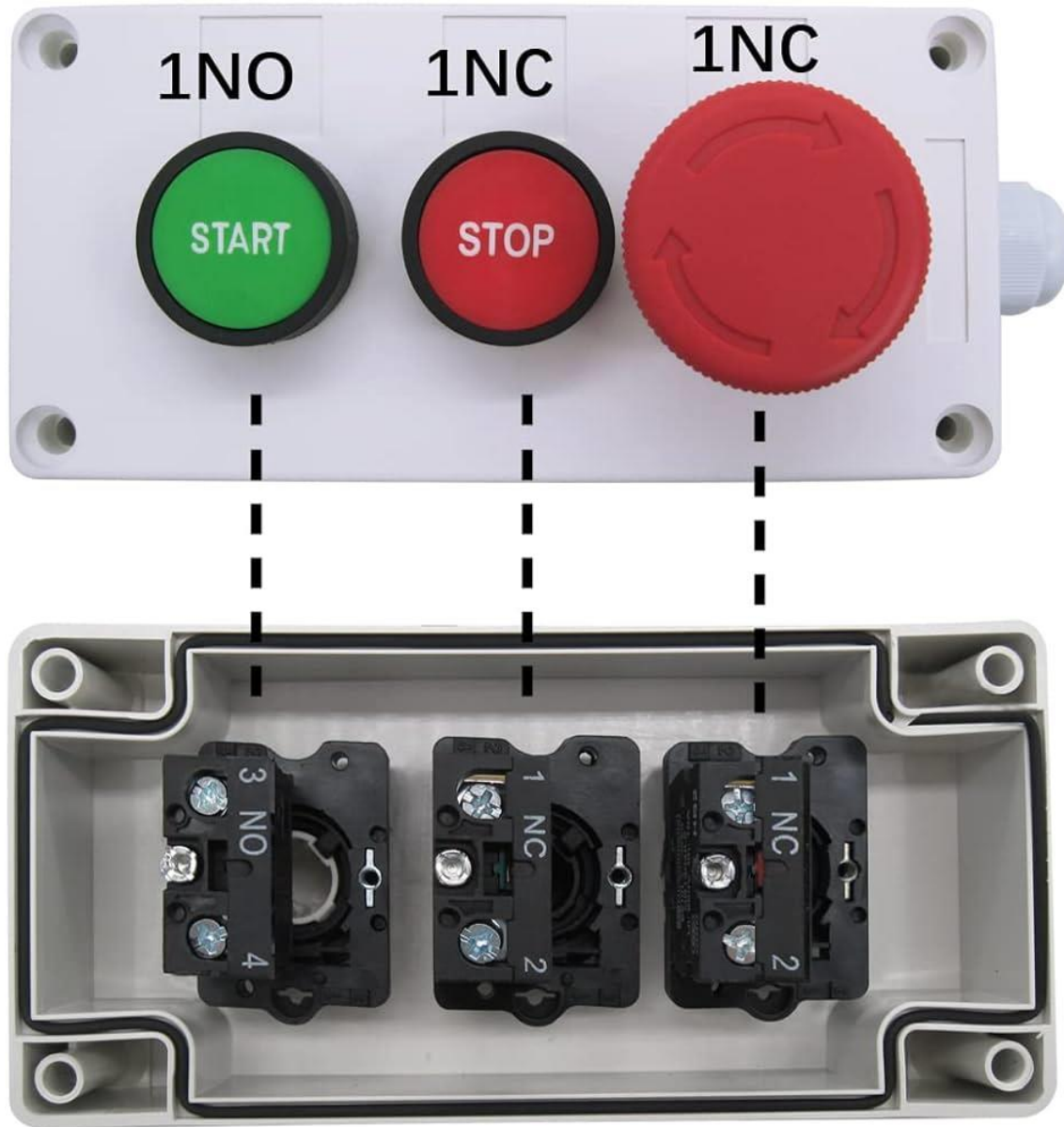


Stop Start Station and Motor Starter

Controlling Starter with a PLC (Programmable Logic Controller)

The basic stop start station with E-Stop (emergency stop button)



The Start button has a momentary NO (normally open) electrical contact.

The Stop button has a momentary NC (normally closed) electrical contact.

The E-Stop button has a maintained NC (normally closed) electrical contact.

