



Datasheet

ALM-173-R1 Alarm Input & Relay Output Module

Part No.: ALM-173-R1

Manufacturer: ISYSTEMS AUTOMATION S.R.L.

Hardware Version: V1.0

Architecture: Modular (MCU Board + Field Board)

Controller: RP2350A



Functional Overview

The ALM-173-R1 is a modular alarm input and relay output module designed for intrusion detection, supervision systems, and industrial annunciation panels. It provides 17 opto-isolated digital inputs and 3 SPDT relay outputs, with local user interface (4 buttons, 4 user LEDs). The module communicates over RS-485 as a Modbus RTU slave and is configured via USB-C Web Serial interface.

Board	Function
MCU Board	RP2350A controller, RS-485 communication, USB-C configuration interface, power conversion
Field Board	17 isolated digital inputs, isolated sensor power rails, Relays

The module operates as a Modbus RTU slave over RS-485 and supports configuration and firmware update via USB-C.

Technical Specifications

Specification	Details
Microcontroller	RP2350A dual-core microcontroller
Storage	External QSPI Flash (W25Q32JV, 32 Mbit)
Power Input	24 V DC nominal (V+ / 0V); recommended range 18–30 V DC
Input Protection	1 A time-lag fuse, reverse polarity diode, TVS surge suppression, EMI filtering
Main Logic Supply	Buck regulator 24 V → 5.0 V (~4.96 V nominal), 3.3 V LDO regulator
Digital Inputs	17 × opto-isolated digital inputs, 5 V DC discrete inputs
Max Input Voltage	5 V DC continuous, Input Isolation: 3.75 kVrms (optocoupler test voltage)
Relay Outputs*	3 × SPDT dry-contact relays
Rated Load (System Limit)	3 A @ 250 VAC (resistive contact rating)
Max Load @ 250 VAC	750 VA (system limit)
Max Load @ 30 VDC	90 W (system limit)
Relay Component Rating (Informative Only)	Relay components are rated up to 12 A @ 250 VAC (resistive); however, this rating does not apply to the complete module
Isolated +12 V Output	12 V isolated rail, 2 W; max 167 mA theoretical (≤ 150 mA recommended)
Isolated +5 V Output	5 V isolated rail, 1 W; max 200 mA theoretical (≤ 150 mA recommended)
RS-485	Half-duplex Modbus RTU with surge protection and fail-safe biasing
USB	USB-C, 5 V logic, ESD protected
1-Wire	1 × protected 1-Wire interface (+5 V, DATA, GND)
User Interface	4 buttons; 9 LEDs (Power, 4 user, RX, TX, Relay1, Relay2)
File System	LittleFS persistent configuration storage

*Relay outputs are **not internally fused**. External overcurrent protection must be provided in accordance with applicable standards and installation requirements. Use appropriately rated fuses or circuit breakers and consider external contactors for loads exceeding 3 A or for inductive and high inrush loads.

Typical module power consumption: 0.2–0.5 W (logic only).

Maximum module power consumption: approximately 3 W (relays ON + ISO outputs loaded).

Top Terminal Block (1-28)

Front view – terminals numbered from left to right.

Pos	Marking	Signal	Description
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1	V+	+24V	24 V DC supply input
2	0V	0V	Power supply return
3	GND	DI1_GND	Digital Input 1 return
4	I1	DI1	Digital Input 1
5	GND	DI2_GND	Digital Input 2 return
6	I2	DI2	Digital Input 2
7	GND	DI3_GND	Digital Input 3 return
8	I3	DI3	Digital Input 3
9	GND	DI4_GND	Digital Input 4 return
10	I4	DI4	Digital Input 4
11	GND	DI5_GND	Digital Input 5 return
12	I5	DI5	Digital Input 5
13	GND	DI6_GND	Digital Input 6 return
14	I6	DI6	Digital Input 6
15	GND	DI7_GND	Digital Input 7 return
16	I7	DI7	Digital Input 7
17	GND	DI8_GND	Digital Input 8 return
18	I8	DI8	Digital Input 8
19	GND	DI9_GND	Digital Input 9 return
20	I9	DI9	Digital Input 9
21	GND	DI10_GND	Digital Input 10 return
22	I10	DI10	Digital Input 10
23	NC	R1_NC	Relay 1 Normally Closed
24	C	R1_COM	Relay 1 Common
25	NO	R1_NO	Relay 1 Normally Open
26	NC	R3_NC	Relay 3 Normally Closed
27	C	R3_COM	Relay 3 Common
28	NO	R3_NO	Relay 3 Normally Open

Bottom Terminal Block (12-22)

Front view – terminals numbered from left to right.

