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NORVI CONTROLLERS

NORVI X-R8 | Relay Output Expansion

The **NORVI X-R8** is an 8-channel relay output expansion module designed for the NORVI X modular controller platform.

It provides electrically isolated relay outputs suitable for industrial control, automation, and power switching applications.

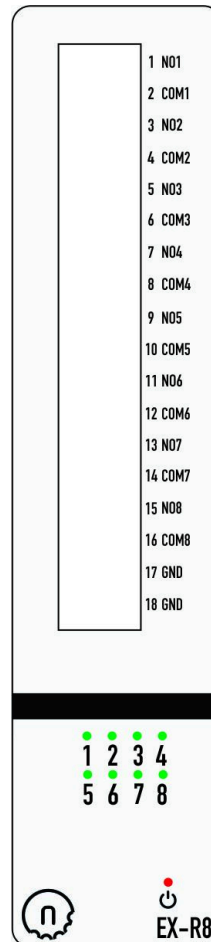
Relay outputs are controlled via an **I²C I/O expander (PCA9538)**, allowing reliable expansion with minimal MCU I/O usage.

Product Features

- 8 × Electromechanical relay outputs (COM / NO)
- Controlled via PCA9538 I²C I/O expander
- Industrial relay with high endurance
- Suitable for AC and DC load switching
- Compact DIN-rail compatible expansion module
- Designed for NORVI X modular architecture

Applications

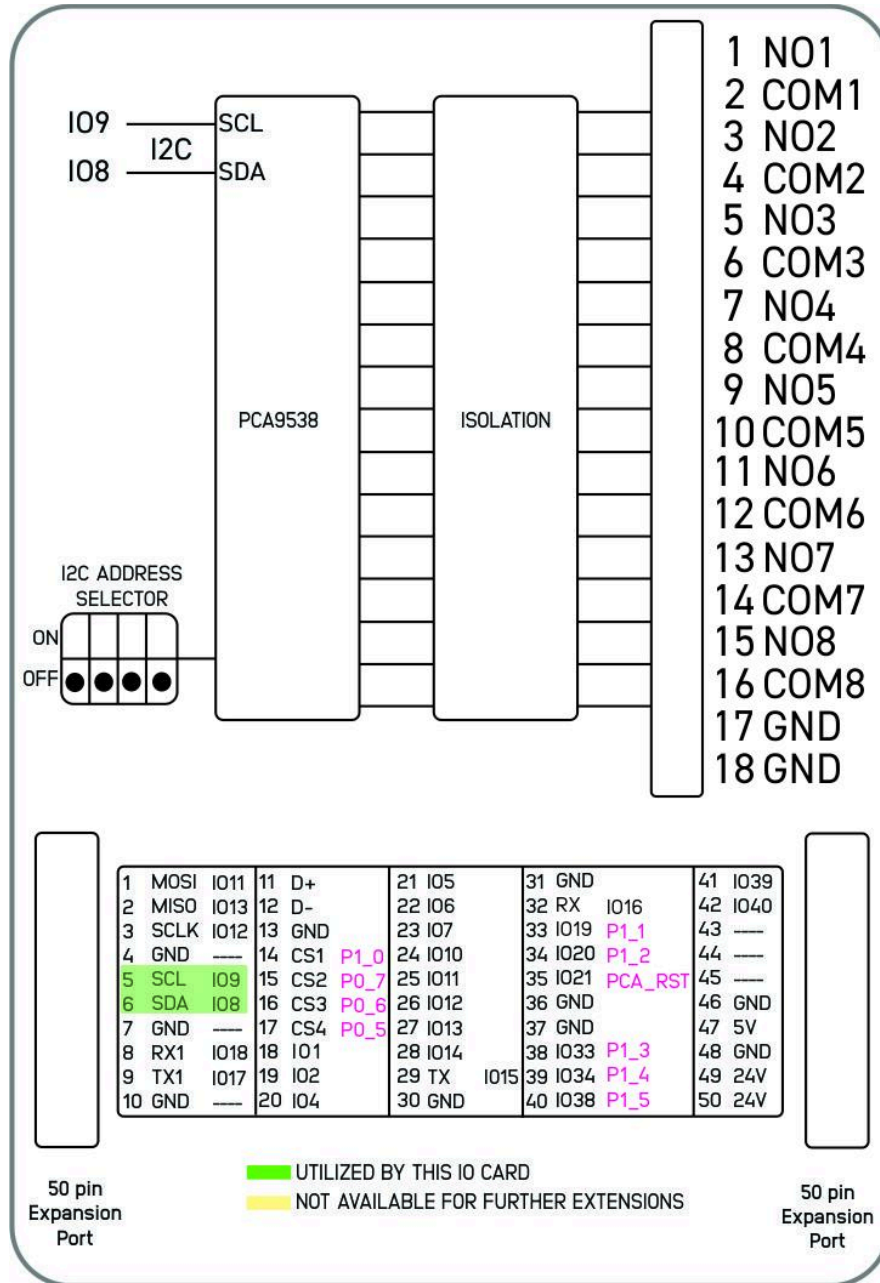
- Machine and process signal monitoring
- PLC and control system I/O expansion
- Sensor interfacing in industrial automation
- Low-frequency pulse and state detection