The E-Stop is closed under normal operation and open in an emergency

The MCC (motor control center) starter bucket door

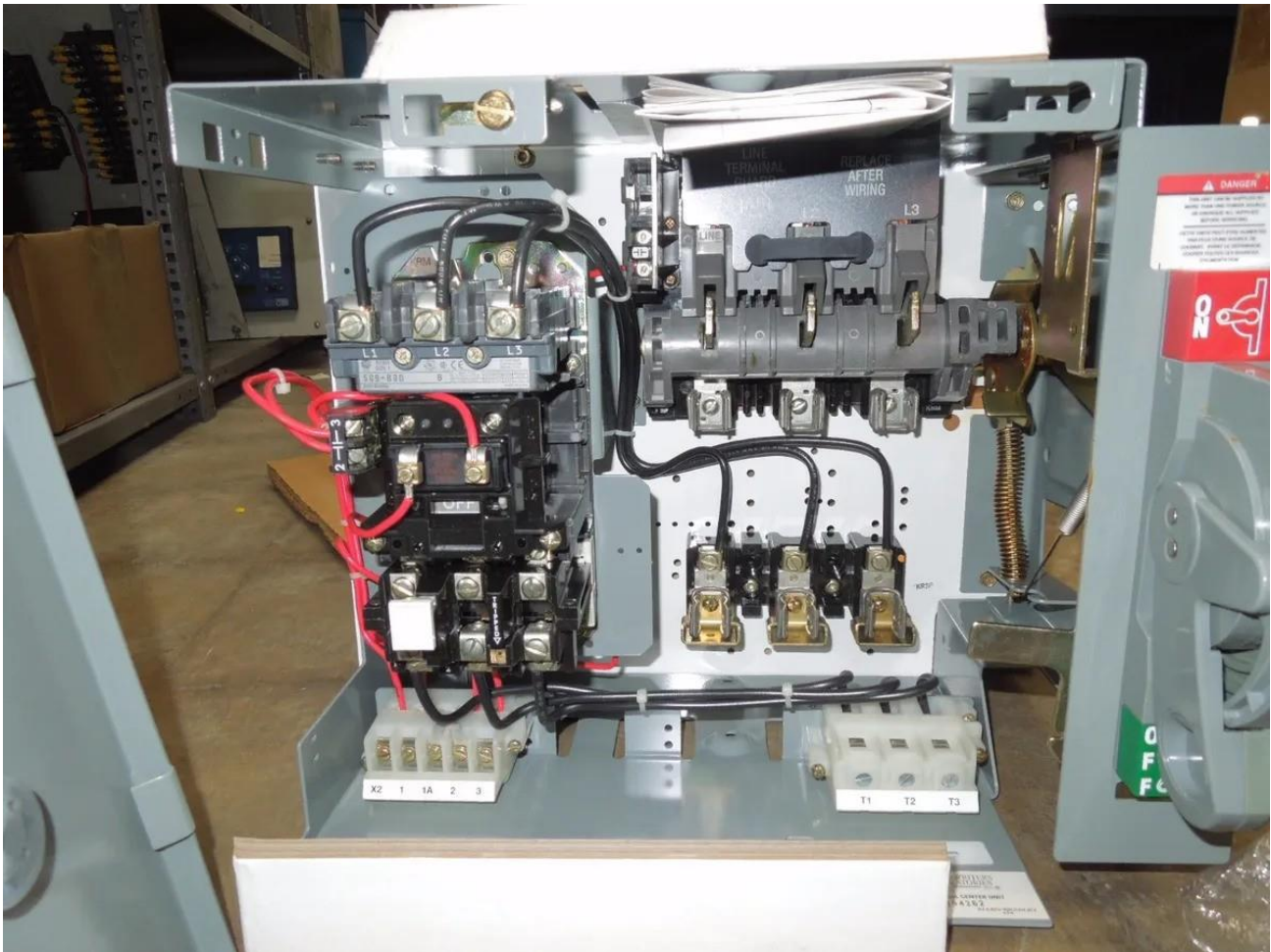


The top green lighted green button is the Start button.

The middle blue lighted button (usually is red) would be the Stop button.

The bottom selector switch is for HOA (hand-off-auto) or Remote-Off-Local operation of the starter.

The MCC (motor control center) starter bucket. It inserts into the MCC with many starters.



