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AMERICAN-STANDARD

Electra

MODEL EP ELECTRIC BOILER APPLICATIONS MANUAL

FORM NO. EB-666

JULY, 1966

ELECTRIC HEATING

Forward

Electric heating uses electricity as a fuel in a manner not unlike coal, oil and gas are used in other systems. In all of these cases the fuel may be considered a source of energy and the appliances used in the heating system are machines for converting this energy into useful heat. When a fuel is burned, its chemical make-up is changed into other chemical compounds which have lower energy levels and the difference in energy appears as heat. In a boiler this heat is absorbed by water and transferred to the air in our living space to produce heating comfort. In a warm air furnace the heat released by the combustion of the fuel is absorbed directly by the air and the heated air is mixed with the air in which we live in order to raise or maintain its temperature and thereby produce a comfortable condition.

When a fuel is converted into heat energy there are almost always some unavoidable losses. Since adding the products of combustion to the atmosphere of our living space would produce an uncomfortable condition, we must take steps to dispose of these by-products to the outside and they carry away with them a certain amount of the heat released in the combustion process. This necessary loss is an amount somewhere in the neighborhood of 20% of the amount of energy stored in the fuel. These losses are unavoidable since we use the atmosphere (nearly 80% of which is nitrogen) to furnish oxygen for the combustion process. The carbon and hydrogen of fossil fuels combine with the oxygen of the atmosphere to form carbon dioxide and water, and these by-products with the inert nitrogen are conducted through the chimney to the outside. These losses are further increased because we cannot have such a carefully controlled combustion process so that the exact amount of required oxygen is furnished; we must use an excess amount of air to insure complete combustion since incomplete combustion might produce carbon monoxide as a by-product. The ill effects of breathing carbon monoxide by redblooded animal life is well-known.

When electricity is used as a fuel, these unavoidable losses are still present but they appeared in the boiler rooms and chimneys of the power generating station and the energy delivered to us through the transmission lines is the pure product; therefore, its cost is normally proportionately higher. One might reason that these losses are not present when electricity is generated at a hydroelectric plant and this is true, but another loss immediately presents itself unless we consume the electricity at the point where it is generated. Cross-country transmission lines are costly and this cost becomes prohibitive at points considerably distant from the waterfall.

The energy contained in coal may be stored in a bin; fuel oil is stored in a tank; and gas may be stored in underground caverns or in large metal "holders." Electricity represents energy derived from electrons in motion and must be used instantly. Only a fraction of a second elapses between the time a force is applied on the shaft of a generator until a unit of heat is released from a resistance unit in a home using electricity as a fuel. It is therefore apparent that the maximum demand, with all generators turning or ready to be placed in motion instantly, must be available at all times.

If each home had a coal mine, a gas field, an oil well, and a waterfall beneath it, we would have great freedom of choice in deciding which fuel to use, but if we chose electricity it would require a considerable investment in the necessary equipment to convert this source of energy into heat. It would also require a great amount of supervision in order to regulate this equipment. With the other fuels, relatively simple equipment supervised by mechanical devices could produce a satisfactory conversion.

With all of the foregoing facts in mind, we must admit that electricity is a premium fuel to be used in the production of heat, which is the ultimate end product of all motion outside of the atom and within our gravitational sphere. The cost of a unit of heat generated by electricity in a home at some distance from a generating station is apt to be between three and four times as great as the same unit of heat generated by fossil fuels, but despite this fact there are many applications where electric heating is feasible. Its cleanliness is certainly a most desirable factor. The simplicity of the equipment required to heat a home electrically considerably reduces the original investment. It may be turned on and off completely on an instant's notice without subjecting the equipment to any attendant damage. There are countless other factors which contribute to the desirability of electricity as a fuel, and when the decision has been made to use this fuel, it is our firm belief that the electro-hydronic system is by far the best method of utilizing it.

The "Electra"

The American-Standard "Electra" was designed with the Hydronic contractor in mind. The "Electra" is normally mounted on the wall at eye-level. Designed to reduce installation time---both piping and electrical---to a minimum, the installer need only connect supply and return piping; wire the thermostat (low voltage) to the appropriate terminals and have his electrician run cable from the main house supply to the unit. All steps of the installation are standard for a hydronic system. With the "Electra" all accessories are shipped in place and correctly wired. The installer need not concern himself with such items as air valves, expansion tank, drain valve, pressure-temperature gauge or operating controls. These are all factory installed.

The standard "Electra" is designed and wired for continuous circulation. This means that the circulating pumps runs continuously with the heating elements being cycled by the thermostat on a call for heat. The elements raise the temperature of the water in the boiler sufficiently to satisfy the heating requirements of the space to be heated. This is true modulation. While the unit is in operation, should it reach high limit water temperature before the thermostat is satisfied, the immersion limit control cuts off the elements, but the pump will continue to run. The elements will stay off until the water temperature has gone down to a point which is required in order to reactivate the operating control. When the thermostat is satisfied all elements shut off and the pump will continue to run, dissipating the heat generated by the boiler. The low voltage, heat anticipator thermostat senses or anticipates the added heat that will be circulated after the elements are shut down and guards against over heating of the space.

A review of the wiring compartment (right hand side as you face the unit) reveals that each element is individually fused. With this arrangement, should an element malfunction and cause a fuse to blow, it affects only that element and the others will continue to operate. The red pilot lights are wired in series with the elements and provide a visual alert. With individually fused elements there is no need for emergency calls because one fatigued element will not affect the entire system - other elements in the circuit will continue to operate. In addition to each element being fused, the circulator is also separately fused for added protection of this component.

For the ultimate in system protection and equipment safeguard, American-Standard controls in four areas. An adjustable immersion limit allows the installer to select the water temperature for which the system is designed. If the temperature exceeds the limit setting the elements are disconnected electrically. If the pressure in the system exceeds 28 psi a high pressure switch shuts down the unit until pressures fall below 28 psi. If for some reason the pressure should reach 30 psi the relief valve will relieve the pressure by mechanical means. On the other side of the ledger, we also provide a low pressure switch which prevents the boiler from being fired dry by being operative only when there is at least 4 psi water pressure in the boiler.

The boiler has been designed to require minimum servicing. Before initial start-up and at the beginning of each heating season, the circulator should be oiled according to instructions shown on the circulator.

In the event of heating element burnout, replacement should be made with a square-flanged type having 2-1/2" bolt circle. All elements are of the low-density type (80 watts per square inch or less) and are rated at 5,000 watts each, except for one 4,000 watt element in the Model EP-82.

Distributor's Net Prices

When a new product is first introduced in a territory, each man should make plans to see that such items that are special are available in his area. If any of the following components are "specials" such as the high and low pressure switches, it is suggested that the local distributor be advised to stock one or two for emergency situations.

000 $3.83
000 4.79 Electric Immersion Elements: Wiegand - Chromolox (4,000 and 5,000 watts)

8.41 Limit Control: Honeywell L4008A

32.43 Circulator: B & G #125

" 15.46)
" 20.18) Sequencing Relay: Honeywell R8154
" 26.84) "A" 32.33

16.00 High Pressure Switch: Allen-Bradley #836CP11 - HKAZS

2.40 Low Pressure Switch: J. W. Hobbs #M4440

3.00 Temperature-Pressure Gauge: Marshalltown #117

2.25 Automatic Air Vent: Flair, Maid-O-Mist, American Tube

7.75 Expansion Tank: Extrol #15, Flair #18, General 4P-XI, American Tube #15

.50 Drain Valve: Consolidated 31-601

4.00 Relief Valve: Watts M-374 3/4"
Fuse: SC-10 $.10 SC-30 $.34

The following specifications are given for the American-Standard electric boiler which is intended for use on the standard 240 volt, AC, three-wire, single phase, 60 cycle electrical service.
Transformer AT-72 $2.18

Indicator Lights + lead $.80

Model No.	Watts	Btuh	Amps drawn @ 240 volts
EP-34	10,000	34,130	41.7
EP-51	15,000	51,195	62.4
EP-68	20,000	68,260	83.2
EP-82	24,000	81,912	100.0

It is to be noted that the boiler alone may use up to 100 amperes of drain on the electrical service. The conventional wiring in a home is usually for a maximum of 100 amperes to furnish the lighting, cooking and appliance load. It is necessary, therefore, to check the capacity of the owner's electrical service before a boiler is installed, since in all probability greater capacity will need be furnished and this cost should be considered in the original estimate. The wiring from the entrance switch to the boiler should be of the proper size and type shown in the technical bulletin since the resistance of the wiring acts the same as any other conductor. Wire that is under specification for the service could quickly overheat and cause considerable damage.

