



# GE Instructions

## 300-Line Wye-Delta Starters Closed Transition NEMA Sizes 1-5

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

**Warning:** Disconnect power before installing or servicing.

### Description

Among the various methods of starting three-phase induction motors to obtain reduced starting current and torque, the wye-delta method is of exceptional convenience for many applications. Wye-delta panels are designed for use with three-phase motors which have windings that may be connected wye as well as delta.

Wye-delta starting can be used for medium starting duty; when the motor is connected in wye, only 58% of line voltage is applied to the windings of the motor, only  $\frac{1}{3}$  the amount of current is drawn from the line and only  $\frac{1}{3}$  the starting torque is developed as compared to these same values which would be obtained with the motor connected in delta.

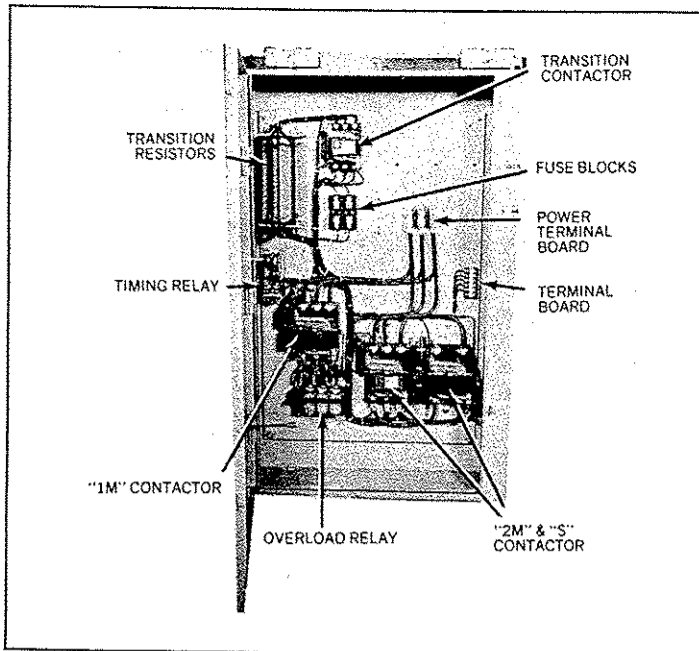


Figure 1. Wye-delta starter.

Wye-delta panels are available either open or closed transition. The difference being that with closed transition, a resistor is connected in series with each motor phase winding during transition. This eliminates opening the circuit and prevents transient currents which may occur during open transition.

### Installation

These instructions are intended to assist the electrician to obtain correct operation of the controller. Refer to the component instructions for more information on renewal parts and maintenance.

The starter must be mounted rigidly in the vertical position.

Remove all packing and clean the contactor magnetic mating surfaces. Inspect all wiring for clean, tight connections. Operate the movable portion of the contactor magnets, contact units, and mechanical interlock of the contactor magnets, contact units, and mechanical interlock by hand to assure their free movement. All external wiring from the starter must be made in strict accordance with the wiring diagram supplied with the starter.

The timing relay (TR) has been set for a specific time at the factory during the test of this panel. The time, to operate properly, may be adjusted to suit the application by adjusting the screw on the timer. Turning the screw clockwise will speed up the timer and turning the screw counterclockwise will slow it down. Care should be exercised that the length of time for the timer to operate must not be set beyond the point where it will cause the overload relays to operate and open the control circuit of the panel.

Heaters for the CR324 thermal-type overload relays should be selected for the motor's full-load current and service factor. Select the heater size required using the heater table supplied with the panel. Mount the heaters in the overload relays in accordance with the heater instructions. Before mounting the heaters, remove the two heater mounting screws. Mount the heater in the overload relay, insert the heater mounting screws in their original holes and tighten. *Do not bend the bimetal strip inside the overload relay.* With the exception of heaters, no renewal parts are supplied for overload relays.

### Operation

This complete starter consists of one control relay (CR); one 3-pole "1M" contactor; one 3-pole "2M" contactor; one 2- or 3-pole "S" contactor (3-pole for Size 5 panels only); one 3-pole transition contactor "T"; one pneumatic timer "TR"; a 3-phase overload relay; and three transition resistors. A wiring diagram showing the connections of the starter is supplied with the complete device. All control, motor, and line connections are plainly marked.

Pushing the START button energizes contactor "S" and timing relay "TR" through closed contact 2-3 of "2M" contactor and contact 3-4 of transition contactor. Contactor "S" connects the motor windings in a wye configuration and, through contact 2-6, also energizes contactor "1M" to connect the motor to the power source. Motor accelerates in wye connection. After a time delay as set on timer "TR", contact 6-8 closes. Contactor "T" will close, momentarily placing the transition resistors in parallel with wye connected motor windings. Contactor "T" contact 3-4 will now open, dropping out the "S" contactor. The motor wye-point is now opened with each end connected to the power source through contactor "T" and resistors RA, RB, and RC. Hence, the motor is not disconnected from the line and flux does not decay in motor to cause transient currents or voltages when reconnected to delta. Reconnection to delta is accomplished immediately when "S" contact 6-7 closes to energize contactor "2M". An electrical interlock on the "S" contactor prevents the "2M" contactor from closing until the "S" contactor has opened. In addition to this electrical interlock, there is also a mechanical interlock between the "2M" and "S" contactors as a further safeguard.