Pos	Marking	Signal	Description
29	+	+12V_ISO	Isolated 12 V output
30	–	12V_ISO_GND	12 V return
31	+	+12V_ISO	Isolated 12 V output
32	–	12V_ISO_GND	12 V return

33	+	+5V_ISO	Isolated 5 V output
34	–	5V_ISO_GND	5 V return
35	+	+5V_ISO	Isolated 5 V output
36	–	5V_ISO_GND	5 V return
37	COM	RS485_COM	RS-485 reference
38	B	RS485_B	RS-485 B line
39	A	RS485_A	RS-485 A line
40	GND	DI11_GND	Digital Input 11 return
41	I11	DI11	Digital Input 11
42	GND	DI12_GND	Digital Input 12 return
43	I12	DI12	Digital Input 12
44	GND	DI13_GND	Digital Input 13 return
45	I13	DI13	Digital Input 13
46	GND	DI14_GND	Digital Input 14 return
47	I14	DI14	Digital Input 14
48	GND	DI15_GND	Digital Input 15 return
49	I15	DI15	Digital Input 15
50	GND	DI16_GND	Digital Input 16 return
51	I16	DI16	Digital Input 16
52	GND	DI17_GND	Digital Input 17 return
53	I17	DI17	Digital Input 17
54	NC	R2_NC	Relay 2 Normally Closed
55	C	R2_COM	Relay 2 Common
56	NO	R2_NO	Relay 2 Normally Open

Installation, Environmental & Mechanical

Specification	Details
Terminal Type	Pluggable screw terminal blocks, 5.08 mm pitch
Wire Cross Section	0.2–2.5 mm ² (AWG 24–12)
Tightening Torque	0.4–0.6 Nm

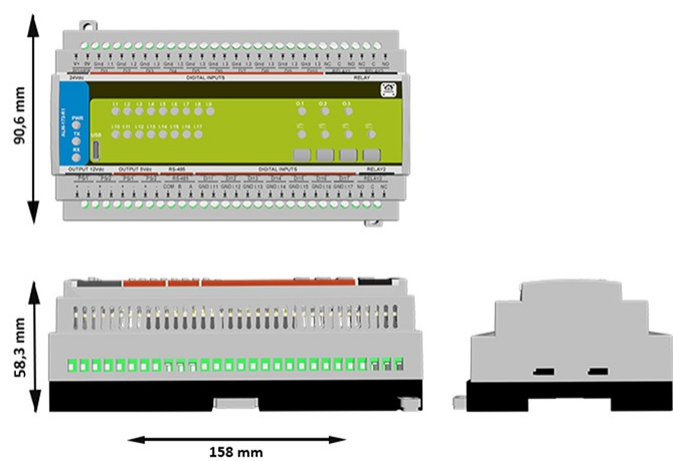
Specification	Details
Operating Temperature	0 °C to +40 °C
Storage Temperature	–10 °C to +55 °C
Relative Humidity	0–90 % RH, non-condensing
Ingress Protection	IP20 (inside cabinet only)
Maximum Altitude	2000 m
Pollution Degree	2

Specification	Details
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Dimensions	158 × 90 × 58.3 mm (L × W × H)
DIN units	4 division units (≈ 160 mm DIN rail mounting width)
Net weight	Xxx g
Gross weight	Xxx+130 g
Pack size	230× 140 × 87 mm (L × W × H)
Mechanical drawing	Front + side views with DIN-clip depth (see below)
Notes	All dimensions shown in millimeters unless stated otherwise
Mounting	35 mm DIN rail (EN 50022)
Enclosure Material	PC/ABS, UL94-V0

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 power wiring.
- If crossing power cables is unavoidable, cross at 90°.
- Keep cable runs as short as practical.
- Avoid parallel runs with high-current conductors.

RS-485 Cable

- Twisted pair recommended (120 Ω characteristic impedance).
- Shielded cable recommended in industrial environments.
- Use one twisted pair for A/B.
- Use second conductor as COM reference if required.

Shield Grounding

- Bond cable shield(s) to cabinet PE/EMC ground at one end (PLC side recommended).
- Do not connect shields directly to signal terminals (A/B/COM).

Compliance & Certifications

The ALM-173-R1 module is CE marked and designed to comply with applicable European Union directives. The manufacturer maintains technical documentation and a signed EU Declaration of Conformity (DoC).

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

Standards: EN 61000-6-1 · EN 61000-6-3 · EN 62368-1 · EN IEC 63000

Safety Notice

The power input and signal terminals are SELV circuits. Relay output terminals may switch hazardous voltage up to 250 VAC.

Adequate insulation and separation must be ensured during installation. Installation by qualified personnel only.

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