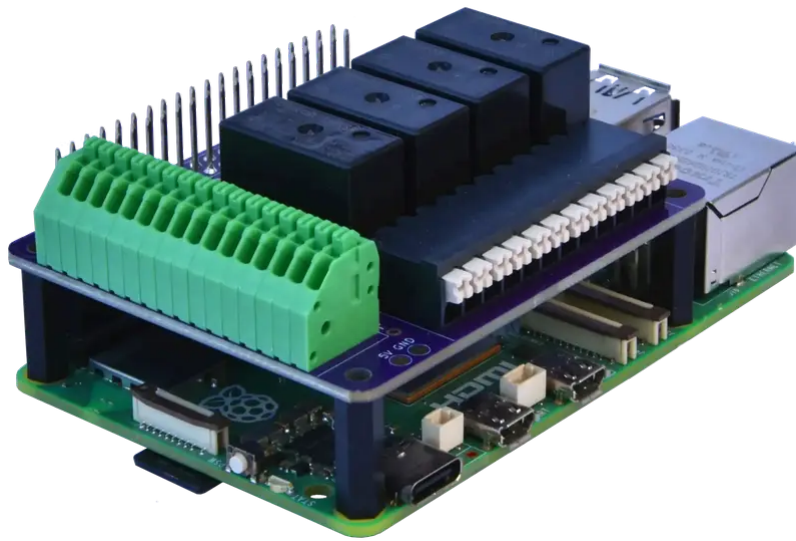


Technical Data Sheet: qPIO Max v1.0

Industrial I/O Expansion Module for Raspberry Pi (8 Input / 4 Output)

Official Product Page: <https://aqex.eu/qpio-raspberry-pi-io-module-with-8-input-4-output.html>



1. Product Concept & Strategic Advantages

The **qPIO** is a professional industrial interface expansion board designed to bridge the gap between the Raspberry Pi's low-voltage logic and high-voltage industrial environments. It provides robust, isolated control and sensing capabilities, making it an ideal choice for building automation, PLC replacements, and industrial monitoring systems.

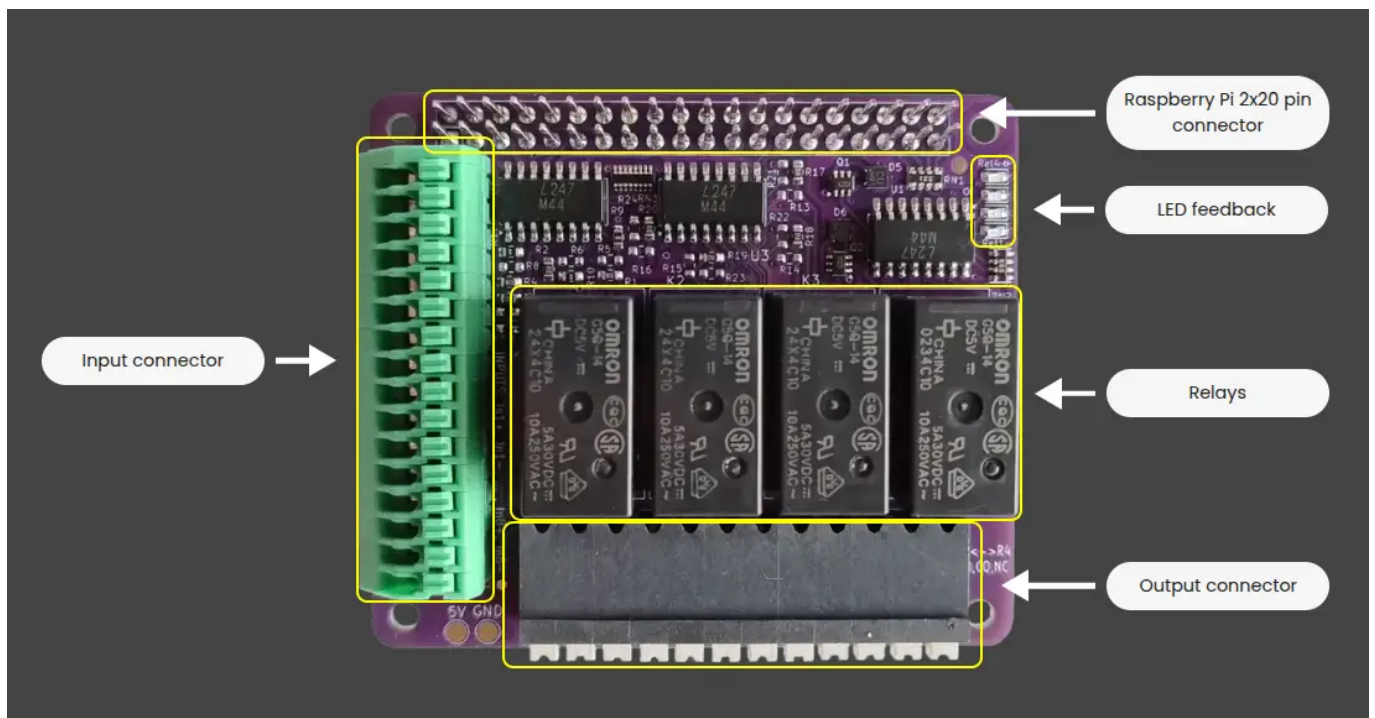
Strategic advantages:

