MITSUBISHI ELECTRIC

MELSEC System Q

Programmable Controllers

Installation Manual for NAMUR Input Module ME1X16NA-Q

Art.no.: 260165 ENG, Version A, 11122012

Safety Information

For qualified staff only

This manual is only intended for use by properly trained and qualified electrical technicians who are fully acquainted with automation technology safety standards. All work with the hardware described, including system design, installation, setup, maintenance, service and testing, may only be performed by trained electrical technicians with approved qualifications who are fully acquainted with the applicable automation technology safety standards and regulations.

Proper use of equipment

The programmable controllers (PLC) of the MELSEC System Q are only intended for the specific applications explicitly described in this manual or the manuals listed below. Please take care to observe all the installation and operating parameters specified in the manual. All products are designed, manufactured, tested and documented in agreement with the safety regulations. Any modification of the hardware or software or disregarding of the safety warnings given in this manual or printed on the product can cause injury to persons or damage to equipment or other property. Only accessories and peripherals specifically approved by MITSUBISHI ELECTRIC may be used. Any other use or application of the products is deemed to be improper.

Relevant safety regulations

All safety and accident prevention regulations relevant to your specific application must be observed in the system design, installation, setup, maintenance, servicing and testing of these products.
In this manual special warnings that are important for the proper and safe use of the products are clearly identified as follows:

DANGER:
Personnel health and injury warnings.
Failure to observe the precautions described here can result in serious health and injury hazards.

CAUTION:
Equipment and property damage warnings.
Failure to observe the precautions described here can result in serious damage to the equipment or other property.

Further Information

The following manuals contain further information about the module:

- Hardware manuals for the MELSEC System Q
- User's Manual for the NAMUR Input Module ME1X16NA-Q
- MELSEC-Q/L Programming Manual

These manuals are available free of charge through the internet (www.mitsubishi-automation.com).

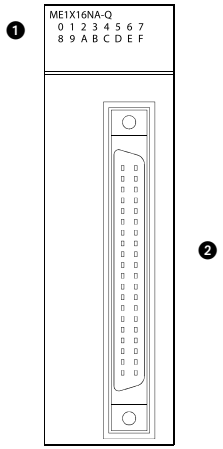
If you have any questions concerning the installation, configuration or operation of the equipment described in this manual, please contact your relevant sales office or department.

Overview

The ME1X16NA-Q is a digital input module for connection of up to 16 NAMUR sensors. In contrast to an ordinary binary sensor which has only the two states ON and OFF, a NAMUR sensor can indicate four states: ON, OFF, wire break and short circuit.

The ME1X16NA-Q supplies the voltage for the sensors and measures the current in order to detect their individual states. Wire breaks and short circuits are recognised for each input.

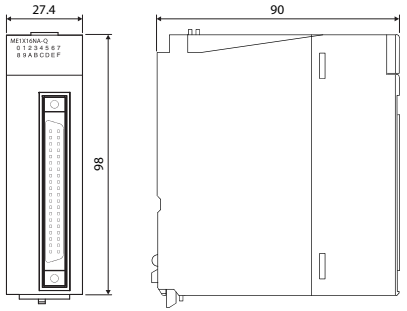
Part Names



No.	Description	
❶	Indicator LEDs	Used to indicate the status of each input. (0: Input CH0 to F: Input CHF)
		● Input is ON
		○ Input is OFF
❷	40-pin connector	Used for connection of the NAMUR sensors and the external power supply.

●: LED is ON, ○: LED is OFF

Dimensions



All dimensions are in „mm".

