I/O Module Type Building Block

User's Manual

MITSUBISHI

Mitsubishi
Programmable Controller

MELSEC-Q

• SAFETY PRECAUTIONS •

(Always read these instructions before using this equipment.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.
The instructions given in this manual are concerned with this product. For the safety instructions of the programmable controller system, please read the CPU module user's manual.
In this manual, the safety instructions are ranked as "DANGER" and "CAUTION".

⚠ DANGER	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Note that the ⚠CAUTION level may lead to a serious consequence according to the circumstances. Always follow the instructions of both levels because they are important to personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

[Design Instructions]

⚠ DANGER

- Install a safety circuit external to the PLC that keeps the entire system safe if there are problems with the external power supply or PLC. Not doing so may cause false output or malfunction, leading to accidents.
  (1) Outside the PLC, construct mechanical damage preventing interlock circuits, e.g. emergency stop circuits, protective circuits, forward/reverse or other conflicting operation interlocking circuits, and upper and lower positioning limit switches.
  (2) When the PLC detects either of the following problems, it will stop arithmetic operation and turn off all outputs in the case of (a). In the case of (b), it will stop arithmetic operation and hold or turn off all outputs according to the parameter setting.
    (a) The overcurrent protection or overvoltage protection of the power supply module is activated.
    (b) The self-diagnostic function of the PLC CPU has detected a fault such as the watchdog timer error.

  In addition, all outputs may be turned on when there are problems undetectable by the PLC CPU, such as in the I/O controller. Build a fail-safe circuit or provide a mechanism externally of the PLC to operate the machine safely at such times. Refer to the CPU module user's manual for fail-safe circuit examples.
  (3) Output could be left on or off when there is trouble in the output module's relays, transistors, etc. So build an external monitoring circuit that will monitor any output signal that could lead to a serious accident.

[Design Instructions]

⚠ DANGER

- When overcurrent exceeding the rated load current or caused by a shorted load or the like flows in the output module for a long time, it may cause smoke or fire. To prevent this, configure an external safety circuit, such as fuses.
- Build a circuit that turns on the external power supply after the PLC power supply has been turned on. If the external power supply is turned on first, it could result in false output or malfunction.
- When there are communication problems with the data link, refer to the corresponding data link manual for the operating status of each station. Not doing so could result in false output or malfunction.
- When connecting a peripheral device to the CPU module or connecting a personal computer or the like to the intelligent function module to exercise control (data change) on the running PLC, configure up an interlock circuit in the sequence program to ensure that the whole system will always operate safely.
  Also before exercising other control (program change, operating status change (status control)) on the running PLC, read the manual carefully and fully confirm safety.
  Especially for the above control on the remote PLC from an external device, an immediate action may not be taken for PLC trouble due to a data communication fault.
  In addition to configuring up the interlock circuit in the sequence program, corrective and other actions to be taken as a system for the occurrence of a data communication fault should be predetermined between the external device and PLC CPU.

⚠ CAUTION

- Do not bundle the control wires or communication cables with the main circuit or power wires, or run them close to each other.
  They should be run 100mm (3.94in.) or more away from each other.
  Not doing so could result in noise that would cause malfunction.
- When the output module is used to control a lamp load, heater, solenoid valve or the like, large current (approximately 10 times greater than the normal) may flow when the output is turned from OFF to ON. Choose an output module having a sufficient rated current.

[Installation Instructions]

⚠ CAUTION

- Use the PLC in an environment that meets the general specifications contained in this manual. Using this PLC in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- Hold down the module-loading lever at the module bottom, and securely insert the module-fixing hook into the fixing hole in the base unit. Incorrect loading of the module can cause a malfunction, failure or drop.
  When using the PLC in the environment of much vibration, tighten the module with a screw. Tighten the screw in the specified torque range. Undertightening can cause a drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.
- When installing extension cables, be sure that the base unit and the extension module connectors are installed correctly.
  After installation, check them for looseness.
  Poor connections could cause an input or output failure.
- Securely load the memory card into the memory card loading connector.
  After installation, check for lifting.
  Poor connections could cause an operation fault.
- Completely turn off the external power supply before loading or unloading the module. Not doing so could result in damage to the product.
- Do not directly touch the module's conductive parts or electronic components.
  Touching the conductive parts could cause an operation failure or give damage to the module.

[Wiring Instructions]

⚠ DANGER

- Completely turn off the external power supply before starting wiring. Not doing so could result in electric shock or damage to the product.
- When turning on the power supply or starting operation after wiring work, always mount the product with the supplied terminal cover.
  Not doing so could result in electric shock.

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[Wiring Instructions]

⚠ CAUTION

- Always ground the FG and LG terminals to the protective ground conductor. Not doing so could result in electric shock or malfunction.
- Before wiring the module, confirm the rated voltage and terminal layout of the product.
  Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or failure.
- External connectors should be crimped or pressure-welded with the specified tools, or correctly soldered. Imperfect connections could result in short circuit, fires or malfunction.
- Tighten the terminal screws in the specified torque range.
  Undertightening could result in short circuit, fire or malfunction.
  Overtightening could cause damage to the screws and/or the module, resulting in drop, short circuit or malfunction.
- Be careful not to allow foreign matter such as chips and wire off-cuts to enter the module.
  Foreign matter could cause fire, failure, or malfunction.
- The module has an ingress prevention label on its top to prevent foreign matter, such as wire offcuts, from entering the module during wiring.
  Do not peel this label during wiring.
  Before starting system operation, be sure to peel this label because of heat dissipation.
- Install our PLC in a control panel for use.
  Wire the main power supply to the power supply module installed in a control panel through a distribution terminal block.
  Furthermore, the wiring and replacement of a power supply module have to be performed by a maintenance worker who acquainted with shock protection.
  (For the wiring methods, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).)

[Startup/Maintenance Instructions]

⚠ DANGER

- Do not touch the terminals while power is on.
  Doing so could cause electric shock.
- Correctly connect the battery. Do not charge, disassemble, heat, place in fire, short circuit, or solder the battery.
  Mishandling of the battery can cause heat generation, burst or ignition which could result in injury or fire.
- Switch off all phases of the externally supplied power used in the system when cleaning the module or retightening the terminal or module mounting screws.
  Not doing so could result in electric shock.
  Undertightening of terminal screws can cause a short circuit or malfunction.
  Overtightening of screws can cause damages to the screws and/or the module, resulting in fallout, short circuits, or malfunction.

[Startup/Maintenance Instructions]

⚠ CAUTION
• The online operations conducted for the running CPU module by connecting a peripheral device (especially program modification, forced output, operating status change) should be performed after you have read the manual carefully read and fully confirmed safety. Operation mistakes could cause machine damage or accident. • Do not disassemble or modify the modules. Doing so could cause failure, malfunction, injury or fire. • Completely turn off the externally supplied power used in the system before mounting or removing the module. Not doing so could result in damage to the product. • Do not mount/remove the module to/from the base unit or the terminal block more than 50 times (IEC61131-2-compliant), after the first use of the product. Failure to do so may cause module malfunctions. • Before touching the module, always touch grounded metal, etc. to discharge static electricity from human body, etc. Not doing so can cause the module to fail or malfunction.

[Disposal Instructions]

⚠ CAUTION
• When disposing of this product, treat it as industrial waste.

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REVISIONS

* The manual number is given on the bottom left of the back cover.

Print Date	* Manual Number	Revision
Dec., 1999	SH (NA)-080042-A	First edition
Feb., 2000	SH (NA)-080042-B	[Addition model] QH42P, QX48Y57, QX70, QX71, QX72, QY18A [Addition] Chapter 4 [Partial correction] Section 1.2, Chapter 5, 8.1, Chapters 4 to 8 (changed into Chapters 5 to 9)
Apr., 2000	SH (NA)-080042-C	[Deletion] QY18A
Jul., 2000	SH (NA)-080042-D	[Addition model] QX28,QX40-S1,QY18A,QY22,QI60 [Addition] Chapter 5 [Partial correction] Section 1.2 Chapters 5 to 9 (changed into Chapters 6 to 10)
Nov., 2000	SH (NA)-080042-E	[Addition model] QY70, QY71 [Addition] Section 1.3 [Partial correction] CONTENTS, Section 3.3, 5.1
Jan., 2001	SH (NA)-080042-F	[Addition model] QY68A [Addition] Section 10.2 [Partial correction] CONTENTS, Section 1.2, 3.3, 5.1, Chapters 7
Mar., 2001	SH (NA)-080042-G	[Partial correction] Section 2.4, 8.1
Jul., 2001	SH (NA)-080042-H	[Addition model] Q6TE-18S [Addition] Chapter 9, APP 1.3 [Partial correction] CONTENTS, Section 2.1, 2.2, 2.4, 5.1 Chapters 9 to 10 (changed into Chapters 10 to 11)
Jul., 2002	SH (NA)-080042-I	[Addition model] QX41-S1, QX42-S1, A6CON4

Japanese Manual Version SH-080024-R

Print Date	* Manual Number	Revision
Mar., 2003	SH (NA)-080042-J	Addition model QX82
May, 2003	SH (NA)-080042-K	Partial correction Section 1.2, 2.2
May, 2003	SH (NA)-080042-L	Addition model QX82-S1 Partial correction Section 1.2, 3.3 Addition Section 2.15
Jul., 2004	SH (NA)-080042-M	Partial correction Section 1.2, 2.1 to 2.15, 3.1 to 3.12, 4.1, 4.2, 5.1, 8.1, 8.2.1, 8.2.2, 10
Jul., 2005	SH (NA)-080042-N	Partial correction SAFETY PRECAUTIONS, Section 3.3 Addition Appendix 1.3
Apr., 2006	SH (NA)-080042-O	Partial correction SAFETY PRECAUTIONS, Section 4.1, Chapter6
Sep., 2006	SH (NA)-080042-P	Partial correction Section 11.1, 11.2, Appendix 1.2, 1.3
Oct., 2006	SH (NA)-080042-Q	Addition model QX50 Partial correction SAFETY PRECAUTIONS, Section 2.10 to 2.16, 3.4 to 3.12, 4.1, 4.2 Addition Section 2.9
Sep., 2007	SH (NA)-080042-R	Addition model QX41Y41P Partial correction Section 1.2, 1.3.3, 2.1 to 2.16, 3.1 to 3.12, 4.1, 4.3, 5.1, 7.1, 8.1, Chapter 10, Section 11.1, 11.2, Appendix 1.2 Addition Section 4.2
Jun., 2008	SH (NA)-080042-S	Addition model QX10-TS, QX40-TS, QX80-TS, QY10-TS, QY40P-TS, QY80-TS Partial correction Section 1.2, 2.3 to 2.19, 3.3 to 3.15, 9.2, Chapter 10 Addition Section 2.2, 2.6, 2.16, 3.2, 3.6, 3.14, 9.1, 9.3

Print Date	* Manual Number	Revision
Oct., 2008	SH (NA)-080042-T	Addition model QX40-H, QX70-H, QX80-H, QX90-H Partial correction Section 1.2.5, 1.3.1, 2.8 to 2.23, 9.2, Chapter 10 Addition Section 2.7, 2.14, 2.19, 2.23

INTRODUCTION

Thank you for choosing the MITSUBISHI MELSEC-Q Series General-Purpose Programmable Logic Controller. Before using this product, please read this manual carefully to use the equipment to its optimum.

CONTENTS

About Manuals

The following manuals are also related to this product.

In necessary, order them by quoting the details in the tables below.

Related Manuals

Manual Name	Manual Number (Model Code)
QCPU User's Manual (Hardware Design/Maintenance and Inspection) This manual provides the specifications of the CPU modules, power supply modules, base units, extension cables, memory cards and others. (Sold separately)	SH-080483ENG (13JR73)
QCPU User's Manual (Function Explanation/Program Fundamentals) This manual explains the functions, programming methods, devices on necessary to create programs with the QCPU. (Sold separately)	SH-080484ENG (13JR74)

Conformation to the EMC Directive and Low Voltage Instruction

(1) For programmable controller system

To configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi programmable controller (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to Chapter 9 "EMC AND LOW VOLTAGE DIRECTIVES" of the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

(2) For the product

No additional measures are necessary for the compliance of this product with the EMC and Low Voltage Directives.

MEMO

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1. GENERAL SPECIFICATIONS MODULES AND PRECAUTIONS FOR USE OF I/O MODULE

This chapter describes the general specifications and precautions for use of I/O module.

1.1 General Specifications

Refer to the following manual for the general specifications of the I/O modules.
• QCPU User's Manual (Hardware Design/Maintenance and Inspection)

1.2 Precautions for Use

1.2.1 Input module

(1) The number of simultaneous on points of input module depends on its input voltage and ambient temperature.
Refer to the number of simultaneous on points shown on the specifications of each input module.

(2) Input modules may take in noise or the like as an input depending on the pulse width of a signal.
This pulse width has a value as listed below depending on the parameter-set response time. Set input response time while fully consider the operating environment.

Setting value of response time (ms)	Minimum value of pulse width where noise or the like may be taken in as an input (ms)
1	0.3
5	3
10	6
20	12
70	45

For settings of the input response time, refer to Section 1.3.1.

(3) Read the following precautions carefully for use of the high-speed input modules (QX40H, QX70H, QX80H, and QX90H).

(a) When switching to the high-speed input, the specifications of the high-speed input modules and the input module QX40-S1 are identical. On the other hand, when switching to the interrupt input, the specifications of the high-speed input modules and the interrupt module QI60 are identical too. Therefore, the specifications of the input module (QX40-S1) are construed as the specifications of the high-speed input module switched to the high-speed input. Similarly, the specifications of the interrupt module (QI60) indicated in the manuals other than this manual are construed as the specifications of the high-speed input module switched to the interrupt input.

(b) The high-speed input modules switch module types (high-speed input or interrupt input) for 16 input points all together and between valid and invalid noise filters as shown below.

Function selector switch	Noise filter selector switch	GX Developer setting		
		Module type	Interrupt operation	Input response time
ON	ON	High-speed input*1	×	○
	OFF			×*2
OFF	ON	Interrupt*1	○	○
	OFF			×*2

○: Settable ×: Not settable

*1: When selecting an improper module type, an error (error code: 2100) occurs.

*2: Setting the input response time with GX Developer is ignored.

(c) If the small number of value of input response time is set, the modules tend to have impact of noise. Ensure that the modules do not have impact of noise. For the details of the measure against noise, refer to QCPU User's manual (Hardware Design, Maintenance and Inspection).

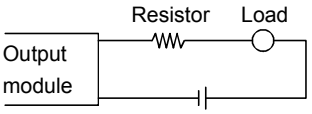
(d) The high-speed input modules connected with electric appliance such as relays may load a chattering as a signal.

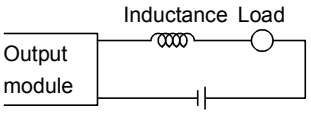
(e) Select a cable whose length is three meters or less, when using the high-speed input module as a CE-compatible product.

1.2.2 Output module

(1) If an output module drives load, its maximum switching frequency must be on for one second or longer and off for one second or longer.

(2) If a counter or timer which has a DC-DC converter as a load is used with an output module, choosing an output module by its average current can cause a failure due to periodic inrush current at power-on or during operation.
To reduce the influence of inrush current for use of the above load, connect a resistor or an inductance to the load in series or use a module whose maximum load current is large.





(3) Fuses installed to an output module cannot be replaced.

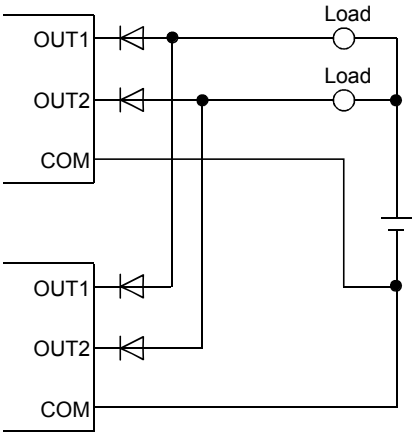
(4) Fuses installed to an output module are to prevent external wiring from being burned in case that outputs of the module short.
Therefore, if the fuses became a failure due to other than a short-circuit, the output modules may not be protected.

(5) It is recommended to install fuses to external terminals per point to prevent the external device and module from being burned in case of load short in the QY22 or QY68A.
Operations of the following fuses have been checked and ensured by Mitsubishi.

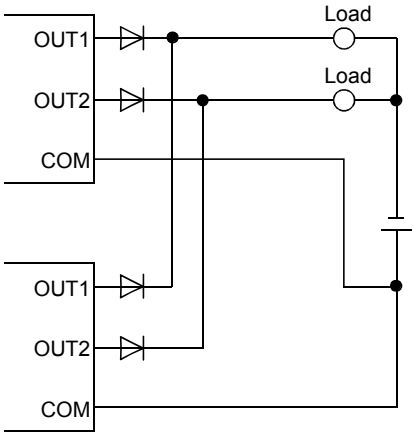
Module model	QY22*1		QY68A*2	
Fuse model	216 02.5	216 002	216 3.15	312 003
Rated current	2.5A	2A	3.15A	3A
Manufacturer	Littelfuse, Inc			

*1: Fuses that conform to Sheet 1 of IEC60127 are recommended.
*2: Fast blow fuses whose rated current is 3A are recommended.

(6) Connecting the transistor output modules in parallel may result in a failure of the output elements.
If connecting the transistor output modules in parallel, use diodes for the circuit as shown below.



Sink type

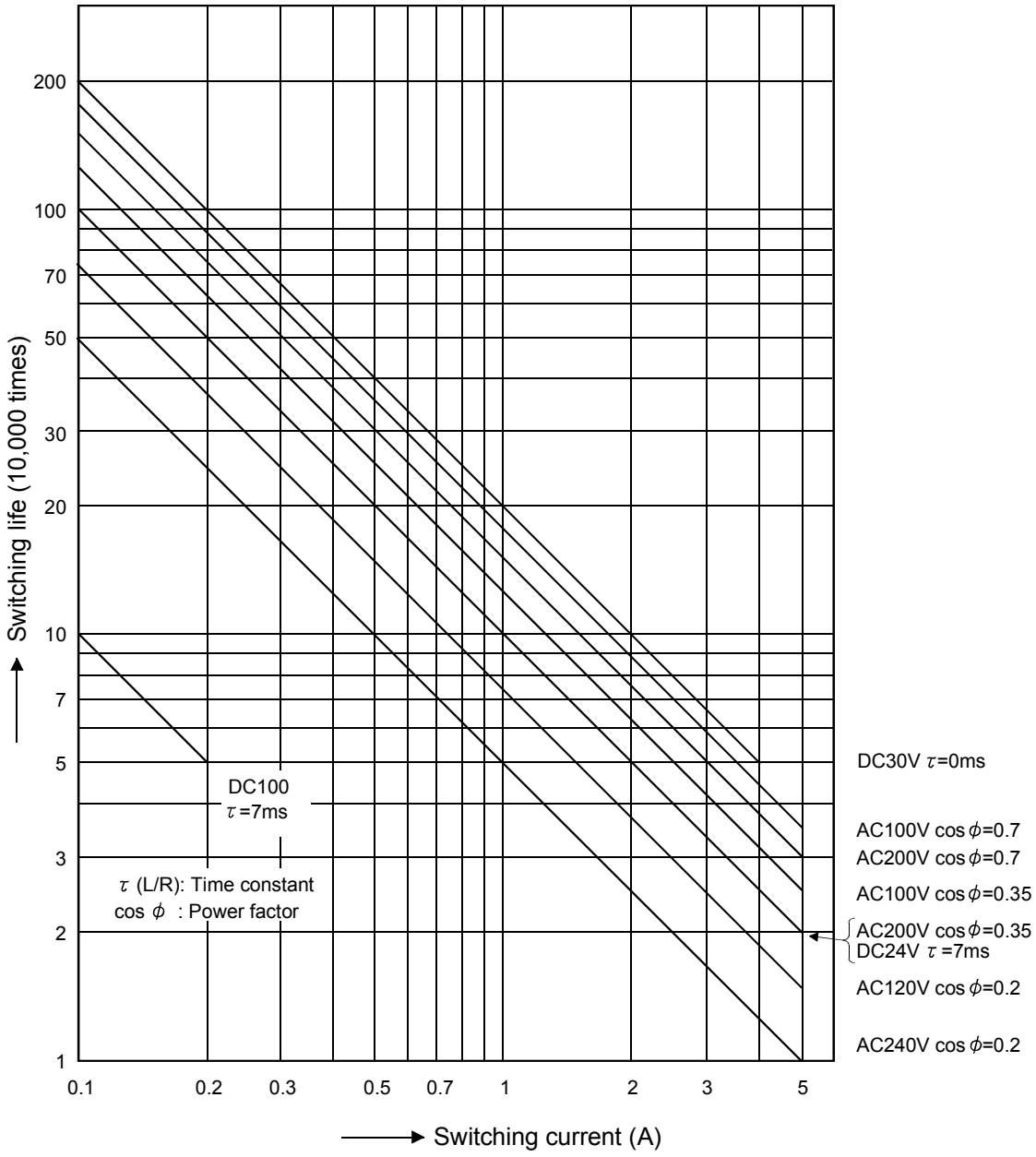


Source type

(7) Precautions for the use of contact output module

(a) Relay life of contact output module

Applicable module: QY10, QY10-TS, QY18A



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POINT

(1) When using the module for the application in which the relay contact is frequently switched, the relay life span should be considered. Therefore, it is recommended to use a triac output module.

(2) The relay life curve shows the value based on actual use, which is not guaranteed. Therefore, make sure to allow for a margin of error.
The relay life span differs according to the specifications as follows:

• Rated switching voltage, current load	100 thousand times
• 200VAC 1.5A, 240VAC 1A (COS ϕ =0.7)	100 thousand times
• 200VAC 0.4A, 240VAC 0.3A (COS ϕ =0.7)	300 thousand times
• 200VAC 1A, 240VAC 0.5A (COS ϕ =0.35)	100 thousand times
• 200VAC 0.3A, 240VAC 0.15A (COS ϕ =0.35)	300 thousand times
• 24VDC 1A, 100VDC 0.1A (L/R=7ms)	100 thousand times
• 24VDC 0.3A, 100VDC 0.03A (L/R=7ms)	300 thousand times

(b) Measures against inrush current

Relay life significantly varies depending on its load type the characteristics of its inrush current.

Take following measures since the inrush current may cause contact welding.

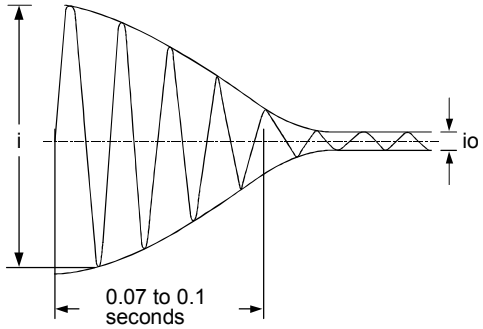
- In case of an increase in inrush current, select a load so that the inrush current will be within the rated current of the module.
- Connect the relay that can sustain inrush current outside the module.

1) Inductive load

Inrush current of inductive load may flow 20 times as large as the rated current depending on a load.

[Load of a solenoid]

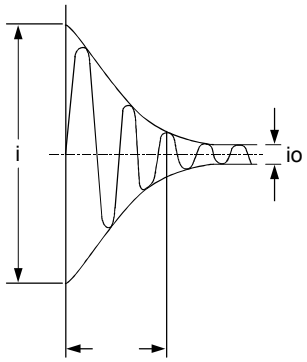
i ÷ io ≒ 10 to 20 times



i: Inrush current
io: Rated current

[Load of a magnetic contactor]

i ÷ io ≒ 3 to 10 times



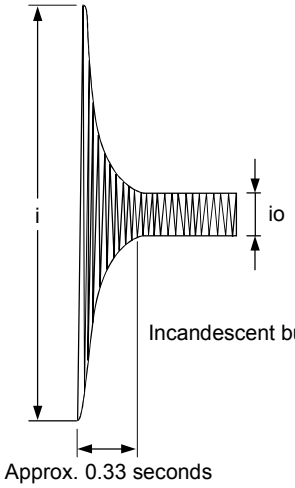
i: Inrush current
io: Rated current

2) Load of a lamp

Inrush current 10 times as large as the rated current may flow through the lamp circuit depending on a load.

[Load of an incandescent bulb]

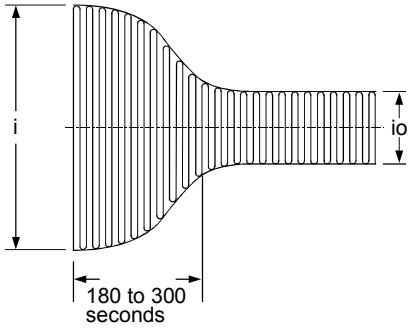
i ÷ io ≒ 3 to 10 times



i: Inrush current
io: Rated current

[Load of a mercury lamp]

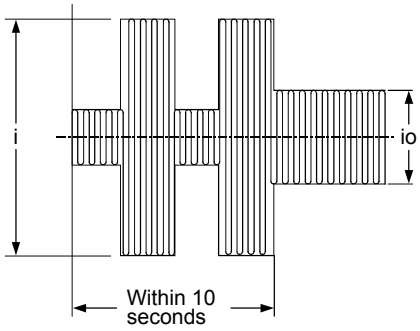
i ÷ io ≒ 3 times



i: Inrush current
io: Rated current

[Load of a fluorescent]

i ÷ io ≒ 5 to 10 times



i: Inrush current
io: Rated current

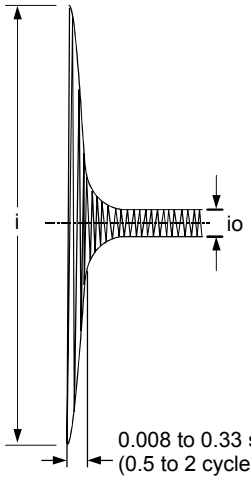
3) Capacitive load

When a load circuit includes such as a capacitor, inrush current 40 times as large as the rated current may flow through the load circuit depending on a load.

Also, pay attention to the wire capacity when the wiring is laid long.

[Capacitive load]

i ÷ io ≒ 20 to 40 times



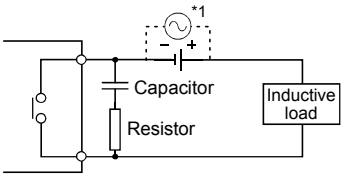
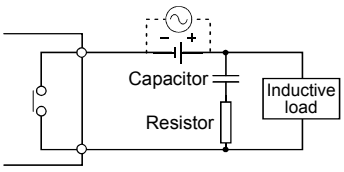
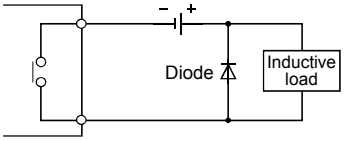
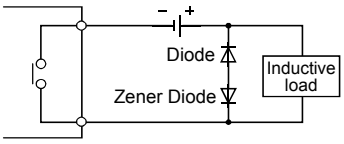
i: Inrush current

io: Rated current

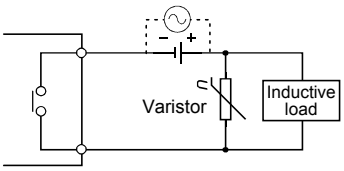
(c) Measures against back EMF

When inductive load such as a magnetic contactor and solenoid is shut off, high back EMF is generated between the contacts and arc discharge occurs.
Especially when the power factor is small, the life shortens due to arc discharge.
Therefore, take measures against arc discharge.
The following is four methods to protect a relay contact against back EMF.

- Capacitor + Resistor method (CR method)
- Diode method
- Diode + Zener diode method
- Varistor method

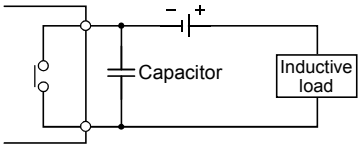
Circuit example		Method for selecting elements	Remarks
Capacitor + Resistor method (CR method)		Refer to the following for constants of the capacitor and resistor. Note that the following values may differ depending on a nature of the load and a variation of characteristics. • Capacitor 0.5 to 1 (μF) against contact current of 1A • Resistor 0.5 to 1 (Ω) against contact voltage of 1V Use a capacitor whose withstanding voltage is 200 to 300V. In AC circuit, use a capacitor having no polarity.	If a load is from a relay or solenoid, the recovery time delays. A capacitor suppresses electric discharge while a contact is off, and a resistor restricts a flow of current while a contact is on. *1: When using AC power, impedance of CR must be larger enough than that of the load. (prevention of a malfunction due to leak current from the CR)
			
Diode method		Use a diode whose reverse breakdown voltage is 10 times as large as the circuit voltage or more and whose forward current is equal to or more than the load current.	The recovery time is later than the CR method.
Diode + Zener diode method		Use zener voltage for the zener diode equal to or more than the power supply voltage.	The diode method is effective when the recovery time is too late.

(To the next page)

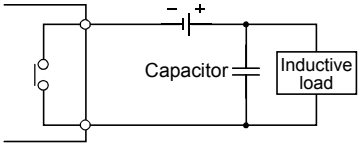
Circuit example		Method for selecting elements	Remarks
Varistor method		Select a cut voltage (Vc) for the varistor to meet the following condition. Multiply the value by root two for use of AC power. Vc > Power supply voltage × 1.5 (V) Note that when selecting an element whose Vc is too high, its effect will weaken.	The recovery time delays slightly.

POINT

(1) Avoid providing a protection circuit as shown below.



This circuit is greatly effective to an arc at shut-off. However, since an electric charge has been accumulated in a capacitor while a contact is off, short circuit current of the capacitor flows while the contact is on, which tends to result in contact welding.



This circuit is greatly effective to an arc at shut-off. However, since a charge current of the capacitor flows while the contact is on, which tends to result in contact welding.

(2) A protection circuit must be provided so that it may be close to a load or contact (module). If their distance is far, the protection circuit cannot show its effect. Provide the circuit so that their distance may be within 50cm (19.69 inch) (rough standard).

1.2.3 I/O combined module

(1)I/O numbers of combined I/O modules

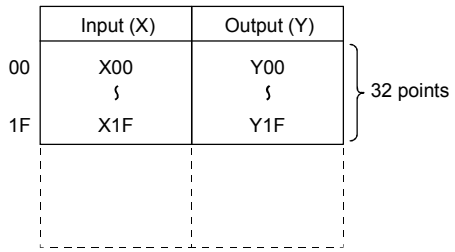
There are two types of combined I/O modules:

- Module using same I/O numbers for input and output

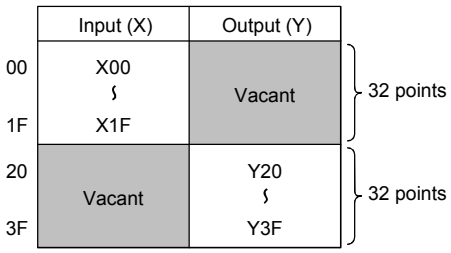
Since same number is used for input and output, the I/O numbers to be used can be saved.

- Module using sequential I/O numbers for input and output

Since I/O assignments are the same for A series, it is useful when replacing modules from those of A series.



Module using same I/O numbers for input and output (QH42P)



Module using sequential I/O numbers for input and output (QX41Y41P)

(2)When using the QH42P, QX41Y41P or QX48Y57, configure it with the following devices.

Part name	Detail
CPU PLC	Product of product information [011120000000000-A] or later
GX Developer	SW5D5C-GPPW or later

The CPU PLCs other than those listed above cannot be used.
When the SW4D5C-GPPW is used, the response time cannot be set (fixed at 10ms).
Set OUTPUT for the I/O allocation.
For how to check product information of the CPU module, refer to QCPU User's Manual (Hardware Design, Maintenance and Inspection).

1.2.4 I/O module with protection function

The overload protection function and overheat protection function of the following modules are explained below.

(1) QY40P, QY40P-TS, QY41P, QY42P, QX41Y41P, QH42P

Function	Description
Common (Overload and overheat protection functions)	• If an overcurrent due to overload keeps flowing, heat is generated and the overheat protection function is activated. • Each protection function is to protect the internal elements of the module, not to protect the external devices.
Overload protection function	• The overload protection function is activated in units of 1 point at 1A to 3A/point. • The overload protection function returns to normal operation when the load becomes a rated load.
Overheat protection function	• The overheat protection function is activated in units of 1 point. • The overheat protection function automatically returns to normal operation after heat reduces.

(2) QY81P

Function	Description
Common (Overload and overheat protection functions)	• If an overcurrent due to overload keeps flowing, heat is generated and the overheat protection function is activated. • Each protection function is to protect the internal elements of the module, not to protect the external devices.
Overload protection function	• The overload protective function is activated in units of 1 point at 1A to 3A/point. • The overload protective function returns to normal operation when the load becomes a rated load.
Overheat protection function	• The overheat protection function is activated in units of 2 points. (It is activated in units of 2 points of Y0/Y1, Y2/Y3, ..., and when overheat protection is activated, 2 points of them are activated simultaneously. If an overheat status persists, heat is conducted, and which it may activate another overheat protection function.) • If an output turns on at the activation of the overheat protection function, the actual output voltage oscillates between 0V and load voltage. At the load voltage of 24V, the average voltage during oscillation is approx. 7V. No oscillation occurs when the output is off at the activation of the overheat protection function. To ensure that the output is turned off at the activation of the overheat protection function, use an external load that turns off at 7V or more. • The overheat protective function automatically returns to normal operation after heat reduces.

1.2.5 Interrupt module

(1) If setting the response time during the interrupt input operation of QI60 or QX40H, QX70H, QX80H, and QX90H, use the module whose contents are shown below. The response time cannot be set with other contents (fixed at 0.2ms.).

Product name	Contents
PLC CPU	Product information "021120000000000-B" or later
GX Developer	SW6D5C-GPPW or later

For how to check product information of the CPU module, refer to QCPU User's Manual (Hardware Design, Maintenance and Inspection).

1.2.6 Installation and wiring

(1) Insulation-sleeved-solderless terminals cannot be used with the terminal block. It is recommended to cover the wire connections of the solderless terminals with mark or insulation tubes.

(2) Use wires of 0.3 to 0.75mm^2 core and 2.8mm (0.11in.) OD max. to connect to the terminal block. When using a wire whose core is 0.75mm or more, it is preferable to use the spring terminal block(Q6TE-18S).

(3) Tighten the module fixing and terminal block screws to the torques in the following ranges.

Screw location	Tightening torque range
Module fixing screw (M3×12 screw)	36 to 48 N•cm
I/O module terminal block screw (M3 screw)	42 to 58 N•cm
I/O module terminal block mounting screw (M3 screw)	66 to 89 N•cm

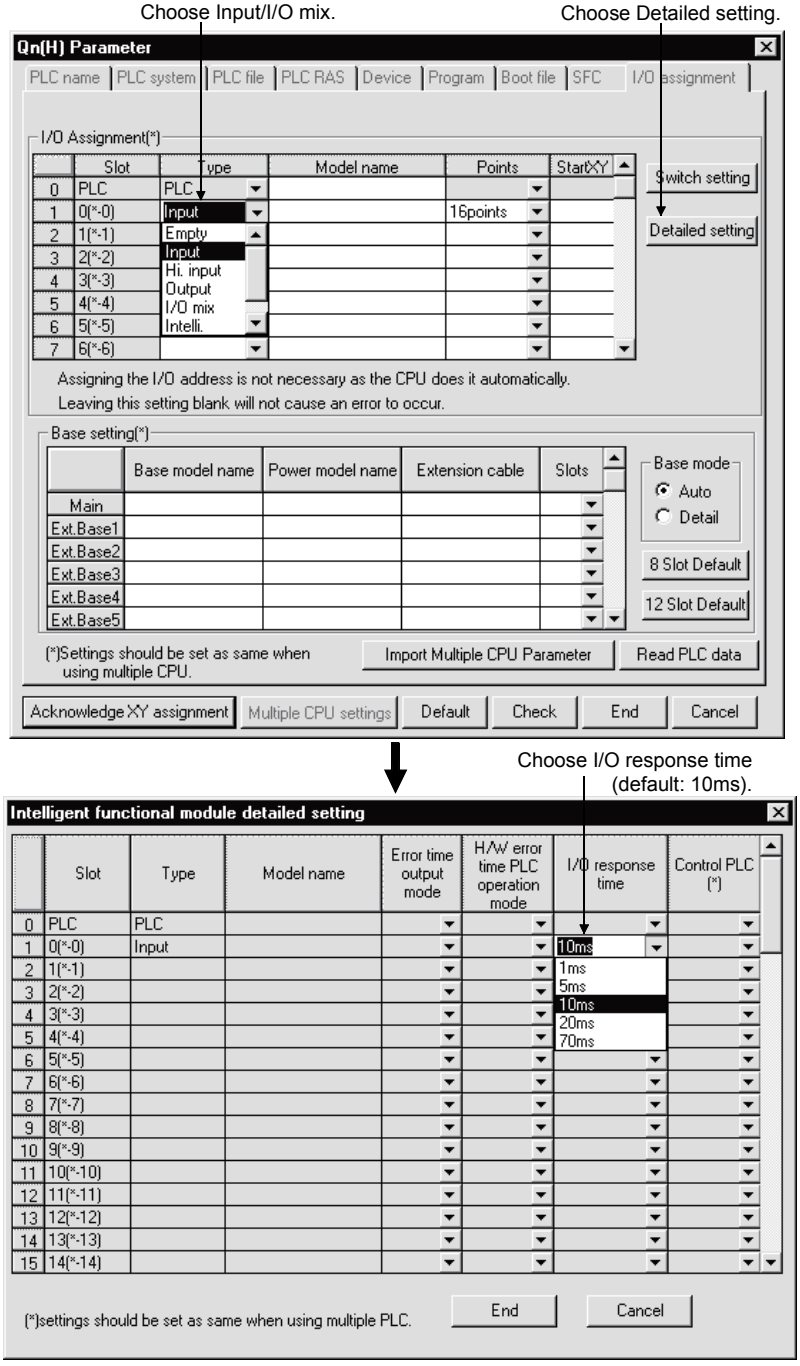
1.3 Various Settings for I/O Module

Various settings for the I/O module can be made with GX Developer.
This section describes how to make the settings with GX Developer.

