# Circuit diagrams
## Autotransformer & part winding



### **Autotransformer** – HOA

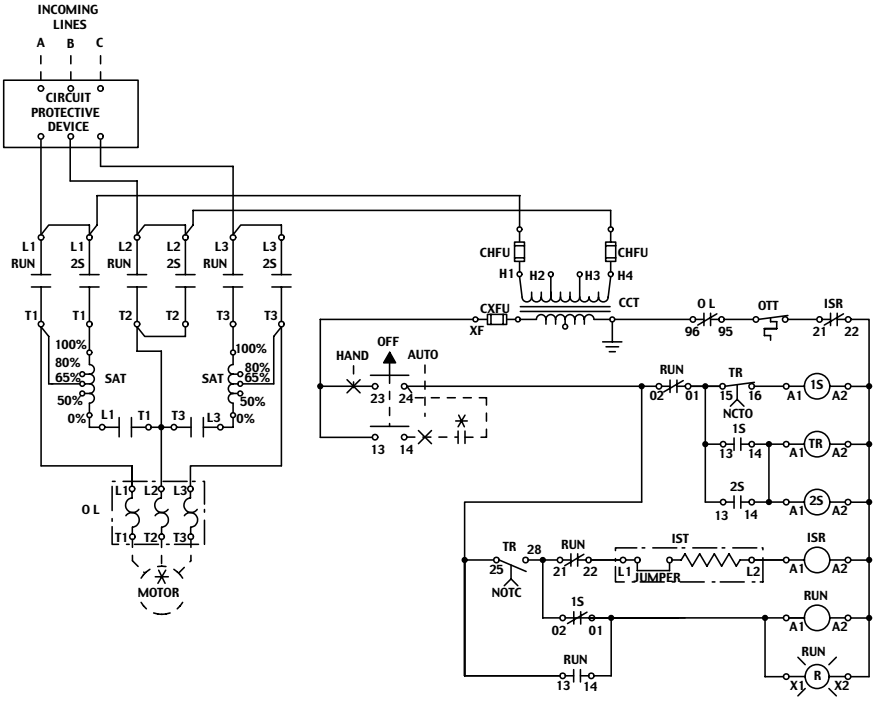
An autotransformer starter reduces inrush current by using a transformer in the line just ahead of the motor to step down the voltage applied to the motor terminals. By reducing the voltage, the current drawn from the line is reduced during start-up.

When the setting time on the timer has expired, the autotransformer is bypassed. The 1S contactor drops out, the run contactor closes, and the 2S contactor opens, proving full voltage to the motor.

The ABB autotransformer starter is a closed transition type, meaning that the motor remains connected to the line during the entire acceleration period.

The transformer has three taps which provide 50%, 65% and 80% of full line voltage. At delivery, the transformer is connected to the 65% tap; the inrush current will be reduced to 42% of normal; and the starting torque will be reduced to 42%.

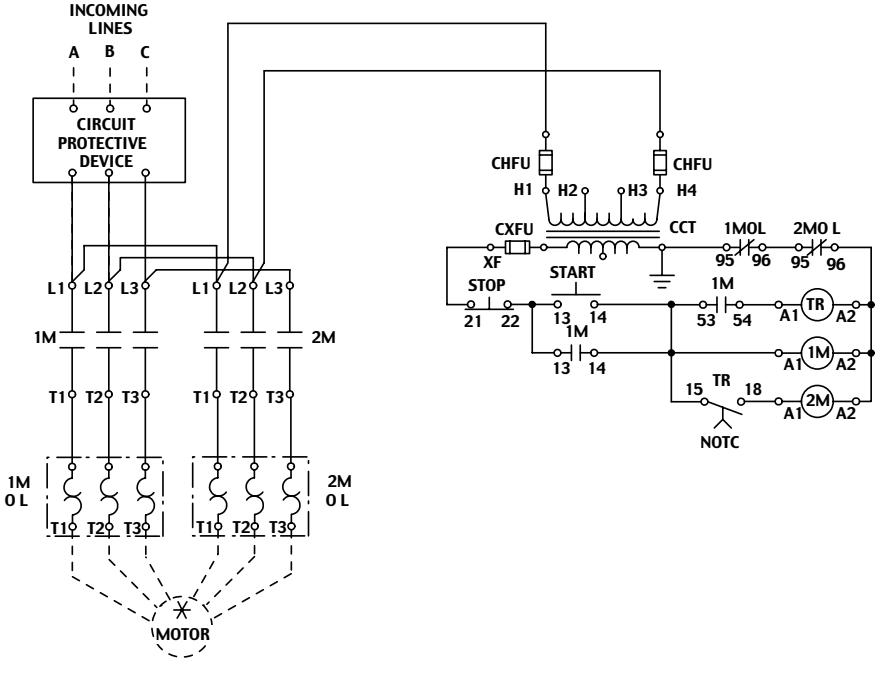
The autotransformer starter can be used for any squirrel-cage motor.




### **Part winding** – STOP-START

The part winding starter reduces inrush current by using two different sets of windings in the motor. Therefore, part winding starters can be used only with motors having stator windings divided into two equal parts with the terminals of each part available for external connection.

The part winding starter consists of two across the line starters and a timer. The first starter is used to connect one winding of the motor across the line. The starting current from one winding will be about 50% of the starting current if both windings were connected. The starting torque is correspondingly 50%.

Because the starting torque is so low and will not increase until the second winding is connected, the motor may not begin to accelerate. Therefore, the time delay for the second winding to be energized should not be more than 4 seconds.

When the second winding is energized, the inrush current will increase depending upon the speed of the motor when the second winding is energized.