# PowerShaper Relay Controller - Installer Notes

v20200812.0

## General

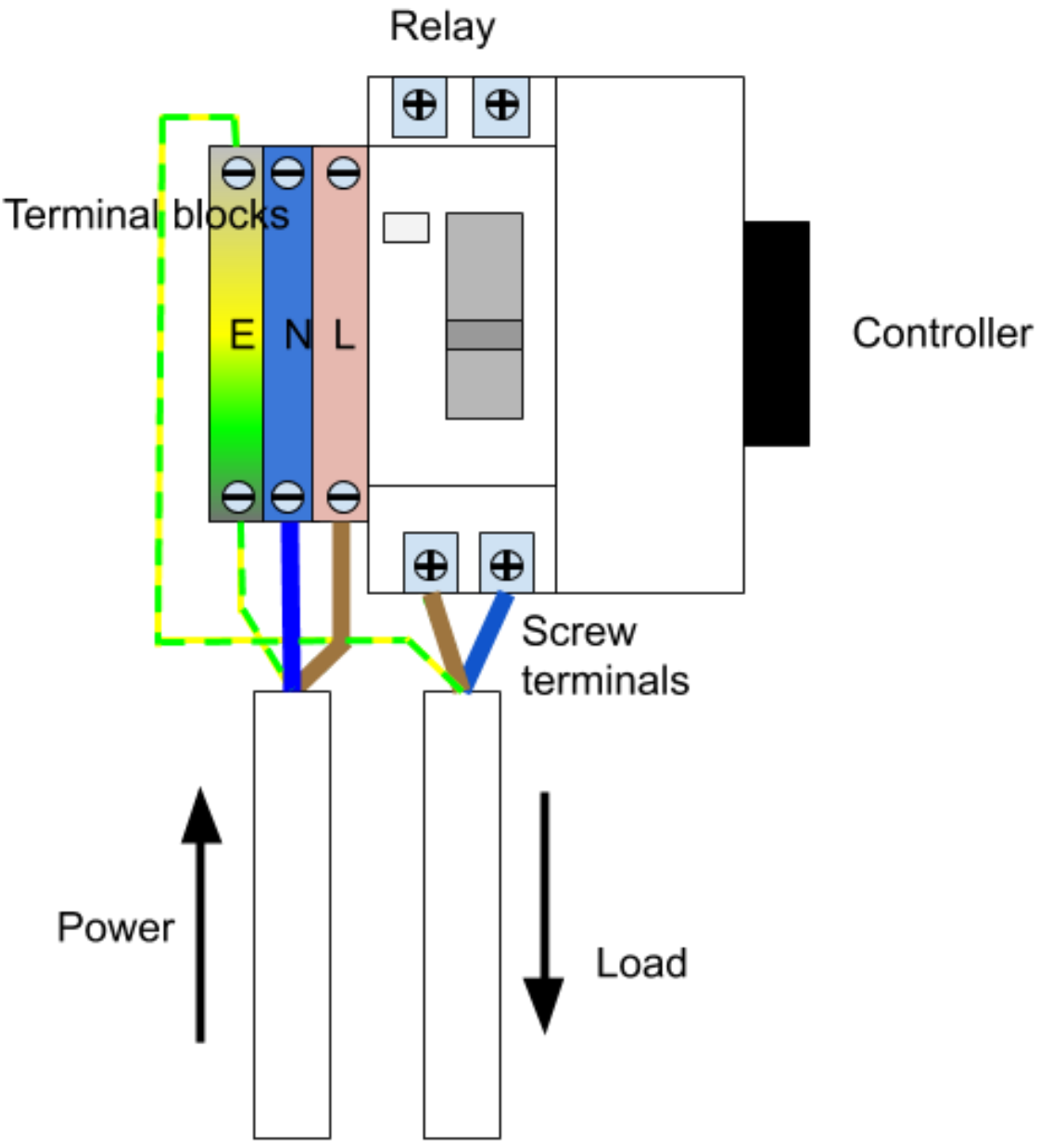
The relay controller is used for the remote on/off control and power monitoring of resistive electrical appliances up to 25A such as immersion heaters, storage heaters, and solar diverters (where a voltage sensing input is available).

