



GE Instructions

300-Line Reduced Voltage Magnetic Starters CR331 Series Autotransformer Type, NEMA Sizes 6 & 7

Caution: Before installing in a nuclear application, determine that the product is intended for such use.

Warning: Disconnect power before installing or servicing.

Tips On Use

These automatic reduced-voltage starters are designed for the control of squirrel-cage induction motors where reduced-voltage starters, torques, and currents are required. It is designed for three-phase motors up to 600 volts.

Installation

These instructions are intended to assist the electrician in the proper installation of the controller. Refer to the component instructions for more information on renewal parts and maintenance.

The CR331 floor-mounted starter must be mounted rigidly in a level position.

Remove all packing and clean magnetic mating surfaces.

Inspect all wiring and be certain that the connections are clean and tight. Operate movable magnets, contact units, and mechanical interlock by hand to assure free movement.

All external wiring from the starter must be made in strict accordance with the wiring diagram supplied with the starter.

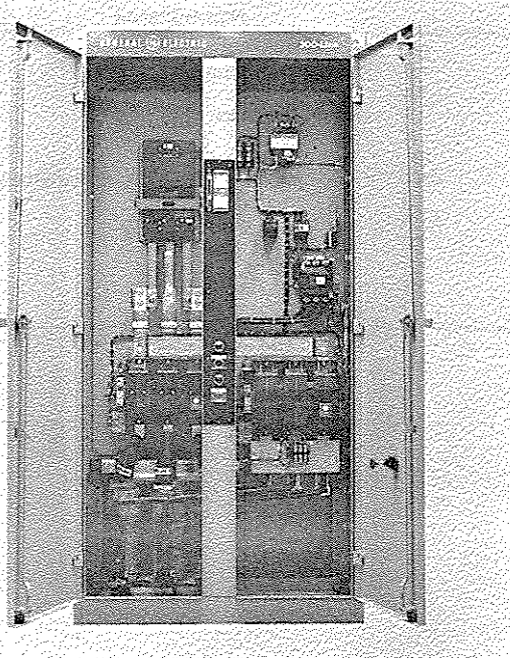


Figure 1. CR331

Heaters for the CR324 thermal overload relays should be selected for the motor's actual full-load current and service factor. They should be mounted in accordance with the instructions given on the heater carton. Before mounting, remove the two heater screws. After the heater is mounted, make certain that the heater screws are tightened properly.

DO NOT BEND THE BIMETAL STRIP. With the exception of the heaters, no renewal parts are supplied for the overload relays.

Operation

A wiring diagram showing the connections of the starter is supplied with the complete device. All control, motor, and line connections on the starter are plainly marked.

Refer to Figures 2 and 3—depressing *START* button on the push button station will energize the coil on the control relay (CR), the coil of the pneumatic time-delay relay (TR), the coil of the 3-pole *START* contactor (2S), the 3-pole *NEUTRAL* contactor (1S) connecting the autotransformer to the lines and the motor leads to taps on the autotransformer, thus providing reduced voltage for starting. Contact 1-2 and 2-3 closes thereby completing the holding circuit for the magnetic coil of the relay. After a definite time, depending upon the setting of the pneumatic time-delay relay, contact 5-6 opens and contact 5-7 closes causing the *NEUTRAL* contactor to open and the *RUN* contactor to close. During the transition from *START* to *RUN* condition the motor remains connected to the line through a portion of the autotransformer acting as a reactor. This results in closed transition operation.

An electrical interlock on the *NEUTRAL* contactor prevents the *RUN* contactor from closing until the *NEUTRAL* contactor has opened. In addition to the electrical interlock, there is also a mechanical interlock between the two contactors as a further safeguard. The *RUN* and *START* contactors remain energized while running.

Depressing the *STOP* button of the push button station will deenergize the control circuit, drop out the *RUN* and *START* contactors, open the seal circuit, and stop the motor.

Motor Overload Protection

The CR324 three-phase overload relay is designed to provide running and stalled motor protection.

When an overload occurs, the heating elements are heated above their normal temperatures, causing the bimetal strips to deflect sufficiently to open the overload contact. The opening of this contact will cause the motor to be disconnected from the line. After tripping, the thermostatic strips must cool before the relay can be reset. The time for this cooling is approximately three minutes depending upon the severity of the overload.

The ultimate tripping current of installed relay heater can be adjusted $\pm 10\%$ by using adjustment dial. Turn dial clockwise to reduce ultimate tripping current and counterclockwise to increase ultimate tripping current.

Heater Selection

The heaters are of the interchangeable type. A sufficient number of sizes is available to permit selection of the proper heater for any value of motor full-load current within the range indicated in the heater table.