T-238A Indoor/outdoor control $8.49

Boiler No.	Conductor Size (AWG)	Boiler No.	Conductor Size (AWG)
EP-34	6	EP-68	2
EP-51	4	EP-82	1

Use wire suitable for at least 75°C (167°F).

All wiring must be made in compliance with any local codes and recommendations of the local power company as well as the national electrical code.

Insulation of Structure

Recognizing the fact that electricity as a fuel is generally more expensive than other fuels, we must take every reasonable step to reduce the heat loss from the heated space. Greater expense of insulation can be economically justified because of the greater net savings in operating costs. Insulating materials may be fabricated in various forms and sizes. Rigid insulation is a form where the material is fabricated into boards or sheets. Blankets, batts and loose fill are other commonly used types. Blanket insulation is particularly useful in lending itself to completely fill any space around obstructions and irregular shapes, but may present a problem in maintaining a moisture seal. The very best insulating material loses its value when saturated with moisture. Even spun glass fibers which cannot absorb moisture will hold a film and droplets of water and therefore lose their value. A moisture seal or vapor barrier must be employed to maintain the effectiveness of any insulating material used in walls, floors and ceiling of a house.

Normal living in a home introduces a large amount of water vapor into the inside atmosphere. A human being may lose from one to four pounds of water to his surroundings in a twenty-four hour period, chiefly in evaporation from the skin and in the exhaled breath. Bathing, cooking and laundry are other sources of releasing moisture to the inside of a home. Adding water vapor to the atmosphere increases its pressure. This pressure increase in moisture content of the air inside a home will cause the air and water vapor to be forced through the porous building materials of the home unless it is contained by a barrier. Polyethylene sheets, asphalt impregnated paper and foil backed sheet rock are examples of vapor sealing means. The vapor seal should be installed on the room side of the insulation.

It is most difficult, although not impossible, to properly insulate an existing home. If loose fill is used in the stud and joist spaces, a vapor seal of moisture proof paint or varnish may be applied to inside surfaces of walls, floors and ceilings.

In the home to be heated with electricity, the entire stud space should be filled with the optimum density of good insulation material. The attic space should have a minimum of six and preferably eight inches of insulation. Floors over unheated spaces should have an insulation thickness of 3-5/8". Any type of insulation may be improved when coated with a reflective coating which may be of paint or applied foil.

Special attention must be given to all doors and windows in an electrically heated home. All windows should be double hung wood sash with weather stripping and protected with closely fitted storm sash. The doors should be of solid wood and weather stripped. Storm doors must be installed and properly fitted.

Great emphasis has been placed on the necessity for proper insulation with the full recognition that a problem may be created in that this very tight house may now not permit enough infiltration of outside air to eliminate excessive moisture and odors at all times. Bedrooms should have provision for admitting controlled amounts of fresh air. While a kitchen fan may be used to remove cooking odors, the inlet to the area should be adjustable so that unnecessary quantities of air are not being "dumped" when the fan is in operation. Controlled ventilation for other parts of the home may be necessary for those occasions when more than the normal number of persons are in the home. In general, for the average occupancy and house construction and insulation as outlined above, the normal infiltration and normal use of the kitchen exhaust fan will provide adequate ventilation.

Installation

Figure 1 (attached) illustrates pertinent installation dimensions and necessary clearances for component removal when necessary.

Figure 2 shows minimum clearances which must be maintained when the "Electra" is installed in a closet or confined space.

Figures 3, 4, 5 and 6 show internal wiring of the four boiler sizes available.

Figure 7 applies to modification of the boiler for zoning with zone valves.

Figure 8 illustrates a relay wired into the circuit for intermittent operation of the circulator.

Sequencing

The Honeywell R8154 control used as standard equipment with the "Electra" provides for a 1/120th of a second delay between element energizings. Theoretically this fractional break in electrical load provides for an incremental load on the power lines. However, on installations where the capacity of the pole transformer serving the job is marginal, dimming of lights may occur. For this reason, Utilities in some areas require delays in element energizings of up to 45 seconds between each 5 kw. Normally this requirement only applies where the appliance draws in excess of 15 kw. This means that on the EP-68 and EP-82 Models, time delay sequencers other than the standard R8154 may be required to meet local specifications and/or requirements.

For this situation, we will make available as an optional extra the White-Rodgers Type 24A11-4 sequencer which provides for a 45 second delay on element energizings. Figures 9, 10 and 11 illustrate how these controls should be wired into the standard unit.

> Note: In the event that 45 second sequencing is required on units smaller than 15 kw, the W-R 24A11-4 can be wired into the circuit between any two elements to achieve this delay.

Applications

The "Electra" is ideally suited for the new home construction market primarily because it is felt that in this market insulation requirements, so necessary to economical electric heat operations, could best be achieved. The 2" insulation under floors; 4" in walls; and 6" on ceilings is normally required by Utilities in order to qualify for the lower electric rates. On modernization jobs a detailed audit should be made of the construction of the home under consideration to determine the feasibility of insulating to required specifications. Under no condition should electric heating equipment be installed without consideration being given to proper insulation. The insulation of a structure determines final operating costs. Unfavorable operating costs can give any system a "black eye." It is for this reason that we caution you to insist that proper attention to insulation be made mandatory on all electric boiler installations.

The "Electra" is ideal for, but not limited to, baseboard installations. It is first, last and always a hydronic boiler and as such can be used on any hydronic installation within the range of the boiler's output.

For the ultimate in temperature modulation, the boiler can be wired to incorporate an indoor-outdoor thermostat which when used in conjunction with the previously discussed time-delay sequencers by White-Rodgers provides for partial loading of the boiler depending on the indoor-outdoor setting. Figure 12 illustrates this type of hookup.

Conclusions

Where electricity is the chosen and preferred fuel, offer the "Electra" Electric Boiler. Sell the Hydronic Heating concept using these six pluses:

1. Low element temperatures mean cleaner, safer heating.
2. Zone sensibly with hydronics by living area not by closing doors.
3. Hydronics offers complete decorating freedom.
4. True temperature modulation with no costly heat carry-over.
5. Real heating comfort floor to ceiling with 2^{o} temperature differential.
6. Quality heating at competitive prices.

Keywords:

Sell Hydronics--the system--first
Insulate properly

Fundamentals of Electricity

Nearly everyone is familiar with Ohm's Law which states that $E = IR$. This means that the force produced by a given potential difference is equal to the product of the intensity of the current and the resistance to the flow of that current in a circuit.

"E" stands for a unit of force (volt) which an electron (or each of a vast number of electrons) may have which urges it to move to another place in a circuit where it will be in equilibrium with those electrons at that point.

"I" is a unit of the intensity of the flow of electrons (ampere). It is the measure of the number of electrons which pass a given point in a circuit in one second when electricity is flowing through a conductor.

"R" is a measure of the difficulty which the atoms (and their own electrons) of a conductor present to the movement of electrons through it. The unit is an Ohm.

Note: Consider a sponge, which is saturated with water, lying on a surface. It is holding its complete capacity. Another drop of water is admitted to the top of the sponge and immediately a drop is forced out at the bottom. The drop seeping out at the bottom may not be the same water which was admitted above, and although the drop at the bottom was forced out immediately, the movement of the new drop throughout the sponge may be rather slow. This same picture may be used in considering the flow of electrons in an electrical circuit.

Whenever electrons are flowing through a conductor, a magnetic field is "induced" around that conductor and this field remains there as long as the electrons continue to flow. If the flow of electrons in the conductor stops, the energy of the "field" finds its way back into the conductor to restore its original equilibrium. If we do not use the magnetic field to perform any work (such as magnetizing a piece of iron and allowing that piece of iron to move another piece of iron or another magnetic field), it makes no difference in which direction the current is flowing and alternating current may be considered the same as direct current.