1.3.1 Setting of I/O response time

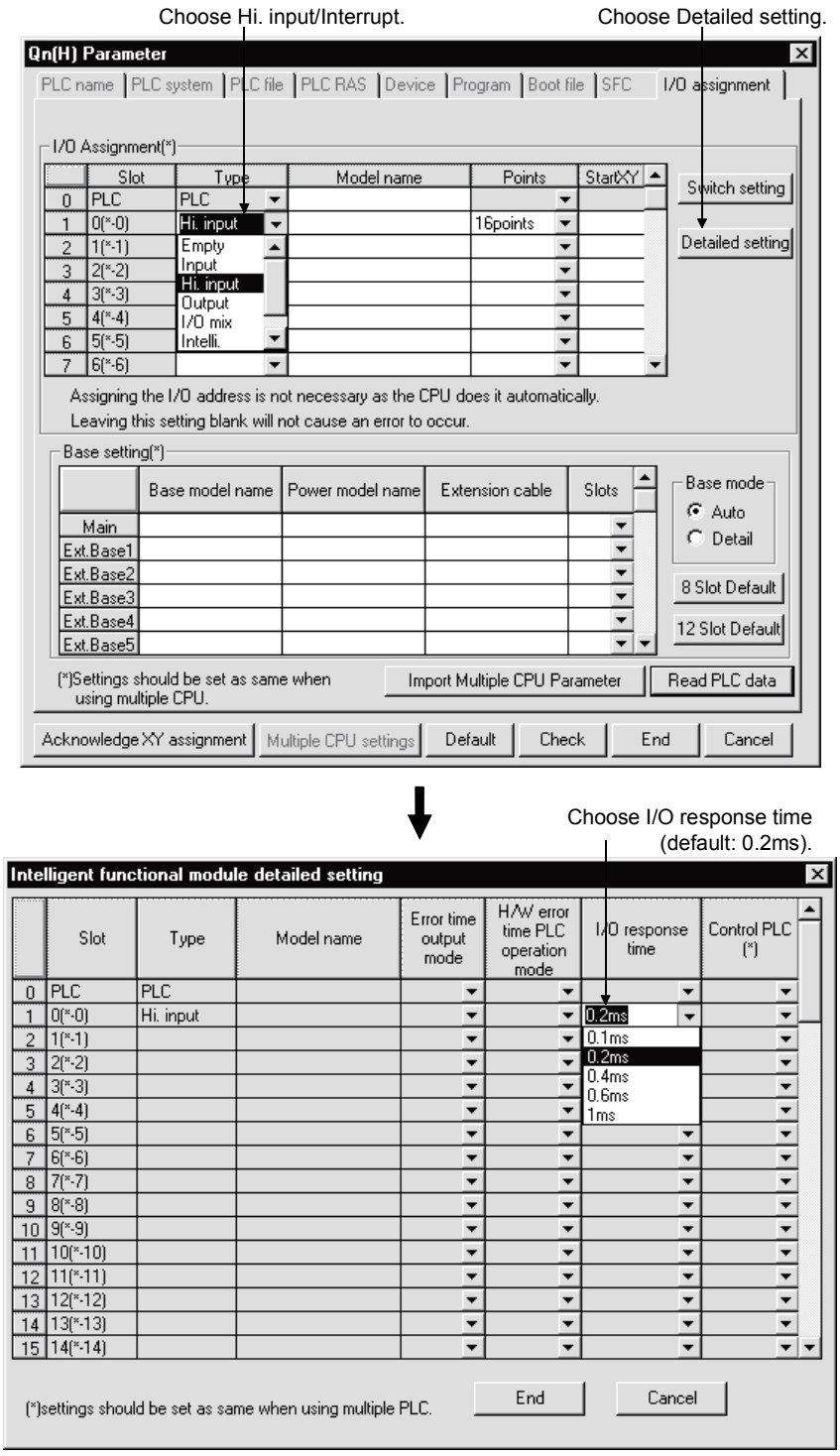
Set the I/O response time on the I/O assignment tab of PLC Parameter.

(1) For Input/I/O mix module
Select "Input" or "I/O mix" in "Type" combo box on the I/O assignment tab of PLC parameter. Then, click the "Detailed setting" button, and then select the input response time in "I/O response time" combo box.



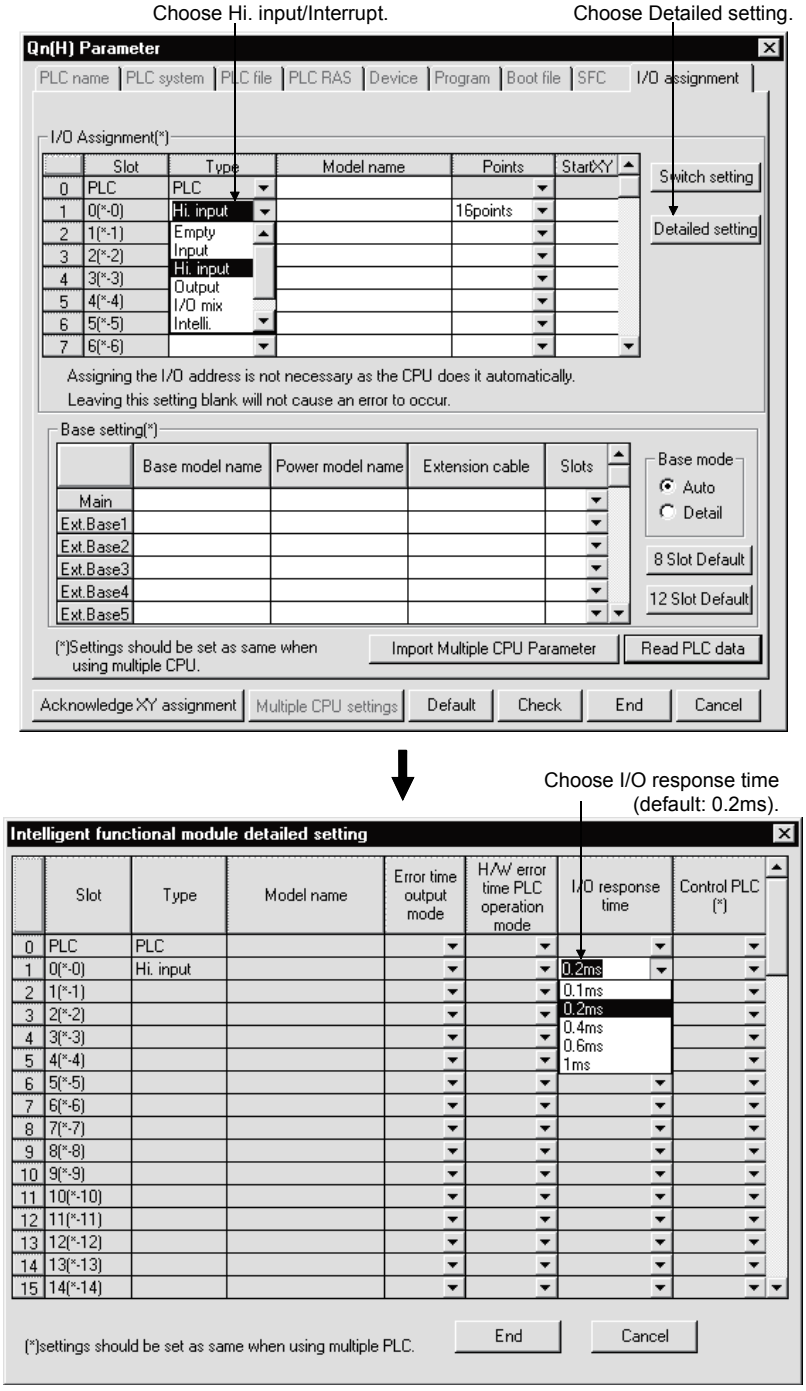
(2) For high-speed input module/QI60

Select "Hi. input" or "Interrupt" in "Type" combo box on the I/O assignment tab of PLC parameter. Then, click the "Detailed setting" button, and then select the input response time in "I/O response time"*1 combo box.



*1: When the actual response time differs from the setting value, refer to the specifications of the relevant I/O modules.

(3) For high-speed input module/QX40H, QX70H, QX80H, QX90H
Select "Hi.input" or "Interrupt", which is the same module type as the one selected with the high-speed input module switch, in "Type" combo box on the I/O assignment tab of PLC parameter.*1 Then, click the "Detailed setting" button, and then select the input response time in "I/O response time"*2*3 combo box.



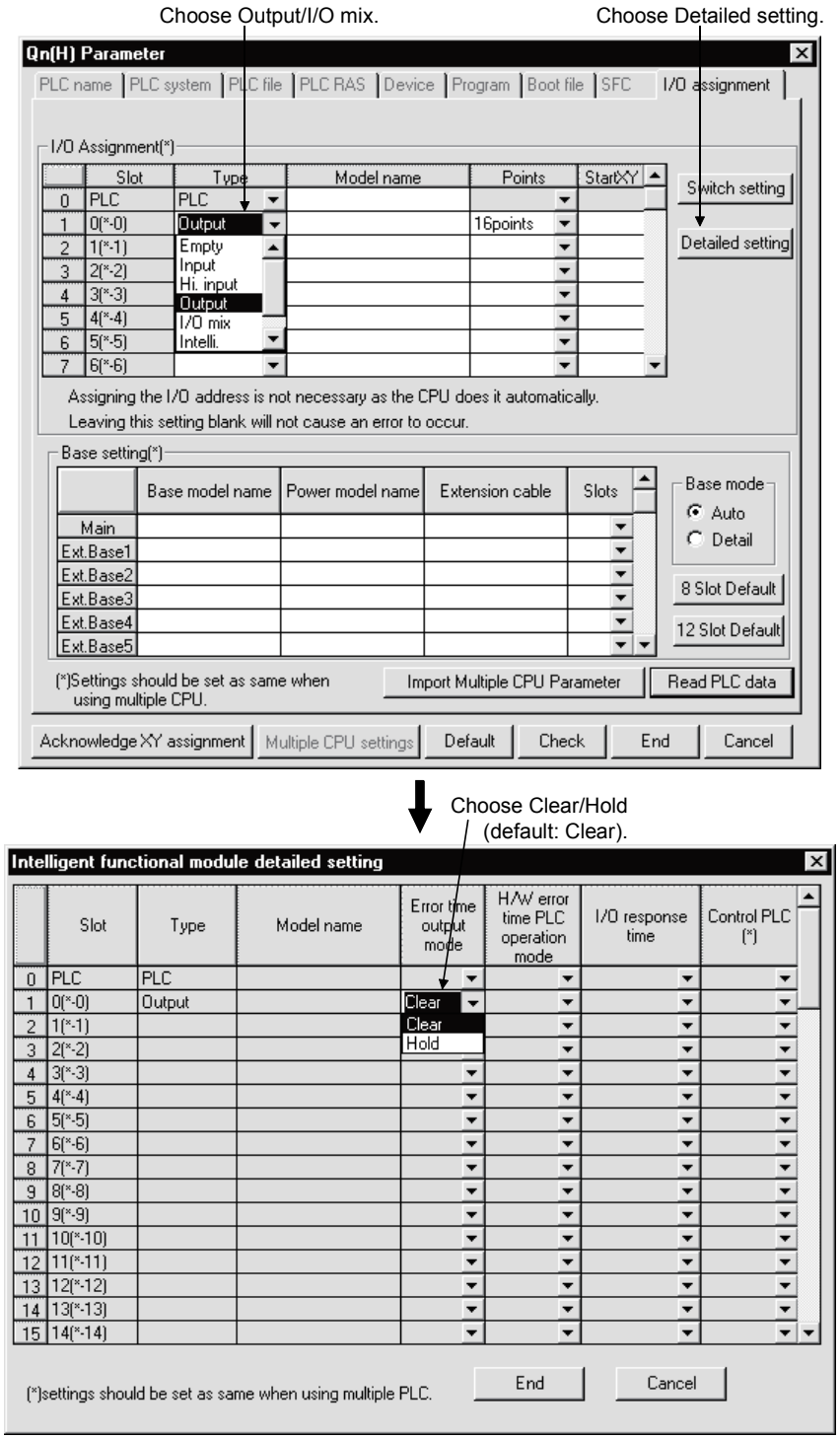
*1: If selected a different module type with the one selected by the function selector switch of high-speed input module, an error occurs.

*2: If disabled the noise filter with the noise filter selector switch of the high-speed input module, the setting value is ignored.

*3: When the actual response time differs from the setting value, refer to the specifications of the relevant I/O modules.

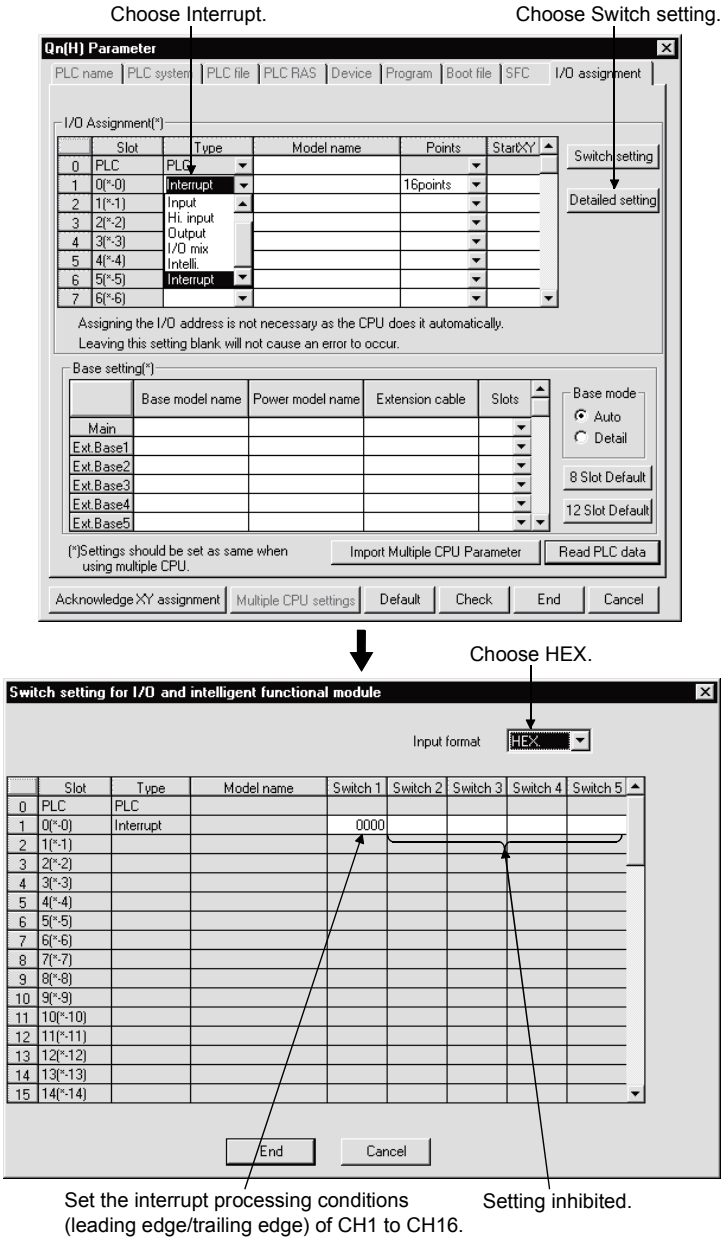
1.3.2 Setting of error-time output mode

Set the error-time output mode on the I/O assignment tab of PLC parameter in GX Developer.
Select "Output" or "I/O mix" in the "Type" combo box on the I/O assignment tab of PLC parameter. Then, click the "Detailed setting" button, and then select "Clear" or "Hold" in the "Error time output mode" combo box.



1.3.3 Switch setting of interrupt module

Perform the switch setting on the I/O assignment tab of PLC parameter when operating the interrupt input for QI60, QX40H, QX70H, QX80H, or QX90H.
Select "Interrupt" in the "Type" combo box on the I/O assignment tab of PLC parameter. Then, click the "Switch setting" button, and then select "HEX" in the "Input format" combo box. Lastly, set 0 (leading edge) or 1 (trailing edge) in the "Switch1" box for the interrupt processing.



Set the interrupt processing condition with switch 1. The relationships between bits and inputs are as indicated below.

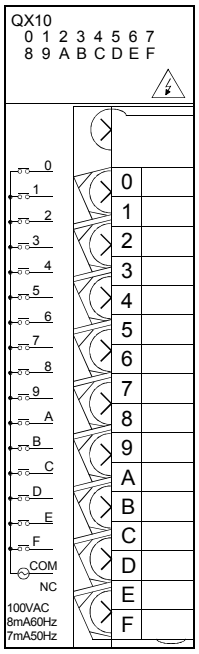
b15							to								b0
XF	XE	XD	XC	XB	XA	X9	X8	X7	X6	X5	X4	X3	X2	X1	X0

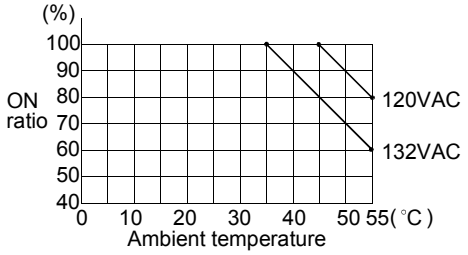
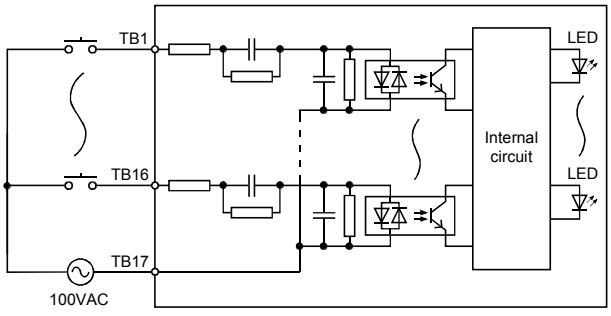
0: Leading edge, 1: Trailing edge

2. INPUT MODULE SPECIFICATIONS

2.1 QX10 AC Input Module

Specifications \ Type		AC Input Module	
		QX10	Appearance
Number of input points		16 points	
Isolation method		Photocoupler	
Rated input voltage, frequency		100-120VAC (+10/-15%) 50/60Hz (±3Hz)	
Input voltage distortion		Within 5% (Refer to section 1.2)	
Rated input current		Approx. 8mA (100VAC, 60Hz), approx. 7mA (100VAC, 50Hz)	
Input derating		Refer to the derating chart.	
Inrush current		Max. 200mA within 1ms (at 132VAC)	
ON voltage/ON current		80VAC or higher/5mA or higher (50Hz, 60Hz)	
OFF voltage/OFF current		30VAC or lower/1.7mA or lower (50Hz, 60Hz)	
Input impedance		Approx. 12kΩ (60Hz), approx. 15kΩ (50Hz)	
Response time	OFF to ON	15ms or less (100VAC 50Hz, 60Hz)	
	ON to OFF	20ms or less (100VAC 50Hz, 60Hz)	
Dielectric withstand voltage		1780VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 1500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP1X	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Number of I/O points		16 (I/O allocation is set as a 16-points input module)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption		50mA (TYP. all points ON)	
Weight		0.17kg	



Derating Chart

External Connections


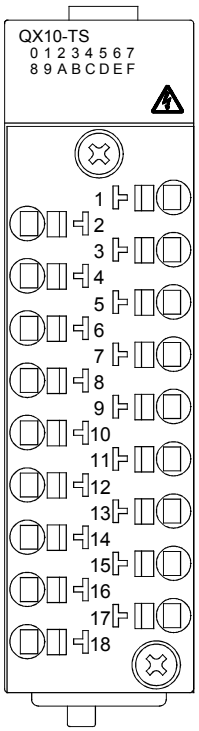
Terminal Block Number	Signal Name
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM
TB18	Vacant

2.2 QX10-TS AC Input Module

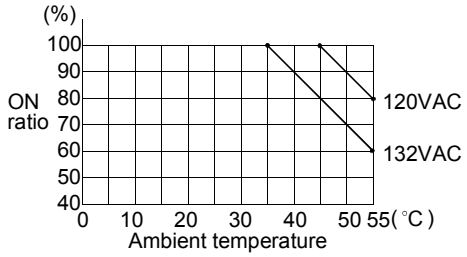
This module is a spring clamp terminal block type and an input module that has indicators for checking the insertion state of wire.

Specifications \ Type		AC Input Module
		QX10-TS
Number of input points		16 points
Isolation method		Photocoupler
Rated input voltage, frequency		100-120VAC (+10/-15%) 50/60Hz (±3Hz)
Input voltage distortion		Within 5% (Refer to section 1.2)
Rated input current		Approx. 8mA (100VAC, 60Hz), approx. 7mA (100VAC, 50Hz)
Input derating		Refer to the derating chart.
Inrush current		Max. 200mA within 1ms (at 132VAC)
ON voltage/ON current		80VAC or higher/5mA or higher (50Hz, 60Hz)
OFF voltage/OFF current		30VAC or lower/1.7mA or lower (50Hz, 60Hz)
Input impedance		Approx. 12kΩ (60Hz), approx. 15kΩ (50Hz)
Response time	OFF to ON	15ms or less (100VAC 50Hz, 60Hz)
	ON to OFF	20ms or less (100VAC 50Hz, 60Hz)
Dielectric withstand voltage		1780VAC rms/3 cycles (altitude 2000m (6557.38ft.))
Insulation resistance		10MΩ or more by insulation resistance tester
Noise immunity		By noise simulator of 1500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency
		First transient noise IEC61000-4-4: 1kV
Protection of degree		IP2X
Common terminal arrangement		16 points/common (common terminal: TB17)
Number of I/O points		16 (I/O allocation is set as a 16-points input module)
Operation indicator		ON indication (LED)
External connections		Two piece Spring clamp terminal block
Applicable wire size		0.3 to 2.0mm^2 core (AWG22 to 15)
Applicable crimping terminal		Refer to section 9.1
5VDC internal current consumption		50mA (TYP. all points ON)
Weight		0.17kg

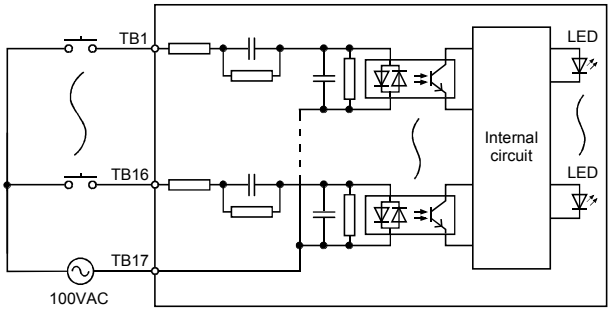
Appearance



Derating Chart

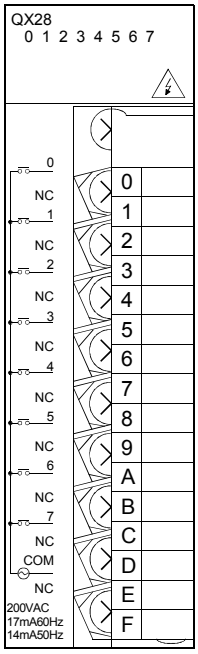


External Connections

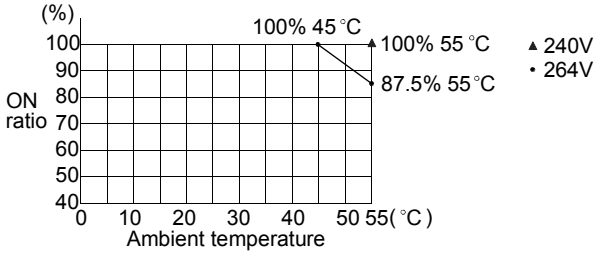


Terminal Block Number	Signal Name
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM
TB18	Vacant

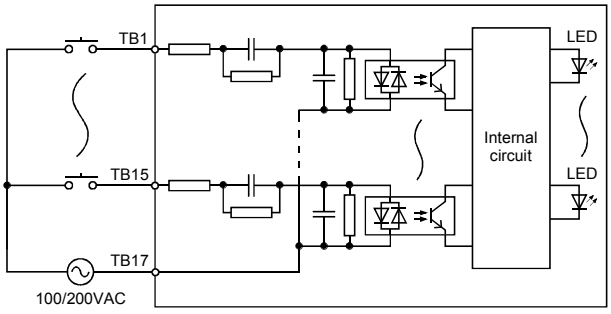
2.3 QX28 AC Input Module

Specifications \ Type		AC Input Module	
		QX28	Appearance
Number of input points		8 points	
Isolation method		Photocoupler	
Rated input voltage, frequency		100-240VAC (+10/-15%) 50/60Hz (±3Hz)	
Input voltage distortion		Within 5% (Refer to section 1.2)	
Rated input current		Approx. 17mA (200VAC, 60Hz), approx. 14mA (200VAC, 50Hz) Approx. 8mA (100VAC, 60Hz), approx. 7mA (100VAC, 50Hz)	
Input derating		Refer to the derating chart.	
Inrush current		Max. 500mA within 1ms (at 264VAC)	
ON voltage/ON current		80VAC or higher/5mA or higher (50Hz, 60Hz)	
OFF voltage/OFF current		30VAC or lower/1.7mA or lower (50Hz, 60Hz)	
Input impedance		Approx. 12kΩ (60Hz), approx. 15kΩ (50Hz)	
Response time	OFF to ON	10ms or less (100VAC 50Hz, 60Hz)	
	ON to OFF	20ms or less (100VAC 50Hz, 60Hz)	
Dielectric withstand voltage		2830VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 1500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP1X	
Common terminal arrangement		8 points/common (common terminal: TB17)	
Number of I/O points		16 (I/O allocation is set as a 16-points input module)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption		50mA (TYP. all points ON)	
Weight		0.20kg	

Derating Chart

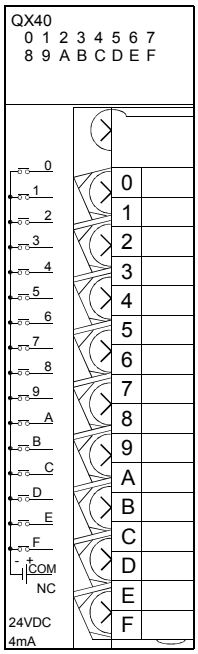


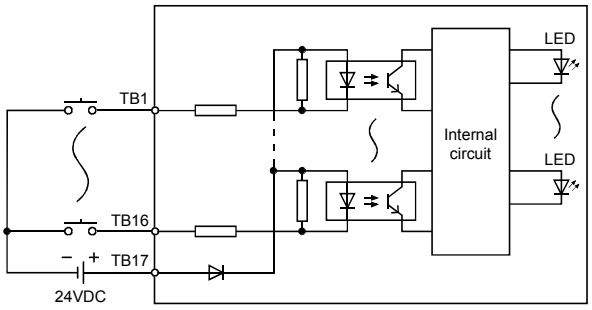
External Connections



Terminal Block Number	Signal Name
TB1	X00
TB2	Vacant
TB3	X01
TB4	Vacant
TB5	X02
TB6	Vacant
TB7	X03
TB8	Vacant
TB9	X04
TB10	Vacant
TB11	X05
TB12	Vacant
TB13	X06
TB14	Vacant
TB15	X07
TB16	Vacant
TB17	COM
TB18	Vacant

2.4 QX40 DC Input Module (Positive Common Type)

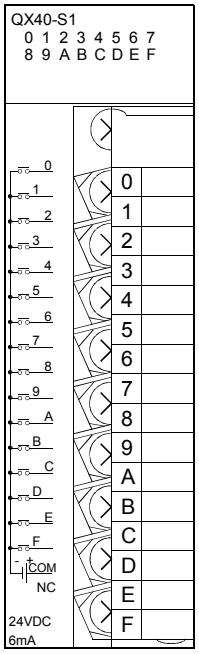
Specifications \ Type		DC Input Module (Positive Common Type) QX40	Appearance
Number of input points		16 points	
Isolation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		No	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input impedance		Approx. 5.6kΩ	
Response time	OFF to ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
	ON to OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Number of I/O points		16 (I/O allocation is set as a 16-points input module)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption		50mA (TYP. all points ON)	
Weight		0.16kg	

External Connections	Terminal Block Number	Signal Name
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM
	TB18	Vacant

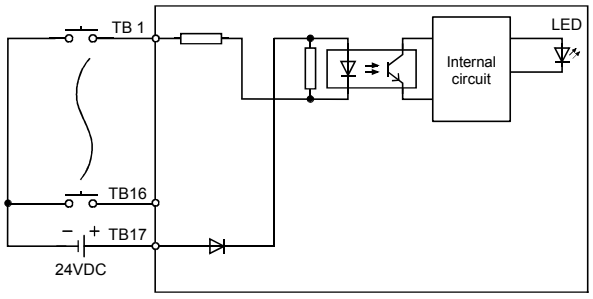
＊1: For the setting method, refer to the section 1.3.1.

2.5 QX40-S1 DC Input Module (Positive Common Type)

Specifications \ Type			DC Input Module (Positive Common Type)				
			QX40-S1				Appearance
Number of input points			16 points				
Isolation method			Photocoupler				
Rated input voltage			24VDC (+20/-15%, ripple ratio within 5%)				
Rated input current			Approx. 6mA				
Input derating			No				
ON voltage/ON current			19V or higher/4.0mA or higher				
OFF voltage/OFF current			11V or lower/1.7mA or lower				
Input impedance			Approx. 3.9kΩ				
Response time	Set value ＊1		0.1	0.2	0.4	0.6	1
	OFF to ON	Typ	0.05ms	0.15ms	0.30ms	0.55ms	1.05ms
		max	0.10ms	0.20ms	0.40ms	0.60ms	1.20ms
	ON to OFF	Typ	0.15ms	0.20ms	0.35ms	0.60ms	1.10ms
		max	0.20ms	0.30ms	0.50ms	0.70ms	1.30ms
Dielectric withstand voltage			560VAC rms/3 cycles (altitude 2000m (6557.38ft.))				
Insulation resistance			10MΩ or more by insulation resistance tester				
Noise immunity			By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency				
			First transient noise IEC61000-4-4: 1kV				
Protection of degree			IP2X				
Common terminal arrangement			16 points/common (common terminal: TB17)				
Number of I/O points			16 (I/O allocation is set as a 16-points Hi. input module)				
Operation indicator			ON indication (LED)				
External connections			18-point terminal block (M3×6 screws)				
Applicable wire size			0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)				
Applicable crimping terminal			R1.25-3 (sleeved crimping terminals cannot be used.)				
5VDC internal current consumption			60mA (TYP. all points ON)				
Weight			0.20kg				



External Connections

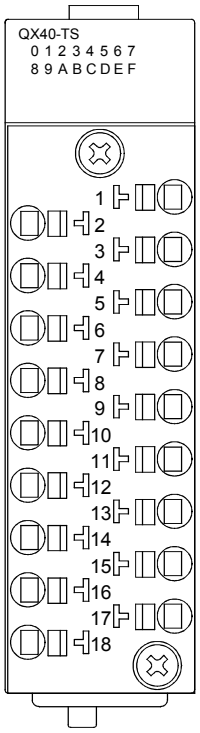


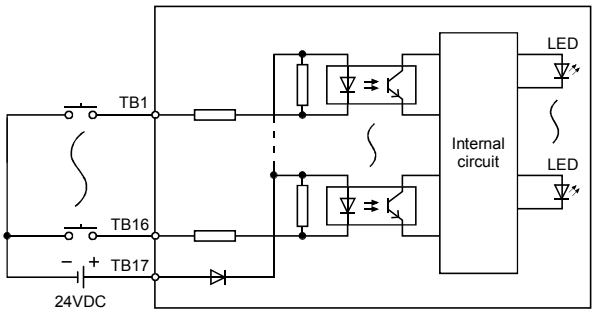
Terminal Block Number	Signal Name
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM
TB18	Vacant

＊1: CPU parameter setting. (Initial setting is 0.2ms)
Response time can be changed on SW5D5C-GPPW or later.
For the setting method, refer to the section 1.3.1.

2.6 QX40-TS DC Input Module (Positive Common Type)

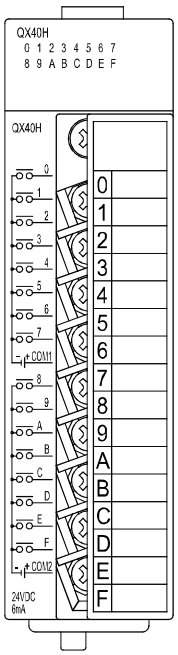
This module is a spring clamp terminal block type and an input module that has indicators for checking the insertion state of wire.

Specifications \ Type		DC Input Module (Positive Common Type)	
		QX40-TS	Appearance
Number of input points		16 points	
Isolation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		No	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input impedance		Approx. 5.6kΩ	
Response time	OFF to ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
	ON to OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Number of I/O points		16 (I/O allocation is set as a 16-points input module)	
Operation indicator		ON indication (LED)	
External connections		Two piece Spring clamp terminal block	
Applicable wire size		0.3 to 2.0mm^2 core (AWG22 to 15)	
Applicable crimping terminal		Refer to section 9.1	
5VDC internal current consumption		50mA (TYP. all points ON)	
Weight		0.16kg	

External Connections	Terminal Block Number	Signal Name
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM
	TB18	Vacant

＊1: For the setting method, refer to the section 1.3.1.

2.7 QX40H DC High-Speed Input Module (Positive Common Type)

Specifications \ Type			DC high-speed input module (Positive Common Type) QX40H						Appearance
Number of input points			16 points						
Isolation method			Photocoupler						
Rated input voltage			24VDC (+20/-15%, ripple ratio within 5%)						
Rated input current			Approx. 6mA						
Input derating			Refer to the derating chart.						
ON voltage/ON current			13V or higer/3mA or higher						
OFF voltage/OFF current			8V or lower/1.6mA or lower						
Input impedance			Approx. 3.9kΩ						
Response time	SW1 (noise filter) ＊1		OFF	ON					
	Set value ＊2		Invalid	0.1	0.2	0.4	0.6	1	
	OFF to ON	TYP.	0ms ＊3	0.04ms	0.10ms	0.25ms	0.50ms	0.95ms	
		MAX.	- ＊3	0.05ms	0.15ms	0.30ms	0.60ms	1.00ms	
	ON to OFF	TYP.	0ms ＊3	0.04ms	0.10ms	0.25ms	0.50ms	0.95ms	
		MAX.	- ＊3	0.05ms	0.15ms	0.30ms	0.60ms	1.00ms	
Function setting	SW2＊4		OFF: Interrupt, ON: High-speed input						
Dielectric withstand voltage			560VAC rms/3 cycles (altitude 2000m (6557.38ft.))						
Insulation resistance			10MΩ or more by insulation resistance tester						
Noise immunity＊5			By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency						
Protection of degree			IP2X						
Common terminal arrangement			8 points/common (common terminal: TB9,TB18)						
Number of I/O points			16 (I/O allocation is set as a 16-points high-speed input module or interrupt module)＊4						
Operation indicator			Set by Switch setting in GX Developer＊4 ＊6						
External connections			ON indication (LED)						
Applicable wire size			18-point terminal block (M3×6 screws)						
Applicable crimping terminal			0.3 to 0.75mm^2 core (2.8mm (0.11in.)OD max.)						
Protection of degree			R1.25-3(sleeved solderless terminals cannot be used.)						
5VDC internal current consumption			80mA (TYP. all points ON)						
Weight			0.16kg						

＊1: If turning on the switch 1, the noise filter takes effect.
The off-status noise filter disables I/O response time setting.
After switching on or off the switch 1, reset the power supply of the CPU module.

＊2: Set an input response time in "I/O response time" combo box of PLC parameter in GX Developer. (Default: 0.2ms)
The response time in SW6D5C-GPPW or later can be changed.
For the setting details, refer to Section 1.3.1.

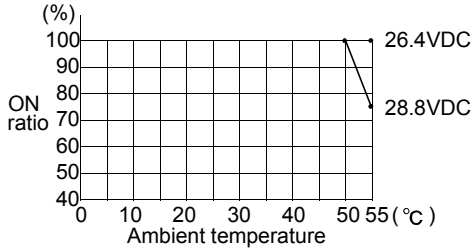
＊3: The actual response time is 5μs delay when turning on, 10μs delay when turning off, because the hardware response time is added.
For the details of the CPU overhead time, refer to QCPU User's Manual (Function Explanation, Program Fundamentals)...

＊4: The module function can be changed according to the switch 2 status.
ON : High-speed input
OFF : Interrupt
If changing the switch 2 setting while the CPU module is in RUN, an error (error code:2100) occurs.

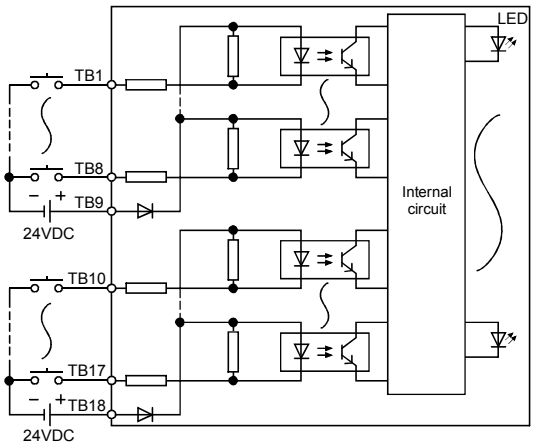
＊5: Indicates the noise immunity when the noise filter takes effect (the switch is turned on).

＊6: For the setting method, refer to Section 1.3.3.