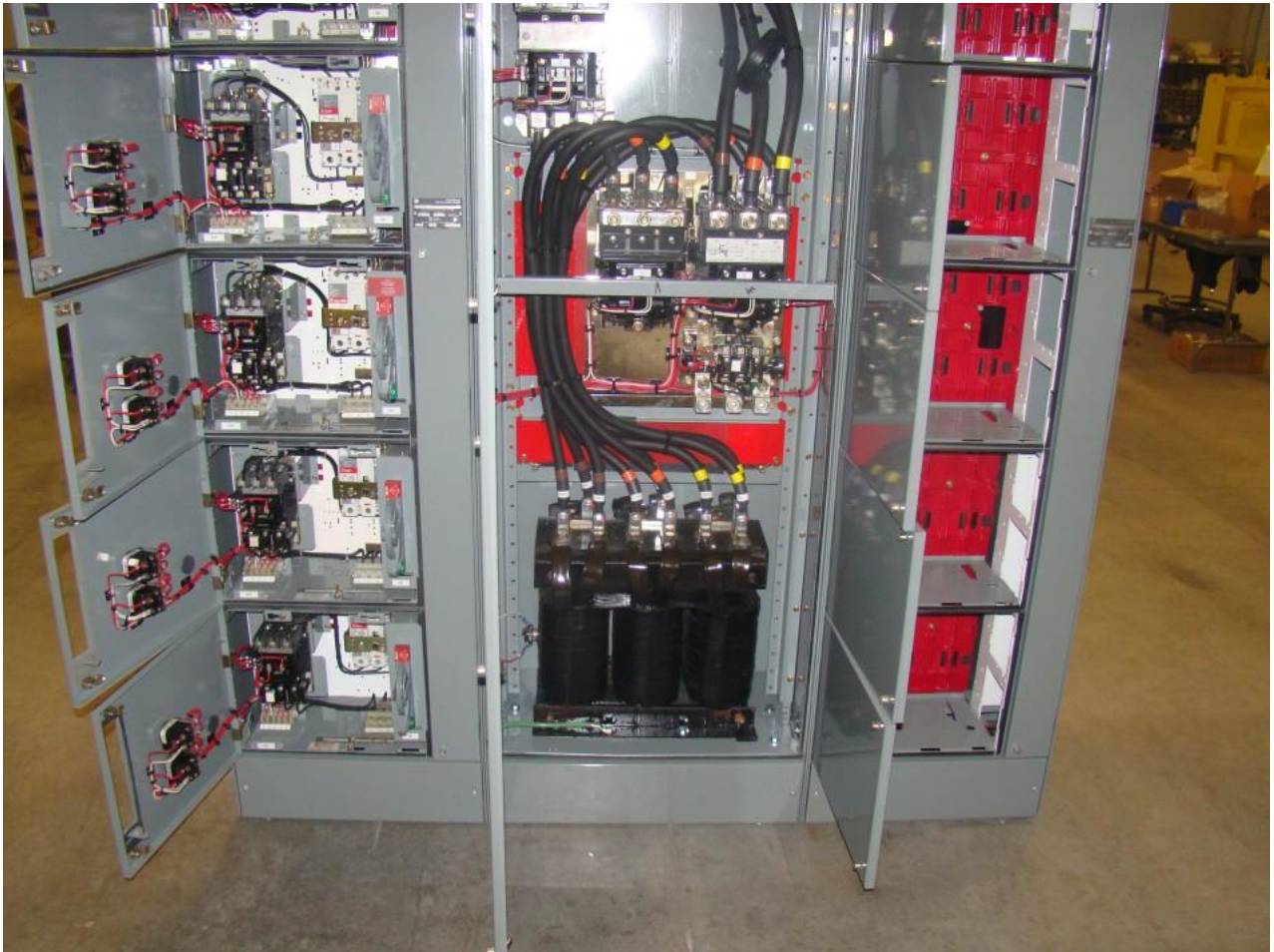
The starter bucket consist of:

- 1) Fuses or a Breaker (right side)
- 2) Motor Starter (left side)
- 3) Overload Unit (lower left under the starter)
Stops motor from drawing too much current under abnormal conditions.
- 4) Sometimes the starter bucket has a voltage reducing transformer, for control voltage.

The control wiring connects on the left terminal block and the motor wires connect on the right terminal block (T1, T2, T3).

This starter bucket utilizes a NEMA (national electrical manufactures association) starter.

The MCC (motor control center) where the starter bucket is installed.



The starter buckets are installed on the left side. The right side is for future starters.

The middle section is a reduced voltage starter, for large motors so they draw less current when starting up. This keeps the plant voltage from dropping and the lights don't dim.

