

Technical Note TN194

**Conversion from PE cell controlled power to 24/7 power
and electrical clearance hazard remediation for Rate 3
switchboards**

July 2023



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1 Purpose

This technical note provides guidance on the conversion of PE cell controlled power to 24/7 mains controlled power and the removal of screws from the facing escutcheon plate for Department of Transport and Main Roads-owned Rate 3 switchboards. With the upcoming rollout of the new road lighting control management system (CMS) and smart lighting controllers (SLCs) on the department's Rate 3 lighting network, there is a need to change the department's Rate 3 streetlights to 24/7 power so the full benefits of the CMS can be realised. The aim is to provide an interim guide for combined safety retrofit and changeover to 24/7 power on Rate 3 switchboards for projects retrofitting existing installations with new light emitting diode (LED) luminaires and SLC retrofits where LEDs have already been installed.

2 Background

During trial phases of the road lighting CMS, it was recognised that 24/7 power to all Rate 3 road lighting poles will be required to achieve the maximum benefits that the CMS can offer. Having 24/7 power activated where SLCs have been installed on LED luminaires allows for full-time monitoring and management of the Rate 3 road lighting network. Additionally, a safety risk has been identified that, with enough pressure placed on the facing escutcheon plate, the installation could create an active connection to the escutcheon plate via the label screws, causing a significant safety risk. This changeover should be included as part of the LED luminaire retrofit activities when SLC's are being installed. It is important to note that this technical note only applies to Sites undergoing a LED or SLC retrofit. Where new Sites are installed with LED luminaires and SLCs, the relevant department Standard Drawings (www.tmr.qld.gov.au/business-industry/Technical-standards-publications/Standard-drawings-roads) or Rate 3 switchboard wiring shall be followed.

3 Definitions

Term	Definition
SLC	Smart Lighting Controller
CMS	Control Management System
RATE 3	Public lighting supplied, owned, installed and maintained by the Department of Transport and Main Roads.
EMPC	Electrical Maintenance Performance Contract

4 Procedure for escutcheon plate screw removal safety retrofit

Logix has developed two different kits for use on the escutcheon plate screw removal safety retrofit.

Kit 1 – is to be used where the PE cell circuit is being removed to convert the Site to 24/7 power.

Pack includes:

- 1 x Label with poles labelled 1 to 12 (including a black dot where it is expected the new holes should be drilled, noting the need to check exact positions as position of screw holes can vary)
- 6 x rivets 2.4 mm stainless steel x 5.5 mm long
- 3 x pole filler, and
- 1 x PE cell blank – stainless steel.

Logix part number R3L/RFK/T1 to order packs from Logix.

Kit 2 – is to be used where the screws and labels are to be removed as part of the Periodic Verification works.

Pack includes:

- 1 x Label with poles labelled 1 to 9 and PE cell circuit labelling (including a black dot where it is expected the new holes should be drilled, noting the need to check exact positions as position of screw holes can vary), and
- 6 x rivets 2.4 mm stainless steel x 5.5 mm long.

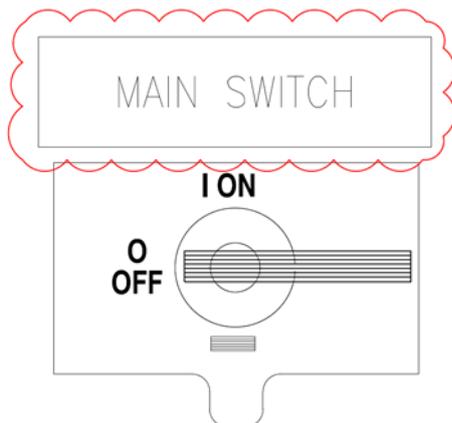
Use Logix part number R3L/RFK/T2 to order packs from Logix.

Prior to attending Site, the Contractor will need to ensure that they have the correct Logix supplied kit available for the intended Works. Both kits will come with all required parts, labels and installation manual.

Isolate main switch and perform the works as outlined.

Figure 4(a) illustrates the main switch.

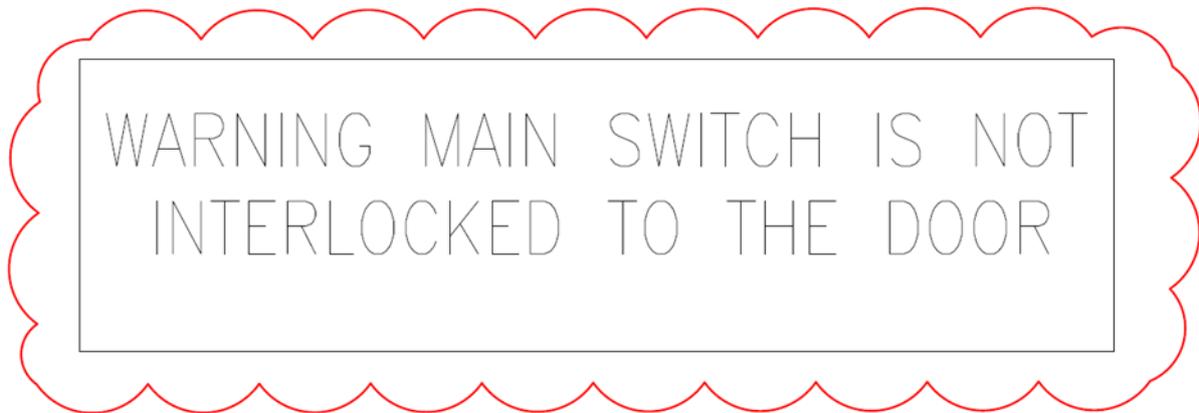
Figure 4(a) — Main switch and label modification



- Remove screws from existing label and replace existing screws with 2.4 mm stainless steel x 5.5 mm long rivets.
- Rivets are to be installed so that the flat head of the rivet is installed from the rear of the escutcheon plate.