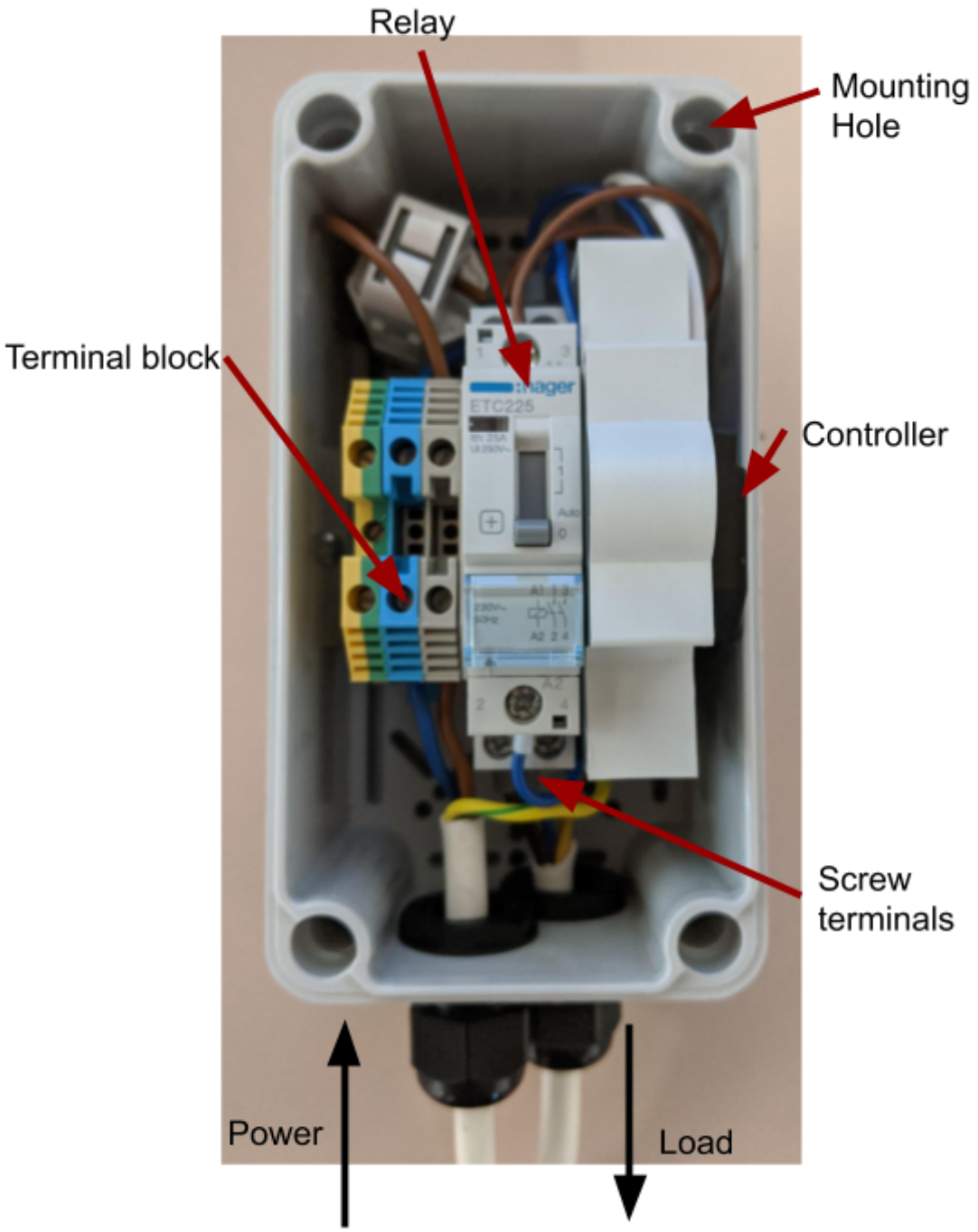
## Contents

The package comes pre-assembled and consists of:

- DIN rail enclosure.
- 25A Hager night/day relay contactor with a manual control (ETC225) mounted on DIN rail.
- ShellyEM wifi controller mounted using adhesive on blank insert mounted on DIN rail.
- Current measuring clip wired into ShellyEM.
- Terminal blocks for easy installation connecting to incoming power.

