

SAFETY

IMPORTANT SAFETY INSTRUCTIONS. SAVE THIS INFORMATION.

Follow all safety and assembly instructions when installing the Q Relay.

Safety Instructions

	DANGER: Risk of electric shock. Risk of fire. Do not attempt to repair the Q Relay; it contains no user-serviceable parts. Tampering with or opening the Q Relay will void the warranty. Warranty void if cover removed. If the Q Relay fails, contact Enphase Customer Support for assistance (http://enphase.com/global/contact/).
	DANGER: Risk of electric shock. Always open or disconnect circuit from power-distribution system (or service) of building before installing or servicing the Q Relay.
	DANGER: Risk of electric shock. Do not use Enphase equipment in a manner not specified by the manufacturer. Doing so may cause death or injury to persons, or damage to equipment.
	DANGER: Risk of electric shock. Be aware that installation of this equipment includes risk of electric shock. If you wire the Q Relay at the sub-board, always de-energise the sub-board before beginning.
	DANGER: Risk of electric shock. Risk of fire. Only qualified personnel should troubleshoot, install, or replace the Q Relay.
	WARNING: Risk of electric shock. Always make the PV terminal connections before completing the grid terminal connections. If grid terminals are connected first, the PV terminals become live.
	WARNING: Before installing or using the Q Relay, read all instructions and cautionary markings in the technical description and on the Q Relay.
	WARNING: Risk of equipment damage. When installing the Q Relay in an enclosure, choose an area for installation where ambient temperature remains between -40° C and 50° C.
	The temperature of the terminals may exceed 60° C. Use an appropriately temperature-rated cable to connect to the terminals.
	NOTE: Perform all electrical installations in accordance with all national and local electrical codes.
	NOTE: Install a residual current circuit breaker if required by national regulations.
	NOTE: To ensure optimal reliability and to meet warranty requirements, the Enphase Q Relay must be installed according to the instructions in this guide.

SPECIFICATIONS

Over voltage category (EN 61010-1)	III
CAT III	GRID terminal is rated for measurement category III
Pollution degree (EN 61010-1)	2
Supply range	85 to 265 VAC
Nominal input frequency	50 Hz
Voltage and frequency acquisition time on valid input during normal operation	100 ms (5 line cycles @ 50Hz)
Output	4-pole normally open relay (L1, L2, L3 & N)
Output power rating	6 kVA per phase
Output rating (typical)	240 VAC, 25A
Power consumption	18 VA
Conducted and radiated EMI	IEC 61326, BS EN 50065-1 & 2-2, BS EN 61326-1&2, BS EN 61000-3-11&12
Operating temperature range	-40 °C to 50 °C
IP rating	IP 20 (must be in protected environment)
Relative humidity	0 to 95 non-condensing

PREPARATION

In Enphase installations, the multiphase Q Relay (network system relay controller) acts as a galvanic disconnection device. It is designed for three-phase or multiphase use and has built in contactors. During specified grid abnormalities, the Q Relay disconnects the Enphase Microinverters from the AC grid, and when the voltages return to normal and the grid frequency is in the acceptable range, the Q Relay reconnects the microinverters to the AC grid. The Q Relay has built in current sensing that can detect DC current injection required by VDE V 0126-1-1 requirements.

The Q Relay works together with the Envoy-S to meet the need to break lines and neutral per grid requirements.

See full installation instructions for the Enphase Envoy-S and/or Enphase Microinverters at: enphase.com/support.

It is best practice to install the Q Relay when installing the Envoy-S and before commissioning the system.

The Q relay is IP-20 rated and supports up to 19 IQ 7 Microinverters or up to 16 IQ 7+ Microinverters.

You must mount it in an environmentally protected enclosure. Typically this is a switch-board.

You must also use 2.5 - 6.0 mm² conductors for relay connections.

INSTALLATION

DANGER! Risk of electric shock. Always de-energise circuits before beginning wiring.

- Install the Enphase Envoy-S as directed in the [Envoy-S Quick Install Guide](#).
 - Install the Q Relay in a protected environment (e.g., switchboard) on a 35 mm DIN rail near the Envoy-S.
 - Connect the Line and Neutral conductors (2.5 - 6.0 mm²) from the PV system to the "FROM PV" terminals of the Q Relay so that the Neutral is on the N terminal and the Lines connect to the L1, L2, and L3 terminals.
- DANGER:** Risk of electric shock. Always make the PV connections before completing the grid connections. If grid terminals are connected first, the PV terminals become live.
- Connect a Neutral conductor (2.5 - 6.0 mm²) from the "TO GRID" N terminal of the Q Relay to the Neutral busbar.
 - Connect the Line conductors (2.5 - 6.0 mm²) from the "TO GRID" L terminal of the Q Relay to an IEC/AS/NZS 60947-2 approved circuit breaker, rated for no more than 20A. The circuit breaker must be suitably located and easily reached. It must also be marked as the disconnecting device for the PV system.
 - Tighten all relay terminal connections to 0.85 N m.
 - Energise the circuit.
 - Upon power up, the LEDs should all turn green to indicate the AC voltage and frequency are within specification of the grid code. See the LED states table.
 - Use the Enphase Installer Toolkit to apply a grid profile to the Q Relay and microinverters. Do not skip this step.