Figure 4(b) illustrates the warning label.

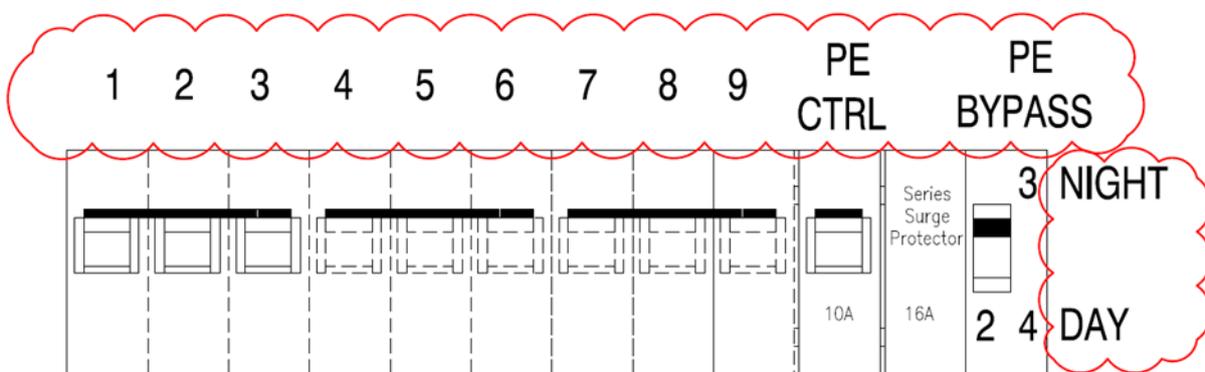
Figure 4(b) — Warning label



- Remove screws from existing label and replace existing screws with 2.4 mm stainless steel x 5.5 mm long rivets.
- Rivets are to be installed so that the flat head of the rivet is installed from the rear of the escutcheon plate.

Figure 4(c) illustrates the circuit protection and day / night labels.

Figure 4(c) — Circuit protection and day / night labels



If performing PE cell change over works:

- Remove existing screws and labels.
- Replace existing circuit numbering label with new Logix supplied label from Kit 1 package.
- Install new label as per Kit 1 package instruction manual.

If performing periodic verification works:

- Remove existing screws and labels.
- Replace existing circuit numbering label with new Logix supplied label from Kit 2 package.
- Install new label as per Kit 2 package instruction manual.

5 Procedure to change from PE cell controlled power to 24/7 power for post top mounted switchboards built to current Standard Drawings

Figure 5(a) illustrates the main switch.

Figure 5(a) — Main switch

- a) Isolate main switch.

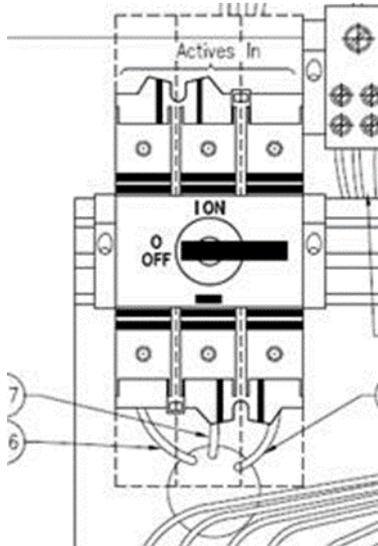


Figure 5(b) parts 1 and 2 illustrates disconnection and sealing of the PE cell.

Figure 5(b)(Part 1) — Disconnect the PE cell

- b) Disconnect PE cell cabling and remove PE cell from the switchboard cabinet. Refer Section 6 for PE cell removal on ground-mounted pillars.

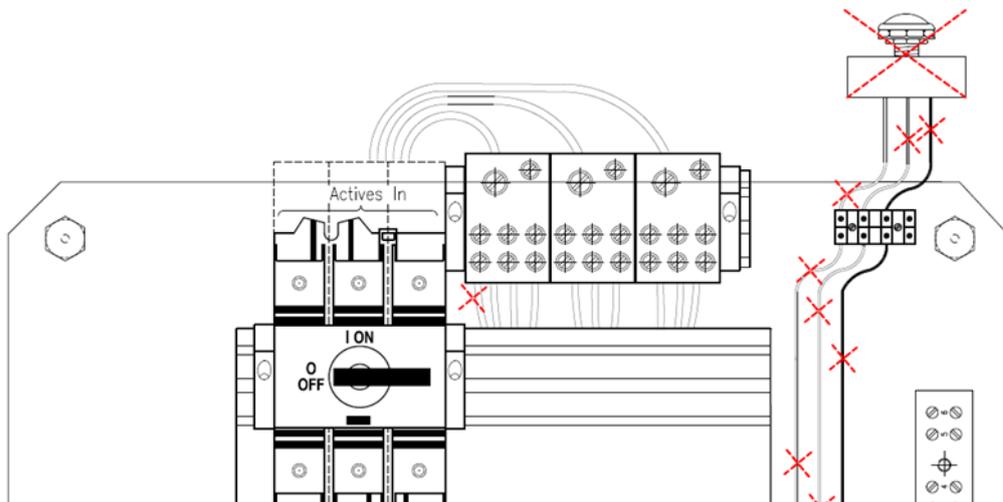
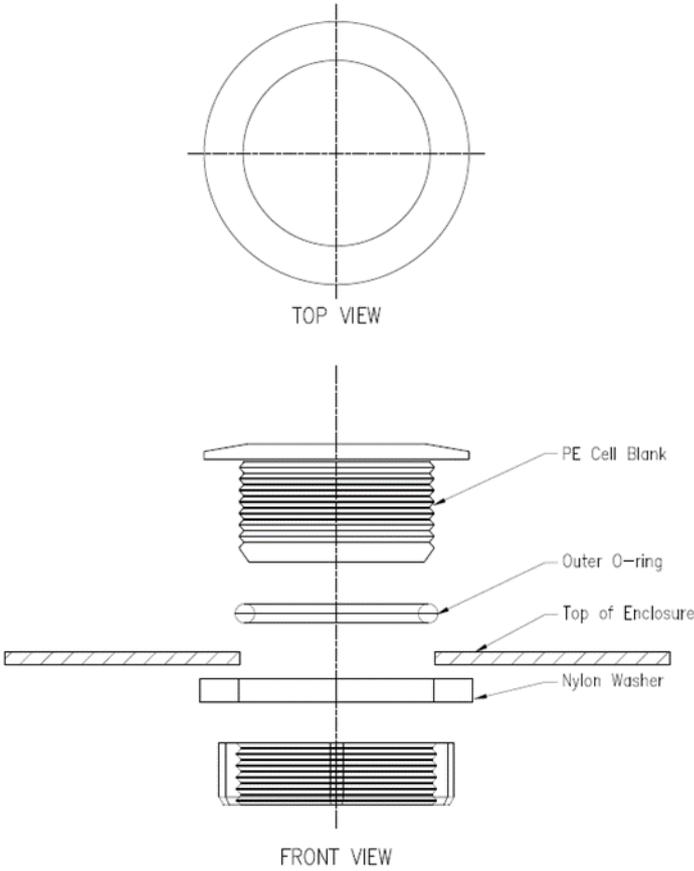


