.699-.767	H1342
.710-.779	.790-.869	.780-.859	.768-.844	H1343
.780-.859	.870-.959	.860-.939	.845-.929	H1344
.860-.959	.960-1.06	.940-1.04	.930-1.03	H1345
.960-1.03	1.07-1.15	1.05-1.13	1.04-1.11	H1346
1.04-1.15	1.16-1.28	1.14-1.25	1.12-1.24	H1347
1.16-1.25	1.29-1.37	1.26-1.37	1.25-1.35	H1348
1.26-1.37	1.38-1.53	1.38-1.51	1.36-1.50	H1349
1.38-1.49	1.54-1.65	1.52-1.64	1.51-1.62	H1350
1.50-1.65	1.66-1.83	1.65-1.81	1.63-1.79	H1351
1.66-1.82	1.84-2.03	1.82-2.01	1.80-1.99	H1352
1.83-2.01	2.04-2.21	2.02-2.21	2.00-2.19	H1353
2.02-2.17	2.22-2.40	2.22-2.40	2.20-2.37	H1354
2.18-2.38	2.41-2.66	2.41-2.66	2.38-2.63	H1355
2.39-2.64	2.67-2.91	2.67-2.93	2.64-2.91	H1356
2.65-2.91	2.92-3.21	2.94-3.25	2.92-3.21	H1357
2.92-3.13	3.22-3.49	3.26-3.53	3.22-3.49	H1358
3.14-3.43	3.50-3.79	3.54-3.87	3.50-3.83	H1359
3.44-3.81	3.80-4.21	3.88-4.29	3.84-4.25	H1360
3.82-4.14	4.22-4.58	4.30-4.73	4.26-4.67	H1361
4.15-4.57	4.59-5.01	4.74-5.23	4.68-5.17	H1362
4.58-4.93	5.02-5.46	5.24-5.69	5.18-5.57	H1363
4.94-5.43	5.47-5.95	5.70-6.28	5.58-6.15	H1364
5.44-5.93	5.96-6.49	6.29-6.93	6.16-6.72	H1365
5.94-6.41	6.50-7.09	6.94-7.60	6.73-7.44	H1366
6.42-6.99	7.10-7.79	7.61-8.39	7.45-8.20	H1367
7.00-7.70	7.80-8.49	8.40-9.19	8.21-9.04	H1368
7.71-8.39	8.50-9.19	9.20-10.1	9.05-9.95	H1369
8.40-9.19	9.20-10.0	10.2-11.3	9.96-11.0	H1370
9.20-9.99	10.1-10.9	11.4-12.5	11.1-12.1	H1371
10.0-10.8	11.0-11.9	12.6-13.8	12.2-13.4	H1372
10.9-11.6	12.0-13.0	13.9-15.0	13.5-14.6	H1373
11.7-12.4	13.1-13.9	15.1-16.3	14.7-15.8	H1374
12.5-13.5	14.0-15.5	16.4-18.3	15.9-17.6	H1375
13.6-14.5	15.6-16.6	18.4-19.9	17.7-19.0	H1376
14.6-15.4	16.7-18.2	20.0-22.1	19.1-21.0	H1377
15.5-17.0	18.3-19.4	22.2-24.1	21.1-22.7	H1378
---	19.5-21.2	24.2-26.5	22.8-24.8	H1379
---	21.3-23.0	26.6-29.2	24.9-26.7	H1380
---	23.1-24.5	29.3-31.1	26.8-28.5	H1381
---	24.6-26.5	31.2-33.9	28.6-31.3	H1382
---	26.6-29.3	34.0-36.6	31.4-33.8	H1383
---	---	36.7-39.9	33.9-37.2	H1384
---	---	40.0-42.4	37.3-39.9	H1385
---	---	42.5-44.8	40.0-43.2	H1386
---	---	44.9-50.3	43.3-46.6	H1387
---	---	50.4-54.9	46.7-49.5	H1388
---	---	55.0-60.4	49.6-51.7	H1389



HEATER COILS FOR OVERLOAD RELAYS

Selection Tables—Continued

TABLES 66A and 67A

Price \$3.00 (Two Per Carton)