PROGRAM FOR 1 or 2 PHASE OPERATION

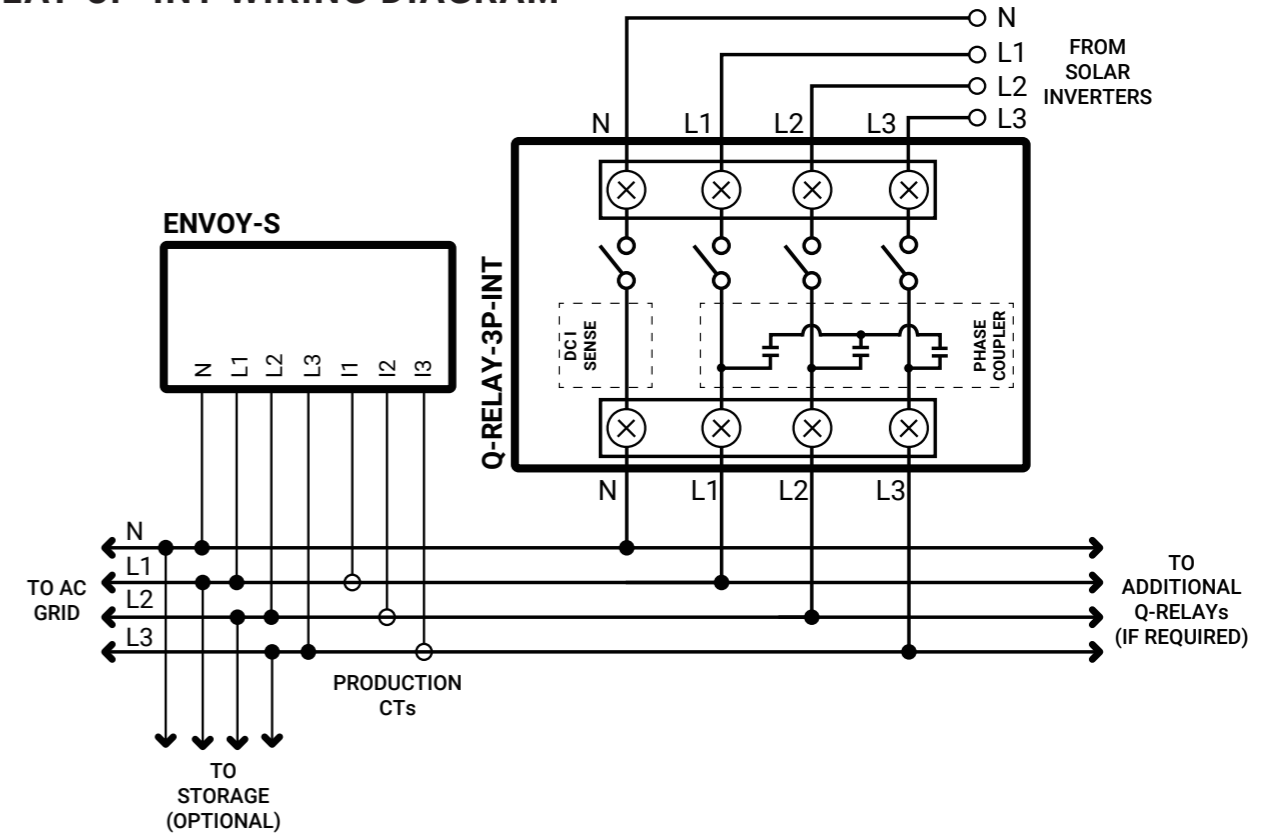
The 3-phase Q-Relay can also support 2-phase and single-phase applications. To program the number of phases:

- Press and hold the test button. The phase voltage indicators (V1, V2, V3), will turn red and the relay will click. After approx. 6 seconds the phase voltage LEDs will start flashing red. The number of red LEDs flashing corresponds to the number of phases. A sequence of 3, then 2, then 1 flashing LEDs is repeated.
- Release the test button when the appropriate number of LEDs are flashing.

Notes:

- The selected mode will persist through power cycling.
- The selected number of phases must be connected in sequence starting at L1.
- All options must include a Neutral.

Q-RELAY-3P-INT WIRING DIAGRAM



LED BEHAVIOR

LED #1 (Voltage, V1-N)	LED #2 (Voltage, V2-N)	LED #3 (Voltage, V3-N)	LED #4 (Hz, DCI)	Description	Condition	Relay
OFF	OFF	OFF	(Hz, DCI)	Description/Status	Unpowered or non-functional	OPEN
GREEN (solid)	X	X	X	Phase voltage (V1-N) is within range.	--	--
X	GREEN (solid)	X	X	Phase voltage (V2-N) is within range.	--	--
X	X	GREEN (solid)	X	Phase voltage (V3-N) is within range.	--	--
X	X	X	GREEN (solid)	Frequency and DCI (if applicable) are all within spec.	--	--
GREEN (solid)	GREEN (solid)	GREEN (solid)	GREEN (solid)	Voltage, frequency and DCI (if applicable) are all within spec.	Normal	CLOSED
RED (solid)	X	X	X	Phase voltage (V1-N) setpoints (HV1, HV2, LV1, LV2 or LV3) has timed out or the reconnection value has not been met.	FAULT	OPEN
X	RED (solid)	X	X	Phase voltage (V2-N) setpoints (HV1, HV2, LV1, LV2 or LV3) has timed out or the reconnection value has not been met.	FAULT	OPEN
X	X	RED (solid)	X	Phase voltage (V3-N) setpoints (HV1, HV2, LV1, LV2 or LV3) has timed out or the reconnection value has not been met.	FAULT	OPEN
X	X	X	RED (solid)	Grid frequency (V1) has timed out or reconnect frequency hasn't been met yet or the DCI threshold is met (if used) and the relay is opened.	FAULT	OPEN
RED (solid)	RED (solid)	RED (solid)	RED (solid)	TEST button is being pushed.	Test contactor and autoconfig phase assignments	Toggle state
RED (flashing)	RED (flashing)	RED (flashing)	RED (flashing)	Corrupt FLASH	FAULT	OPEN

