

PQube® 3 RM8 Module

User Guide

Revision 1.0



WARNING: Death, serious injury, or fire hazard could result from improper connection or operation of this instrument. Carefully read and understand manual before connecting this instrument.

AVERTISSEMENT: Si l'instrument est mal connecté, la mort, des blessures graves, ou un danger d'incendie peuvent s'en suivre. Lisez attentivement le manuel avant de connecter l'instrument.

WARNUNG: Der falsche Anschluß dieses Gerätes kann Tod, schwere Verletzungen oder Feuer verursachen. Bevor Sie dieses Instrument anschließen, müssen Sie die Anleitung lesen und verstanden haben.

ADVERTENCIA: Una conexión incorrecta de este instrumento puede producir la muerte, lesiones graves y riesgo de incendio. Lea y entienda el manual antes de conectar.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired. Installation, service, and maintenance of your PQube must only be done by an expert for electrical installations.

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Symbol	Meaning
	Caution. Consult this manual in all cases where this symbol is marked, in order to find out the nature of the potential hazards and any actions which have to be taken to avoid them.
	Caution. Risk of electric shock
	Alternating current
	Alternating current (a.c.) or direct current (d.c.)
	Double or Reinforced insulation
	Functional earth terminal <u>not</u> relied on for safety

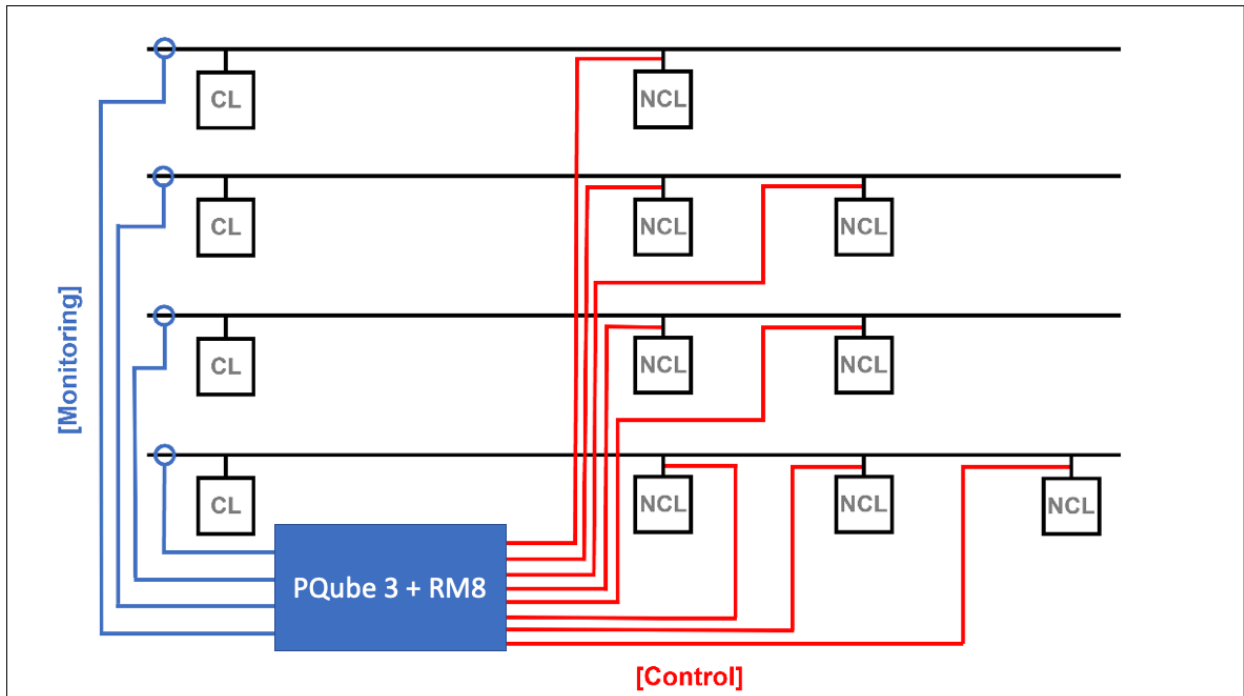
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Introduction

What is the RM8 Module for the PQube® 3?