Derating Chart



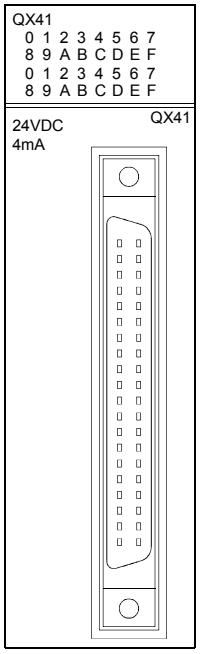
External Connections



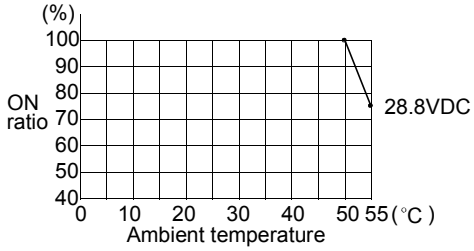
Terminal Block Number	Signal Name
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	COM1
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	COM2

2.8 QX41 DC Input Module (Positive Common Type)

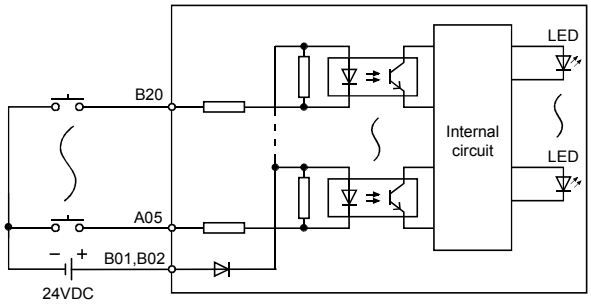
Specifications \ Type		DC Input Module (Positive Common Type) QX41	Appearance
Number of input points		32 points	
Isolation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		Refer to the derating chart.	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input impedance		Approx. 5.6kΩ	
Response time	OFF to ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
	ON to OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		32 points/common (common terminal: B01, B02)	
Number of I/O points		32 (I/O allocation is set as a 32-points input module)	
Operation indicator		ON indication (LED)	
External connections		40-pin connector	
Applicable wire size		0.3mm^2 (For A6CON1 or A6CON4) ＊2	
External wiring connector		A6CON1, A6CON2, A6CON3, A6CON4 (optional)	
Applicable connector/terminal block conversion module		A6TBXY36, A6TBXY54, A6TBX70	
5VDC internal current consumption		75mA (TYP. all points ON) (0.08A is shown on the rating plate of the module.)	
Weight		0.15kg	



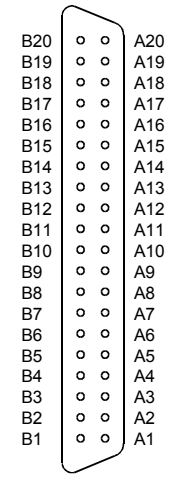
Derating Chart



External Connections



Pin-Outs



Module front view

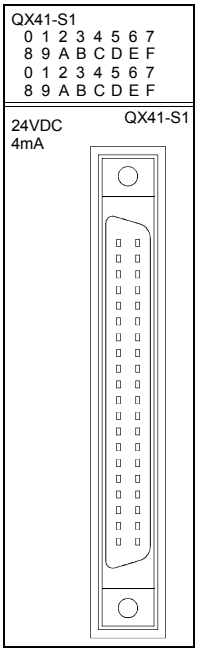
Pin No.	Signal No.	Pin No.	Signal No.
B20	X00	A20	X10
B19	X01	A19	X11
B18	X02	A18	X12
B17	X03	A17	X13
B16	X04	A16	X14
B15	X05	A15	X15
B14	X06	A14	X16
B13	X07	A13	X17
B12	X08	A12	X18
B11	X09	A11	X19
B10	X0A	A10	X1A
B09	X0B	A09	X1B
B08	X0C	A08	X1C
B07	X0D	A07	X1D
B06	X0E	A06	X1E
B05	X0F	A05	X1F
B04	Vacant	A04	Vacant
B03	Vacant	A03	Vacant
B02	COM	A02	Vacant
B01	COM	A01	Vacant

＊1: For the setting method, refer to the section 1.3.1.

＊2: When using A6CON2 or A6CON3, refer to Chapter 7.

2.9 QX41-S1 DC Input Module (Positive Common Type)

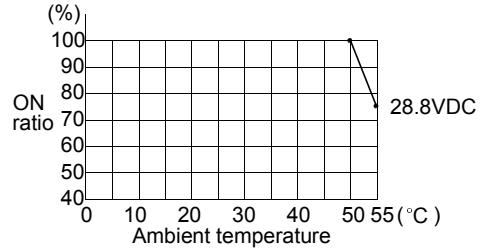
Specifications \ Type			DC Input Module (Positive Common Type) QX41-S1					Appearance
Number of input points			32 points					
Isolation method			Photocoupler					
Rated input voltage			24VDC (+20/-15%, ripple ratio within 5%)					
Rated input current			Approx. 4mA					
Input derating			Refer to the derating chart.					
ON voltage/ON current			19V or higher/3.0mA or higher					
OFF voltage/OFF current			9.5V or lower/1.5mA or lower					
Input impedance			Approx. 5.6kΩ					
Response time	Set value ∗1		0.1	0.2	0.4	0.6	1	
	OFF to ON	Typ	0.05ms	0.15ms	0.30ms	0.55ms	1.05ms	
		max	0.12ms	0.20ms	0.40ms	0.60ms	1.20ms	
	ON to OFF	Typ	0.15ms	0.20ms	0.35ms	0.60ms	1.10ms	
		max	0.20ms	0.30ms	0.50ms	0.70ms	1.30ms	
Dielectric withstand voltage			560VAC rms/3 cycles (altitude 2000m (6557.38ft.))					
Insulation resistance			10MΩ or more by insulation resistance tester					
Noise immunity			By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency					
			First transient noise IEC61000-4-4: 1kV					
Protection of degree			IP2X					
Common terminal arrangement			32 points/common (common terminal: B01, B02)					
Number of I/O points			32 (I/O allocation is set as a 32-points Hi. input module)					
Operation indicator			ON indication (LED)					
External connections			40-pin connector					
Applicable wire size			0.3mm^2 (For A6CON1 or A6CON4) ∗2					
External wiring connector			A6CON1, A6CON2, A6CON3, A6CON4 (optional)					
Applicable connector/terminal block conversion module			A6TBXY36, A6TBXY54, A6TBX70					
5VDC internal current consumption			75mA (TYP. all points ON) (0.08A is shown on the rating plate of the module.)					
Weight			0.15kg					



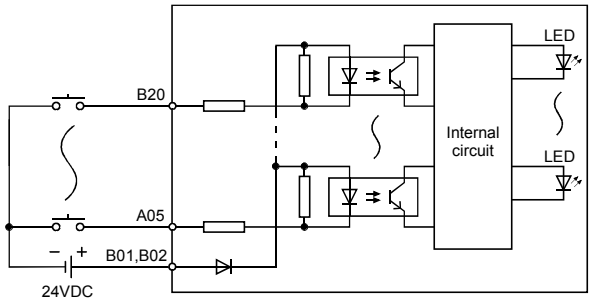
∗1: CPU parameter setting. (Initial setting is 0.2ms)
Response time can be changed on SW5D5C-GPPW or later.
For the setting method, refer to the section 1.3.1.

∗2: When using A6CON2 or A6CON3, refer to Chapter 7.

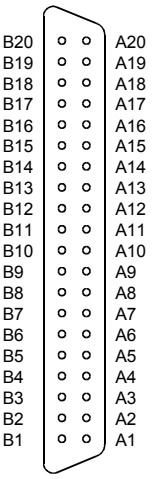
Derating Chart



External Connections



Pin-Outs



Module front view

Pin No.	Signal No.	Pin No.	Signal No.
B20	X00	A20	X10
B19	X01	A19	X11
B18	X02	A18	X12
B17	X03	A17	X13
B16	X04	A16	X14
B15	X05	A15	X15
B14	X06	A14	X16
B13	X07	A13	X17
B12	X08	A12	X18
B11	X09	A11	X19
B10	X0A	A10	X1A
B09	X0B	A09	X1B
B08	X0C	A08	X1C
B07	X0D	A07	X1D
B06	X0E	A06	X1E
B05	X0F	A05	X1F
B04	Vacant	A04	Vacant
B03	Vacant	A03	Vacant
B02	COM	A02	Vacant
B01	COM	A01	Vacant

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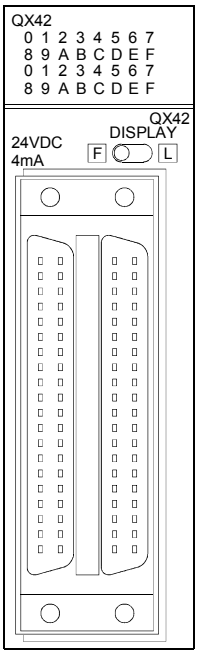
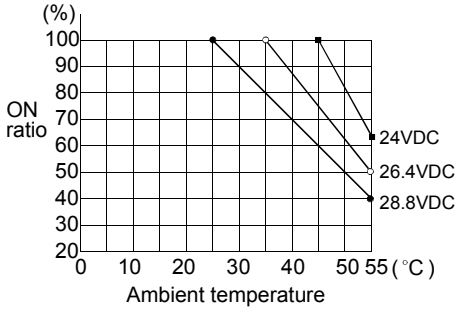
2.10 QX42 DC Input Module (Positive Common Type)

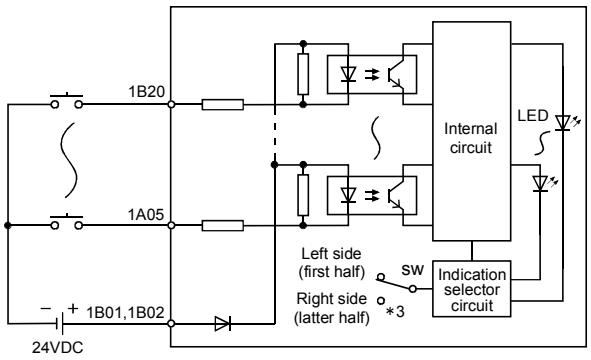
Specifications \ Type		DC Input Module (Positive Common Type) QX42	Appearance
Number of input points		64 points	
Isolation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		Refer to the derating chart.	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input impedance		Approx. 5.6kΩ	
Response time	OFF to ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
	ON to OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		32 points/common (common terminal: 1B01, 1B02, 2B01, 2B02)	
Number of I/O points		64 (I/O allocation is set as a 32-points input module)	
Operation indicator		ON indication (LED), 32 point switch-over using switch	
External connections		40-pin connector	
Applicable wire size		0.3mm^2 (For A6CON1 or A6CON4) ＊2	
External wiring connector		A6CON1, A6CON2, A6CON3, A6CON4 (optional)	
Applicable connector/terminal block conversion module		A6TBXY36, A6TBXY54, A6TBX70	
5VDC internal current consumption		90mA (TYP. all points ON)	
Weight		0.18kg	

＊1: For the setting method, refer to the section 1.3.1.
＊2: When using A6CON2 or A6CON3, refer to Chapter 7.

Derating Chart

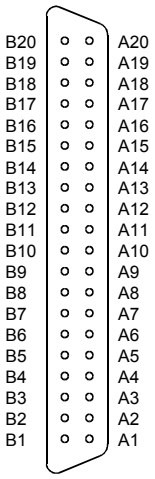


External Connections



The above diagram shows the first half of 32 points (F).
The latter half of 32 points (L) are similar.

Pin-Outs



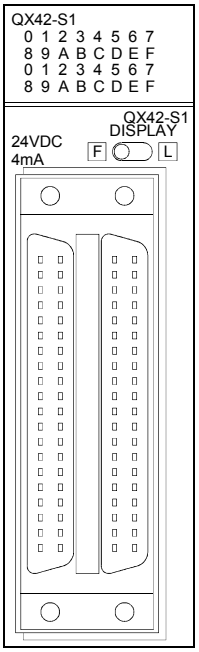
Module front view

Pin No. *4	Signal No.	Pin No. *4	Signal No.	Pin No. *4	Signal No.	Pin No. *4	Signal No.
1B20	X00	1A20	X10	2B20	X20	2A20	X30
1B19	X01	1A19	X11	2B19	X21	2A19	X31
1B18	X02	1A18	X12	2B18	X22	2A18	X32
1B17	X03	1A17	X13	2B17	X23	2A17	X33
1B16	X04	1A16	X14	2B16	X24	2A16	X34
1B15	X05	1A15	X15	2B15	X25	2A15	X35
1B14	X06	1A14	X16	2B14	X26	2A14	X36
1B13	X07	1A13	X17	2B13	X27	2A13	X37
1B12	X08	1A12	X18	2B12	X28	2A12	X38
1B11	X09	1A11	X19	2B11	X29	2A11	X39
1B10	X0A	1A10	X1A	2B10	X2A	2A10	X3A
1B09	X0B	1A09	X1B	2B09	X2B	2A09	X3B
1B08	X0C	1A08	X1C	2B08	X2C	2A08	X3C
1B07	X0D	1A07	X1D	2B07	X2D	2A07	X3D
1B06	X0E	1A06	X1E	2B06	X2E	2A06	X3E
1B05	X0F	1A05	X1F	2B05	X2F	2A05	X3F
1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
1B02	COM1	1A02	Vacant	2B02	COM2	2A02	Vacant
1B01	COM1	1A01	Vacant	2B01	COM2	2A01	Vacant

*3: Selection of left-hand (F) side provides the first half (X00 to X1F) LED indications, and selection of right-hand (L) side provides the latter half (X20 to X3F) LED indications.

*4: Pin number of 1 □ □ □ indicates that of the left-hand side connector, and pin number of 2 □ □ □ indicates that of the right-hand side connector.

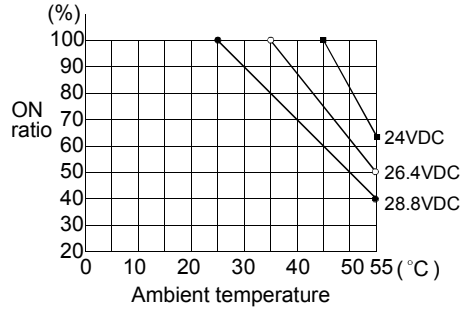
2.11 QX42-S1 DC Input Module (Positive Common Type)

Specifications \ Type			DC Input Module (Positive Common Type) QX42-S1					Appearance
Number of input points			64 points					
Isolation method			Photocoupler					
Rated input voltage			24VDC (+20/-15%, ripple ratio within 5%)					
Rated input current			Approx. 4mA					
Input derating			Refer to the derating chart.					
ON voltage/ON current			19V or higher/3.0mA or higher					
OFF voltage/OFF current			9.5V or lower/1.5mA or lower					
Input impedance			Approx. 5.6kΩ					
Response time	Set value ＊1		0.1	0.2	0.4	0.6	1	
	OFF to ON	Typ	0.05ms	0.15ms	0.30ms	0.55ms	1.05ms	
		max	0.12ms	0.20ms	0.40ms	0.60ms	1.20ms	
	ON to OFF	Typ	0.15ms	0.20ms	0.35ms	0.60ms	1.10ms	
		max	0.20ms	0.30ms	0.50ms	0.70ms	1.30ms	
Dielectric withstand voltage			560VAC rms/3 cycles (altitude 2000m (6557.38ft.))					
Insulation resistance			10MΩ or more by insulation resistance tester					
Noise immunity			By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency					
			First transient noise IEC61000-4-4: 1kV					
Protection of degree			IP2X					
Common terminal arrangement			32 points/common (common terminal: 1B01, 1B02, 2B01, 2B02)					
Number of I/O points			64 (I/O allocation is set as a 64-points Hi. input module)					
Operation indicator			ON indication (LED), 32 point switch-over using switch					
External connections			40-pin connector					
Applicable wire size			$0.3mm^2$ (For A6CON1 or A6CON4) ＊2					
External wiring connector			A6CON1, A6CON2, A6CON3, A6CON4 (optional)					
Applicable connector/terminal block conversion module			A6TBXY36, A6TBXY54, A6TBX70					
5VDC internal current consumption			90mA (TYP. all points ON)					
Weight			0.18kg					

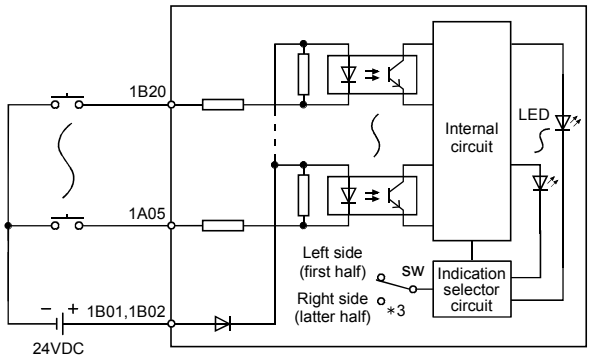
＊1: CPU parameter setting. (Initial setting is 0.2ms)
Response time can be changed on SW5D5C-GPPW or later.
For the setting method, refer to the section 1.3.1.

＊2: When using A6CON2 or A6CON3, refer to Chapter 7.

Derating Chart

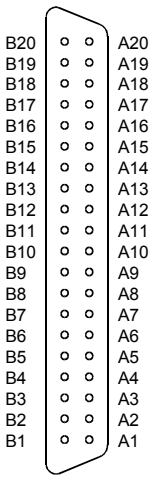


External Connections



The above diagram shows the first half of 32 points (F).
The latter half of 32 points (L) are similar.

Pin-Outs



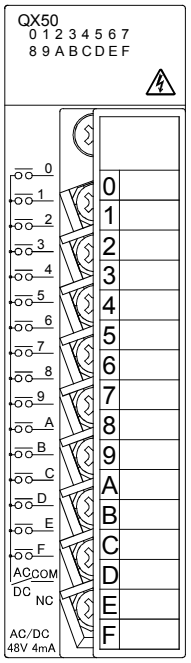
Module front view

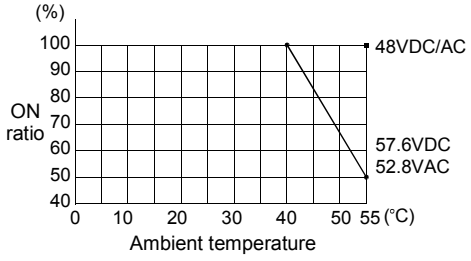
Pin No. *4	Signal No.	Pin No. *4	Signal No.	Pin No. *4	Signal No.	Pin No. *4	Signal No.
1B20	X00	1A20	X10	2B20	X20	2A20	X30
1B19	X01	1A19	X11	2B19	X21	2A19	X31
1B18	X02	1A18	X12	2B18	X22	2A18	X32
1B17	X03	1A17	X13	2B17	X23	2A17	X33
1B16	X04	1A16	X14	2B16	X24	2A16	X34
1B15	X05	1A15	X15	2B15	X25	2A15	X35
1B14	X06	1A14	X16	2B14	X26	2A14	X36
1B13	X07	1A13	X17	2B13	X27	2A13	X37
1B12	X08	1A12	X18	2B12	X28	2A12	X38
1B11	X09	1A11	X19	2B11	X29	2A11	X39
1B10	X0A	1A10	X1A	2B10	X2A	2A10	X3A
1B09	X0B	1A09	X1B	2B09	X2B	2A09	X3B
1B08	X0C	1A08	X1C	2B08	X2C	2A08	X3C
1B07	X0D	1A07	X1D	2B07	X2D	2A07	X3D
1B06	X0E	1A06	X1E	2B06	X2E	2A06	X3E
1B05	X0F	1A05	X1F	2B05	X2F	2A05	X3F
1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
1B02	COM1	1A02	Vacant	2B02	COM2	2A02	Vacant
1B01	COM1	1A01	Vacant	2B01	COM2	2A01	Vacant

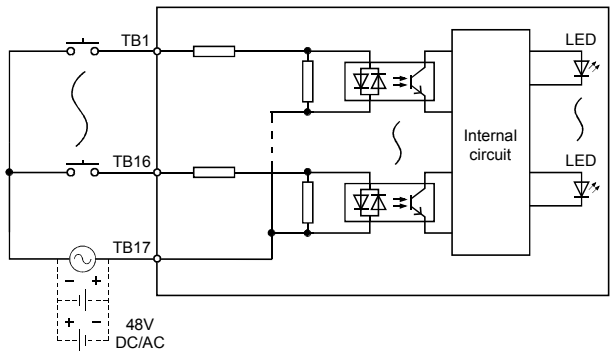
*3: Selection of left-hand (F) side provides the first half (X00 to X1F) LED indications, and selection of right-hand (L) side provides the latter half (X20 to X3F) LED indications.
*4: Pin number of 1□□□ indicates that of the left-hand side connector, and pin number of 2□□□ indicates that of the right-hand side connector.

2.12 QX50 DC (Positive Common/Negative Common Shared Type)/ AC Input Module

Specifications \ Type		DC (positive common/negative common shared type)/ AC input module		
		QX50		Appearance
		DC Input	AC Input	
Number of input points		16 points		
Isolation method		Photocoupler		
Rated input voltage		48VDC (+20/-15%, ripple ratio within 5%)	48VAC (+10/-15%) 50/60Hz (±3Hz) (ripple ratio within 5%)	
Rated input current		Approx. 4mA		
Input derating		Refer to the derating chart.		
ON voltage/ON current		28V or higher/2.5mA or higher		
OFF voltage/OFF current		10V or lower/1.0mA or lower		
Input impedance		Approx. 11.2kΩ		
Response time＊1	OFF to ON	5ms or less	15ms or less	
	ON to OFF	20ms or less	20ms or less	
Dielectric withstand voltage		1060VAC rms/3 cycles (altitude 2000m (6557.38ft.))		
Insulation resistance		10MΩ or more by insulation resistance tester		
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency		
		First transient noise IEC61000-4-4: 1kV		
Protection of degree		IP2X		
Common terminal arrangement		16 points/common (common terminal: TB17)		
Number of I/O points		16 (I/O allocation is set as a 16 points input module)		
Operation indicator		ON indication (LED)		
External connections		18-point terminal block (M3×6 screws)		
Applicable wire size		0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)		
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)		
5VDC internal current consumption		50mA (TYP. all points ON)		
Weight		0.13kg		



Derating Chart


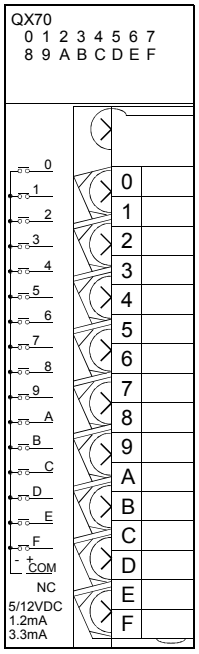
External Connections


Terminal Block Number	Signal Name
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM
TB18	Vacant

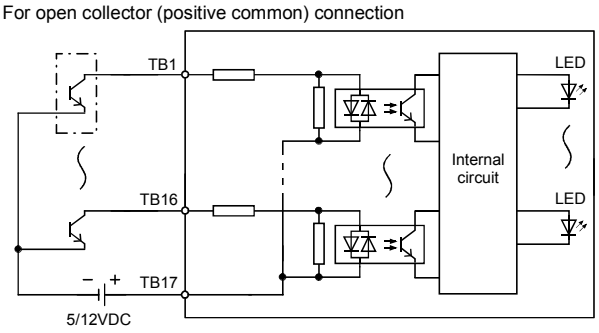
＊1: Response time cannot be changed. Parameter setting of the CPU module will be invalid.

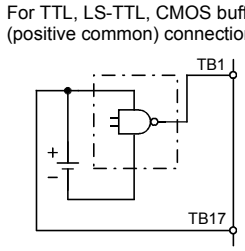
2.13 QX70 DC Input Module (Positive Common/Negative Common Shared Type)

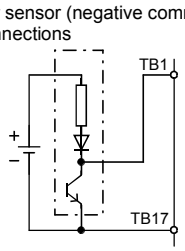
Specifications \ Type		DC Input Module (Positive Common/Negative Common Shared Type) QX70	Appearance
Number of input points		16 points	
Insulation method		Photocoupler	
Rated input voltage		5VDC (+20/-10%, ripple ratio within 5%) / 12VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 1.2mA / Approx. 3.3mA	
Input derating		None	
ON voltage/ON current		3.5V or higher/1mA or higher	
OFF voltage/OFF current		1V or lower/0.1mA or lower	
Input resistance		Approx. 3.3kΩ	
Response time	OFF to ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ∗1 Initial setting is 10ms	
	ON to OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ∗1 Initial setting is 10ms	
Dielectric maximum voltage		560VAC rms/3 cycles (altitude 2000m)	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 0.25kV	
Protection of degree		IP2X	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Number of I/O points		16 (I/O allocation is set as a 16-points input module)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screw)	
Applicable wire size		Core cable: 0.3 to 0.75mm^2 (Outside diameter: 2.8mm or smaller)	
Applicable connector terminal		R1.25-3 (Terminals with sleeve cannot be used)	
5VDC internal current consumption		55mA (TYP, all points ON) (0.06A is shown on the rating plate of the module.)	
Weight		0.14kg	



External Connections



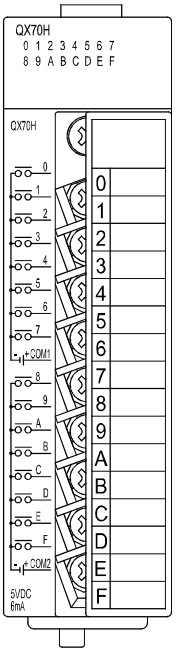




Terminal Block Number	Signal Name
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	X09
TB11	X0A
TB12	X0B
TB13	X0C
TB14	X0D
TB15	X0E
TB16	X0F
TB17	COM
TB18	Vacant

∗1: For the setting method, refer to the section 1.3.1.

2.14 QX70H DC High-speed Input Module (Positive Common Type)

Specifications \ Type			DC high-speed input module (Positive Common Type) QX70H						Appearance
Number of input points			16 points						
Isolation method			Photocoupler						
Rated input voltage			5VDC (+20/-15%, ripple ratio within 5%)						
Rated input current			Approx. 6mA						
Input derating			None						
ON voltage/ON current			3.5V or higer/3mA or higher						
OFF voltage/OFF current			1V or lower/1mA or lower						
Input impedance			Approx. 470Ω						
Response time	SW1 (noise filter) ＊1		OFF	ON					
	Set value ＊2		Invalid	0.1	0.2	0.4	0.6	1	
	OFF to ON	TYP.	0ms ＊3	0.04ms	0.10ms	0.25ms	0.50ms	0.95ms	
		MAX.	- ＊3	0.05ms	0.15ms	0.30ms	0.60ms	1.00ms	
	ON to OFF	TYP.	0ms ＊3	0.04ms	0.10ms	0.25ms	0.50ms	0.95ms	
		MAX.	- ＊3	0.05ms	0.15ms	0.30ms	0.60ms	1.00ms	
Function setting	SW2＊4		OFF: Interrupt, ON: High-speed input						
Dielectric withstand voltage			560VAC rms/3 cycles (altitude 2000m (6557.38ft.))						
Insulation resistance			10MΩ or more by insulation resistance tester						
Noise immunity＊5			By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency						
Protection of degree			IP2X						
Common terminal arrangement			8 points/common (common terminal: TB9,TB18)						
Number of I/O points			16 (I/O allocation is set as a 16-points high-speed input module or interrupt module)＊4						
Operation indicator			Set by Switch setting in GX Developer＊4 ＊6						
External connections			ON indication (LED)						
Applicable wire size			18-point terminal block (M3×6 screws)						
Applicable crimping terminal			0.3 to 0.75mm^2 core (2.8mm (0.11in.)OD max.)						
Protection of degree			R1.25-3 (sleeved solderless terminals cannot be used.)						
5VDC internal current consumption			80mA (TYP. all points ON)						
Weight			0.16kg						

＊1: If turning on the switch 1, the noise filter takes effect.
The off-status noise filter disables I/O response time setting.
After switching on or off the switch 1, reset the power supply of the CPU module.

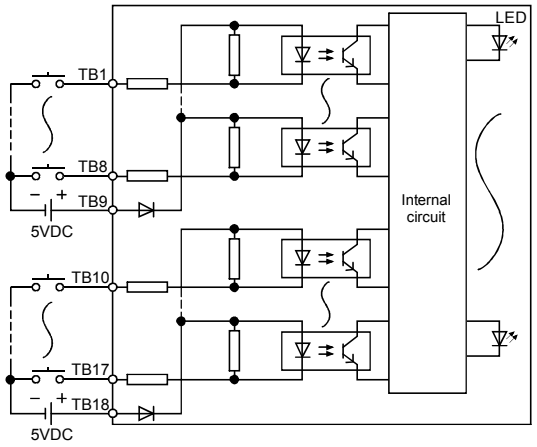
＊2: Set an input response time in "I/O response time" combo box of PLC parameter in GX Developer. (Default: 0.2ms)
The response time in SW6D5C-GPPW or later can be changed.
For the setting details, refer to Section 1.3.1.

＊3: The actual response time is 5μs delay when turning on, 10μs delay when turning off, because the hardware response time is added.
For the details of the CPU overhead time, refer to QCPU User's Manual (Function Explanation, Program Fundamentals)...

＊4: The module function can be changed according to the switch 2 status.
ON : High-speed input
OFF : Interrupt
If changing the switch 2 setting while the CPU module is in RUN, an error (error code:2100) occurs.

＊5: Indicates the noise immunity when the noise filter takes effect (the switch is turned on).

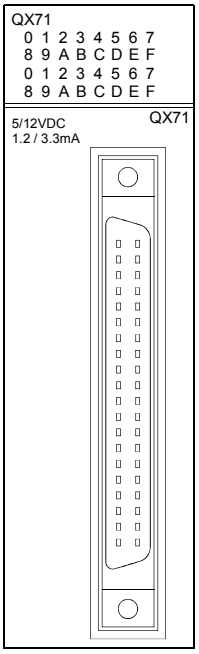
＊6: For the setting method, refer to Section 1.3.3.

External Connections	Terminal Block Number	Signal Name
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	COM1
	TB11	X09
	TB12	X0A
	TB13	X0B
	TB14	X0C
	TB15	X0D
	TB16	X0E
	TB17	X0F
	TB18	COM2

2 - 19

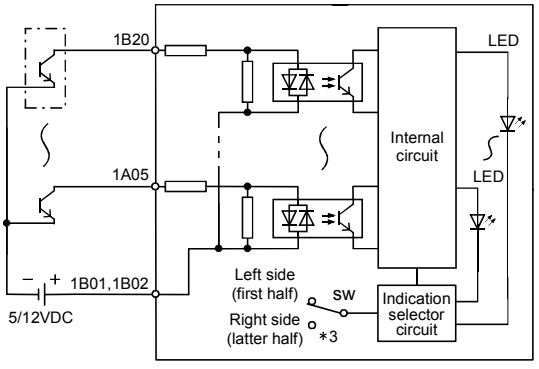
2.15 QX71 DC Input Module (Positive Common/Negative Common Shared Type)

Specifications \ Type		DC Input Module (Positive Common/Negative Common Shared Type)	
		QX71	Appearance
Number of input points		32 points	
Insulation method		Photocoupler	
Rated input voltage		5VDC (+20/-10%, ripple ratio within 5%)	12VDC (+20/-15%, ripple ratio within 5%)
Rated input current		Approx. 1.2mA	Approx. 3.3mA
Input derating		None	
ON voltage/ON current		3.5V or higher/1mA or higher	
OFF voltage/OFF current		1V or lower/0.1mA or lower	
Input resistance		Approx. 3.3kΩ	
Response time	OFF to ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ∗1 Initial setting is 10ms	
	ON to OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ∗1 Initial setting is 10ms	
Dielectric maximum voltage		560VAC rms/3 cycles (altitude 2000m)	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 0.25kV	
Protection of degree		IP2X	
Common terminal arrangement		32 points/common (common terminal: B01, B02)	
Number of I/O points		32 (I/O allocation is set as a 32-points input module)	
Operation indicator		ON indication (LED)	
External connections		40-pin connector	
Applicable wire size		0.3mm^2 (For A6CON1 or A6CON4) ∗2	
External wiring connector		A6CON1, A6CON2, A6CON3, A6CON4 (optional)	
5VDC internal current consumption		70mA (TYP, all points ON)	
Weight		0.12kg	

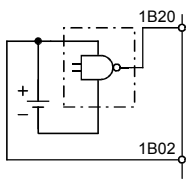


External Connections

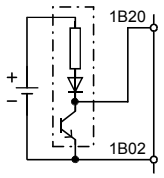
For open collector (positive common) connection



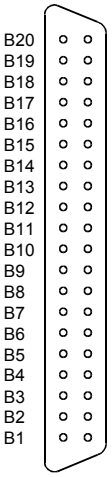
For TTL, LS-TTL, CMOS buffer (positive common) connections



For sensor (negative common) connections



Pin-Outs



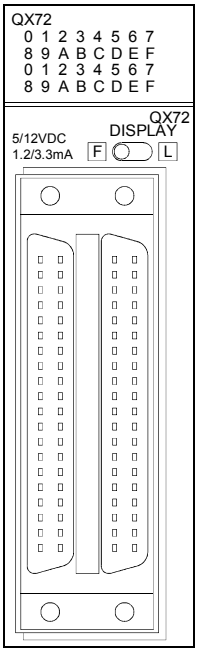
Module front view

Pin No.	Signal No.	Pin No.	Signal No.
B20	X00	A20	X10
B19	X01	A19	X11
B18	X02	A18	X12
B17	X03	A17	X13
B16	X04	A16	X14
B15	X05	A15	X15
B14	X06	A14	X16
B13	X07	A13	X17
B12	X08	A12	X18
B11	X09	A11	X19
B10	X0A	A10	X1A
B09	X0B	A09	X1B
B08	X0C	A08	X1C
B07	X0D	A07	X1D
B06	X0E	A06	X1E
B05	X0F	A05	X1F
B04	Vacant	A04	Vacant
B03	Vacant	A03	Vacant
B02	COM	A02	Vacant
B01	COM	A01	Vacant

∗1: For the setting method, refer to the section 1.3.1.
∗2: When using A6CON2 or A6CON3, refer to Chapter 7.

2.16 QX72 DC Input Module (Positive Common/Negative Common Shared Type)

Specifications \ Type		DC Input Module (Positive Common/Negative Common Shared Type)		Appearance
		QX72		
Number of input points		64 points		
Insulation method		Photocoupler		
Rated input voltage		5VDC (+20/-10%, ripple ratio within 5%)	12VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 1.2mA	Approx. 3.3mA	
Input derating		None		
ON voltage/ON current		3.5V or higher/3mA or higher		
OFF voltage/OFF current		1V or lower/0.1mA or lower		
Input resistance		Approx. 3.3kΩ		
Response time	OFF to ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ∗1 Initial setting is 10ms		
	ON to OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ∗1 Initial setting is 10ms		
Dielectric maximum voltage		560VAC rms/3 cycles (altitude 2000m)		
Insulation resistance		10MΩ or more by insulation resistance tester		
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency		
		First transient noise IEC61000-4-4: 0.25kV		
Protection of degree		IP2X		
Common terminal arrangement		32 points/common (common terminal: 1B01, 1B02, 2B01, 2B02)		
Number of I/O points		64 (I/O allocation is set as a 64-points input module)		
Operation indicator		ON indication (LED), 32-point switchover using switch		
External connections		40-pin connector		
Applicable wire size		$0.3mm^2$ (For A6CON1 or A6CON4) ∗2		
External wiring connector		A6CON1, A6CON2, A6CON3, A6CON4 (optional)		
5VDC internal current consumption		85mA (TYP, all points ON) (0.09A is shown on the rating plate of the module.)		
Weight		0.13kg		

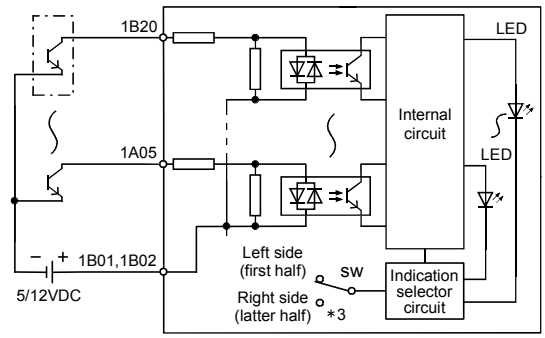


∗1: For the setting method, refer to the section 1.3.1.

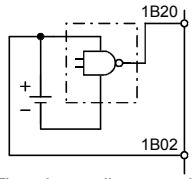
∗2: When using A6CON2 and A6CON3, refer to Chapter 7.

External Connections

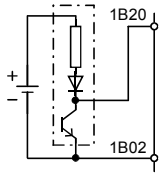
For open collector (positive common) connection



For TTL, LS-TTL, CMOS buffer (positive common) connections

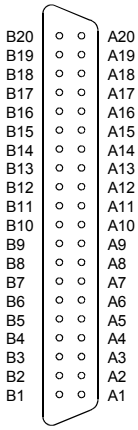


For sensor (negative common) connections



The above diagram shows the first half of 32 points (F).
The latter half of 32 points (L) are similar.