- **Double Isolated Outputs:** For maximum safety, each relay output is protected by **dual isolation (Optocoupler + Mechanical Relay)**, ensuring the Raspberry Pi is completely decoupled from high-voltage loads.
- **Individually Configurable Inputs:** Each of the 8 input channels is **independently factory-configured** to match the specific signal type: **Voltage Level** (5V-70V) or **Dry Contact** (potential-free).
- **High-Power Switching:** 4 OMRON mechanical relays for reliable AC/DC load switching (up to 10A per channel).
- **Stackable Design:** The 40-pin pass-through header allows other HATs to be used simultaneously, only reserving the 12 required I/O pins.

2. Comprehensive Technical Specifications

Parameter	Value	Condition / Detailed Notes
Input Voltage (Vcc)	5.0V DC	Powered via Raspberry Pi 40-pin header
Number of Outputs	4	Double Isolated Relays (OMRON)
Max Switching Current	10A	Per relay (at 250V AC)
Number of Inputs	8	Opto-isolated digital inputs
Input Versatility	Per-channel config	Voltage or Dry Contact (Factory-set)
Input Voltage Range	3V – 45V	Applies to "Voltage Level" configured channels
Isolation (Output)	Double Isolation	Optocoupler + Relay galvanic separation
Isolation (Input)	Opto-isolation	Full protection against industrial transients

3. qUPS-P-SC User Interfaces and Indicators



4. Input & Output Configuration

4.1 Relay Outputs (4 Channels)

The relays are controlled via the Raspberry Pi's internal GPIO pins.

The relays feature Changeover (CO) contacts (Common, NO, NC) with secondary opto-isolation on the logic side. The outputs are wired to high-quality spring terminals.

Relay	GPIO	Header Pin
Relay 1	GPIO 19	Pin 35
Relay 2	GPIO 26	Pin 37
Relay 3	GPIO 20	Pin 38
Relay 4	GPIO 21	Pin 40

4.2 Digital Inputs (8 Channels)

Each input channel (I1-I8) is factory-set to one of the following types:

1. **Voltage Level Sensing:** Detects 3V-45V AC/DC signals.
2. **Dry Contact Sensing:** Detects the state of potential-free contacts/switches.

Input	GPIO	Header Pin	Terminal Label
Input 1	GPIO 27	Pin 13	I1
Input 2	GPIO 17	Pin 11	I2
Input 3	GPIO 22	Pin 15	I3
Input 4	GPIO 05	Pin 29	I4
Input 5	GPIO 16	Pin 36	I5
Input 6	GPIO 13	Pin 33	I6
Input 7	GPIO 12	Pin 32	I7
Input 8	GPIO 06	Pin 31	I8

5. Hardware Interface

- **Industrial Terminals (Inputs, Outputs):** High-quality, vibration resistant spring terminals for field wiring.
- **Pass-through Header:** Allows stacking additional HATs (only the used 12 GPIOs are reserved).
- **3.3V Logic:** Internally compatible with the Raspberry Pi's 3.3V signaling level.

6. Visual Diagnostics (Status LEDs)

The qPIO features status LEDs for every relay channel, allowing for rapid field diagnostics without software tools:

- **Relay LEDs:** Lights up when the corresponding relay is energized (Active).

7. Software Integration

- **Universal Compatibility:** Since it uses standard GPIO pins, it is compatible with any programming language (Python, C++, Node.js, Codesys).
- **Logic Level:**
 - **Output:** Set GPIO to HIGH to energize the relay.
 - **Input:** GPIO will read HIGH when voltage is present on the terminal.

8. Safety & Compliance

- **Galvanic Isolation:** The control side (Raspberry Pi) is completely separated from the load/sense side.
- **Overvoltage Protection:** Inputs are designed to withstand industrial transients up to the rated limits.

HW Version: 1.0 | **Released:** 2025

Manufacturer: AQEX Electronics | aqex.eu