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NORVI CONTROLLERS

NORVI X-DI4 | Digital Input Expansion

The **NORVI X-DI4** is an **industrial-grade digital input expansion module** designed to seamlessly integrate with the NORVI X Modular Controller. It provides **four optically isolated and protected 24 V DC digital inputs**, enabling reliable interfacing with sensors, switches, and other field devices used in industrial automation and monitoring systems.

The **DI4 variant** directly connects its inputs to the **host CPU's GPIO**, offering **high-speed signal capture** suitable for **PWM, pulse-train, and encoder inputs**. Its design ensures noise immunity, galvanic isolation, and compatibility with both sourcing (PNP) and sinking (NPN) sensor types.

Product Features

- 4 × Optically Isolated 24 V Digital Inputs
- Direct GPIO Link to Host CPU (for high-speed signal acquisition)
- Supports fast inputs such as PWM, pulse trains & encoders
- One common terminal for all four inputs
- DIN-rail mountable industrial enclosure
- Status indicators for each input

Applications

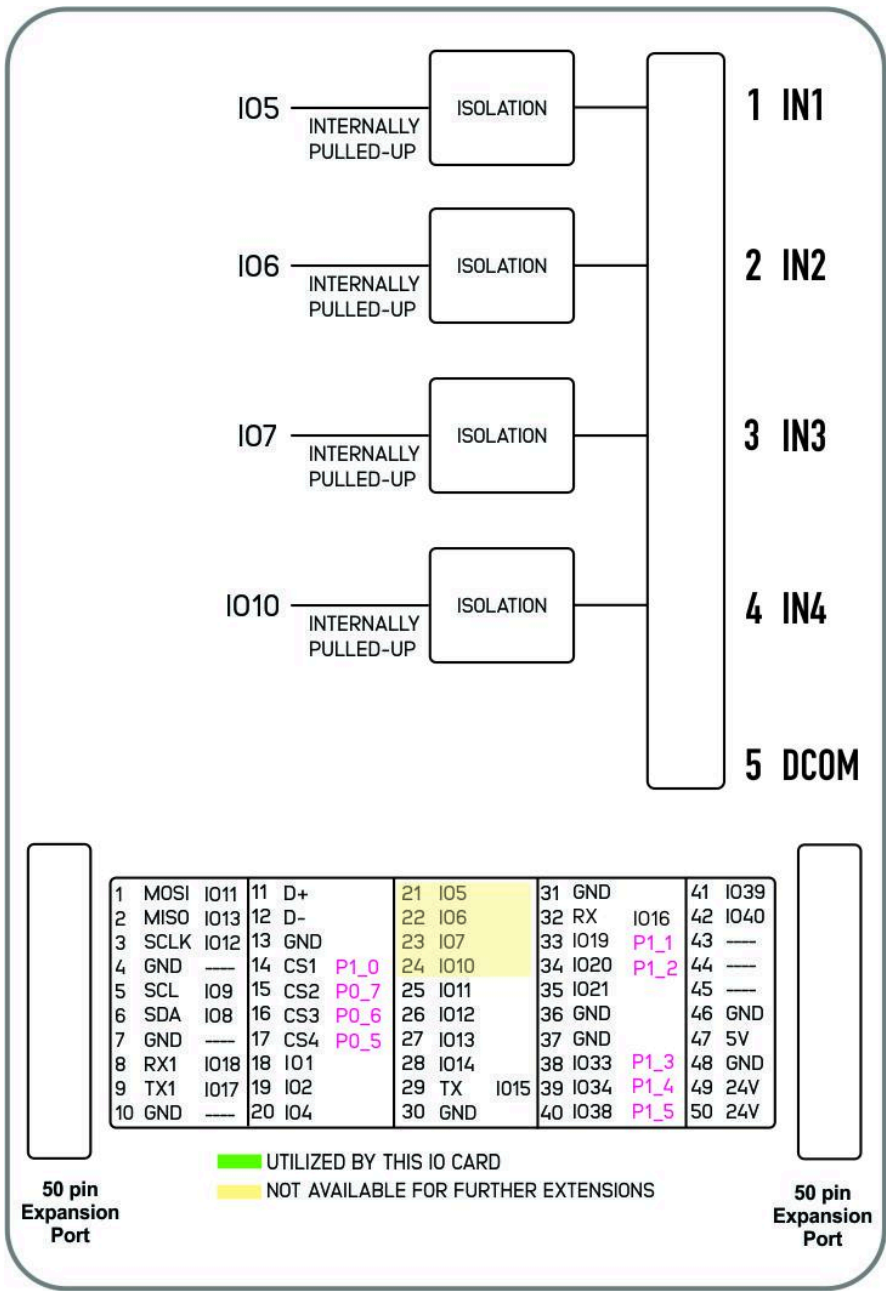
- Industrial switch and sensor interfacing
- Counter and encoder signal reading
- Pulse input measurement and frequency monitoring
- Fast digital signal capture from machines or process lines