IEC (International Electrotechnical Commission) Motor Starter



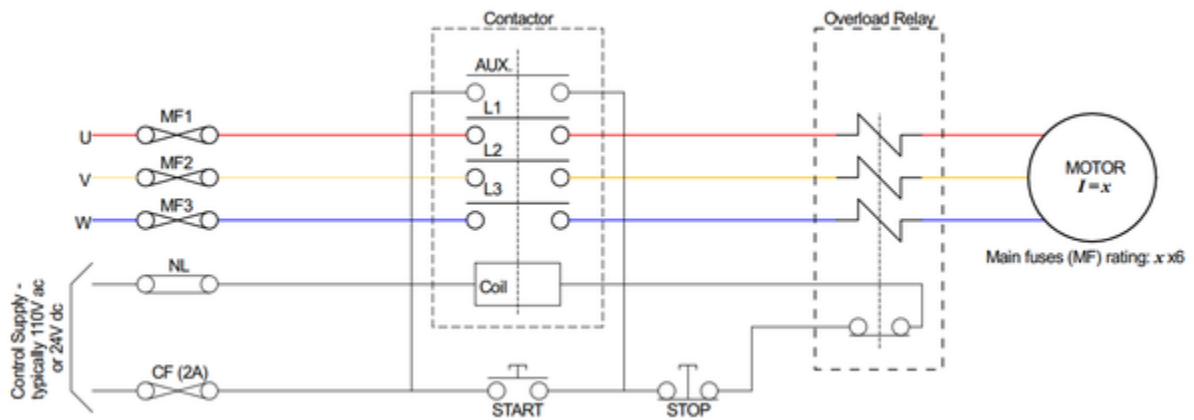
Contactor



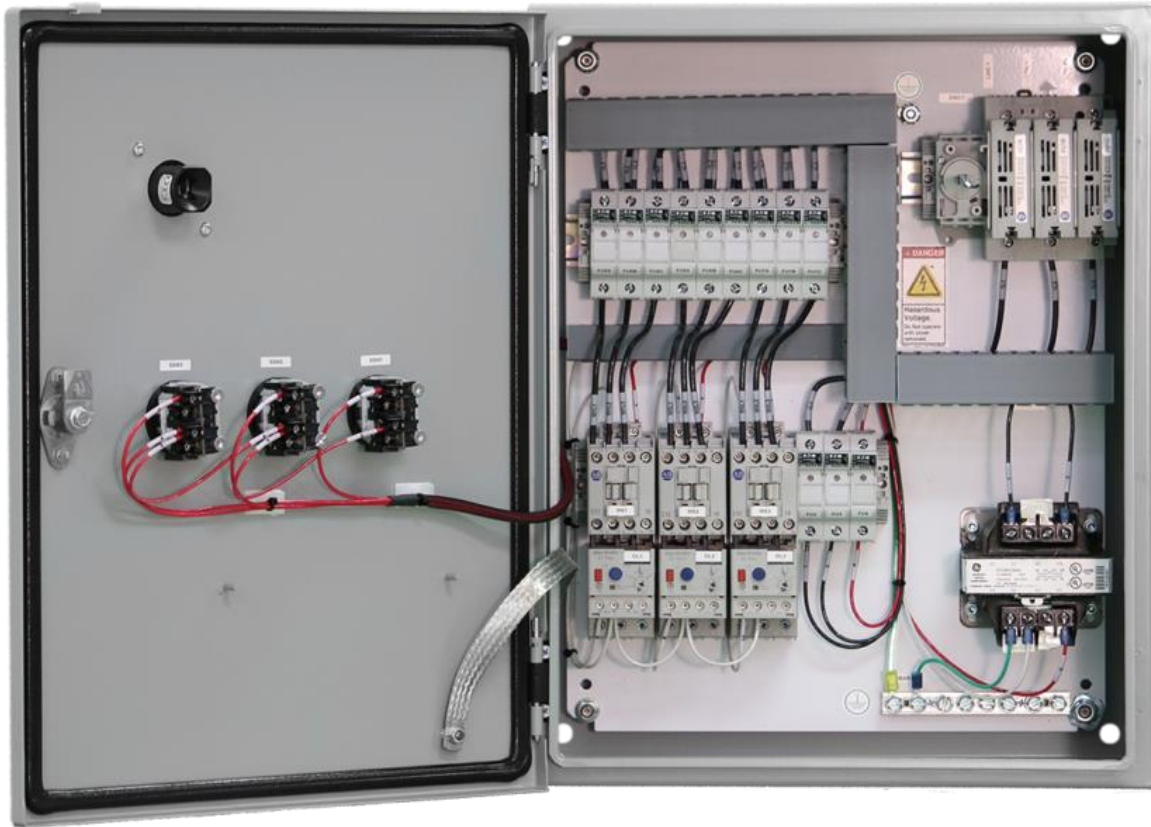
Overload



Motor Starter



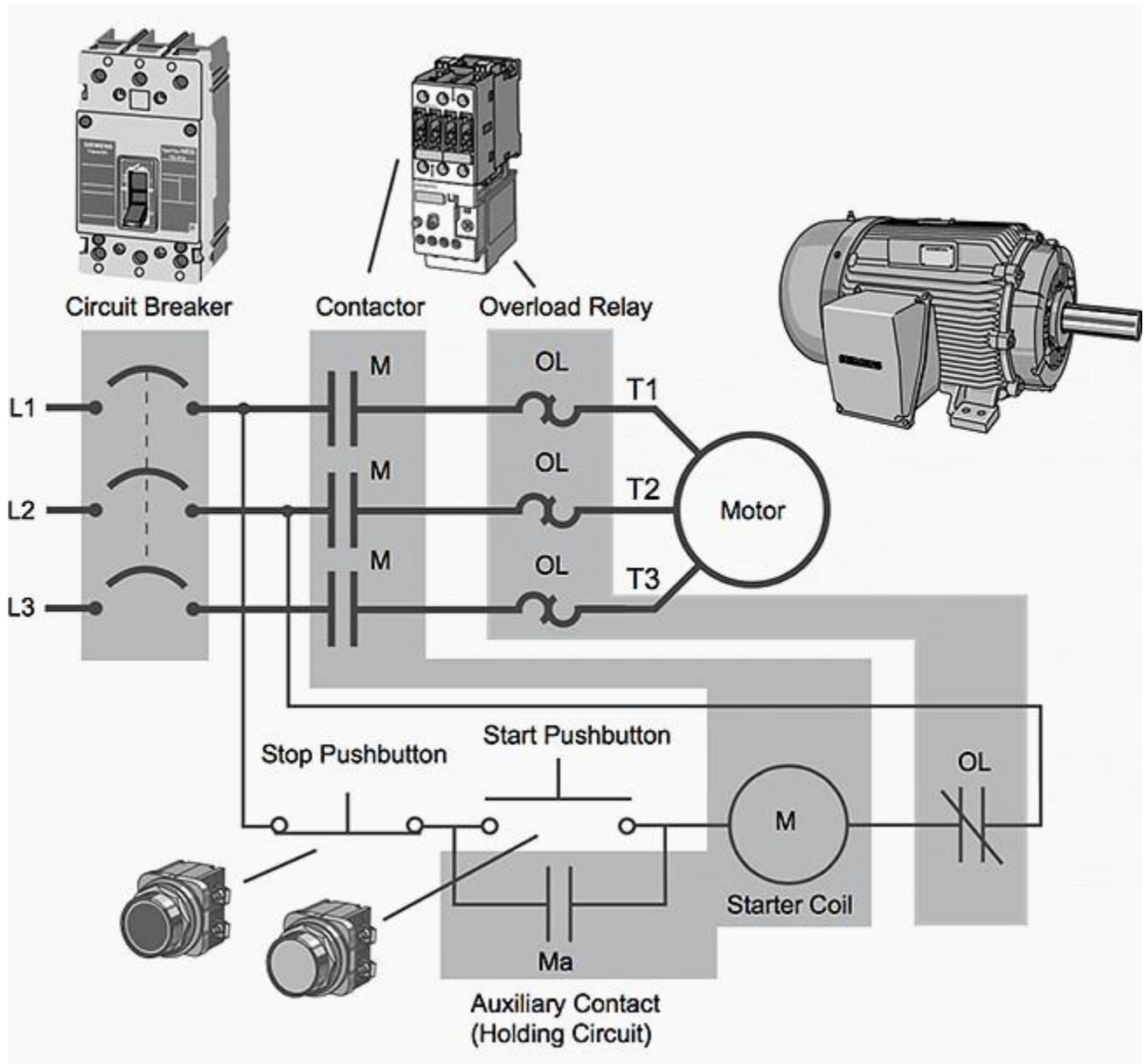
Control Panel Containing Three IEC Starters



The IEC starters are installed on the lower left side. On the right side and top are circuit breaker switches.

The top right is a control panel power disconnect switch, controlled through the door cover. The lower right is a control voltage transformer. It reduces the 480 volt AC supply voltage to 120 AC control voltage.