The RM8 Module is an optional expansion module for your PQube 3 Power Analysis System. It adds 8 programmable signal relay outputs to your PQube 3. These can be useful for load shedding, alarms, and notifications to system operators.





Typical use case: Monitor branch circuits powering critical loads (CL). Upon a rise above preset power thresholds or other alarm conditions, the RM8 Module turns off non-critical loads (NCL).

Features

- Each RM8 module can control up to 8 individual non-critical loads
- Monitors up to two branch circuits with the standard PQube 3, and up to four branch circuits with the PQube 3e.
- For each relay, set trigger thresholds based on the power consumption on any given branch circuit.

IMPORTANT: the RM8 module contains 8 programmable *signal* relays. Do not attempt to use the RM8 relays for directly switching power to loads greater than the rated value (2 Amps max at max 60VDC/30VAC). While LEDs and other low-voltage low-current loads can be switched directly with the RM8, in the typical case RM8 are used to switch the coil of an interposing power relay that controls power flow of the switched loads.

Overview of Connections

	
From left to right: R1, R2, R3, R4	From left to right: R5, R6, R7, R8

Specifications

Relays	
Number of relays :	8 (4 on top , 4 on bottom of module)
Type :	Latching relays
Rating :	2 Amps max at max 60VDC/30VAC
Operate time:	< 20ms
Trigger and functions	
Default state :	User defined : Normally Closed (NC) or Normally Open (NO)
Operation:	Upon triggering (see below), the relay activates as long as the triggering condition is maintained
Triggering functions:	Active Power (or apparent power) averaged over a period of 1 second. Assessment of the value over/under a configurable threshold (in W or VA).
Module dimensions: Height X Width X Depth	89.50mm (3.523") X 36.32 (1.43") X 78.24mm (3.08") <i>Note: width including interface connector: 45.36 mm (1.786")</i>
Environment	-20°C ~ 65°C

