

GENERAL INSTRUCTIONS FOR MAGNETIC CONTROLLER

INSTALLATION

Unpack the equipment carefully, as small parts may be thrown away with the packing material.

Check the nameplate rating of the controller and make sure that its horsepower, voltage, frequency, etc., are the same as those on the nameplate of the motor with which the control is to be used.

Mount the panel vertically so that, when power is cut off, the contactors will open by gravity. Panels should be mounted on a flat surface, and care should be taken not to twist or warp the back when mounting. The supports of open controllers and the enclosures of enclosed controllers should be grounded. The conduit connection to the case of enclosed controllers is usually considered sufficient grounding protection.

The sealing surface of the magnet frame and armature of a-c contactors with clapper-type magnets is spread with grease or oil to prevent rusting in shipment. The grease or oil should be removed when the contactor is put into service, but the surface may be wiped occasionally with a thin rust-resisting oil.

Before power is applied, operate each contactor and relay by hand to see that the moving parts operate freely without binding. See that all electrical interlocks are clean and make positive contact when closed.

Inspect the connections of wires or buses to studs, to be certain that they are tight. The nuts may have loosened during shipment.

Cast-grid resistors are sometimes shipped with corrugated paper packed between the individual cast grids, to prevent breakage in shipment. Remove this packing before putting the resistor into service.

Resistor boxes should always be mounted with the grids in a vertical plane and located to permit free ventilation. To keep the heating at a minimum, it is recommended that 6-in. spacers be used between boxes of grids when stacked and that the stacks be 12 in. apart. Such arrangement is desirable when continuous or heavy intermittent duty is expected, and essential when boxes are stacked over six high. Slow

burning or noninflammable wire should be used in connecting to resistor terminals, to withstand the heat from the resistor.

A diagram showing the connections of the panel and of the resistor is shipped with each equipment. All terminals to which external connections are to be made are numbered on the equipment and indicated on the wiring diagram.

For controllers having current transformers, there may be temporary connectors across overload relays if the heaters or coils are not mounted at the factory, or across terminals in the current transformer secondary circuit. Before applying power to the controller, remove all such connectors, see that all overload heaters or coils are properly mounted, and that the secondary circuit of the current transformers is not open.

Generally it is advisable to test the panel with the motor armature leads disconnected in order to check the operation and sequence of closing of the contactors. Series contactors cannot be operated unless the motor armature is connected in circuit.

ADJUSTMENTS

The adjustments of the contactors or relays on the magnetic controller are explained on the individual instructions sheets for each device. The relation of the devices to each other and their functions are explained in the instructions for the complete controller.

Contactors are designed to operate properly if the line voltage is within 85 to 110 per cent of the panel nameplate rating for a-c circuits and within 80 to 110 per cent for d-c circuits. Wider ranges require special devices. Where there is a continuous 10 per cent increase in voltage, suitable coils should be ordered, because with this increase in voltage there is an increase in wattage and in the heating of the coil. This will not cause immediate failure of the coil but the deterioration of the insulation is more rapid and the ultimate life of the coil is shortened. There is also an increase of about 20 per cent in the pounding effect resulting in more rapid wear of the armature,

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

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magnet parts, and contacts. The armatures should seal when the proper voltage is applied to the coils and should open by gravity when the power is cut off. The contacts of a single-break clapper-type contactor should, when closed, make line contact near the bottom of the face. On opening, the final break will be near the top. The rolling and wiping motions when closing and opening keep the contacts in good condition.

Mechanical interlocks are so adjusted that with one contactor in the sealed (closed) position, there is a very small play on the other contactor. This play must not allow the moving contacts of the second contactor to touch the corresponding stationary contacts when the contacts of the first contactor are just touching.

Replace all covers and arc chutes on individual devices before the panel is placed in service. Be sure that all devices, such as dashpot relays, that require oil, are provided with the right grade and the right amount. If the complete controller is immersed in oil, fill the oil tank with the grade of oil required up to the oil line (usually painted on the inside of the oil tank). If oil is added above this mark, it will overflow when the tank is lifted into position. If an oil gage is furnished, check the oil level after the controller is submerged in its normal position.

MAINTENANCE

Inspect all parts at regular intervals. Keep all parts free from dirt, oil, and grease. Replace the contacts when worn.

Do not lubricate contacts, as lubrication shortens their life. Both copper and silver contacts will become darkened and somewhat roughened in normal operation, but this should not interfere with their performance, and does not indicate that the contacts should be filed. In general, contacts will not need attention during their normal life, but if prominent beads form on the surface due to severe arcing, the contact faces may be dressed with a fine file. Do not use sandpaper or emery cloth.

Should parts become worn so that adjustments cannot be maintained, new parts should be used.

Frequent inspection should be made of all nuts and connection wires on panels and resistors, particularly when subjected to vibration.

Grid resistor units should be kept clamped tightly together.

Some rules that most good maintenance men follow, and are to be recommended, are:

1. Become thoroughly familiar with the circuit

and the operation of each new controller.

2. Use the wiring diagram and keep it handy. Many service men frame these diagrams and keep them near the controllers to which they apply.
3. Have a convenient portable instrument for use in checking voltage, current, resistance, etc. Its use will indicate conditions which, if corrected at once, will keep the equipment operating efficiently and satisfactorily.
4. Prepare a list of items to be checked at each inspection and, in making an inspection, follow the list to be sure that each point is covered. Of equal importance is the preparation of the schedule for conducting regular inspections and the following of the schedule. Casual inspections conducted at odd times are inadequate.
5. Keep on hand an adequate stock of renewal and repair parts. General Electric will furnish a recommended list of parts, if such a list was not included in the Instructions book accompanying the controller. This list can be modified as experience dictates. The cost of carrying spare parts is small, when compared with the cost of lost production occasioned by shut-downs.
6. Buy spare parts made by the manufacturer, to save time and trouble. Parts made by other manufacturers may appear to be the same as the original parts, but may not meet the specifications in important details which cannot be detected by inspection.

FAULTY OPERATION

First, renew any necessary parts. Refer to the controller wiring diagram, trace out all the connections and examine all coils, connection wires, and resistors for burned out, broken, or loose parts. If local electricians cannot overcome the trouble, communicate with the nearest office of the General Electric Company, explaining in detail the nature of the trouble and giving the complete nameplate rating of the device.

RENEWAL PARTS

When ordering renewal parts, give the complete nameplate rating of the individual device and state the name and catalog number of the parts, if possible, or send a sample or sketch of each part required. If extra contacts and spare voltage coils are kept on hand, delays will be avoided when such parts require renewal.

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