MITSUBISHI ELECTRIC

MELSEC System Q

Programmable Controllers

Installation Manual for CANopen® Module ME3CAN1-Q

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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.

WARNING:
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 CANopen® module ME3CAN1-Q
- MELSEC-Q/L Programming Manual

These manuals are available free of charge through the internet (https://eu3a.mitsubishielectric.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.

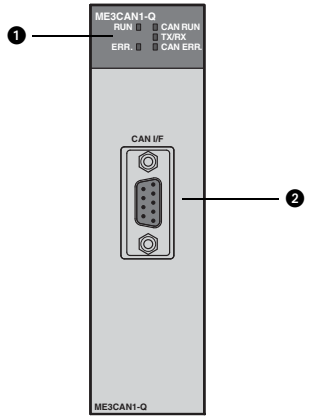
Registration

- CiA® and CANopen® are registered Community Trademarks of CAN in Automation e.V.
- The company name and the product name to be described in this manual are the registered trademarks or trademarks of each company.

Overview

The ME3CAN1-Q is used to connect a MELSEC System Q PLC system to CANopen® and CAN Layer 2 networks. CAN (Controller Area Network) is a serial bus system especially for networking devices as well as sensors and actuators.

Part Names



No.	Description			
1	Status LEDs	RUN	●	Normally operating
			○	Hardware error (watchdog timer error) or power failure
		ERR	●	An module error has occurred.
			○	Normally operating
		CAN RUN	●	• CANopen® mode: The device is in CANopen state *Operational*. • Layer 2 mode: The device is in Layer 2 online mode.
			▲	LSS Services in progress
			◆	CANopen® mode: The device is in CANopen® state *Pre-operational*.
			△	The device is in CANopen® state *Stopped*.
			○	Layer 2 mode: The device is in Layer 2 offline mode.
		Tx/Rx	●	Module is transmitting or receiving CAN messages.
			○	Module is not transmitting or receiving CAN messages.
		CAN ERR	●	• The CAN controller is Bus-OFF-state. • The CAN controller has too many transmission errors.
			▲	LSS Services in progress
			◆	General error
			◇	• NMT guarding failure (NMT-Slave or NMT-Master) • Heartbeat failure
			△	Warning limit reached
			○	No error
2	CANopen® interface connector (D-sub 9-pin male connector)			

●: LED ON
▲: Flickering (0.05 s ON, 0.05 s OFF)
◆: Blinking (0.2 s ON, 0.2 s OFF)
◇: Two short flashes (0.2 s each) followed by a pause of 1 s
△: One short flash (0.2 s) followed by a pause of 1 s
○: LED OFF

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.

WARNING

- ***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.***

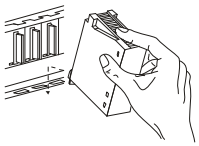
Tighten the module screw within the following range.

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

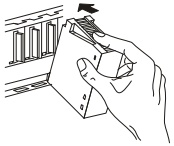
Mounting a module to a base unit

WARNING

- ***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

WARNING

- ***Always confirm the connector layout before connecting the CAN bus to the ME3CAN1-Q.***
- ***Make sure that foreign matter such as cutting chips and wire scraps does not enter the ME3CAN1-Q. Failure to observe this could lead to fires, faults or malfunctioning.***
- ***Make sure to affix the CAN bus connector with fixing screws.***
  Tightening torque should be within 0.20 to 0.28 Nm. Loose connections may cause malfunctions
- ***Do not disconnect the CAN bus cable connected to the ME3CAN1-Q by pulling the cable section. Be sure to hold the connector connected to the ME3CAN1-Q.***
  Pulling the cable while it is connected to the ME3CAN1-Q may lead to malfunctioning or damage of the ME3CAN1-Q or cable.
- ***Do not bundle or adjacently lay the communication cable connected to the ME3CAN1-Q 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.***
- ***Place the communication cable in grounded metallic ducts or conduits both inside and outside of the control panel whenever possible.***

Applicable Cable

Use twisted pair shielded cable (2 pairs) with a cross section of 0.3 to 0.82 mm^2 and an impedance of 120 Ω. (The relation between the bus length and the cross section of the wires to be used is given below.) The cables should conform to ISO 11898/1993.

Relation between bus length and cable cross section

Bus length [m]	Cable cross section (mm^2)	Length-related resistance (mΩ/m)
0 to 40	0.3 to 0.34	70
40 to 300	0.34 to 0.60	<60
300 to 600	0.50 to 0.60	<40
600 to 1000	0.75 to 0.80	<26

For details, refer to CiA® 303.