RM8 Module Installation

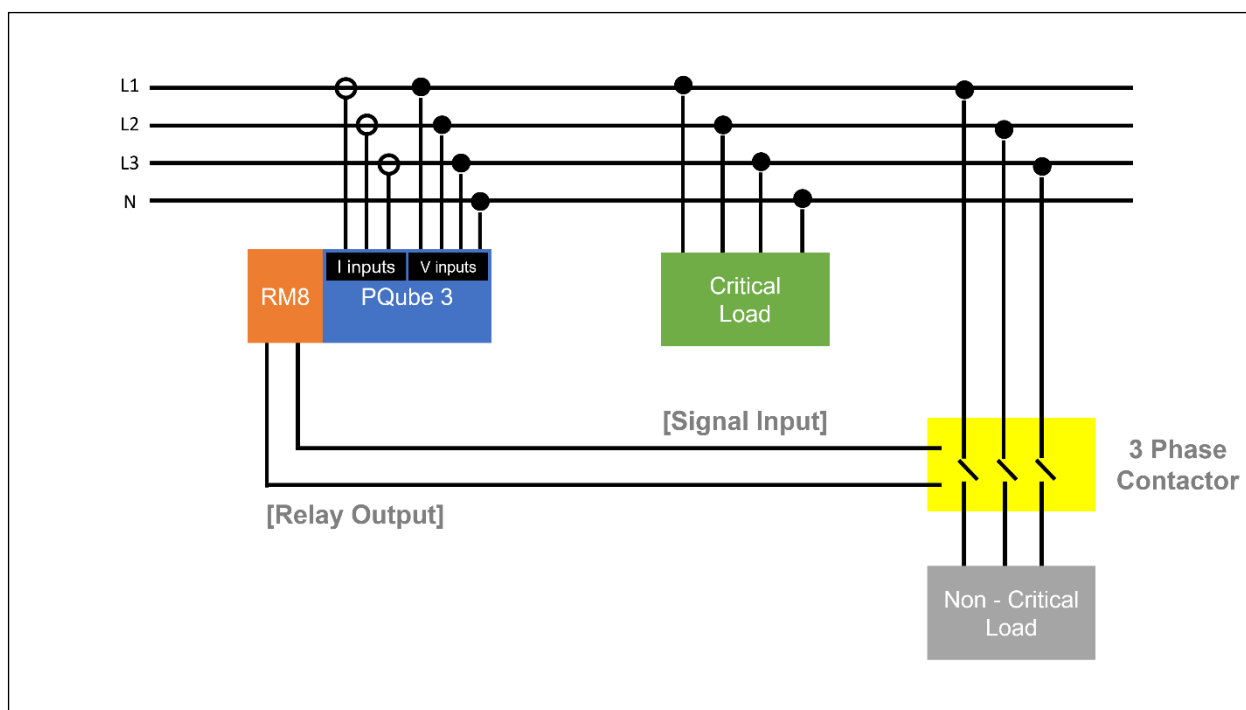
General Installation Procedures

Read all instructions before installation.

NOTE: it is very important that installation of your PQube 3 and associated modules such as the RM8 is performed by qualified personnel in accordance with the local electrical guidelines and codes.

The instructions shown here are for the RM8 module only. Refer to the PQube 3 Instruction Manual for wiring instructions for the PQube 3.

Example Wiring Diagram



1. Install the RM8 module onto the DIN rail

Snap the RM8 module onto the DIN rail, directly to the left of your PQube 3.

IMPORTANT: PQube 3 and modules must be installed onto the DIN rail separately.

2. Slide the PQube 3 and all modules together

After all modules have been installed onto the DIN rail, slide them together and install DIN rail stoppers to prevent them from sliding apart after installation.

3. Make all the voltage and current connections to the PQube 3

3-phase circuit #1, use I1, I2, I3 terminals

3-phase circuit #2, use I6, I7, I8 terminals

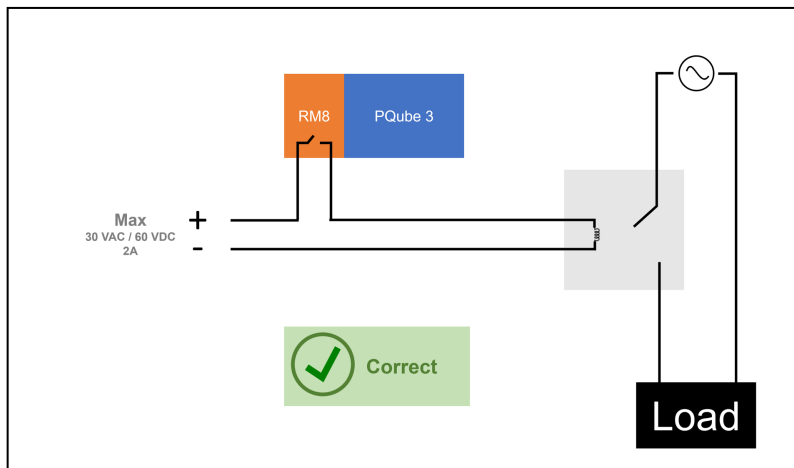
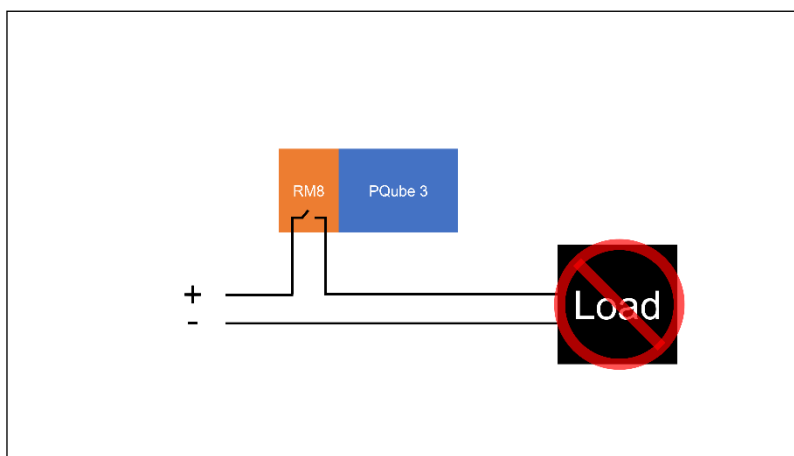
3-phase circuit #3, use I9, I10, I11 terminals (PQube 3e only)

3-phase circuit #4, use I12, I13, I14 terminals (PQube 3e only)

The voltage must be common to all circuits.

