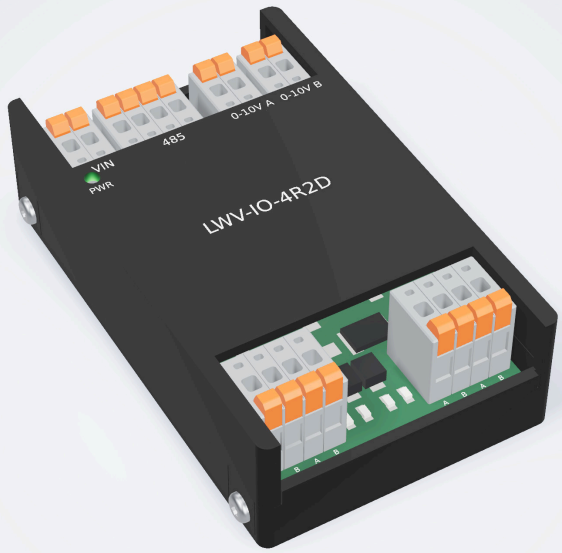
GCU FAMILY

LWV-IO-4R2D

Switch it. Dim it. One DIN-rail module.

The LWV-IO-4R2D gives a GCU four switched contacts and two 0–10 V outputs in one DIN-rail module. The contacts are solid-state and made for 24 V control circuits: contactor coils for fans, pumps and dehumidifiers, solenoid valves and equipment control inputs. It is a Modbus RTU device on the GCU's RS-485 bus, checks its own field wiring, and goes to a state you choose if the bus goes quiet.



Rev C, rendered from the design.

4 × 2 A
solid-state dry contacts for 24 V control circuits

2 × 0–10 V
outputs, sink or source, set in software

RS-485
Modbus RTU, 19 200 baud

53 mm
wide (2.09 in): 3 modules on a 35 mm DIN rail

FEATURES

Four solid-state contacts

Each channel is an isolated dry contact for a 24 V AC or DC control circuit, 2 A continuous. There is no relay to wear out, and every contact has its own resettable fuse and surge suppressor.

Finds wiring faults

Every contact watches its own loop. The module tells an open wire, a blown fuse or a supply that is off from a healthy circuit, before the load is needed.

Sink or source, in software

Each 0–10 V output works with LED drivers that supply their own 10 V (sink) and with inputs that expect a voltage (source). The mode is a setting, not a jumper, and the line is measured back.

A safe state per channel

If the bus goes quiet for longer than the watchdog time, each contact holds, opens or closes and each output holds, goes to 100 % or to 0 %, as you set it.

Lever terminals, labelled

Top-entry lever terminals take 16–26 AWG wire without a screwdriver. Every pole is labelled on the board, in the open ends of the case.

Set up over the bus

The address and the output modes are saved settings written over Modbus: no switches to set wrong on site. Firmware updates travel over the same RS-485 pair.

SPECIFICATIONS

Contact outputs

Channels	4, normally open, solid-state; each isolated from the logic and from the other channels
Circuit voltage	Up to 36 V DC, or 24 V AC nominal: low-voltage control circuits only
Load current	2 A continuous, 3 A inrush, AC or DC
Switch	Toshiba TLP3555A PhotoMOS, rated 60 V and 3 A, 0.1 Ω when on
Isolation	2.5 kV rms, contact to logic (rating of the switch)
Protection	Resettable fuse, 2 A hold / 4 A trip, and a 36 V bidirectional surge suppressor on every contact
Wiring check	Isolated sensing across each open contact, about 1 mA at 24 V
State at power-up	Open until the first command

0–10 V outputs

Channels	2, each sink or source, set in software
Range and resolution	0–10 V, 12-bit
Sink mode	Regulates a line that the connected device powers: LED drivers with a 0–10 V dimming input
Source mode	Drives the line from the module through 220 Ω: fan controllers, drives, actuators, analog inputs
Readback	Line voltage on both outputs; load current in source mode
Line protection	12 V surge suppressor and 1 µF on each output
Drive capability	To be confirmed
State at power-up	To be confirmed

RS-485 and Modbus

Interface	RS-485, 2-wire, half duplex, surge-protected
Protocol	Modbus RTU, 19 200 baud, 8N1
Address	1–247, a saved setting; ships at 45
Termination	120 Ω, by a jumper under the cover
Functions	01, 03, 04, 05, 06, 15, 16
Comms watchdog	0–3600 s, 300 s as shipped; 0 turns it off
On lost comms	Each contact: hold, off or on (ships as hold). Each output: hold, 100 % or 0 % (ships as 100 %)
Diagnostics	Supply voltage, uptime, switching count per contact, bus frame and error counters, fault flags
Firmware update	Over RS-485