66A	67A	Heater Coil Cat. No.
Ampere Range		
.767-.839	.720-.784	9586-H2947
.840-.919	.785-.862	H2948
.920-1.01	.863-.959	H2949
1.02-1.12	.960-1.05	H2950
1.13-1.22	1.06-1.15	H2951
1.23-1.33	1.16-1.25	H2952
1.34-1.49	1.26-1.40	H2953
1.50-1.62	1.41-1.53	H2954
1.63-1.79	1.54-1.69	H2955
1.80-1.93	1.70-1.83	H2956
1.94-2.18	1.84-2.06	H2957
2.19-2.44	2.07-2.31	H2958
2.45-2.64	2.32-2.49	H2959
2.65-2.89	2.50-2.74	H2960
2.90-3.18	2.75-3.05	H2961
3.19-3.56	3.06-3.42	H2962
3.57-3.81	3.43-3.66	H2963
3.82-4.43	3.67-4.24	H2964
4.44-4.60	4.25-4.44	H2965
4.61-4.88	4.45-4.72	H2966
4.89-5.35	4.73-5.18	H2967
5.36-5.79	5.19-5.61	H2968
5.80-6.38	5.62-6.24	H2969
6.39-7.34	6.25-7.19	H2970
7.35-7.99	7.20-7.83	H2971
8.00-8.80	7.84-8.62	H2972
8.81-10.0	8.63-9.89	H2973
---	9.90-11.1	H2974
---	11.2-12.3	H2975

TABLE 68A

Price \$3.00 (Two per Carton)

Heater Coil Ampere Range	Heater Coil Cat. No.
10.0-11.8	9586-H42
11.9-12.7	H43
12.8-14.6	H44
14.7-17.3	H45
17.4-19.4	H46
19.5-23.8	H3355
23.9-26.9	H3356
27.0-29.7	H3357
29.8-33.8	H50
33.9-38.9	H51
39.0-43.8	H3358
43.9-49.6	H53
49.7-56.7	H54
56.8-59.6	H55
59.7-67.0	H234
67.1-76.8	H235
76.9-88.2	H236
88.3-101.	H237
102.-116.	H238
117.-134.	H239
135.-155.	H240
156.-179.	H241
180.-203.	H242
204.-236.	H243
237.-269.	H244
270.-312.	H245

TABLE 69A

Price \$3.00 (Two Per Carton)

Ampere Range	Heater Coil Cat. No.	Ampere Range	Heater Coil Cat. No.
.968-1.07	9586-H1345	10.4-11.6	9586-H1370
1.08-1.16	H1346	11.7-12.7	H1371
1.17-1.29	H1347	12.8-14.0	H1372
1.30-1.41	H1348	14.1-15.3	H1373
1.42-1.56	H1349	15.4-16.7	H1374
1.57-1.69	H1350	16.8-18.7	H1375
1.70-1.87	H1351	18.8-20.0	H1376
1.88-2.07	H1352	20.1-22.4	H1377
2.08-2.28	H1353	22.5-24.4	H1378
2.29-2.47	H1354	24.5-27.0	H1379
2.48-2.74	H1355	27.1-29.5	H1380
2.75-3.03	H1356	29.6-31.7	H1381
3.04-3.35	H1357	31.8-35.0	H1382
3.36-3.64	H1358	35.1-38.3	H1383
3.65-3.99	H1359	38.4-42.6	H1384
4.00-4.38	H1360	42.7-46.9	H1385
4.39-4.82	H1361	47.0-51.4	H1386
4.83-5.33	H1362	51.5-56.4	H1387
5.34-5.80	H1363	56.5-61.6	H1388
5.81-6.40	H1364	61.7-65.3	H1389
6.41-7.07	H1365	65.4-71.9	H1390
7.08-7.75	H1366	72.0-78.2	H1799
7.76-8.55	H1367	78.3-84.7	H1800
8.56-9.51	H1368	84.8-91.9	H1801
9.52-10.3	H1369	92.0-99.9	H1802

TABLE 70A

Price \$3.00 (Two Per Carton)