4. Install interposing relays to switch high-power loads

All loads should be directly switched by a high power relay. Do **NOT** connect the RM8 relays directly to loads.



5. Connect RM8 relays to an external voltage source

The relays in your RM8 module are “dry” contacts. You must “wet” the contacts by applying voltage from an external source. The RM8 relays are installed so as to switch the coil input of your high-power interposing relay. Refer to the specifications of your high-power relay to determine the coil voltage.

IMPORTANT: The RM8 relays are rated for 30VAC/60VDC and 2A. Take care not to exceed these values.

6. Apply power to PQube 3 and verify meter readings

Apply power and your PQube 3 will begin booting up. You can access your PQube 3’s readings from the built-in touchscreen display.

Verify that the meter readings on your PQube3 are consistent with voltage and currents measured, and then secure the installation. If any corrections need to be made, safely disconnect the power before servicing the connections.

This completes the installation process. All that remains, if not already completed, is the configuration of your PQube 3 using the PQube 3 Configurator Program which can be found on the USB drive included with your PQube 3. The latest Configurator Program can also be downloaded from <http://www.powerstandards.com/download-center/pqube-3-3e/>

Disconnect mains prior to servicing

Always disconnect all mains connections, and verify disconnections, prior to servicing and configuring your PQube 3 for use with the RM8 module.

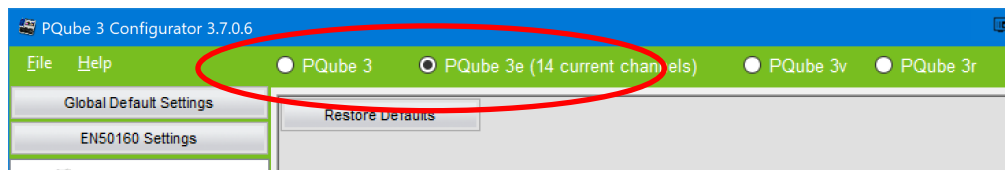
Once your PQube 3 has been installed, you will need to configure it for use with the RM8 module.

For general device setup, refer to the PQube 3 Instruction Manual.