Power

Supply	24 V DC nominal, 10–30 V DC
Input protection	1.5 A resettable fuse, reverse-polarity protection, 36 V surge suppressor
Internal supply	5 V buck regulator
Consumption	To be confirmed

Enclosure

Size	53 × 88 × 23.6 mm (2.09 × 3.46 × 0.93 in), without the rail clip
Mounting	35 mm DIN rail, 3 modules wide
Case	Printed ASA, two parts, four screws; terminal ends open
Terminals	WAGO 2601 top-entry lever, 3.5 mm (0.14 in) pitch, 16–26 AWG
Board	48 × 83 mm (1.89 × 3.27 in), 4 layers, factory-assembled
Protection	Not sealed: for a dry panel or a rated enclosure
Operating temperature	To be confirmed
Weight	To be confirmed

Processor and firmware

Processor	RP2350, on a plug-in Seeed XIAO RP2350 module
Firmware	Rev C release in development
USB-C	On the processor module, under the cover; for service only

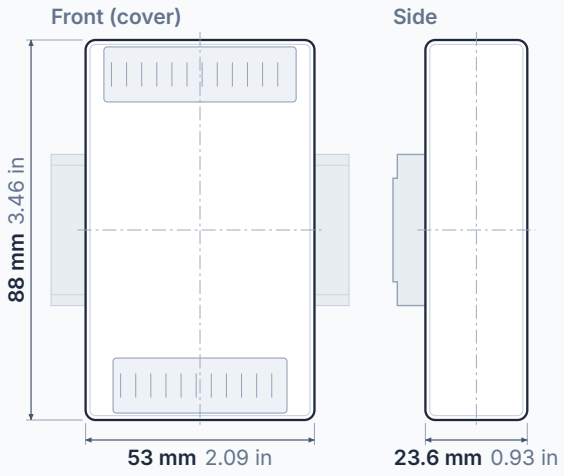
CONNECTORS

PORT	TYPE	USE
VIN	2-pole lever terminal	24 V DC supply: + and −, as labelled on the board
RS-485	4-pole lever terminal	B, A, G, G: the bus pair, the bus reference, and a second G for the cable shield or the onward cable
0-10V A, 0-10V B	2-pole lever terminal each	+ to the 0–10 V input of the device, − to its return
R1 · R2	4-pole lever terminal	R1 A and B, R2 A and B: one dry contact across each pair
R3 · R4	4-pole lever terminal	R3 A and B, R4 A and B
Termination (inside)	2-pin jumper	fit it only when the module is the last device on the bus

STATUS LIGHTS

LIGHT	MEANING
PWR	green: the internal 5 V supply is up
BUS	green flash for each valid Modbus frame addressed to the module
FAULT	red: an internal fault (output driver or measuring circuit not answering) or a contact fault
R1–R4	green: the contact is commanded closed

DIMENSIONS



Weight	To be confirmed
Mounting	Clips onto a 35 mm DIN rail and takes 3 modules, 53 mm (2.09 in), of rail. Wires enter the lever terminals from the front, at both ends of the module: leave room above and below for them to bend.

WORKS WITH

- LWV GCU with firmware 6.2 or later, as an LWV I/O module on the RS-485 bus (address 45 as shipped)
- GCU Cloud and the LWV-GCU app, which name each output and give it a role
- Any Modbus RTU master
- 24 V contactor coils, solenoid valves and equipment control inputs
- LED drivers with a 0–10 V dimming input; fan controllers, drives and actuators with a 0–10 V input

ORDERING

PART	DESCRIPTION
LWV-IO-4R2D	I/O module, Rev C, assembled in its DIN-rail case with the rail clip. Ordering code to be confirmed.

1. Every figure is a design value until bench tests confirm it. The wiring check and the 0–10 V readback need module firmware that is in development.
2. Low-voltage control circuits only. Never connect mains to any terminal: for a mains load, switch the coil of its contactor.
3. Keep each contact circuit at or below 36 V DC or 24 V AC nominal: the surge suppressor across the contact conducts above that.
4. The wiring check passes about 1 mA through the load while a contact is open. A very high-impedance electronic input may read that as closed.
5. Firmware images are checked with CRC16, not cryptographically signed: keep the RS-485 bus to trusted equipment.