

Mounting and wiring instruction manual

Communication Expansion Module **QMC1-MT**

No. QMC13E2 2023.07

Preface

Thank you for purchasing our communication expansion module [QMC1-MT] (hereinafter referred to as this instrument or communication expansion module).

This instruction manual (hereinafter referred to as this manual) describes the mounting method, functions, operation method, and handling of this instrument.

Please read this manual carefully and fully understand it before using it.

Also, be sure to give this manual to users of this instrument to prevent accidents due to mishandling.

For details on how to use it, refer to the instruction manual (detailed version) of QMC1-MT.

Please access our website from the following URL or QR code to download the instruction manual (detailed version).

https://shinko-technos.co.jp/e/download/d_manual_download.html#Q

Notes

- This instrument should be used in accordance with the specifications described in the manual. If it is not used according to the specifications, it may malfunction or cause a fire.
- Be sure to follow the warnings, cautions and notices. If they are not observed, serious injury or malfunction may occur.
- The contents of this instruction manual are subject to change without notice.
- Care has been taken to ensure that the contents of this instruction manual are correct, but if there are any doubts, mistakes or questions, please inform our sales department.
- This instrument is designed to be installed on a DIN rail within a control panel. If it is not, measures must be taken to ensure that the operator does not touch power terminals or other high voltage sections.
- Any unauthorized transfer or copying of this document, in part or in whole, is prohibited.
- Shinko Technos Co., Ltd. is not liable for any damage or secondary damage(s) incurred as a result of using this product, including any indirect damage.

SAFETY PRECAUTIONS

(Be sure to read these precautions before using our products.)

The safety precautions are classified into categories: "Warning" and "Caution". Depending on circumstances, procedures indicated by **⚠** Caution may result in serious consequences, so be sure to follow the directions for usage.

⚠ Warning Procedures which may lead to dangerous conditions and cause death or serious injury, if not carried out properly.

⚠ Caution Procedures which may lead to dangerous conditions and cause superficial to medium injury or physical damage or may degrade or damage the product, if not carried out properly.

⚠ Warning

- To prevent an electrical shock or fire, only Shinko or qualified service personnel may handle the inner assembly.
- To prevent an electrical shock, fire, or damage to instrument, parts replacement may only be undertaken by Shinko or qualified service personnel.

⚠ Safety Precautions

- To ensure safe and correct use, thoroughly read and understand this manual before using this instrument.
- This instrument is intended to be used for industrial machinery, machine tools and measuring equipment. Verify correct usage after purpose-of-use consultation with our agency or main office. (Never use this instrument for medical purposes with which human lives are involved.)
- External protection devices such as protective equipment against excessive temperature rise, etc. must be installed, as malfunction of this product could result in serious damage to the system or injury to personnel. Proper periodic maintenance is also required.
- This instrument must be used under the conditions and environment described in this manual. Shinko Technos Co., Ltd. does not accept liability for any injury, loss of life or damage occurring due to the instrument being used under conditions not otherwise stated in this manual.

Warning on Model Label

⚠ Caution

Failure to handle this instrument properly may result in minor or moderate injury or property damage due to fire, malfunction, or electric shock. Please read this manual before using the product to ensure that you fully understand the product.

⚠ Caution with Respect to Export Trade Control Ordinance

To avoid this instrument from being used as a component in, or as being utilized in the manufacture of weapons of mass destruction (i.e. military applications, military equipment, etc.), please investigate the end users and the final use of this instrument. In the case of resale, ensure that this instrument is not illegally exported.

Precautions for Use

Installation Precautions

⚠ Caution

This instrument is intended to be used under the following environmental conditions (EN61010-1):

- Pollution degree 2
- Ensure the mounting location corresponds to the following conditions:
 - A minimum of dust, and an absence of corrosive gases
 - No flammable, explosive gases
 - No mechanical vibrations or shocks
 - No exposure to direct sunlight, an ambient temperature of -10 to 50°C (14°F to 122°F) that does not change rapidly, and no icing
 - An ambient non-condensing humidity of 35 to 85 %RH
 - No large capacity electromagnetic switches or cables through which large current is flowing
 - No water, oil or chemicals or the vapors of these substances can come into direct contact with the unit.
- When installing this unit within a control panel, please note that ambient temperature of this unit – not the ambient temperature of the control panel – must not exceed 50°C (122°F). Otherwise the life of electronic components (especially electrolytic capacitor) may be shortened.
- Avoid setting this instrument directly on or near flammable material even though the case of this instrument is made of flame-resistant resin.