Define your 3-phase loads

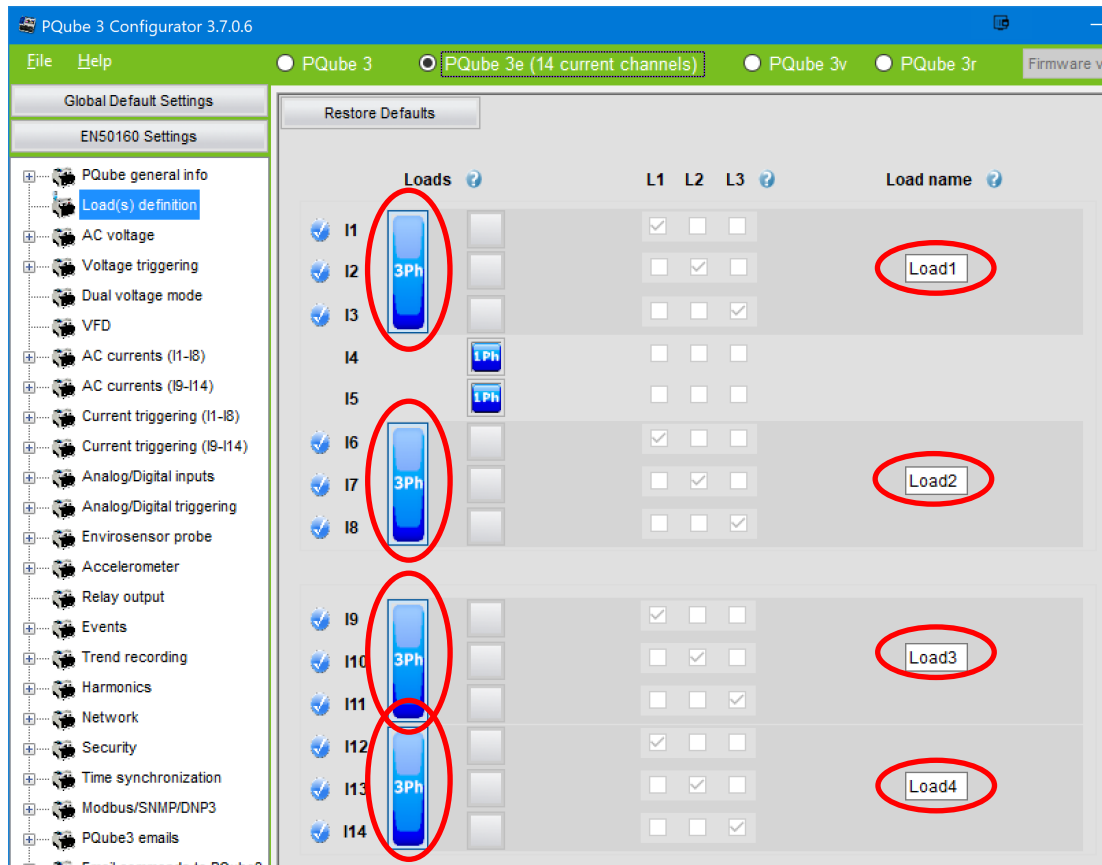
1. Select your PQube 3 model

Open the PQube 3 Configurator and choose PQube 3 or PQube 3e.



2. Assign labels to each branch

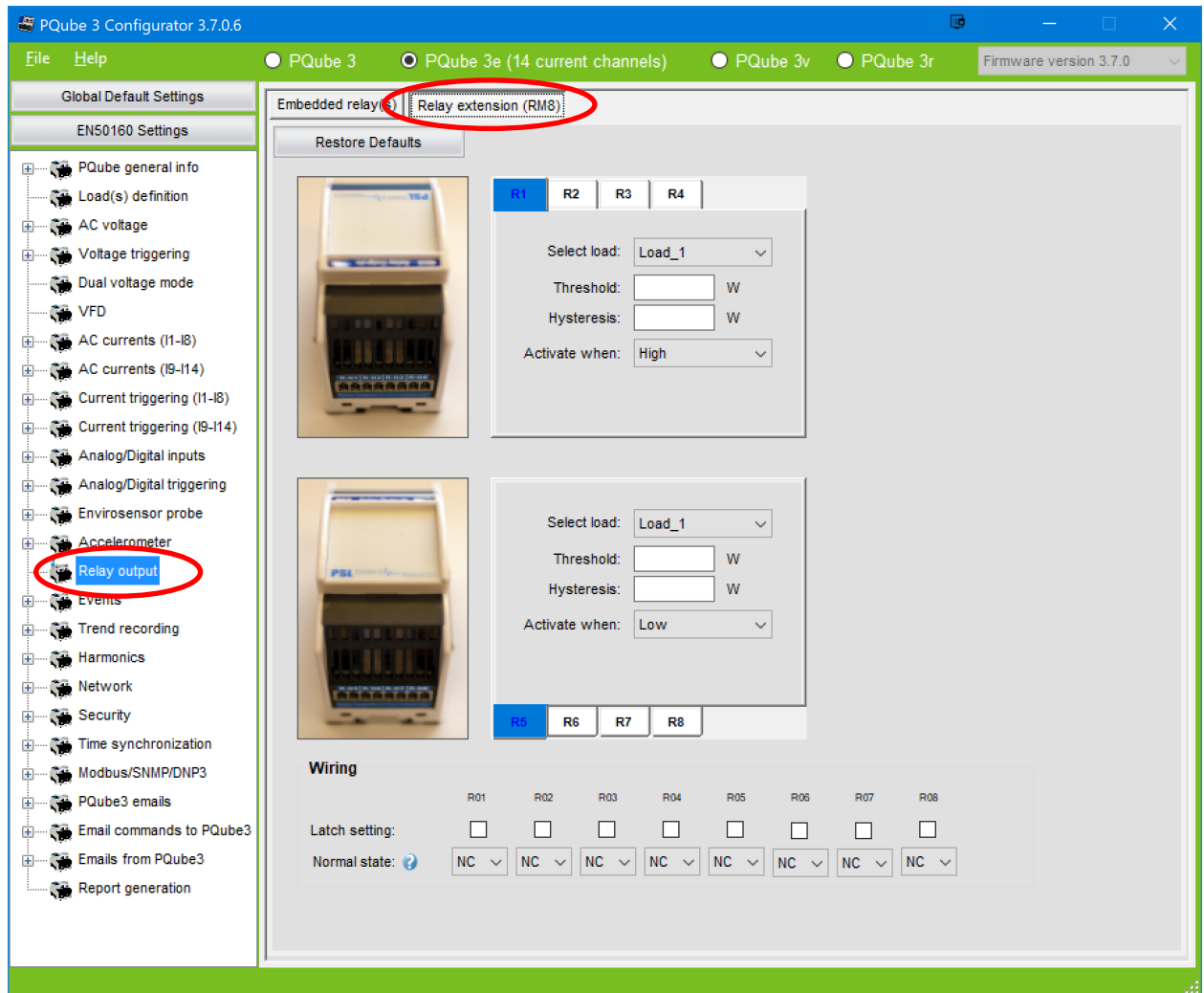
Go to Load(s) Definition page. Click the 3Ph buttons on the right to enable power calculations and recording for that branch, then add a name for each branch circuit.