Pin-Outs



Module front view

Pin No. *4	Signal No.	Pin No. *4	Signal No.	Pin No. *4	Signal No.	Pin No. *4	Signal No.
1B20	X00	1A20	X10	2B20	X20	2A20	X30
1B19	X01	1A19	X11	2B19	X21	2A19	X31
1B18	X02	1A18	X12	2B18	X22	2A18	X32
1B17	X03	1A17	X13	2B17	X23	2A17	X33
1B16	X04	1A16	X14	2B16	X24	2A16	X34
1B15	X05	1A15	X15	2B15	X25	2A15	X35
1B14	X06	1A14	X16	2B14	X26	2A14	X36
1B13	X07	1A13	X17	2B13	X27	2A13	X37
1B12	X08	1A12	X18	2B12	X28	2A12	X38
1B11	X09	1A11	X19	2B11	X29	2A11	X39
1B10	X0A	1A10	X1A	2B10	X2A	2A10	X3A
1B09	X0B	1A09	X1B	2B09	X2B	2A09	X3B
1B08	X0C	1A08	X1C	2B08	X2C	2A08	X3C
1B07	X0D	1A07	X1D	2B07	X2D	2A07	X3D
1B06	X0E	1A06	X1E	2B06	X2E	2A06	X3E
1B05	X0F	1A05	X1F	2B05	X2F	2A05	X3F
1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
1B02	COM1	1A02	Vacant	2B02	COM2	2A02	Vacant
1B01	COM1	1A01	Vacant	2B01	COM2	2A01	Vacant

*3: Selection of left-hand (F) side provides the first half (X00 to X1F) LED indications, and selection of right-hand (L) side provides the latter half (X20 to X3F) LED indications.

*4: Pin number of 1□ □ □ indicates that of the left-hand side connector, and pin number of 2□ □ □ indicates that of the right-hand side connector.

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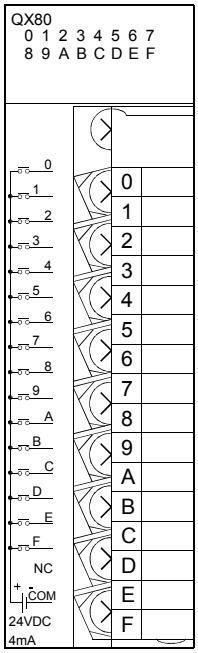
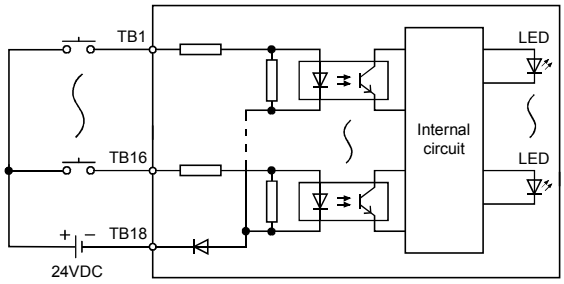
2.17 QX80 DC Input Module (Negative Common Type)

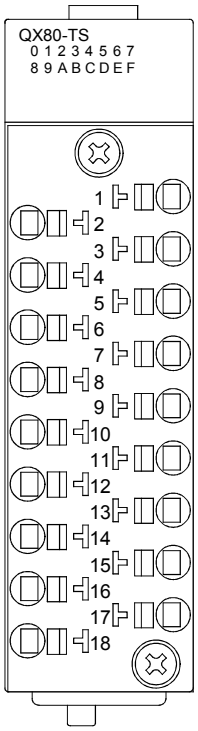
Specifications \ Type		DC Input Module (Negative Common Type) QX80	Appearance
Number of input points		16 points	
Isolation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		No	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input impedance		Approx. 5.6kΩ	
Response time	OFF to ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
	ON to OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		16 points/common (common terminal: TB18)	
Number of I/O points		16 (I/O allocation is set as a 16-points input module)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption		50mA (TYP. all points ON)	
Weight		0.16kg	

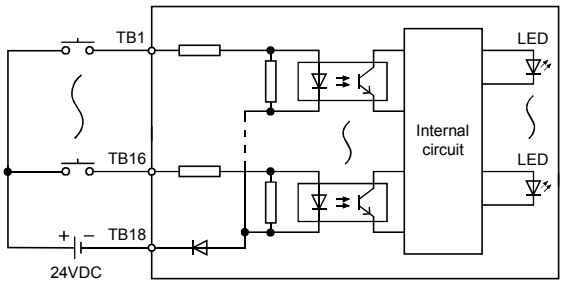
External Connections	Terminal Block Number	Signal Name
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	Vacant
	TB18	COM

＊1: For the setting method, refer to the section 1.3.1.

2.18 QX80-TS DC Input Module (Negative Common Type)

This module is a spring clamp terminal block type and an input module that has indicators for checking the insertion state of wire.

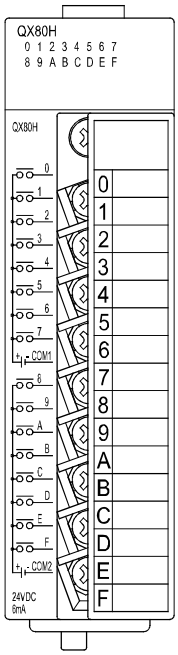
Specifications \ Type		DC Input Module (Negative Common Type) QX80-TS	Appearance
Number of input points		16 points	
Isolation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		No	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input impedance		Approx. 5.6kΩ	
Response time	OFF to ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
	ON to OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		16 points/common (common terminal: TB18)	
Number of I/O points		16 (I/O allocation is set as a 16-points input module)	
Operation indicator		ON indication (LED)	
External connections		Two piece Spring clamp terminal block	
Applicable wire size		0.3 to 2.0mm^2 core (AWG22 to 15)	
Applicable crimping terminal		Refer to section 9.1	
5VDC internal current consumption		50mA (TYP. all points ON)	
Weight		0.16kg	

External Connections	Terminal Block Number	Signal Name
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	Vacant
	TB18	COM

＊1: For the setting method, refer to the section 1.3.1.

2.19 QX80H DC High-speed Input Module (Negative Common Type)

Specifications \ Type			DC high-speed input module (Negative Common Type)						
			QX80H						Appearance
Number of input points			16 points						
Isolation method			Photocoupler						
Rated input voltage			24VDC (+20/-15%, ripple ratio within 5%)						
Rated input current			Approx. 6mA						
Input derating			Refer to the derating chart.						
ON voltage/ON current			13V or higer/3mA or higher						
OFF voltage/OFF current			8V or lower/1.6mA or lower						
Input impedance			Approx. 3.9kΩ						
Response time	SW1 (noise filter)＊1		OFF	ON					
	Set value ＊2		Invalid	0.1	0.2	0.4	0.6	1	
	OFF to ON	TYP.	0ms ＊3	0.04ms	0.10ms	0.25ms	0.50ms	0.95ms	
		MAX.	- ＊3	0.05ms	0.15ms	0.30ms	0.60ms	1.00ms	
	ON to OFF	TYP.	0ms ＊3	0.04ms	0.10ms	0.25ms	0.50ms	0.95ms	
		MAX.	- ＊3	0.05ms	0.15ms	0.30ms	0.60ms	1.00ms	
Function setting	SW2＊4		OFF: Interrupt, ON: High-speed input						
Dielectric withstand voltage			560VAC rms/3 cycles (altitude 2000m (6557.38ft.))						
Insulation resistance			10MΩ or more by insulation resistance tester						
Noise immunity＊5			By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency						
Protection of degree			IP2X						
Common terminal arrangement			8 points/common (common terminal: TB9,TB18)						
Number of I/O points			16 (I/O allocation is set as a 16-points high-speed input module or interrupt module)＊4						
Operation indicator			Set by Switch setting in GX Developer＊4 ＊6						
External connections			ON indication (LED)						
Applicable wire size			18-point terminal block (M3×6 screws)						
Applicable crimping terminal			0.3 to 0.75mm^2 core (2.8mm (0.11in.)OD max.)						
Protection of degree			R1.25-3 (sleeved solderless terminals cannot be used.)						
5VDC internal current consumption			80mA (TYP. all points ON)						
Weight			0.16kg						



＊1: If turning on the switch 1, the noise filter takes effect.
The off-status noise filter disables I/O response time setting.
After switching on or off the switch 1, reset the power supply of the CPU module.

＊2: Set an input response time in "I/O response time" combo box of PLC parameter in GX Developer. (Default: 0.2ms)
The response time in SW6D5C-GPPW or later can be changed.
For the setting details, refer to Section 1.3.1.

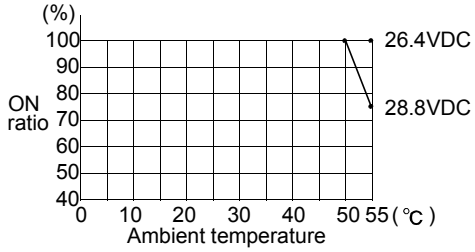
＊3: The actual response time is 5μs delay when turning on, 10μs delay when turning off, because the hardware response time is added.
For the details of the CPU overhead time, refer to QCPU User's Manual (Function Explanation, Program Fundamentals)...

＊4: The module function can be changed according to the switch 2 status.
ON : High-speed input
OFF : Interrupt
If changing the switch 2 setting while the CPU module is in RUN, an error (error code:2100) occurs.

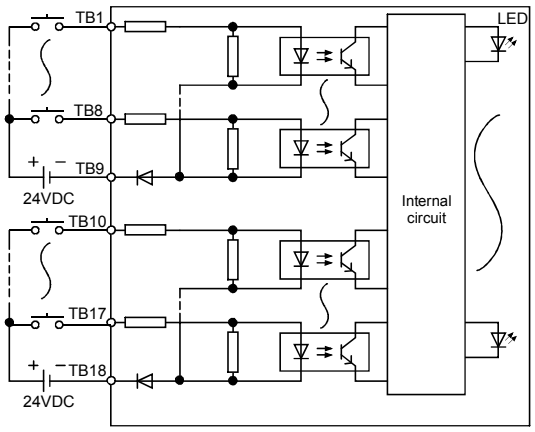
＊5: Indicates the noise immunity when the noise filter takes effect (the switch is turned on).

＊6: For the setting method, refer to Section 1.3.3.

Derating Chart



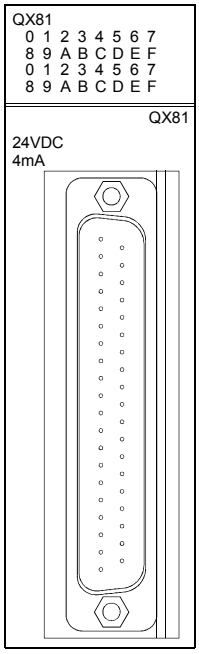
External Connections



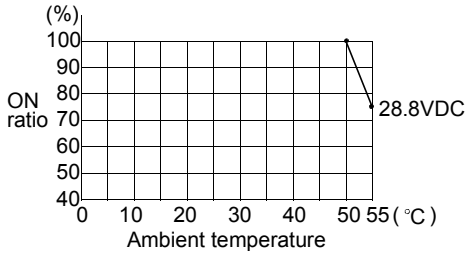
Terminal Block Number	Signal Name
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	X08
TB10	COM1
TB11	X09
TB12	X0A
TB13	X0B
TB14	X0C
TB15	X0D
TB16	X0E
TB17	X0F
TB18	COM2

2.20 QX81 DC Input Module (Negative Common Type)

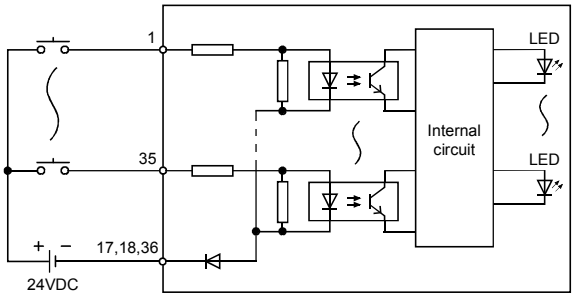
Specifications \ Type		DC Input Module (Negative Common Type) QX81	Appearance
Number of input points		32 points	
Isolation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		Refer to the derating chart.	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input impedance		Approx. 5.6kΩ	
Response time	OFF to ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ∗1 Initial setting is 10ms.	
	ON to OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ∗1 Initial setting is 10ms.	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		32 points/common (common terminal: 17, 18, 36)	
Number of I/O points		32 (I/O allocation is set as a 32-points input module)	
Operation indicator		ON indication (LED)	
External connections		37-pin D-sub connector	
Applicable wire size		0.3mm^2 (For A6CON1E) ∗2	
External wiring connector		A6CON1E, A6CON2E, A6CON3E (optional)	
Applicable connector/terminal block conversion module		A6TBX36-E, A6TBX54-E, A6TBX70-E	
5VDC internal current consumption		75mA (TYP. all points ON) (0.08A is shown on the rating plate of the module.)	
Weight		0.16kg	



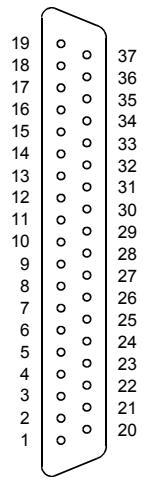
Derating Chart



External Connections



Pin-Outs



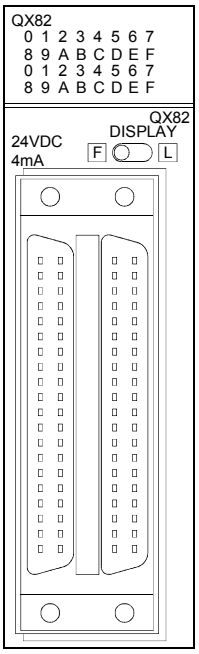
Module front view

Pin No.	Signal No.	Pin No.	Signal No.
1	X00	9	X10
20	X01	28	X11
2	X02	10	X12
21	X03	29	X13
3	X04	11	X14
22	X05	30	X15
4	X06	12	X16
23	X07	31	X17
5	X08	13	X18
24	X09	32	X19
6	X0A	14	X1A
25	X0B	33	X1B
7	X0C	15	X1C
26	X0D	34	X1D
8	X0E	16	X1E
27	X0F	35	X1F
17	COM	37	Vacant
36	COM	19	Vacant
18	COM		

∗1: For the setting method, refer to the section 1.3.1.

∗2: When using A6CON2E or A6CON3E, refer to Chapter 7.

2.21 QX82 DC Input Module (Negative Common Type)

Specifications \ Type		DC Input Module (Negative Common Type) QX82	Appearance
Number of input points		64 points	
Isolation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		Refer to the derating chart.	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input impedance		Approx. 5.6kΩ	
Response time	OFF to ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
	ON to OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting) ＊1 Initial setting is 10ms.	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		32 points/common (common terminal: 1B01, 1B02, 2B01, 2B02)	
Number of I/O points		64 (I/O allocation is set as a 64-points input module)	
Operation indicator		ON indication (LED), 32 point switch-over using switch	
External connections		40-pin connector	
Applicable wire size		0.3mm^2 (For A6CON1 or A6CON4) ＊2	
External wiring connector		A6CON1, A6CON2, A6CON3, A6CON4 (optional)	
Applicable connector/terminal block conversion module		————	
5VDC internal current consumption		90mA (TYP. all points ON)	
Weight		0.18kg	

＊1: For the setting method, refer to the section 1.3.1.
＊2: When using A6CON2 or A6CON3, refer to Chapter 7.

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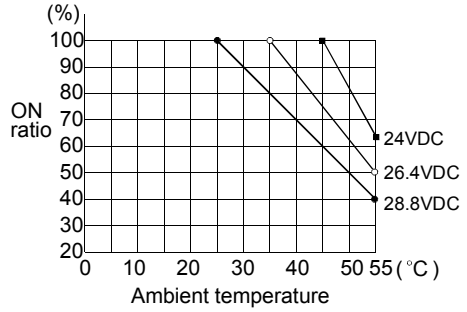
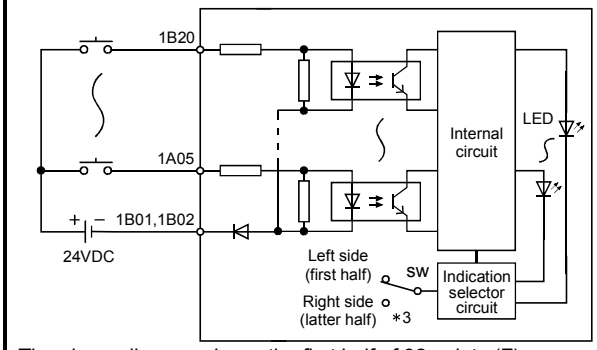
Derating Chart

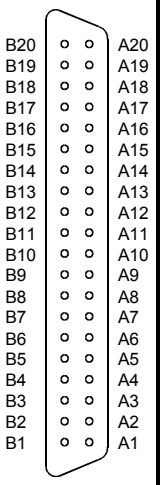


External Connections



The above diagram shows the first half of 32 points (F).
The latter half of 32 points (L) are similar.

Pin-Outs



Module front view

Pin No. *4	Signal No.	Pin No. *4	Signal No.	Pin No. *4	Signal No.	Pin No. *4	Signal No.
1B20	X00	1A20	X10	2B20	X20	2A20	X30
1B19	X01	1A19	X11	2B19	X21	2A19	X31
1B18	X02	1A18	X12	2B18	X22	2A18	X32
1B17	X03	1A17	X13	2B17	X23	2A17	X33
1B16	X04	1A16	X14	2B16	X24	2A16	X34
1B15	X05	1A15	X15	2B15	X25	2A15	X35
1B14	X06	1A14	X16	2B14	X26	2A14	X36
1B13	X07	1A13	X17	2B13	X27	2A13	X37
1B12	X08	1A12	X18	2B12	X28	2A12	X38
1B11	X09	1A11	X19	2B11	X29	2A11	X39
1B10	X0A	1A10	X1A	2B10	X2A	2A10	X3A
1B09	X0B	1A09	X1B	2B09	X2B	2A09	X3B
1B08	X0C	1A08	X1C	2B08	X2C	2A08	X3C
1B07	X0D	1A07	X1D	2B07	X2D	2A07	X3D
1B06	X0E	1A06	X1E	2B06	X2E	2A06	X3E
1B05	X0F	1A05	X1F	2B05	X2F	2A05	X3F
1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
1B02	COM1	1A02	Vacant	2B02	COM2	2A02	Vacant
1B01	COM1	1A01	Vacant	2B01	COM2	2A01	Vacant

*3: Selection of left-hand (F) side provides the first half (X00 to X1F) LED indications, and selection of right-hand (L) side provides the latter half (X20 to X3F) LED indications.
*4: Pin number of 1□□□ indicates that of the left-hand side connector, and pin number of 2□□□ indicates that of the right-hand side connector.

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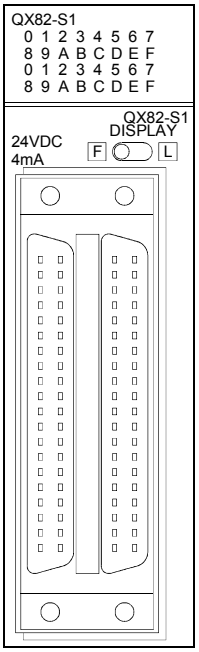
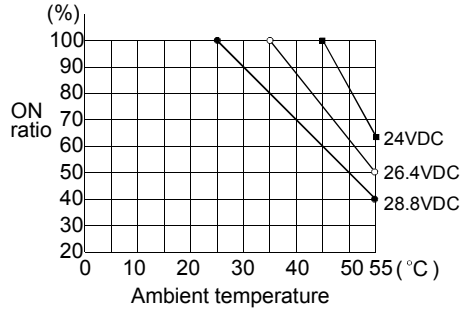
2.22 QX82-S1 DC Input Module (Negative Common Type)

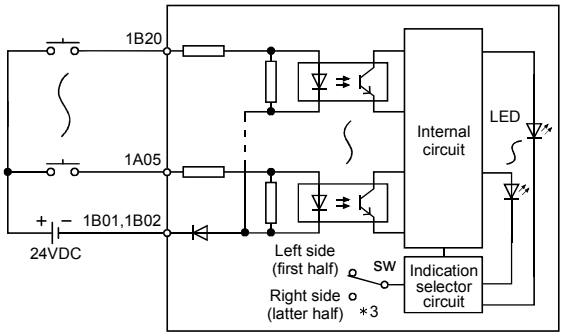
Specifications \ Type			DC Input Module (Negative Common Type)					
			QX82-S1					Appearance
Number of input points			64 points					
Isolation method			Photocoupler					
Rated input voltage			24VDC (+20/-15%, ripple ratio within 5%)					
Rated input current			Approx. 4mA					
Input derating			Refer to the derating chart.					
ON voltage/ON current			19V or higher/3.0mA or higher					
OFF voltage/OFF current			9.5V or lower/1.5mA or lower					
Input impedance			Approx. 5.6kΩ					
Response time	Set value ∗1		0.1	0.2	0.4	0.6	1	
	OFF to ON	Typ	0.05ms	0.15ms	0.30ms	0.55ms	1.05ms	
		max	0.12ms	0.20ms	0.40ms	0.60ms	1.20ms	
	ON to OFF	Typ	0.15ms	0.20ms	0.35ms	0.60ms	1.10ms	
		max	0.20ms	0.30ms	0.50ms	0.70ms	1.30ms	
Dielectric withstand voltage			560VAC rms/3 cycles (altitude 2000m (6557.38ft.))					
Insulation resistance			10MΩ or more by insulation resistance tester					
Noise immunity			By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency					
			First transient noise IEC61000-4-4: 1kV					
Protection of degree			IP2X					
Common terminal arrangement			32 points/common (common terminal: 1B01, 1B02, 2B01, 2B02)					
Number of I/O points			64 (I/O allocation is set as a 64-points Hi. input module)					
Operation indicator			ON indication (LED), 32 point switch-over using switch					
External connections			40-pin connector					
Applicable wire size			$0.3mm^2$ (For A6CON1 or A6CON4) ∗2					
External wiring connector			A6CON1, A6CON2, A6CON3, A6CON4 (optional)					
Applicable connector/terminal block conversion module			————					
5VDC internal current consumption			90mA (TYP. all points ON)					
Weight			0.18kg					

∗1: CPU parameter setting. (Initial setting is 0.2ms)
Response time can be changed on SW5D5C-GPPW or later.
For the setting method, refer to the section 1.3.1.
∗2: When using A6CON2 or A6CON3, refer to Chapter 7.

Derating Chart

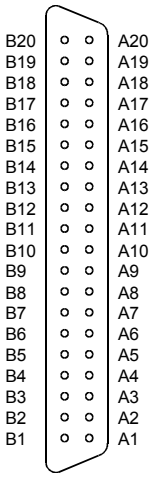


External Connections



The above diagram shows the first half of 32 points (F).
The latter half of 32 points (L) are similar.

Pin-Outs

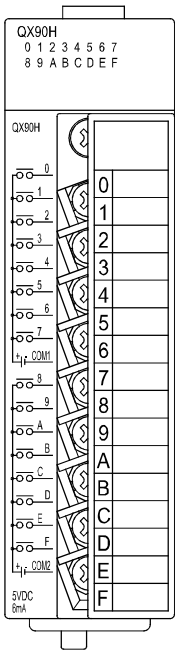


Module front view

Pin No. *4	Signal No.	Pin No. *4	Signal No.	Pin No. *4	Signal No.	Pin No. *4	Signal No.
1B20	X00	1A20	X10	2B20	X20	2A20	X30
1B19	X01	1A19	X11	2B19	X21	2A19	X31
1B18	X02	1A18	X12	2B18	X22	2A18	X32
1B17	X03	1A17	X13	2B17	X23	2A17	X33
1B16	X04	1A16	X14	2B16	X24	2A16	X34
1B15	X05	1A15	X15	2B15	X25	2A15	X35
1B14	X06	1A14	X16	2B14	X26	2A14	X36
1B13	X07	1A13	X17	2B13	X27	2A13	X37
1B12	X08	1A12	X18	2B12	X28	2A12	X38
1B11	X09	1A11	X19	2B11	X29	2A11	X39
1B10	X0A	1A10	X1A	2B10	X2A	2A10	X3A
1B09	X0B	1A09	X1B	2B09	X2B	2A09	X3B
1B08	X0C	1A08	X1C	2B08	X2C	2A08	X3C
1B07	X0D	1A07	X1D	2B07	X2D	2A07	X3D
1B06	X0E	1A06	X1E	2B06	X2E	2A06	X3E
1B05	X0F	1A05	X1F	2B05	X2F	2A05	X3F
1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
1B02	COM1	1A02	Vacant	2B02	COM2	2A02	Vacant
1B01	COM1	1A01	Vacant	2B01	COM2	2A01	Vacant

*3: Selection of left-hand (F) side provides the first half (X00 to X1F) LED indications, and selection of right-hand (L) side provides the latter half (X20 to X3F) LED indications.
*4: Pin number of 1□□□ indicates that of the left-hand side connector, and pin number of 2□□□ indicates that of the right-hand side connector.

2.23 QX90H DC High-speed Input Module (Negative Common Type)

Specifications \ Type			DC high-speed input module (Negative Common Type) QX90H						Appearance
Number of input points			16 points						
Isolation method			Photocoupler						
Rated input voltage			5VDC (+20/-15%, ripple ratio within 5%)						
Rated input current			Approx. 6mA						
Input derating			None						
ON voltage/ON current			3.5V or higer/3mA or higher						
OFF voltage/OFF current			1V or lower/1mA or lower						
Input impedance			Approx. 470Ω						
Response time	SW1 (noise filter)＊1		OFF	ON					
	Set value ＊2		Invalid	0.1	0.2	0.4	0.6	1	
	OFF to ON	TYP.	0ms ＊3	0.04ms	0.10ms	0.25ms	0.50ms	0.95ms	
		MAX.	- ＊3	0.05ms	0.15ms	0.30ms	0.60ms	1.00ms	
	ON to OFF	TYP.	0ms ＊3	0.04ms	0.10ms	0.25ms	0.50ms	0.95ms	
		MAX.	- ＊3	0.05ms	0.15ms	0.30ms	0.60ms	1.00ms	
Function setting	SW2＊4		OFF: Interrupt, ON: High-speed input						
Dielectric withstand voltage			560VAC rms/3 cycles (altitude 2000m (6557.38ft.))						
Insulation resistance			10MΩ or more by insulation resistance tester						
Noise immunity＊5			By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency						
Protection of degree			IP2X						
Common terminal arrangement			8 points/common (common terminal: TB9,TB18)						
Number of I/O points			16 (I/O allocation is set as a 16-points high-speed input module or interrupt module)＊4						
Operation indicator			Set by Switch setting in GX Developer＊4 ＊6						
External connections			ON indication (LED)						
Applicable wire size			18-point terminal block (M3×6 screws)						
Applicable crimping terminal			0.3 to 0.75mm^2 core (2.8mm (0.11in.)OD max.)						
Protection of degree			R1.25-3 (sleeved solderless terminals cannot be used.)						
5VDC internal current consumption			80mA (TYP. all points ON)						
Weight			0.16kg						

＊1: If turning on the switch 1, the noise filter takes effect.
The off-status noise filter disables I/O response time setting.
After switching on or offthe switch 1, reset the power supply of the CPU module.

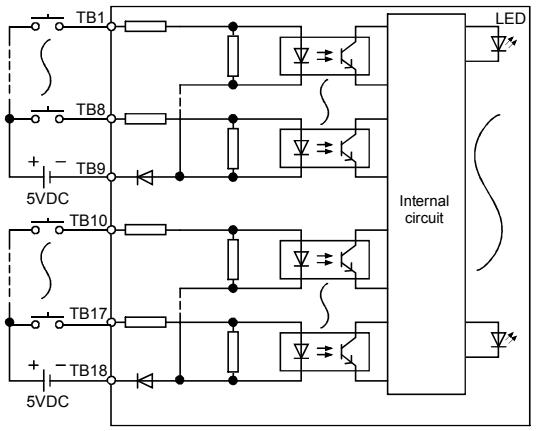
＊2: Set an input response time in "I/O response time" combo box of PLC parameter in GX Developer. (Default: 0.2ms)
The response time in SW6D5C-GPPW or later can be changed.
For the setting details, refer to Section 1.3.1.

＊3: The actual response time is 5μs delay when turning on, 10μs delay when turning off, because the hardware response time is added.
For the details of the CPU overhead time, refer to QCPU User's Manual (Function Explanation, Program Fundamentals)...

＊4: The module function can be changed according to the switch 2 status.
ON : High-speed input
OFF : Interrupt
If changing the switch 2 setting while the CPU module is in RUN, an error (error code:2100) occurs.

＊5: Indicates the noise immunity when the noise filter takes effect (the switch is turned on).

＊6: For the setting method, refer to Section 1.3.3.

External Connections	Terminal Block Number	Signal Name
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	COM1
	TB11	X09
	TB12	X0A
	TB13	X0B
	TB14	X0C
	TB15	X0D
	TB16	X0E
	TB17	X0F
	TB18	COM2

MEMO

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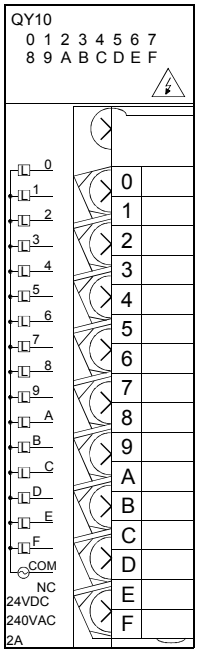
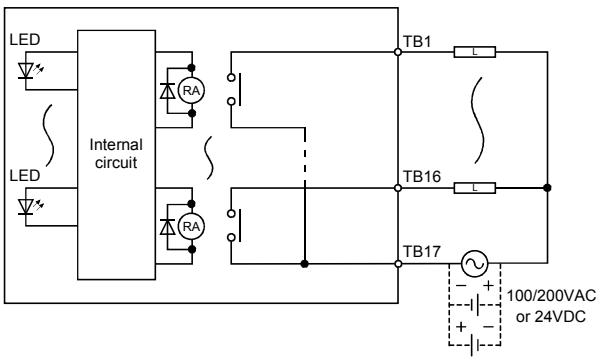
3. OUTPUT MODULE SPECIFICATIONS

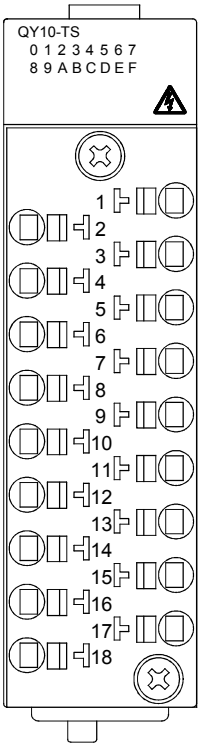
3.1 QY10 Contact Output Module

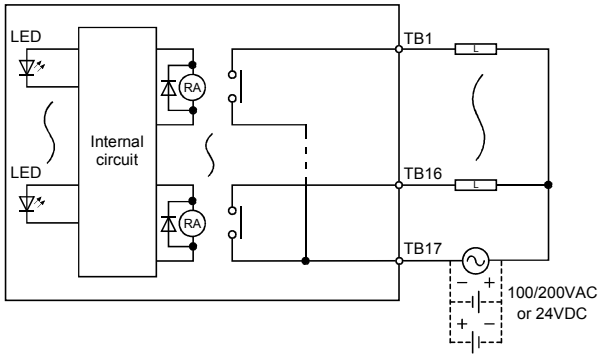
Specifications \ Type		Contact Output Module	
		QY10	Appearance
Number of output points		16 points	
Isolation method		Relay	
Rated switching voltage, current		24VDC 2A (resistive load) 240VAC 2A (cos ϕ =1) /point, 8A/common	
Minimum switching load		5VDC 1mA	
Maximum switching load		264VAC 125VDC	
Response time	OFF to ON	10ms or less	
	ON to OFF	12ms or less	
Life	Mechanical	20 million times or more	
	Electrical	Rated switching voltage/current load More than 100 thousand times or more	
		200VAC 1.5A, 240VAC 1A (COS ϕ =0.7) 100 thousand times or more 200VAC 0.4A, 240VAC 0.3A (COS ϕ =0.7) 300 thousand times or more	
		200VAC 1A, 240VAC 0.5A (COS ϕ =0.35) 100 thousand times or more 200VAC 0.3A, 240VAC 0.15A (COS ϕ =0.35) 300 thousand times or more	
		24VDC 1A, 100VDC 0.1A (L/R=7ms) 100 thousand times or more 24VDC 0.3A, 100VDC 0.03A (L/R=7ms) 300 thousand times or more	
Maximum switching frequency		3600 times/hour	
Surge suppressor		No	
Fuse		No	
Dielectric withstand voltage		2830VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10M Ω or more by insulation resistance tester	
Noise immunity		By noise simulator of 1500Vp-p noise voltage, 1 μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP1X	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Number of I/O points		16 (I/O allocation is set as a 16-points output module)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3 × 6 screws)	
Applicable wire size		0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption		430mA (TYP. all points ON)	
Weight		0.22kg	

External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	COM
	TB18	Vacant

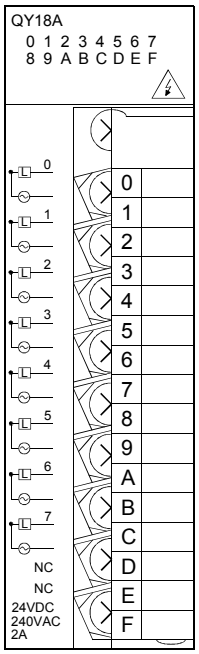
3.2 QY10-TS Contact Output Module

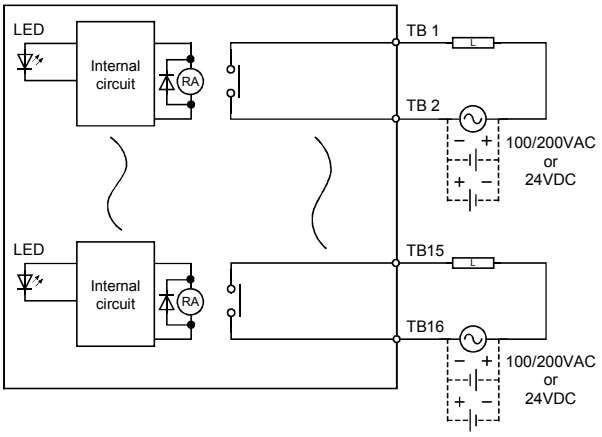
This module is a spring clamp terminal block type and an output module that has indicators for checking the insertion state of wire.