Figure 5(b)(Part 2) — Hole left by the PE cell

The hole left by the PE cell removal is to be sealed via a Logix engineering-supplied blanking plug as per assembly sequence following.



ASSEMBLY SEQUENCE
FOR PE CELL BLANK

Figure 5(c) illustrates removal of the PE cell circuit breaker.

Figure 5(c) — Remove PE cell circuit breaker

- c) Remove PE cell circuit breaker, day / night switch, surge protector, contactors and cabling from switchboard. Refer Section 6 where 10-way busbars are present.

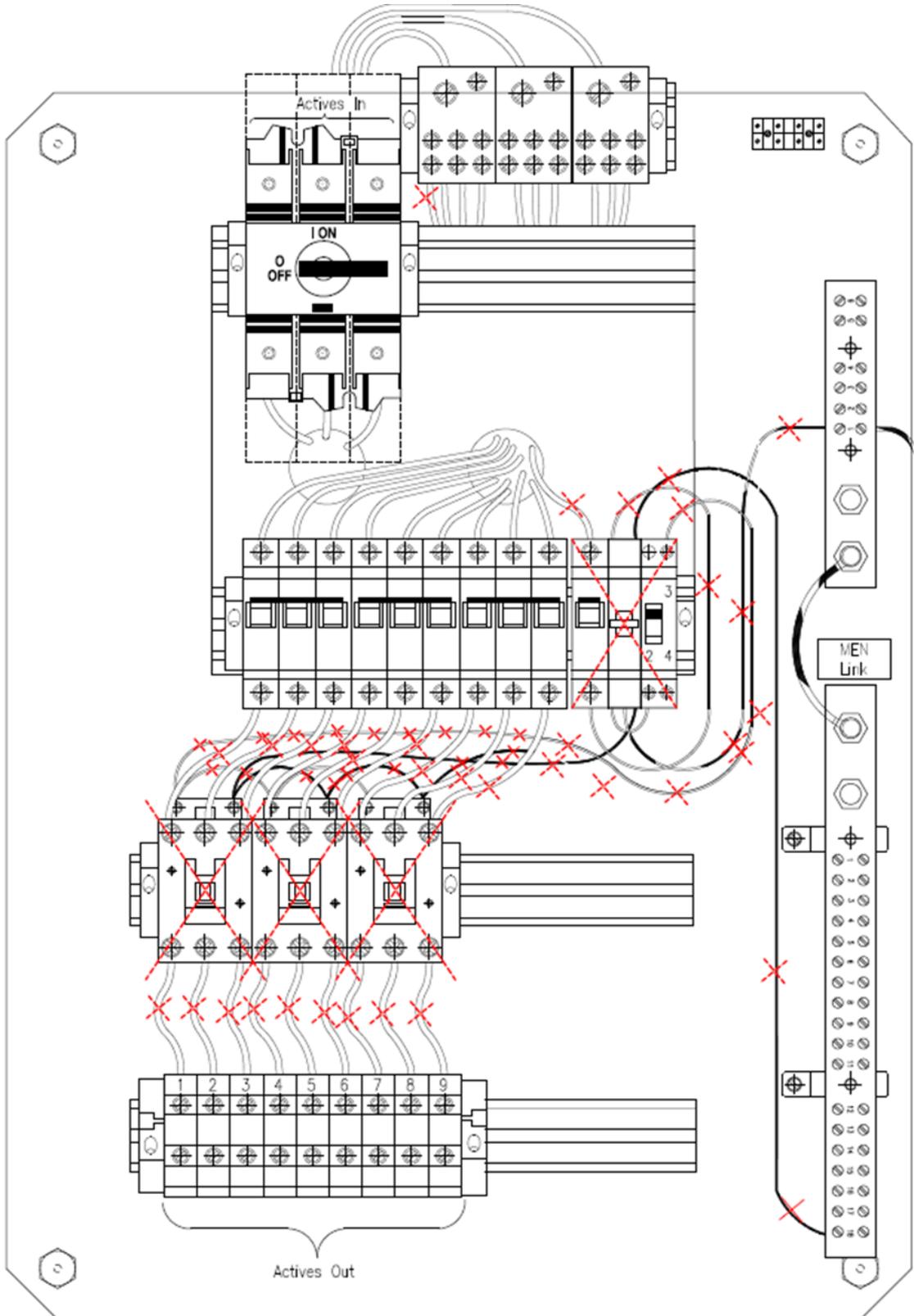
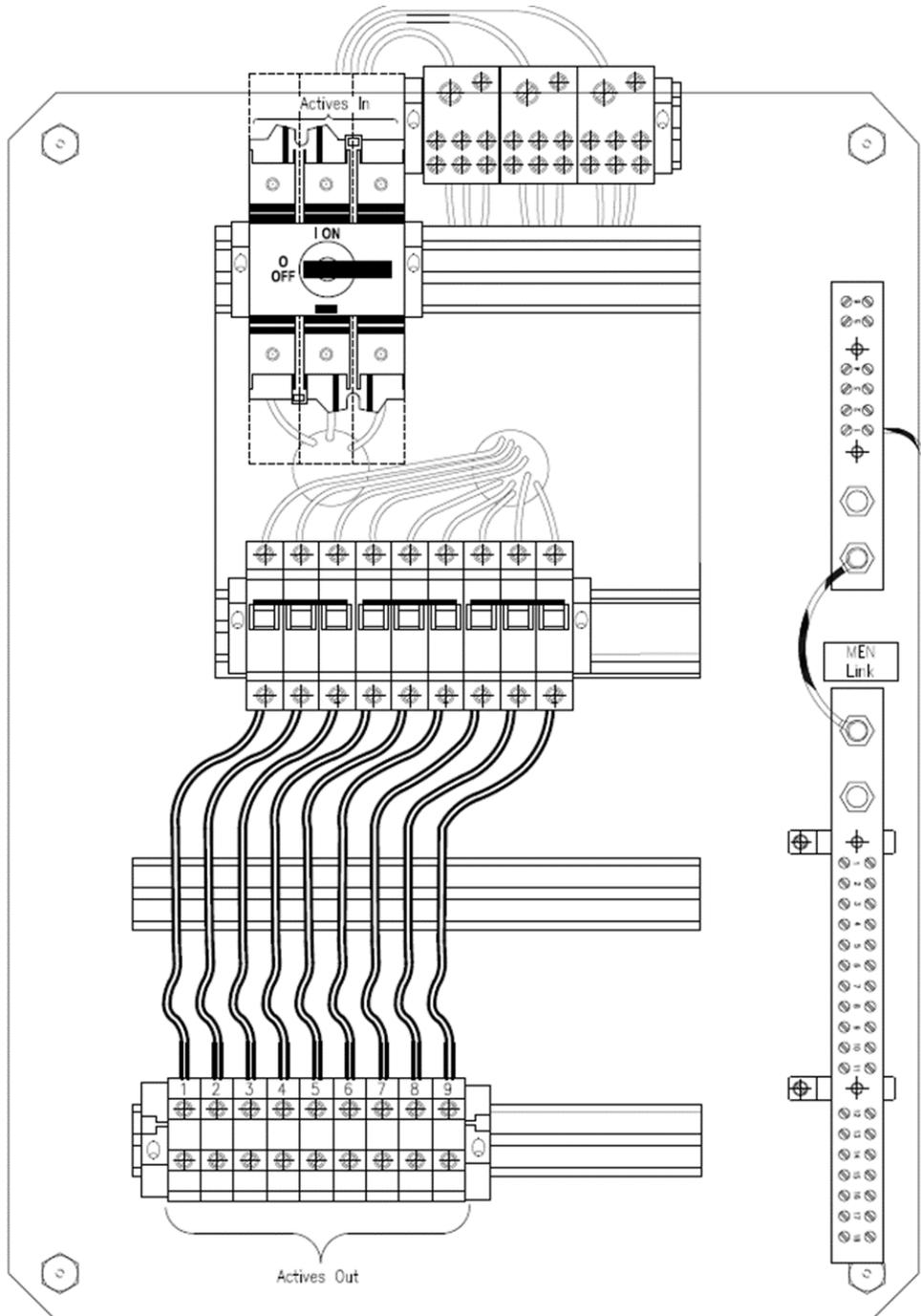


Figure 5(d) illustrates installation of required copper cable.

Figure 5(d) — Install required length

- d) Install required lengths of 6 mm² copper cable and reconnect each circuit to 'active out' field terminals. The 6 mm² copper cable links shall be colour matched to the connected phase if modifying 3 phase switchboards.



