

# Definite purpose contactors and starters



Compact single-pole with shunt



Compact two-pole



Standard (50 mm) DP contactor

## History and background

The concept for definite purpose (DP) contactors and starters originated in the 1950s at the request of several large heating, ventilating, air conditioning and refrigeration (HVACR) OEMs. Until this time, these OEMs had used NEMA® rated contactors and starters in their equipment. However, these NEMA rated devices were very robust and expensive and they were outlasting the equipment in which they were installed.

The HVACR OEMs called in several electrical control companies, including Eaton (known as Cutler-Hammer at this time), and asked them to design a line of contactors and starters that would have a much lower electrical life and a reduced cost based on this performance, while maintaining the high quality of the NEMA rated products. This new line became known as definite purpose contactors and starters because they were designed for specific requirements and a specific market.

## Market

The market for DP contactors and starters is primarily a North American market. Outside North America, IEC rated contactors and starters are used for similar HVACR applications. The 2015 market for DP control in the Americas was estimated at \$166 million.

## Target market segments and applications

While DP control products were originally designed for the HVACR industry, over the years their use has expanded to many other market segments. A good rule of thumb for DPs is if a customer has an application that “heats, cools, refrigerates, controls, or moves air”, then they are probably a good candidate for DP contactors or starters.

DP contactors can be grouped into two main categories depending on the application: compact single- and two-pole DP contactors (20 A to 40 A) and standard frame DP contactors (15 A to 360 A). Compact DP contactors are the product of choice for the unitary central air conditioning units installed in many homes. Standard frame DP contactors are used in the larger commercial/ industrial air conditioning units that you see mounted on the rooftops of industrial plants, hotels, hospitals, office buildings, and other commercial and industrial installations.

## Application expansion

Eaton DP contactors have expanded outside of the HVACR space and are now being used in various industrial machinery and commercial applications. Some examples of current applications are compressors, condensers, mobile equipment, telecommunication devices, food industry, and industrial equipment, etc.

The following is a listing of other Standard Industrial Classification (SIC) and NAICS code numbers where DP contactors/starters are typically applied.

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## SIC numbers where DP contactors are typically applied

**Table 1. Four-digit SIC numbers**

SIC codes	Description
2449	Hot tubs, manufacturing
3088	Hot tubs, plastic/fiberglass manufacturing
3563	Air gas compressors manufacturing
3564	Fans/blowers/air purification manufacturing
3567	Industrial processing furnace/oven manufacturing
3581	Automatic vending machine manufacturing
3582	Dry cleaning and pressing machine manufacturing
3585	Air conditioning and heating equipment manufacturing
3629	Battery chargers rectifying/non-rotating manufacturing
3842	Whirlpool baths/equipment manufacturing
3548	Welding and cutting apparatus, gas or electric manufacturing
3634	Humidifiers, electric, portable manufacturing
3582	Washing machines, commercial manufacturing
3639	Water heaters, electric, manufacturing
3556	Ovens, bakery manufacturing
3821	Ovens, laboratory manufacturing
3556	Meat grinders
3589	Garbage disposers, commercial manufacturing

**Table 2. Six-digit SIC numbers**

SIC codes	Description
308802	Hot tub and spa manufacturers
356701	Ovens—industrial manufacturers
358101	Vending machine manufacturers
358298	Commercial—laundry dry clean machine manufacturers
369402	Battery charging equipment manufacturers
363908	Water heaters—manufacturers
399934	Tanning salon equipment—manufacturers
358501	Air conditioning equipment—manufacturers
358598	Air conditioning/heating/refrigeration equipment manufacturers
356301	Compressors—air—manufacturers
356398	Air and gas compressors—manufacturers
354801	Welding equipment supplies—manufacturers
356498	Industrial and commercial fans and blowers
356401	Fans—industrial and commercial manufacturers
356402	Air cleaning and purifying equipment
355605	Ovens—bakers—manufacturers
356413	Ventilating equipment manufacturers
356789	Industrial process—furnaces/ovens
358903	Compactors—waste—industrial/commercial manufacturers
358512	Marine refrigeration and air conditioning manufacturers
358513	Air conditioner room units—manufacturers
356303	Spraying equipment—manufacturers
358203	Pressing machine—manufacturers
363410	Water jet cutting

## Industry standards

### Air Conditioning & Refrigeration Institute (ARI)

The Air Conditioning & Refrigeration Institute Standard 780/790, definite purpose and limited duty definite purpose magnetic, although it has been withdrawn, this specification is written into most specifications and is the main design standard for definite purpose contactors. Conformance to this standard is self-certified and completely voluntary. In addition to its recommendations on design, ARI 780/790 also defines performance requirements and additional testing not covered in the UL® and CSA® standards.

### Underwriters Laboratories (UL) and Canadian Standards Association (CSA)

UL and CSA are mainly concerned with the safety of electrical products and the requirements for DP contactors. The UL standards used to evaluate DP products are covered in UL Standard 508 and UL 60947-4-1 for industrial control equipment. The CSA standards used to evaluate DP products are covered in CSA C22.2 No. 14 and/or CSA 60947-4-1 for industrial control equipment. Conformance is mandatory in order to apply the UL and/or listing or recognition marks to products or equipment. Contact the Technical Resource Center (TRC) (877-386-2273, TRC@Eaton.com) for further information related to North American certification agency compliance.

### IEC standards and CE mark

Many of the DP contactors have been self-certified and tested to IEC 60947-4-1, EN 60947-4-1 and carry AC-1, AC-3, AC-4, and AC-8a ratings.