Specifications \ Type		Contact Output Module: QY10-TS	Appearance
Number of output points		16 points	
Isolation method		Relay	
Rated switching voltage, current		24VDC 2A (resistive load) 240VAC 2A (cos ϕ =1) /point, 8A/common	
Minimum switching load		5VDC 1mA	
Maximum switching load		264VAC 125VDC	
Response time	OFF to ON	10ms or less	
	ON to OFF	12ms or less	
Life	Mechanical	20 million times or more	
	Electrical	Rated switching voltage/current load More than 100 thousand times or more	
		200VAC 1.5A, 240VAC 1A (COS ϕ =0.7) 100 thousand times or more 200VAC 0.4A, 240VAC 0.3A (COS ϕ =0.7) 300 thousand times or more	
		200VAC 1A, 240VAC 0.5A (COS ϕ =0.35) 100 thousand times or more 200VAC 0.3A, 240VAC 0.15A (COS ϕ =0.35) 300 thousand times or more	
		24VDC 1A, 100VDC 0.1A (L/R=7ms) 100 thousand times or more 24VDC 0.3A, 100VDC 0.03A (L/R=7ms) 300 thousand times or more	
Maximum switching frequency		3600 times/hour	
Surge suppressor		No	
Fuse		No	
Dielectric withstand voltage		2830VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10M Ω or more by insulation resistance tester	
Noise immunity		By noise simulator of 1500Vp-p noise voltage, 1 μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Number of I/O points		16 (I/O allocation is set as a 16-points output module)	
Operation indicator		ON indication (LED)	
External connections		Two piece Spring clamp terminal block	
Applicable wire size		0.3 to 2.0mm^2 core (AWG22 to 15)	
Applicable crimping terminal		Refer to section 9.1	
5VDC internal current consumption		430mA (TYP. all points ON)	
Weight		0.22kg	

External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	COM
	TB18	Vacant

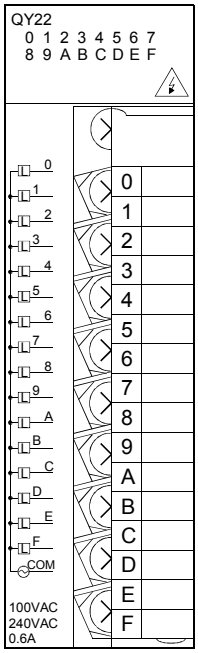
3.3 QY18A Contact Output Module (All Independent)

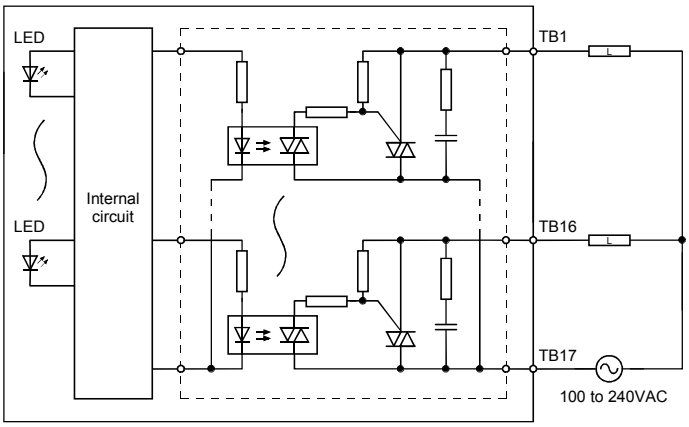
Specifications \ Type		Contact Output Module (All points Independent)	Appearance
		QY18A	
Number of output points		8 points	
Isolation method		Relay isolation	
Rated switching voltage/current		24VDC 2A (resistive load) 240VAC 2A (cos ϕ =1) } point, 8A/unit	
Min. switching load		5VDC 1mA	
Max. switching load		264VAC 125VDC	
Response time	OFF to ON	10ms or shoter	
	ON to OFF	12ms or shoter	
Life	Mechanical	20 million cycles or more	
	Electrical	Rated switching voltage/current load: 100 thousand cycles or more	
		200VAC 1.5A, 240VAC 1A (COS ϕ =0.7) 100 thousand cycles or more 200VAC 0.4A, 240VAC 0.3A (COS ϕ =0.7) 300 thousand cycles or more	
		200VAC 1A, 240VAC 0.5A (COS ϕ =0.35) 100 thousand cycles or more 200VAC 0.3A, 240VAC 0.15A (COS ϕ =0.35) 300 thousand cycles or more	
		24VDC 1A, 100VDC 0.1A (L/R=7ms) 100 thousand cycles or more 24VDC 0.3A, 100VDC 0.03A (L/R=7ms) 300 thousand cycles or more	
Max. switching frequency		3600 cycles/hour	
Surge killer		None	
Fuse		None	
Dielectric maximum voltage		2830VAC rms/3 cycles (altitude 2000m)	
Insulation resistance		10M Ω or more by insulation resistance tester	
Noise immunity		By noise simulator of 1500Vp-p noise voltage, 1 μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP1X	
Number of I/O points		16 (I/O allocation is set as a 16-points output module)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3 $\times$ 6 screws)	
Applicable wire size		Core cable: 0.3 to 0.75mm^2 (Outside diameter: 2.8mm or smaller)	
Applicable connector terminal		R1.25-3 (Terminals with sleeve cannot be used)	
5VDC internal current consumption		240mA (TYP. all points ON)	
Weight		0.22kg	

External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	
	TB3	Y01
	TB4	
	TB5	Y02
	TB6	
	TB7	Y03
	TB8	
	TB9	Y04
	TB10	
	TB11	Y05
	TB12	
	TB13	Y06
	TB14	
	TB15	Y07
	TB16	
	TB17	Vacant
	TB18	Vacant

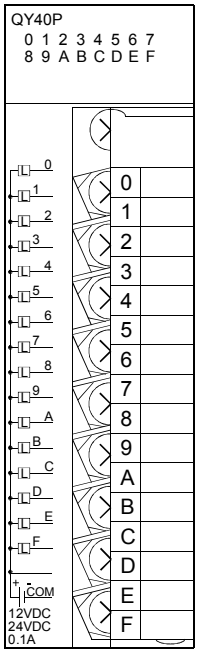
3.4 QY22 TRIAC Output Module

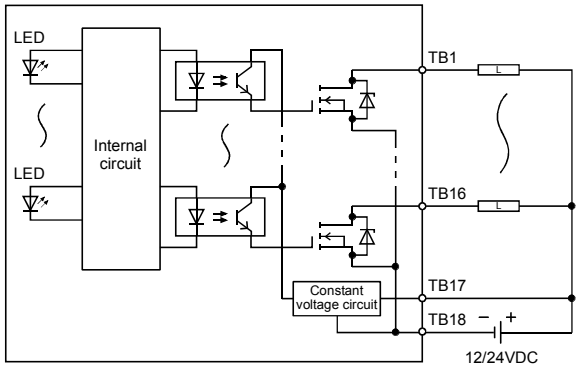
Specifications \ Type		TRIAC Output Module	
		QY22	Appearance
Number of output points		16 points	
Isolation method		Photocoupler	
Rated load voltage		100 to 240VDC 50/60Hz ± 5%	
Load voltage distortion rate		Within 5%	
Maximum load voltage		264VAC	
Maximum load current		0.6A/point, 4.8A/common	
Minimum load voltage/current		24VAC 100mA, 100VAC 25mA, 240VAC 25mA	
Maximum rush current		20A/cycle or less	
Leakage current at OFF		3mA or lower (for 240V, 60Hz), 1.5mA or lower (for 120V, 60Hz)	
Maximum voltage drop at ON		1.5V or lower	
Response time	OFF to ON	1ms or less	
	ON to OFF	1ms + 0.5 cycles or less (rated load, resistance load)	
Surge killer		CR absorber	
Fuse		None (Attaching a fuse to each external wiring is recommended. Refer to Section 1.2)	
Dielectric maximum voltage		2830VAC rms/3 cycles (altitude 2000m)	
Insulation resistance		10MΩ or higher by insulation resistance meter	
Noise immunity		By noise simulator of 1.5kVp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP1X	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Number of I/O points		16 (I/O allocation is set as a 16-points output module)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		Core cable: 0.3 to 0.75mm^2 (Outside diameter: 2.8mm or smaller)	
Applicable connector terminal		R1.25-3 (Terminals with sleeve cannot be used)	
5VDC internal current consumption		250mA (Max., all points ON)	
Weight		0.40kg	



External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	COM
	TB18	Vacant

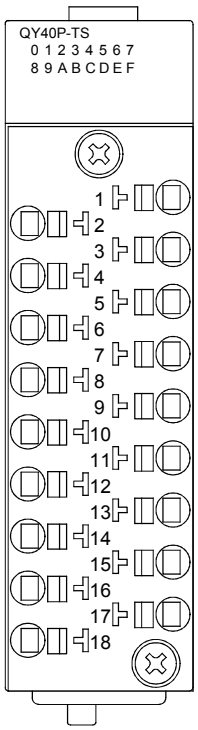
3.5 QY40P Transistor Output Module (Sink Type)

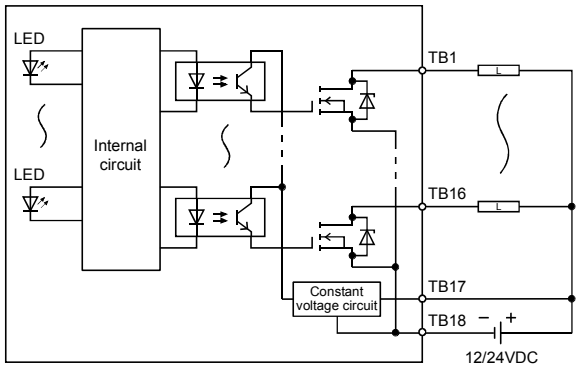
Specifications \ Type		Transistor Output Module (Sink Type) QY40P	Appearance
Number of output points		16 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Maximum load current		0.1A/point, 1.6A/common	
Maximum inrush current		0.7A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.1VDC (TYP.) 0.1A, 0.2VDC (MAX.) 0.1A	
Response time	OFF to ON	1ms or less	
	ON to OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		No	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	10mA (when 24VDC and all point is ON)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		16 points/common (common terminal: TB18)	
Number of I/O points		16 (I/O allocation is set as a 16-points output module)	
Protection function		Yes (overload protection function, overheat protection function) • Overheat protection function is activated in increments of 1 point. • Overload protection function is activated in increments of 1 point.	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption		65mA (TYP. all points ON) (0.07A is shown on the rating plate of the module.)	
Weight		0.16kg	

External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	12/24VDC
	TB18	COM

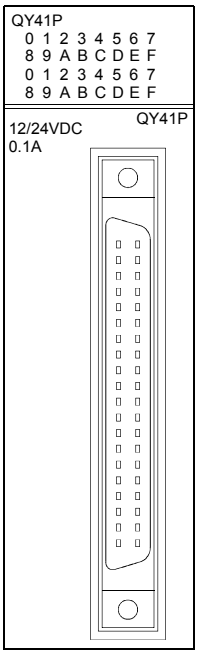
3.6 QY40P-TS Transistor Output Module (Sink Type)

This module is a spring clamp terminal block type and an output module that has indicators for checking the insertion state of wire.

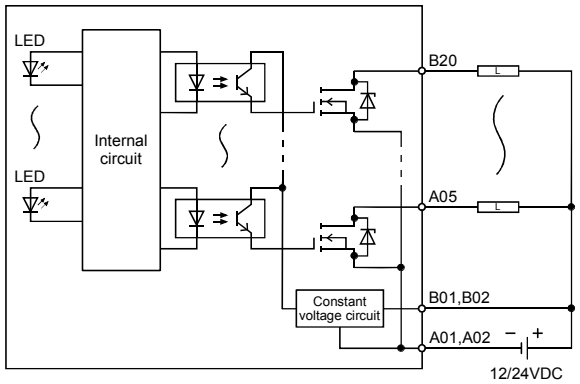
Specifications \ Type		Transistor Output Module (Sink Type) QY40P-TS	Appearance
Number of output points		16 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Maximum load current		0.1A/point, 1.6A/common	
Maximum inrush current		0.7A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.1VDC (TYP.) 0.1A, 0.2VDC (MAX.) 0.1A	
Response time	OFF to ON	1ms or less	
	ON to OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		No	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	10mA (when 24VDC and all point is ON)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		16 points/common (common terminal: TB18)	
Number of I/O points		16 (I/O allocation is set as a 16-points output module)	
Protection function		Yes (overload protection function, overheat protection function) • Overheat protection function is activated in increments of 1 point. • Overload protection function is activated in increments of 1 point.	
Operation indicator		ON indication (LED)	
External connections		Two piece Spring clamp terminal block	
Applicable wire size		0.3 to 2.0mm^2 core (AWG22 to 15)	
Applicable crimping terminal		Refer to section 9.1	
5VDC internal current consumption		65mA (TYP. all points ON) (0.07A is shown on the rating plate of the module.)	
Weight		0.16kg	

External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	12/24VDC
	TB18	COM

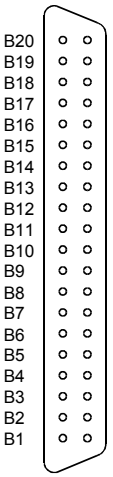
3.7 QY41P Transistor Output Module (Sink Type)

Specifications \ Type		Transistor Output Module (Sink Type) QY41P	Appearance
Number of output points		32 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Maximum load current		0.1A/point, 2A/common	
Maximum inrush current		0.7A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.1VDC (TYP.) 0.1A, 0.2VDC (MAX.) 0.1A	
Response time	OFF to ON	1ms or less	
	ON to OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		No	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	20mA (at 24VDC)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		32 points/common (common terminal: A01, A02)	
Number of I/O points		32 (I/O allocation is set as a 32-points output module)	
Protection function		Yes (overheat protection function, overload protection function) • Overheat protection function is activated in increments of 1 point. • Overload protection function is activated in increments of 1 point.	
Operation indicator		ON indication (LED)	
External connections		40-pin connector	
Applicable wire size		0.3mm^2 (For A6CON1 or A6CON4) ∗1	
External wiring connector		A6CON1, A6CON2, A6CON3, A6CON4 (optional)	
Applicable connector/terminal block conversion module		A6TBXY36, A6TBXY54	
5VDC internal current consumption		105mA (TYP. all points ON) (0.11A is shown on the rating plate of the module.)	
Weight		0.15kg	

External Connections



Pin-Outs



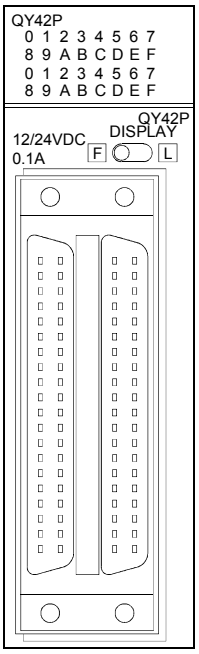
Module front view

Pin No.	Signal No.	Pin No.	Signal No.
B20	Y00	A20	Y10
B19	Y01	A19	Y11
B18	Y02	A18	Y12
B17	Y03	A17	Y13
B16	Y04	A16	Y14
B15	Y05	A15	Y15
B14	Y06	A14	Y16
B13	Y07	A13	Y17
B12	Y08	A12	Y18
B11	Y09	A11	Y19
B10	Y0A	A10	Y1A
B09	Y0B	A09	Y1B
B08	Y0C	A08	Y1C
B07	Y0D	A07	Y1D
B06	Y0E	A06	Y1E
B05	Y0F	A05	Y1F
B04	Vacant	A04	Vacant
B03	Vacant	A03	Vacant
B02	12/24 VDC	A02	COM
B01	12/24 VDC	A01	COM

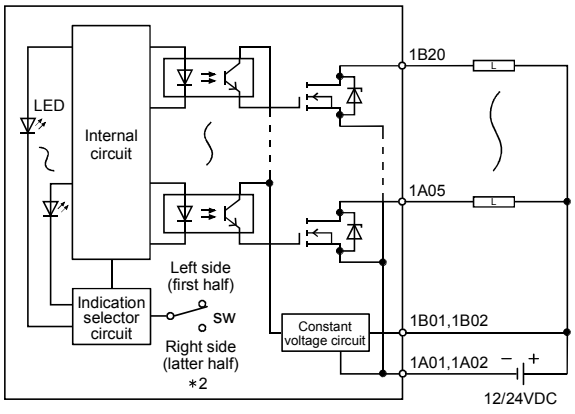
∗1: When using A6CON2 or A6CON3, refer to Chapter 7.

3.8 QY42P Transistor Output Module (Sink Type)

Specifications \ Type		Transistor Output Module (Sink Type) QY42P	Appearance
Number of output points		64 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Maximum load current		0.1A/point, 2A/common	
Maximum inrush current		0.7A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.1VDC (TYP.) 0.1A, 0.2VDC (MAX.) 0.1A	
Response time	OFF to ON	1ms or less	
	ON to OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		No	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	20mA (at 24VDC)/common	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		32 points/common (common terminal: 1A01, 1A02, 2A01, 2A02)	
Number of I/O points		64 (I/O allocation is set as a 64-points output module)	
Protection function		Yes (overheat protection function, overload protection function) • Overheat protection function is activated in increments of 1 point. • Overload protection function is activated in increments of 1 point.	
Operation indicator		ON indication (LED), 32 point switch-over using switch	
External connections		40-pin connector	
Applicable wire size		0.3mm^2 (For A6CON1 or A6CON4) ＊3	
External wiring connector		A6CON1, A6CON2, A6CON3, A6CON4 (optional)	
Applicable connector/terminal block conversion module		A6TBXY36, A6TBXY54	
5VDC internal current consumption		150mA (TYP. all points ON)	
Weight		0.17kg	

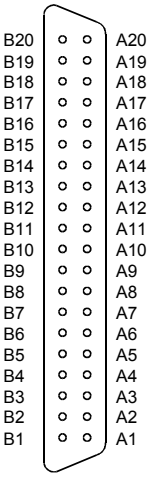


External Connections



The above diagram shows the first half of 32 points (F).
The latter half of 32 points (L) are similar.

Pin-Outs



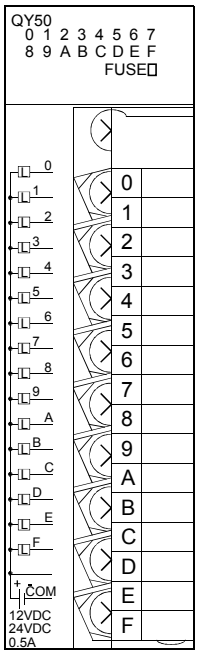
Module front view

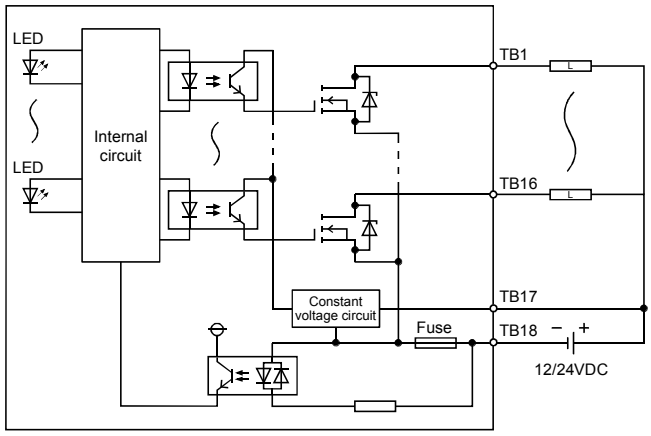
Pin No. ＊1	Signal No.	Pin No. ＊1	Signal No.	Pin No. ＊1	Signal No.	Pin No. ＊1	Signal No.
1B20	Y00	1A20	Y10	2B20	Y20	2A20	Y30
1B19	Y01	1A19	Y11	2B19	Y21	2A19	Y31
1B18	Y02	1A18	Y12	2B18	Y22	2A18	Y32
1B17	Y03	1A17	Y13	2B17	Y23	2A17	Y33
1B16	Y04	1A16	Y14	2B16	Y24	2A16	Y34
1B15	Y05	1A15	Y15	2B15	Y25	2A15	Y35
1B14	Y06	1A14	Y16	2B14	Y26	2A14	Y36
1B13	Y07	1A13	Y17	2B13	Y27	2A13	Y37
1B12	Y08	1A12	Y18	2B12	Y28	2A12	Y38
1B11	Y09	1A11	Y19	2B11	Y29	2A11	Y39
1B10	Y0A	1A10	Y1A	2B10	Y2A	2A10	Y3A
1B09	Y0B	1A09	Y1B	2B09	Y2B	2A09	Y3B
1B08	Y0C	1A08	Y1C	2B08	Y2C	2A08	Y3C
1B07	Y0D	1A07	Y1D	2B07	Y2D	2A07	Y3D
1B06	Y0E	1A06	Y1E	2B06	Y2E	2A06	Y3E
1B05	Y0F	1A05	Y1F	2B05	Y2F	2A05	Y3F
1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
1B02	12/24V DC	1A02	COM1	2B02	12/24V DC	2A02	COM2
1B01	12/24V DC	1A01	COM1	2B01	12/24V DC	2A01	COM2

＊1: Pin number of 1 □□□ indicates that of the left-hand side connector, and pin number of 2 □□□ indicates that of the right-hand side connector.
＊2: Selection of left-hand (F) side provides the first half (Y00 to Y1F) LED indications, and selection of right-hand (L) side provides the latter half (Y20 to Y3F) LED indications.
＊3: When using A6CON2 or A6CON3, refer to Chapter 7.

3.9 QY50 Transistor Output Module (Sink Type)

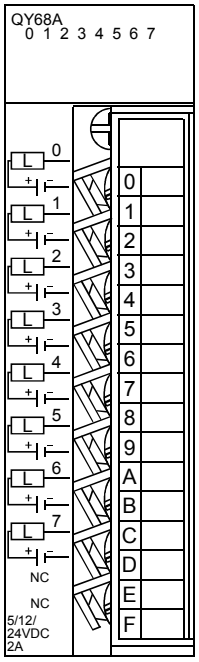
Specifications \ Type		Transistor Output Module (Sink Type) QY50	Appearance
Number of output points		16 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Maximum load current		0.5A/point, 4A/common	
Maximum inrush current		4A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.2VDC (TYP.) 0.5A, 0.3VDC (MAX.) 0.5A	
Response time	OFF to ON	1ms or less	
	ON to OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		6.7A (unchangeable) (fuse blow capacity: 50A)	
Fuse blow indication		Yes (When fuse blows, LED indicates it and signal is output to CPU) ＊1	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	20mA (at 24VDC)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		16 points/common (common terminal: TB18)	
Number of I/O points		16 (I/O allocation is set as a 16-points output module)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption		80mA (TYP. all points ON)	
Weight		0.17kg	

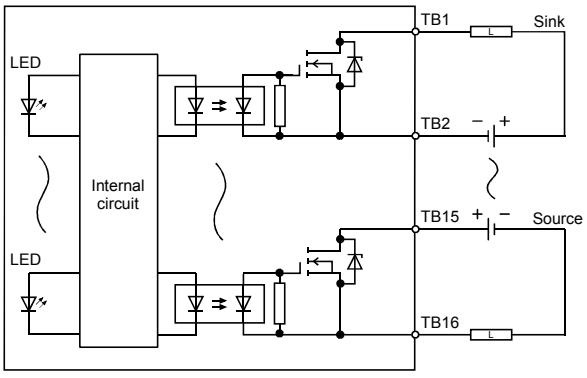


External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	12/24VDC
	TB18	COM

＊1: Fuse disconnection is not detected when the external power supply is off.

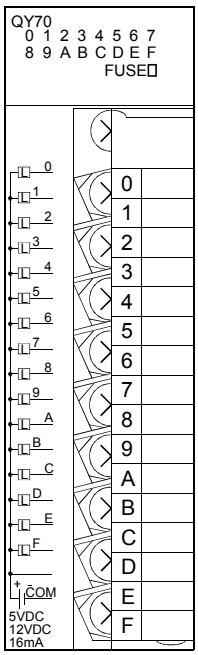
3.10 QY68A Transistor Output Module (All Points Independent, Sink/Source Type)

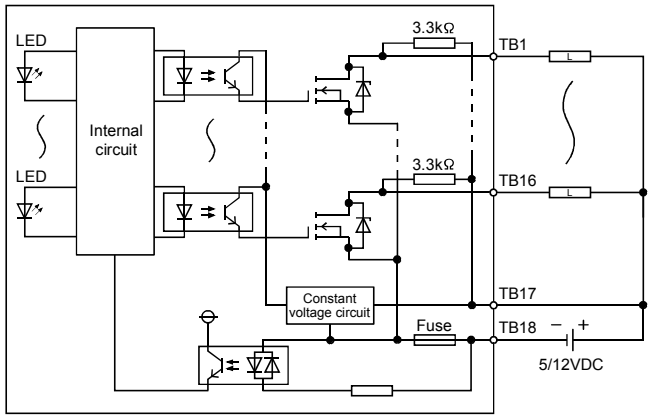
Specifications \ Type		Transistor Output Module (All Points Independent, Sink/Source Type) QY68A	Appearance
Number of output points		8 points	
Isolation method		Photocoupler	
Rated load voltage		5-24VDC (+20/-10%)	
Maximum load current		2A/point, 8A/unit	
Maximum inrush current		8A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.3VDC (MAX.) 2A	
Response time	OFF to ON	3ms or less	
	ON to OFF	10ms or less (resistive load)	
Surge suppressor		Zener diode	
Fuse		None (Attaching a fuse to external wiring is recommended. Refer to Section 1.2)	
External supply power		None	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		All points Independent	
Number of I/O points		16 (I/O allocation is set as a 16-points output module)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption		110mA (TYP. all points ON)	
Weight		0.14kg	

External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	
	TB3	Y01
	TB4	
	TB5	Y02
	TB6	
	TB7	Y03
	TB8	
	TB9	Y04
	TB10	
	TB11	Y05
	TB12	
	TB13	Y06
	TB14	
	TB15	Y07
	TB16	
	TB17	Vacant
	TB18	Vacant

3.11 QY70 Transistor Output Module (Sink Type)

Specifications \ Type		Transistor Output Module (Sink Type) QY70	Appearance
Number of output points		16 points	
Isolation method		Photocoupler	
Rated load voltage		5/12VDC (+25/-10%)	
Maximum load current		16mA/point, 256mA/common	
Maximum inrush current		40mA, 10ms or less	
Output voltage at OFF		VOH: 3.5VDC (VCC=5VDC, IOH=0.4mA)	
Maximum voltage drop at ON		VOL: 0.3VDC	
Response time	OFF to ON	0.5ms or less	
	ON to OFF	0.5ms or less (resistive load)	
Surge suppressor		None	
Fuse		1.6A (unchangeable) (fuse blow capacity: 50A)	
Fuse blow indication		Yes (When fuse blows, LED indicates it and signal is output to CPU) ＊1	
External supply power	Voltage	5/12VDC (+25/-10%) (ripple ratio within 5%)	
	Current	90mA (when 12VDC and all point is ON)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		16 points/common (common terminal: TB18)	
Number of I/O points		16 (I/O allocation is set as a 16-points output module)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption		95mA (TYP. all points ON) (0.10A is shown on the rating plate of the module.)	
Weight		0.14kg	

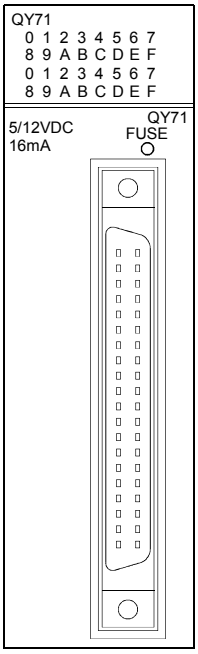


External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	5/12VDC
	TB18	COM

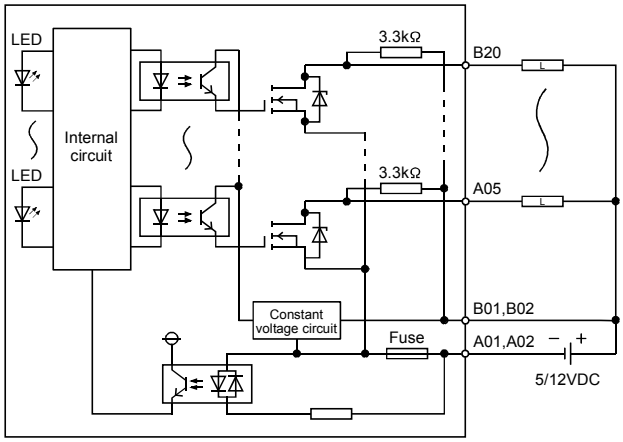
＊1: Fuse disconnection is not detected when the external power supply is off.

3.12 QY71 Transistor Output Module (Sink Type)

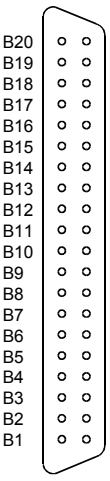
Specifications \ Type		Transistor Output Module (Sink Type) QY71	Appearance
Number of output points		32 points	
Isolation method		Photocoupler	
Rated load voltage		5/12VDC (+25/-10%)	
Maximum load current		16mA/point, 512mA/common	
Maximum inrush current		40mA, 10ms or less	
Output voltage at OFF		VOH: 3.5VDC (VCC=5VDC, IOH=0.4mA)	
Maximum voltage drop at ON		VOL: 0.3VDC	
Response time	OFF to ON	0.5ms or less	
	ON to OFF	0.5ms or less (resistive load)	
Surge suppressor		None	
Fuse		1.6A (unchangeable) (fuse blow capacity: 50A)	
Fuse blow indication		Yes (When fuse blows, LED indicates it and signal is output to CPU) ＊1	
External supply power	Voltage	5/12VDC (+25/-10%) (ripple ratio within 5%)	
	Current	170mA (when 12VDC and point is ON)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		32 points/common (common terminal: A01, A02)	
Number of I/O points		32 (I/O allocation is set as a 32-points output module)	
Operation indicator		ON indication (LED)	
External connections		40-pin connector	
Applicable wire size		0.3mm^2 (For A6CON1 or A6CON4) ＊2	
External wiring connector		A6CON1, A6CON2, A6CON3, A6CON4 (optional)	
5VDC internal current consumption		150mA (TYP. all points ON)	
Weight		0.14kg	



External Connections



Pin-Outs



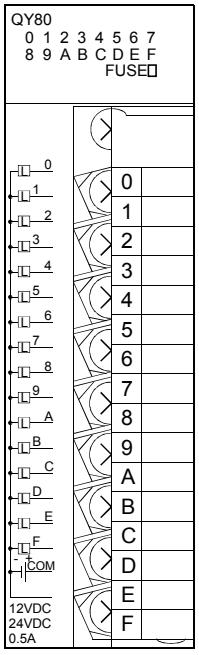
Module front view

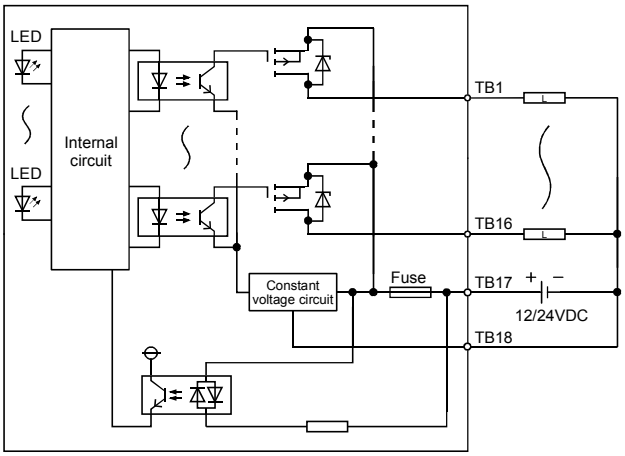
Pin No.	Signal No.	Pin No.	Signal No.
B20	Y00	A20	Y10
B19	Y01	A19	Y11
B18	Y02	A18	Y12
B17	Y03	A17	Y13
B16	Y04	A16	Y14
B15	Y05	A15	Y15
B14	Y06	A14	Y16
B13	Y07	A13	Y17
B12	Y08	A12	Y18
B11	Y09	A11	Y19
B10	Y0A	A10	Y1A
B09	Y0B	A09	Y1B
B08	Y0C	A08	Y1C
B07	Y0D	A07	Y1D
B06	Y0E	A06	Y1E
B05	Y0F	A05	Y1F
B04	Vacant	A04	Vacant
B03	Vacant	A03	Vacant
B02	5/12 VDC	A02	COM
B01	5/12 VDC	A01	COM

＊1: Fuse disconnection is not detected when the external power supply is off.
＊2: When using A6CON2 or A6CON3, refer to Chapter 7.

3.13 QY80 Transistor Output Module (Source Type)

Specifications \ Type		Transistor Output Module (Source Type) QY80	Appearance
Number of output points		16 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Maximum load current		0.5A/point, 4A/common	
Maximum inrush current		4A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.2VDC (TYP.) 0.5A, 0.3VDC (MAX.) 0.5A	
Response time	OFF to ON	1ms or less	
	ON to OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		6.7A (unchangeable) (fuse blow capacity: 50A)	
Fuse blow indication		Yes (When fuse blows, LED indicates it and signal is output to CPU) ＊1	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	20mA (at 24VDC)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Number of I/O points		16 (I/O allocation is set as a 16-points output module)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screws)	
Applicable wire size		0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)	
Applicable crimping terminal		R1.25-3 (sleeved crimping terminals cannot be used.)	
5VDC internal current consumption		80mA (TYP. all points ON)	
Weight		0.17kg	



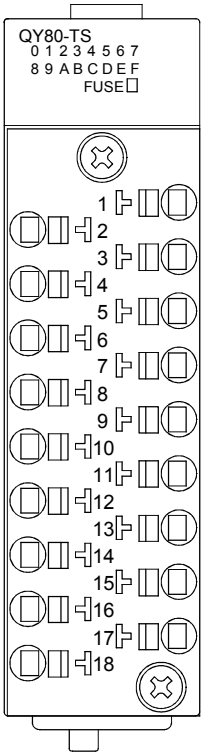
External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	COM
	TB18	0V

＊1: Fuse disconnection is not detected when the external power supply is off.

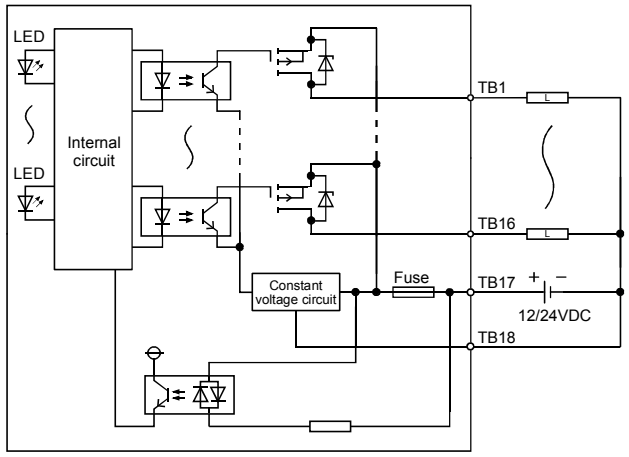
3.14 QY80-TS Transistor Output Module (Source Type)

This module is a spring clamp terminal block type and an output module that has indicators for checking the insertion state of wire.

Specifications \ Type		Transistor Output Module (Source Type) QY80-TS	Appearance
Number of output points		16 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Maximum load current		0.5A/point, 4A/common	
Maximum inrush current		4A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.2VDC (TYP.) 0.5A, 0.3VDC (MAX.) 0.5A	
Response time	OFF to ON	1ms or less	
	ON to OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		6.7A (unchangeable) (fuse blow capacity: 50A)	
Fuse blow indication		Yes (When fuse blows, LED indicates it and signal is output to CPU) ＊1	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	20mA (at 24VDC)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		16 points/common (common terminal: TB17)	
Number of I/O points		16 (I/O allocation is set as a 16-points output module)	
Operation indicator		ON indication (LED)	
External connections		Two piece Spring clamp terminal block	
Applicable wire size		0.3 to 2.0mm^2 core (AWG22 to 15)	
Applicable crimping terminal		Refer to section 9.1	
5VDC internal current consumption		80mA (TYP. all points ON)	
Weight		0.17kg	



＊1: Fuse disconnection is not detected when the external power supply is OFF.

External Connections	Terminal Block Number	Signal Name
	TB1	Y00
	TB2	Y01
	TB3	Y02
	TB4	Y03
	TB5	Y04
	TB6	Y05
	TB7	Y06
	TB8	Y07
	TB9	Y08
	TB10	Y09
	TB11	Y0A
	TB12	Y0B
	TB13	Y0C
	TB14	Y0D
	TB15	Y0E
	TB16	Y0F
	TB17	COM
	TB18	0V

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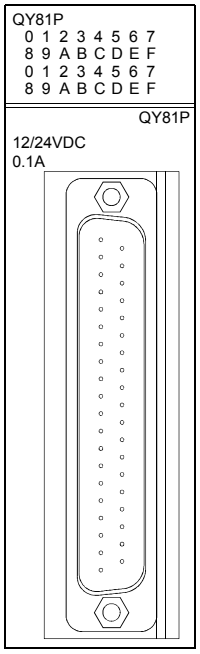
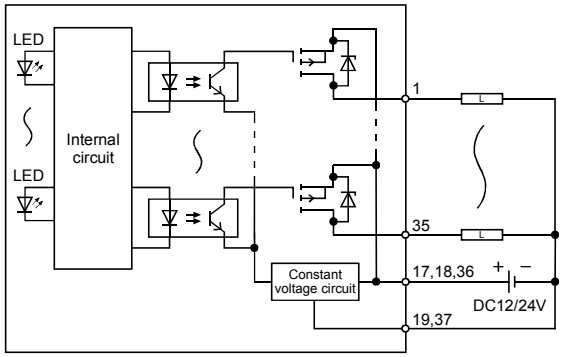
3.15 QY81P Transistor Output Module (Source Type)

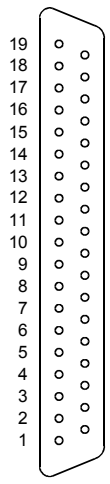
Specifications \ Type		Transistor Output Module (Source Type) QY81P	Appearance
Number of output points		32 points	
Isolation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Maximum load current		0.1A/point, 2A/common	
Maximum inrush current		0.7A, 10ms or less	
Leakage current at OFF		0.1mA or less	
Maximum voltage drop at ON		0.1VDC (TYP.) 0.1A, 0.2VDC (MAX.) 0.1A	
Response time	OFF to ON	1ms or less	
	ON to OFF	1ms or less (rated load, resistive load)	
Surge suppressor		Zener diode	
Fuse		No	
External supply power	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	40mA (at 24VDC)	
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m (6557.38ft.))	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		32 points/common (common terminal: 17, 18, 36)	
Number of I/O points		32 (I/O allocation is set as a 32-points output module)	
Protection function		Yes (overheat protection function, overload protection function) • Overheat protection function is activated in increments of 2 points. • Overload protection function is activated in increments of 1 point.	
Operation indicator		ON indication (LED)	
External connections		37-pin D-sub connector	
Applicable wire size		0.3mm^2 (For A6CON1E)＊1	
External wiring connector		A6CON1E, A6CON2E, A6CON3E (optional)	
Applicable connector/terminal block conversion module		A6TBY36-E, A6TBY54-E	
5VDC internal current consumption		95mA (TYP. all points ON) (0.10A is shown on the rating plate of the module.)	
Weight		0.15kg	



Derating Chart



Pin-Outs



Module front view

Pin No.	Signal No.	Pin No.	Signal No.
1	Y00	9	Y10
20	Y01	28	Y11
2	Y02	10	Y12
21	Y03	29	Y13
3	Y04	11	Y14
22	Y05	30	Y15
4	Y06	12	Y16
23	Y07	31	Y17
5	Y08	13	Y18
24	Y09	32	Y19
6	Y0A	14	Y1A
25	Y0B	33	Y1B
7	Y0C	15	Y1C
26	Y0D	34	Y1D
8	Y0E	16	Y1E
27	Y0F	35	Y1F
17	COM	37	0V
36	COM	19	0V
18	COM		

＊1: When using A6CON2E or A6CON3E, refer to Chapter 7.

MEMO

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4. COMBINED I/O MODULE

4.1 QH42P I/O Module

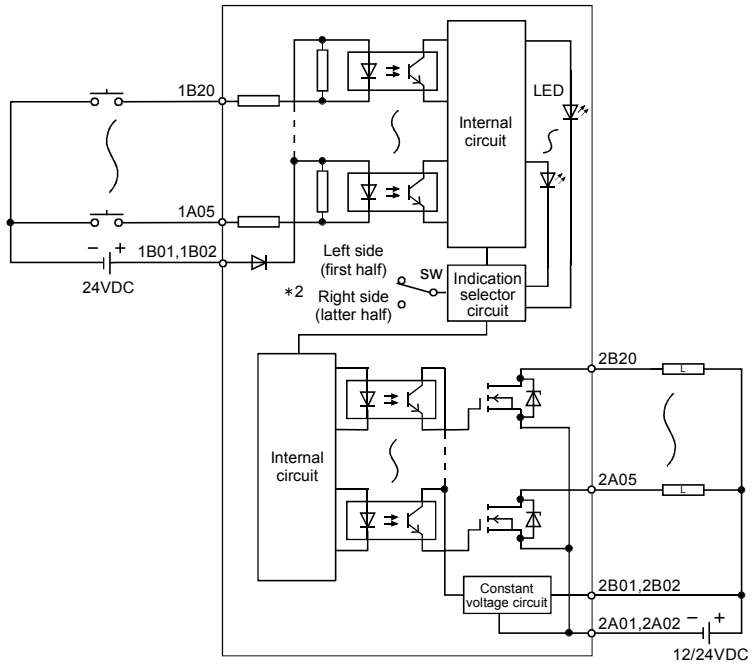
• When using the main module, use the constructions listed in Section 1.2.3 (2).
• This module uses same I/O numbers for input and output.
For I/O numbers of combined I/O modules, refer to Section 1.2.3.