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Product Block Diagram



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Main

Range of Product	NORVI X
Product type	Expansion Module for NORVI X Series
Certifications	EN 61131-2:2007 EN 61010-1:2010+A1:2019 EN IEC 61010-2-201:2018 2014/30/EU- Electromagnetic Compatibility (EMC) Annex III, Part B, Module C
Rated supply voltage	24V DC

Complementary

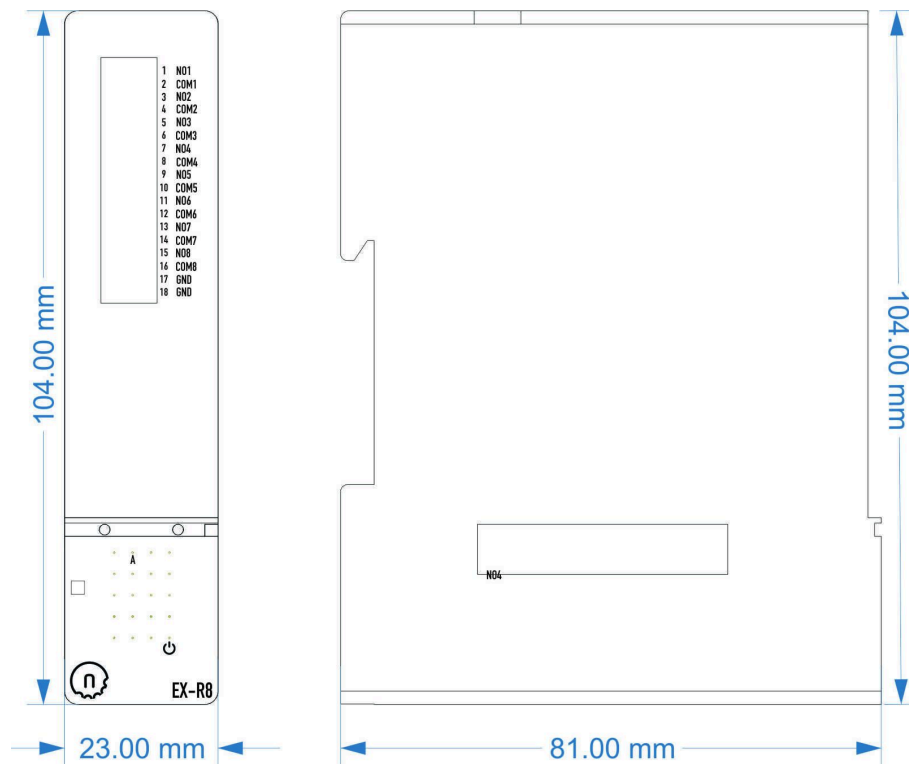
Product Part Numbers	NORVI X-R8
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Mechanical Properties

Enclosure	NORVI X-N1
Mounting / Installation Method	DIN RAIL
Terminal Type	Push-in terminal
Terminal Arrangement	Front
Length	81.00 mm
Height	104.00 mm
Width	23.00 mm

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Environment

IP degree of protection	IP20
Operating altitude	0 - 2000 meters
Operating Temperature	- -10 ... +85° C (14...185 °F)
Storage altitude	0 - 3000 meters
Shock resistance	15 gn for 11ms
Resistance to electrostatic discharge	4kV on contact 8kV on air
Resistance to electromagnetic fields	10 V/m (80 MHz 1GHz) 3 V/m (1.4 MHz 2 GHz) 1 V/m (2 MHz 3 GHz)