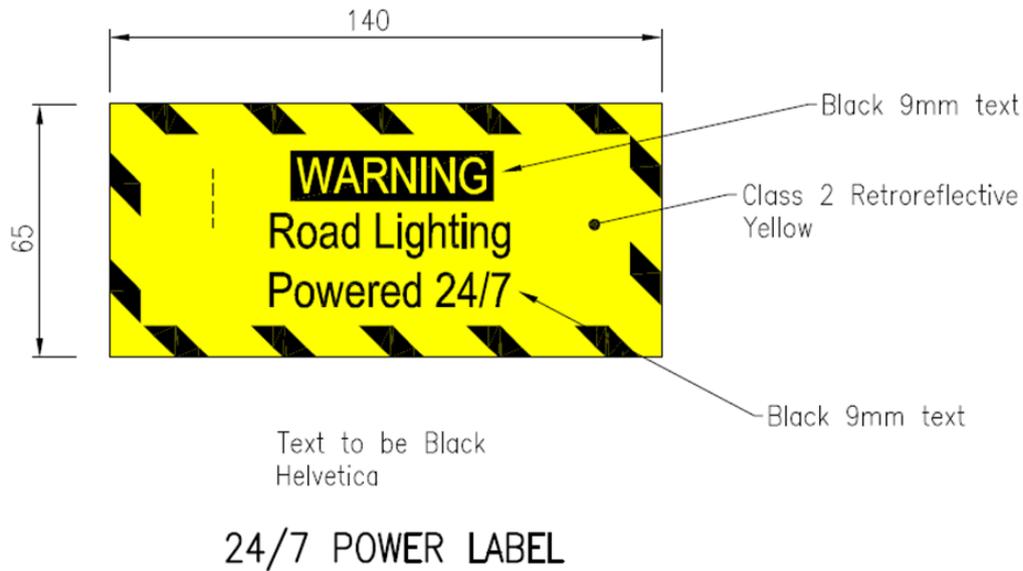
Remove all reference to PE cell:

If not complete already, remove existing labels that reference PE cell circuit operation (night / day, PE cell and Surge labels / plate) from escutcheon plate. As per Section 4, use Kit 1 Logix Label replacement and follow supplied instructions. Install pole fillers over removed hardware.

Figure 5(e) illustrates installation of the warning sticker.

Figure 5(e) — Install warning sticker

- e) Install warning sticker on the escutcheon plate inside the switchboard 'Road Lighting Powered 24/7'.

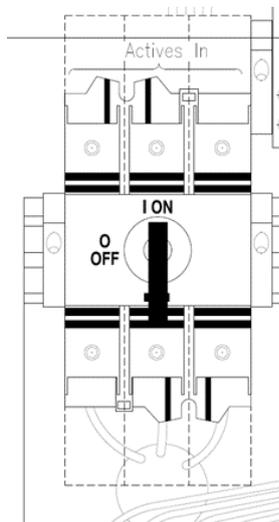


Undertake testing to ensure circuit connections are correct.

Figure 5(f) illustrates re-energising the main switch.

Figure 5(f) — Re-energise

- f) Re-energise the main switch.



- g) Once SLCs have been installed on Site:
 - i. complete red pen mark-up As Constructed and note on plans that the road lighting circuits have been converted to 24/7, and
 - ii. complete certificate of test and note in comments that road lighting circuits are now powered 24/7.

6 Procedure to change from PE cell controlled power to 24/7 power for post top mounted switchboards with 10-way busbars

Figure 6(a) illustrates the main switch.

Figure 6(a) — Main switch

- a) Isolate main switch.

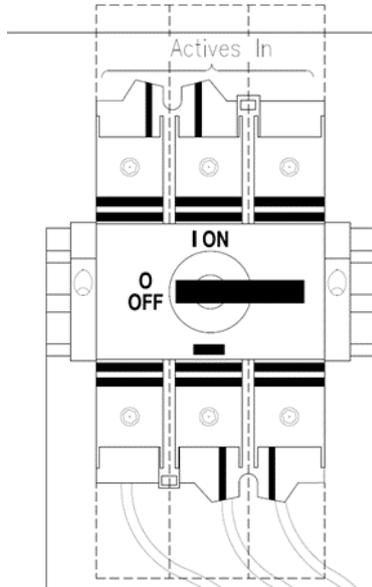


Figure 6(b) parts 1 and 2 illustrate disconnecting and sealing the PE cell.

Figure 6(b)(Part 1) — Disconnect PE cell

- b) Disconnect PE cell cabling and remove PE cell from the switchboard cabinet. Refer Section 6 for PE cell removal on ground mounted pillars.

