

EXHIBIT 430.2 Essential parts of a motor circuit installation.

- (1) Where a rectifier bridge of the single-phase, half-wave type is used, 190 percent.
- (2) Where a rectifier bridge of the single-phase, full-wave type is used, 150 percent.

(B) Multispeed Motor. For a multispeed motor, the selection of branch-circuit conductors on the line side of the controller shall be based on the highest of the full-load current ratings shown on the motor nameplate. The ampacity of the branch-circuit conductors between the controller and the motor shall not be less than 125 percent of the current rating of the winding(s) that the conductors energize.

(C) Wye-Start, Delta-Run Motor. For a wye-start, delta-run connected motor, the ampacity of the branch-circuit conductors on the line side of the controller shall not be less than 125 percent of the motor full-load current as determined by 430.6(A)(1). The ampacity of the conductors between the controller and the motor shall not be less than 72 percent of the motor full-load current rating as determined by 430.6(A)(1).

Informational Note: The individual motor circuit conductors of a wye-start, delta-run connected motor carry 58 percent of the rated load current. The multiplier of 72 percent is obtained by multiplying 58 percent by 1.25.

A wye-start, delta-run winding configuration is a method of providing reduced-voltage starting for polyphase induction motor wye windings. This requires a specific type of motor controller and a delta-wired motor with all leads brought out to the terminal box. This method of starting finds wide application in certain compressors used for air conditioning and where the driven machinery is allowed to start unloaded. During starting, the

windings are arranged in a wye configuration. The wye-start configuration results in a reduced starting voltage of a mathematical ratio of $1/\sqrt{3} = 0.5774$, or 58 percent of the full line voltage, which results in approximately 58 percent starting current and about one-third of the normal starting torque. Once the motor attains speed, the windings are reconfigured to run as delta, giving full line voltage to the individual windings, which allows the motor to have full torque capability. Since the delta-connected motor load is 58 percent of the rated load current and the conductors are sized at 125 percent of the motor full-load current, the conductors would be sized at 1.25 times 58 percent, or 72 percent of the motor full-load current rating.

In Exhibit 430.3, conductors from terminals T_1 , T_2 , and T_3 to the motor, as well as the conductors from terminals T_4 , T_5 , and T_6 to the motor, are all sized at 58 percent of the full-load current used to size the conductors that supply L_1 , L_2 , and L_3 . During START, contacts 1M and S are closed and contacts 2M are open. During RUN, contacts 1M and 2M are closed and the S contacts are open.

(D) Part-Winding Motor. For a part-winding connected motor, the ampacity of the branch-circuit conductors on the line side of the controller shall not be less than 125 percent of the motor full-load current as determined by 430.6(A)(1). The ampacity of the conductors between the controller and the motor shall not be less than 62.5 percent of the motor full-load current rating as determined by 430.6(A)(1).

Informational Note: The multiplier of 62.5 percent is obtained by multiplying 50 percent by 1.25.

A part-winding motor starter supplies power to partial sections of the primary winding of the motor. When the motor is running, load on the conductors will be approximately 50 percent of motor full-load current. The 62.5 percent of the full-load current rating is 125 percent of the running current with all windings connected.

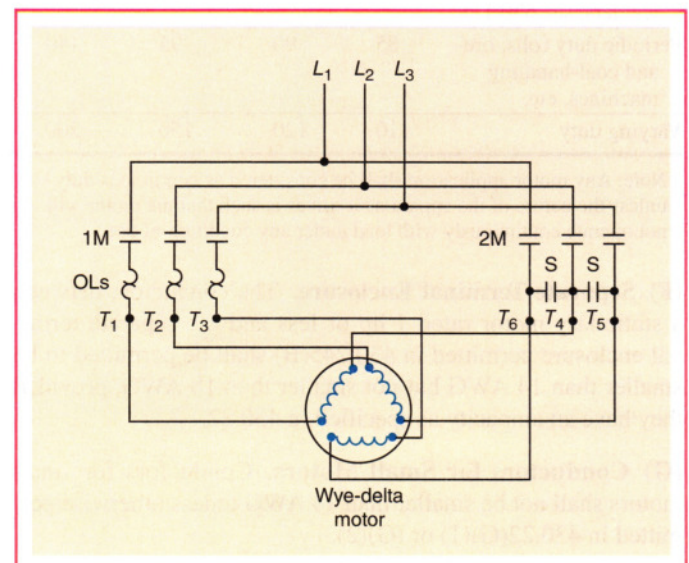


EXHIBIT 430.3 A one-line wiring diagram of a typical wye-start, delta-run motor and controller. (Courtesy of Schneider Electric)