Wiring Precautions

⚠ Caution

- Do not connect QTC1-2P (with power supply / communication option) (hereinafter referred to as QTC1-2P) or QTC1-4P (with power supply / communication option) (hereinafter referred to as QTC1-4P) in the same unit.
- When wiring, do not drop wire scraps into the ventilation window of this instrument. It may cause fire or malfunction.
- When wiring, use a crimping pliers and a solderless terminal with an insulation sleeve in which an M3 screw fits.
- Tighten the terminal screw using the specified torque. If excessive force is applied to the screw when tightening, the screw or case may be damaged.
- Do not pull or bend the lead wire with the terminal as the base point during or after wiring work. It may cause malfunction.
- This instrument does not have a built-in power switch, circuit breaker and fuse. It is necessary to install an appropriate power switch, circuit breaker, and fuse near this instrument.
- When wiring the power supply (24 VDC), do not confuse the polarities.
- Use copper wires AWG16 to 14 (1.31 to 2.08 mm²) for the FG terminal and Power supply terminal.

Operation and Maintenance Precautions

⚠ Caution

- Do not touch live terminals. This may cause electrical shock or problems in operation.
- Turn the power supply to the instrument OFF when retightening the terminal or cleaning. Working on or touching the terminal with the power switched ON may result in severe injury or death due to electrical shock.
- Use a soft, dry cloth when cleaning the instrument. (Alcohol based substances may tarnish or deface the unit.)
- As the display section is vulnerable, be careful not to put pressure on, scratch or strike it with a hard object.

Compliance with Safety Standards

⚠ Caution

- If the instrument is used in a manner not specified by the manufacturer, the protection provided by the instrument may be impaired.
- Use a device with reinforced insulation or double insulation for the external circuit connected to this product.
- When using this product as a UL certified product, use a power supply conforming to Class 2 or LIM for the external circuit connected to the product.

1. Specifications

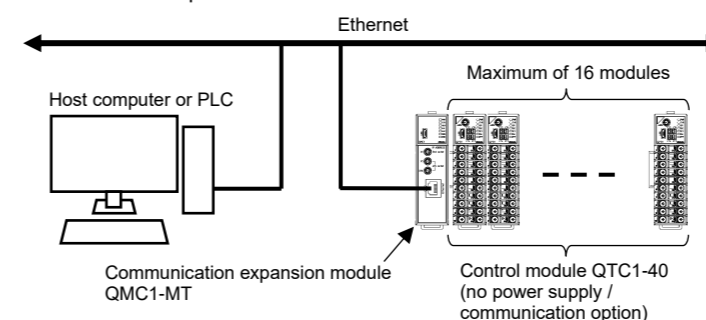
Power supply voltage	24 V DC
Allowable fluctuation range	20 to 28 V DC
Power consumption	4 W or less
Ambient temperature	-10 to 50 °C (no condensation or freezing)
Ambient humidity	35 to 85 %RH (no condensation)
Altitude	2,000 m or less
Weight	Approx. 140 g
Installation environment	Pollution degree 2 (according to EN61010-1)
Memory protection	Non-volatile IC memory (write cycles: 1 million)
Ethernet communication	
Physical layer	10BASE-T/100BASE-TX automatic recognition

User layer	MODBUS/TCP	Number of connections: 1
SIF function		
User layer	TCP/IP	
	Mitsubishi Electric Corporation PLC MELSEC Communication Protocol	
	Frame: QnA compatible 3E frame (SLMP 3E frame)	
	Code: Binary or ASCII	
	Connectable PLC: 1 unit	
Communication between control modules (QTC1-□)		
Communication line	Internal Bus	
Communication method	Half-duplex communication	
Synchronization method	Start-stop synchronization	
Communication speed	57600 bps	
Data bit	8 bits	
Parity	Even	
Stop bit	1 bit	