Wiring Diagram

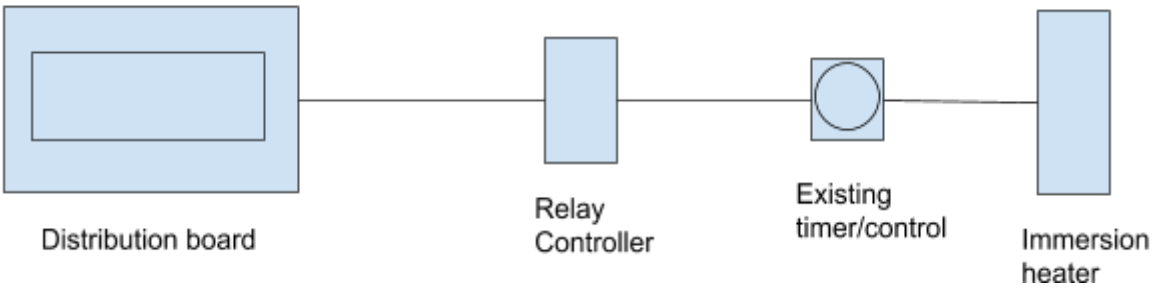



Relay
Mounting Hole
Terminal block
Controller
Screw terminals
Power
Load

## Installation

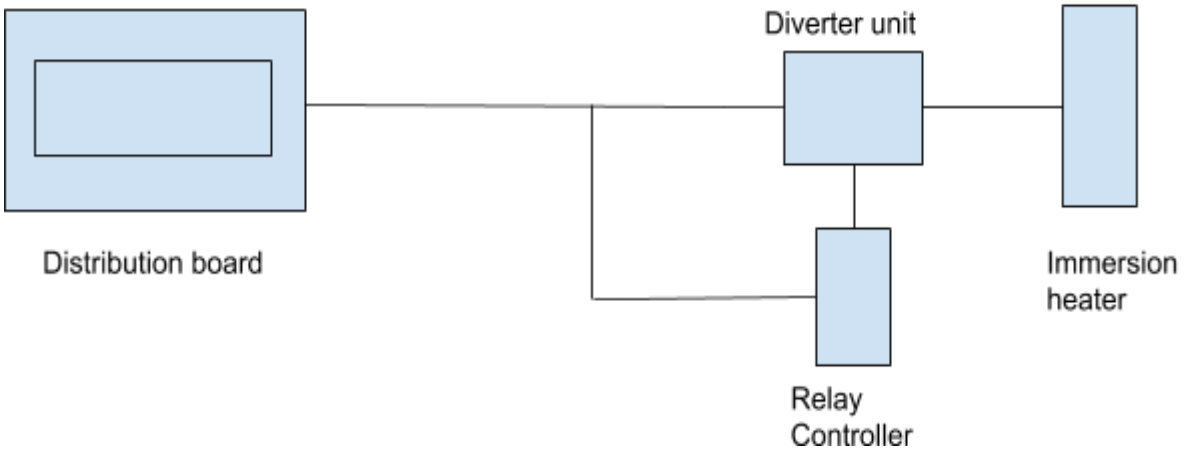
- The enclosure has 4 mounting holes in the corner underneath the top cover fixtures accessible by removing the top cover.
- Flexible wire tails should be fitted with plastic shroud type bootlace crimp ferrules before being inserted into the terminals. This is to ensure a robust compliant connection.
- Ensure all terminals are tightened with a torque driver to 0.8 Nm.
- The cable glands should be tightened after installation is completed.
- In both cases below the relay controller needs to be powered by wiring it into main on the power input. In the case of the connection to a solar diverter this could be taken off the supply to the diversion unit or otherwise.

### Immersion heater




- Should be installed between existing controls, such as timers or switches (which should remain in place), and distribution board etc. (as per diagram). This is because the relay controller needs to be powered and if installed behind controls would not work properly.
- Immersion heater is connected to the load output from the relay.

### Solar diversion

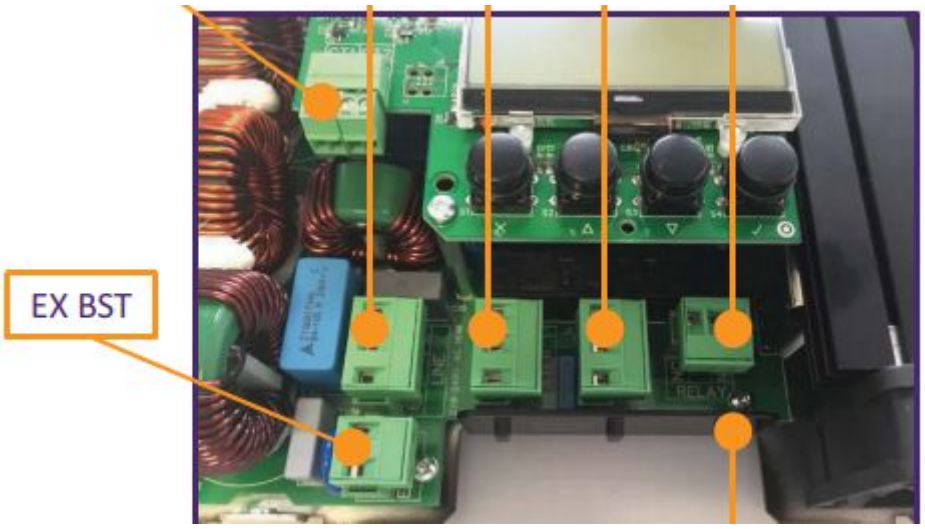



- In this case we are not switching the load ourselves but using the diverter to do it. We then control the diverter with our relay through inputs on the diverter.