Ampere Range	Heater Coil Cat. No.	Ampere Range	Heater Coil Cat. No.	Ampere Range	Heater Coil Cat. No.	Ampere Range	Heater Coil Cat. No.
.570-.619	9586-H1562	1.81-1.98	9586-H1574	5.53-6.07	9586-H1586	17.4-18.9	9586-H1598
.620-.689	H1563	1.99-2.17	H1575	6.08-6.64	H1587	19.0-20.8	H1599
.690-.759	H1564	2.18-2.37	H1576	6.65-7.36	H1588	20.9-23.0	H1600
.760-.829	H1565	2.38-2.62	H1577	7.37-8.07	H1589	23.1-25.2	H1601
.830-.919	H1566	2.63-2.89	H1578	8.08-8.87	H1590	25.3-27.6	H1602
.920-1.00	H1567	2.90-3.15	H1579	8.88-9.75	H1591	27.7-30.3	H1603
1.01-1.09	H1568	3.16-3.37	H1580	9.76-10.6	H1592	30.4-33.3	H1604
1.10-1.21	H1569	3.38-3.77	H1581	10.7-11.7	H1593	33.4-36.7	H1605
1.22-1.33	H1570	3.78-4.13	H1582	11.8-12.9	H1594	36.8-40.5	H1606
1.34-1.47	H1571	4.14-4.54	H1583	13.0-14.2	H1595	40.6-44.5	H1607
1.48-1.61	H1572	4.55-4.99	H1584	14.3-15.7	H1596		
1.62-1.80	H1573	5.00-5.52	H1585	15.8-17.3	H1597		

TABLE 71A

Price \$3.00 (Two Per Carton)

Ampere Range	Heater Coil Cat. No.	Ampere Range	Heater Coil Cat. No.	Ampere Range	Heater Coil Cat. No.	Ampere Range	Heater Coil Cat. No.
.179-.197	9586-H1460	.830-.909	9586-H142	3.76-4.18	9586-H158	17.8-19.1	9586-H866
.198-.214	H1461	.910-.989	H143	4.19-4.48	H159	19.2-21.3	H186
.215-.239	H1462	.990-1.09	H144	4.49-5.01	H160	21.4-23.3	H321
.240-.261	H1463	1.10-1.21	H145	5.02-5.53	H161	23.4-24.6	H322
.262-.285	H1464	1.22-1.31	H146	5.54-6.15	H162	24.7-27.5	H323
.286-.317	H1465	1.32-1.48	H147	6.16-6.69	H163	27.6-30.5	H324
.318-.345	H1466	1.49-1.57	H148	6.70-7.49	H164	30.6-33.7	H688
.346-.384	H1467	1.58-1.74	H149	7.50-7.97	H165	33.8-37.3	H689
.385-.420	H1468	1.75-1.91	H150	7.98-8.75	H166	37.4-40.9	H690
.421-.457	H1469	1.92-2.11	H151	8.76-9.99	H167	41.0-44.9	H691
.458-.510	H1470	2.12-2.30	H152	10.0-10.6	H168	45.0-49.3	H692
.511-.559	H1471	2.31-2.54	H153	10.7-11.7	H169	49.4-54.6	H693
.560-.629	H138	2.55-2.81	H154	11.8-13.1	H170	54.7-57.9	H694
.630-.709	H139	2.82-3.25	H155	13.2-14.8	H171	58.0-65.8	H707
.710-.749	H140	3.26-3.40	H156	14.9-16.0	H172	65.9-74.6	H708
.750-.829	H141	3.41-3.75	H157	16.1-17.7	H173	74.7-82.1	H735

