Application and Installation

Temperature and Ventilation

Capacitors should be located in areas where the surrounding ambient temperature does not exceed 40° C and where there is adequate ventilation. As capacitors always operate at full load and generate heat of their own, maximum heat dissipation must be provided to ensure long operating life.

Line frequency and operating voltage are factors that can cause capacitor temperature to rise.

- **Line Frequency** - Assuming the line frequency of the capacitor matches the frequency of the incoming service, line frequency is not a concern since it is constant in modern power systems.

- **Operating Voltage** - Capacitor overheating at a normal operating voltage and with adequate ventilation seldom occurs. However, when the voltage exceeds 110% of the capacitor rating, overheating and resultant damage can happen.

When the operating voltage exceeds 110% of the capacitor's rated voltage, the line voltage should be reduced or the capacitor taken off line.

This overvoltage problem is exactly why, when determining the required kvar capacitance for a distribution system, a person should always "undersize" a capacitor's kvar rating... too much capacitance means overvoltage... too much overvoltage means excessive heat... and excessive heat can be damaging to the capacitor unit!!!

Special Applications

Care should be taken when power factor correction capacitors are used in the following applications:

- Plugging and jogging applications
- Frequent starts
- Crane or elevator motors where the load may drive the motor
- Multi-speed motors
- Motors involving open transition reduced voltage starting
- Reversing starters if they reverse more frequently than once per minute

Discharging Time

Power factor capacitors need a minimum of one minute to discharge. Afterwards, it is always recommended that the terminals be short-circuited to ground before touching.

Typical Capacitor Specifications

The following guidelines can be used when specifying capacitors.

SPECIFICATIONS FOR CAPACITORS

600 Volts and Below

Furnish and install where indicated power factor correction capacitors of the size, voltage rating, and enclosure type shown on the drawings.

(OPTIONAL) All motors of _____ horsepower and above shall have individual power factor correction capacitors energized with the motor.

All capacitors shall be the self healing metallized-film type filled with vermiculite, a dry NONFLAMMABLE filler material; oil-filled capacitors will not be acceptable. Discharge resistors shall be provided to automatically discharge the capacitor to less than 50 volts within one minute after de-energization. An internal ground lug shall be provided. The capacitors shall withstand 135% of rated current continuously, 110% of rated voltage continuously; and an ambient temperature range of -40°C to +40°C.

Losses shall be less than 0.5 watts per kvar. Each element shall be individually protected and the enclosure shall be filled with a dry, non-toxic, nonflammable insulating material. The capacitors shall be UL Listed and CSA approved. Capacitors shall be ABB or equivalent.

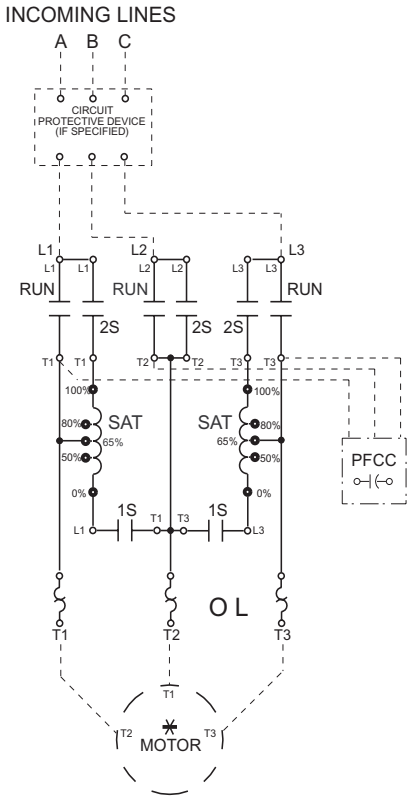
ABB contactor kvar ratings

Contactor	208V	240V	480V	600V	Max amps
UA26	3.5	4.0	8.0	10.0	10
UA30	7.0	8.0	16.5	20.5	20
UA50	10.5	12.5	25.0	31.0	30
UA75	21.5	25.0	50.0	62.0	60
UA95	25.0	29.0	58.0	72.0	70
UA110	28.5	33.0	66.0	83.0	80
A145	43	50	100	125	120
A185	57	66	133	166	160
A210	66	77	153	192	185
A260	75	87	174	218	210
A300	88	101	203	254	245
AF400	119	137	274	343	330
AF460	142	164	329	410	396
AF580	178	205	411	514	495
AF750	214	247	495	618	595

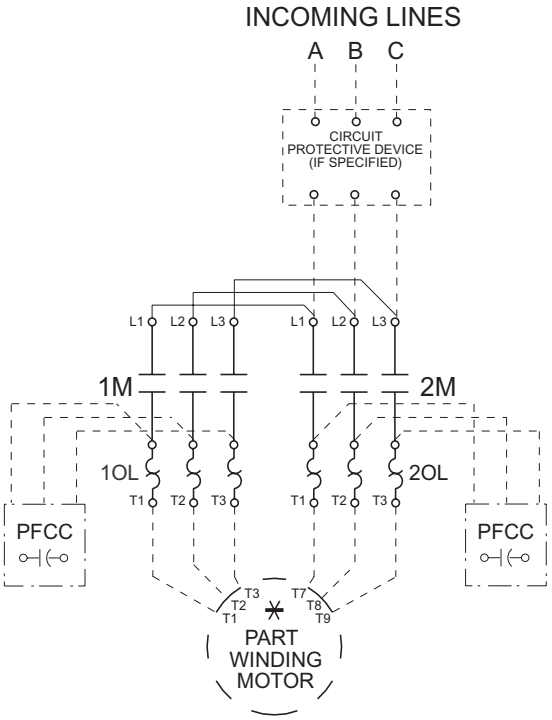
Application and installation
Wiring diagrams for Autotransformer, part-winding, wye-delta, multi-speed