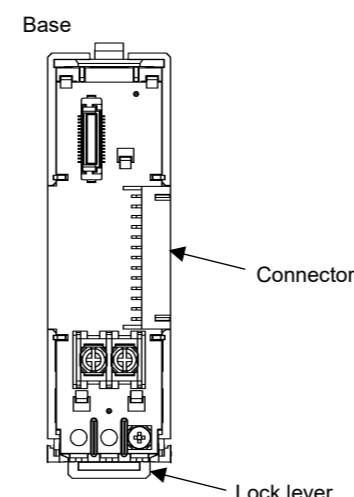
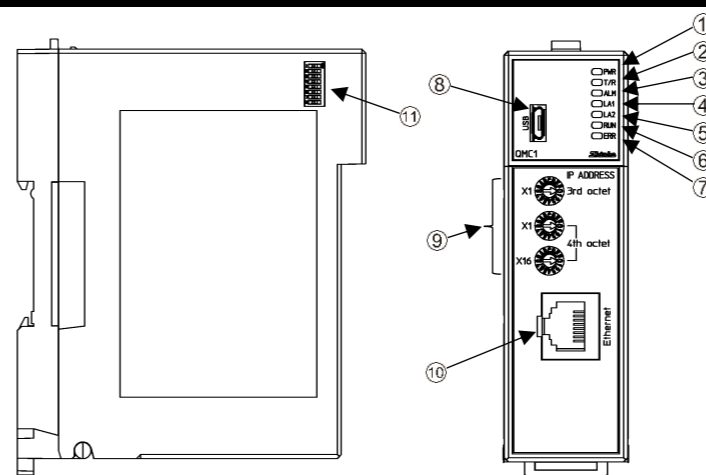
2. Overview

This instrument is a communication expansion module that connects to the control module (QTC1-□) for Ethernet communication. A maximum of 16 control modules QTC1-20 (no power supply / communication option) (hereinafter referred to as QTC1-20) or QTC1-40 (no power supply / communication option) (hereinafter referred to as QTC1-40) can be connected via BUS, and a maximum of 64 points can be controlled.

Connection example of QMC1-MT and QTC1-40



3. Name and Functions



Operation indicator

No.	Symbol (color)	Name and Function
①	PWR (Green)	Power indicator (*1) Energized: Lights up Nonvolatile IC memory error: Flashing (500 ms lights up/500 ms lights off)
②	T/R (Yellow)	Communication indicator (*1) When sending Ethernet communication: Lights up
③	ALM (Red)	Alarm indicator (*1) When communication with the slave is error: Lights up for 1 sec. (*2) When power is supplied from a PC via USB: Flashing (250 ms lights up/250 ms lights off)
④	LA1 (Yellow)	Link indicator (LA1) When link is established: Lights up When link is not established: Lights off
⑤	LA2 (Yellow)	Link indicator (LA2) Always lights off
⑥	RUN (Green)	Line connection indicator (*1) When Ethernet connection: Lights up
⑦	ERR (Red)	Communication error indicator (*1) When communication error of SLMP communication (*3) of Ethernet: Lights up for 1 sec.

(*1): Each operation indicator (except LA1 and LA2) lights up sequentially during warm-up after power-on.
(*2): Does not light up in the SIF function.
(*3): Communication protocol for Mitsubishi Electric Corporation PLC MELSEC.

Switch and connector

No.	Symbol	Name and Function
⑧	USB	Console communication connector
⑨	IP ADDRESS	QMC1-MT IP address setting rotary switch
⑩	Ethernet	Ethernet communication connector [Modular jack (RJ45)]
⑪		DIP switch (Not used in this instrument. Please leave all switches OFF.)

4. Setting of QMC1-MT IP Address

⚠ Caution

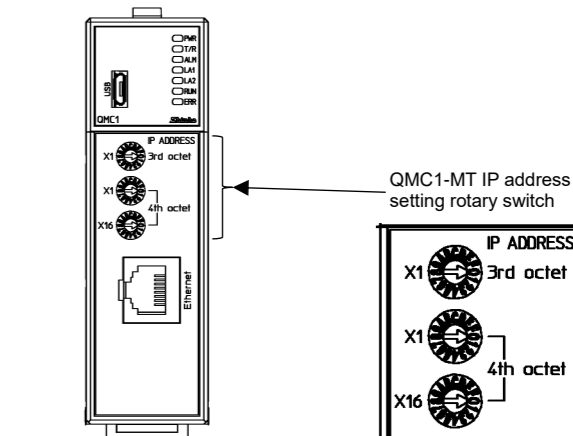
- The QMC1-MT IP address setting is required for Ethernet communication. Selection of QTC1-20 or QTC1-40 module address is required to communicate with QMC1-MT.
- If the QMC1-MT IP address setting has been changed, turn the power OFF and ON. The QMC1-MT IP address setting becomes effective by turning the power OFF and ON.

The 3rd (a) and 4th (b) bytes of the QMC1-MT IP address (e.g. 192.168.a.b) are set using the QMC1-MT IP address setting rotary switch or console software.