E = IR as defined above is really saying that to produce a flow of electrons, the amount of necessary urging (volts) must be equal to the number of electrons being "urged" (current) times the amount of resistance (Ohms) each one of these electrons will meet:

$$E = IR$$

and $I = E/R$

also, $R = E/I$

A watt (W) is a measure of the accomplishment of "urging" electrons to overcome the combined resistance which each one meets as it flows in its circuit and can be expressed by multiplying the magnitudes of the "urging" force (volts) by the number of electrons flowing (amperes), or:

$$W = EI$$

since $E = IR$, we may substitute IR in place of E

and $W = (IR)\,I = I^2R$

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$$\text{if} \quad I = \frac{E}{R} \text{ then } I^2 = \left(\frac{E}{R}\right)^2 \quad \text{or} \quad \frac{E^2}{R^2}$$

$$\text{and} \quad W = \frac{E}{R}^2 2 \times R = \frac{E^2 R}{R^2} = \frac{E^2}{R}$$

Consider a flashlight which uses two 1½ volt cells and a light bulb which has a filament with 3 ohms resistance:

$$E = 3$$

$$R = 3$$

$$3 = 3I \quad (E = IR)$$

$$I = \frac{3}{3} = 1$$

This indicates that 3 volts will "urge" a flow of 1 ampere through 3 Ohms of resistance and that a measure of this accomplishment is expressed by:

$$W = EI = 3 \times 1 = 3$$

$$\text{or} \quad W = \frac{E^2}{R} = \frac{3x3}{3} = \frac{9}{3} = 3$$

Let us transfer this same thinking to a 5,000 watt heater operating on a 240 volt circuit:

$$5{,}000 = 240 \times I$$

$$I = \frac{5{,}000}{240} = 20.8$$

Thus it will be seen that 240 volts will force a flow of 20.8 amperes through a certain 5,000 watt heater and since E = IR:

$$240 = 20.8 \times R$$

$$R = \frac{240}{20.8} = 11.55$$

Let us see what happens if we apply only 120 volts to this same heater which is rated at 5,000 watts on a 240 volt circuit:

$$\text{now,} \quad W = \frac{E}{R}^2$$

$$= \frac{(120)^2}{11.55} = \frac{14{,}400}{11.55} = 1{,}250$$

If we allow a watt to flow in a circuit for one hour, it may be said that a watt-hour of electricity was converted to heat or some other form of energy. A more convenient term for measurement is to allow 1,000 watts (a kilowatt) to flow for one hour and then speak of a kilowatt-hour, which is the conventional measurement for the consumption of electrical energy. One kilowatt-hour (kwh) is equal to 3,413 btu.

EP Electric oiler

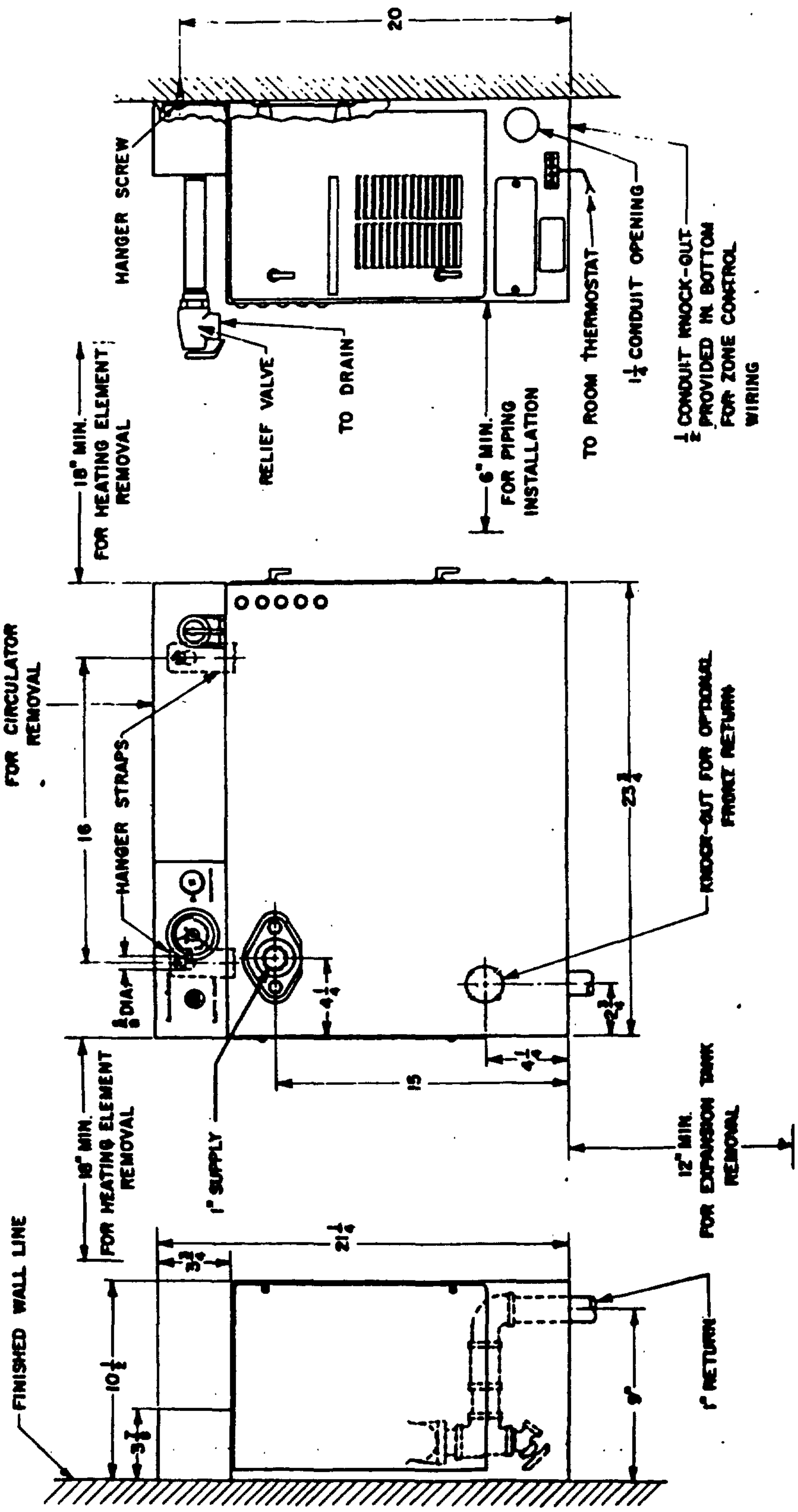

Figure 1

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PACKAGING

The Model EP Electric Boiler is shipped as a completely factory-assembled unit in one carton. The shipping carton contains the following:

1 - Boiler
1 - "Jiffy" Bag of Accessories - See Packing List in Bag for Contents.
1 - Installation Manual

INSTALLATION

Roughing-in dimensions are shown in Figure 1.

It is intended that the boiler be wall mounted using wood screws, lag screws, or other suitable devices from which the boiler may hang by the hanger straps mounted on the back of the boiler. To gain access to the hanger straps, remove the circulator access panel and the decorative control cover from the top of the boiler.

The unit must be installed in accordance with applicable building and electrical codes. Authorities having jurisdiction should be consulted before installation is made.

Approximate Shipping Weight - 90 lbs.

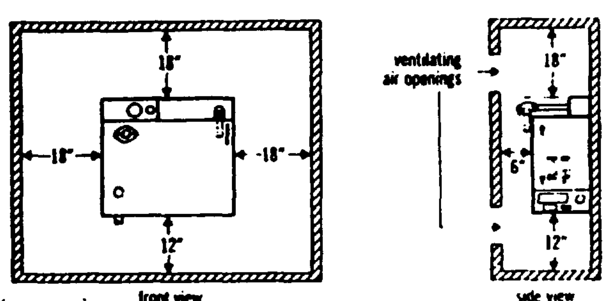

Figure 2

The minimum installation clearances shown in Figure 2 should be provided for service accessibility.

The boiler has been approved for closet installation with these same clearances from combustible material and with two air openings of 108 sq. in. (6" x 18") each.

WATER CONNECTIONS AND PIPING

The supply and return system connections are 1" NPT female and are located as shown in Figure 1.

A drain valve with standard "garden" hose connection is provided at the bottom left end of the water vessel.

The relief valve supplied should be installed as shown in Figure 1.

The outlet of the relief valve should be piped to a suitable drain.

Either a manual or automatic fill system may be used. The manual fill is recommended since a completely closed system is preferred; that is, if an automatic fill valve were called upon to function because of leaks, the leaks should be repaired.

If an automatic fill valve is installed, it is recommended that a bypass (with shutoff valve) be piped around the valve so that full water flow rates may be used to adequately purge the system of air on initial fill.

EXPANSION TANK

The boiler is factory equipped with a diaphragm-type expansion tank, which is precharged to 12 psig. The tank is fitted with a tire valve to be used if it is necessary to increase the initial air pressure in the tank with the system cold to insure adequate expansion volume.

AUTOMATIC AIR VENT

The boiler is factory equipped with an automatic air vent to bleed off entrained air in the heating system. The air vent is located on the top left end of the boiler under the decorative control cover (see Figure 9). Before filling the system, screw down the cap on the air vent to prevent dirt and scale from fouling the valve in the air vent during the fill process.

After the system has been filled with water, loosen the air vent cap two turns so that the vent will operate properly.

