Contactors are similar to relays but have higher current ratings and the coils are designed such a way that they can be replaced. They are primarily remotely controlled and electrically operated switches. They consist of one or more contact pairs that serve to open or close external circuits.

Type of Contactors: There are three major style of Contactors used in motor control applications.

> NEMA style
> IEC style
> Definite Purpose

Definite Purpose (DP) Contactors are generally used in the Air conditioning, Electrical Heating, Ventilation, Refrigeration, welding, Pool and Spa, Electrical motor controllers and lighting applications. They can also be used in special applications requiring making and breaking of high current loads. They are UL recognized and CSA certified.

DP Contactors have FLA, LRA and Resistive ratings. They also have HP and Lighting rating. These are used in single phase and three phase applications up to 600VAC max.

FLA (Full load Amperes): This is motor (compressor) current when it is running at full load. This is generally inductive load with power factor @ 0.8.

LRA (Locked Rotor Amperes): This is a locked rotor (starting) current of the motor (compressor). This is generally inductive load with power factor @ 0.5.

Resistive Amperes: The current when the load is resistor. This is generally used for Electrical heating application. The power factor is @ 1.0.

DP Contactors are available in single pole, single pole with shunt, two pole, three pole and four pole configuration. The single pole, two pole and four pole have up to 40FLA /50A resistive rating. The three pole have up to 120FLA/150A resistive rating.

Method of Operation:

Contactors have two separate circuits. Main circuit and control circuit. The opening and closing of the main circuit is accomplished by an electromagnetic control circuit (Coil). The magnetic field is created in the core by the current in the coil. This attracts the armature. The movement of the armature closes and opens the main circuit. The main terminals can have either Screws or Lugs and can be with or without the ¼" quick connects.

Screw: Combo screw – requires having either ring or fork terminal on the wire to connect to contactor.

SEMS washer Screw – can connect solid wire under the SEMS washer.

Lugs: Can connect solid or stranded wire from the line and load circuit without any ring or fork terminal.

Quick connects: Unless the load is small (less than 15A), Quick connects are generally used to connect secondary circuits to main power coming to the contactor.

The control circuit supplies the power to the coil. The voltage for the main load circuit and control load circuit is often different. The DP contactors are mainly available with 24VAC, 120VAC, 208/240VAC, 277VAC, 480VAC and 575V AC coils. The coil terminals have dual ¼" QC. The coil terminals can have one ¼" QC and one screw (only 3P and 4P models). DC voltage coils are available for special applications. The DC coils have economizer coil design (called three lead DC as these have dual winding coils). Some of the DP 3 pole and 4 pole Contactors are available with 12VDC, 24VDC, 48VDC and 115VDC. Replacement coils are available for some of the 3 pole Contactors.

There are Auxiliary switches available for the 3 pole and 4 pole DP Contactors which can be snapped to the side of the Contactor. The switches are available in SPNO, SPNC, SPDT and 1NO1NC configuration. The Aux. switches can be used for control signals and lights with in the range of the rating of the switches.

When selecting a Contactor for replacement, following conditions must be taken in to consideration.

1) The replacement Contactor must have equal or higher current rating

2) The contacts must be of original configuration like SPNO, DPNO, 3PNO etc.

3) The coil must be of same voltage and with in same VA range. (The VA of the coil can be higher if the transformer supplying the power to the coil can handle higher VA).

4) The terminal connections are compatible to original configuration.

5) Physical size of replacement must fit into space available.