HEATER COILS FOR OVERLOAD RELAYS



Selection Tables

TABLES 72A and 73A

Price \$1.50 Each

72A	73A	Heater Coil Catalog Number
Heater Coil Ampere Range		
.186 — .205 .206 — .225 .226 — .249 .250 — .273 .274 — .300	.188 — .207 .208 — .227 .228 — .251 .252 — .276 .277 — .303	9104- H1328 H1329 H1330 H1331 H1332
.301 — .328 .329 — .359 .360 — .395 .396 — .435 .436 — .478	.304 — .331 .332 — .363 .364 — .399 .400 — .439 .440 — .482	H1333 H1334 H1335 H1336 H1337
.479 — .529 .530 — .589 .590 — .659 .660 — .719 .720 — .779	.483 — .535 .536 — .599 .600 — .662 .663 — .726 .727 — .799	H1338 H1339 H1340 H1341 H1342
.780 — .859 .860 — .949 .950 — 1.05 1.06 — 1.13 1.14 — 1.27	.800 — .879 .880 — .967 .968 — 1.07 1.08 — 1.15 1.16 — 1.28	H1343 H1344 H1345 H1346 H1347
1.28 — 1.37 1.38 — 1.51 1.52 — 1.64 1.65 — 1.81 1.82 — 1.99	1.29 — 1.39 1.40 — 1.54 1.55 — 1.65 1.66 — 1.85 1.86 — 2.04	H1348 H1349 H1350 H1351 H1352
2.00 — 2.18 2.19 — 2.37 2.38 — 2.63 2.64 — 2.88 2.89 — 3.18	2.05 — 2.25 2.26 — 2.44 2.45 — 2.71 2.72 — 3.00 3.01 — 3.28	H1353 H1354 H1355 H1356 H1357
3.19 — 3.46 3.47 — 3.75 3.76 — 4.16 4.17 — 4.53 4.54 — 5.01	3.29 — 3.57 3.58 — 3.91 3.92 — 4.34 4.35 — 4.77 4.78 — 5.23	H1358 H1359 H1360 H1361 H1362
5.02 — 5.45 5.46 — 5.95 5.96 — 6.59 6.60 — 7.14 7.15 — 7.84	5.24 — 5.69 5.70 — 6.28 6.29 — 6.93 6.94 — 7.52 7.53 — 8.31	H1363 H1364 H1365 H1366 H1367
7.85 — 8.55 8.56 — 9.43 9.44 — 10.4 10.5 — 11.2 11.3 — 12.5	8.32 — 9.04 9.05 — 9.95 9.96 — 11.0 11.1 — 12.1 12.2 — 13.2	H1368 H1369 H1370 H1371 H1372
12.6 — 13.6 13.7 — 14.8 14.9 — 16.4 16.5 — 17.7 ---	13.3 — 14.6 14.7 — 15.7 15.8 — 17.6 17.7 — 19.0 19.1 — 21.0	H1373 H1374 H1375 H1376 H1377
---	21.1 — 22.9 23.0 — 25.4 25.5 — 27.8 27.9 — 29.8	H1378 H1379 H1380 H1381

TABLE 74A

Price \$3.00 (Two Per Carton)

Heater Coil Ampere Range	Heater Coil Catalog Number
.175 — .191 .192 — .211 .212 — .233 .234 — .257 .258 — .281	9586- H1328 H1329 H1330 H1331 H1332
.282 — .308 .309 — .338 .339 — .371 .372 — .407 .408 — .449	H1333 H1334 H1335 H1336 H1337
.450 — .497 .498 — .556 .557 — .616 .617 — .676 .677 — .744	H1338 H1339 H1340 H1341 H1342
.745 — .817 .818 — .899 .900 — .999 1.00 — 1.07 1.08 — 1.18	H1343 H1344 H1345 H1346 H1347
1.19 — 1.29 1.30 — 1.43 1.44 — 1.55 1.56 — 1.72 1.73 — 1.90	H1348 H1349 H1350 H1351 H1352
1.91 — 2.10 2.11 — 2.27 2.28 — 2.52 2.53 — 2.79 2.80 — 3.05	H1353 H1354 H1355 H1356 H1357
3.06 — 3.31 3.32 — 3.63 3.64 — 4.03 4.04 — 4.43 4.44 — 4.85	H1358 H1359 H1360 H1361 H1362
4.86 — 5.28 5.29 — 5.82 5.83 — 6.37 6.38 — 6.97 6.98 — 7.69	H1363 H1364 H1365 H1366 H1367
7.70 — 8.37 8.38 — 9.21 9.22 — 10.1 10.2 — 11.0 11.1 — 12.2	H1368 H1369 H1370 H1371 H1372
12.3 — 13.3 13.4 — 14.3 14.4 — 15.8 15.9 — 16.9	H1373 H1374 H1375 H1376