ELECTRICAL HOOKUP

ALL HOOKUP WIRING MUST CONFORM WITH LOCAL AND NATIONAL CODES.

The boiler is prewired for constant circulator operation. Electrical service required is 240 volt a-c (nominal) three-wire, single-phase, 60-cycle. On the Models EP-68 and EP-82, the service conductors are connected to the "L" & "N" terminals provided in the control compartment on the right-hand end of the boiler. On the Models EP-34 and EP-51, one of the "hot" service conductors is connected to the pressure terminal on the Honeywell R8154 sequencing switch.

Applicable wiring diagrams are shown as follows:

Model EP-34 -- Figure 3
Model EP-51 -- Figure 4
Model EP-68 -- Figure 5
Model EP-82 -- Figure 6

A wiring diagram is affixed to the inside of the control compartment access door.

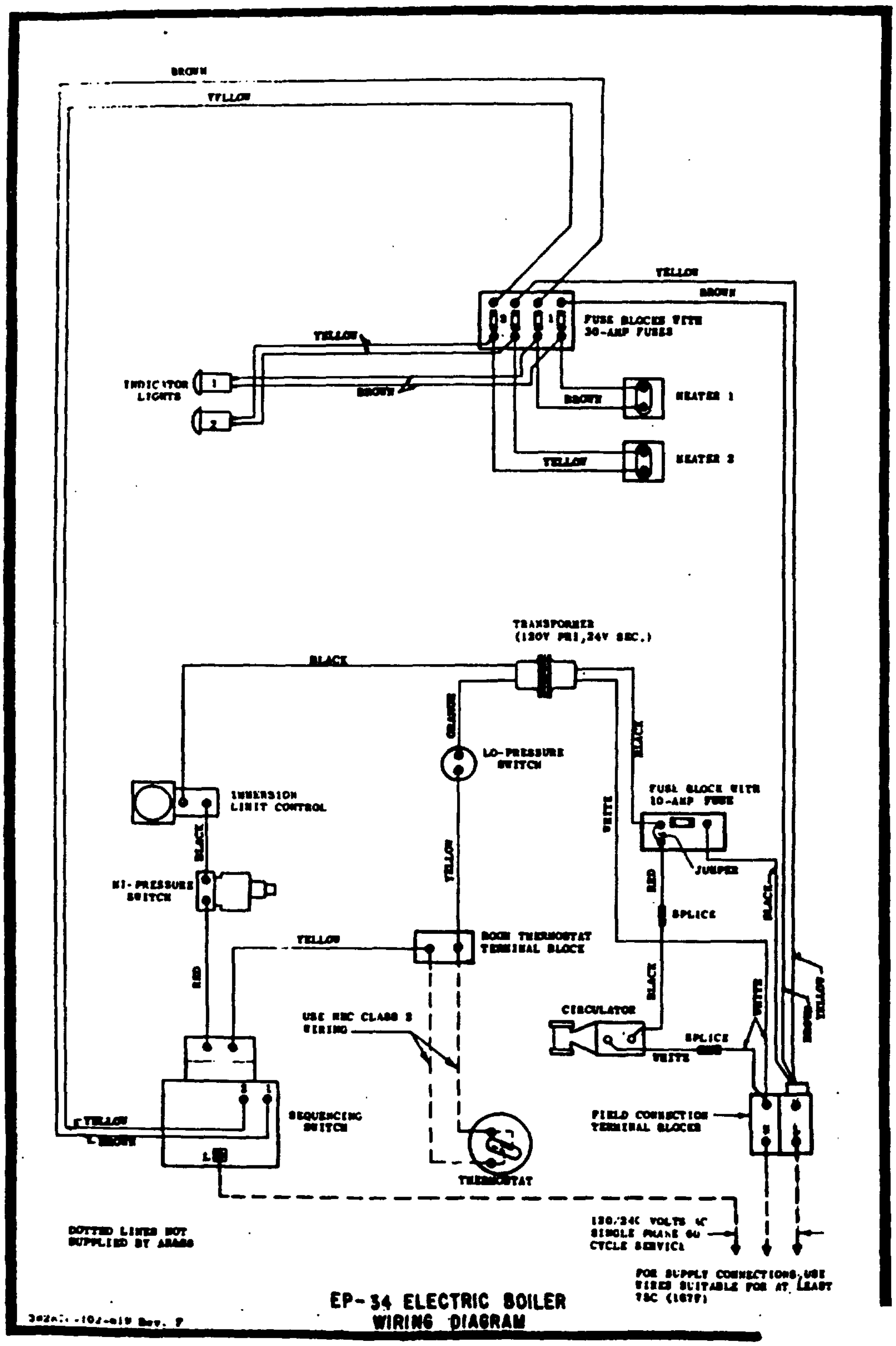
BROWN
YELLOW
FUSE BLOCKS WITH 30-AMP FUSES
INDICATOR LIGHTS
HEATER 1
HEATER 2
TRANSFORMER (120V PRI,24V SEC.)
BLACK
ORANGE
LO-PRESSURE SWITCH
IMMERSION LIMIT CONTROL
FUSE BLOCK WITH 10-AMP FUSE
WHITE
JUMPER
HI-PRESSURE SWITCH
RED
SPLICE
ROOM THERMOSTAT TERMINAL BLOCK
USE NEC CLASS 2 WIRING
CIRCULATOR
SEQUENCING SWITCH
FIELD CONNECTION TERMINAL BLOCKS
THERMOSTAT
DOTTED LINES NOT SUPPLIED BY AMANA
SINGLE PHASE
CYCLE SERVICE
FOR SUPPLY CONNECTIONS, USE WIRES SUITABLE FOR AT LEAST
EP-34 ELECTRIC BOILER WIRING DIAGRAM

