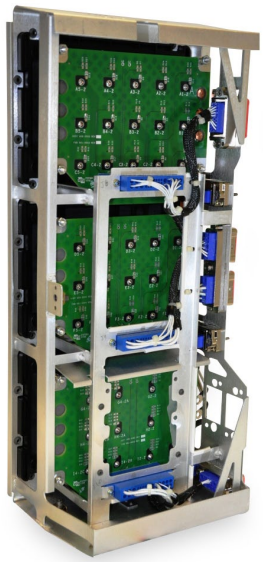

Eaton's New Plug-In Circuit Breaker Panel Offers Weight Savings, Flexible Configurations, Enhanced Thermal Efficiency and Ease of Maintenance

Eaton's new patent pending plug-in circuit breaker panel was developed for a broad range of aerospace applications and replaces the bulky labor intensive conventional circuit breaker panels. The result is an easy to maintain approach that offers significant weight savings, enhanced thermal efficiency and a readily customizable approach to circuit protection.

Eaton modified its standard and Arc-Fault circuit breaker portfolio to support a socket and pin mounting scheme; that allows individual circuit breakers to be installed or replaced without mounting hardware, wiring, exposed buss work, or specialized tools. The technology is similar to small plug in type relays or connectors and the circuit breakers mount directly on an engineered thermal matrix that makes the electrical connections without exposed wiring terminations or the need for tedious mounting hardware.

The new design eliminates traditional exposed internal point-to-point wiring, embeds the traditional buss work, and is readily modifiable without wire routing, buss work or mounting concerns.

- Significantly reduces behind the panel depth
- Virtual wireless design, eliminates wire looms, busses, and mounting hardware
- 30% to 40% weight savings compared to conventional panels
- Operates 40°C cooler compared to conventional panels
- Easier to install and maintain, with higher reliability
- Integrated panel lighting options
- Options for breaker status monitoring and reporting

Conductive Matrix

Eaton's plug-in circuit breaker eliminates point-to-point wiring by embedding the current buss work within an engineered material that is thermally conductive and electrically isolated. The thermally conductive material is much more resilient than a printed circuit board assembly, withstands much higher temperatures, and spreads the heat loading across the entire assembly.

Embedding the buss work in this material eliminates hot spots, reduces operating temperatures, and allows for weight optimized power dissipation networks. It also reduces the required panel depth and eliminates the need for epoxy and shields. By reducing the size of the buss work and isolating them from FOD, this eliminates the heavy and bulky individual interconnect wire looms, exposed terminations, and buss work found in conventional circuit breaker panels. It also creates a uniform error proof circuit breaker panel assembly that is easier to install, maintain, and is more reliable.

Faster Assembly, Better Access

Eaton's re-configurable panels are built in layers to facilitate ready assembly and ease of access to circuit breakers. This significantly reduces the assembly time of a circuit breaker panel. Stand alone line replaceable units can be readily mounted in a power distribution box or aircraft with all of the electrical connection in an embedded connector. This significantly reduces circuit breaker replacement time.

Any individual circuit breaker can be removed, upgraded, or replaced from the front of the panel. The traditional panel mounting hardware and terminal hardware is eliminated with no wiring terminations to identify or add; the entire process can be completed in less than 5 minutes with a single screw driver. The new design allows easy configurability with customized faceplates, frames, terminal blocks and connectors.

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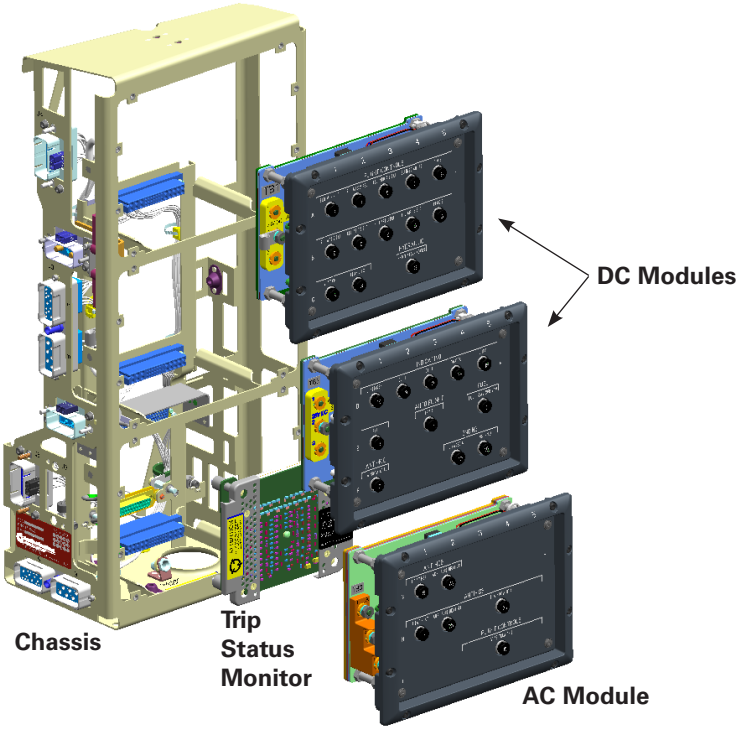
Improved Panel Lighting

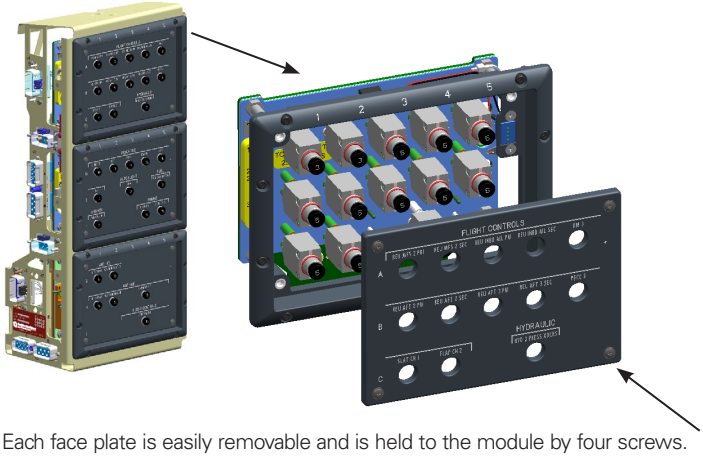
Eaton offers an illuminated panel option in which the circuit breaker nomenclature can double as illumination. This lighting can be a very thin electroluminescent label or for more stringent applications can be a customized LED acrylic faceplate commonly used in aerospace cockpits. The LED and its controlling circuit board is embedded in the illuminated faceplate and can be readily replaced or modified as a line replaceable unit for customization or repair.

Module Options

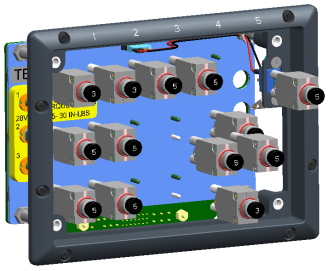
Eaton's plug-in circuit breaker modules are available in various forms and are modularized to reflect unique application configurations along with built-in spares capability. Electronics for illumination, circuit breaker status monitoring, and data buss status reporting can also be integrated into the plug-in circuit breaker assemblies developed by Eaton.

Circuit Breaker Panel





Each face plate is easily removable and is held to the module by four screws.



Removal of the face plate exposes the plug and play patented circuit breaker design.

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