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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-DI4
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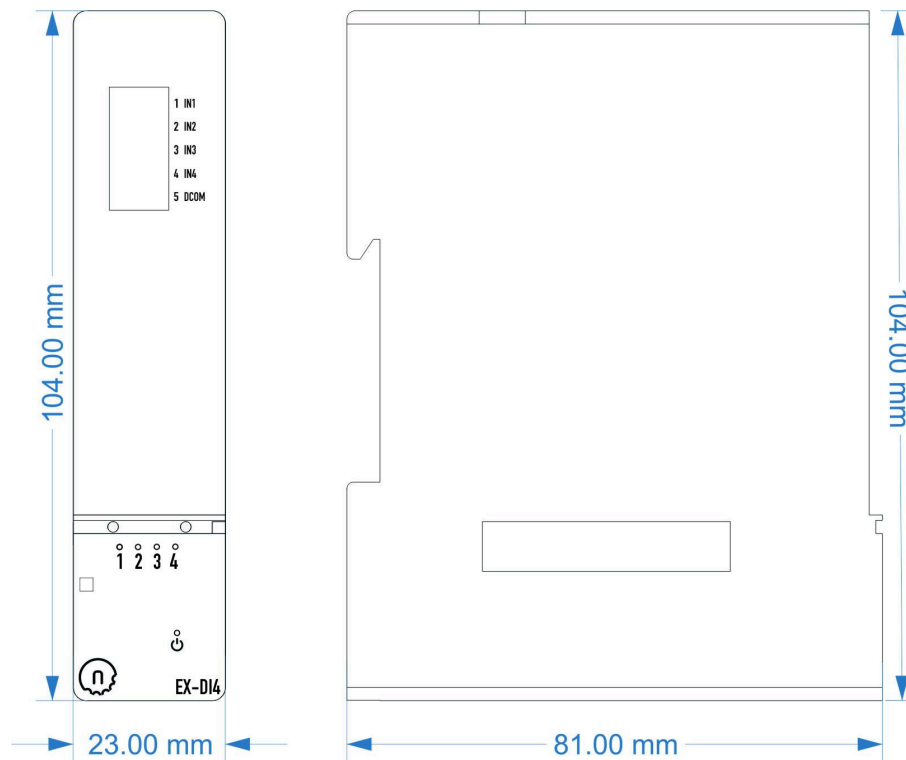
Mechanical Properties

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 Inputs	4 Digital Inputs
Input Type	Isolated 24 V DC
Isolation Voltage	> 1500 Vrms (optical isolation from CPU)
Input Voltage Range	0 – 30 V DC
Logic Low (OFF)	< 5 V DC
Logic High (ON)	> 15 V DC
Input Impedance	Approx. 3.3 kΩ
Input Current	~ 7 mA @ 24 V DC
Switching Frequency	Up to 5 kHz (fast input mode)
Protection	Over-voltage, Reverse Polarity, ESD Protected
Isolation Type	Opto-coupler isolation per channel
Interface to CPU	NORVI X Expansion Port (Direct GPIO)
Status Indicators	4 × LED Input Indicators
Power Supply	24 V DC (shared with CPU via expansion port)
Communication Bus	Internal Expansion Bus
Connector Type	Push-in Terminal Block

Terminal Configuration

Terminal	Description
IN1	Digital Input 1
IN2	Digital Input 2
IN3	Digital Input 3
IN4	Digital Input 4
DCOM	Isolated Digital Ground

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GPIO Utilization

Utilization	Connection to CPU
Digital Input 1	IO5
Digital Input 2	IO6
Digital Input 3	IO7
Digital Input 4	IO10

Expansion Port

Utilized GPIO Connections are highlighted in Yellow. 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	PCA9539 I2C Address 0x75
34	P1_2	P1_2	
35	IO21	IO21	ESP32-S3
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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