CUTLER-HAMMER Inc. Sales Offices

ALA.	BIRMINGHAM 13	15 Office Park Circle	205 871-1166
ARIZ.	PHOENIX 12	3500 N. Central Avenue	602 279-0031
CALIF.	FRESNO 7	1244 N. Mariposa Street	209 268-3301
"	LOS ANGELES 22	6431 Bandini Boulevard	213 723-8391
"	SACRAMENTO 14	1331 "T" Street	916 442-2351
"	SAN DIEGO 3	3780 5th Avenue	714 298-5432
"	SAN FRANCISCO	1661 Industrial Way, Belmont, Calif.	415 591-7361
COLO.	DENVER 23	1030 West Ellsworth Avenue	303 222-3628
CONN.	NEW HAVEN 14	60 Connolly Parkway	203 248-6353
D.C.	WASHINGTON	8055 13th St., Silver Spring, Md.	301 587-5952
FLA.	JACKSONVILLE 11	6957 Lillian Road	305 725-2845
"	TAMPA 6	540 W. Davis Boulevard	813 253-3559
GA.	ATLANTA	2115 American Industrial Way, Chamblee, Ga.	404 451-2331
ILL.	CHICAGO	2375 Touhy Avenue, Elk Grove Village, Ill.	312 439-1910
"	PEORIA	301 S. Adams Street	309 674-4131
"	ROCKFORD	1404 N. Main Street	815 965-9469
IND.	HAMMOND	6719 Calumet Avenue	219 931-8890
"	INDIANAPOLIS 20	5420 N. College Avenue	317 253-3408
"	SOUTH BEND 15	435 S. Ironwood Drive	219 282-2022
IOWA	DAVENPORT	220 Main Street	319 323-8057
KANS.	WICHITA 3	1818 W. Douglas Avenue	316 363-5216
KY.	LOUISVILLE 7	195 Colony Way	502 896-1786
LA.	NEW ORLEANS 12	1000 Howard Avenue	504 522-3691
"	SHREVEPORT	2210 Line Avenue	318 424-3544
MD.	BALTIMORE 12	7215 York Road	301 825-6041
MASS.	BOSTON 35	415 Western Avenue	617 254-6210
MICH.	DETROIT 38	15427 Woodrow Wilson Avenue	313 883-1600
"	GRAND RAPIDS 7	733 Alger Street, S.E.	616 243-0152
"	SAGINAW	1808 N. Michigan Avenue	517 755-0417
MINN.	MINNEAPOLIS 6	4439 Hiawatha Avenue	612 721-4453
MO.	KANSAS CITY 12	4916 Main Street	816 931-2787
"	ST. LOUIS 30	8118 Page Boulevard	314 429-7711
NEBR.	OMAHA 2	1319 Farnam Street	402 345-8600
N. J.	NEWARK 14	315 Sherman Avenue	201 248-3905
"	TRENTON 8	1432 Brunswick Avenue	609 695-6763
N. Y.	ALBANY 7	90 State Street	518 434-4242
"	BUFFALO 25	3385 Harlem Road	716 836-4444
"	NEW YORK 17	733 Third Avenue	212 687-0707
"	NO. SYRACUSE 12	Northern Lights Office Park	315 454-2402
N. C.	CHARLOTTE 3	2505 South Blvd.	704 523-3056
"	GREENSBORO	2408 Kery Drive	919 274-1426
OHIO	AKRON 13	441 Beaumont Drive	216 666-1704
"	CINCINNATI 18	11322 Southland Road, Forest Park	513 825-5252
"	CLEVELAND 7	1521 W. 117th Street	216 221-0100
"	COLUMBUS 9	2700 E. Main Street	614 237-2587
"	DAYTON 20	1221 Wilmington Avenue	513 293-2117
"	TOLEDO 2	1220 Madison Avenue	419 246-4922
"	YOUNGSTOWN 12	5609 Market Street	216 788-8751
OKLA.	OKLAHOMA CITY 12	2241 N.W. 40th Street	405 524-9945
"	TULSA 14	2570 S. Harvard Avenue	918 747-7531
ORE.	PORTLAND 4	208 S.W. Stark Street	503 227-2405
PA.	ALLENTOWN	834 Hamilton Street	215 437-4469
"	PHILADELPHIA	65 West Avenue, Wayne, Pa.	215 878-0820
"	PITTSBURGH 5	2240 Noblestown Road	412 922-2707
"	YORK	12 E. King Street	York 29-515
TENN.	MEMPHIS 3	60 N. Main Street	901 527-7123
"	NASHVILLE 11	306 Randall Drive	615 832-2435
TEXAS	DALLAS 7	9040 Directors Row	214 631-3460
"	EL PASO 25	9972 Debbie Drive	915 591-0521
"	HOUSTON 6	3303 Montrose Boulevard	713 526-2008
"	MIDLAND	4017 Roosevelt Boulevard	915 694-5031
UTAH	SALT LAKE CITY 1	253 Rio Grande Street	801 328-0233
VA.	RICHMOND 30	3122 W. Clay Street	703 353-4413
WASH.	SEATTLE 4	623 8th Avenue So.	206 624-3545
"	SPOKANE 33	Box 121, Route 2	509 489-3940
W. VA.	CHARLESTON	1120 Kanawha Boulevard, E.	304 343-4141
WISC.	APPLETON	526 W. Wisconsin Avenue	414 734-5651
"	MILWAUKEE 6	2312 W. Capitol Drive	414 271-7800, X2500

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