Figure 3

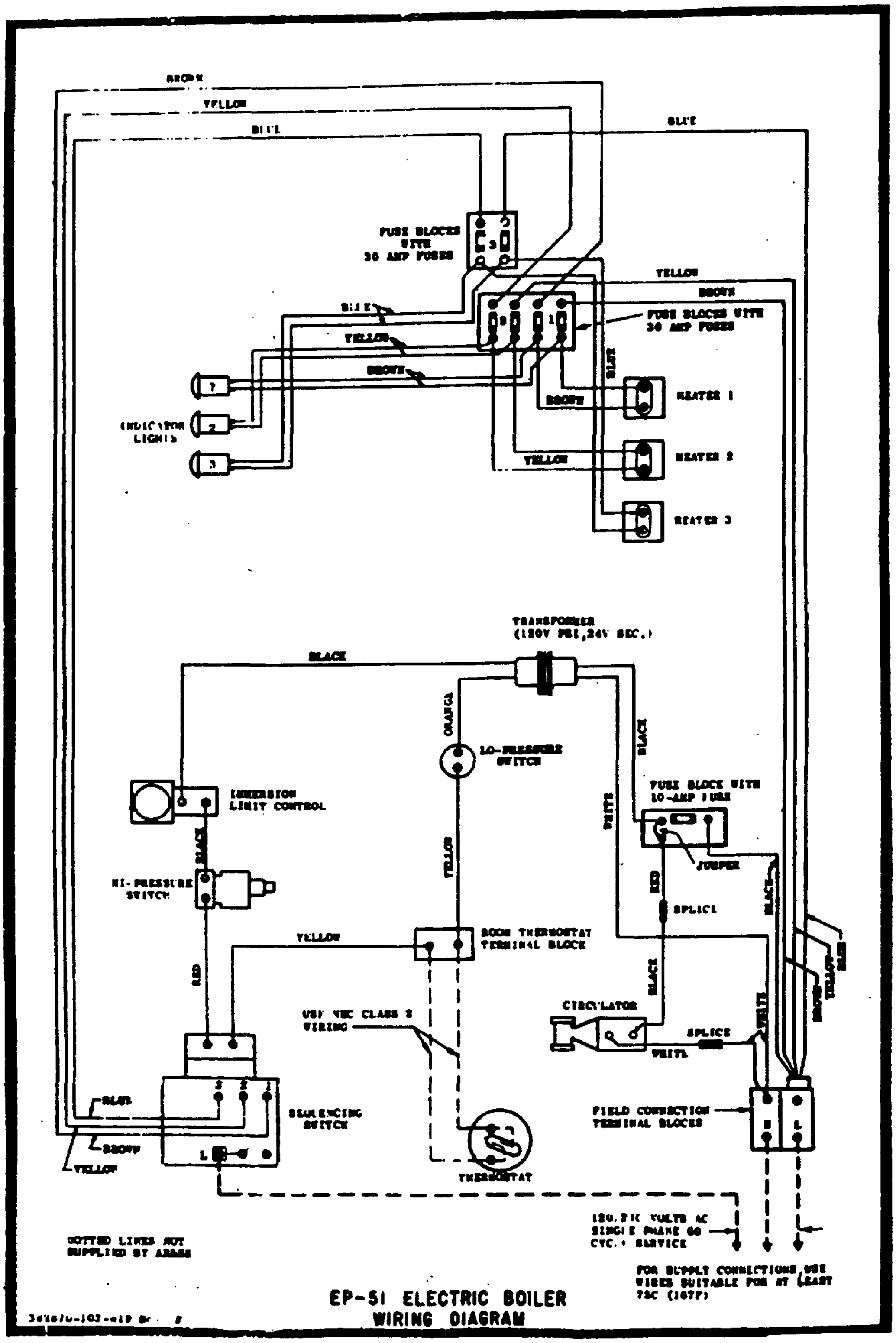

Figure 4

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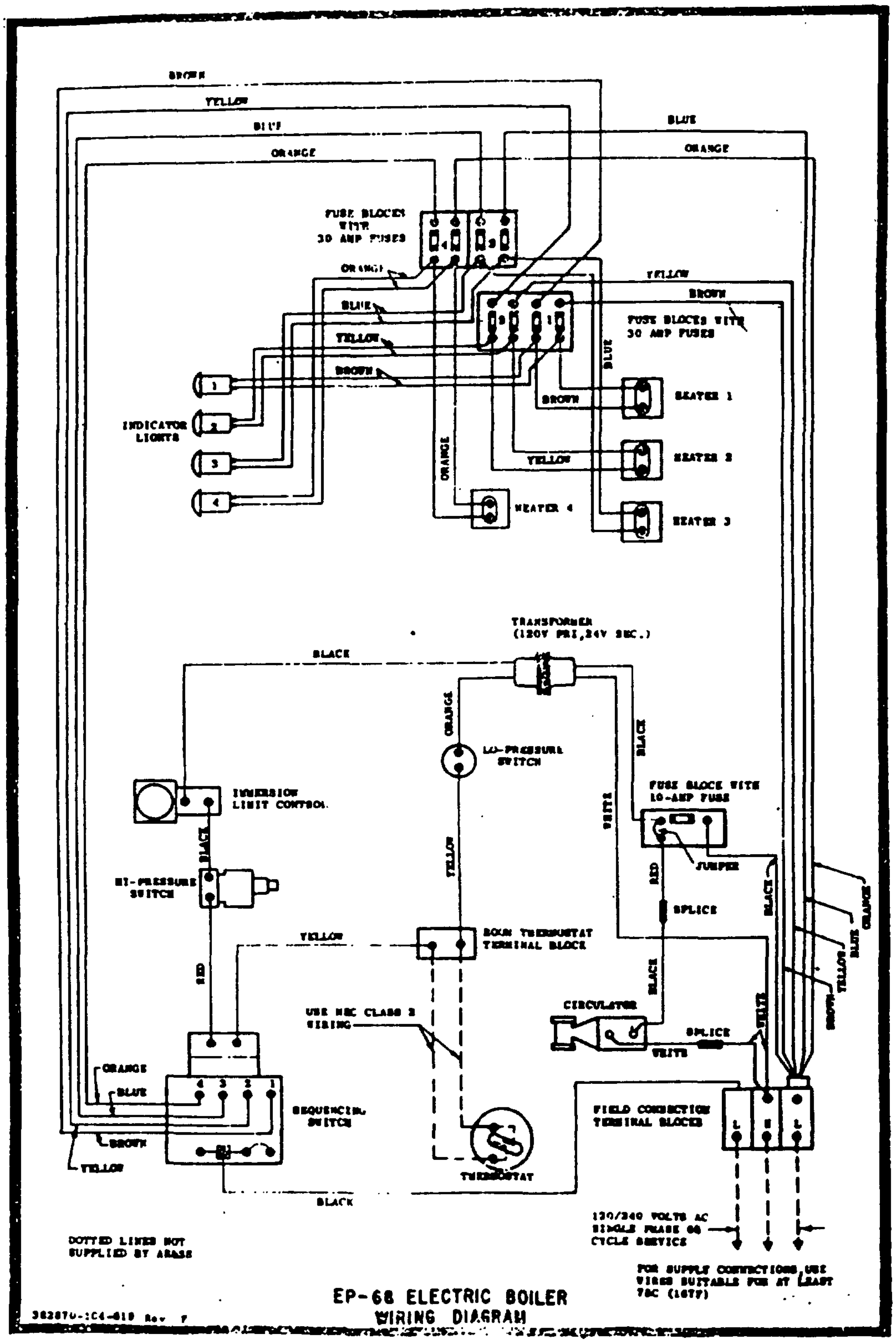
EP Electric Boiler



Figure

EP Electric Boiler

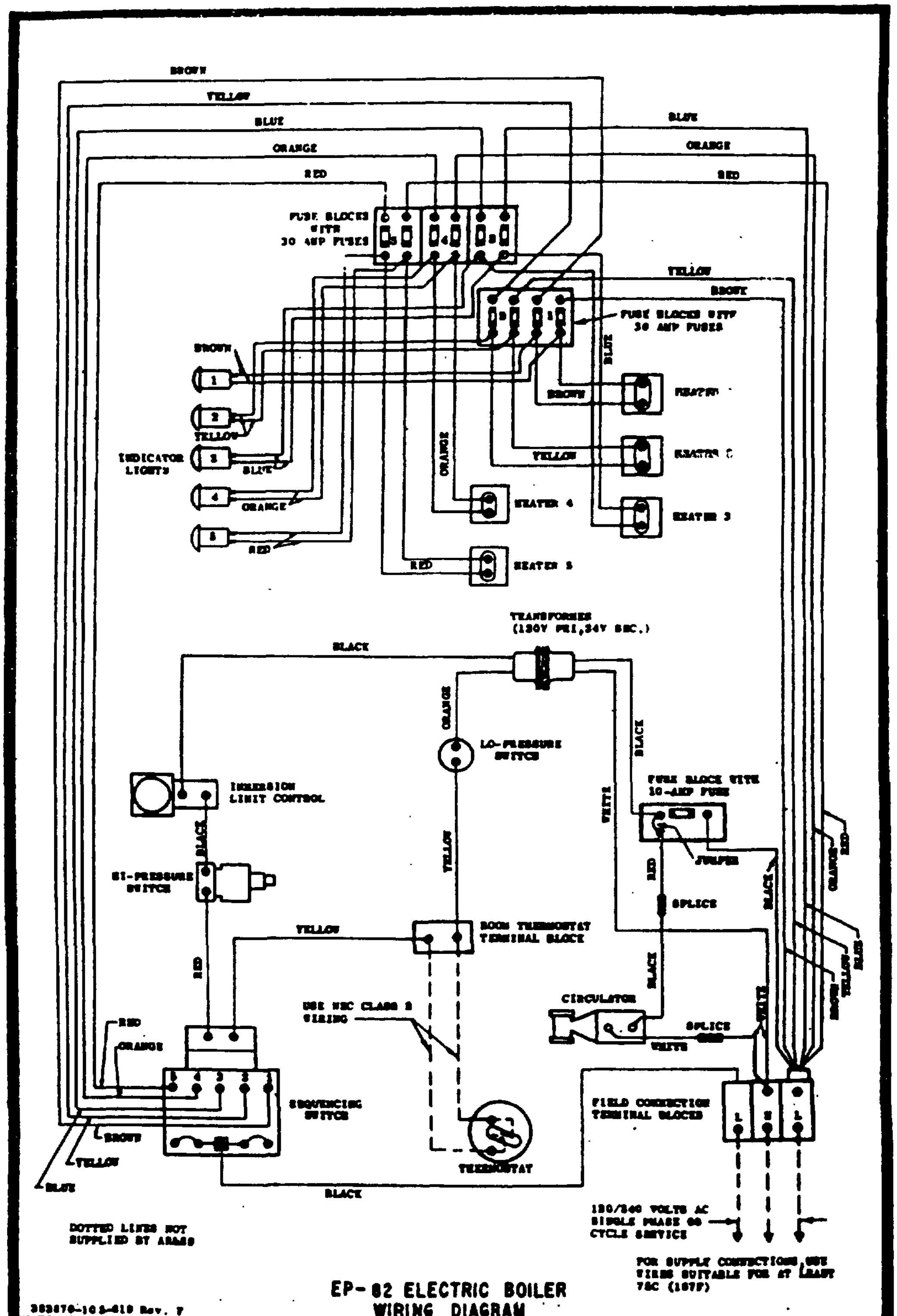


Figure 6

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Service conductors should be suitable for at least 75 C (167 F) and of the minimum size shown in Table I.