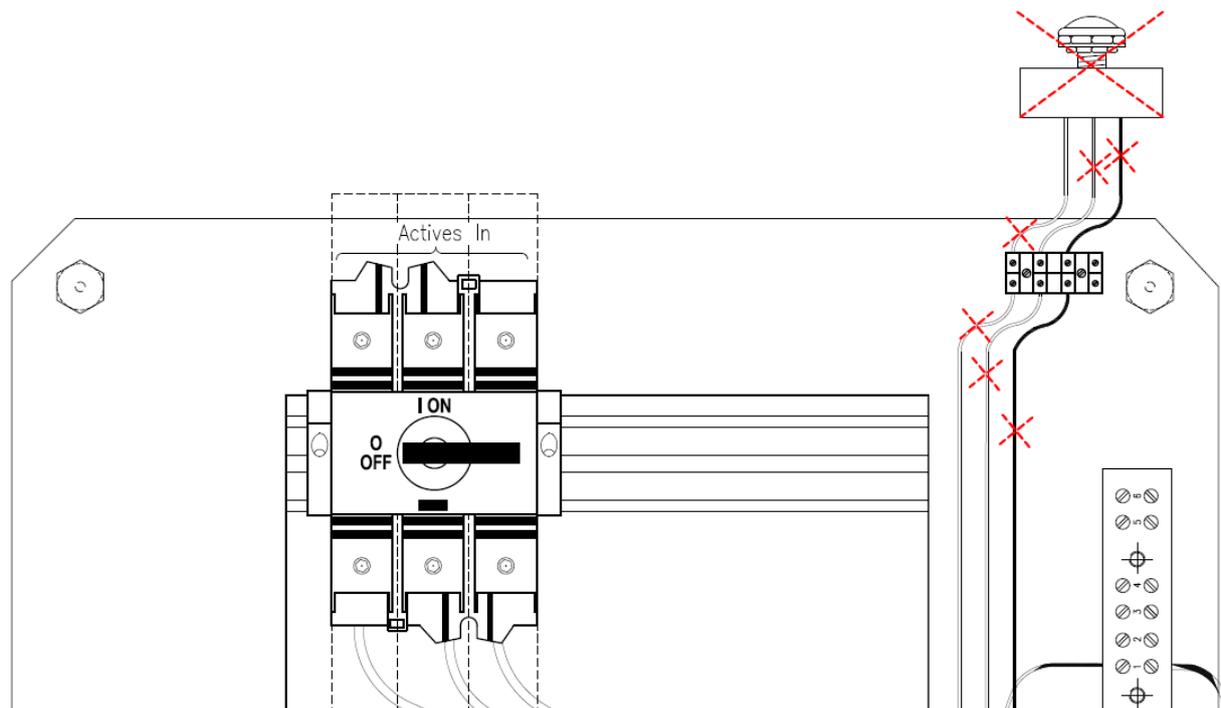
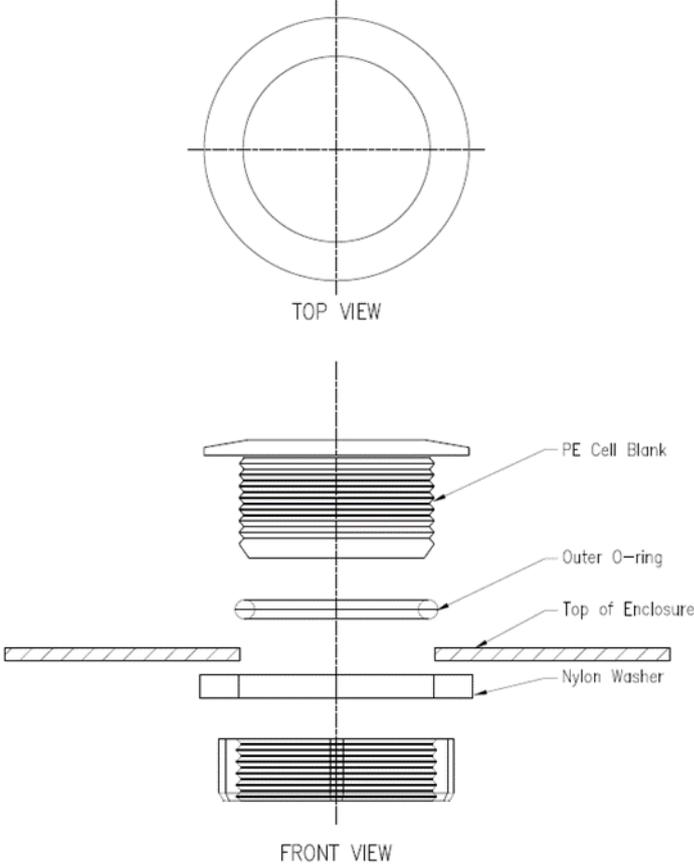


Figure 6(b)(Part 2) — The hole left by the PE cell

The hole left by the PE cell removal is to be sealed via a Logix engineering-supplied blanking plug as per assembly sequence following.



ASSEMBLY SEQUENCE
FOR PE CELL BLANK

Figure 6(c) illustrates removal of the day / night switch.

Figure 6(c) — Remove day / night switch

- c) Remove day / night switch, surge protection, contactors and cabling from switchboard.
The 10a PE cell circuit breaker to remain but shall be labelled 'PE CELL BREAKER NOT IN USE' on front escutcheon plate. The PE cell circuit breaker must remain in place so that an active terminal of the bus bar is not exposed.