The heaters provide approximately 115 to 125% protection. Select heaters from the table supplied with each magnetic starter. Heaters should not be selected for motor ratings in excess of the rating of the starter with which relay is used.

Pneumatic Time-Delay Relay

The timing relay (TR) has been set at approximately 10 seconds at the factory. The relay is field adjustable but the duty cycle of the autotransformer (back page) must be observed if the timer is readjusted.

Autotransformer

Starters rated 200 hp and more have autotransformers with taps at 50, 65, and 80%.

The leads are connected to the 65% taps of the autotransformer at the factory. However, if the motor will not start or starts too slowly, disconnect and move each lead to the 80% taps. Be certain that the corresponding tap is used on each coil after attaching the leads to the desired set of taps.

Duty Cycle For Magnetic Controllers

For motors above 200 horsepower:

ON	30 seconds
OFF	30 seconds
REPEAT	2 times (for a total of 3 cycles)
REST	1 hour
ON	30 seconds
OFF	30 seconds
REPEAT	2 times (for a total of 3 cycles)
TAP	65%
TAP CURRENT	300% of motor full-load current
POWER FACTOR	50% or less

Autotransformer Protective Thermostat

A thermostat is mounted on the autotransformer to sense the heat radiated from the autotransformer. In the event of the starter cycling too rapidly, or from other malfunctions, the thermostat should trip the starter from the line before autotransformer damage can occur.

Principal Renewal Parts

For contactor and relay renewal parts, refer to the following component instructions.

CR331H

START contactor, Size 5	GEH-4839
RUN contactor, Size 6	GEH-5198
NEUTRAL contactor, Size 4	GEH-4807
CR, Control Relay	GEH-4115
OL, Thermal Overload	GEH-4821

CR331J

START contactor, Size 6	GEH-5198
RUN contactor, Size 7	GEH-5108
NEUTRAL contactor, Size 4	GEH-4807
CR, Control Relay	GEH-4115
OL, Thermal Overload	GEH-4821

Order Autotransformer by complete description, giving HP, Voltage, Phase and Hertz, and catalog number of controller.

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 nearest GE sales office.

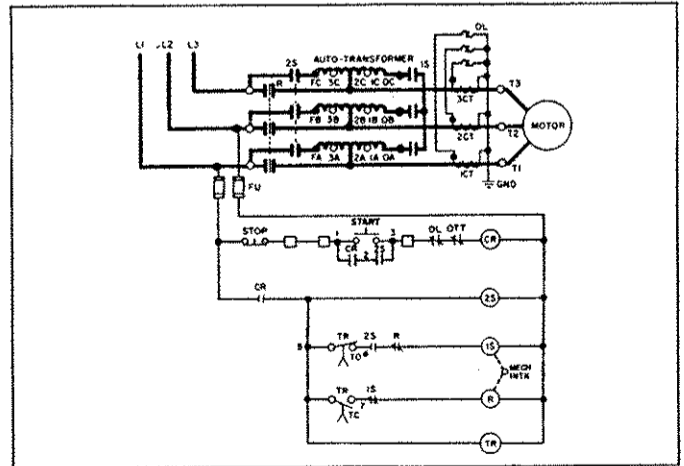


Figure 2. Typical wiring diagram for CR331H

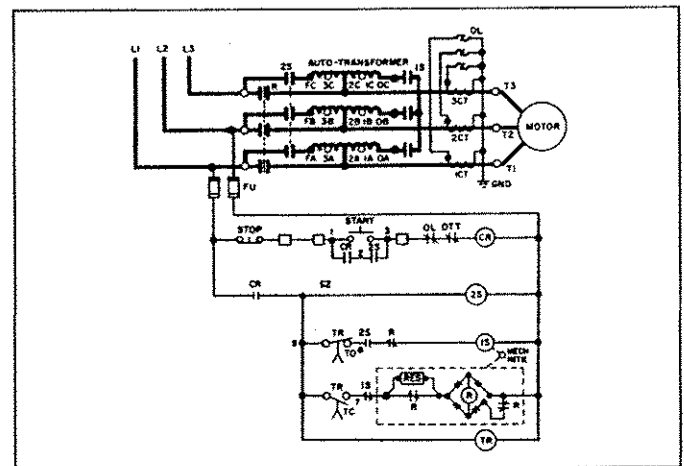


Figure 3. Typical wiring diagram for CR331J

Nomenclature

CR	Control Relay
CT	Current Transformer
FU	Fuse
1S	Neutral Contactor
R	Run Contactor
OL	Thermal Overload
OTT	Over Temperature Thermostat (Autotransformer)
2S	Start Contactor
RES	Resistor
TC	Time Closing
TO	Time Opening
TR	Pneumatic Time-delay Relay
□	Terminal Board Points



GE Industrial Systems