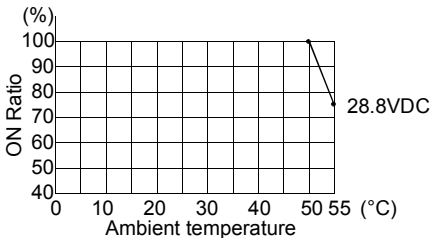
(1) DC Input Specification (Positive Common Type)

Specifications \ Type		QH42P I/O Module (Input Specification)
Number of input points		32 points
Insulation method		Photocoupler
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)
Rated input current		Approx. 4mA
Input derating		See the derating chart.
ON voltage/ON current		19V or higher/3mA or higher
OFF voltage/OFF current		11V or lower/1.7mA or lower
Input resistance		Approx. 5.6kΩ
Response time	OFF→ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting)＊1 Initial setting is 10ms
	ON→OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting)＊1 Initial setting is 10ms
Dielectric maximum voltage		560VAC rms/3 cycles (altitude 2000m)
Insulation resistance		10MΩ or more by insulation resistance tester
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency
		First transient noise IEC61000-4-4: 1kV
Protection of degree		IP2X
Common terminal arrangement		32 points/common (common terminal: 1B01, 1B02)
Number of I/O occupied points		32 points (For I/O allocation on I/O mixed module, set 32 points.)
Operation indicator		ON indication (LED), 32-point switchover using switch＊2
External connections		40-pin connector
Applicable wire size		$0.3mm^2$ (For A6CON1 or A6CON4)＊3
External wiring connector		A6CON1, A6CON2, A6CON3, A6CON4 (optional)
Mixed connector/terminal block conversion module		A6TBXY36, A6TBXY54, A6TBX70
5VDC internal current consumption		130mA (TYP, all points ON)
Weight		0.20kg

＊1: For the setting method, refer to the Section 1.3.1.
＊2: Selection of left-hand (F) side provides the first half (X00 to X1F) LED indications, and selection of right-hand (L) side provides the latter half (Y00 to Y1F) LED indications.
＊3: When using A6CON2 or A6CON3, refer to Chapter 7.

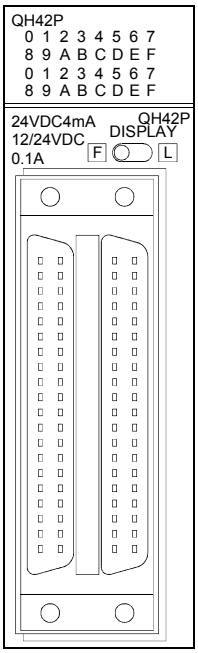
External Connections	Derating Chart



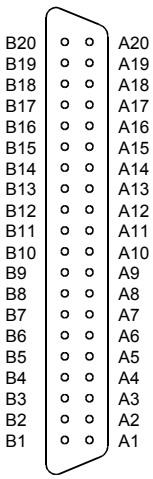


∗2: Selection of left-hand (F) side provides the first half (X00 to X1F) LED indications, and selection of right-hand (L) side provides the latter half (Y00 to Y1F) LED indications.

(2) Transistor Output Specification (Sink Type)

Specifications \ Type		QH42P I/O Module (Output Specification)	Appearance
Number of output points		32 points	
Insulation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Max. load current		0.1A/point, 2A/common	
Max. rush current		0.7A/10ms or less	
Leakage current at OFF		0.1mA or lower	
Max. voltage drop at ON		0.1VDC (TYP.) 0.1A, 0.2VDC (MAX.) 0.1A	
Response time	OFF→ON	1ms or shorter	
	ON→OFF	1ms or shorter (rated load, resistance load)	
Surge killer		Zener diode	
Fuse		None	
External power supply	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	15mA /common (when 24VDC and all point is ON)	
Common terminal arrangement		32 points/common (common terminal: 2A01, 2A02)	
Protection function		Provided (overheat protection function, overload protection function) • Overheat protection function operate independently of each other. • Overload protection function operate independently of each other.	

Pin-Outs



Module front view

Pin No.4 ＊4	Signal No.	Pin No.4 ＊4	Signal No.	Pin No.4 ＊4	Signal No.	Pin No.4 ＊4	Signal No.
1B20	X00	1A20	X10	2B20	Y00	2A20	Y10
1B19	X01	1A19	X11	2B19	Y01	2A19	Y11
1B18	X02	1A18	X12	2B18	Y02	2A18	Y12
1B17	X03	1A17	X13	2B17	Y03	2A17	Y13
1B16	X04	1A16	X14	2B16	Y04	2A16	Y14
1B15	X05	1A15	X15	2B15	Y05	2A15	Y15
1B14	X06	1A14	X16	2B14	Y06	2A14	Y16
1B13	X07	1A13	X17	2B13	Y07	2A13	Y17
1B12	X08	1A12	X18	2B12	Y08	2A12	Y18
1B11	X09	1A11	X19	2B11	Y09	2A11	Y19
1B10	X0A	1A10	X1A	2B10	Y0A	2A10	Y1A
1B09	X0B	1A09	X1B	2B09	Y0B	2A09	Y1B
1B08	X0C	1A08	X1C	2B08	Y0C	2A08	Y1C
1B07	X0D	1A07	X1D	2B07	Y0D	2A07	Y1D
1B06	X0E	1A06	X1E	2B06	Y0E	2A06	Y1E
1B05	X0F	1A05	X1F	2B05	Y0F	2A05	Y1F
1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
1B02	COM1	1A02	Vacant	2B02	12/24 VDC	2A02	COM2
1B01	COM1	1A01	Vacant	2B01	12/24 VDC	2A01	COM2

＊4: Pin number of 1 □ □ □ indicates that of the left-hand side connector, and pin number of 2 □ □ □ indicates that of the right-hand side connector.

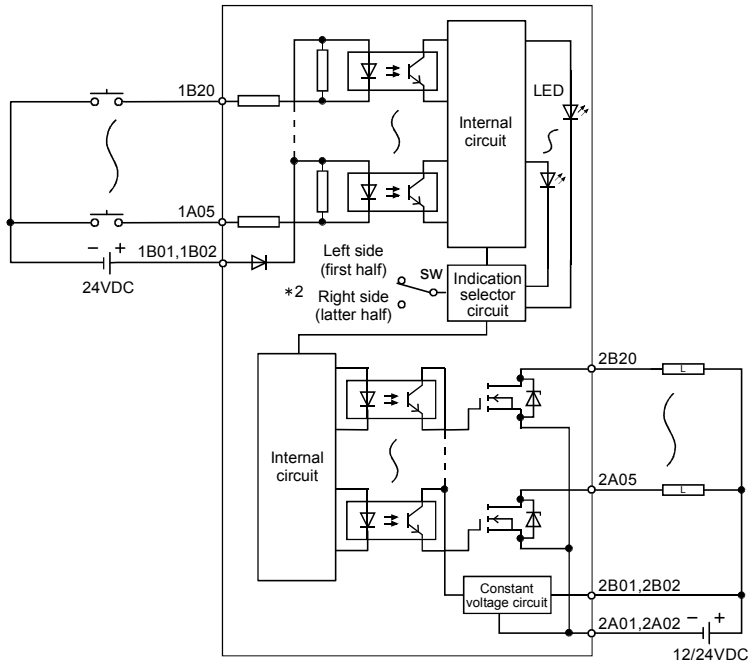
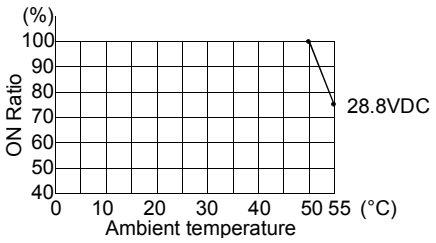
4.2 QX41Y41P I/O Module

- When using the main module, use the constructions listed in Section 1.2.3 (2).
- This module uses sequential I/O numbers for input and output.
  For I/O numbers of combined I/O modules, refer to Section 1.2.3.

(1) DC Input Specification (Positive Common Type)

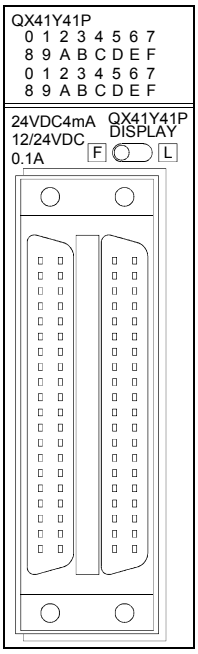
Specifications \ Type		QX41Y41P I/O Module (Input Specification)
Number of input points		32 points
Insulation method		Photocoupler
Rated input voltage		20.4 to 28.8VDC (ripple ratio within 5%)
Rated input current		Approx. 4mA
Input derating		See the derating chart.
ON voltage/ON current		19V or higher/3mA or higher
OFF voltage/OFF current		11V or lower/1.7mA or lower
Input resistance		Approx. 5.6kΩ
Response time	OFF→ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting)＊1 Initial setting is 10ms
	ON→OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting)＊1 Initial setting is 10ms
Dielectric maximum voltage		560VAC rms/3 cycles (altitude 2000m)
Insulation resistance		10MΩ or more by insulation resistance tester
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency
		First transient noise IEC61000-4-4: 1kV
Protection of degree		IP2X
Common terminal arrangement		32 points/common (common terminal: 1B01, 1B02)
Number of I/O occupied points		64 points (For I/O allocation on I/O mixed module, set 64 points.)
Operation indicator		ON indication (LED), 32-point switchover using switch＊2
External connections		40-pin connector
Applicable wire size		$0.3mm^2$ (For A6CON1 or A6CON4)＊3
External wiring connector		A6CON1, A6CON2, A6CON3, A6CON4 (optional)
Mixed connector/terminal block conversion module		A6TBXY36, A6TBXY54, A6TBX70
5VDC internal current consumption		130mA (TYP, all points ON)
Weight		0.20kg

＊1: For the setting method, refer to the Section 1.3.1.
＊2: Selection of left-hand (F) side provides the first half (X00 to X1F) LED indications, and selection of right-hand (L) side provides the latter half (Y00 to Y1F) LED indications.
＊3: When using A6CON2 or A6CON3, refer to Chapter 7.

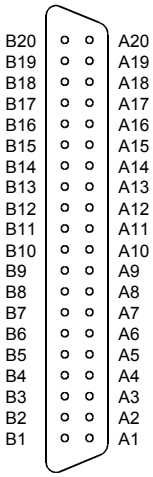
External Connections	Derating Chart
	

∗2: Selection of left-hand (F) side provides the first half (X00 to X1F) LED indications, and selection of right-hand (L) side provides the latter half (Y00 to Y1F) LED indications.

(2) Transistor Output Specification (Sink Type)

Specifications \ Type		QX41Y41P I/O Module (Output Specification)	Appearance
Number of output points		32 points	
Insulation method		Photocoupler	
Rated load voltage		12-24VDC (+20/-15%)	
Max. load current		0.1A/point, 2A/common	
Max. rush current		0.7A/10ms or less	
Leakage current at OFF		0.1mA or lower	
Max. voltage drop at ON		0.1VDC (TYP.) 0.1A, 0.2VDC (MAX.) 0.1A	
Response time	OFF→ON	1ms or shorter	
	ON→OFF	1ms or shorter (rated load, resistance load)	
Surge killer		Zener diode	
Fuse		None	
External power supply	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)	
	Current	15mA /common (when 24VDC and all point is ON)	
Common terminal arrangement		32 points/common (common terminal: 2A01, 2A02)	
Protection function		Provided (overheat protection function, overload protection function) • Overheat protection function operate independently of each other. • Overload protection function operate independently of each other.	

Pin-Outs



Module front view

Pin No.4 ＊4	Signal No.	Pin No.4 ＊4	Signal No.	Pin No.4 ＊4	Signal No.	Pin No.4 ＊4	Signal No.
1B20	X00	1A20	X10	2B20	Y20	2A20	Y30
1B19	X01	1A19	X11	2B19	Y21	2A19	Y31
1B18	X02	1A18	X12	2B18	Y22	2A18	Y32
1B17	X03	1A17	X13	2B17	Y23	2A17	Y33
1B16	X04	1A16	X14	2B16	Y24	2A16	Y34
1B15	X05	1A15	X15	2B15	Y25	2A15	Y35
1B14	X06	1A14	X16	2B14	Y26	2A14	Y36
1B13	X07	1A13	X17	2B13	Y27	2A13	Y37
1B12	X08	1A12	X18	2B12	Y28	2A12	Y38
1B11	X09	1A11	X19	2B11	Y29	2A11	Y39
1B10	X0A	1A10	X1A	2B10	Y2A	2A10	Y3A
1B09	X0B	1A09	X1B	2B09	Y2B	2A09	Y3B
1B08	X0C	1A08	X1C	2B08	Y2C	2A08	Y3C
1B07	X0D	1A07	X1D	2B07	Y2D	2A07	Y3D
1B06	X0E	1A06	X1E	2B06	Y2E	2A06	Y3E
1B05	X0F	1A05	X1F	2B05	Y2F	2A05	Y3F
1B04	Vacant	1A04	Vacant	2B04	Vacant	2A04	Vacant
1B03	Vacant	1A03	Vacant	2B03	Vacant	2A03	Vacant
1B02	COM1	1A02	Vacant	2B02	12/24 VDC	2A02	COM2
1B01	COM1	1A01	Vacant	2B01	12/24 VDC	2A01	COM2

＊4: Pin number of 1 □ □ □ indicates that of the left-hand side connector, and pin number of 2 □ □ □ indicates that of the right-hand side connector.

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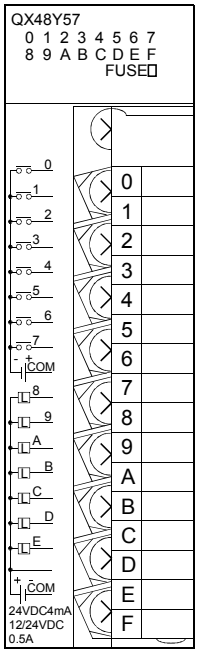
4.3 QX48Y57 I/O Module

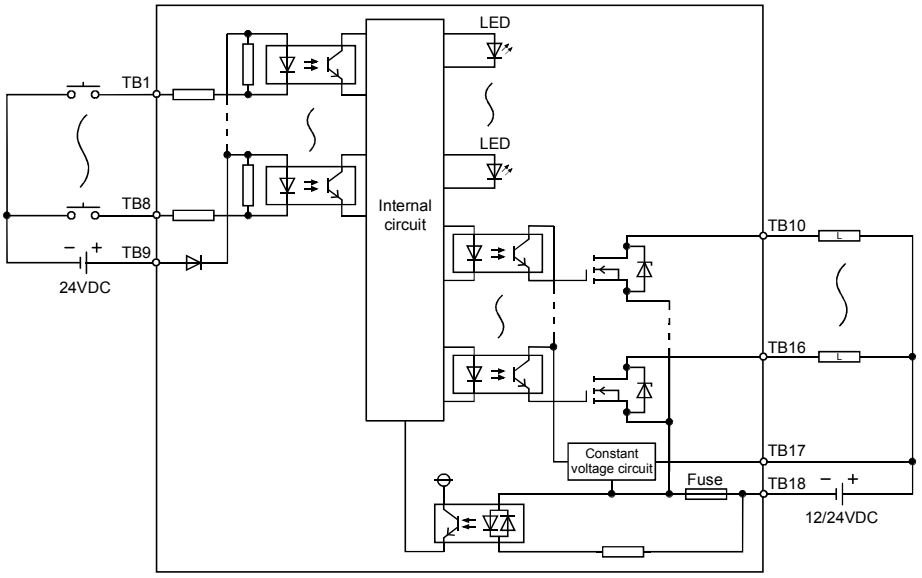
- When using the main module, use the constructions listed in Section 1.2.3 (2).
- This module uses sequential I/O numbers for input and output.
  For I/O numbers of combined I/O modules, refer to Section 1.2.3.

(1) DC Input Specification (Positive Common Type)

Specifications \ Type		QX48Y57 I/O Module (Input Specification)	Appearance
Number of input points		8 points	
Insulation method		Photocoupler	
Rated input voltage		24VDC (+20/-15%, ripple ratio within 5%)	
Rated input current		Approx. 4mA	
Input derating		None	
ON voltage/ON current		19V or higher/3mA or higher	
OFF voltage/OFF current		11V or lower/1.7mA or lower	
Input resistance		Approx. 5.6kΩ	
Response time	OFF→ON	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting)＊1 Initial setting is 10ms	
	ON→OFF	1ms/5ms/10ms/20ms/70ms or less (CPU parameter setting)＊1 Initial setting is 10ms	
Dielectric maximum voltage		560VAC rms/3 cycles (altitude 2000m)	
Insulation resistance		10MΩ or more by insulation resistance tester	
Noise immunity		By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency	
		First transient noise IEC61000-4-4: 1kV	
Protection of degree		IP2X	
Common terminal arrangement		8 points/common (common terminal: TB9)	
Number of I/O occupied points		16 points (For I/O allocation on I/O mixed module, set 16 points.)	
Operation indicator		ON indication (LED)	
External connections		18-point terminal block (M3×6 screw)	
Applicable wire size		Core cable: 0.3 to 0.75mm^2 (Outside diameter: 2.8mm or smaller)	
Applicable connector terminal		R1.25-3 (Terminals with sleeve cannot be used)	
5VDC internal current consumption		80mA (TYP, all points ON)	
Weight		0.20kg	

＊1: For the setting method, refer to the Section 1.3.1.

External Connections



Terminal Block No.	Signal Name
TB1	X00
TB2	X01
TB3	X02
TB4	X03
TB5	X04
TB6	X05
TB7	X06
TB8	X07
TB9	COM1
TB10	Y08
TB11	Y09
TB12	Y0A
TB13	Y0B
TB14	Y0C
TB15	Y0D
TB16	Y0E
TB17	12/24VDC
TB18	COM2

(2) Transistor Output Specifications (Sink Type)

Specifications \ Type		QX48Y57 I/O Module (Output Specification)
Number of output points		7 points
Insulation method		Photocoupler
Rated load voltage		12-24VDC (+20/-15%)
Max. load current		0.5A/point, 2A/common
Max. rush current		4A/10ms or less
Leakage current at OFF		0.1mA or lower
Max. voltage drop at ON		0.2VDC (TYP.) 0.5A, 0.3VDC (MAX.) 0.5A
Response time	OFF→ON	1ms or shorter
	ON→OFF	1ms or shorter (rated load, resistance load)
Surge killer		Zener diode
Fuse		4A (Not replaceable) (Fuse breakage capacity: 50A)
Fuse breakage indication		Provided (When fuse is broken, LED lights and a signal is output to CPU)＊2
External power supply	Voltage	12-24VDC (+20/-15%) (ripple ratio within 5%)
	Current	10mA (at 24VDC)
Common terminal arrangement		7 points/common (common terminal: TB18)

＊2: When the external power supply is turned off, fuse breakage is not detected.

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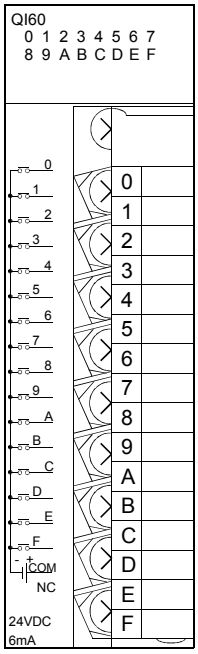
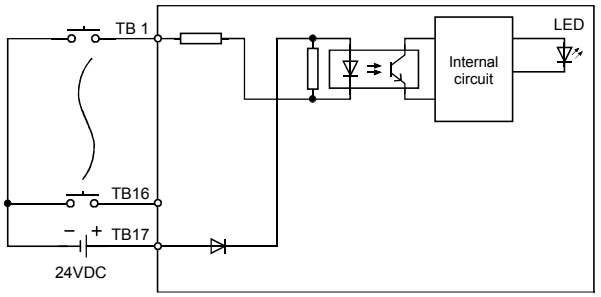
5. INTERRUPT MODULE

5.1 QI60 Interrupt Module

For usage of the main module, refer to the QCPU User's Manual (Function Explanation/Program Fundamentals).

Specifications \ Type			Interrupt Module				
			QI60				Appearance
Number of input points			16 points				
Isolation method			Photocoupler				
Rated input voltage			24VDC (+20/-15%, ripple ratio within 5%)				
Rated input current			Approx. 6mA				
Input derating			No				
ON voltage/ON current			19V or higher/4.0mA or higher				
OFF voltage/OFF current			11V or lower/1.7mA or lower				
Input impedance			Approx. 3.9kΩ				
Response time	Set value ＊1		0.1	0.2	0.4	0.6	1
	OFF to ON	Typ	0.05ms	0.15ms	0.30ms	0.55ms	1.05ms
		max	0.10ms	0.20ms	0.40ms	0.60ms	1.20ms
	ON to OFF	Typ	0.15ms	0.20ms	0.35ms	0.60ms	1.10ms
		max	0.20ms	0.30ms	0.50ms	0.70ms	1.30ms
Dielectric withstand voltage			560VAC rms/3 cycles (altitude 2000m (6557.38ft.))				
Insulation resistance			10MΩ or more by insulation resistance tester				
Noise immunity			By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency				
			First transient noise IEC61000-4-4: 1kV				
Protection of degree			IP2X				
Common terminal arrangement			16 points/common (common terminal: TB17)				
Number of I/O points			16 (I/O allocation is set as a 16-points interrupt module) ＊3				
Interrupt processing condition			Set by setting the CPU parameter switch. ＊2				
Operation indicator			ON indication (LED)				
External connections			18-point terminal block (M3×6 screws)				
Applicable wire size			0.3 to 0.75mm^2 core (2.8mm (0.11in.) OD max.)				
Applicable crimping terminal			R1.25-3 (sleeved crimping terminals cannot be used.)				
5VDC internal current consumption			60mA (TYP. all points ON)				
Weight			0.20kg				



External Connections	Terminal Block Number	Signal Name
	TB1	X00
	TB2	X01
	TB3	X02
	TB4	X03
	TB5	X04
	TB6	X05
	TB7	X06
	TB8	X07
	TB9	X08
	TB10	X09
	TB11	X0A
	TB12	X0B
	TB13	X0C
	TB14	X0D
	TB15	X0E
	TB16	X0F
	TB17	COM
	TB18	Vacant

＊1: Use the CPU parameter settings to select. (Default: 0.2ms). Refer to Section 1.3.1 for the setting method.
For the QCPUs and GX Developer where the response time can be set, refer to Section 1.2.5.
＊2: For the setting method, refer to the section 1.3.3.
＊3: When making settings with an SW5D5C-GPPW or earlier GX Developer, select "16 point intelligent module."

MEMO

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6. BLANK COVER MODULE

This chapter provides the specifications of the blank cover module used to protect the vacant slot (between I/O modules) of the base module from dust.

Table 6.1 Blank Cover Module Specifications

Item \ Type		QG60
Number of I/O points occupied		Default: 16 points (Can be changed to 0, 16, 32, 48, 64, 128, 256, 512, 1024 points by "PLC system" of "PLC parameter".)
Application		Used as a dustproof cover for a slot not loaded with an I/O module (especially a vacant slot between modules).
External dimensions	H	98(3.86) mm(inch)
	W	27.4(1.08) mm(inch)
	D	90(3.55) mm(inch)
Weight		0.07 kg

* Load the blank cover module with the connector cover of the base module fitted.

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MEMO

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7. CONNECTORS

The 40-pin connectors and 37-pin D-sub connectors used with the input and output modules are to be user-prepared.
The following tables list the connector types and applicable models, and introduce crimp-contact and pressure-displacement tools.

(1) 40-pin connectors

(a) 40-pin connectors

Type	Model Name	Applicable Wire Size	Applicable Model
Soldering type connector	A6CON1	0.3mm^2 (AWG#22)	QX41, QX41-S1, QX42, QX42-S1, QX71, QX72, QX82, QY41P, QY42P, QY71, QH42P, QX41Y41P
Crimp-contact type connector	A6CON2	AWG#24 to 28	
Pressure-displacement type connector	A6CON3	AWG#28 (twisted) AWG#30 (single wire)	
Soldering type connector	A6CON4	0.3mm^2 (AWG#22)	

(b) 40-pin connector crimp-contact and pressure-displacement tools

Type	Model Name	Contact
Crimp-contact tool	FCN-363T-T005/H	FUJITSU COMPONENT LIMITED
Pressure-displacement tool	FCN-367T-T012/H (locator plate)	
	FCN-707T-T001/H (cable cutter)	
	FCN-707T-T101/H (hand press)	

(2) 37-pin D-sub connectors

(a) 37-pin D-sub connectors

Type	Model Name	Applicable Wire Size	Applicable Model
Soldering type connector	A6CON1E	0.3mm^2 (AWG#22)	QX81, QY81P
Crimp-contact type connector	A6CON2E	AWG#24 to 24	
Pressure-displacement type connector	A6CON3E	AWG#28 (twisted) AWG#30 (single wire)	

(b) 37-pin D-sub connector crimp-contact and pressure-displacement tools

Type	Model Name	Contact
Crimp-contact tool	91503-1	Tyco Electronics AMP K.K.
Pressure-displacement tool	768349-1 (die set) 768338-1	
	91220-1 (cable cutter)	
	91085-2 (hand mini-press)	

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8. SPECIFICATIONS OF CONNECTOR/TERMINAL BLOCK CONVERTOR MODULES

8.1 Specifications of Connector/Terminal Block Convertor Modules

This chapter explains the specifications of connector/terminal block convertor modules.

(1) Connector/Terminal Block Convertor Module Specifications

Type	Details	Weight	Applicable wire size	Applicable crimping terminal	Applicable Models
A6TBXY36	For positive common type input modules and sink type output modules (standard type)	0.4kg	0.75 to 2mm^2	1.25-3.5(JIS) 1.25-YS3A V1.25-M3 V1.25-YS3A 2-3.5(JIS) 2-YS3A V2-S3 V2-YS3A	Q series: QX41, QX41-S1, QX42, QX42-S1, QY41P, QY42P, QH42P, QX41Y41P AnS series: A1SX41, A1SX41-S1, A1SX41-S2, A1SX42, A1SX42-S1, A1SX42-S2, A1SX82-S1,A1SY41, A1SY41P, A1SY42, A1SY42P, A1SY82, A1SH42, A1SH42P, A1SH42-S1, A1SH42P-S1 A series: AX42, AX42-S1, AY42, AY42-S1, AY42-S3, AY42-S4, AH42 CC-Link: AJ65SBTCF1-32D, AJ65SBTCF1-32T, AJ65SBC1-32D, AJ65SBC1-32T MELSECNET-MINI: AJ35TC1-32D, AJ35TC1-32T
A6TBXY54	For positive common type input modules and sink type output modules (2-wire type)	0.5kg			
A6TBX70	For positive common type input modules (3-wire type)	0.6kg			Q series: QX41, QX41-S1, QX42, QX42-S1, QH42P, QX41Y41P AnS series: A1SX41, A1SX41-S1, A1SX41-S2, A1SX42, A1SX42-S1, A1SX42-S2, A1SX82-S1, A1SH42, A1SH42P, A1SH42-S1, A1SH42P-S1 A series: AX42, AX42-S1, AH42 CC-Link: AJ65SBTCF1-32D, AJ65SBC1-32D MELSECNET-MINI: AJ35TC1-32D
A6TBX36-E	For negative common type input modules (standard type)	0.4kg			Q series: QX81 AnS series: A1SX81, A1SX81-S2 A series: AX82
A6TBX54-E	For negative common type input modules (2-wire type)	0.5kg			
A6TBX70-E	For negative common type input modules (3-wire type)	0.6kg			
A6TBY36-E	For source type output modules (standard type)	0.4kg			Q series: QY81P AnS series: A1SY81 A series: AY82EP
A6TBY54-E	For source type output modules (2-wire type)	0.5kg			

POINT

(1) The number of connectable I/O points is 32 for all connector/terminal block convertor modules.
Two connector/terminal block convertor modules and two cables for connector/terminal block convertor modules are required for 64-point I/O modules.

(2) Though the A1SX81(S2) is used either as a sink or source type, use the A6TBX36-E, A6TBX54-E or A6TBX70-E.
The A6TBXY36, A6TBXY54 or A6TBX70 cannot be used.

(3) Though the A1SX82-S1 is used either as a sink or source type, the A6TBXY36/XY54/X70 may be used only when the A1SX82-S1 is used as a sink type.
When it is used as a source type, the A6TBXY36/XY54/X70 cannot be used.

(4) Though the A1SY82 is a source type output module, use theA6TBXY36 or A6TBXY54. The A6TBY36-E or A6TBY54-E cannot be used.

(5) In the A series, the plus common input module is separately labeled as a sink type input module, and the minus common input module is separately labeled as a source type input module.

(6) When using the A6TBXY70 as a mixed input/output module, use at the input side.

(7) Tighten the module terminal screws to the following torque.
Supply line connecting terminal screw (M3.5 screw): Tightening torque 78.4N•cm

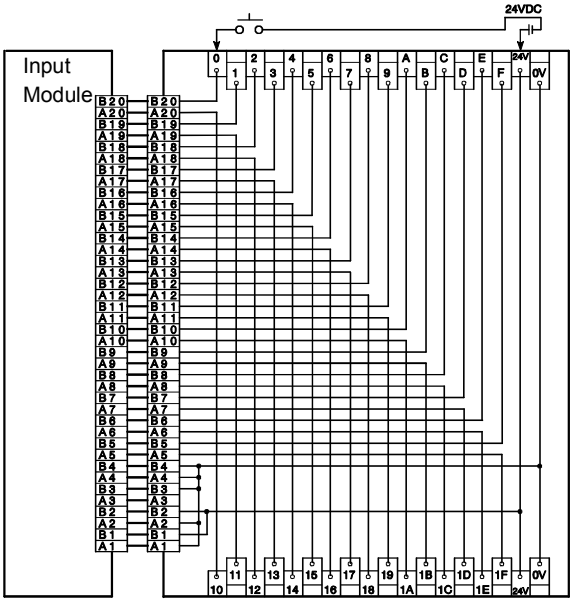
(2) Cable

Type	Details	Weight	Applicable Models
AC05TB	0.5 m (19.69 in.), for sink modules	0.17kg	A6TBXY36 A6TBXY54 A6TBX70
AC10TB	1 m (39.37 in.), for sink modules	0.23kg	
AC20TB	2 m (78.74 in.), for sink modules	0.37kg	
AC30TB	3 m (118.11 in.), for sink modules	0.51kg	
AC50TB	5 m (196.85 in.), for sink modules	0.76kg	
AC80TB	8 m (314.96 in.), for sink modules (common current not exceeding 0.5 A)	1.2kg	
AC100TB	10 m (393.7 in.), for sink modules (common current not exceeding 0.5 A)	1.5kg	
AC05TB-E	0.5 m (19.69 in.), for source modules	0.17kg	A6TBX36-E A6TBY36-E A6TBX54-E A6TBY54-E A6TBX70-E
AC10TB-E	1 m (39.37 in.), for source modules	0.23kg	
AC20TB-E	2 m (78.74 in.), for source modules	0.37kg	
AC30TB-E	3 m (118.11 in.), for source modules	0.51kg	
AC50TB-E	5 m (196.85 in.), for source modules	0.76kg	

8.2 Connector/Terminal Block Convertor Module Connection Diagrams

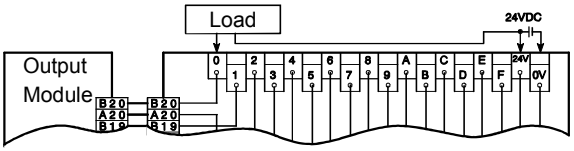
8.2.1 A6TBXY36

(1) When connecting an input module

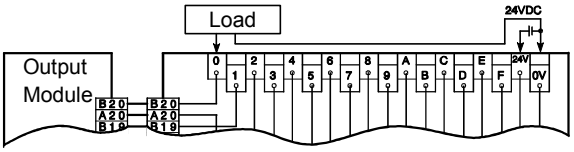


(2) When connecting an output module

(a) Sink Type

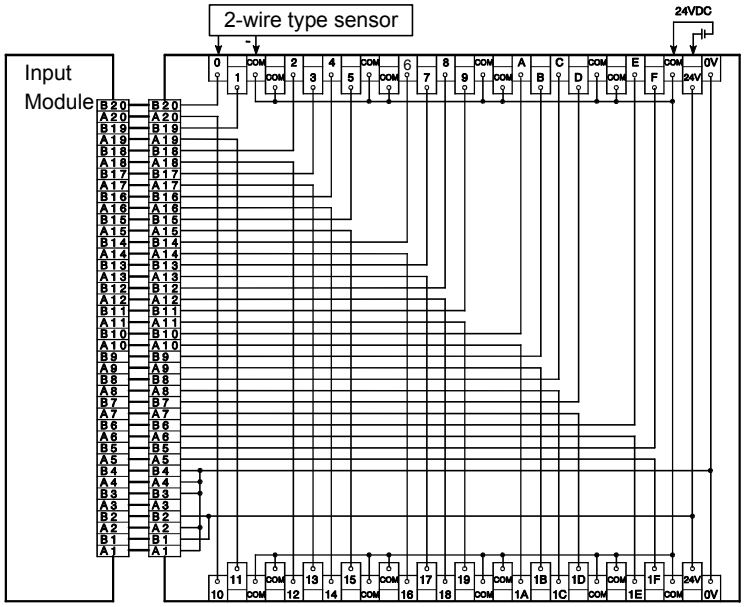


(b) Source Type

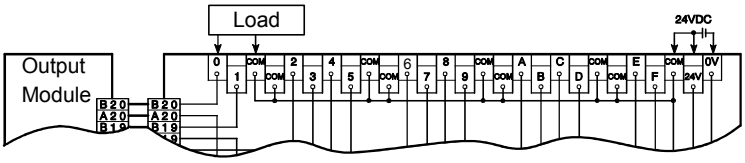


8.2.2 A6TBXY54

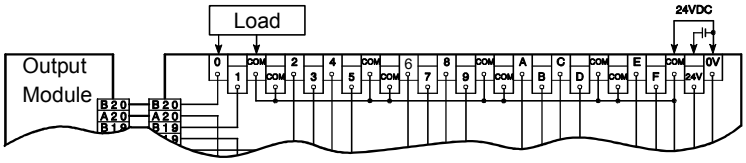
(1) When connecting an input module



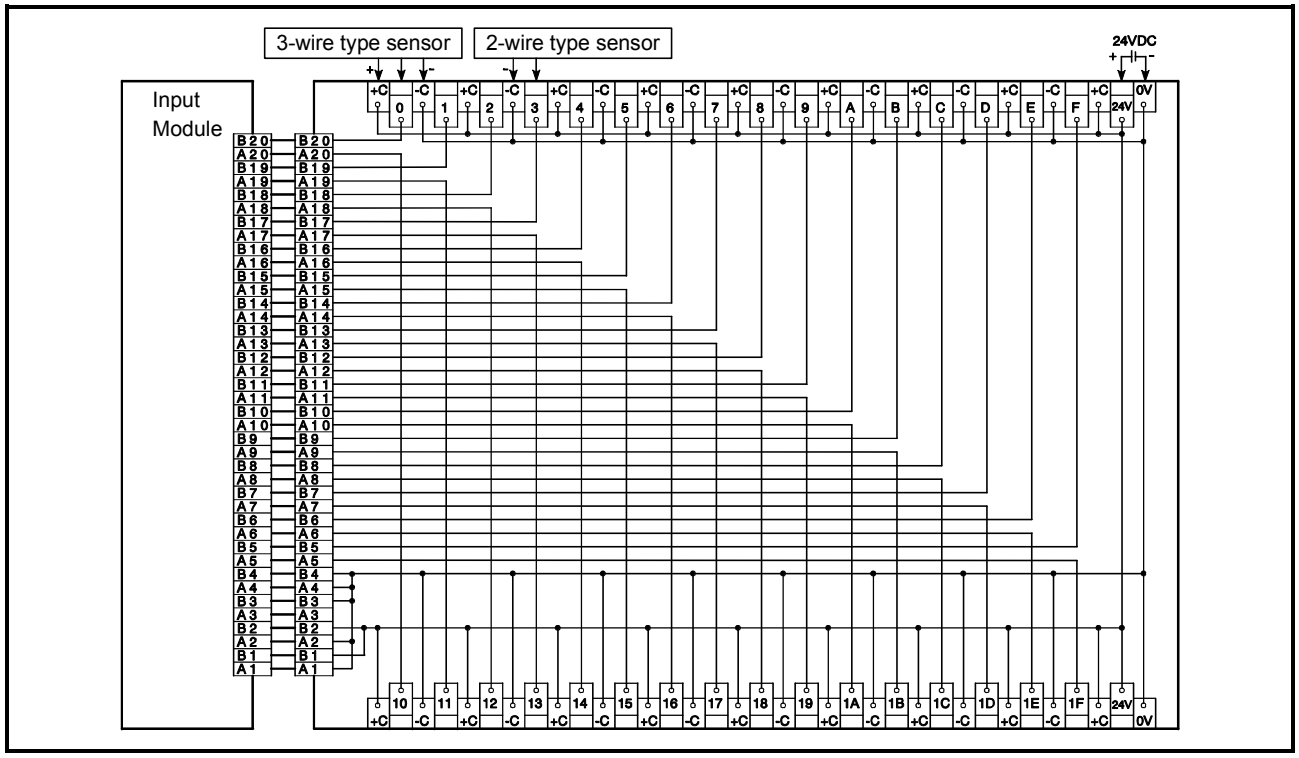
(2) When connecting an output module
(a) Sink Type