TABLE I

Boiler Number	Conductor Size (AWG)	amps @ 240 Volts
EP-34	6	41.7
EP-51	4	62.4
EP-68	2	83.2
EP-82	1	100.0

The service conductors should be wired through a fused disconnect adequate to handle the amperage loads shown in Table I.

The low voltage wiring from the room thermostat should be connected to the terminal block on the outside of the boiler jacket on the right-hand end. The room thermostat provided has an adjustable heat anticipator, which should be set at 0.75 amps.

<u>The jacket must be electrically grounded</u>. A grounding screw is provided inside the wiring compartment below the field terminal blocks; however, local codes should be followed.

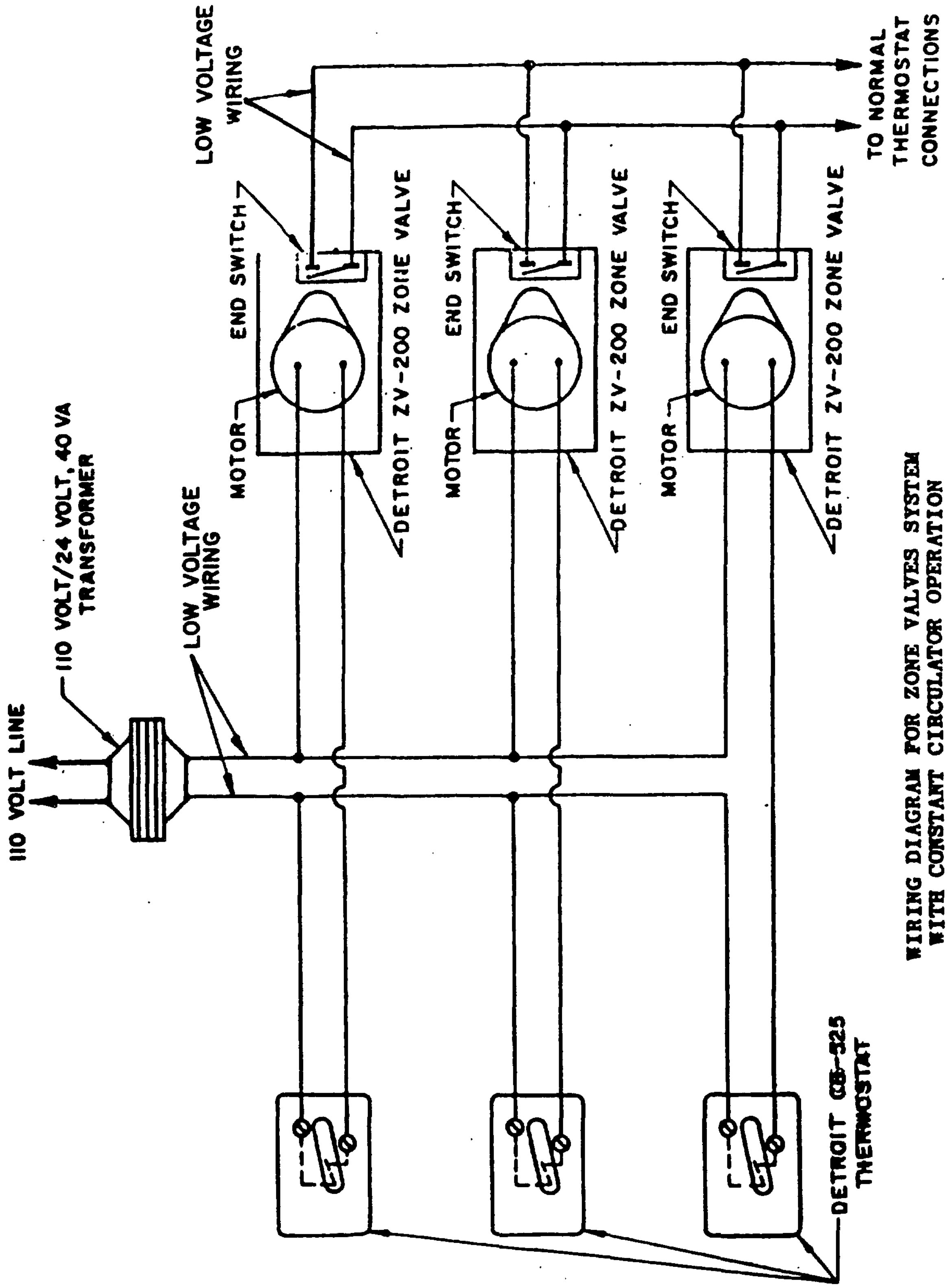
<u>NOTE</u>: DO NOT ATTEMPT TO ELECTRICALLY TEST THE BOILER UNTIL THE SYSTEM HAS BEEN FILLED WITH WATER.

ZONING

Wiring diagrams covering the hookup of multiple zone systems are shown in Figures 7 and 8.

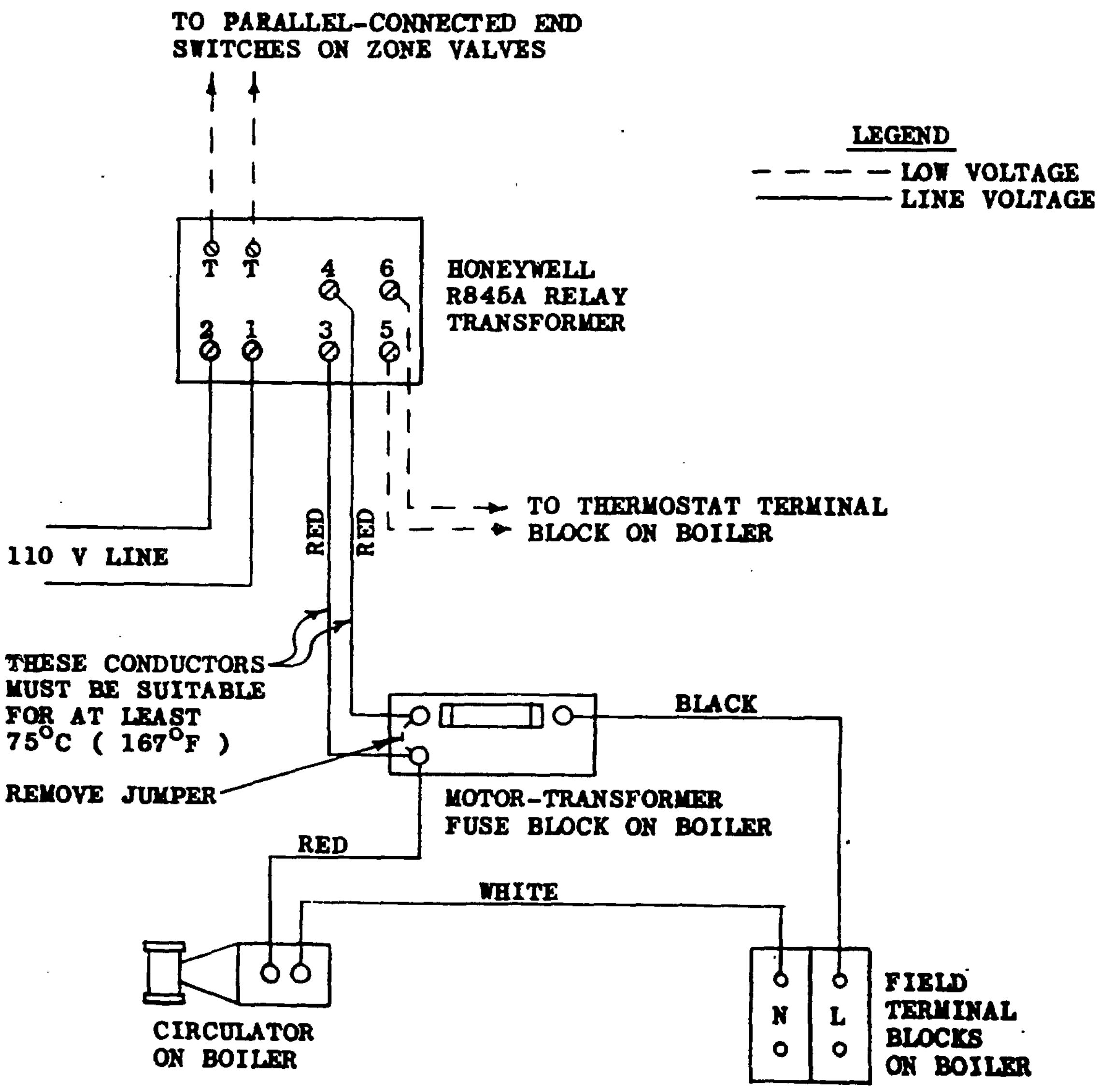
<u>Figure 7</u> - This shows zone valves representative of any two-wire zone valve employing an end switch. In this application the setting of the adjustable heat anticipator in the thermostat should match the amperage rating of the zone valve. With this hookup, the circulator supplied on the boiler operates constantly.

