

New Concepts in Panelboards, Safety Switches and Transformers

INTRODUCTION

Eaton Electrical’s Commercial and Industrial Facilities Division (CIFD) is headquartered in Sumter, SC. CIFD electrical products include switchboards, panelboards, lighting control panels, safety switches, dry-type transformers and TVSS.

This newsletter highlights several new products and services exclusively offered by Eaton Electrical.

EZ™ TRIM

Today’s standard panelboard trim uses a painted steel cover bolted to the box which houses the circuit breaker interior. The hinged door for circuit breaker access is attached to this steel cover. Door-in-Door trim, historically includes an additional hinge on the bolted cover allowing for wiring and the addition of circuit breakers without completely unbolting and removing the cover.

The drawback to standard trim is the difficulty in bolting and unbolting the cover. Generally, this requires two persons. Door-in-Door trim solves this issue as the cover is bolted to the box only one time. However, Door-in-Door trim traditionally is more costly.

The new EZ™ Trim is a Door-in-Door panel trim that latches to the box without the use of bolts or loose connecting hardware. No tools are needed and one person can easily mount the trim.

The EZ Trim is available on Cutler-Hammer Powerline 1, Powerline 2, and Powerline 3 panelboards. The ratings of

these panels are shown in Table 1.

Figure 1 shows the patented trim design. As shown in the figure, the outer door panel includes door hangers that fits into slotted channel bolted around the perimeter of the box.



FIGURE 1 - EZ Trim with the Hangers

PANEL	VOLTAGE	MAIN LUG	MAIN BREAKER	BRANCH BREAKERS
PRL1a	240 VAC Maximum	400A	400A	100A - 1,2 or 3 pole
PRL2a	240 or 480/277 VAC	400A	400A	100A - 1,2 or 3 pole
PRL3a	240, 480/277, or 600 VAC	800A	800A	225A - 1,2 or 3 pole

TABLE 1 - CUTLER-HAMMER PANELBOARDS AVAILABLE with EZ TRIM

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Figure 2 shows the hangers mounted and the slotted channel. The door hangers then fit into slots and a box mounted, movable vertical latch located on the opposite side of the hangers, locks the outer door in place when closed.

When the inner door is closed, a metal channel is pushed by the inner door into a slot above the hanger. This prevents the trim from being lift and removed when the inner door is closed and locked.

The advantages of the new trim design are:

- ✓ Trim installs in seconds rather than minutes
- ✓ One person can easily install the trim
- ✓ Door-in-Door is standard
- ✓ No tools needed
- ✓ Sharp edges are eliminated
- ✓ No exposed hardware
- ✓ Ability to adjust the flush box to an irregular wall

Safety is another advantage of the new EZ trim.

Traditional back boxes are constructed of laser cut galvanized steel. A characteristic of this construction is sharp edges which often results in cuts and injuries during the installation process.

As seen in Figure 2, the channel mounted around the perimeter of the back box is *painted steel*. This eliminates the sharp edges thus greatly reducing the possibility of injury during installation.

The simplicity of installation makes complying with OSHA construction regulations easier. OSHA requires energized electrical panels to have the covers installed. The only exception is when direct wiring connections are being made. This rule is violated when plastic sheets or card board are used to cover the panel interior.

Most often, this regulation is enforced after normal construction hours. However at large construction sites where OSHA has a daily presence, the regulations are enforced at all times - not only after working hours. Therefore the



FIGURE 2 - EZ Trim with the Box Channel

panel trim must be installed at all times except when persons are working in the panel. All electrical panel trim covers can be reinstalled after panel wiring is completed making OSHA compliance easy therefore avoiding costly safety fines.

The new EZ Trim is available November 15, 2005. Eventually, this new door-in-door trim will be the standard Eaton Cutler-Hammer trim offering.

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AUXILIARY POWER HEAVY-DUTY SAFETY SWITCH

The National Electric Code (NEC) section 210.63 requires a 125VAC single phase, 15 Amp or 20 Amp receptacle within 25 feet of HVAC equipment. Further, this code change mandates the receptacle not be powered from the load side of the equipment disconnect switch.

For ease of compliance with this code, Cutler-Hammer has developed a specialty safety switch with an integral 120VAC receptacle fed from transformer. The 120 VAC transformer is protected by a molded case circuit breaker (240 VAC version) or a fuse block (480 VAC version).

Figure 3 is the “all-in one” auxiliary power safety switch, which includes a disconnect switch with either a pull-out fuse block (480VAC) or a circuit breaker (240VAC), transformer to supply 120VAC to the receptacle, the receptacle itself, a molded case circuit breaker to protect the transformer, and a fuse to protect the receptacle.

This panel is available through a Cutler-Hammer distributor and is suitable for outdoor applications.

Features include:

- 30 – 100 ampere main switch ratings.
- 208, 240, 480 and 600VAC auxiliary circuit primary voltages.
- Available in fusible and non-fusible.
- 2 kVA control transformer for thermal margins required for rooftop installations and stepping down to 120 volts
- Secondary fusing for control transformer (time-delay to handle high inrush currents).
- External commercial-grade GFI receptacle.
- In-use weatherproof receptacle cover.
- Gasketed NEMA 3R outdoor enclosure.
- 100 kAIC at 208 and 240 volts.
- 200 kAIC at 480 and 600 volts.
- UL listed File No. E5239.
- Suitable for unistrut or wall mounting.



FIGURE 3 - AUXILIARY POWER HEAVY-DUTY SAFETY SWITCH

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FEDERAL ENERGY POLICY ACT of 2005

On August 8 of 2005, congress pass and the president signed the Energy Policy Act of 2005. This law has several detailed measures which target reducing energy consumption by making facilities more energy efficient.

The law specifically targets electrical distribution transformers establishing the NEMA TP-1 2002 energy efficiency standard for compliance. The law also references the NEMA TP-2 1998 testing procedure for validation of transformer efficiency. The U.S. Department of Energy's Energy Star® program designates those transformers that meet the NEMA TP-1 energy efficiency requirements, as shown in Table 2.

The Energy Policy Act defines transformers requiring NEMA TP-1 compliance as:

1. Input voltage of 600 Volts or less
2. Output voltage of 600 Volts or less
3. Operating frequency of 60 Hertz

This definition applies to distribution class transformers *including K rated and harmonic mitigating transformers*.

However, the Energy Policy Act specifically excludes the below transformers from the above definition of "distribution transformers":

- Drive isolation transformers
- Auto-transformers
- Non-distribution transformers such as UPS system transformers
- Grounding and testing transformers

KVA Rating	Required Efficiency
15	97.0
30	97.5
45	97.7
75	98.0
112.5	98.2
150	98.3
225	98.5
300	98.6
500	98.7
750	98.8

TABLE 2 - NEMA TP-1 Efficiencies at 35% Load

- Machine tool, welding, or test transformers
- Sealed and non-Ventilated transformers
- Transformers with a tap range greater than 15%
- Transformers below 15kVA

Given the above definition and exceptions, the Energy Policy Act targets general purpose, dry-type transformers. Further, the law requires the NEMA TP-1 designation.

The practical effect of this law is all facilities now require NEMA TP-1 (Energy Star) rated distribution transformers **effective January 1, 2007**.

Cutler-Hammer's product offering includes a complete line of general purpose dry-type, K-factor, and harmonic mitigating transformers all with the Energy Star label.