Power Factor Correction Capacitor connection locations

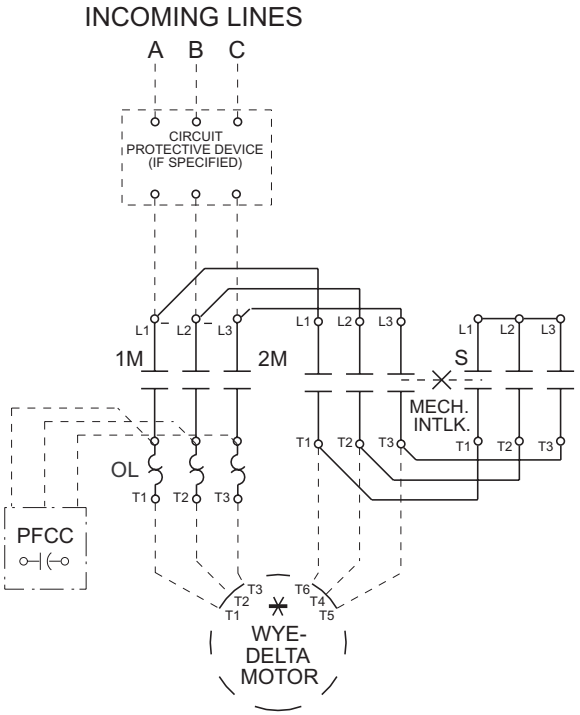
Autotransformer



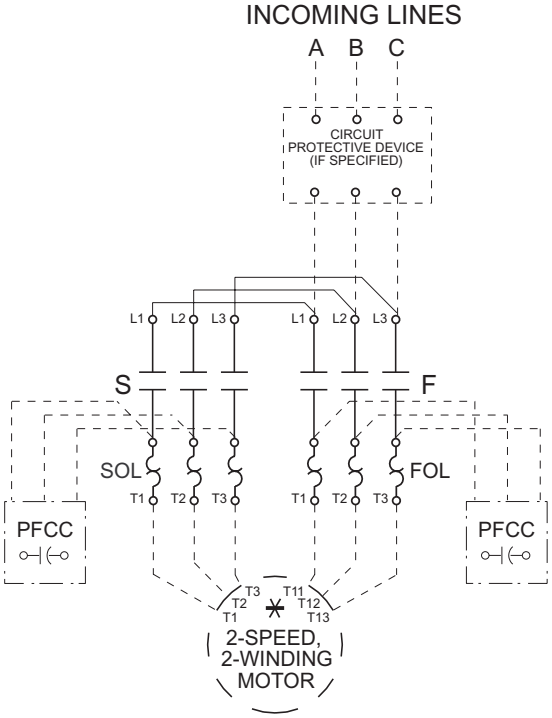
Part-winding



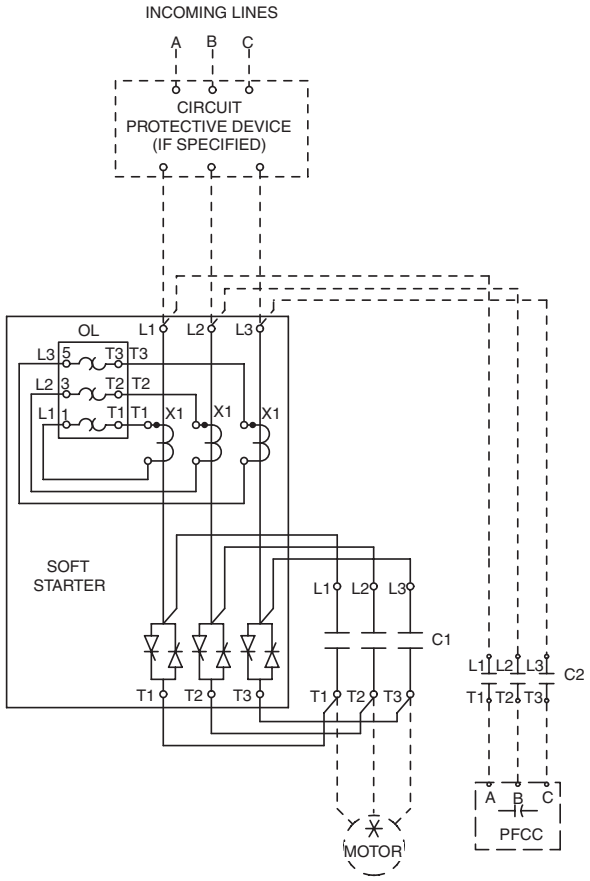
Wye-delta

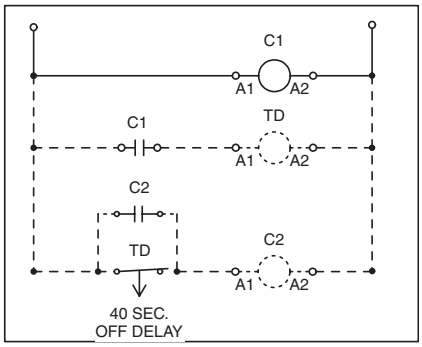


2 Speed, 2 winding



Softstarter





BYPASS CONTACTOR
CONTROL CIRCUIT