Electrical Characteristics

Grid Powered Devices

Rated Supply Voltage (V)	24V DC
Current Consumption (mA)	80mA @ 24VDC

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I/O Specifications

Parameter	Specification
Number of Outputs	8 SPST Relays Outputs
Output Type	Single Pole Normally Open Relay
Isolation Voltage	750 Vrms Between open contacts
Insulation System	Class F
Standard	IEC 61810
Rated Switching Voltage	250 VAC / 30 VDC
Maximum Switching Voltage	277 VAC
Rated Switching Current	5 A
Limiting Continuous Current	5 A
Breaking Capacity (Max)	1250 VA (AC) 750 W (DC)
Contact Material	AgNi, gold-plated
Initial Contact Resistance	$\leq 30 \text{ m}\Omega$ (5 VDC, 100 mA)
Mechanical Endurance	10×10^6 operations
Power Supply	24 V DC (shared with CPU via expansion port)
Communication Bus	Direct GPIO / Internal Expansion Bus
Connector Type	Push-in Terminal Block

Terminal Configuration

No.	Terminal	Description
1	RO1_NO	Relay 1 Normally Open
2	RO1_COM	Relay 1 Common
3	RO2_NO	Relay 2 Normally Open
4	RO2_COM	Relay 2 Common
5	RO3_NO	Relay 3 Normally Open

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6	RO3_COM	Relay 3 Common
7	RO4_NO	Relay 4 Normally Open
8	RO4_COM	Relay 4 Common
9	RO5_NO	Relay 5 Normally Open
10	RO5_COM	Relay 5 Common
11	RO6_NO	Relay 6 Normally Open
12	RO6_COM	Relay 6 Common
13	RO7_NO	Relay 7 Normally Open
14	RO7_COM	Relay 7 Common
15	RO8_NO	Relay 8 Normally Open
16	RO8_COM	Relay 8 Common
17	GND	Ground
18	GND	Ground

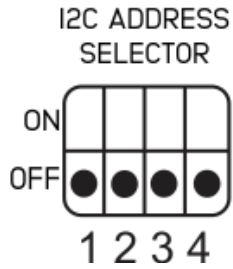
GPIO Utilization

Utilization	Connection to CPU
SCL	IO9
SDA	IO8

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I2C Address Selection



Address Selection				
DIP 1	DIP 2	DIP 3	DIP 3	Address
OFF	OFF	x	x	0x73
ON	OFF	x	x	0x72
OFF	ON	x	x	0x71
ON	ON	x	x	0x70

Expansion Port

Utilized GPIO Connections are highlighted in Green. They cannot be used for any other purpose with this module connected.

PIN INDEX	Purpose	GPIO	SOURCE
1	MOSI	IO11	ESP32-S3
2	MISO	IO13	
3	SCLK	IO12	
4	GND	----	
5	SCL	IO9	
6	SDA	IO8	
7	GND	----	
8	RX1	IO18	
9	TX1	IO17	
10	GND	----	
11	D+	----	
12	D-	----	
13	GND	----	
14	CS1	P1_0	PCA9539 I2C Address 0x75
15	CS2	P0_7	
16	CS3	P0_6	
17	CS4	P0_5	
18	IO1	IO1	ESP32-S3
19	IO2	IO2	
20	IO4	IO4	
21	IO5	IO5	

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22	IO6	IO6	
23	IO7	IO7	
24	IO10	IO10	
25	IO11	IO35	
26	IO12	IO36	
27	IO13	IO37	
28	IO14	IO14	
29	RS485_TX	IO15	
30	GND	----	
31	GND	----	
32	RS485_RX	IO16	
33	P1_1	P1_1	
34	P1_2	P1_2	
35	IO21	IO21	PCA9538 Reset
36	GND	----	
37	GND	----	
38	P1_3	P1_3	PCA9539 I2C Address 0x75
39	P1_4	P1_4	
40	P1_5	P1_5	
41	IO39	IO39	ESP32-S3
42	IO40	IO40	
43	NC	----	
44	NC	----	
45	NC	----	
46	GND	----	
47	5V	5V	
48	GND	GND	
49	24V	24V	
50	24V	24V	

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