

Using Residual Current Breaker Panels (RCBO): RCB8-40-10-10-CE Frequently Asked Questions

Please note that Lutron is actively investigating solutions that allow for the most efficient handling of the new Residual Current Device (RCD) requirements of the IEE 17th Edition UK Electrical Wiring Regulations.

What are RCBO breakers and what purpose do they serve?

An RCBO (Residual Circuit Breaker with built-in Overload protection), like an RCD, is a breaker designed to disconnect a circuit whenever it detects an imbalance of electrical current between a phase “Live” and neutral conductor. This kind of imbalance can be detected as leakage from earth/ground where the RCBO is designed to break the connection in time to prevent or reduce the risk of electric shock. The difference between an RCBO and an RCD is that the RCBO combines earth leakage protection with additional overload and short-circuit protection.

How do RCBOs work?

RCBOs are designed to prevent or limit electrical shock by detecting the current balance between Line and Neutral. The sum of all supply and return currents must be equal to zero. The RCBO will open its contacts if it detects a leakage of current coming from earth/ground or another source. In addition to detecting residual currents, RCBOs break power in short-circuit and overload conditions. When detecting residual currents, RCBOs are typically designed to break power at 30 mA within less than 40 milliseconds, preventing serious electric shock.

What is the difference between this panel and the PBK8-40-10-10-CE ?

The main difference between RCB8 panels and PBK8 panels is that the RCB8 panels use 10 A RCBO input breakers, instead of 13 A standard breakers.

When do I need to use this panel?

This panel should be used when you have circuits that require RCD protection or a combination of earth-leakage protection and overload protection. Please note that although the regulations call for RCD protection of certain circuits, RCBOs meet these requirements without sacrificing short-circuit and overload protection.

Understanding the IEE 17th Edition—UK electrical wiring regulations.

There have been some changes in electrical wiring regulations since the IEE 16th Edition. The new changes now require RCD protection for certain circuits based on use and installation.

Bathrooms (section 701.411.3.3):

The changes require RCD protection of circuits serving bathrooms. There are some experts that interpret this section as only requiring RCD protection on circuits serving defined zones in a bathroom; however, other experts claim it applies to all circuits in bathrooms. Consult your local electrical code for details.

General circuits (section 411.3.3):

The changes require RCD protection on all circuits serving socket-outlets rated up to 20A intended for general-use and mobile equipment rated up to 32A for outdoor use.

Other circuits (sections 522.6.6, 522.6.7, and 522.6.8):

Changes have been made regarding how cable must be protected, adding RCD protection in particular installations.

Four basic ways to provide protection of circuit cabling as described in the regulations:

1. Installing cable at least 50 mm deep.
2. Mechanical protection (conduit or the like).
3. Special routing of cables within specifically defined zones - so called "safe zones".
4. RCD protection (new).

Two characteristics of installations determine which protection method(s) are acceptable:

1. Supervised or unsupervised.
2. Metallic parts in the walls.

Here is how these interplay:

- A.** When installed at least 50 mm deep, and the walls do not contain metallic parts, the cables in supervised or unsupervised installations require no further protection (No RCD's, no mechanical protection, no special cable routing).
- B.** When installed at least 50 mm deep, and the walls contain metallic parts, the cables in unsupervised installations must be mechanically protected or RCD protected.
- C.** When installed <50 mm deep, whether or not walls contain metallic parts, the cables in supervised installations must be routed within "safe zones" or mechanically protected.
- D.** When cables are installed <50 mm deep, whether or not walls contain metallic parts, the cables in unsupervised installations must be routed within "safe zones" and mechanically protected OR routed within "safe zones" and RCD protected.

Important Notes

Codes: All wiring must be installed in accordance with all local and national electrical codes.

Cooling: This equipment is air-cooled. Mount in a place where the vented cover will not be blocked. Clearance of 30 cm (12 in) is required in front of the unit.

Environment: This unit is intended for indoor use only.

Mounting Location: Modules will hum slightly and internal relays will click while in use. Mount in a location where such noise is acceptable.

Mount panel so that mains voltage wiring will be at least 1,8 m (6 ft) from audio or electronic equipment and its wiring.

Installation

1. Mount Rough-In Enclosure using one of the following methods (mounting hardware is not provided):

- Surface Mount—Use keyholes shown in Figure 2 with bolts sufficient for 45 kg (100 lbs) load (M6 (1/4 in) bolts recommended).
- Recess Mount—Use screws sufficient for 45 kg (100 lbs) through the corners of the panel. Mount panel flush to or not more than 3 mm (1/8 in) below the finished wall surface. Enclosure is 9,8 cm (3 7/8 in) deep past cover mounting holes. Enclosure cover dimensions are 161 cm x 47 cm (63 3/8 in x 18 1/2 in).



