

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 needs into the PDU using EMI filters, transformers, varistors, and other features to assure a clean and stable power signal to all connected equipment.

Control capabilities in PDUs offer a range of options including switches, breakers, remote signals across Ethernet, and even automated switching between power sources. Consolidating power control features into the PDU can help reduce the overall size, complexity, and cost of power distribution.

Power monitoring with digital displays and status indicators provide confidence that downstream equipment is getting what it needs. This might include tracking of power quality, available capacity, and simple on/off status of circuits or outlets.

Marway's ability to integrate power conversion, conditioning, control, and monitoring technologies, and select perfectly matched components for the job allows for optimization not possible with separate third-party products. The result is a solution balanced for space, weight, performance, and cost.

The application depicted in this illustration is hypothetical. The non-Marway products and components depicted are intended to be generic, and do not specifically represent any particular manufacturer or product model. The Marway products shown are also not intended to represent specific models.
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Remote EPO

Control signals can provide remote enable/disable of outlets, and incorporate an EPO circuit. Marway's Commander remote EPO panels utilize 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 suppression is one of the power conditioning technologies. It is used to suppress or divert short spikes of excessive voltage on incoming power lines. These spikes are induced by static discharges, lightning, and even upstream equipment on the same lines.

Transformers

Used to convert one ac voltage to another, a transformer can be used to generate a lower or higher voltage for outlets, or a low voltage source for local and remote control signals.

Transformers can also be used to isolate the power in the PDU from the facility. For example, a 240 Vac inlet can run through a transformer which also outputs 240 Vac. While the voltage is the same, the transformer eliminates a number of signal imperfections, thereby conditioning the power signal. Isolation also provides 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 imperfections in their power signals 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 minimize EMI influences, and prevent EMI-induced behavior problems. Specific filters can provide general purpose protection, or be selected for specific conditions known to be a problem.

Power Supplies and Inverters

Using power supplies, we can create dc voltage from an ac input source. Dc can be used for internal controls, and for power distribution as well. In fact, we can even make more than one dc voltage to suit multiple needs from the same PDU.

Inverters create ac power from dc sources. Certain environments may have only dc as a facility power source. An inverter creates the ac needed to power conventional equipment connected to, or components in, the PDU.

Connectors

For power, control, RF, and other signals, if a connector exists, we can use it. Power connectors most often fall into the standardized NEMA and IEC types, though we use several other specialty types.

Signal connectors are quite varied from plastic snap fit types to rugged Mil-Spec circular connectors.

Regardless of the signal type, the selection of any given 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 directly from the PDU using panel-mounted switches. Manual operation can 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. Optima's RCM Software option provides on/off control of any "outlet" whether that be a traditional 5-15R or C13 outlet, a 3-phase twist-lock, specific pins 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 of compatible capacity. For example, a networked board can use small pilot relays to open and close contactors which deliver high-energy three-phase power.

Remote On/Off

As part of the remote on/off/EPO system, manual control at 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.

Circuit Breakers

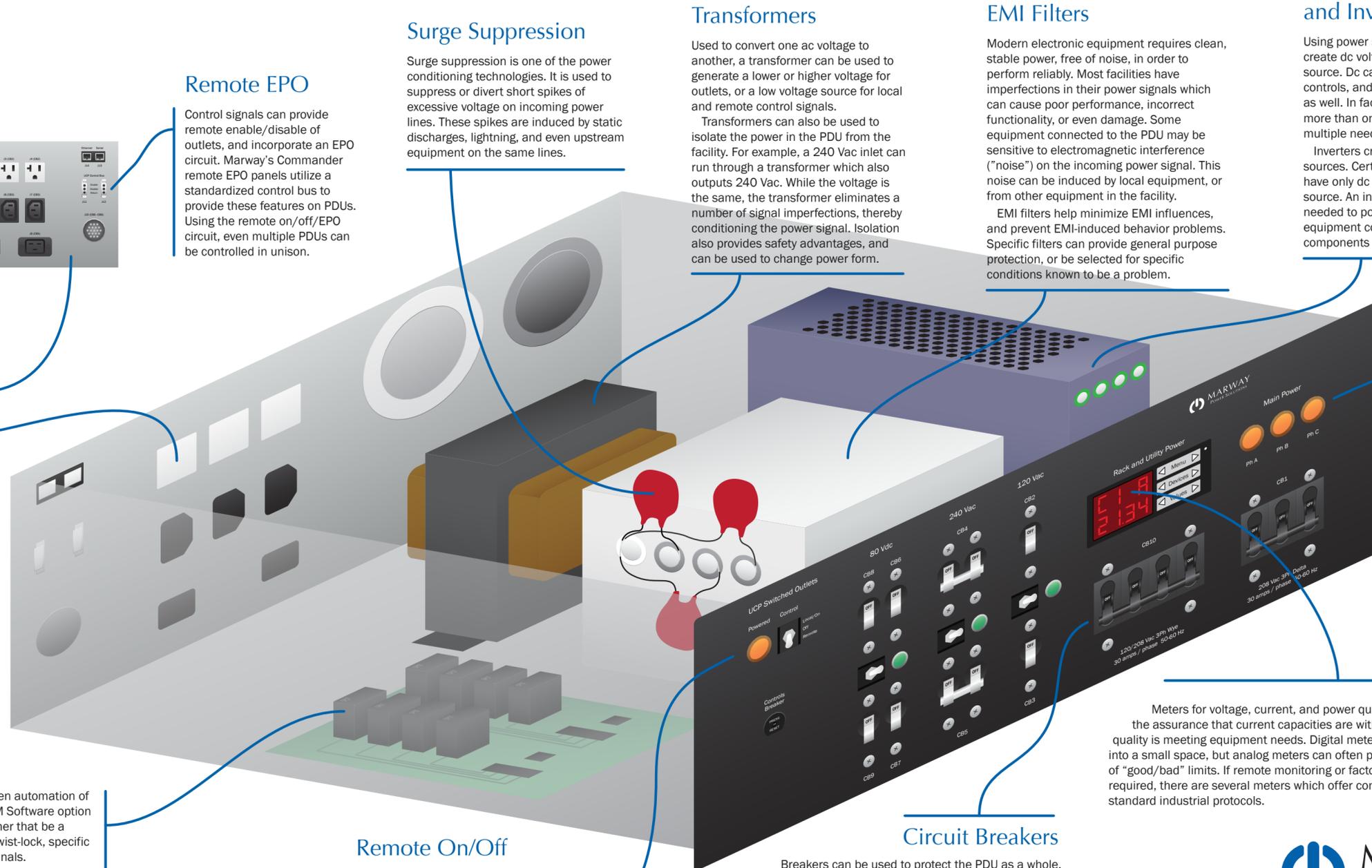
Breakers can be used to protect the PDU as a whole, individual power branches, or even each individual outlet. There are a variety of technologies (thermal, hydraulic magnetic, etc.), a variety of form factors, different certifications (UL 1077, UL 489), as well as other characteristics. You can count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

Indicators

As simple as they are, an indicator can provide an operator with key status information very quickly. Size, color, and even replaceable lamps are common options. After that, uniformity with existing equipment often dictates specific style selections.

Meters

Meters for voltage, current, and power quality monitoring can 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 often provide a faster assessment of "good/bad" limits. If remote monitoring or factory automation integration is required, there are several meters which offer connectivity using a variety of standard industrial protocols.



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