The factory default for the QMC1-MT IP address is 192.168.0.0.

When using the QMC1-MT IP address setting rotary switch

Use a small flat-blade screwdriver to set the QMC1-MT IP address.



Rotary switch	Description and Setting range	Factory default
3rd octet	QMC1-MT IP address 3rd byte setting Setting range: 0 to 15 (0 to F)	0
4th octet	QMC1-MT IP address 4th byte setting Setting range: 0 to 255(0 to FF)	0

When using the console software

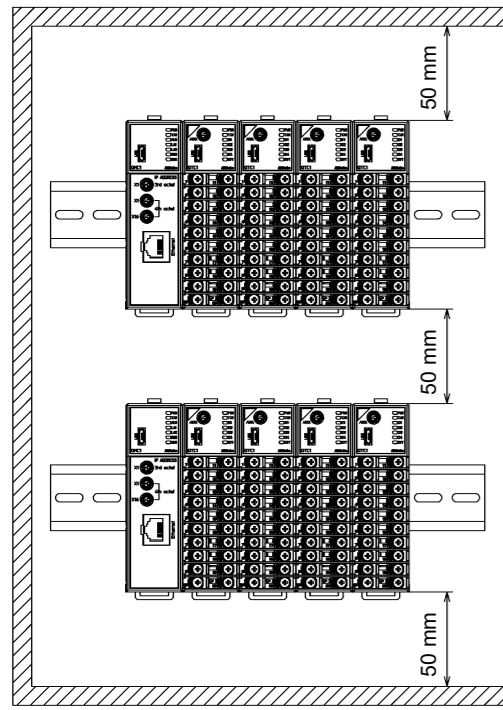
When the 4th octet of the rotary switch for setting the QMC1-MT IP address is set to "0," the setting values of the 3rd and 4th bytes of the console software set using USB communication become effective. If necessary, set the 1st byte (192) and the 2nd byte (168). Refer to "QMC1-MT INSTRUCTION MANUAL" for details.

5. Mounting

Caution

- Turn off the power supply to this instrument when mounting or removing it.
- Do not connect QTC1-2P or QTC1-4P in the same unit.
- Mount the DIN rail horizontally.
- This instrument fits the following DIN rails.
Top hat rail TH35 JIS C 2812-1988
- If this instrument is mounted in a position susceptible to vibration or shock, mount commercially available end plate at both ends of the instrument.
- When installing, make sure that the orientation (upper and lower) of this instrument is correct.
- When mounting or removing this instrument on the DIN rail, it must be tilted slightly.

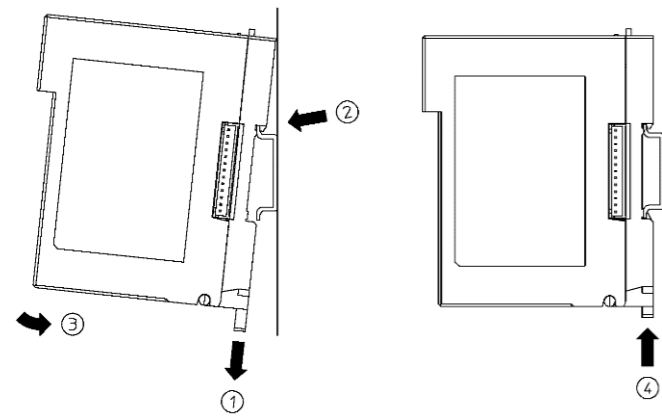
Spacing when QMC1-MT and QTC1-40 are connected



5.1 Mounting

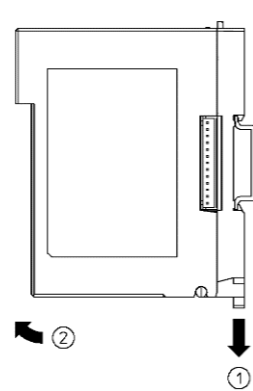
Mounting to the DIN rail

- ① Lower the lock lever of this instrument. (The lock lever of this instrument has a spring structure, but if lower it in the direction of the arrow until it stops, it will be locked in that position.)
- ② Hook the part ② of this instrument onto the top of the DIN rail.
- ③ Insert the lower part of this instrument with the part ② as a fulcrum.
- ④ Raise the lock lever of this instrument. Make sure it is fixed to the DIN rail.