<u>Figure 8</u> - This is the same zone valve system as in Figure 7, except that the circulator operation is intermittent and operates only when there is a call for heat. A 1/2" conduit knockout is provided in the bottom of the control compartment for convenience in running wiring to the motor-transformer fuse block.



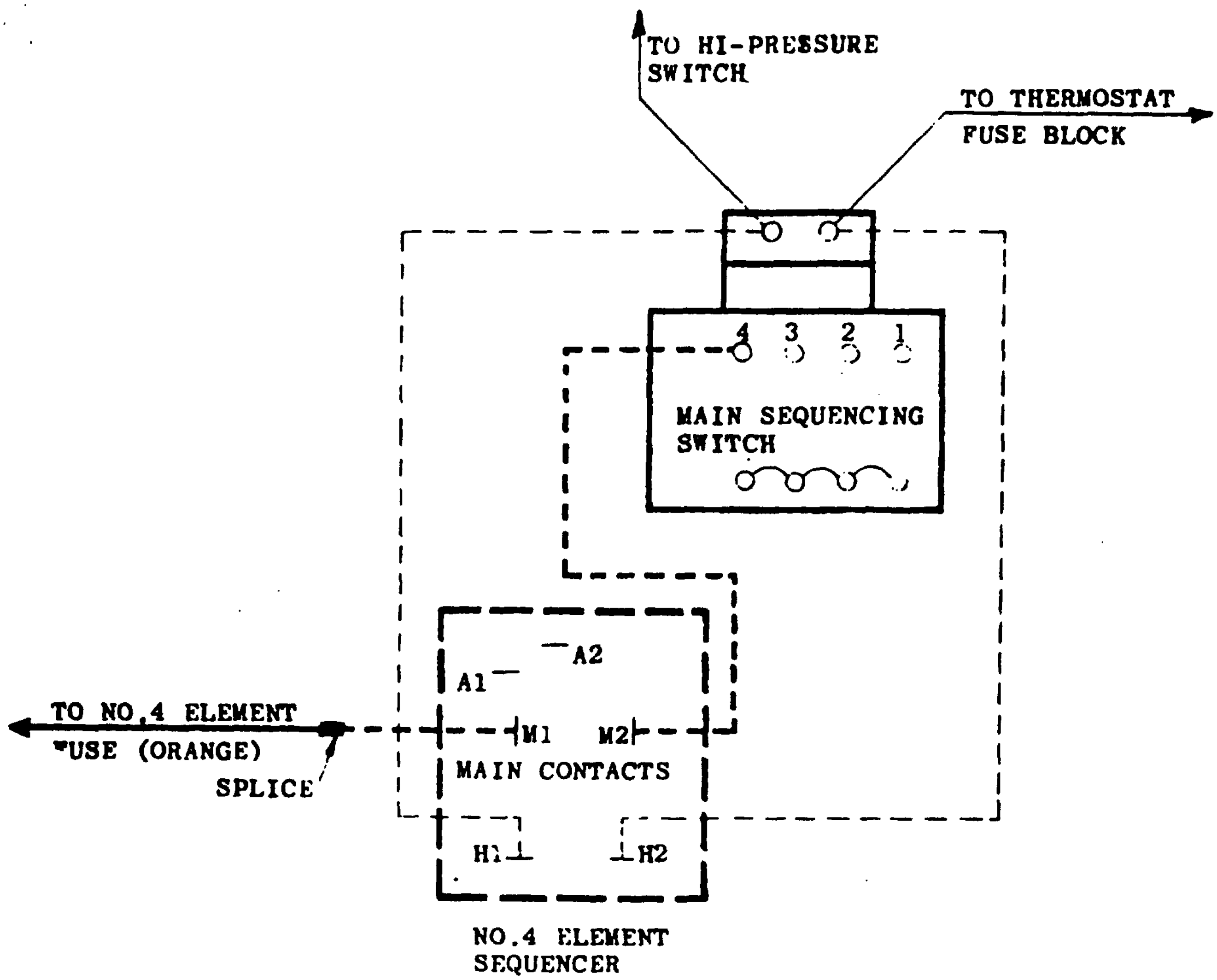
WIRING DIAGRAM FOR ZONE VALVES SYSTEM WITH CONSTANT CIRCULATOR OPERATION

Figure 7



WIRING DIAGRAM FOR ZONE VALVE SYSTEM
WITH INTERMITTENT CIRCULATOR OPERATION

Figure 8



<u>WIRING DIAGRAM FOR FIELD INSTALLATION OF</u>
<u>WHITE-RODGERS SEQUENCER</u>
<u>TYPE 24A11-4</u>
<u>FOR THE EP-68 BOILER</u>

FIGURE 9

R-2226

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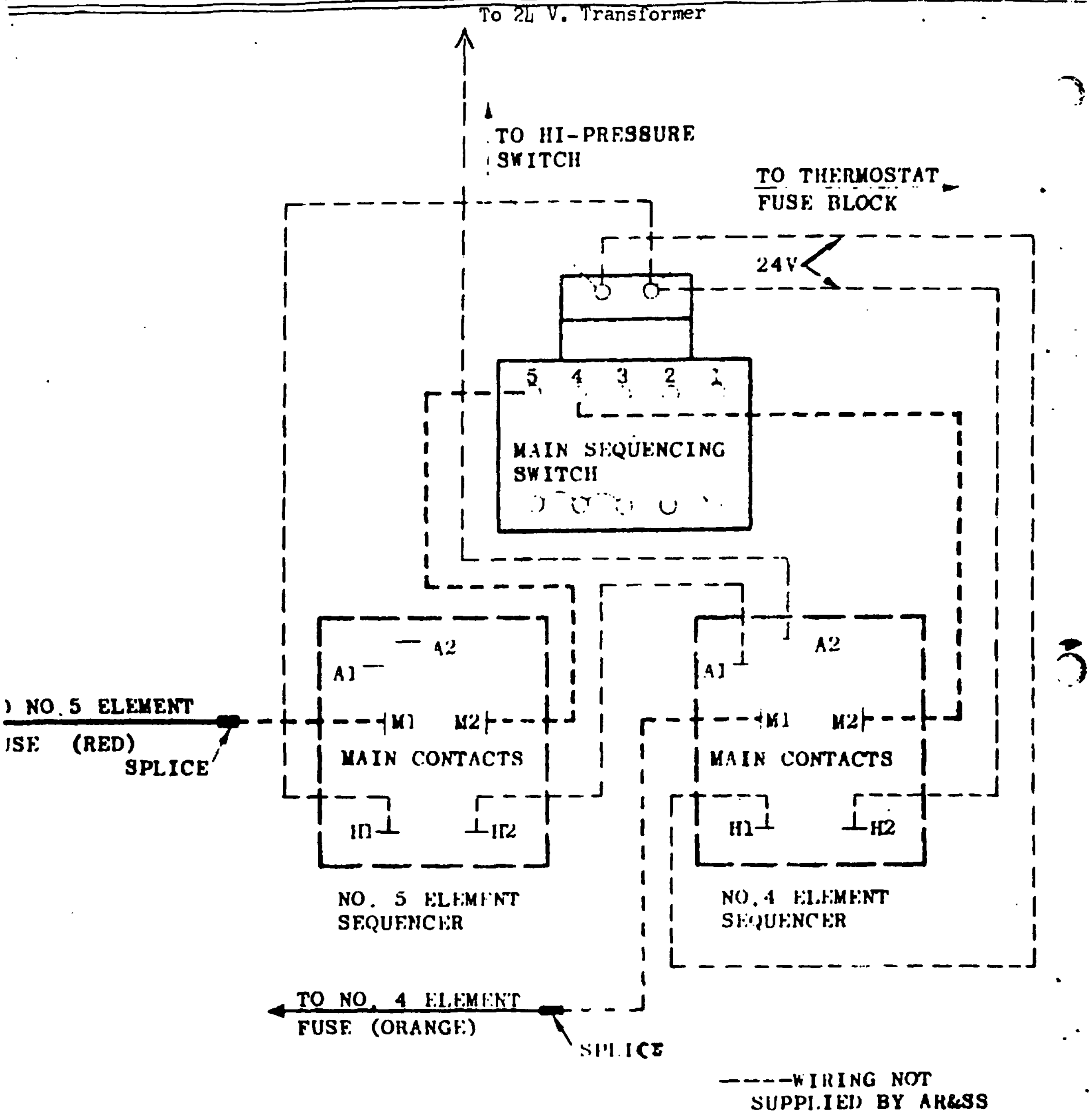

