

DATASHEET

NORVI CONTROLLERS

NORVI X-AQ4 | Analog Output Expansion

The **NORVI X-AQ4** is a high-performance 4-channel analog output expansion module for the NORVI X Modular Controller, enabling precise control of industrial actuators, VFDs, and process valves.

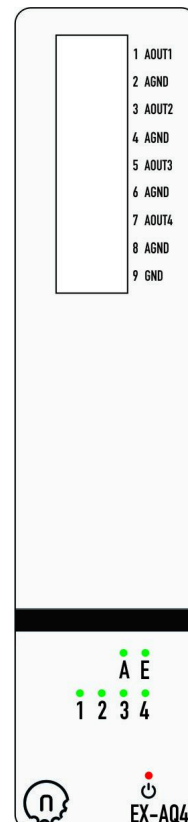
Featuring an onboard **STM32 microcontroller** for dedicated **12-bit DAC** management, the module offloads timing-critical signal generation from the main CPU to ensure superior stability. It provides four independent outputs configurable for **0-10V** or **4-20mA** signals, each protected by **active filtering** and **TVS diodes** for maximum noise immunity and surge protection in harsh industrial environments.

Product Features

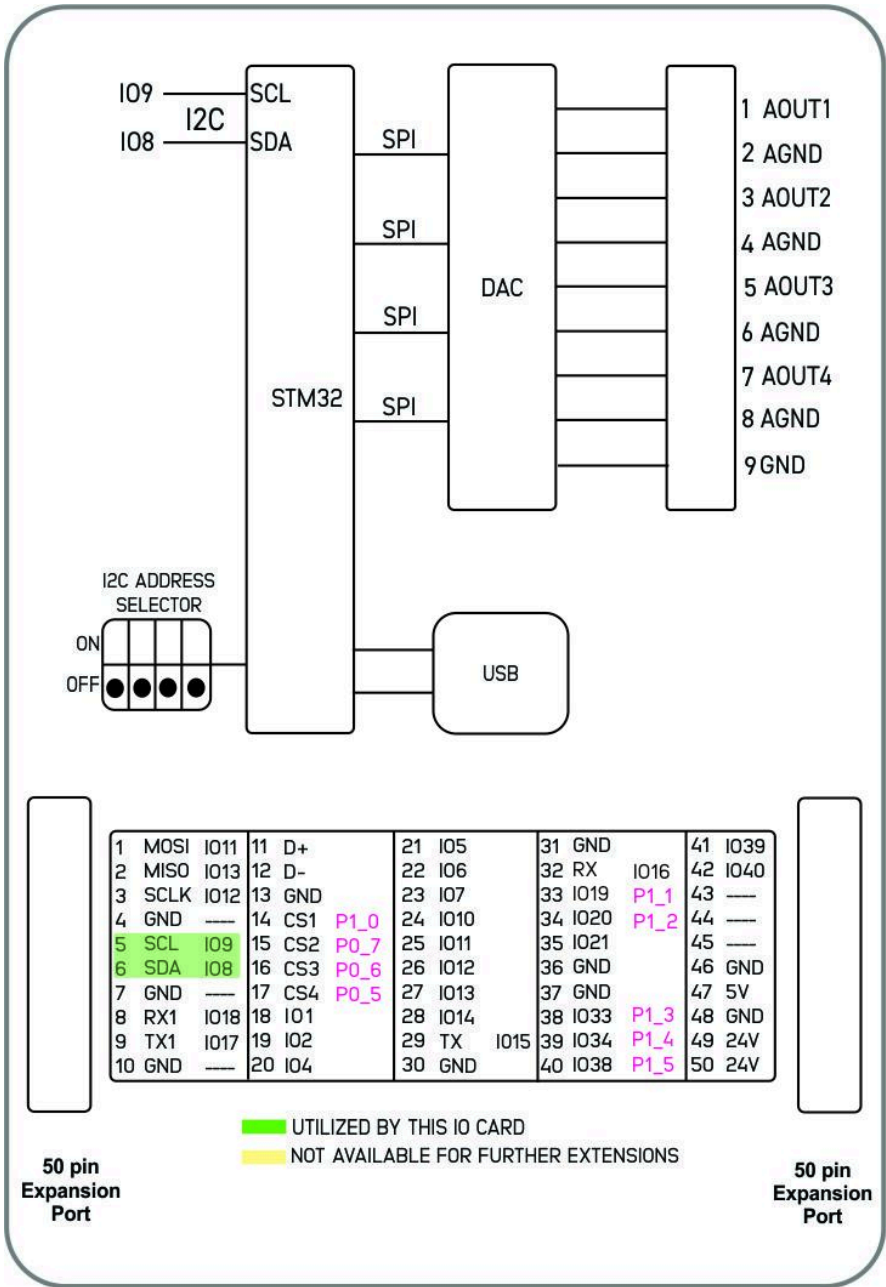
- 4-Channel Analog Output
- 12-bit DAC Resolution
- 0-10V DC / 4-20mA Support
- I²C Expansion Bus
- DIP Switch Addressing
- Status LED indicators for each input channel
- Plug-and-play connection to NORVI X CPU module via expansion bus
- DIN-rail Mounting

