

# DATASHEET

NORVI CONTROLLERS  
NORVI X-DI16 | Digital Input Expansion

---

The **NORVI X-DI16** is an **16-channel digital input expansion module** for the **NORVI X Modular Controller**. It provides **protected 24 V DC digital inputs** for industrial switches, sensors, and logic-level signals.

At its core, the module integrates a **PCA9555 I<sup>2</sup>C port expander**, allowing the NORVI X CPU to read input states efficiently via the internal expansion bus. With **four selectable I<sup>2</sup>C addresses**, up to **four DI16 modules** can be connected on the same bus, providing a total of **64 digital inputs** per controller.

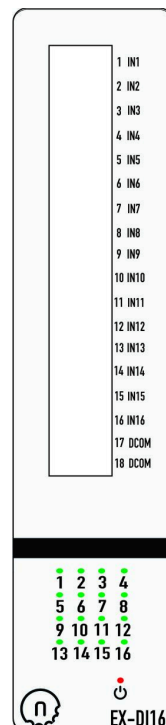
Designed for modular scalability and DIN-rail mounting, the **NORVI X-DI16** delivers reliable, noise-immune, and space-efficient 16-channel input expansion, making it ideal for industrial automation and control applications.

## Product Features

- 16 × Optically isolated 24 V DC digital inputs
- Bi-directional optocouplers — support both sourcing (PNP) and sinking (NPN) inputs
- One common terminal for all sixteen inputs
- PCA9555 I<sup>2</sup>C port expander with 8 selectable addresses
- Up to 8 DI16 modules per controller (128 inputs max)
- Built-in over-voltage and reverse-polarity protection
- Status LED indicators for each input channel
- Plug-and-play connection to NORVI X CPU module via expansion bus
- DIN-rail mountable industrial enclosure

## Applications

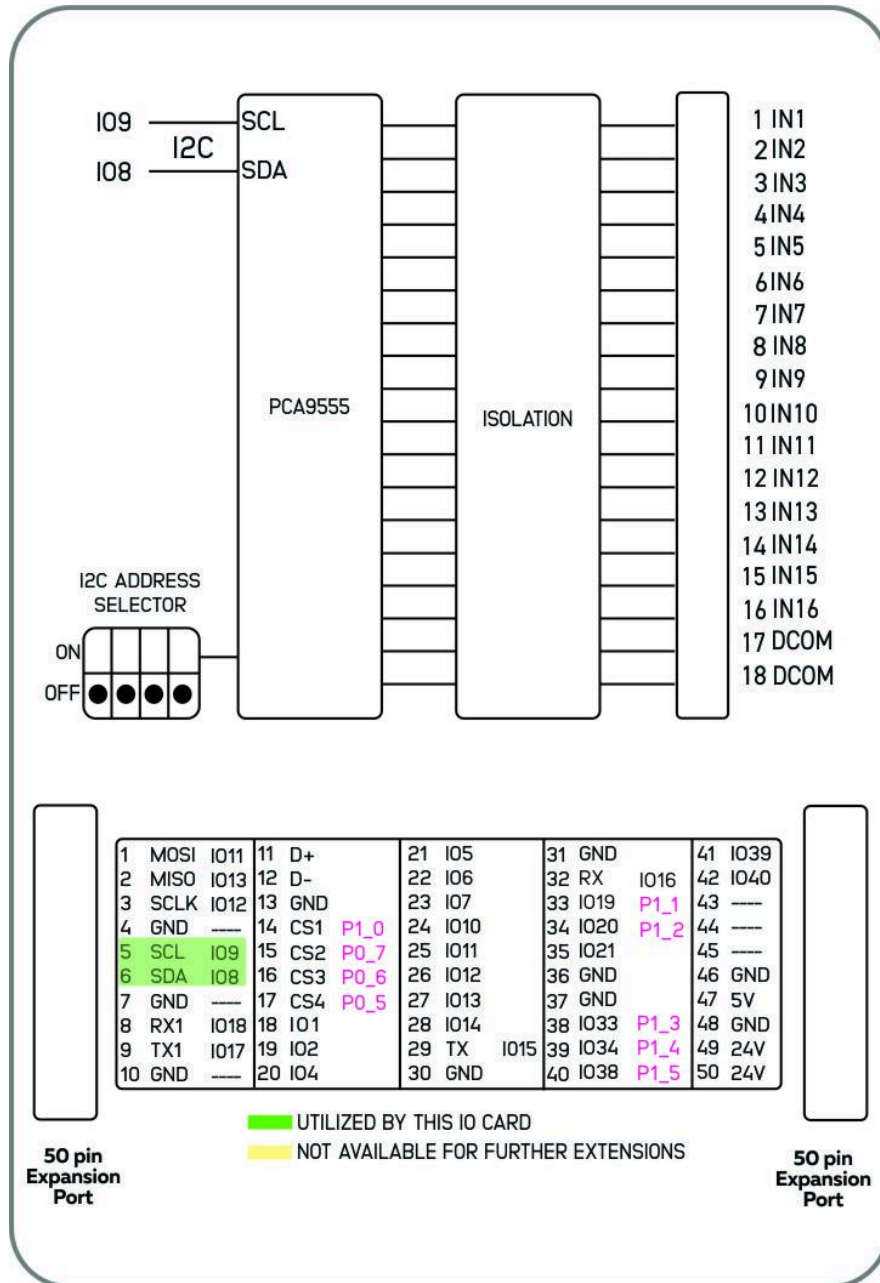
- High-density machine and process signal monitoring
- Large-scale PLC and control system I/O expansion
- Universal NPN/PNP sensor interfacing
- High-speed pulse and encoder signal capture



