

How to Match Contactors to DC Telecommunications Power Systems

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DC contactors (*Figure 1*) are crucial for providing low voltage (LVDC) and battery disconnect functions for telecommunication DC power distribution systems. Compared to other systems components, contactors are relatively uncomplicated – essentially they are heavy-duty electromechanical switches. Yet, for optimum performance and durability, and trouble-free system operation, many decisions are required to properly match the right contactor features to a specific application.

This critical application protects sensitive communications equipment downstream from potentially damaging low-input voltage and deep discharge of the system batteries. When the mains power is on line, the contactor carries the battery float charge current. In case of a mains power failure, the DC contactor carries the current flow from the battery to the load until it is disconnected at low voltage. Once the batteries reach the nominal pre-programmed voltage, the DC contactor opens, protecting the batteries from deep discharge. The basic components of a con-

tactor are operating coils, a plunger spring assembly and pairs of contacts. The contacts consist of a moveable and fixed set of dome shaped contact tips.

DC contactors used in telecommunication power distribution centers are available in either single pole on/off or double pole on/off configurations, with various product options meeting specific application requirements. The selection process for specifying a contactor's capabilities and the features necessary to meet telecommunication requirements are virtually identical to other UPS

equipment. The process takes into account voltage and current requirements, operational and environmental challenges, as well as serviceability, form, fit and function considerations. The following methodology will help you to properly select the right configuration and models for increasingly demanding, specialized telecommunication power systems.

Put Quality First

The reliability and performance of the DC contactors and disconnect switches will carry the entire back-up system of your telecommunication, power distribution and switching system. The system is only as reliable as

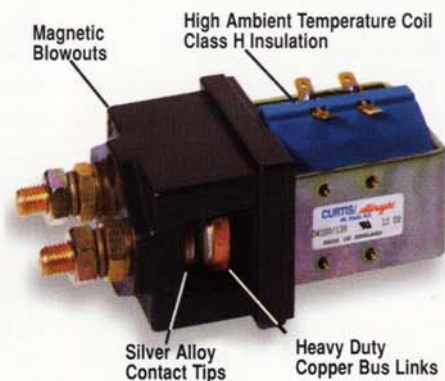


Figure 1. DC Contactor.

its individual components. Because contactors are integral to protecting your system, you should find the best, most reliable products your budget will allow.

Environmental Conditions

Know where the telecommunications equipment will be installed. For example, if the installation is in an environment with extreme ambient temperature, you will need a high temperature operating coil of at least 85°C. In high humidity and marine environments, consider the corrosion protection offered by the contactor manufacturer. The best protection is offered by zinc plate and yellow zinc chromate processing and by silver plating on the contactor hardware (i.e., on the bus mounting assembly).

Continuous Current Rating

Specify according to the maximum continuous thermal current rating of your application. To prevent overheating or contact tip welding, it is vital that you plan for the highest load. Contactors with silver alloy tips are preferable, as they offer longer life, enhanced durability and higher reliability.

Voltage Ratings

The first step in considering voltage rating is to determine the maximum, as well as the nominal, voltage the contactor is expected to handle. It is essential that the operating coil voltage is rated to the maximum voltage level to which the contactor will be subjected. For example, a contactor for a battery power supply in a typical 48VDC telephone system must have a coil rated for up to 60VDC in order to withstand the boost charging voltages. Without this rating, coil thermal runaway and coil burnout could possibly occur.

Select the Contactor Type

The configuration of your power distribution unit determines the contactor type: either single pole/on-off (the most common configuration for low voltage disconnect for power distribution systems) or double pole/on-off.

Dimensions

Due to tight installation space requirements, the most robust contactor performance in the smallest possible package is needed. Evaluate the contactor's dimension to assure that you have the smallest attainable footprint.

Important Contactor Options

Since each telecommunications contactor application is customized, a great deal of product flexibility is required. The contactor product offering must pro-

vide a full range of options to meet all application requirements. Following are some of the key options for typical telecommunications applications and their functions:

- Magnetic-Blowouts on tip voltages of 60VDC or greater extinguishes the arc caused by the tips opening at higher voltages.
- The Diode Suppression Network bleeds any coil spikes that could damage equipment. (Such spikes could occur in the operating coil.)
- Bridge Rectifiers are used with the DC operating coil to interface with an AC power supply.
- An Enclosed Top Cover keeps out dust and contaminants from the contact tip area.
- The contactor manufacturer should offer a wide range of standard and customized, prefabricated mounting bracket configurations to meet every installation requirement.
- A Microswitch allows you to interface to an operator panel to show if the status of a contactor is open or closed.

Reputation of the Manufacturer

When considering your contactor applications, you should ask the following questions of the manufacturer:

- How long have they been in business?
- How many units are installed worldwide?
- Are they ISO 9001 certified?
- Do their products meet UL Listings?
- Are they willing to customize or modify their components to meet your specifications?
- Do they charge extra for every modification? Is there a charge for tooling costs? If so, how much?
- Do they provide easy to read and complete technical information?
- Do they provide complete customer service?

Field Serviceability

DC contactors and disconnect switches should be easily serviced and repaired in the field. Cheaper, canned solenoid contactors cannot be serviced and need to be replaced. In the long run, it is more economical and more efficient to be able to perform field service and maintenance on a higher quality unit. Periodic preventive maintenance avoids system downtime and other problems before they affect your operation.

In memory of Morton Nitzberg.