



GE Instructions

300-Line Reduced Voltage Magnetic Starters Autotransformer Type, NEMA Sizes 2-5

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.

Description

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

The CR331 wall-mounted starter must be mounted rigidly in a vertical position and floor-mounted starter 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.

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

This complete starter consists of: one 3-pole horizontal type START contactor with 1 NO interlock; one 3-pole horizontal type RUN contactor; one 2-pole horizontal type WYE contactor with 1 NC interlock; one pneumatic timer; one CR324 thermal overload relay; and one autotransformer.

This apparatus is all assembled in an enclosure for wall or floor mounting.

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 Figure 2—Depressing the START button on the push-button station will energize the coil of the relay (CR), if provided, the pneumatic timer (TR), the coil of the 3-pole START contactor (2S), the 2-pole WYE contactor (1S) connecting the autotransformer to the lines and the motor leads to taps on the autotransformer, thus providing reduced voltage for starting. After a definite time, depending upon the setting of the timer, the TO contact opens and the TC contact closes, causing the WYE contactor (1S) to open and the RUN contactor (R) 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 WYE contactor prevents the RUN contactor from closing until the WYE 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 overload and stalled motor protection.

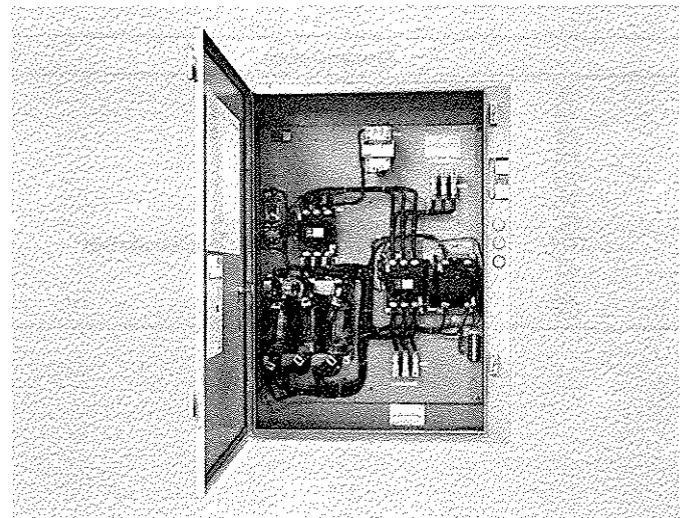


Figure 1. CR331

When an overload occurs, the heating elements are heated above their normal temperatures, causing the bimetal strips to deflect sufficiently to open the overload contacts. The opening of these contacts 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 relays are shipped from the factory arranged for hand reset.

The ultimate tripping current of the installed relay heater(s) can be adjusted $\pm 10\%$ by using the 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.

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 (see back page) must be observed if the timer is readjusted.

Autotransformer

Starters rated 50 hp and less have autotransformers with taps at 65 and 80%. Starters rated more than 50 hp have 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 200 horsepower or less:

ON	15 seconds
OFF	3 minutes, 45 seconds
REPEAT	14 times (for a total of 15 cycles)
REST	2 hours
ON	15 seconds
OFF	3 minutes, 45 seconds
REPEAT	14 times (for a total of 15 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.

Note: Refer to the National Electrical Code. Additional control circuit overcurrent protection may be required.

Nomenclature

R	RUN contactor
1S	WYE contactor
2S	START contactor
TR	Pneumatic timer
TO	Time-opening contact
TC	Time-closing contact
OL	Thermal overload relay (motor)
OTT	Over temperature thermostat autotransformer
AT	Autotransformer
□	Terminal board
CR	Control relay (Size 5 only)

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.

Principal Renewal Parts

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

CR331D

START contactor, Size 2	GEH-4774
RUN contactor, Size 2	GEH-4775
WYE contactor, Size 2	GEH-4774

CR331E

START contactor, Size 3	GEH-4806
RUN contactor, Size 3	GEH-4806
WYE contactor, Size 3	GEH-4806

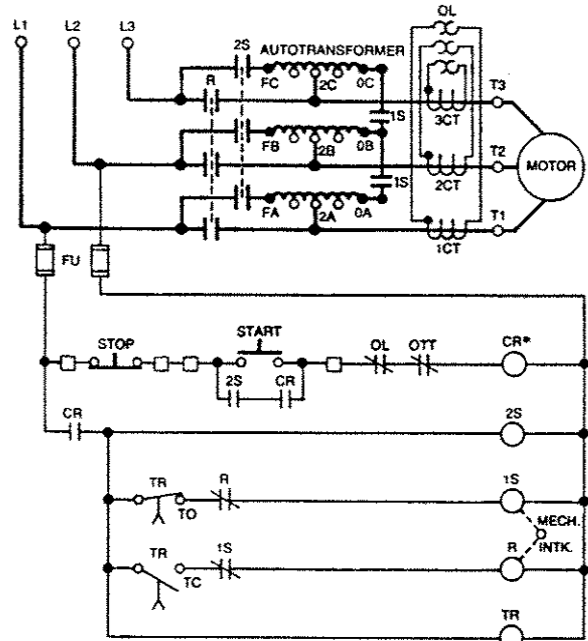
CR331F

START contactor, Size 4	GEH-4807
RUN contactor, Size 4	GEH-4807
WYE contactor, Size 3	GEH-4806

CR331G

START contactor, Size 4	GEH-4807
RUN contactor, Size 5	GEH-4839
WYE contactor, Size 3	GEH-4806
CR relay	GEH-4115

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



* CR331D through CR331F do not have CR relay.
Figure 2. Typical wiring diagram for CR331G.



GE Industrial Systems

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