# DATASHEET

NORVI CONTROLLERS  
 NORVI X-DI16 | Digital Input Expansion

## Product Block Diagram



# DATASHEET

NORVI CONTROLLERS

NORVI X-DI16 | Digital Input Expansion

---

## Main

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

## Complementary

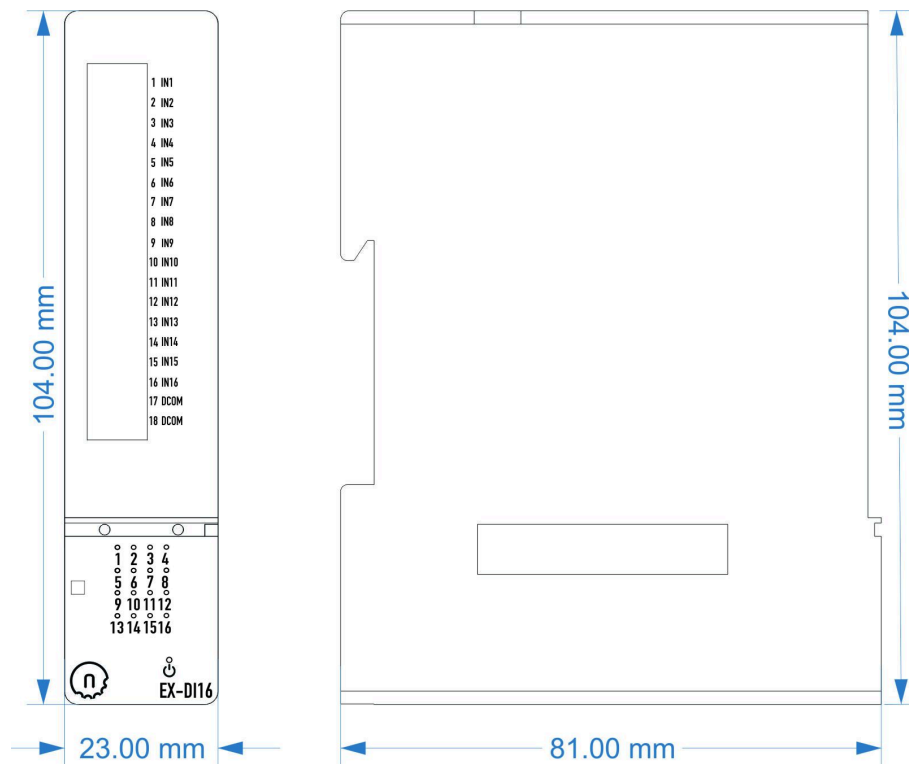
|                      |              |
|----------------------|--------------|
| Product Part Numbers | NORVI X-DI16 |
|----------------------|--------------|

