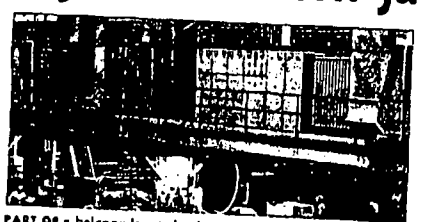
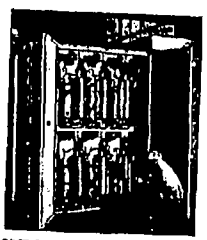


G-E SEALED-TUBE RECTIFIER SUBSTATION needs no protective fence, in no way interferes with duties of plant superintendent nearby.

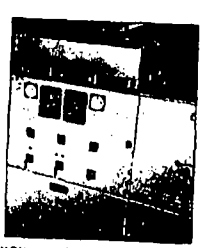
DC conversion equipment—so quiet you can work just one foot away!



PART OF a balcony-located substation, this rectifier is supplied with transformer and low voltage switchgear.



RECTIFIER section consists of six Ignitron tubes, cooling and magnetic excitation systems.



HOUSING (top) contains dynamic load-absorbing resistor to dissipate brake energy.

G-E power rectifiers: no ventilation problem, no oil, no grime—and you pay less for power

When your variable speed or other d-c power needs reach 75 kw, you would do well to consider a G-E rectifier substation. It's considerably less expensive to operate and maintain than other types of conversion equipment, and it can release valuable floor space by mounting on a balcony or other out-of-the-way spot.

G-E sealed Ignitron Rectifiers are part of a complete metal-enclosed substation. Economically and easily installed, these rectifiers supply d-c power in ratings of 250 v and 600 v from 75 kw to 1000 kw. And because of the simplicity of the rectifier design—no major moving parts—downtime and maintenance costs are materially reduced.

The advantages of G-E sealed Ignitron Rectifiers have gained them wide and rapid acceptance among industrial users . . . and have been translated into story after story of savings, dependability and safety. See how you, too, can add these benefits to your plant by calling or writing your nearest G-E sales office for full information. General Electric Co., Schenectady 5, N. Y. 20-1

You can put your confidence in—

GENERAL ELECTRIC

...der the new trends in motor de-...and construction. The old open-...e motor is being rapidly replaced ...he more fully protected enclosure. ...y plants have adopted the TEFC ...ally enclosed fan-cooled) motor ...t across the board. It costs more, ...ves a longer and more dependable ...and needs less maintenance.

...igh insulation standards are coming ...We now have Class B, and a rela-...y new Class H, available for motor ...tallations. Class H is a super job, ...ich you should consider where high ...blems are to be expected, in addition ...eavy duty-cycles.

DC Load. Modern industry still re-...uires much direct current for electro-...ytic processes, variable-speed motors, ...c. The sketches suggest ways to gen-...ate and distribute it.

Lighting. Since modern high-intensity ...hting is a heavy power consumer, the ...lant's electrical problems cannot be properly solved until the future lighting requirements have been expertly determined. Modern industrial lighting experts should always be consulted.

Matters to be considered, in conference with lighting specialists, are combinations of filament and fluorescent lighting—color-improved mercury-vapor lamps for high-bay lighting, 277-v lighting systems and 24-v relay switching. The 277-v lighting system saves much copper and can be operated directly from a 480-v 3-phase circuit by connecting from any phase to the neutral of a wye-connected secondary on the distribution transformer.

Modern Distribution. It is becoming common practice to bring high-voltage primary distribution feeders directly to the heart of each power-consuming area and locate unit substations there. This packaged-type gear includes a step-down transformer and a series of breakers to feed the secondary load, usually at 440-v. The sketches give ideas.

Transformers. The oil-filled transformer remains the standby for such outdoor applications as the primary substation. Indoors the oil is a hazard, so the transformers of substations should be of the dry type or use the non-flammable askarel. The low-cost ventilated dry-type may be satisfactory in clean areas. Dusty or corrosive areas call for the sealed-type transformer.

Circuit Breakers. The oil-filled circuit breaker still has its place in outdoor primary substations to handle the incoming high-voltage feeder, but once inside the plant think in terms of the modern inclosed air-circuit breakers. Don't confuse the steady-load ampere rating of the breaker (nameplate rating) with the interrupting capacity, an immensely higher and important value.

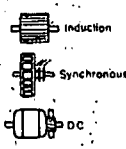
Circuit-breakers installed fifteen or twenty years ago, although well able to handle the possible short-circuit currents at that time, may now be totally inadequate. Ask your utility-company engineer how much short-circuit current you must prepare to handle. Likewise, a short-circuit analysis of your generating equipment will quickly show what short-circuit current is possible at any point in your electrical distribution system. Select breakers to handle these possible currents.

Fuses. The natural use of fuses is in low-voltage lines to protect motor or lighting loads. The modern dual-element fuse offers double protection, especially for motor loads. It handles both short circuits and overloads. The dual-element feature will often prevent needless blowing of fuses where harmless overloads exist. Where high short-circuit currents are possible, look into the new high-rupturing-capacity fuses.

Capacitors. The first step in improving power factor is to spot the causes—such as induction motors too big for their loads. Power factor can be improved by substituting smaller motors, and by tying synchronous motors and shunt capacitors into the system. The shunt capacitors can be conveniently located right at the unit substation.

How to Choose Electrical Equipment

MOTOR CHOICE

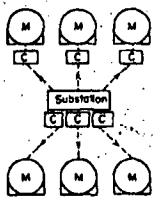


Induction motor is simplest, cheapest, easiest to maintain but is not always best choice

Synchronous motor is constant speed, good for large loads, and power-factor improvement

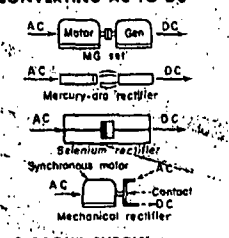
Dc motor is good where wide speed control range of driven unit is a plant requirement

MOTOR-CONTROL LOCATION



Where motor location is not likely to be changed, modern trend is to move controls away from their motors to control point near supply substation, as shown in lower part of sketch

CONVERTING AC TO DC



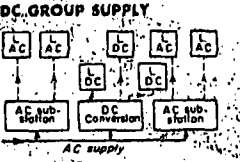
Mg set suitable for loads that need large changes in voltage

Sealed-tube mercury-arc rectifiers are gaining. Reasons: simplicity, lower maintenance

Selenium and germanium rectifiers are now made in neat package units for easier use

Mechanical rectification is growing, especially where high efficiency is required on job

DC GROUP SUPPLY



Try to locate ac-dc conversion units close to your dc loads