Inside a Power Distribution Unit

Highlights of Conversion, Conditioning, Control, and Monitoring Features in PDUs

The Technologies of Power Distribution

With Marway’s ability to create application-specific PDUs, the PDU becomes an ideal place to consolidate many power management needs of electrical platforms. This includes converting available power to other forms, conditioning incoming power to minimize noise, adding controls for safety and convenience, and integrating monitoring to display power quality and status.

Power conversion technologies allow us to use one power form to create one or more others from it. Whatever your facility doesn’t provide at the wall, we can create it from whatever is available.

Most facilities have imperfections in their power signals which can cause performance problems, or even damage. Marway can integrate conditioning technologies into the PDU using EMI filters, transformers, variacors, and other features to assure a clean and stable power signal to all connected equipment.

Power monitoring with digital displays and status indicators provide confidence that power management needs of electrical platforms are being met. This might include tracking of power quality, power signals which can cause performance problems, or even damage. Marway’s ability to integrate power conversion, conditioning, control, and monitoring technologies, and select perfectly matched components for the job allows for optimization of controls for safety and convenience, and integrating monitoring to display power quality and status.

Connectors

For power, control, IT, and other options, a standard connector is often the best choice. The connectors most often used are the standard NEMA and IEC types, though we use several other specialty types. Signal connectors are quite varied from plastic snap fit type to rugged Mil-Spec circular connectors. Regardless of the signal type, the selection of an appropriate connector is usually driven by compatibility with the equipment being connected to.

Outlet Switching

Outlets can be switched on/off in a number of ways. The simplest is manual control of power through a panel-mounted switch. Manual operation can be also be achieved from remote locations using discrete signals or network protocol commands over Ethernet using a web browser interface.

Once remote signals have been added, then automation of outlet control is also possible. Optim’s RDM Software option provides on/off control of any “outlet,” whether that is a traditional 5-12R or 13-outlet, a 3-phase twist-lock, specific area of a MIL connector, or even screw terminals. To facilitate the on/off control of high voltages or currents, the switching signal can be used to trigger a relay or a solid state control. For example, a networked board can use serial signal (RS-485, CAN) to open and close contacts which deliver high-current/low-voltage power.

Remote EPO

Control signals can provide remote (on/off) control of outlets, and incorporate an EPO circuit. Marway’s Commander remote EPO panel utilizes a standardized control bus to provide these features on PDUs. Using the remote on/off EPO circuit, even multiple PDUs can be controlled in unison.

Surge Suppression

Surge protection is one of the power conditioning technologies. It is used to suppress or divert short duration pulses of excessive voltage on incoming power. These surges are induced by static discharges, lightning, and even upstream equipment on the same circuits.

Transformers

Transformers can also be used to isolate the power in the PDU from the facility. For example, a 240 Vac line that can run through a transformer which also contains a 24V source. While the voltage is the same, the transformer isolates a higher level input signal, thereby conditioning the power signal, isolation also provides extra safety advantages, and can be used to change power form.

EMI Filters

Modern electronic equipment requires clean, stable power free of noise. In order to perform reliably, most facilities have some form of EMI filters which can cause poor performance, incorrect functionality, or even damage. Some equipment connected to the PDU may be sensitive to electromagnetic interference ("noise") on the incoming power signal. This noise can be induced by local equipment, or from other equipment in the facility. EMI filters help reduce EMI influences, and prevent EMI-induced behavior problems. Specific filters can provide general purpose protection, or be selected for specific conditions.

Power Supplies and Inverters

Using power supplies, we can create one voltage from an input source. DC can be used for internal controls, and for power distribution as well. In fact, we can even make more than one voltage to suit multiple needs from the same PDU. Inverters convert power from one ac source to another ac source. Certain environments may have only one ac facility power source. An inverter creates the ac needed to power conventional equipment connected to, or components in, the PDU.

Indicators

As simple as they are, an indicator can provide an operator with key status information very quickly. Size, color, and even replacement parts are common options. After that, uniformly themed warning equipment often dictates specific style selections.

Meters

Meters for voltage, current, and power quality monitoring provide the assurance that current capacities are within limits, and that power quality is meeting equipment needs. Digital meters pack a lot of functionality into a small space, but analog meters can offer a faster assessment of power quality, and are more valuable in the assessment of power quality for mission-critical equipment.

Circuit Breakers

Breakers can be used to protect the PDU as a whole, individual power branches, or even each individual outlet. Breakers can be used on breakers, magnetic, hydraulic, etc. a variety of form factors, different certifications (UL 1077, UL 489), as well as other characteristics. You can count on Marway to select the best fit for the application.

Remote On/Off

As part of the remote on/off EPO system, manual control in the PDU panel allows an operator to determine whether the PDU is controlled remotely or locally. Local-only control provides a safer condition for operators working on the equipment attached to the PDU.