## 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         |

# DATASHEET

NORVI CONTROLLERS  
 NORVI X-DI16 | Digital Input Expansion



## 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<br>8kV on air   |
| Resistance to electromagnetic fields  | 10 V/m (80 MHz ..... 1GHz)<br>3 V/m (1.4 MHz ..... 2 GHz)<br>1 V/m (2 MHz ..... 3 GHz) |

## Electrical Characteristics

### Grid Powered Devices

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

# DATASHEET

NORVI CONTROLLERS  
NORVI X-DI16 | Digital Input Expansion

---

## I/O Specifications

| Parameter           | Specification                                 |
|---------------------|---|
| Number of Inputs    | 16 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 1 kHz                                   |
| 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   | 16 × 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 |
| IN5      | Digital Input 5 |
| IN6      | Digital Input 6 |

# DATASHEET

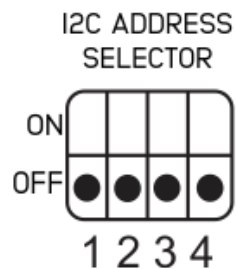
NORVI CONTROLLERS  
NORVI X-DI16 | Digital Input Expansion

|      |                         |
|------|-------------------------|
| IN7  | Digital Input 7         |
| IN8  | Digital Input 8         |
| IN9  | Digital Input 9         |
| IN10 | Digital Input 10        |
| IN11 | Digital Input 11        |
| IN12 | Digital Input 12        |
| IN13 | Digital Input 13        |
| IN14 | Digital Input 14        |
| IN15 | Digital Input 15        |
| IN16 | Digital Input 16        |
| DCOM | Isolated Digital Ground |
| DCOM | Isolated Digital Ground |

## 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   | OFF   | ×     | 0x27    |
| ON                | OFF   | OFF   | ×     | 0x26    |
| OFF               | ON    | OFF   | ×     | 0x25    |
| ON                | ON    | OFF   | ×     | 0x24    |
| OFF               | OFF   | ON    | ×     | 0x23    |
| ON                | OFF   | ON    | ×     | 0x22    |
| OFF               | ON    | ON    | ×     | 0x21    |
| ON                | ON    | ON    | ×     | 0x20    |

# DATASHEET

NORVI CONTROLLERS  
NORVI X-DI16 | Digital Input Expansion

---

## 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<br>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      | ---- |                             |

# DATASHEET

NORVI CONTROLLERS

NORVI X-DI16 | Digital Input Expansion

---

|    |          |      |                             |
|----|----------|------|-----------------------------|
| 31 | GND      | ---- |                             |
| 32 | RS485_RX | IO16 |                             |
| 33 | P1_1     | P1_1 | PCA9539<br>I2C Address 0x75 |
| 34 | P1_2     | P1_2 |                             |
| 35 | IO21     | IO21 | ESP32-S3                    |
| 36 | GND      | ---- |                             |
| 37 | GND      | ---- |                             |
| 38 | P1_3     | P1_3 | PCA9539<br>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  |                             |

# DATASHEET

NORVI CONTROLLERS

NORVI X-DI16 | Digital Input Expansion

---



## REACH US

Technical Support

E-mail : [support@norvi.io](mailto:support@norvi.io)

Sales Inquiries

E-mail [support@norvi.io](mailto:support@norvi.io)

Web [www.norvi.lk/support](http://www.norvi.lk/support)

Order Online [www.norvi.io](http://www.norvi.io)