Weight: 0.14 kg

Installation and Wiring

DANGER

Turn off all phases of the power supply for the PLC and other external sources before starting the installation or wiring work.
In a system where a CPU module supporting the online module change is used, modules can be replaced online (during energizing). For details, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

CAUTION

- ***Use the product in the environment within the general specifications described in the Hardware Manual for the MELSEC System Q. Never use the product in areas with dust, oily smoke, conductive dusts, corrosive or flammable gas, vibrations or impacts, or expose it to high temperature, condensation, or wind and rain.***
- ***When drilling screw holes or wiring, cutting chips or wire chips should not enter ventilation slits. Such an accident may cause fire, failure or malfunction.***
- ***A protective film is attached onto the module top to prevent foreign matters such as wire chips entering the module during wiring. Do not remove the film during wiring. Remove it for heat dissipation before system operation.***
- ***Before handling modules, touch a grounded metal object to discharge the static electricity from the human body. Not doing so may cause failure or malfunctions of the module.***

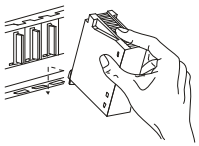
Tighten the module screw within the following ranges.

Screw	Torque
Module fixing screw (M3, optional)	0.36 to 0.48 Nm

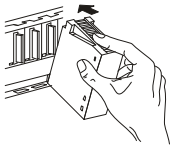
Mounting a module to a base unit

CAUTION

- ***Do not drop the module or subject it to heavy impact.***
- ***Do not open or modify a module. Doing so can cause a failure, malfunction, injury or fire.***
- ***Always insert the module fixing latch of the module into the module fixing hole of the base unit. Forcing the hook into the hole will damage the module connector and module.***
- ***Do not touch the conductive parts of the module directly. Doing so can cause a unit malfunction or failure.***



① After switching off the power supply, insert the module fixing latch into the module fixing hole of the base unit.



② Push the module in the direction of the arrow to load it into the base unit.

③ Secure the module with an additional screw (M3 x 12) to the base unit if large vibration is expected. This screw is not supplied with the module.

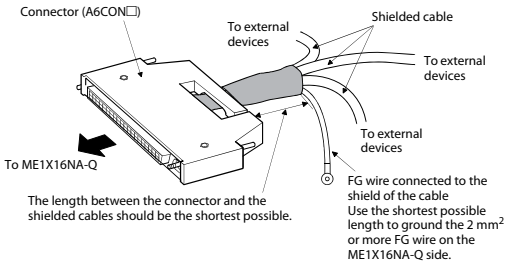
Wiring

CAUTION

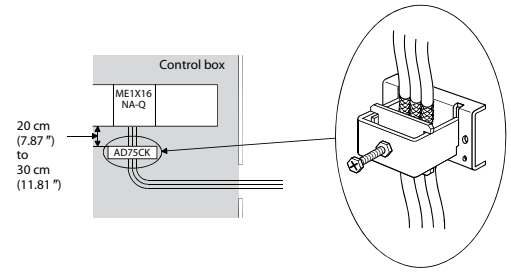
- ***Always confirm the terminal layout before connecting the wires to the ME1X16NA-Q (refer to the next page).***
- ***Securely mount the external device connector to the connector on the ME1X16NA-Q with two screws.***
- ***Do not disconnect the external wiring cable connected to the ME1X16NA-Q by pulling the cable section. When the cable has a connector, be sure to hold the connector connected to the ME1X16NA-Q. Pulling the cable while it is connected to the ME1X16NA-Q may lead to malfunctioning or damage of the ME1X16NA-Q or cable.***
- ***If the cable is not secure, unevenness or movement of the cable or careless pulling on it could result in damage to the ME1X16NA-Q or cable or defective cable connections could cause misoperation of the unit.***

Please observe the following notes to reduce the effects of power supplies or other sources for electrical noise:

- Do not bundle or adjacently lay the connection cable connected to the ME1X16NA-Q external I/O signals with the main circuit line, power line, or the load line other than that for the PLC. Separate these by 100 mm as a guide. Failure to observe this could lead to malfunctioning caused by noise, surge, or induction.
- If the cable connected to the ME1X16NA-Q and the power line must be adjacently laid (less than 100 mm), use a shielded cable. Ground the shield of the cable securely to the control panel on the ME1X16NA-Q side.



- To make this product conform to the EMC and Low Voltage Directive, be sure to use a AD75CK type cable clamp (manufactured by Mitsubishi Electric) for grounding to the control box.



- The influence of noise may be reduced by installing ferrite cores to the cable connected to the ME1X16NA-Q.