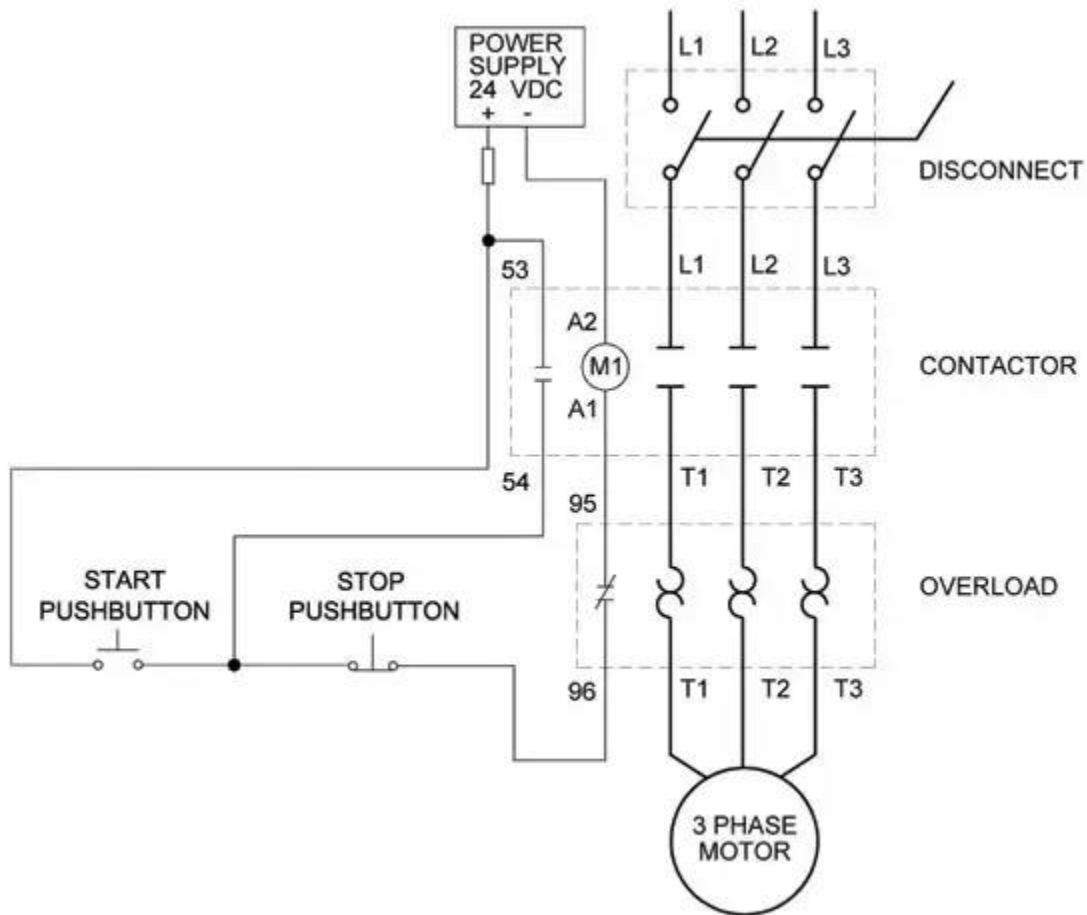
Symbolic Motor Starter Wiring Diagram (simple)



These are the components and their wiring located in the starter bucket. The motor is somewhere far away in the field. The Stop-Start buttons can be in the door, but are usually near the motor itself or sometime the Stop-Start buttons are both in the field and the starter bucket.

If the Stop-Start buttons are in the field and the starter bucket, then there will be a way to select Local control or Remote control in the starter bucket door as shown previously or controlled by the operator HMI (human machine interface) display. The HMI display may be a touchscreen panel or a monitor connect to a computer.

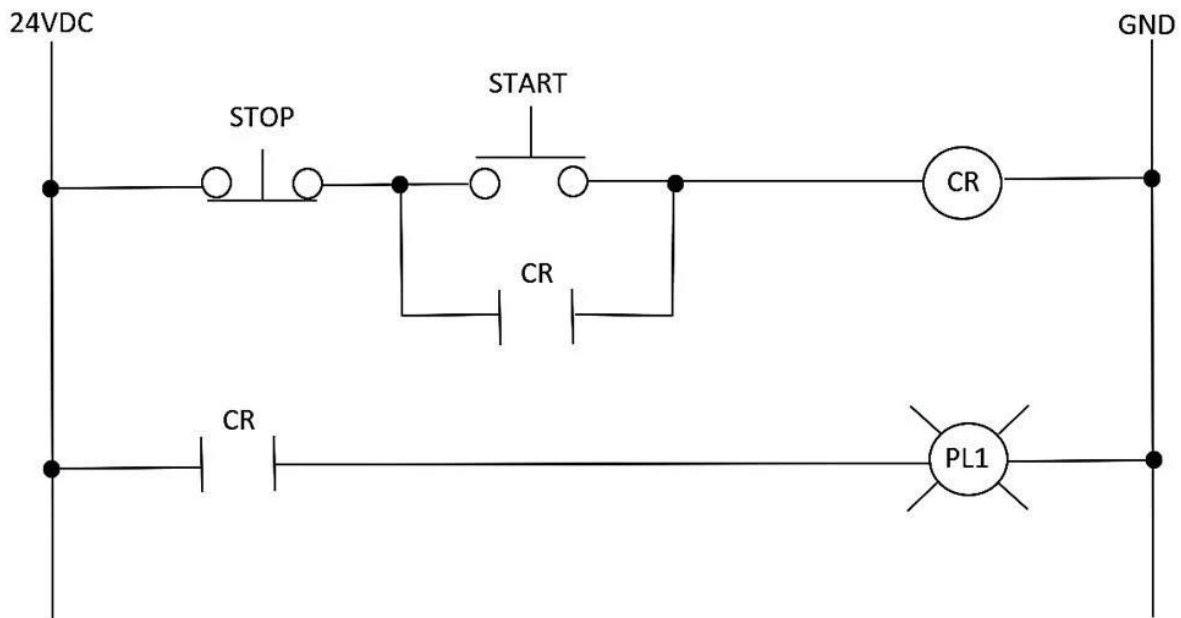
Motor Starter Wiring Diagram (actual wiring)



M1 is the motor starter coil, which pulls in the starter contacts (a heavy duty momentary switch contact for large current draw). To the left of M1 is a small contact (for control signal, it pass less than one amp through it). This is called an axillary contact. It is used for the feedback of the state of the starter.

