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NORVI CONTROLLERS

NORVI X-R4 | Relay Output Expansion

The **NORVI X-R4** is an 4-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.

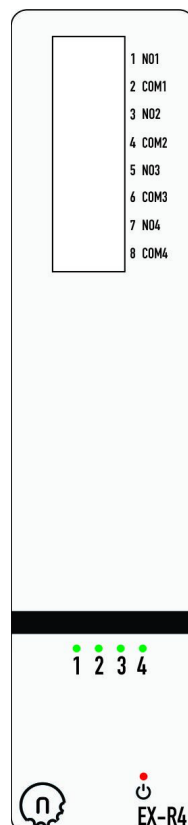
Relay outputs are controlled via an **I²C I/O expander (PCA9538)**, allowing reliable expansion with minimal MCU I/O usage.

Product Features

- 4 × 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

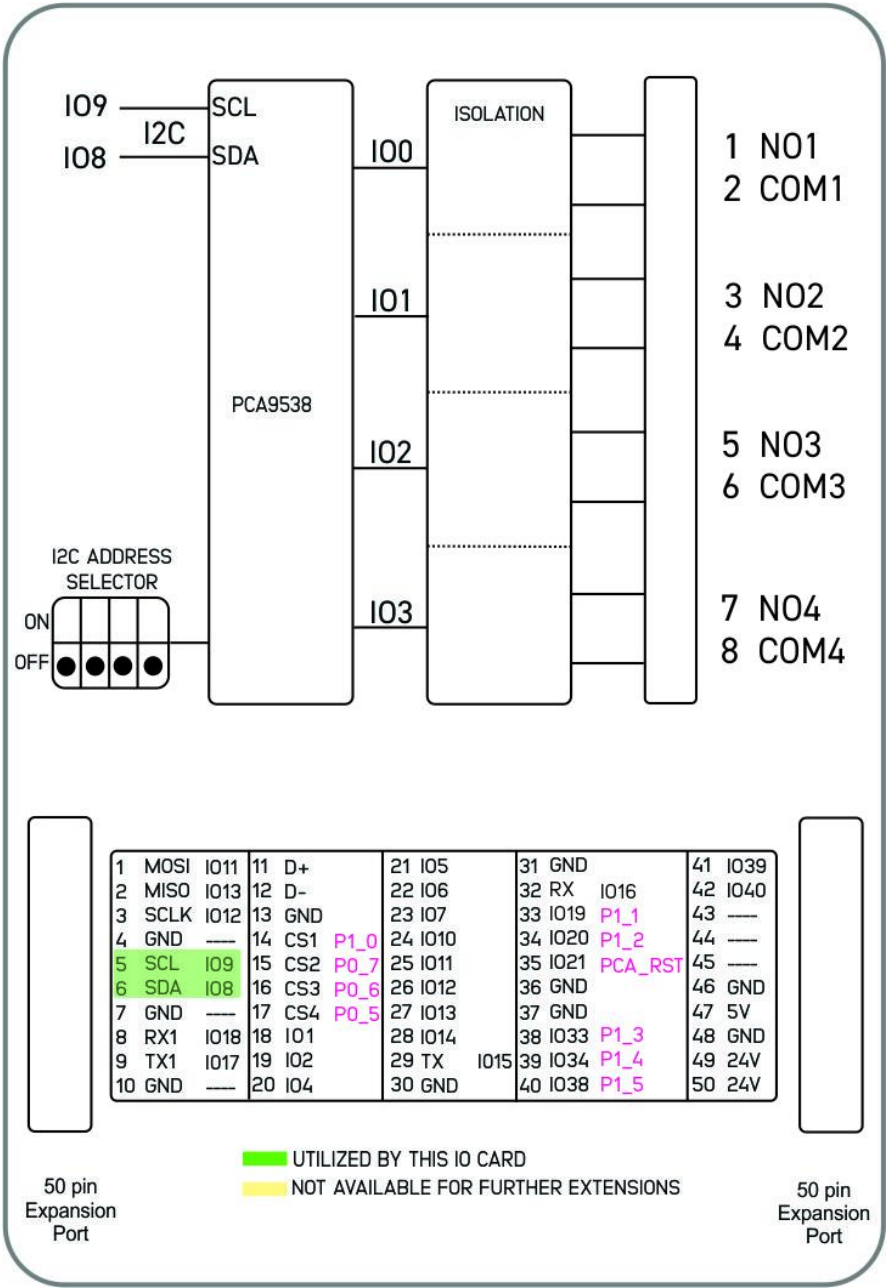
- Small machine and process signal control
- PLC/controller I/O expansion for limited outputs
- Sensor interfacing for industrial automation
- Low-frequency pulse/state switching for devices