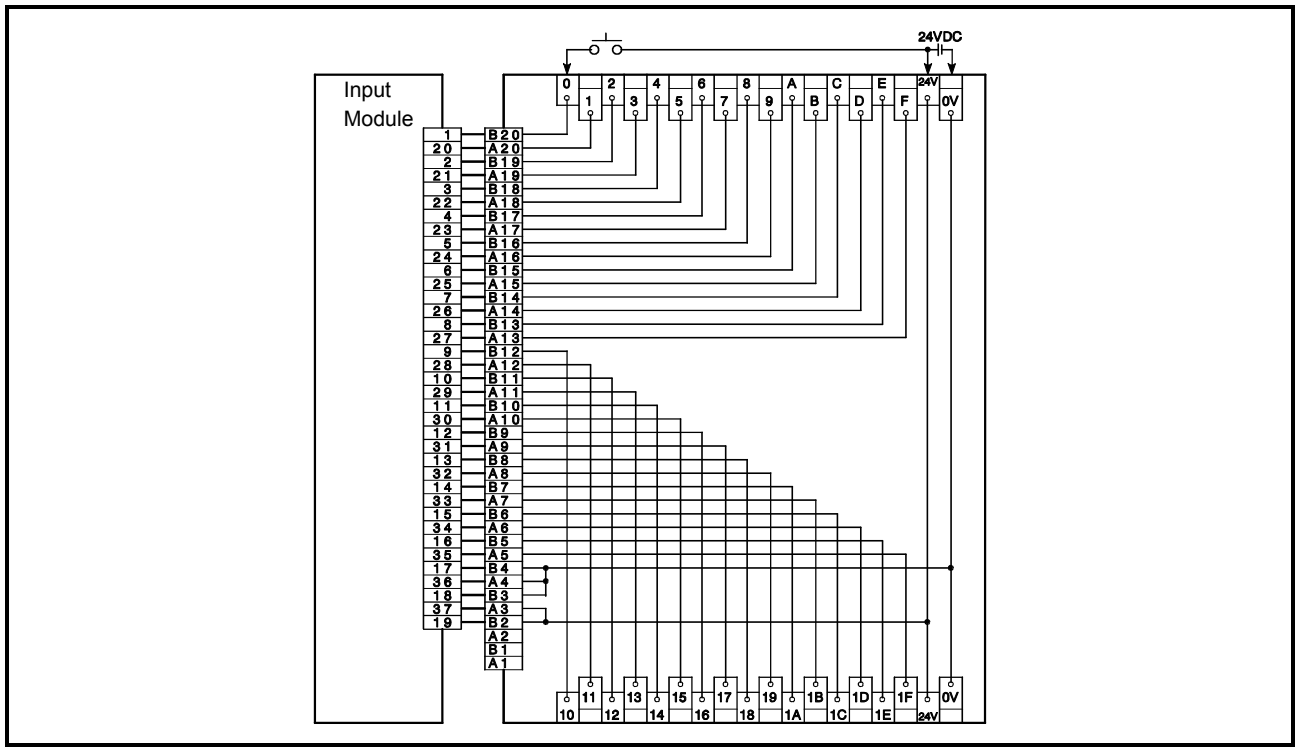
(b) Source Type



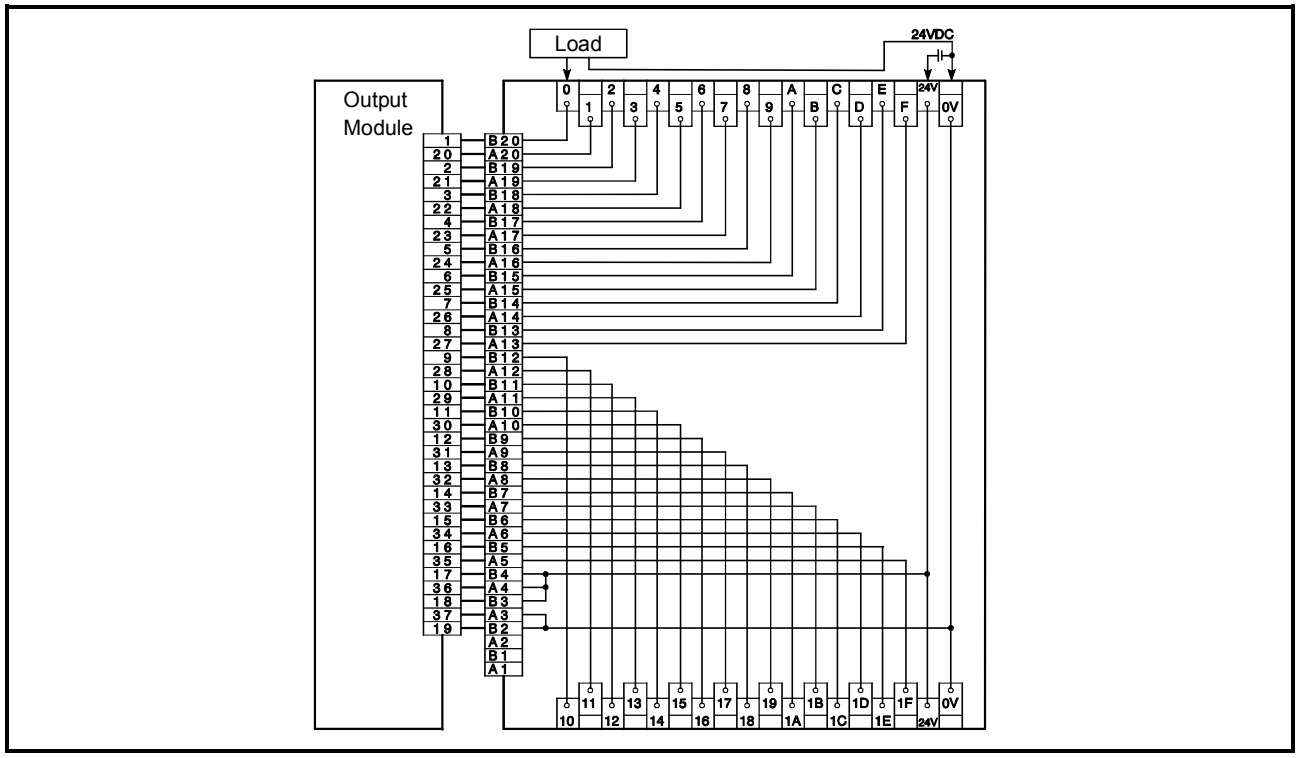
8.2.3 A6TBX70



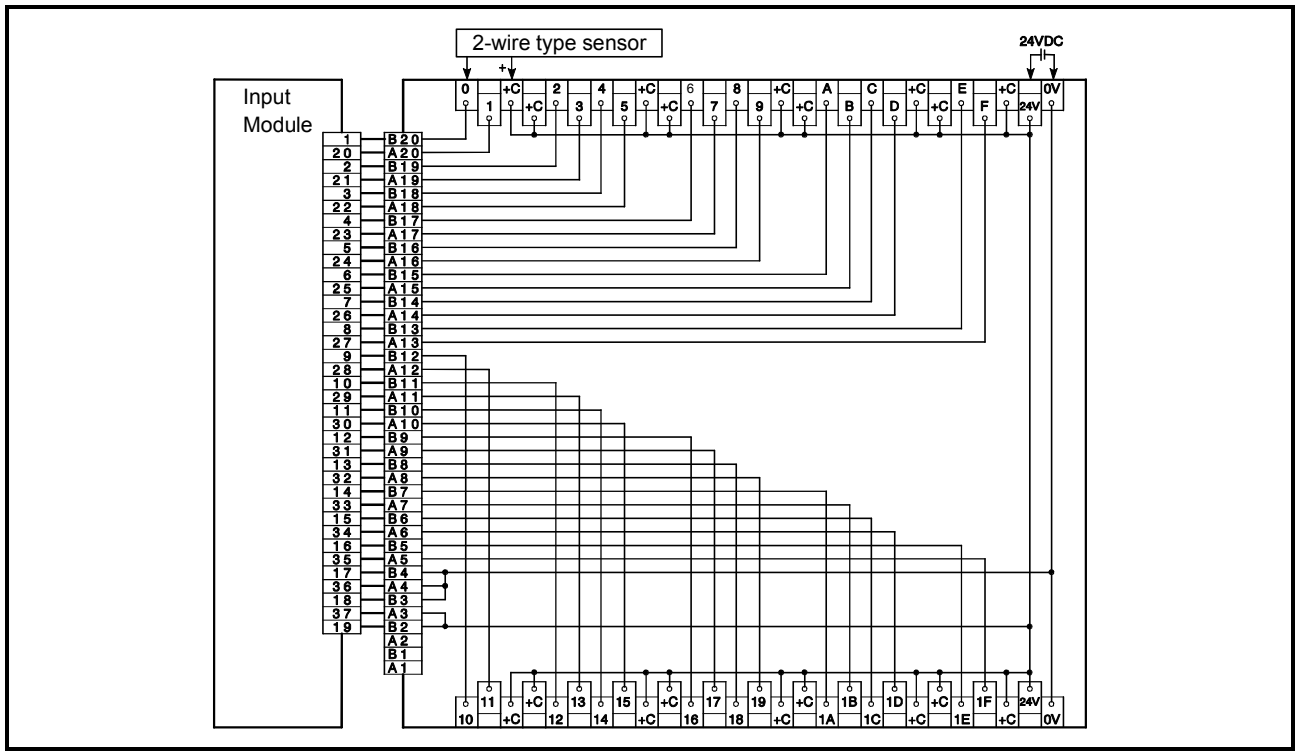
8.2.4 A6TBX36-E



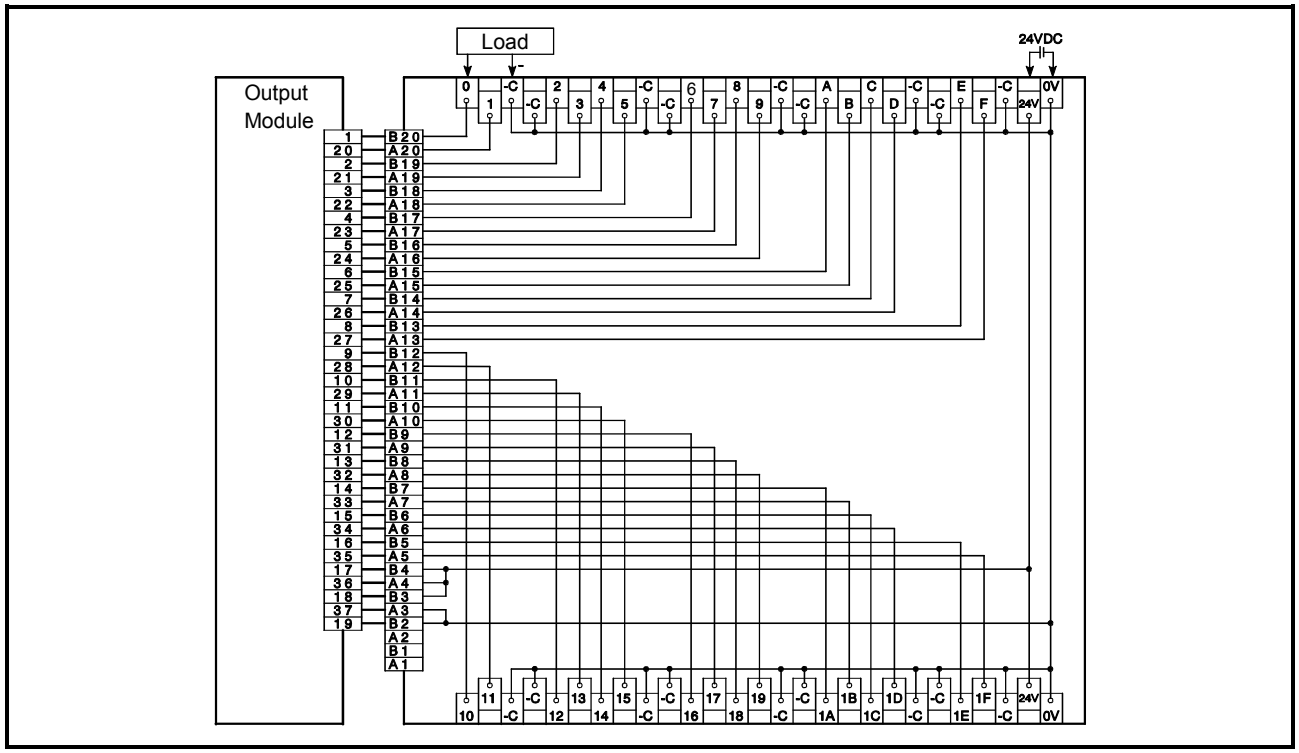
8.2.5 A6TBY36-E



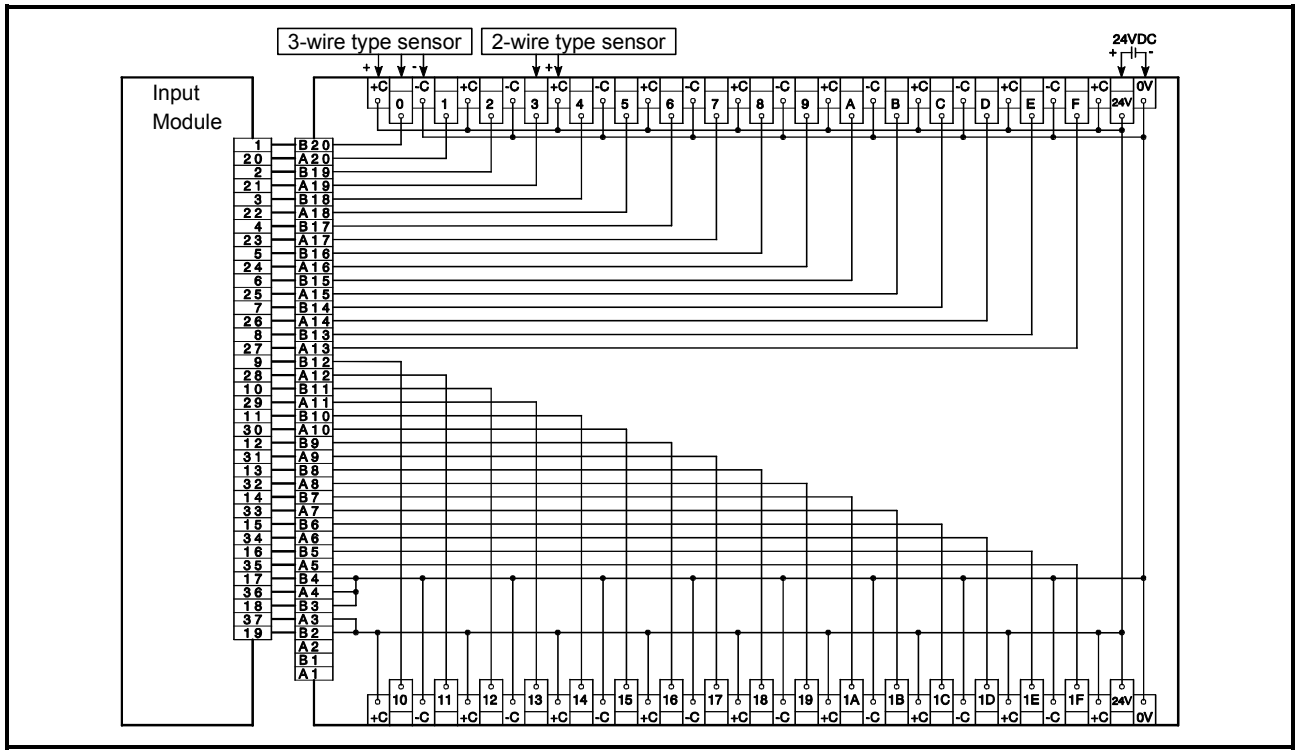
8.2.6 A6TBX54-E



8.2.7 A6TBY54-E



8.2.8 A6TBX70-E



9. SPRING CLAMP TERMINAL BLOCK

This chapter describes a spring clamp terminal block.

9.1 Spring Clamp Terminal Block I/O Module

The spring clamp terminal block I/O module is an I/O module of spring clamp terminal block type.
Since this module uses a spring clamp it does not require screw tightening, which greatly reduces the number of wiring procedures.

(1) Model Name

The model name of spring clamp terminal block I/O module is described below.

Model type	Model name		
I/O module	QX10-TS	QX40-TS	QX80-TS
	QY10-TS	QY40P-TS	QY80-TS

POINT
• Use bar solderless terminals for wiring this module. • For the signal names corresponding to the terminal numbers when connected to an external device, refer to Chapter 2 and 3 in this manual.

9 - 1

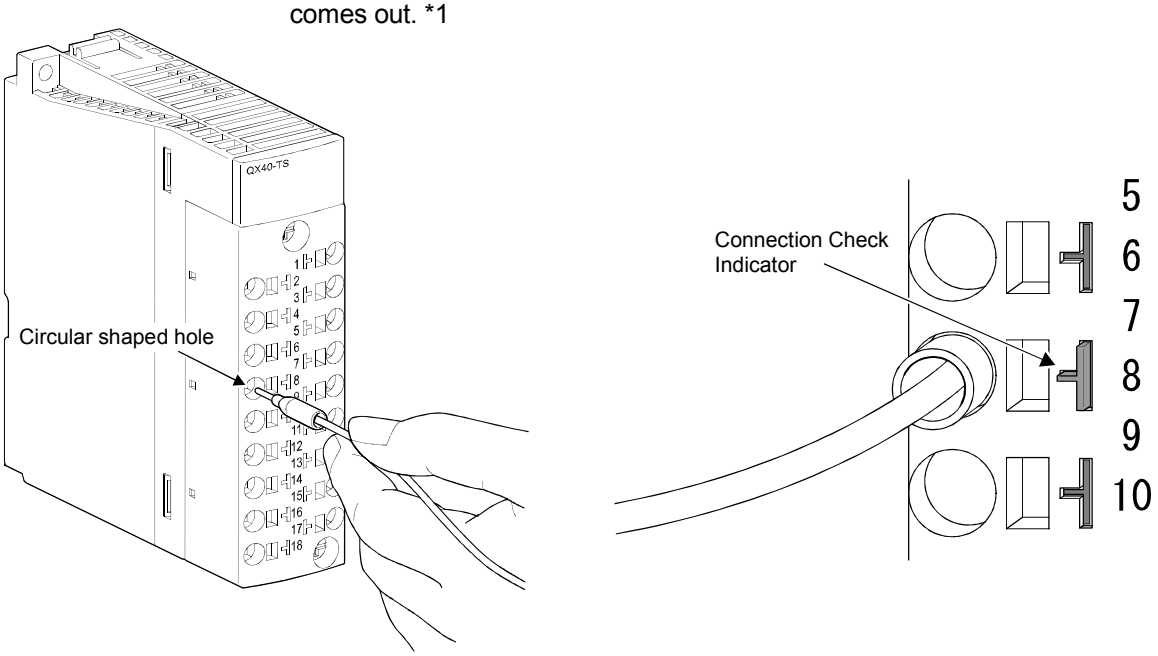
(2) Cable Installation

Strip off about 6.5mm of the cable tip to install the bar solderless terminal to the stripped part.

Connect the cable either by the (a) method or by the (b) method described below.

(a) Connection by inserting the cable

Insert the wire with the bar solderless terminal into the circular shaped hole and then force the wire into the hole until the connection check indicator comes out. *1

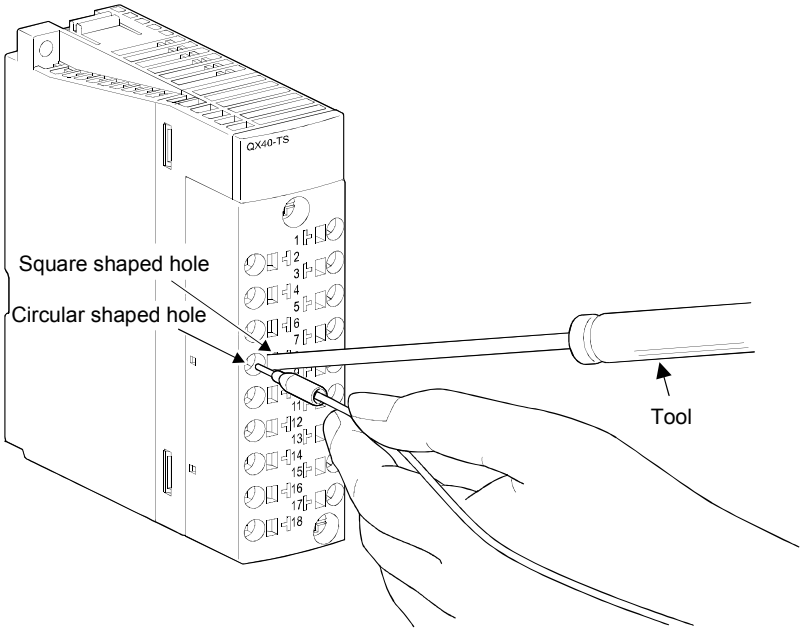


*1: If the connection check indicator does not come out, the cable is not connected to the module properly. Insert the cable until the connection check indicator comes out.

(b) Use of spring clamp terminal block tool

Insert the spring clamp terminal block tool into the corresponding square shaped hole until it stops. While the tool is inside the hole, insert the wire into the corresponding square hole until the connection check indicator comes out, and pull the tool out of the hole completely.

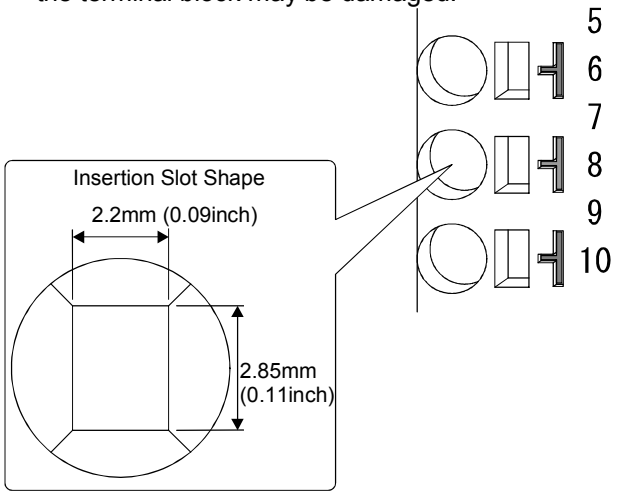
After pulling the tool, check whether the connection check indicator comes out. *1



*1: If the connection check indicator does not come out, the cable is not connected to the module properly. Insert the wire until the connection check indicator comes out.

POINT

- If the stripped wire is inserted into the corresponding hole without installing the bar solderless terminal, the connection check indicator does not come out. Do not use the stripped wire without installing the bar solderless terminal.
- The wire strip length must follow the specification of the bar solderless terminal. Also, use a crimp tool when installing the bar solderless terminal to the wire.
- Before inserting the bar solderless terminal, check the corresponding circular shaped hole and the bar solderless terminal. Before inserting, pay attention to the angle of bar solderless terminal.
  If a bar solderless terminal, which is bigger than the insertion slot, is inserted, the terminal block may be damaged.



(3) Cable Removable

Insert the tool into the corresponding square shaped hole until it stops.
Pull the wire out of the hole completely.

(4) List of Introductory Products

The tools and the bar solderless terminals used for wiring the spring clamp terminal block I/O module are listed below.

Manufacturer	Name of product	Model name	Applicable wire size
Mitsubishi Electric System & Service Co., Ltd.	Spring clamp terminal block tool	KD-5339	—
Mitsubishi Electric Engineering Co., Ltd.	Bar solderless terminal	FA-VTC125T9	0.3 to1.65mm^2
		FA-VTCW125T9	
	Bar solderless terminal tool	FA-NH65A	—
Nichifu Co.,Ltd.	Bar solderless terminal	TE 0.5-8/10	0.3 to 0.5mm^2
		TE 0.75-8/10	0.75mm^2
		TE 1.0-8/10	0.9 to 1.0mm^2
		TE 1.5-8/10	1.25 to 1.5mm^2
	Bar solderless terminal tool	NH79	—
Phoenix Contact Co.,Ltd.	Bar solderless terminal	AI 0.34-8TQ	0.34mm^2
		AI 0.5-8/10WH	0.5mm^2
		AI 0.75-8/10GY	0.75mm^2
		AI 1-8/10RD	1.0mm^2
		AI 1.5-8/10BK	1.5mm^2
		AI 2.5-8/10BU	2.0 to 2.5mm^2
	Bar solderless terminal tool	CRIMPFOX ZA 3	—

9.2 Spring clamp terminal block (Q6TE-18S)

The Q6TE-18S shall be used attached to a Q Series terminal block type I/O module or an intelligent function module.
Since the Q6TE-18S uses a spring clamp it does not require screw tightening, which greatly reduces the number of wiring procedures.

(1) Compatible Models

The QT6E-18S can be used with the following models:

Model type	Model name					
I/O module	QX10	QX28	QX40	QX40H	QX40-S1	QX50
	QX70	QX70H	QX80	QX80H	QX90H	QY10
	QY18A	QY22	QY40P	QY50	QY68A	QY70
	QY80	QX48Y57	QI60			
Intelligent function module	Q62DA	Q62DAN	Q62FA-FG	Q64DA	Q64DAN	Q68DAV
	Q68DAVN	Q68DAI	Q68DAIN			
	Q62AD-DGH	Q64AD	Q64AD-GH	Q68ADV	Q68ADI	
	Q64TCRT	Q64TCRTBW	Q64RD	Q64RD-G		

POINT

The terminal numbers of the Q6TE-18S correspond to the terminal numbers on the compatible module.
For the signal names corresponding to the terminal numbers when connected to an external device, please refer to the following manual.
• I/O module: Chapter 2, 3, 5
• Intelligent function module: User's manual for each module

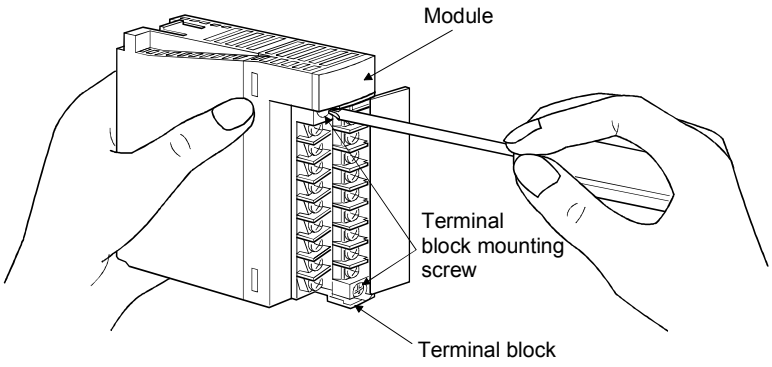
(2) Specifications

Q6TE-18S specification is explained.

Item	Specifications
Applicable wire size	0.3 to 1.5 mm^2 (AWG22 to 16)
Wire strip length	8 to 11 mm
Mounting screw tightening torque range	66 to 89 N · cm
Weight	0.07kg

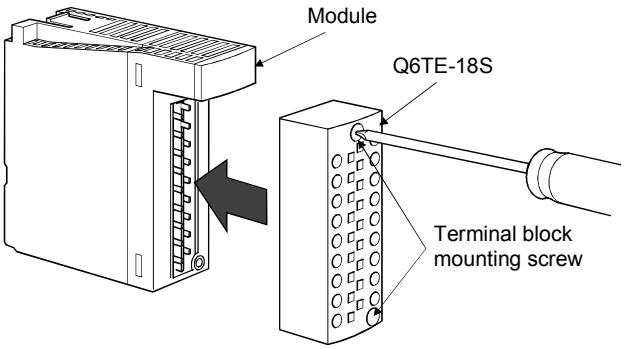
(3) Removal of Terminal Block

Unscrew the two terminal block mounting screws situated at the top and bottom of the terminal block and take them off.



(4) Installation of Q6TE-18S

Mount Q6TE-18S onto the module and tighten the terminal block mounting screws within the specified torque range.



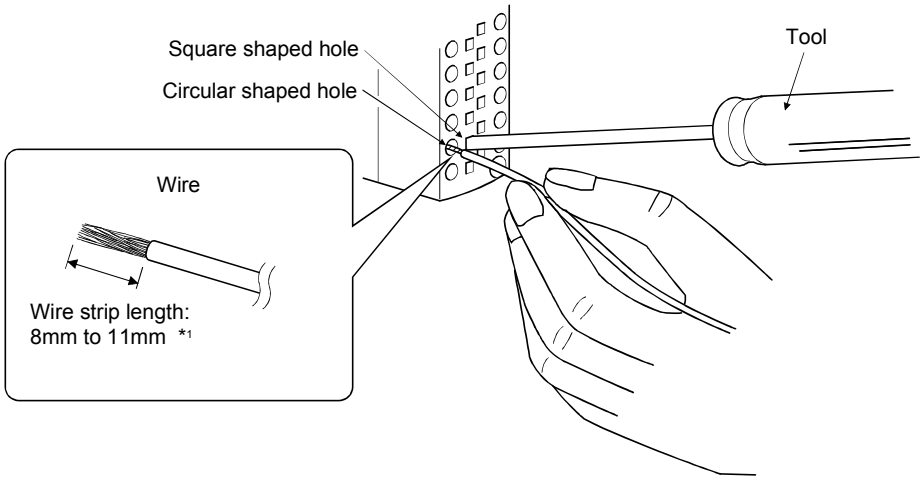
(5) Cable Installation

Insert the tool into the square shaped hole, which corresponds to the terminal you wish to use.

While the tool is inside the hole, insert the wire into the circular shaped hole (as shown below).

Remove the tool from the square shaped hole, taking care not to remove the wire.

After the wire has been clamped, gently pull the wire to confirm that it is secure.



[Cautions]

*1: Take care that the wire strip length is between 8mm to 11mm.
If the wire strip length is too long, this will expose the bare wire, which increases the risk of electric shock or short circuit.
If the wire strip length is too short, this will result in the wire not being securely attached.

(6) Cable removal

Insert the tool into the corresponding square shaped hall until it stops.
Pull the wire out of the hall completely.

(4) List of Introductory Products

The tools and the bar solderless terminal used for wiring the spring clamp terminal block I/O module are listed below.

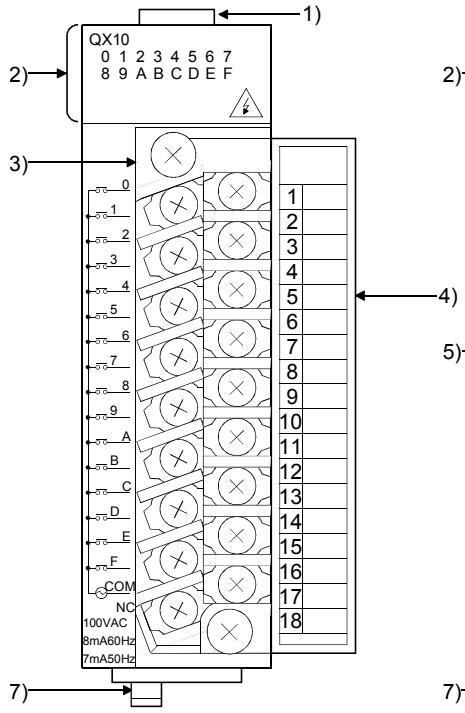
Manufacturer	Name of product	Model name	Applicable wire size
Mitsubishi Electric System & Service Co., Ltd.	Spring clamp terminal block tool	KD-5339	—
Nichifu Co.,Ltd.	Bar solderless terminal ＊1	TE 0.5	0.5 mm^2
		TE 0.75	0.75 mm^2
		TE 1	0.9 to 1.0 mm^2
		TE 1.5	1.25 to 1.5 mm^2
	Bar solderless terminal tool	NH77	—

＊1: This terminal is used when the wire performed terminal treatment is inserted into the spring clamp terminal block or more than one wire is inserted into one terminal.

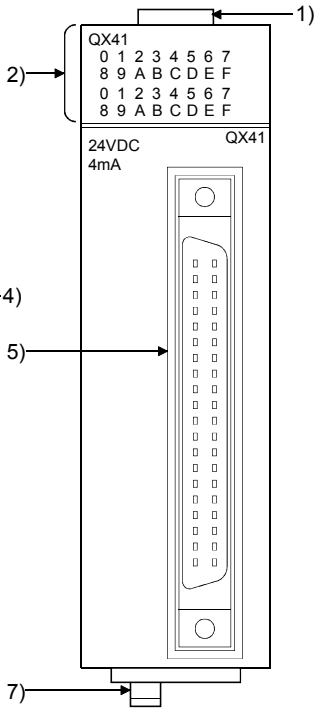
10. NAMES OF MODULE PARTS

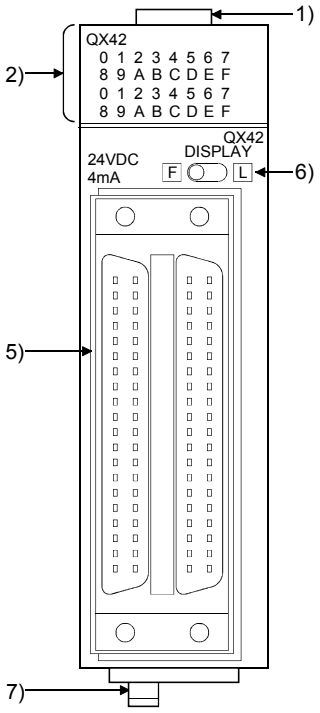
This chapter explains the names of the I/O module parts.

Terminal block type (other than high-speed input module)



40-pin connector type





No.	Name	Description
1)	Module fixing hook	Hook used to fix the module to the base unit. (Single-motion installation)
2)	I/O indicator LED	Indicates the ON/OFF status of I/O and lit when I/O is ON.
3)	Terminal block	Used to connect power and I/O signal wires.
4)	Terminal cover	Terminal cover with recording paper
5)	40-pin connector	Designed for 32- or 64-point module and used to connect power and I/O signal wires.
6)	Indication selector switch ＊1	Used to switch the LED indications between the first-half 32 points and latter-half 32 points of a 64-point module.
7)	Module loading mounting lever	Used to mount the module on the base unit.

＊1: Operate the indication selector switch with your fingertip.
Do not use a screwdriver or similar tool as it may damage the switch.

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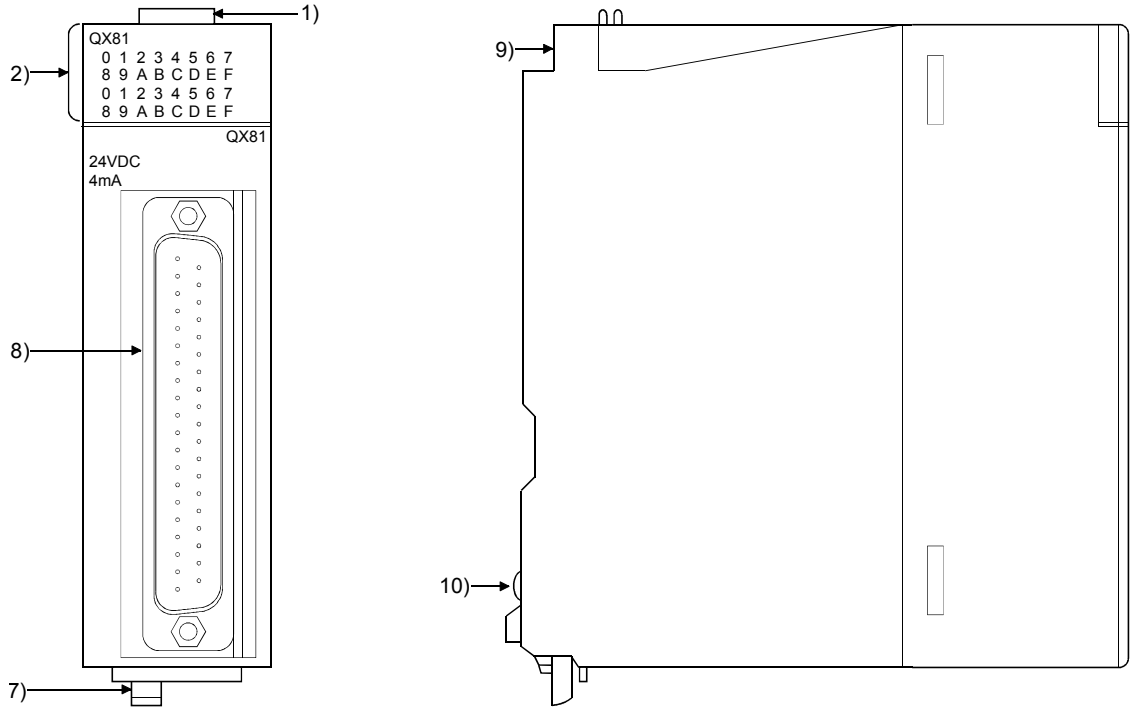
37-pin D-sub connector type



No.	Name	Description
8)	37-pin D-sub connector	Designed for 32 points and used to connect power and I/O signal wires.
9)	Module fixing screw hole	Used to fix the module to the base unit.
10)	Metal fitting	Do not touch as this may be deformed.