Removal from the DIN rail

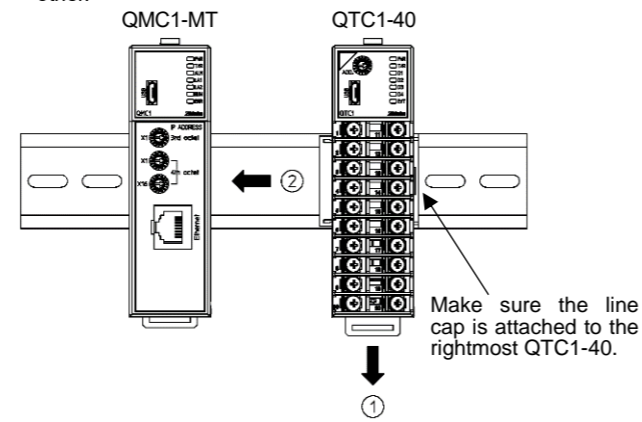
- ① Insert a flat blade screwdriver into the lock lever of this instrument and lower the lock lever until it stops.
- ② Remove this instrument from the DIN rail by lifting it from below.



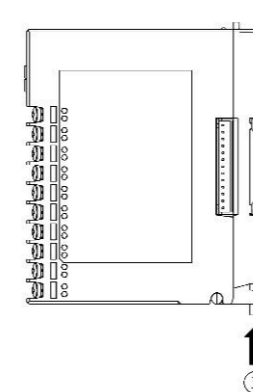
Mounting multiple modules to the DIN rail

This section describes an example of mounting this instrument and QTC1-40 on the DIN rail.

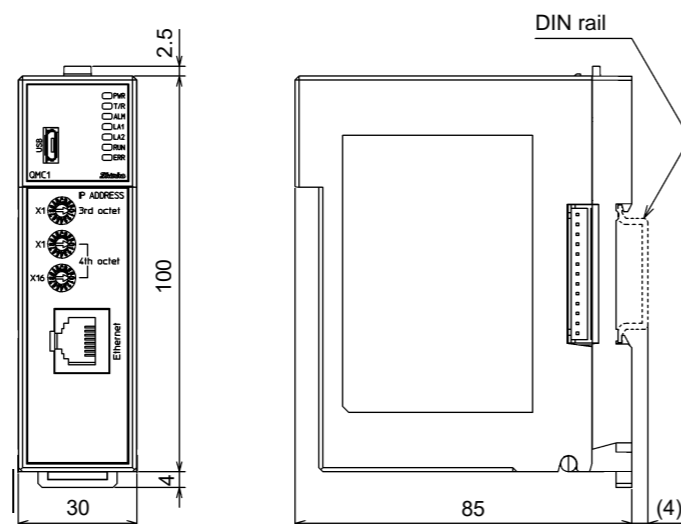
- ① Lower the lock lever of the QTC1-40, and mounting the QTC1-40 to the DIN rail.
- ② Slide the QTC1-40 to the left and connect the connectors to each other.



- ③ Raise the lock lever of the QTC1-40. Make sure it is fixed to the DIN rail.



5.2 External Dimensions (Scale: mm)



Warning

Turn off the power supply to this instrument before wiring. If you work while the power is supplied, you may get an electric shock, which could result in an accident resulting in death or serious injury.

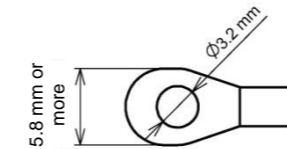
Caution

Do not connect QTC1-2P or QTC1-4P in the same unit.

6.1 Recommended Terminal

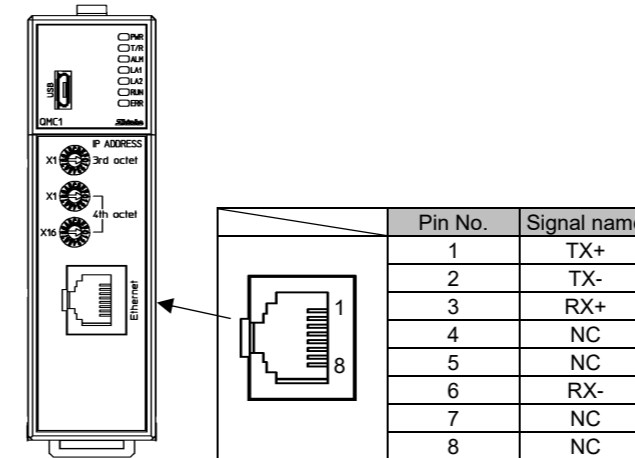
Use a solderless terminal with an insulation sleeve in which an M3 screw fits as shown below.