Setting thresholds for each relay

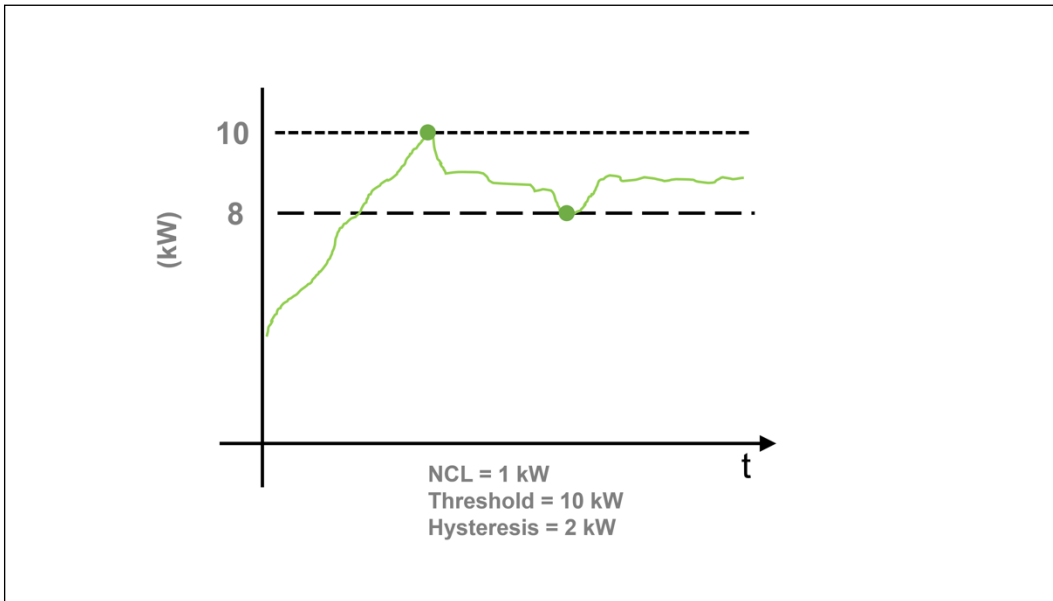
1. Define threshold, hysteresis, and threshold polarity

Go to Relay output page, Relay extension (RM8) tab



For each relay (R1 through R8), define the circuit of interest, then set the threshold, hysteresis, and threshold polarity (over-threshold or under-threshold).

Example of operation of the threshold and the hysteresis: 1kW non-critical load, hysteresis 2kW



For circuit #1 an over-threshold (i.e., activates when high) of 10kW and a hysteresis of 2kW is shown.