### DEMKO

DEMKO is a danish third party test facility owned by Underwriters Laboratories. Contact the TRC for additional information on which products have Demko approvals.

### CCC

CCC is the China Compulsory Certification mark. Contact the TRC for additional information on which products have CCC approvals.

## Competition

The main competitors for DP contactors and starters are:

- ABB (GE)
- Hartland Controls
- Siemens
- Schneider Electric
- Rockwell Automation

Eaton DP starters and contactors have been enhanced with features that improve the customers' ease of doing business with Eaton. The enhancements alongside the robust, yet compact, design provide customers the highest quality product in the easiest fashion. The following is a list of enhancements as well as established features that make this product best in class.

For competitive cross-reference, contact the Technical Resource Center (877-386-2273, TRC@Eaton.com).

## DP contactors

### 2D barcode

A 2D barcode has been added to the label on all standard 15–50 A two- and three-pole contactors. This allows a customer or end-user to scan in the barcode and be quickly linked to the product page for specification sheets, catalogs, or to find a nearby location to replace the unit. The 2D barcode will make finding product information or replacement products as simple as using your cell phone camera.

### Short-circuit current ratings (SCCR)

Standard DP contactors may be used with non-time delay or time-delay fuses. Contact the Technical Resource Center (877-386-2273, TRC@Eaton.com) for information related to UL SCCR approvals. Technical information can also be referenced in the catalog (CA08102001E, Vol05\_Tab04) for product-specific certifications and ratings.

### Current ratings

Eaton 50 mm 15–50 A two- and three-pole DP contactors have the best-in-class ampere range for their frame size. With a total range of 15–360 A for DP contactors, Eaton has the largest range amongst DP contactors and the potential to be a solution for various applications.

### Enclosed housing

Eaton standard DP contactors have plastic side shields on the sides of the contactor to cover the openings for side-mounted accessories. These side shields can be easily removed by hand or with a screwdriver when adding accessories such as side-mounted auxiliary contacts. There are no exposed coils with Eaton compact or standard DP contactors, making the environment as safe as possible.



50 mm DP contactor



Reversing DP contactor

**Quiet operation**

DP contactors are used heavily in residential areas and office settings, making noise a factor in operation. External contaminants on the surface of the contactor magnets can cause the contactor to buzz or hum at increased levels because the magnets are not able to close completely or close unevenly. To eliminate or minimize noise, Eaton compact (single- and two-pole, 20–40 A) and standard (two- and three-pole, 15–50 A) DP contactors have a housing designed to seal it as much as possible to prevent external contaminants from getting onto the magnet surfaces.

**Removable contact inspection cover**

Eaton DP contactors are easy to maintain and inspect. They are designed with a removable inspection cover that enables maintenance personnel to inspect for contact wear and replace the contactor based on their maintenance schedule.

**Universal metal mounting plate**

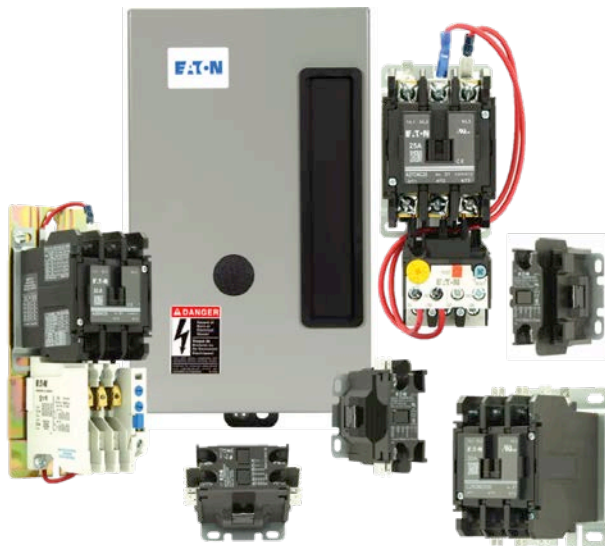
Eaton’s mounting plate is a universal mounting plate and permits replacement of most competitor contactors.

**DIN rail mount capability**

Available as a factory-installed option, 15–50 A DP contactors are offered with a DIN rail mounting adapter. The DIN rail mounting adapter replaces the metal mounting plate and mounts to the housing with the same four screws as the metal mounting plate.

**Reversible coil terminals**

The coil terminals of Eaton 15–75 A standard DP contactors can be rotated 180 degrees from the top of the contactor to the bottom to permit easy wiring for those customers who prefer to wire from the bottom. This can be done easily in the field or as a factory-installed option.



**Line and load terminals**

Eaton standard size DPs (15–50 A) offer more line and load terminal options than any of our competitors. Binding head screw terminals, screw/pressure plate terminals, and box lugs are offered. Also, horizontal (side-by-side) or vertical (in-line) quick connect terminals are available for any of the line and load lugs. Box lugs are offered with either a Posidriv screw or with a hex socket Allen head screw, giving our customers more wiring and assembly options. Overall, there are 14 different terminal options to fit any project need.

**DP starters**

DP starters are available in single- or three-phase motor operations from 15 to 75 A. The starters will use either a bi-metallic overload or an electronic overload. The electronic option (A30, B30) has selectable ground fault and/or phase unbalance detection alongside the capacity for communication modules and a remote reset. The bi-metallic ambient compensated overload options have trip-free mechanisms and selectable manual or automatic reset options. The XT series (A27, B27) has a Class 10 trip where the Freedom series (A25, B25) has a Class 10 or 20 and the A30 class has 10, 20, and 30 settings.



DP starter with C306 overload



DP starter with electronic overload (C440)

For more information, visit  
**Eaton.com/dp**

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