Solderless Terminal	Manufacturer	Model	Compatible wire size	Tightening torque
Ring-type	NICHIFU TERMINAL INDUSTRIES CO., LTD.	TMEX1.25-3	AWG22 to 16	Power supply terminal: 0.5 N·m FG terminal: 0.3 N·m
		TMEX2-3S	AWG16 to 14	
	J.S.T.MFG.CO.,LTD.	V1.25-3	AWG22 to 16	
		V2-MS3	AWG16 to 14	

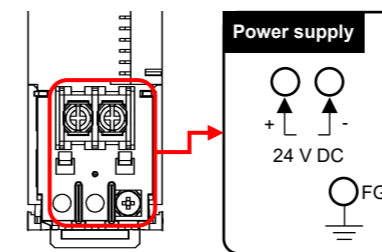


6.2 Pin Assignment and Terminal Arrangement

6.2.1 Pin Assignment of Ethernet Communication Connector



6.2.2 Power supply terminal and FG terminal arrangement

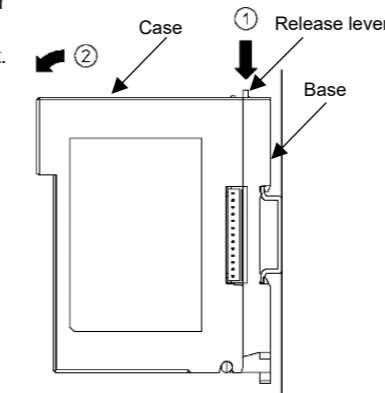


6.3 Wiring for power supply and FG

The power and FG terminals are located on the base of this instrument. Wiring by the following procedure.

(1) Case removal

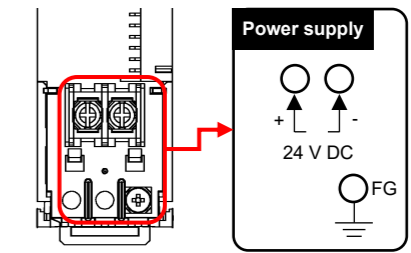
- ① Push the release lever on the top of this instrument to unlock it.
- ② Remove the case.



(2) Wiring

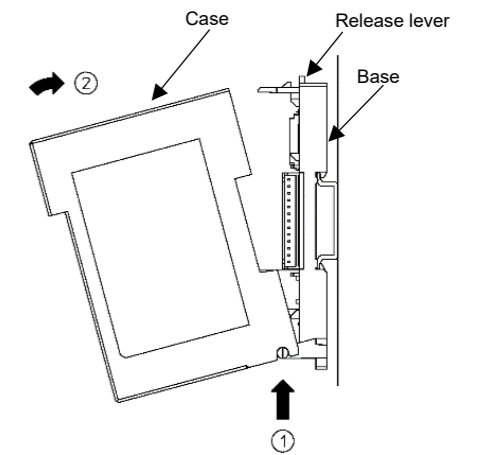
Caution

- Do not use the wrong polarity for the power supply voltage (24 V DC).
- Use copper wires AWG16 to 14 (1.31 to 2.08 mm²) for the FG terminal and Power supply terminal.



(3) Case mounting

- ① Hook the case on the lower part ① of this instrument.
- ② Mount the case so that the lower part ① of this instrument is the fulcrum and covers the release lever. There is a clicking sound.

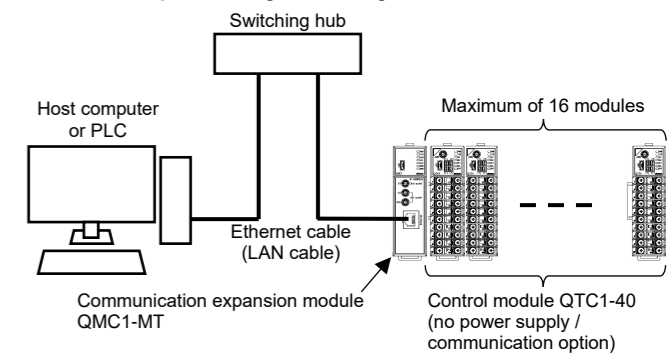


6.4 Connect to Ethernet

Use a commercially available Ethernet cable (LAN cable) for connection to the Ethernet.

Either a straight cable or a crossover cable can be used for the Ethernet cable (LAN cable).

Connection example for using a switching hub



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