WARNING: Locate and lock supply breakers (MCB) in the OFF position before wiring to power terminal blocks. Wiring with the power ON can result in serious personal injury or death.

2. Run power wiring (220-240 V~) into the panel. Locations to run power wiring into the panel are shown at right (Figure 3). The main circuit breaker (MCB) is a 4 pole, 3 phase and will accept wire up to 35 mm² (2 AWG) as shown in Figure 1 below. Tighten circuit breaker (MCB) to 3 N•m (2,2 in-lbs). Do not overtighten.

Figure 1—Power Wiring

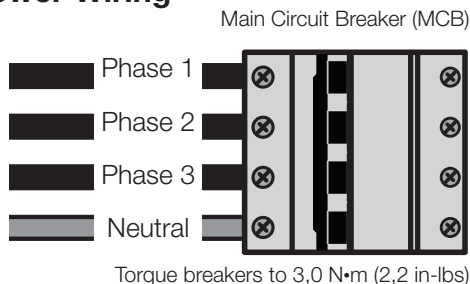


Figure 2—Panel Dimensions

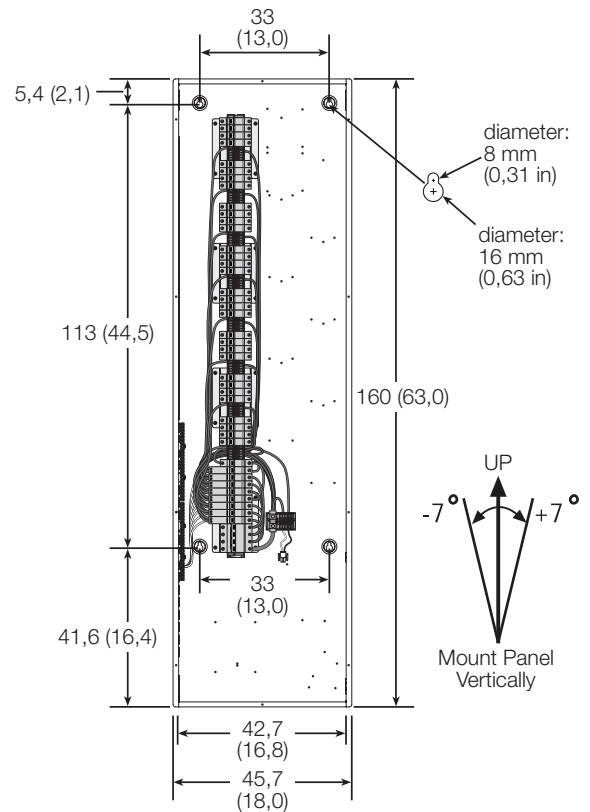
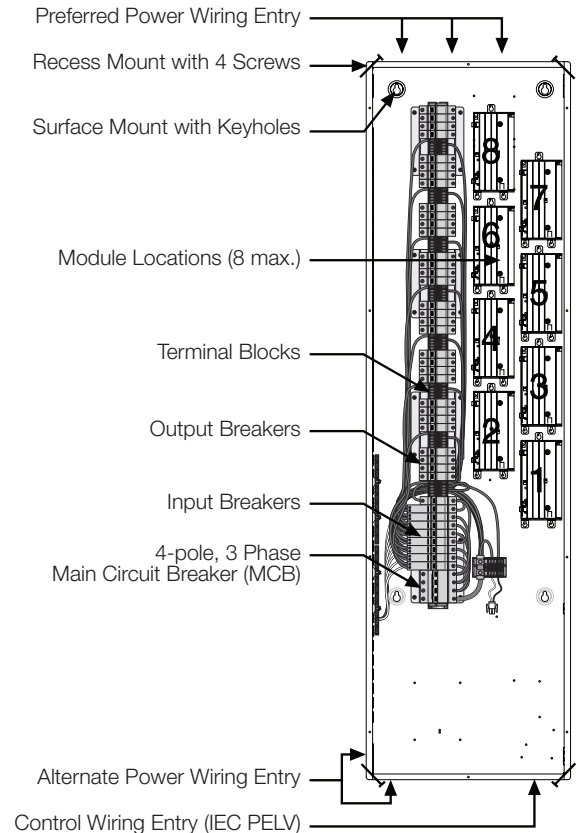


Figure 3—Wire Entry and Panel Mounting



3. Install load wiring. Dress the wire to the left side of the terminal blocks (modules will be to the right of the terminal blocks as shown in Figure 3). Terminal blocks will accept one 4,0 mm² (12 AWG) wire or two 1,0 mm² to 1,5 mm² (18 AWG to 16 AWG) wires. Tighten terminal blocks to 0,40 to 0,57 N•m (3,5 to 5,0 in-lbs). Do not overtighten.

