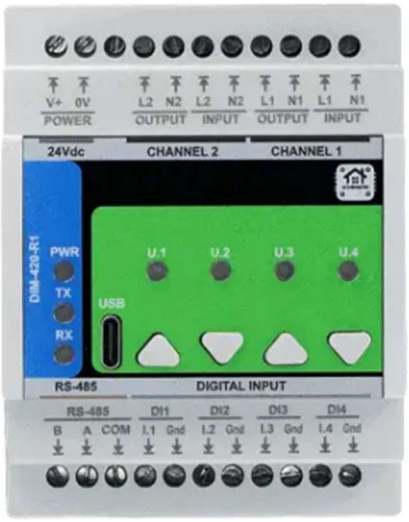
Datasheet

DIM-420-R1 Module

Part No. DIM-420-R1



Manufacturer: ISYSTEMS AUTOMATION S.R.L.
Hardware Version: V1.0
Architecture: Modular (MCU Board + MOSFET Board + Field Board)
Controller: RP2350

Functional Overview

The system is implemented using three hardware boards:

Board	Function
MCU Board	CPU, communication interfaces, USB configuration
Field Board	Digital inputs, signal protection, field interface
MOSFET Board	AC dimming outputs and load switching

The DIM-420-R1 is a modular dimmer I/O module designed for industrial and building automation systems.

It provides 4 isolated digital inputs and 2 AC dimming outputs for monitoring field signals and controlling lighting loads using phase-cut dimming.

The module operates from a 24 V DC supply and includes digital input protection, MOSFET-based AC dimming stages, and communication interfaces for integration with PLCs and distributed control systems.

Its modular architecture and DIN-rail form factor make it suitable for control cabinet.

The module communicates with controllers through RS-485 Modbus RTU and can be configured via USB-C interface.

Technical Specifications

Specification	Details
Microcontroller	RP2350A dual-core microcontroller
Storage	External QSPI Flash (W25Q32JV)
Power Input	24 V DC nominal (V+ / 0V)
Digital Inputs	4 × isolated 24 V DC discrete inputs (DIx + GNDx), supporting dry-contact closure protected by per-channel PTC fuse, TVS surge suppression, and EMI filtering.
Dimming Outputs	2 channels, 110/230 VAC phase-cut (leading/trailing), **1 A RMS per channel** (continuous, Ta ≤ 40°C)
User Interface	4 buttons, 7 x LEDs(Power, 4x user LEDs, RX, TX)
RS-485	RS-485 Modbus RTU (MAX485, half-duplex) with TVS surge protection, PTC fuses, EMI choke, and fail-safe biasing
USB	USB-C (ESD protected, configuration and firmware upload)
File System	LittleFS persistent configuration storage

Note: Relay outputs are not internally fused. Use external overcurrent protection per local code and use an external contactor/relay for loads above 3 A or with high inrush/inductive characteristics.

Installation, Environmental & Mechanical

Category	Specification	Details
Terminal Specifications	Terminal type	Pluggable screw terminal blocks, 5.08 mm pitch
	Terminal pitch	5.08 mm
	Wire cross-section	0.2–2.5 mm² (AWG 24–12)
	Conductor type	Solid or stranded copper
	Stranded wire	Ferrules recommended
	Tightening torque	0.4 Nm (max)
Environmental Ratings	Operating temperature	0 °C to +40 °C
	Storage temperature	-10 °C to 55 °C
	Relative humidity	0–90 % RH, non-condensing
	Ingress protection	IP20 (inside cabinet)
	Installation	Indoor control cabinet only; not for outdoor or exposed installation
	Terminal protection	All wiring terminals must be protected against accidental contact
Mechanical & Packaging	Product dimensions	71.5 x 90 x 59 mm (LxWxH)
	DIN units	4 division units (≈ 72 mm DIN rail mounting width)
	Mounting	35 mm DIN rail
	Net weight	Xxx g
	Gross weight	Xxx+98 g
	Pack size	140× 125 × 94 mm (L × W × H)
	Mechanical drawing	Front + side views with DIN-clip depth (see below)
	Notes	All dimensions shown in millimeters unless stated otherwise

Install only inside a control cabinet with ventilation; the cabinet must include a protective front plate covering all module connection terminals and a closing protective door; not for outdoor or exposed installation.

All wiring terminals must be protected against accidental contact by an insulating front plate, wiring duct, or terminal cover. Exposed live terminals are not permitted.

Cable Recommendations & Shield Grounding

Use shielded, twisted constructions and bond shields correctly to reduce EMI and ground-loop issues.

General Routing Rules

- Route low-level signal cables separately from mains, relay outputs, contactors, VFD motor cables, and power wiring.
- If crossing power cables is unavoidable, cross at **90°**.
- Keep cable runs as short as practical and avoid parallel runs with high-current conductors.

RS-485 Cable

- **Construction:** twisted pair for **A/B**
- **Characteristic impedance: 120 Ω** (recommended)
- **Shielding:** overall shield is recommended in cabinets; use individually shielded pairs + overall shield in high-EMI
- **Examples: J-Y(ST)Y 2×2×0.5 mm²** or **LI2YCY PiMF 2×2×0.50**
- Use one twisted pair for **A/B**. Use the second pair for **COM (0V reference)** or spare.

Shield Grounding

- **Default recommendation:** bond cable shield(s) to cabinet **PE/EMC ground at the PLC end only**.
- **Do not** connect shields to signal terminals (RS-485 A/B/COM).
- If both ends are in equipotential bonded cabinets, shields may be bonded at both ends using proper 360° clamps.

Compliance & Certifications

The HomeMaster MiniPLC is CE marked and designed to comply with the applicable European Union directives. The manufacturer, ISYSTEMS AUTOMATION (HomeMaster brand), maintains the technical documentation and a signed EU Declaration of Conformity (DoC).

EU Directives

EMC 2014/30/EU · LVD 2014/35/EU · RoHS 2011/65/EU

Harmonised Standards

Area	Standards
EMC	EN 61000-6-1 (Immunity) · EN 61000-6-3 (Emissions)
Electrical Safety	EN 62368-1
RoHS	EN IEC 63000

Safety notice

L / N: hazardous voltage · 24 V DC: SELV · Qualified personnel only

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ISYSTEMS AUTOMATION S.R.L.

Deligintei 18

Ploiesti

Romania

Tel: +40721389963

http://www.home-master.eu