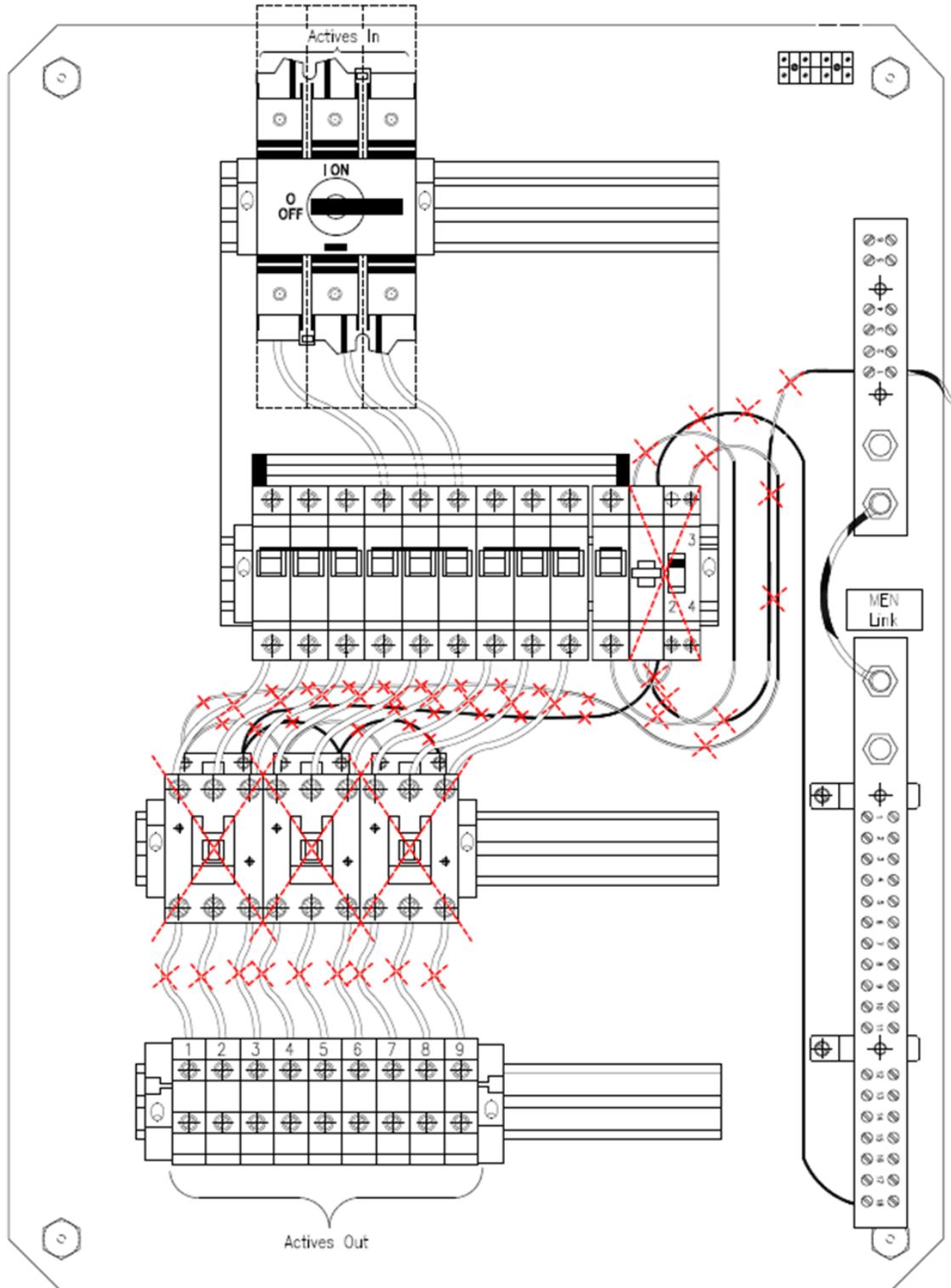
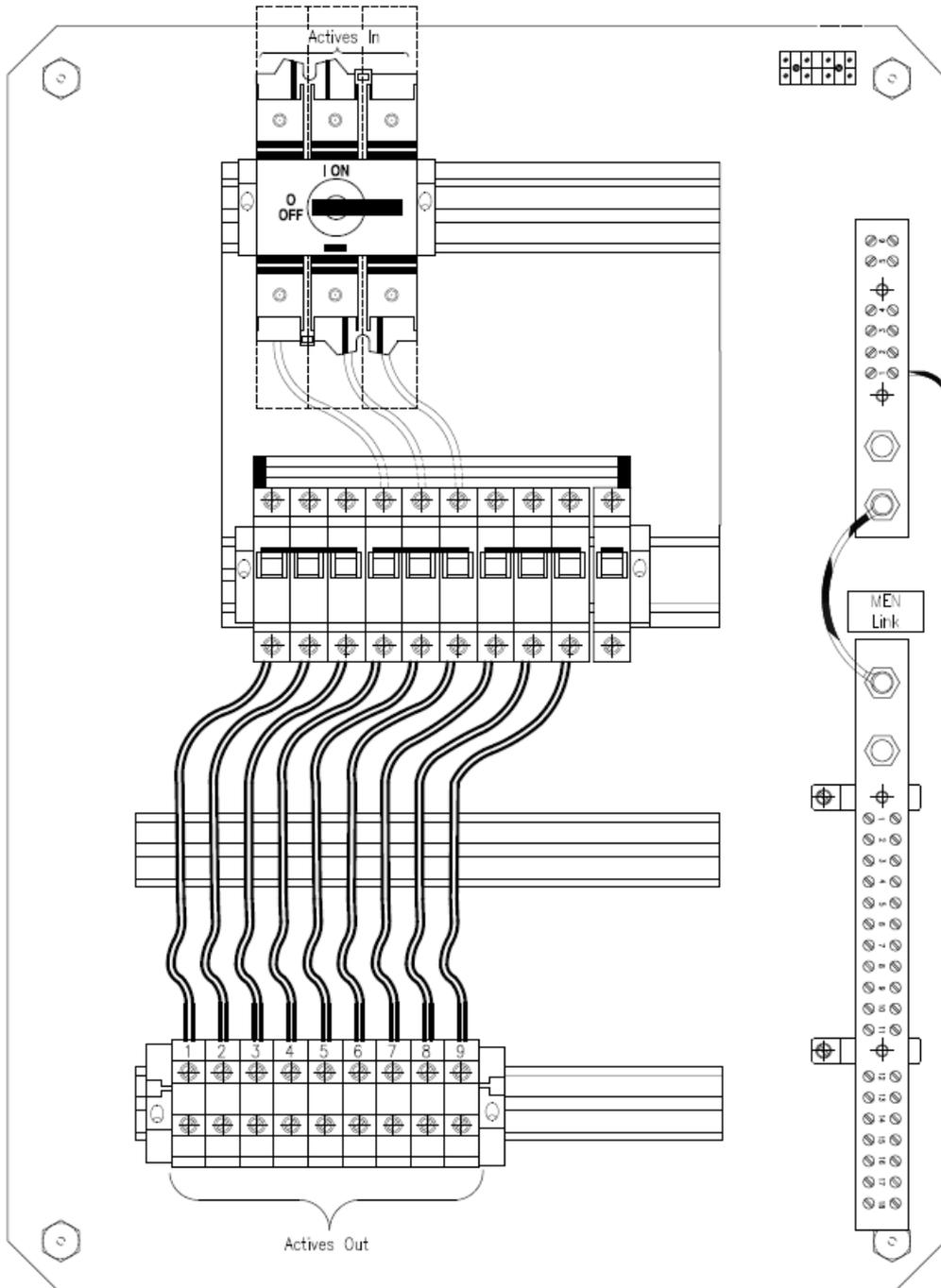


Figure 6(d)) illustrates installation of required copper cable.