Each module controls up to 4 loads. Wiring for the HW-RPM-4A/4U-LL-230 modules is shown in Figure 5.

Label each wire clearly as you wire to the terminal blocks.

NOTE: The total combined load of all four circuits in an HW-RPM-4A/4U-LL-230 module must be 10 A (2 300 VA) or less. No individual output of the HW-RPM-4A/4U-LL-230 module may exceed 10 A (2 300 VA). Exceeding these maximums can damage the module.

4. Test all load wiring. Turn on input power to the module locations using the module circuit breakers (shown in Figure 3). The pre-installed bypass jumpers will distribute power to each load and **MUST NOT** be removed until after all loads are fully tested and all modules are installed. Check all connected lighting to ensure it is on. If a circuit breaker trips, a wiring error exists and must be resolved.

NOTE: Do not remove bypass jumpers at this time. They will be removed after the modules are installed.

5. Install cover. Ensure vents are on the right hand side of the cover, over the module area. Tighten cover screws to 2,3 N•m (20 in-lbs). If a processor or module interface has not been installed, leave this instruction sheet in the enclosure.

Figure 4—Load Wiring

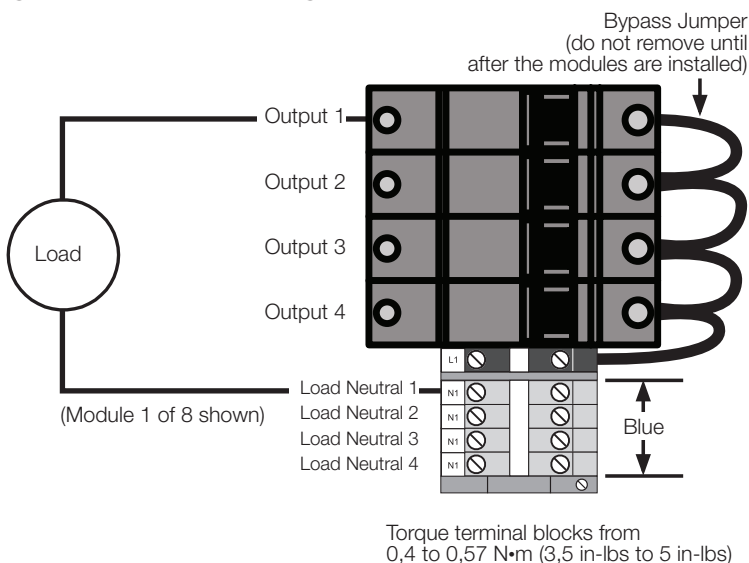
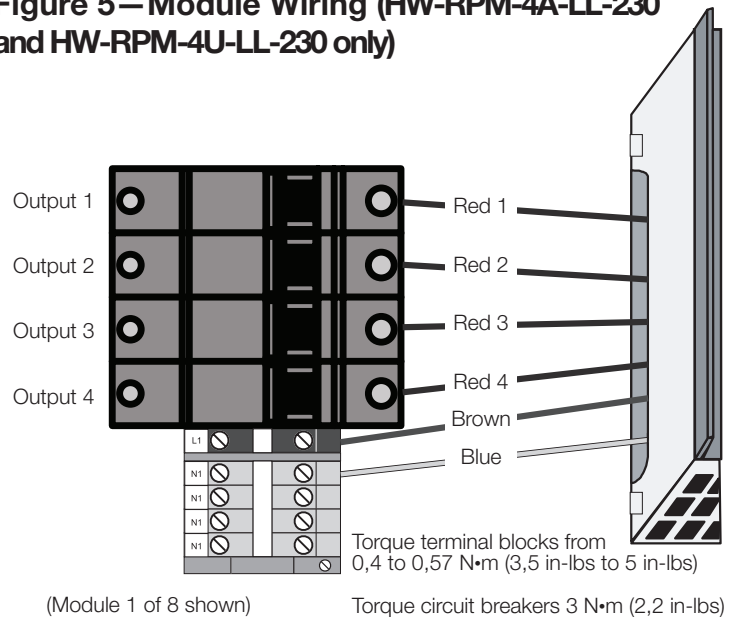


Figure 5— Module Wiring (HW-RPM-4A-LL-230 and HW-RPM-4U-LL-230 only)



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