

UL 489/CSA C22.2 No.5 Standard—Branch Circuit Protection

An OEM product as a whole must be appropriately protected from overcurrent conditions, either by connection in the field to a protected branch circuit (in accordance with NEC) or by inclusion of branch circuit protection within the product itself. In the United States, these branch circuit protection devices must comply with the UL 489/CSA C22.2 No.5 Standard for Molded-Case Circuit Breakers. (see UL 489/CSA C22.2 No.5 No. 1 in Figure 3, which is a drawing of a hypothetical piece of OEM equipment requiring multiple protection devices.)

Applications Requiring UL 489/CSA C22.2 No.5 Listed Circuit Breakers

In some instances, the protective devices being installed in equipment must comply with UL 489/CSA C22.2 No.5. These include the following situations:

1. If a circuit such as a convenience receptacle could leave the equipment, that circuit must be protected by a UL 489/CSA C22.2 No.5 branch circuit protection device (see UL 489/CSA C22.2 No.5 No. 2).
2. If a circuit such as to an external motor could leave the equipment, that circuit must be protected by a UL 489/CSA C22.2 No.5 branch circuit protection device (see UL 489 No. 3).
3. Motors within the equipment should also be protected by a UL 489/CSA C22.2 No.5 device (see UL 489 No. 4).
4. All equipment which requires HACR (Heating, Air Conditioning, and Refrigeration) rating must be protected by a UL 489/CSA C22.2 No.5 branch circuit protection device (see UL 489 No. 5).

NOTE: The motor control circuit may be protected by a UL 1077 device. *It must also have over current protection even though there is a UL 1077 device downstream.*

In general, a UL 489/CSA C22.2 No.5 circuit breaker could also be used in any application for which a UL 1077 device is allowed, since the UL 489/CSA C22.2 No.5 devices meet or exceed the requirements of UL 1077 devices. The converse of this is not true, since UL 1077 devices cannot meet the more stringent UL 489/CSA C22.2 No.5 Standard.

UL 1077 Standard—Supplementary Protection within the Product

Within the OEM product itself, additional (supplementary) protection for sensitive or critical internal circuitry may be provided by one or more supplementary circuit protectors. A supplementary protector is an overcurrent protection device which is specifically designed for OEM applications and which complies with UL 1077 Standard for Supplementary Protectors for Use in Electrical Equipment.

Under UL 1077, supplementary protectors may be used under the following conditions:

- When branch overcurrent protection is already provided
- If short-circuit protection is needed for sensitive devices within the equipment
- When wiring connected to the supplementary protector does not exit the equipment to external devices such as receptacles or motors
- If the UL 1077 device does not provide the only means of disconnecting the product

The following applications illustrated in Figure 3 allow the use of UL 1077 supplementary protectors:

- The supplementary protection is used to supplement or provide additional protection to sensitive components inside the equipment (see UL 1077 No. 1). A UL 489/CSA C22.2 No.5 circuit breaker must be located upstream from the equipment.
- Critical or sensitive internal circuitry (see UL 1077 No. 2) such as: Computers and microprocessors, communications equipment, electronic controllers, power supplies and many other types of equipment
- Motor control circuits may be protected by a UL 1077 device, unless the circuit includes a transformer (in which case a UL 489/CSA C22.2 No.5 device is required).

Figure 3: Guidelines for Application of UL 489 Circuit Breakers and UL 1077 Supplementary Protectors