AbN automation

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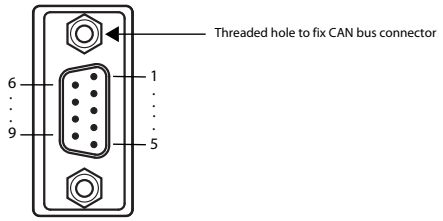
Pin Configuration



NOTE

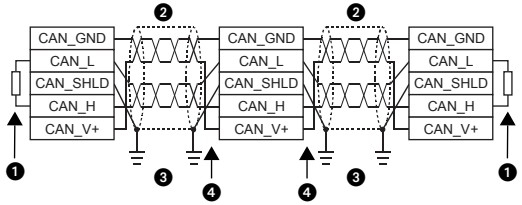
An inch screw thread (#4-40UNC) is used to fix the connector to the ME3CAN1-Q.

Pin	Signal	Description
1	—	Reserved
2	CAN_L	CAN_L bus line (dominant low)
3	CAN_GND	CAN ground
4	—	Reserved
5	CAN_SHLD	CAN shield
6	—	Reserved
7	CAN_H	CAN_H Bus line (dominant high)
8	—	Reserved
9	—	Reserved

WARNING

Leave the "reserved" pins unconnected.

CAN-Bus Wiring

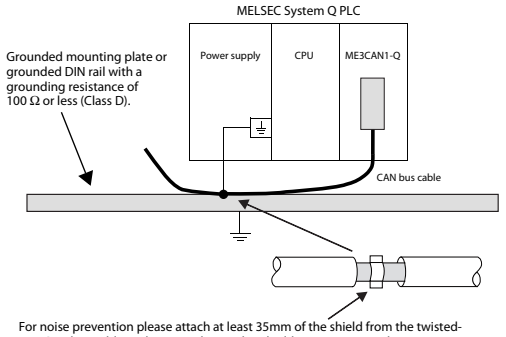


No.	Description
❶	Terminating resistor (120 Ω, 0.5 W) It is recommended to use a CAN bus connector with built-in bus terminator.
❷	4-core shielded twisted pair cable
❸	Class-D Grounding (100 Ω or less) For electromagnetic compatibility (EMC), it is recommended to ground the cable shield at both ends.
❹	Optional external supply for transmission hardware

WARNING

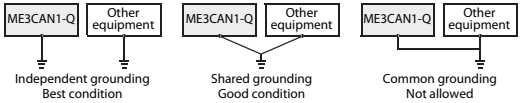
For safety, always check the potential differences between the grounding points. If potential differences are found, proper measures must be taken to avoid damage.

Grounding of the twisted pair CAN bus cable



Ground the communication cables as follows:

- The grounding resistance should be 100 Ω or less.
- The grounding point should be close to the ME3CAN1-Q. Keep the grounding wires as short as possible.
- Independent grounding should be performed for best results. When independent grounding is not performed, perform "shared grounding" of the following figure.



Specifications

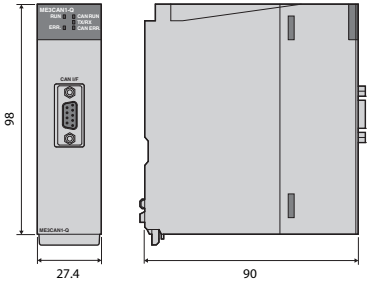
General Specifications

Item	ME3CAN1-Q
No. of occupied I/O points	32 (I/O assignment: 32 intelligent points)
Internal current consumption (5 V DC)	0.34 A
Weight	0.12 kg

Performance Specifications

Item	ME3CAN1-Q
Transmission type	CAN Bus network (RS485, CSMA/CR)
Applicable functions	• CANopen® Node • CAN Layer 2 Node
CANopen® communication services according to CiA® standards	• CiA®-301 V4.2 • CiA®-302 V4.1 • CiA®-305 V2.2
CANopen® device and application profiles according to CiA® standards	Interface and Device Profile CiA®-405 V2.0 for IEC 61131-3 Programmable Devices
Remote Transmit Request (RTR)	• Layer 2 mode: supported • CANopen® mode: not supported for PDO
Node number	Selectable from 1 to 127
Communication method	Acyclic, cyclic or event-driven
Supported transmission speed / maximum bus length	The maximum bus length varies depending on the transmission speed. • 1 Mbps / 25 m • 800 kbps / 50 m • 500 kbps / 100 m • 250 kbps / 250 m • 125 kbps / 500 m • 100 kbps / 600 m • 50 kbps / 1,000 m • 20 kbps / 2,500 m • 10 kbps / 5,000 m
Connection cable	The cable should conform to ISO11898. (Refer to section "wiring")
Connection to CAN network	via 9-pin D-sub connector
Insulation method	• Photocouplers are used to insulate the CAN input from the PLC. • A DC/DC converter is used to insulate the power supply from the CAN input.
Online module change	Not supported

External dimensions



All dimensions are in "mm".