When the power on circuit #1 exceeds 10kW, the PQube 3 will shed the non-critical load on R1.

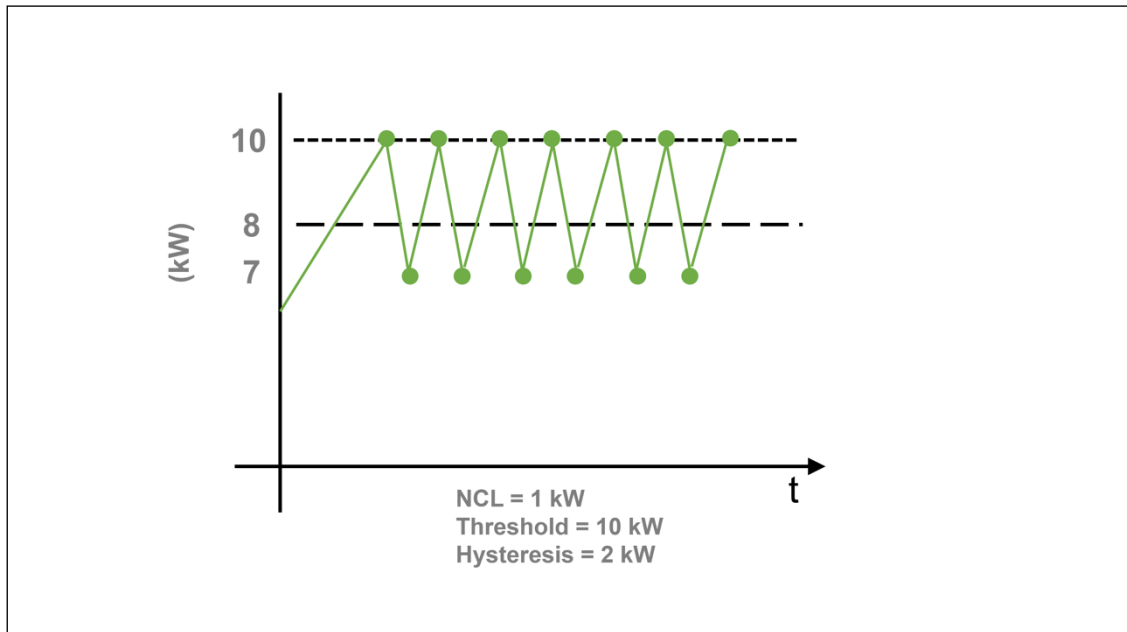
The remaining power on circuit #1 is now 9kW. Your non-critical load will remain disconnected.

Later, the power on circuit #1 drops to 8kW (2kW lower than the threshold). Your non-critical load is now automatically reconnected to the circuit. The power on circuit #1 increases back up to 9kW.

The non-critical load remains connected until the power on circuit #1 exceeds 10kW again.