- Power for the relay controller can either be taken off the same supply as the diverter or a separate supply.
- The power self-consumption of the relay controller is around 5W.
- The load output should be connected to the EX BST input (immersun) or eSense input (eddi + optional eddi relay sensor board). Refer to immersun/eddi manuals for further instructions on relevant terminals and below extracts.

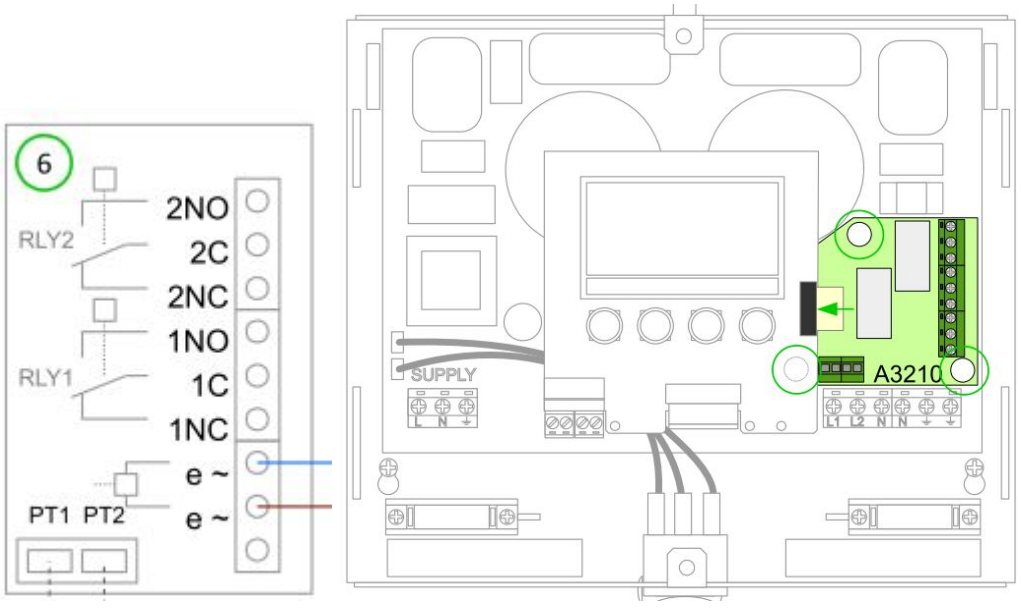
### immersun

Connect relay controller load output to EX BST (labelled in picture below and on immersun mainboard PCB under terminal).




### eddi + optional relay sensor board

This requires an optional part - the relay sensor board - to be pre-installed. Connect relay controller load output to e~ on this board (as labelled in pinout diagram below corresponding to PCB daughter board schematic highlighted in right).



## Installation Commissioning

- The aim of the installation commissioning is to leave the PowerShaper relay controller in a state that ensures the householder continues to have hot water available until the system final commissioning can be completed.
- Based on the existing configuration of the householders immersion heater / diverter one of the following steps should be completed.
- Immersion heater: Relay switch should be set so as to ensure continued good operation of immersion e.g.
    - If immersion uses a timer control which is still in place the relay switch should be left in the ‘1’ position to ensure the timer control continues to work.
    - If immersion was manually operated using a switch which is still in place the relay switch should be left in ‘1’ position.
    - If no other controls are present the relay switch should be left in ‘0’ position (on assumption that relay switch will be used to manually control immersion heater).
- Diverter: Relay switch should be left in ‘0’ position.

## System Final Commissioning

- This will be completed by a Carbon Co-op technician at a later time.

## Certification and testing

The assembly has undergone conformance testing and final assembly QA separately to the components inside which themselves have appropriate CE declarations.

## Reference

Hager ETC225: https://hager.com/uk/products/catalog/product/download/id/11355/
ShellyEM: https://shelly.cloud/documents/user_guide/shelly_em.pdf
Weidmuller WDU4:
https://catalog.weidmueller.com/catalog/Start.do?localeId=en&ObjectID=1020100000
Immersun installer manual v1.3:
https://www.immersun.co.uk/wp-content/uploads/2019/11/immersun-installation-and-user-manual.pdf
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