Figure 6(d) — Install required lengths

- d) Install required lengths of 6mm² copper cable and reconnect each circuit to 'active out' field terminals. The 6mm² copper cable links shall be colour matched to the connected phase if modifying 3 phase switchboards.



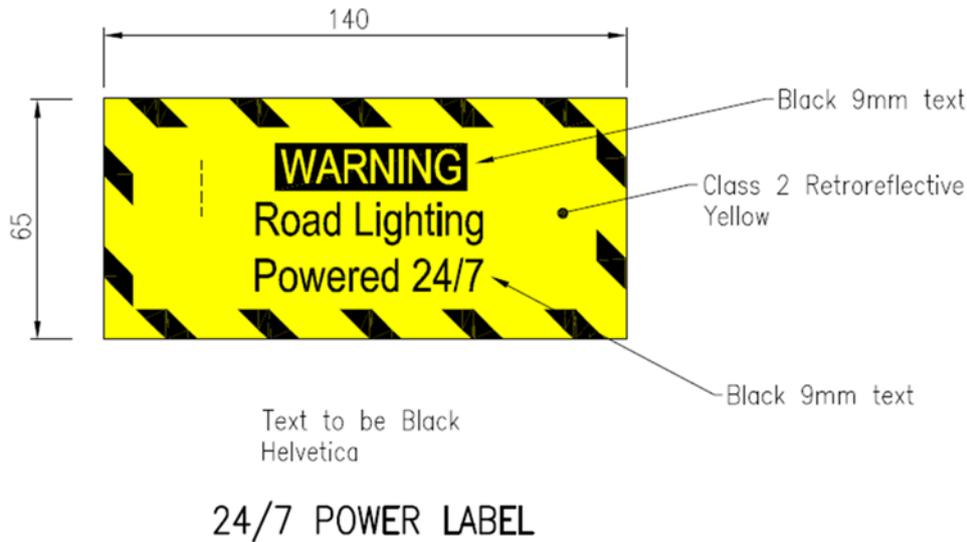
Remove all reference to PE cell:

If not completed already, remove all reference to PE cell circuit operation (night / day, PE cell and Surge labels / plate) from escutcheon plate. As per Section 4, use Kit 1 Logix Label replacement and follow supplied instructions. Install pole fillers over removed hardware.

Figure 6(e) illustrates installation of the warning sticker.

Figure 6(e) — Install warning sticker

- e) Install warning sticker on the escutcheon plate inside the switchboard 'Road Lighting Powered 24/7'.

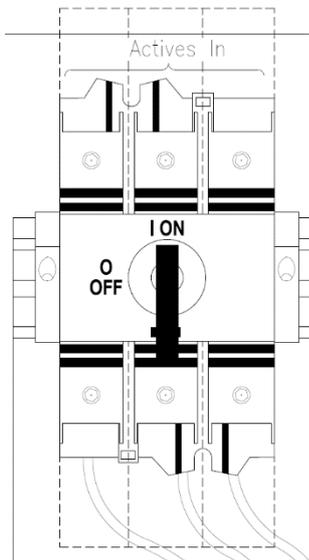


- f) Undertake testing to ensure connections are correct

Figure 6(j) illustrates re-energising the main switch.

Figure 6(j) — Re-energise

- j) Re-energise the main switch



- k) Once the SLCs have been installed:
 - i. complete red pen mark-up As Constructed and note on plans that the road lighting circuits have been converted to 24/7, and
 - ii. complete certificate of test and note in the comments that the road lighting circuits are now powered 24/7.

7 Ground mounted pillars — PE cell removal process and legacy pillars

For ground mounted pillars that are installed within a concrete pad, the following steps are to be taken:

- a) Remove the 4.1 m pedestal, PE cell, circuit breaker, contactor, day / night switch, surge protection and associated cabling from the switchboard.
- b) Install warning sticker on frontside of switchboard (where space allows). If the warning sticker cannot be applied to the front side of the switchboard due to a lack of space, then it is permitted to install two stickers, one on the outside of the switchboard pillar under the Rate 3 site number sticker, and one on the backside of the switchboard (where space allows).
- c) Trim conduit to approximate finished level.
- d) Insert rags into footing conduit with top of rags 250 mm below final finished level.
- e) Seal top of rags with two tubes of silastic clear sealant to create a fully-waterproof seal.
- f) Grout the remaining unsealed conduit and footing flush with the finished level so a trip hazard is not created.

Note:

Where ground mounted pillars are not installed within a concrete pad, the following steps are to be taken:

- a) The existing 4.1 m pedestal is to remain standing. Install three rings of UV-stabilised reflective marker tape on 4.1 m post so the pedestal will be seen as identification marker for the relevant ground mounted pillar box.
- b) Remove the PE cell circuit breaker, contactor, day / night switch, surge protection and associated cabling from the switchboard.
- c) The PE cell is to be removed from Site and a 3-pin shorting plug is to be placed into old PE cell receptor
- d) Regional Electrical Maintenance Performance Contract (EMPC) Administrator is to be notified of the changes to the switchboard.

Refer to relevant parts of Section 4 or 5 for PE cell circuit and contactors removal.

Switchboards with exposed busbars

At Sites where existing White Rate 3 ground mounted switchboards with exposed busbars are found (refer Figure 7), the EMPC manager shall be notified of the switchboard's existence and all relevant Safe Work Method Statements (SWMS) should be followed prior to performing the Works detailed in this technical note.

Figure 7 — Exposed busbars