WIRING DIAGRAM FOR FIELD INSTALLATION OF
WHITE-RODGERS SEQUENCERS
TYPE 24A11-4
FOR THE EP-82 BOILER

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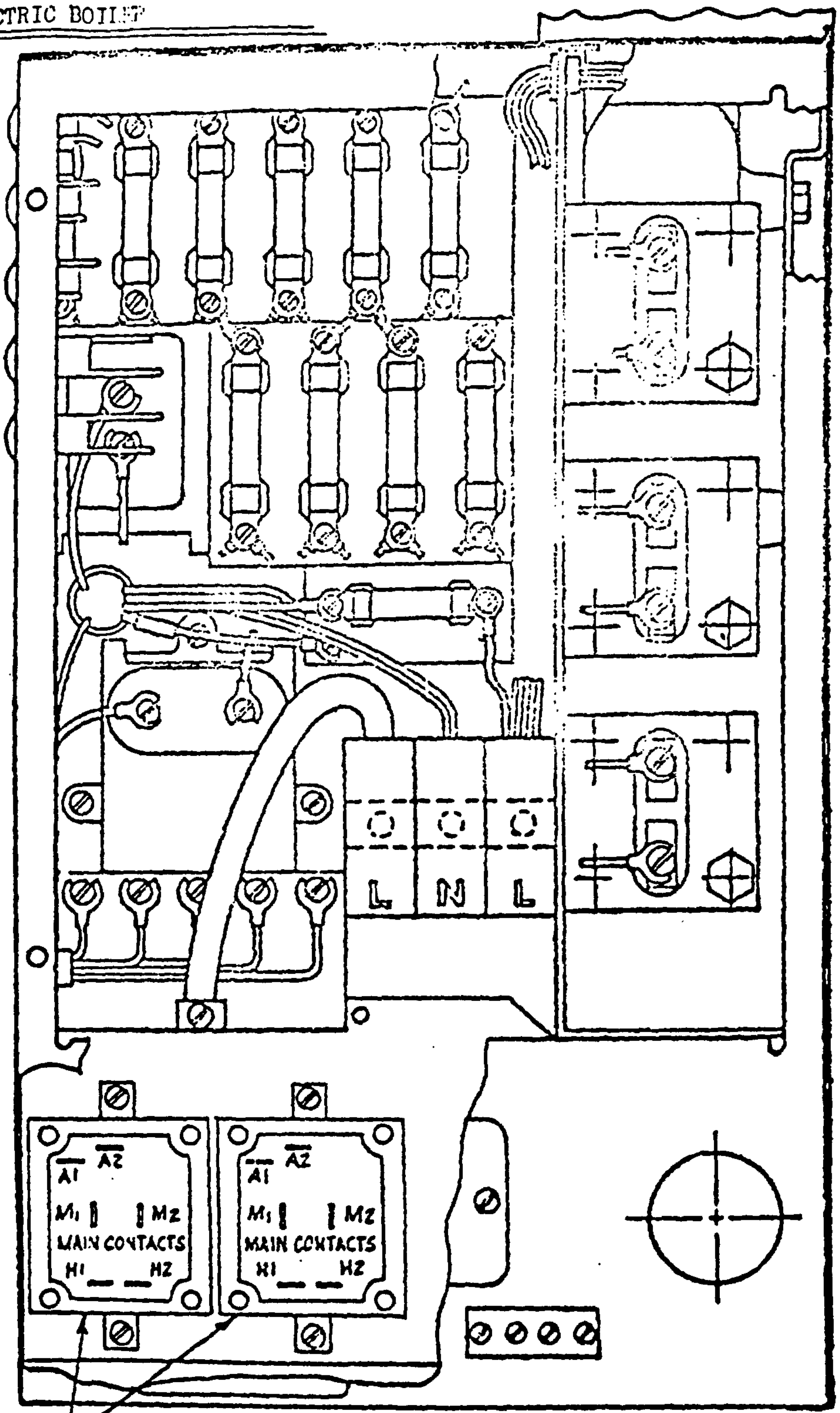
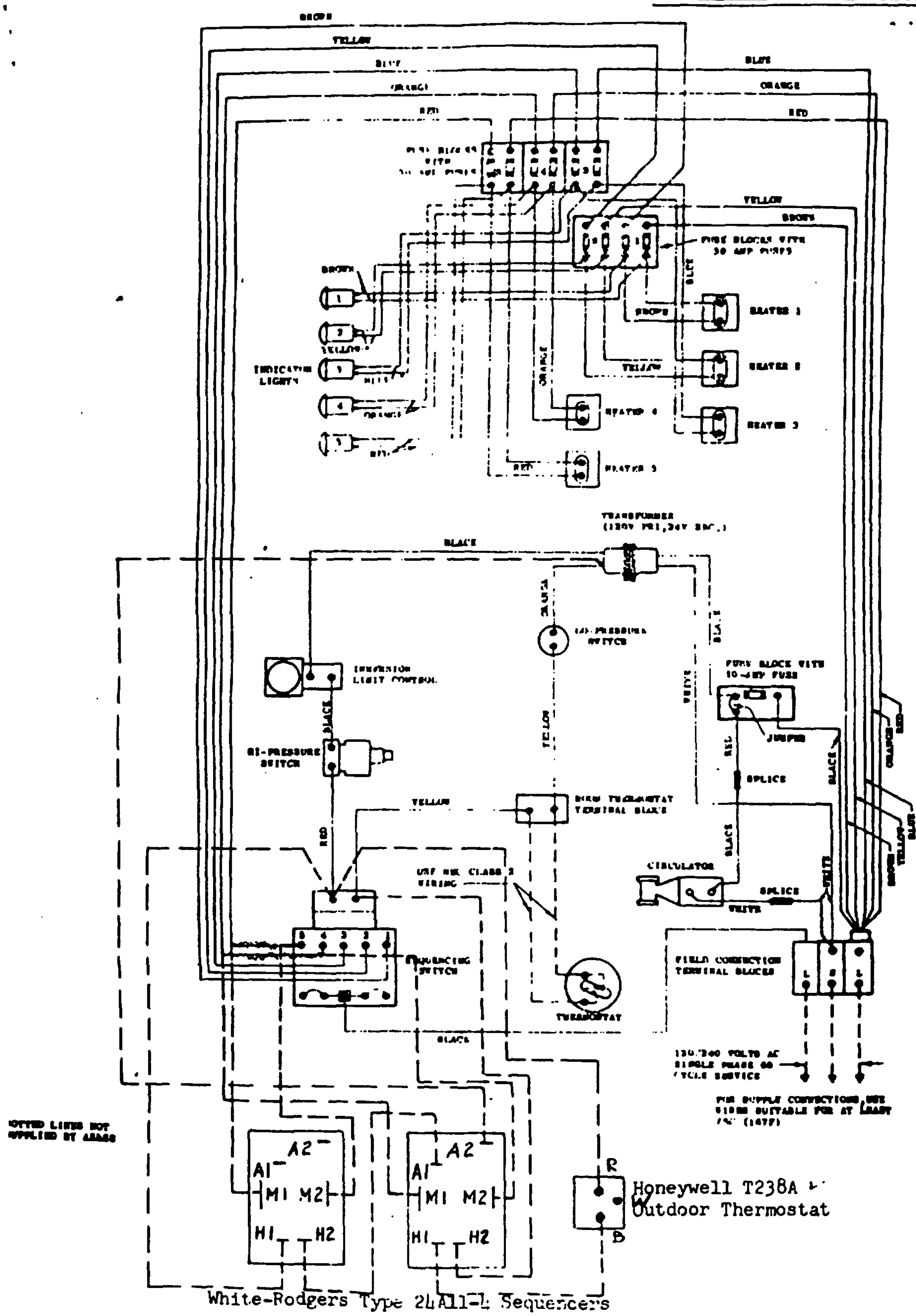


White-Rodgers Type 24A11-4 Sequencers

EP-82 ELECTRIC BOILER
VIEW OF CONTROL PANEL SHOWING
LOCATION OF SEQUENCERS



EP-82 ELECTRIC BOILER

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