Applications

- Variable Frequency Drive (VFD) Control
- Process Automation Systems
- Analog Signal Simulation
- Remote Signal Transmission
- Lighting and Dimming Control



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-AQ4
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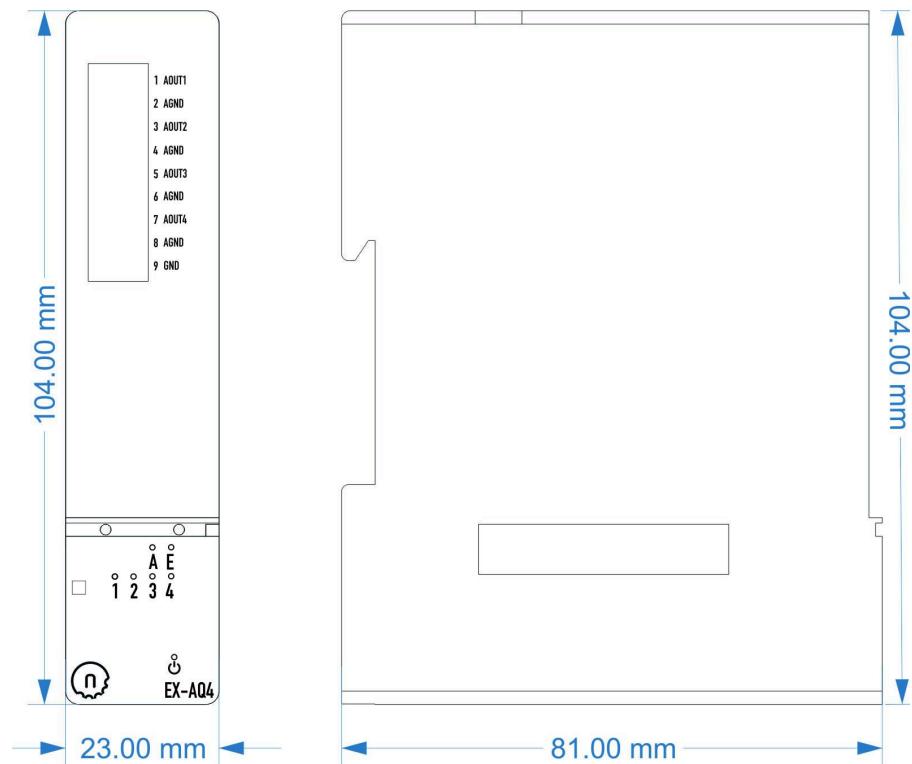
Mechanical Properties

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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Technical Specifications

Feature	Specification
Output Channels	4 Channels
Resolution	12-bit
Output Ranges	0-10V DC / 4-20mA (Software Configurable)
USB	For Debugging Only
Communication	I ² C Interface
Microcontroller	STM32 Series (Internal Bridge)
Power Supply	24V DC (via Expansion Bus)
Internal Interface	High-Speed SPI (MCU to DAC Output Stage)

Terminal Configuration

Terminal	Description
AOUT1	Analog Output 1
AOUT2	Analog Output 2
AOUT3	Analog Output 3
AOUT4	Analog Output 4
AGND x 4	Analog Ground
GND	Ground

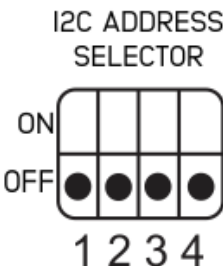
GPIO Utilization

Utilization	Connection to CPU
SCL	IO9
SDA	IO8

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I2C Address Selection



Address Selection				
DIP 1	DIP 2	DIP 3	DIP 4	Address
OFF	OFF	OFF	OFF	0x5F
ON	OFF	OFF	OFF	0x57
OFF	ON	OFF	OFF	0x5B
ON	ON	OFF	OFF	0x53
OFF	OFF	ON	OFF	0x5D
ON	OFF	ON	OFF	0x55
OFF	ON	ON	OFF	0x59
ON	ON	ON	OFF	0x51
OFF	OFF	OFF	ON	0x5E
ON	OFF	OFF	ON	0x56
OFF	ON	OFF	ON	0x5A
ON	ON	OFF	ON	0x52
OFF	OFF	ON	ON	0x5C
ON	OFF	ON	ON	0x54
OFF	ON	ON	ON	0x58
ON	ON	ON	ON	0x50

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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	----	

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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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