



# DC Contactor Overview

# DC Contactor Features

(Depending on model)

## HIGH CARRY CURRENT AND HIGH SWITCHING VOLTAGE

Utilizing a magnetic arc blow-out design in combination with inert gas filled contact chamber allows it to make/break higher voltages.

## COIL ECONOMIZER

Greatly reduces coil power and coil heating after the contactor is energized.

## COMPACT STRUCTURE, LOW NOISE

Contact design yields reduced unit size, low noise while carrying and switching current.

## HIGH SAFETY

There is no arc leakage due to the Hermetically sealed design of the arc chamber.

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(Depending on model)

## HIGH RELIABLE CONTACT

Stable contact resistance no matter how harsh the environment with sealed contacts.

## NO SPECIAL REQUIREMENT FOR MOUNTING

Light weight actuator is less impacted by gravity with no special mounting orientation requirements. Side mounting and bottom mount styles are available on some models.

## OPTIONAL AUXILIARY CONTACT

Allows for contact position signal / feedback.

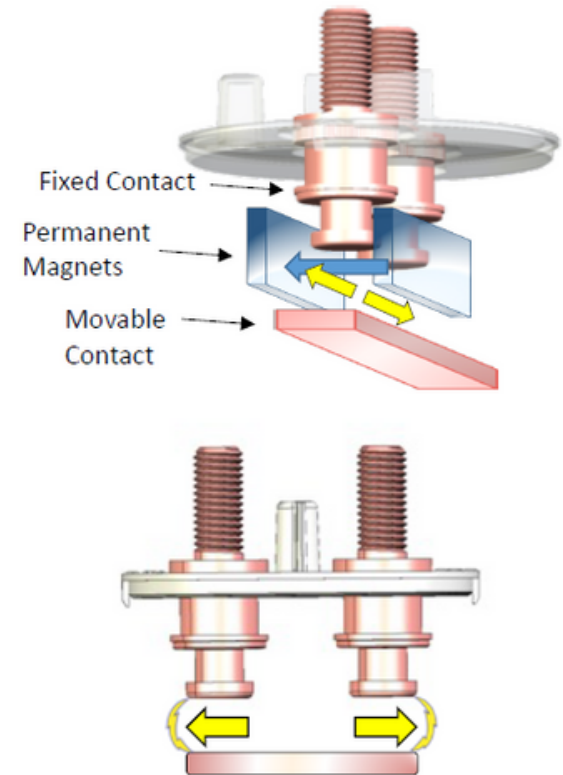
# DC Contactor Features

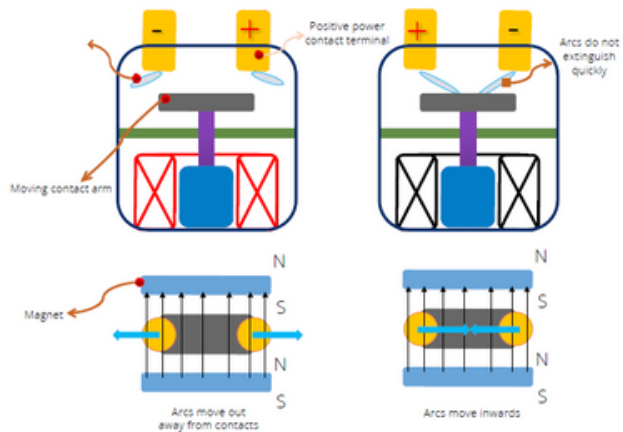
(Depending on model)

**MAGNETIC ARC BLOW-OUT** - design in combination with inert gas filled contact chamber allows it to make/break higher voltages.

## How it Works?

- The permanent magnets create a magnetic field across the contacts, perpendicular to the arc.
- The interaction between the arc current and the magnetic field produces a force driving the arc outward (perpendicular to both the magnetic flux and the arc current).
- Therefore, stretching and extinguishing the electric arc that is formed as the contacts open to interrupt the current.
- This is the reason for Polarized Terminals.





## Polarized

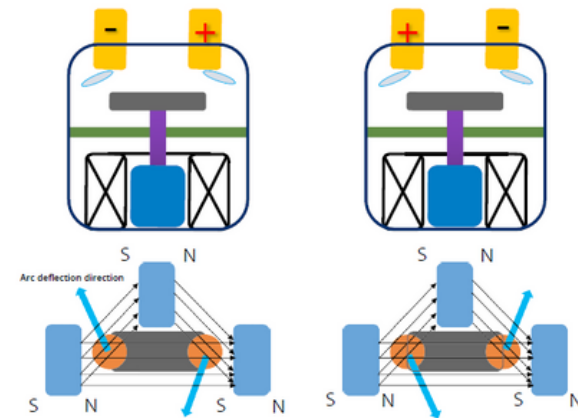
In the above drawing, you can see how the arcs are pushed away from the moving contacts.

However, if we are breaking a current flowing in the opposite direction (right drawing), the magnet effect is in the opposite direction. This means we are not gaining any arc length.

This is the reason why, for polarised contactors and relays, current breaking capacity is optimised for one current flow direction only.