Example of a wrong hysteresis setting 3kW non-critical load, hysteresis 2kW

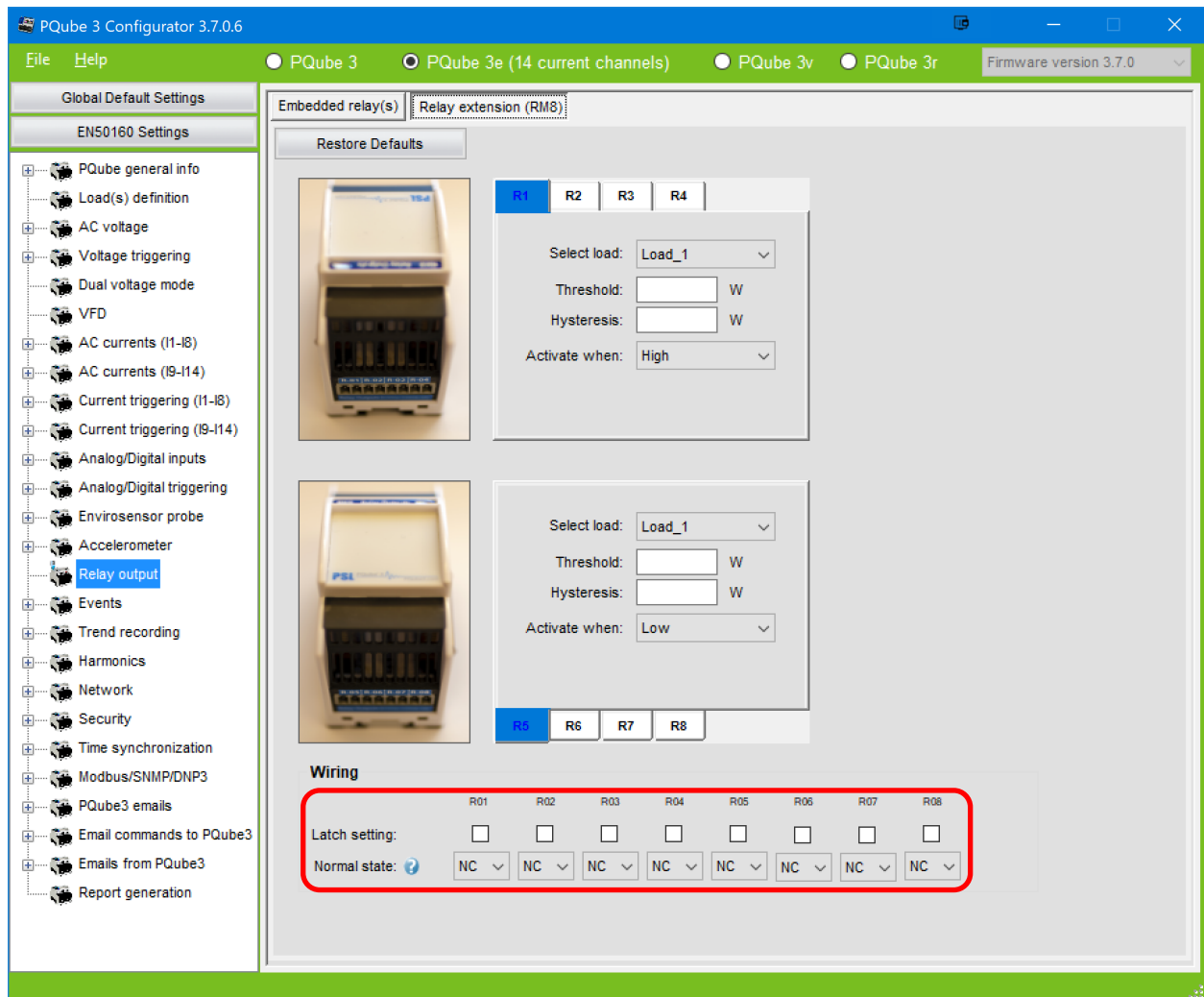
WARNING: It is imperative that the thresholds are set correctly based on the power consumption of your loads. After shedding a non-critical load, you must ensure that the remaining power remains above your threshold + hysteresis. Failure to do so will result in an infinite on/off cycle of your non-critical load.



In this case, switching off the 3kW non-critical load results in the power falling below the threshold + hysteresis. This condition will result in the 3kW non-critical load switching back on again, which exceeds the 10kW threshold. The result is an infinite on/off cycling of this non-critical load. To correct this problem you must increase the hysteresis setting to a value greater than 3kW in order to prevent this infinite cycling condition.

If configuring multiple loads on the same branch circuit, consider the power draw of all loads as you determine your hysteresis settings.

2. Define latch setting and normal state



Enabling the latch setting forces the state of the relay to persist through a PQube 3 system reboot. When the latch setting is disabled, it will switch to its non-normal state (i.e., alarm state) during the reboot process. Upon completion of the PQube 3 reboot, it will return to its normal state unless the circuit load exceeds the threshold.

Additional PQube Information

For additional information, refer to the PQube 3 Instruction Manual. It is located on the USB drive that came with your PQube 3. You can always download the latest version of the manual at <https://www.powerstandards.com/product/pqube-3/highlights/>

Still need help? Contact us at support@powerstandards.com.