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Product Block Diagram



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Main

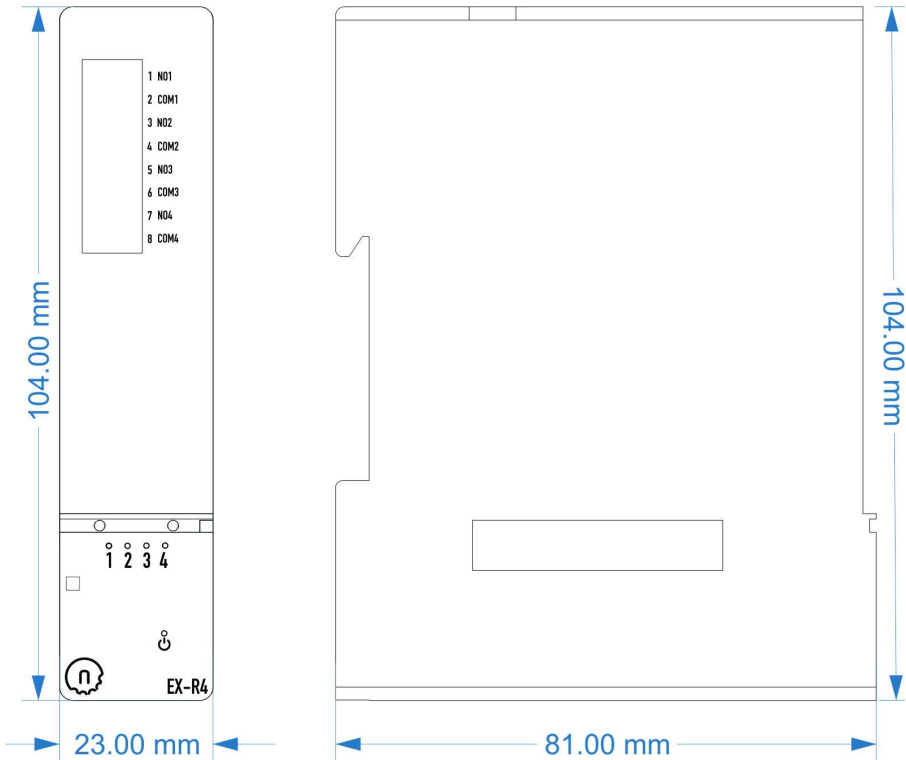
Range of Product	NORVI X
Product type	Expansion Module for NORVI X Series
Certifications	EN 61131-2:2007 EN 61010-1:2010+A1:2019 EN IEC 61010-2-201:2018 2014/30/EU- Electromagnetic Compatibility (EMC) Annex III, Part B, Module C
Rated supply voltage	24V DC

Complementary

Product Part Numbers	NORVI X-R4
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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

I/O Specifications

Parameter	Specification
Number of Outputs	4 x 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	≤ 30 mΩ (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

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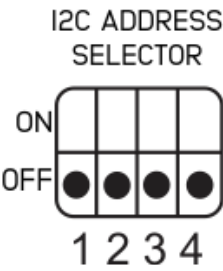
Terminal Configuration

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
6	RO3_COM	Relay 3 Common
7	RO4_NO	Relay 4 Normally Open
8	RO4_COM	Relay 4 Common

GPIO Utilization

Utilization	Connection to CPU
SCL	IO9
SDA	IO8

I2C Address Selection



Address Selection				
DIP 1	DIP 2	DIP 3	DIP 4	Address
OFF	OFF	×	×	0x73
ON	OFF	×	×	0x72
OFF	ON	×	×	0x71
ON	ON	×	×	0x70

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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	
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	PCA9539 I2C Address 0x75
34	P1_2	P1_2	

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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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