If we intend to use a polarised contactor in the reverse direction, its breaking capacity is reduced, as a general rule, by 30 – 50%

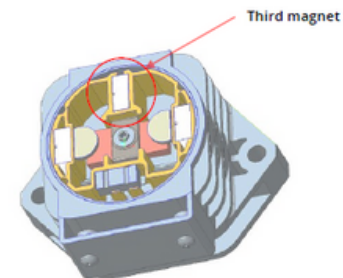
NB: Polarity has no effect through closed contacts, it only matters when the contacts open under load (or bounce when closing under load).



## Non-polarized

Non polarised contactors use a third magnet to move the arc away. This is why non polarised contactors are a little more expensive.

The breaking capacity is a bit lower than polarised contactors, because the arc is pushed away – but not in the optimal direction.



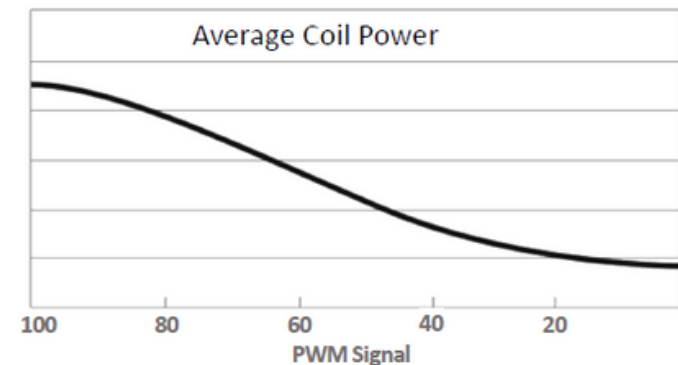
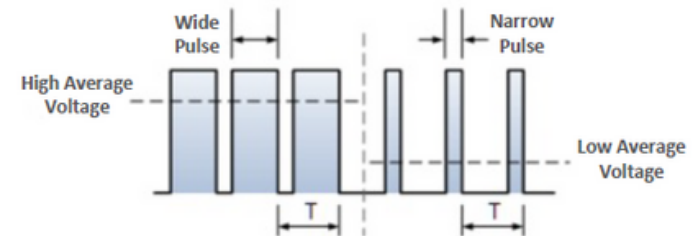
# DC Contactor Features

(Depending on model)

**COIL ECONOMIZER** - Built-in coil economizer greatly reduces coil power and heating after the contactor is energized. Once the contactor is energized, it takes minimal coil power to keep the contacts closed.

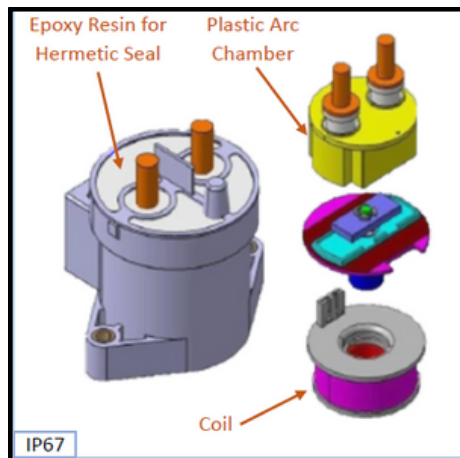
## How it Works?

- This is achieved through Pulse Width Modulation. PWM is a method of reducing the average power delivered by pulsing the electrical signal.
- The average value of voltage (and current) fed to the coil is controlled by the width of each pulse.
- This reduces the coil power by about 80% - 90%.



# Basic construction of High Voltage (HV) Contactors

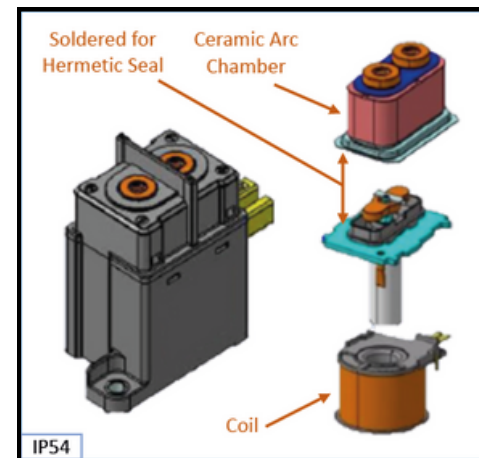
## Resin Design



### Benefits:

- Lower cost
- Simple manufacturing process
- Can include Non-Polar options

## Ceramic Design



### Benefits:

- Better Arc chamber seal
- Higher contact voltage capability
- Withstand higher pressures & temperatures longer

# Parameters to Consider

- Max Contact Rating?
- Is this a continuous carry current application?
- Max Voltage?
- Will the contactor be switching under load?
- How many Electrical switching cycles (Life) is required?
- Ambient Temperature requirements?
- What is the required Coil Voltage?
- Do they require an Auxiliary Contact?

# Applications for High Voltage (HV) Contactors

- Electric Car, Bus & Motorcycle
- Charging Stations
- Renewable Energy Storage (Battery)
- Fork Lift Trucks & Material Handling
- Farm Tractors (John Deere, Claas, Caterpillar, Belarus)
- Mining Vehicles and Equipment
- Construction Equipment
- Electric Airport Equipment
- HVDC Test Equipment
- Battery Management Systems (Marine)
- Uninterruptible Power Supplies
- Electric Agricultural Equipment
- Locomotives & Equipment
- Utility Vehicles, Garbage Trucks