It is referred to as the “Run” indication for the PLC (programmable logic controller) or is used as the seal in circuit (used to keep the starter energized when the momentary start button is released) in the stand alone wiring application.

Motor Starter Wiring Diagram (as seen on installation drawings)



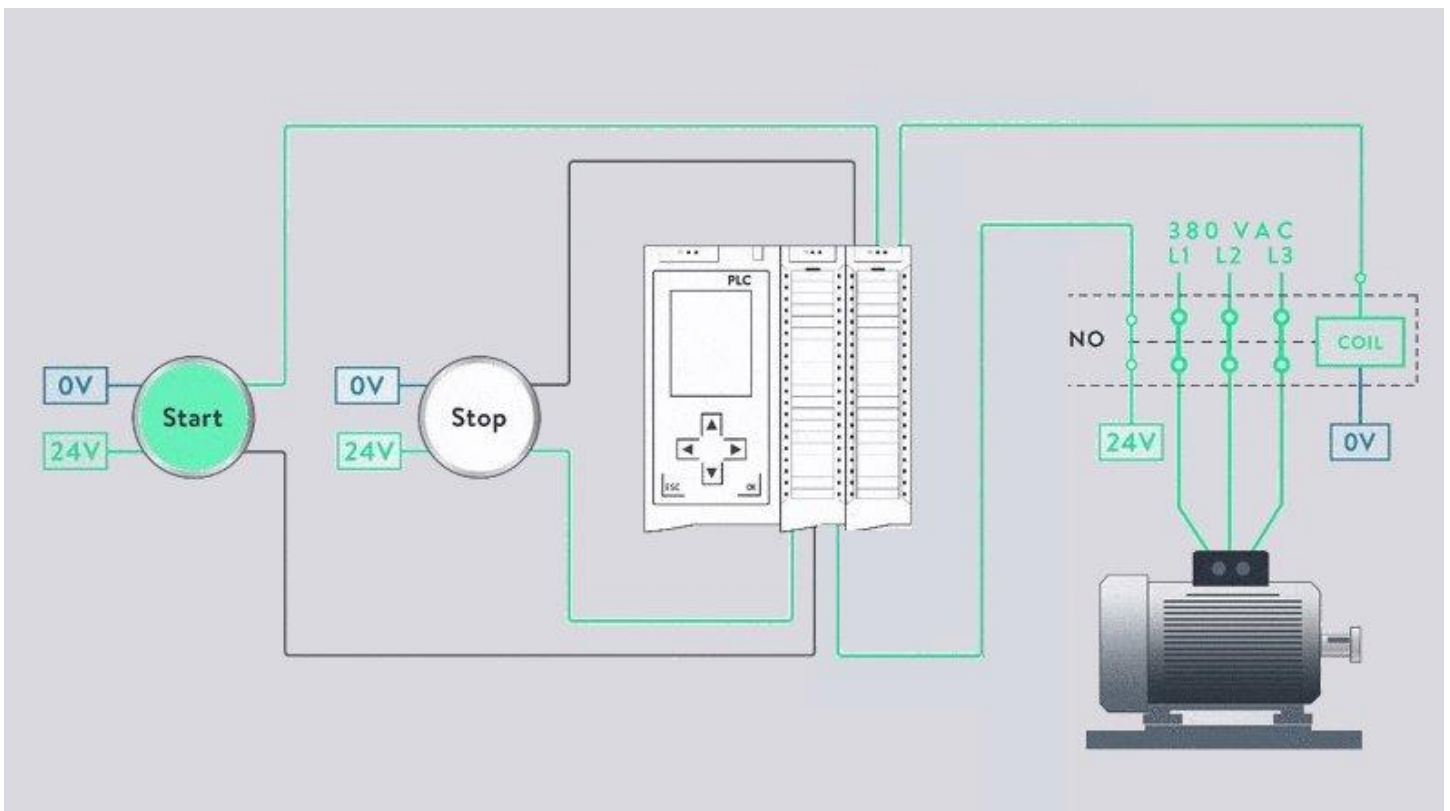
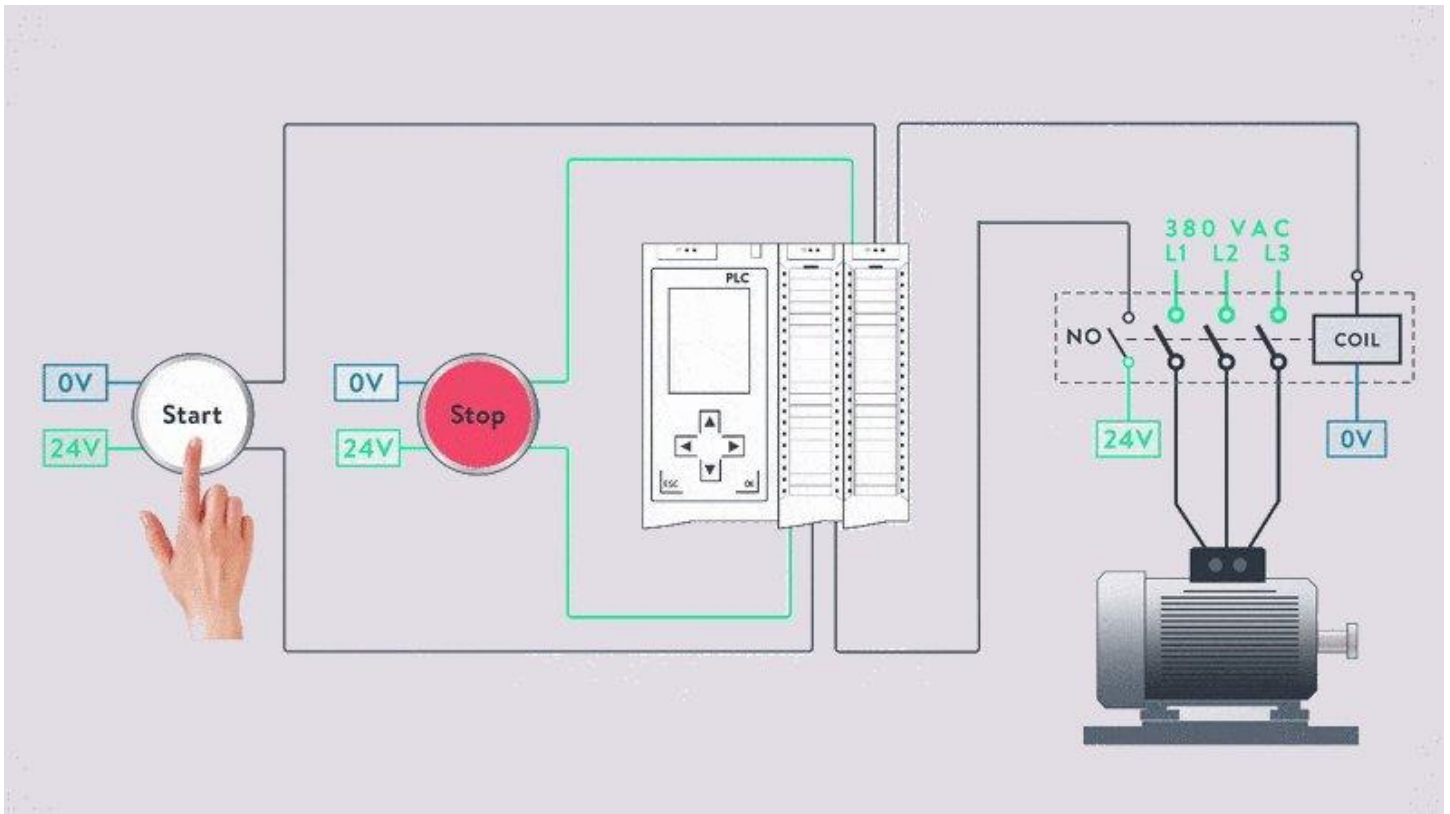
The Stop button is normally closed switch (it momentary opens when pressed), this is for failsafe operation. If a wire comes loose or if the button contact fails, the starter will “drop out” or turn off.

The Start button is a normally open switch (it momentary closes when pressed), energizing the CR (control relay). The CR is a coil or would be a memory bit or output bit in the PLC. When the CR (control relay) is energized, the bit is set to true (1 or 0, True or False).

When the CR bit is set to 1 or True, there is a path for the electric or logic to flow to the CR. This keep the CR on when the Start button is released, using a rung True statement (if plc logic) or voltage path if wired (“hard wired”).

On the second rung, CR turns on the PL1 (pilot light one). In a PLC program, the CR would be replaced by the “Run Indication” (PLC input) from the starter’s axillary contact and the PLC program will turn on the pilot lamp with a PLC output.

PLC Control of Motor Starter (animation)



PLC Program Control of Motor Starter (PLC physical wiring)