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

## Overload Protection

The 3-phase overload relay is designed to provide running overload and stalled motor protection. When an overload occurs, the heater elements are heated above their normal temperatures, causing the bimetal strips to deflect sufficiently to open the overload relay contacts. The opening of these contacts will cause the panel to disconnect the motor from the line. After an overload condition where the overload relay has operated, the relay elements must cool before the relay may be reset. The average cooling time is three minutes, but the time required for the relays to cool is a function of the severity of the overload. The relays are shipped from the factory arranged for hand reset.

## Principal Renewal Parts

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

<b>CR332C</b>	
"T" contactor, Size 1	GEH-5190
"1M" contactor, Size 1	GEH-5190
"2M" contactor, Size 1	GEH-5190
"S" contactor, Size 1	
<b>CR332D</b>	
"T" contact, Size 2	GEH-4774
"1M" contactor, Size 2	GEH-4774
"2M" contactor, Size 2	GEH-4775
"S" contactor, Size 2	
<b>CR332E</b>	
"T" contactor, Size 2	GEH-4774
"1M" contactor, Size 3	GEH-4806
"2M" contactor, Size 3	GEH-4806
"S" contactor, Size 3	
<b>CR332F</b>	
"T" contactor, Size 2	GEH-4774
"1M" contactor, Size 4	GEH-4807
"2M" contactor, Size 4	GEH-4807
"S" contactor, Size 4	
<b>CR332G</b>	
"T" contactor, Size 2	GEH-4774
"1M" contactor, Size 5	GEH-4839
"2M" contactor, Size 5	GEH-4839
"S" contactor, Size 4	
Control Relay	GEH-4115

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

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.

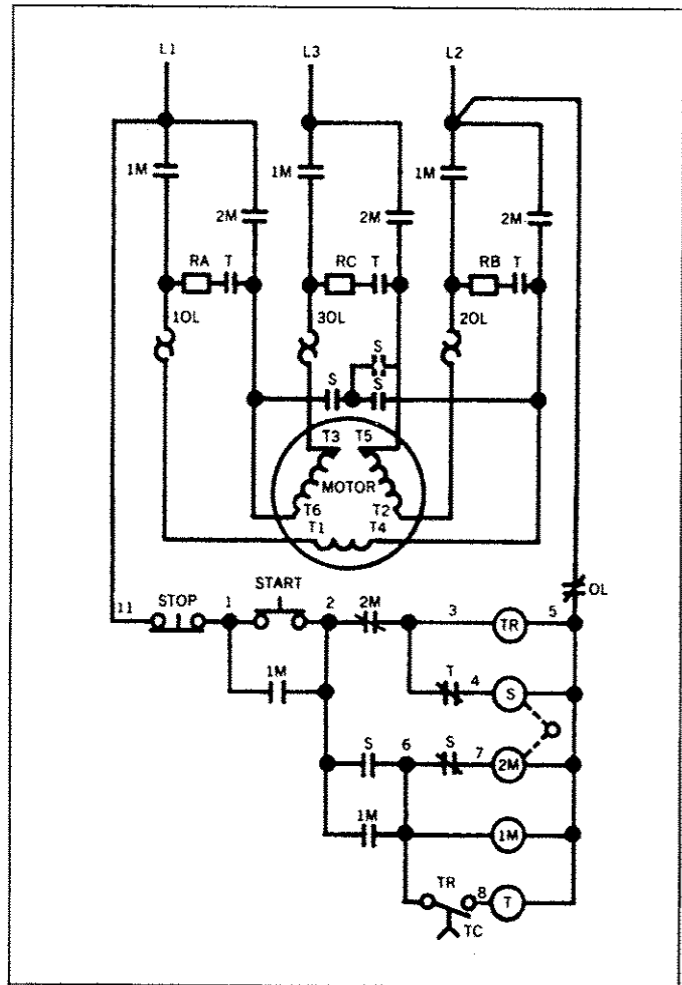


Figure 2. Typical wiring diagram for CR332C through CR332F. CR332G has auxiliary control relay (CR)

### Nomenclature

T	Transition Contactor
1M	Start Contactor
2M	Delta Contactor
S	Start Contactor
OL	Thermal Overload Relay
TR	Pneumatic Timing Relay
TO	Time Opening Contact
TC	Time Closing Contact
CR	Control Relay (not shown, Size 5 only)
RA, RB, RC	Transition Resistors



# GE Industrial Systems

General Electric Company  
 41 Woodford Avenue, Plainville, CT 06062.  
 GEH-5077B 09/10, 10-2102 © 2010 General Electric  
 12/88 (1M)