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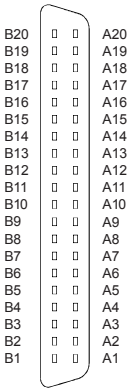
Signal Layout of the Connector

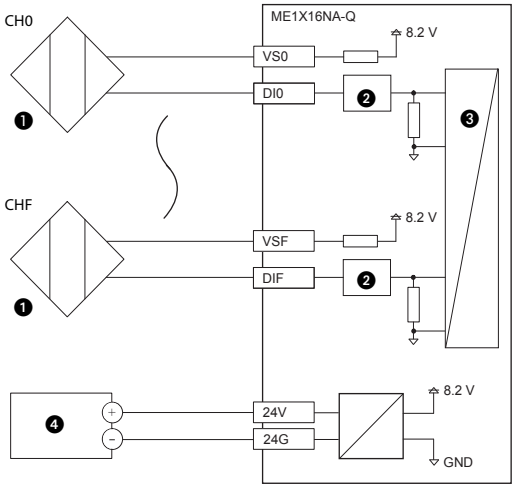


Pin	Signal	Pin	Signal	Channel	Remark
B20	Vacant	A20	Vacant	—	—
B19	DI0	A19	VS0	0	Digital inputs (DI) and voltage supply (VS) for the sensor. Connect the sensor to DI☐ and VS☐ (☐ = 0 to F)
B18	DI1	A18	VS1	1	
B17	DI2	A17	VS2	2	
B16	DI3	A16	VS3	3	
B15	DI4	A15	VS4	4	
B14	DI5	A14	VS5	5	
B13	DI6	A13	VS6	6	
B12	DI7	A12	VS7	7	
B11	DI8	A11	VS8	8	
B10	DI9	A10	VS9	9	
B9	DIA	A9	VSA	A	
B8	DIB	A8	VSB	B	
B7	DIC	A7	VSC	C	
B6	DID	A6	VSD	D	
B5	DIE	A5	VSE	E	
B4	DIF	A4	VSF	F	
B3	Vacant	A3	Vacant	—	—
B2		A2			
B1	24G	A1	24V	—	External power supply A1: +24 V DC B1: 0 V

CAUTION

- ***Leave the "vacant" pins unconnected.***
- ***Do not connect any voltage to a DI☐ or VS☐ pin.***

External Wiring



No.	Description
❶	NAMUR sensor
❷	Input filter
❸	Internal circuit
❹	External power supply (24 V DC (+20%, -15%))

Specifications

Item		ME1X16NA-Q
Number of NAMUR inputs		16 channels
Sensor voltage (from internal power supply)		8.2 V DC
ON current		>2.1 mA
OFF current		<1.2 mA
Hysteresis		0.2 mA
Wire break detection current		<0.2 mA
Short circuit detection current		>7.5 mA
Maximum short circuit current		8.9 mA
Response time	OFF to ON	3 ms/6 ms or less (configured in PLC parameter) (Default: 6 ms)
	ON to OFF	
Time stamping	Resolution	1 ms
Insulation method	Between the I/O terminals and PLC power supply	Digital isolator insulation
	Between the I/O terminals and external power supply (24 V DC)	Photocoupler/transformer insulation
	Between channels	Non-insulated
Dielectric withstand voltage	Between I/O terminals and PLC power supply	500 V ACrms for 1 minute
Insulation resistance		500 V DC 10 MΩ or higher
Number of occupied I/O points		32 points (I/O assignment: Intelligent 32 points)
External wiring connections	Connection system	40-pin connector
	Applicable connectors	A6CON1, A6CON2, A6CON3, A6CON4 (optional)
	Cable specification	Shielded cable
	Applicable wire size	0.3 mm^2 (A6CON1 and A6CON4), 0.08–0.2 mm^2 (A6CON2), 0.05 mm^2 (A6CON3, single wire), 0.08 mm^2 (A6CON3, stranded wire)
External supply power	Voltage	24 V DC (+20%, -15%); ripple ratio within 500mV_{P-P}
	Current	0.15 A
	Inrush current	5.0 A within 230 µs
Online module change		Supported
Internal current consumption (5 V DC)		0.33 A
Weight		0.14 kg