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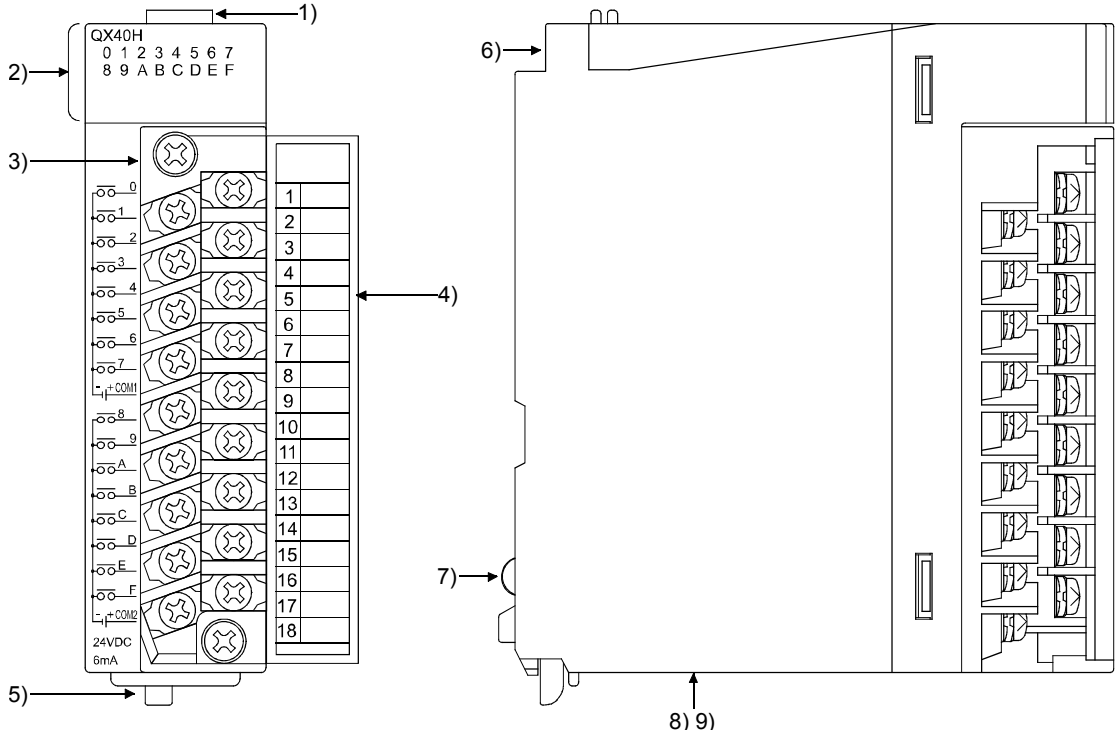
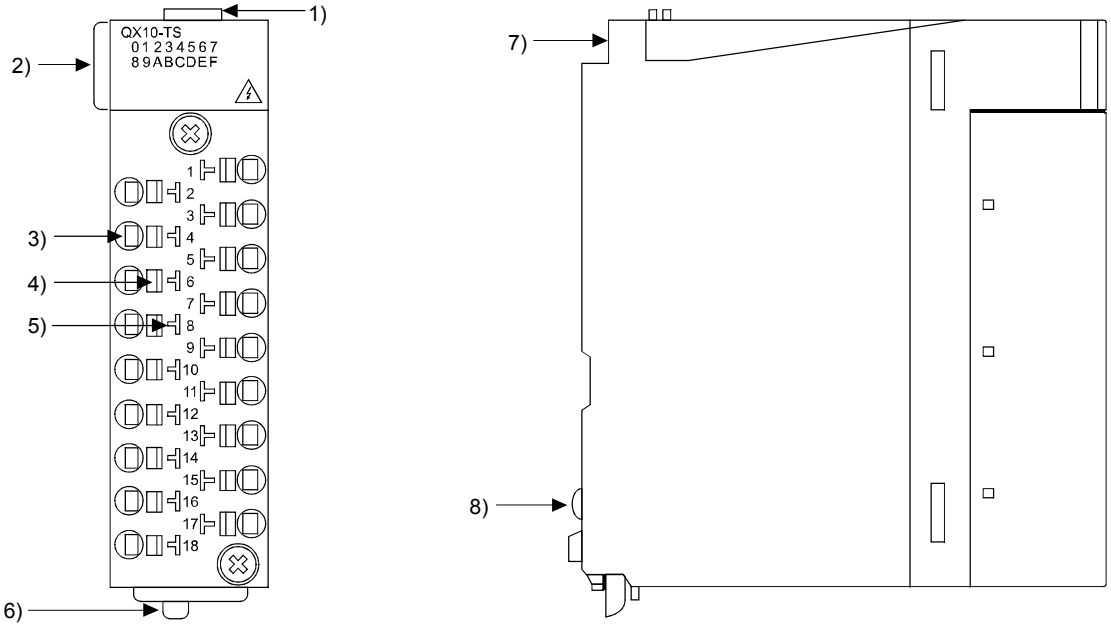
Terminal block type (High-speed input module)



No.	Name	Description
1)	Module fixing hook	Hook used to fix the module to the base unit. (Single-motion installation)
2)	I/O indicator LED	Indicates the ON/OFF status of I/O and lit when I/O is ON.
3)	Terminal block	Used to connect power and I/O signal wires.
4)	Terminal cover	Terminal cover with recording paper
5)	Module mounting lever	Used to mount the module into the base unit.
6)	Module fixing screw hole	Used to fix the module to the base unit.
7)	Metal fitting	Do not touch as this may be deformed.
8)	Noise filter selector switch (Switch 1)*1	Used to set valid/invalid noise filters. ON: Valid (at the factory) OFF: Invalid
9)	Function selector switch (Switch 2)*1	Used to switch the module function. ON: High-speed input module (at the factory) OFF: Interrupt module

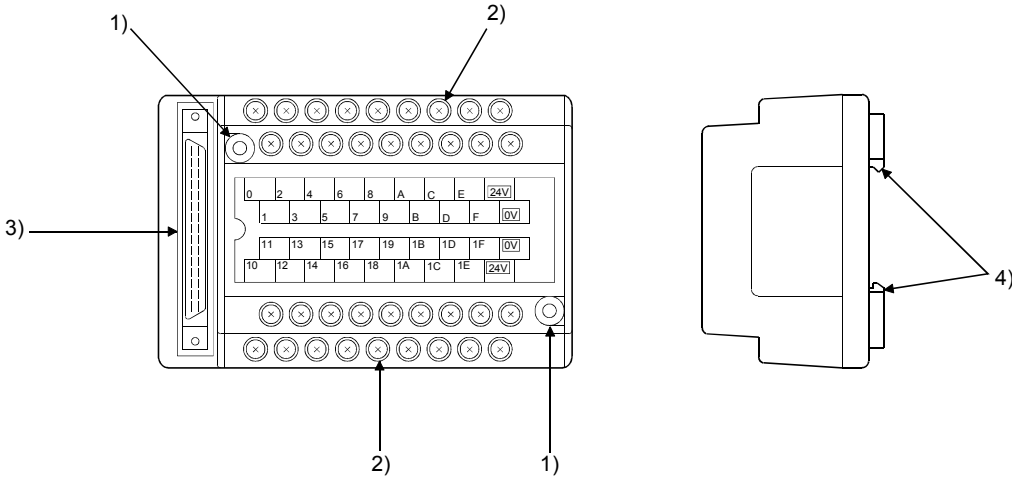
*1: Operate the switch with an industrial tool such as a driver, because the switch is placed beyond your reach. Operate the switch carefully. Failure to do so may result in damage to the switch.

Spring clamp terminal block type

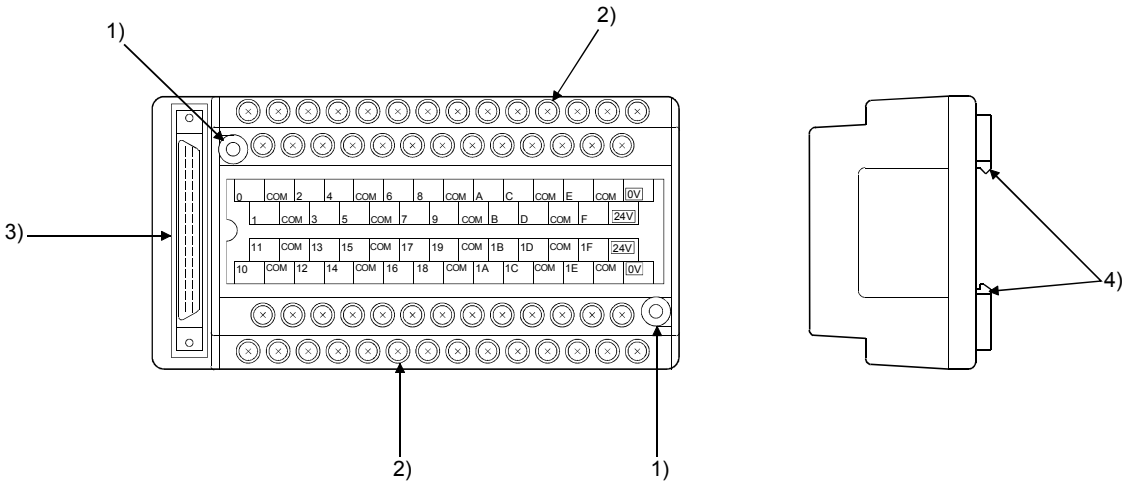


No.	Name	Description
1)	Module fixing hook	Hook used to fix the module to the base unit. (Single-motion installation)
2)	I/O indicator LED	Indicates the ON/OFF status of I/O and lit when I/O is ON
3)	Wire insertion slot	Hole inserted a wire to in wiring (Circular hole)
4)	Tool insertion slot	Hole inserted a spring clamp terminal block tool to in wiring (Square hole)
5)	Connection check indicator	Comes out if a wire is inserted in wiring
6)	Module loading lever	Used to load the module into the base unit
7)	Module fixing screw hole	Used to fix the module to the base unit. (Single-motion installation)
8)	Metal fitting	Do not touch as this may be deformed.

A6TB □ 36 □



A6TB □ 54 □



No.	Name	Description
1)	Panel mounting hole	Used for mounting to panel (for M4 screw).
2)	Terminal block	Used to connect power and signal wires.
3)	40-pin connector	Designed for 32-point module and used to connect power and I/O signal wires.
4)	Module fixing hook	Used for mounting onto DIN rail.

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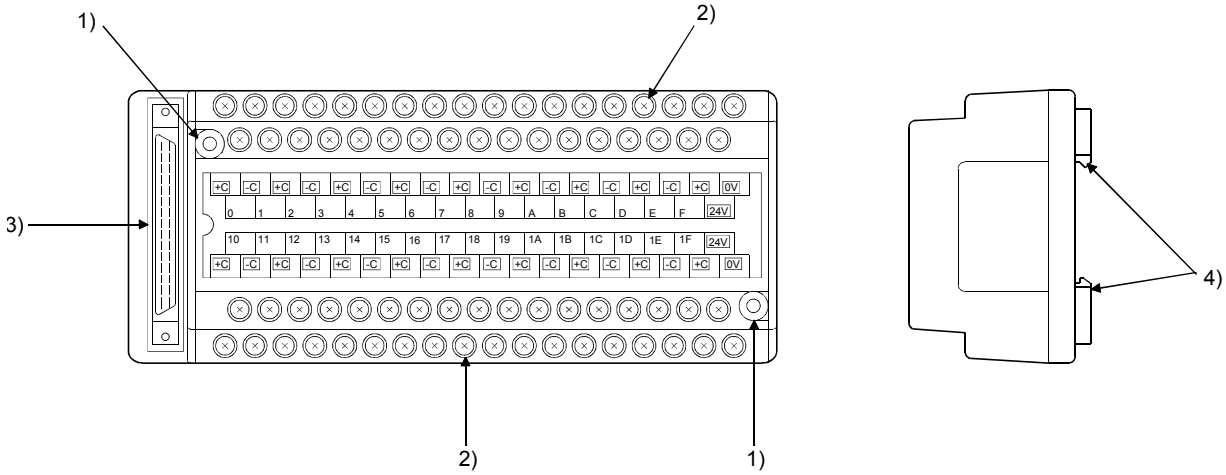
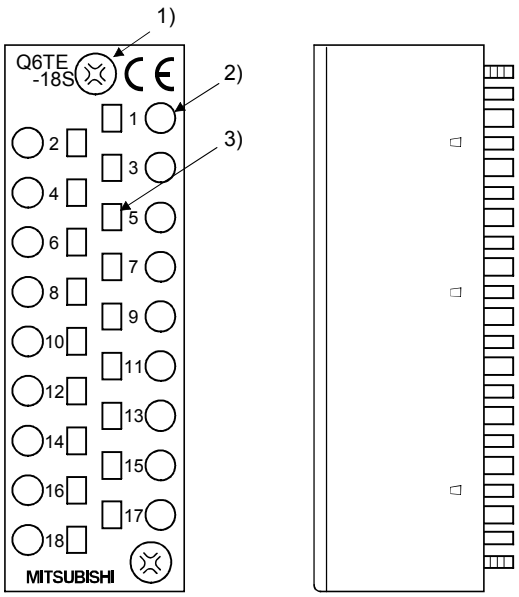
A6TBX70 □



No.	Name	Description
1)	Panel mounting hole	Used for mounting to panel (for M4 screw).
2)	Terminal block	Used to connect power and signal wires.
3)	40-pin connector	Designed for 32-point module and used to connect power and I/O signal wires.
4)	Module fixing hook	Used for mounting onto DIN rail.

Q6TE-18S



No.	Name	Description
1)	Terminal block mounting screw	Used to fix Q6TE-18S terminal block to a module.
2)	Circular shaped hole	Hole for inserting wire when wiring
3)	Square shaped hole	Hole for inserting a tool when wiring

11. I/O MODULE TROUBLESHOOTING

This chapter explains possible problems with I/O circuits and their corrective actions.

11.1 Input Circuit Troubleshooting

This section describes possible problems with input circuits and their corrective actions.

Table 11.1 Input Circuit Problems and Corrective Actions

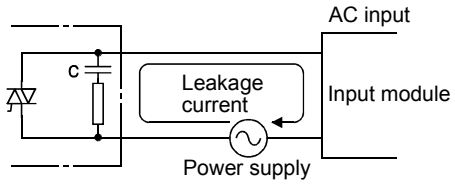
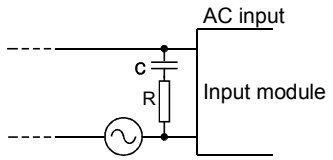
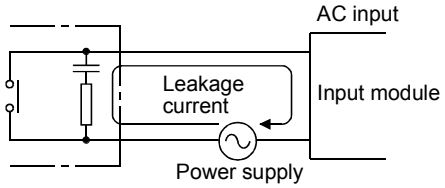
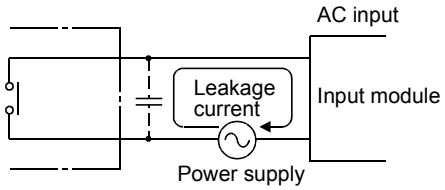
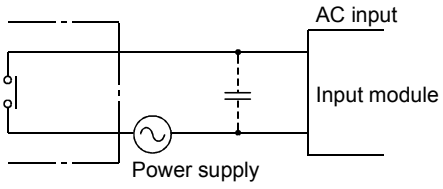
	Condition	Cause	Corrective Action
Example 1	Input signal is not turned OFF.	• Leakage current of input switch (e.g. drive by non-contact switch). 	• Connect an appropriate resistor which will make the voltage across the terminals of the input module lower than the OFF voltage value.  It is recommended to use 0.1 to 47μF + 47 to 120Ω (1/2W) for the CR constant.
Example 2	Input signal is not turned OFF.	• Drive by a limit switch with neon lamp. 	• Same as Example 1. • Or make up another independent display circuit.
Example 3	Input signal is not turned OFF.	• Leakage current due to line capacity of wiring cable. (Line capacity C of twisted pair wire is approx. 100 PF/m). 	• Same as Example 1. • However, leakage current is not generated when the power supply is located in the input equipment side as shown below. 

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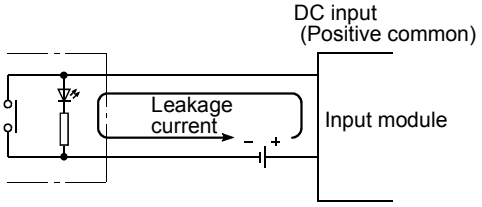
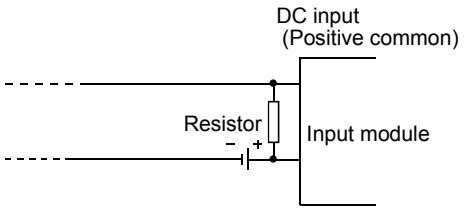
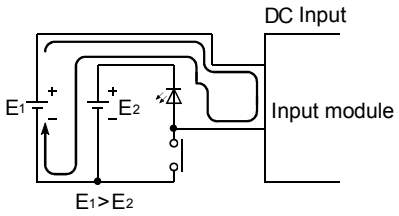
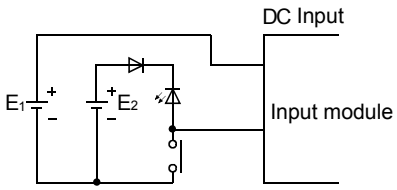
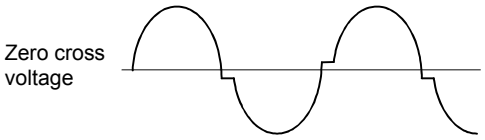
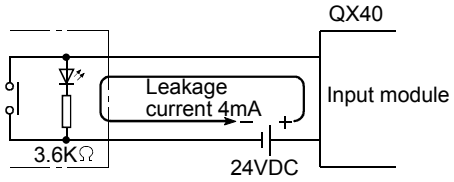
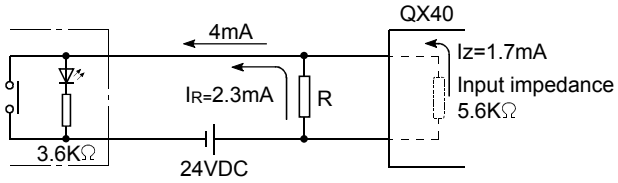
Table 11.1 Input Circuit Problems and Corrective Actions (Continued)

	Condition	Cause	Corrective Action
Example 4	Input signal is not turned OFF.	• Drive by switch with LED indicator. 	• Connect a register which will make the voltage between the input module terminal and common lower than the OFF voltage, as shown below.  * A calculation example of a value for a connected resistor is given on the following page.
Example 5	Input signal is not turned OFF.	• Sneak path due to the use of two power supplies. 	• Use only one power supply. • Connect a sneak path prevention diode. (Figure below) 
Example 6	Input signal is not turned ON (AC input module).	Stepwise distortion as shown below appears to the zero cross voltage of input signal (AC). 	Improve input signal waveform by using the on-line system etc.
Example 6	False input due to noise	Depending on response time setting, noise is imported as input.	Change response time setting. Example 1ms → 5ms (Setting of a shorter response time may produce a higher effect on periodic excessive noise.) If no effects are produced by the above, take basic actions to prevent excessive noise from entering, e.g. avoid bundling the power and I/O cables, and suppress noise by adding surge absorbers to such noise sources as relays and contactors used with the same power supply.)

<Calculation example of Example 4>
Consider a switch with LED indicator connected to the QX40, giving a leakage current of 4mA when a 24VDC power is turned on.



(1) The 1.7mA OFF current of the QX40 is not satisfied. Hence, connect a resistor as shown below.



(2) Calculate the resistor value R as indicated below.
To satisfy the 1.7mA OFF current of the QX40, the resistor R to be connected may be the one where 2.3mA or more will flow.

I_R: I_Z=Z (Input impedance): R

$$R \leqq \frac{I_Z}{I_R} \times Z \text{ (Input impedance)} = \frac{1.7}{2.3} \times 5.6 = 4.14[k\Omega]$$

R<4.14kΩ.
Assuming that resistor R is 3.9kΩ, the power capacity W of resistor R is:

$W = (\text{input voltage})^2 \div R = 28.8^2 \div 3900 = 0.2(W)$

(3) The power capacity of the resistor selected is 3 to 5 times greater than the actual current consumption. A 3.9 (kΩ), 0.6 to 1.0 (W) resistor may therefore be connected to the terminal in question.

11.2 Output Circuit Troubleshooting

This section describes possible problems with output circuits and their corrective actions.

Table 11.2 Output Circuit Problems and Corrective Actions

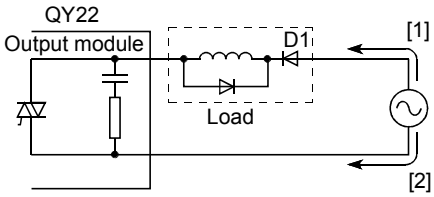
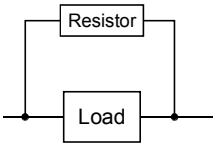
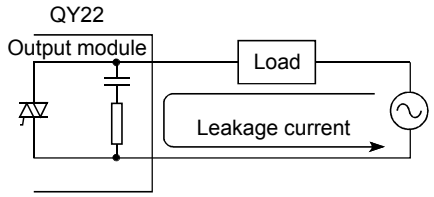
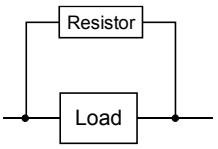
	Condition	Cause	Corrective Action
Example 1	When the output is OFF, excessive voltage is applied to the load.	• Load is half-wave rectified inside (in some cases, this is true of a solenoid).  • When the polarity of the power supply is as shown in [1], C is charged. When the polarity is as shown in [2], the voltage charged in C plus the line voltage are applied across D1. Max. voltage is approx. 2.2E. (If a resistor is used in this way, it does not pose a problem to the output element. But it may cause the diode, which is built into the load, to deteriorate, resulting in a fire, etc.)	• Connect a resistor several tens to hundreds of kΩ across the load. 
Example 2	The load is not turned OFF (triac output).	• Leakage current due to built-in noise suppression. 	• Connect C and R across the load. (When the wiring distance from the output card to the load is long, there may be a leakage current due to the line capacity.) 

Table 11.2 Output Circuit Problems and Corrective Actions (Continued)

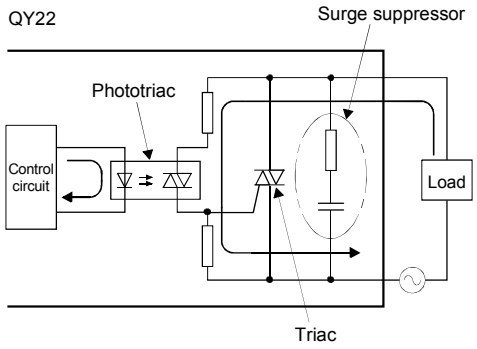
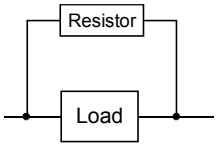
	Condition	Cause	Corrective Action
Example 3	The load is not turned OFF. (Triac output)	• The load current is lower than the minimum load current.  • When the load current is lower than the minimum load current of the output module, the triac does not operate since the load current flows into a phototriac as shown below. When an inductive load is connected, the load may not be turned OFF since surge at the time of OFF is applied to the phototriac.	• Connect a resistor to both ends of a load so that the load current is higher than the minimum load current. 

Table 11.2 Output Circuit Problems and Corrective Actions (Continued)

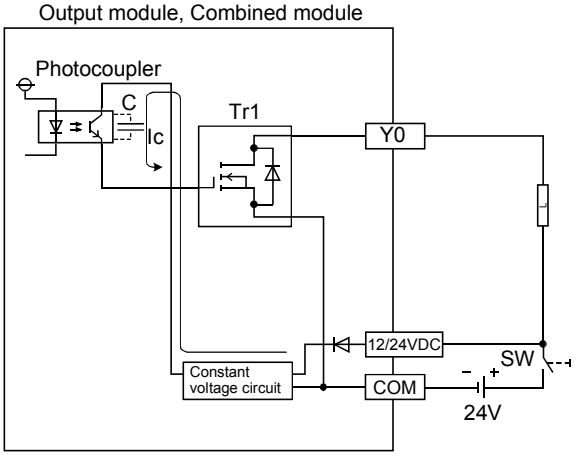
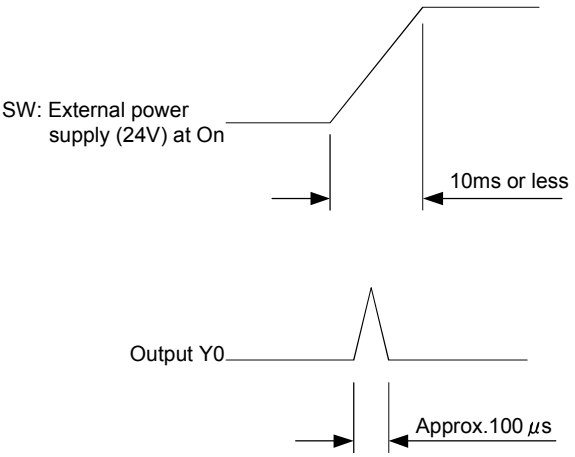
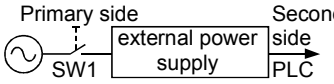
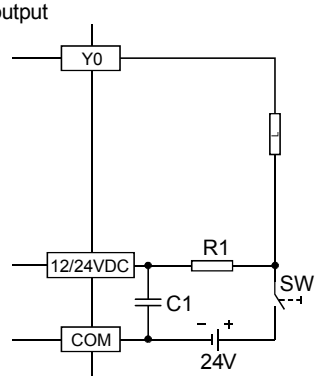
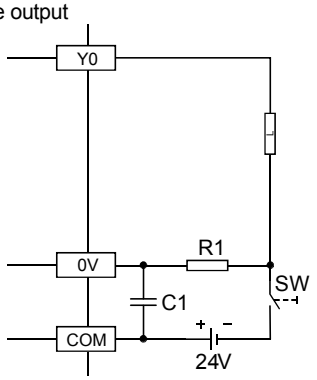
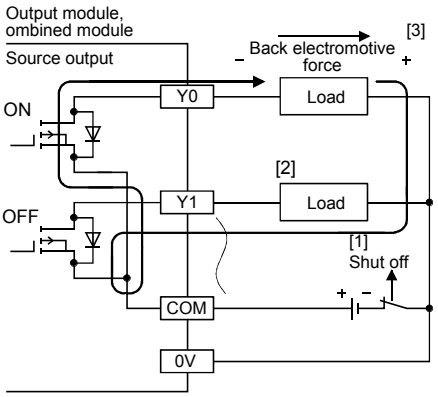
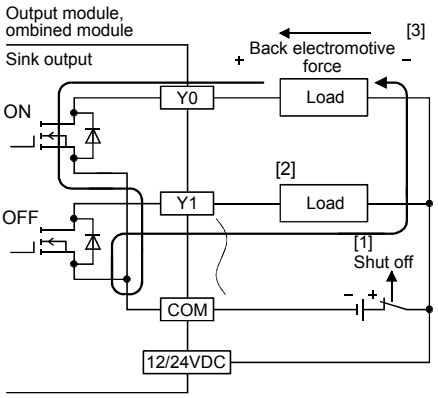
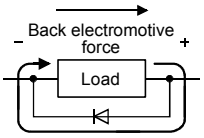
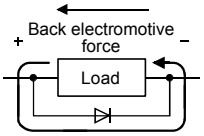
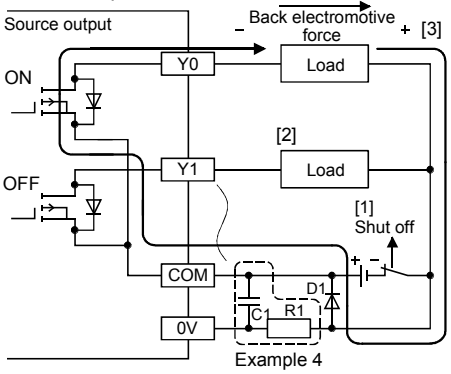
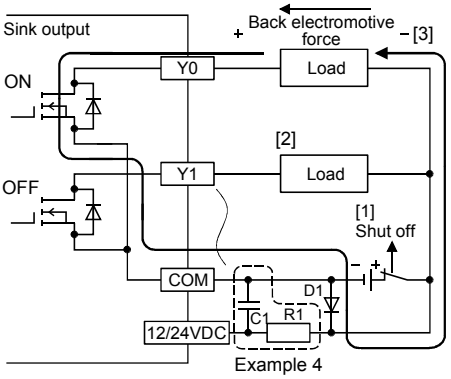
	Condition	Cause	Corrective Action
Example 4	When the external power supply turns on, the load turns on for a moment.	Erroneous output due to the stray capacitance (C) between collector and emitter of hotocoupler. (There is no erroneous output at normal road. An erroneous output may occur at high sensitivity load (such as solid state relay)) Output module, Combined module  (1) If the external power supply is turned on precipitously, Ic current flows due to the stray capacitance (C) between collector and emitter of hotocoupler. (2) Ic current flows to the next stage of transister Tr1 gate and Y0 output turns on by 100 μs 	(1) When the external power turns ON/OFF, check that the external power supply rising edge must be 10ms or more, and switch the SW1 to the primary side of external power supply.  (2) When switching to the secondary side of the external power supply is required, the external power supply rising edge connected a condenser must be slow, and measured 10ms or more. Sink output  Source output  * The measures are ineffective in the following modules due to the characteristic of the external power supply circuit • QY81P R1: Several tens of ohms Power capacity ≧ (external power supply current[*1])^2 × resistance value × (3 to 5)[*2] C1: several hundreds of microfarads 50V *1 Refer to consumption current of the external power supply for modules used in this manual. *2 Select the power capacity of resistance to be 3 to 5 times lager than the actual power consumption. (Example) R1=40 Ω, C1=300 μF Use the below expression to calculated a time constant C1 × R1=300 × 10^{-6} × 40 =12 × 10^{-3}s=12ms

Table 11.2 Output Circuit Problems and Corrective Actions (Continued)

	Condition	Cause	Corrective Action
Example 5	The load which was turned OFF is turned ON for a moment at power-off. (Transistor output)	The load [2] which was turned OFF may be turned ON due to back electromotive force at the time of power-off [1] if an inductive load is used.  	Take action in the following (1) or (2). (1) To prevent the generation of the back electromotive force, connect diode in parallel with load where the back electromotive force has been generated. Source output [3]  Sink output [3]  (2) Install a diode between the positive and negative external power supply to allow an electric current to pass another current path. When the corrective action shown in the example 4 is taken simultaneously, the diode must be installed in parallel with the C1 and R1.  Example 4 * The measures are ineffective in the following modules due to the characteristic of the external power supply circuit • QY81P  Example 4 D1: Reverse voltage VR(VRM) ··· *1, Forward current IF(IFM) ··· *2 *1 Approximately 10times higher than the rated voltage in the specifications Example: 24 VDC → Approximately 200V *2 More than twice as much as the maximum load current (common) in the specifications Example: 2A/1 common → 4A or more

APPENDICES

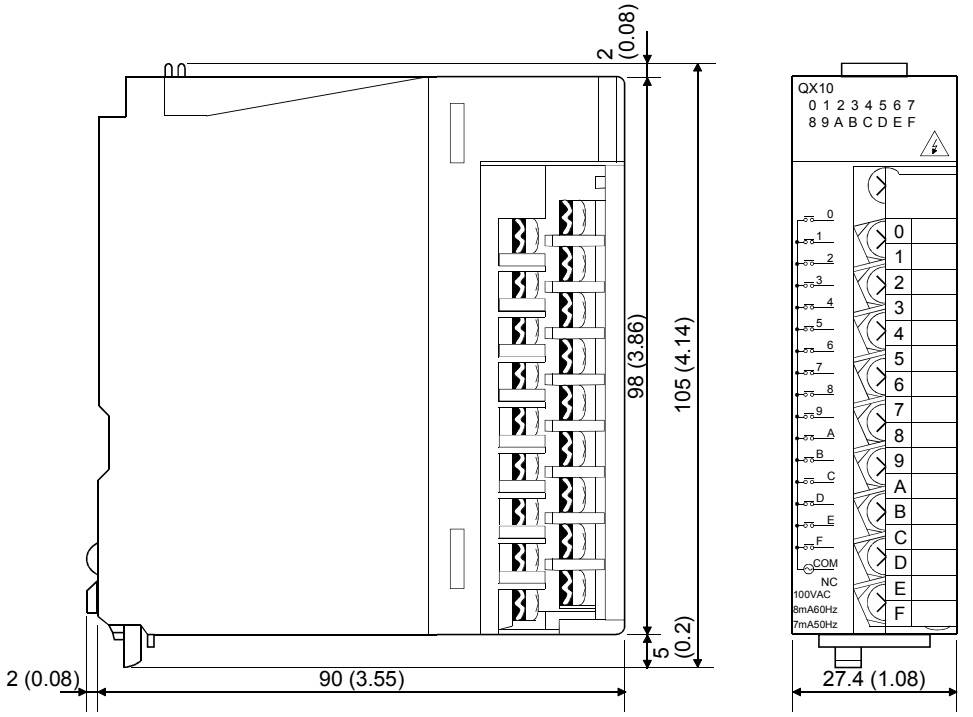
Appendix 1 External Dimensional Drawings

Appendix 1.1 I/O modules

APP.

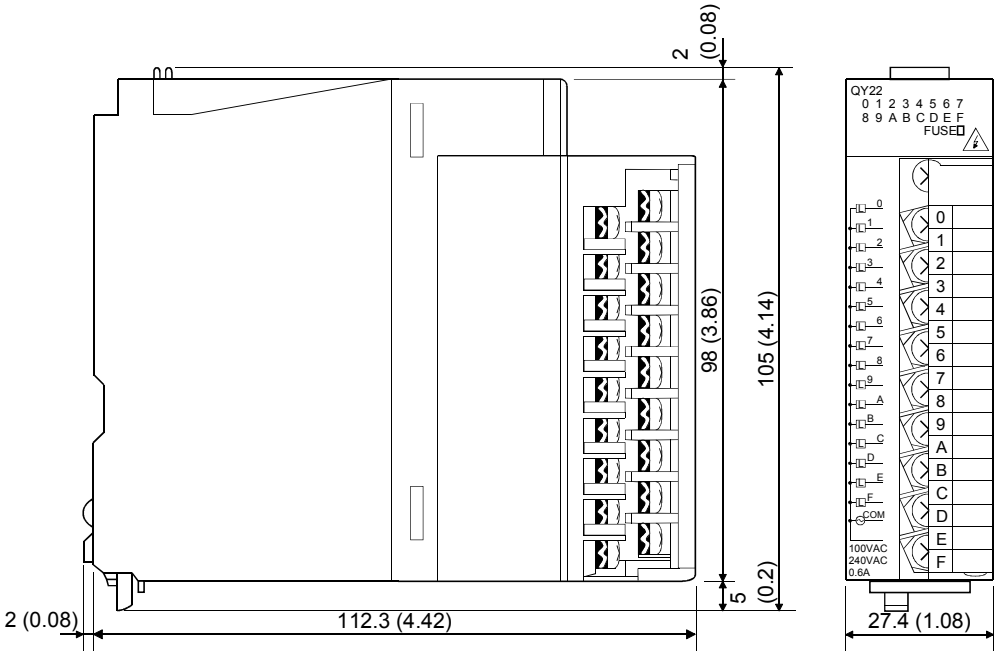
(1) Terminal block connector type

(a) Other than QY22



Unit: mm (inch)

(b) QY22 TRIAC Output Module

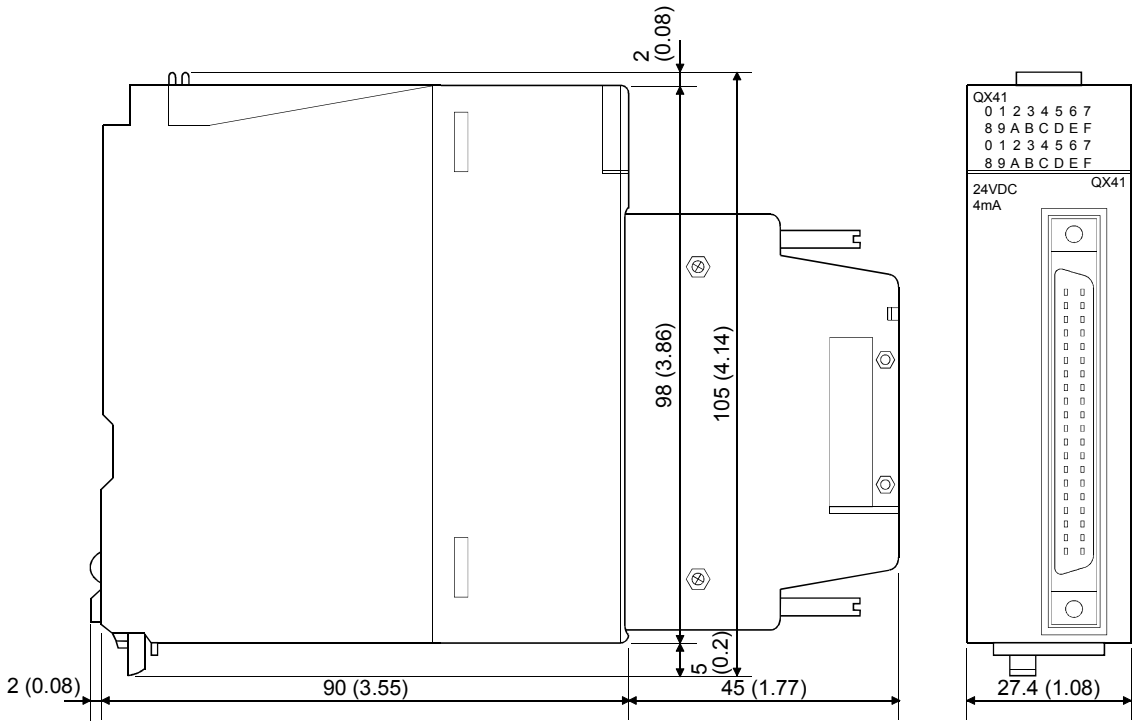


Unit: mm (inch)

APP.

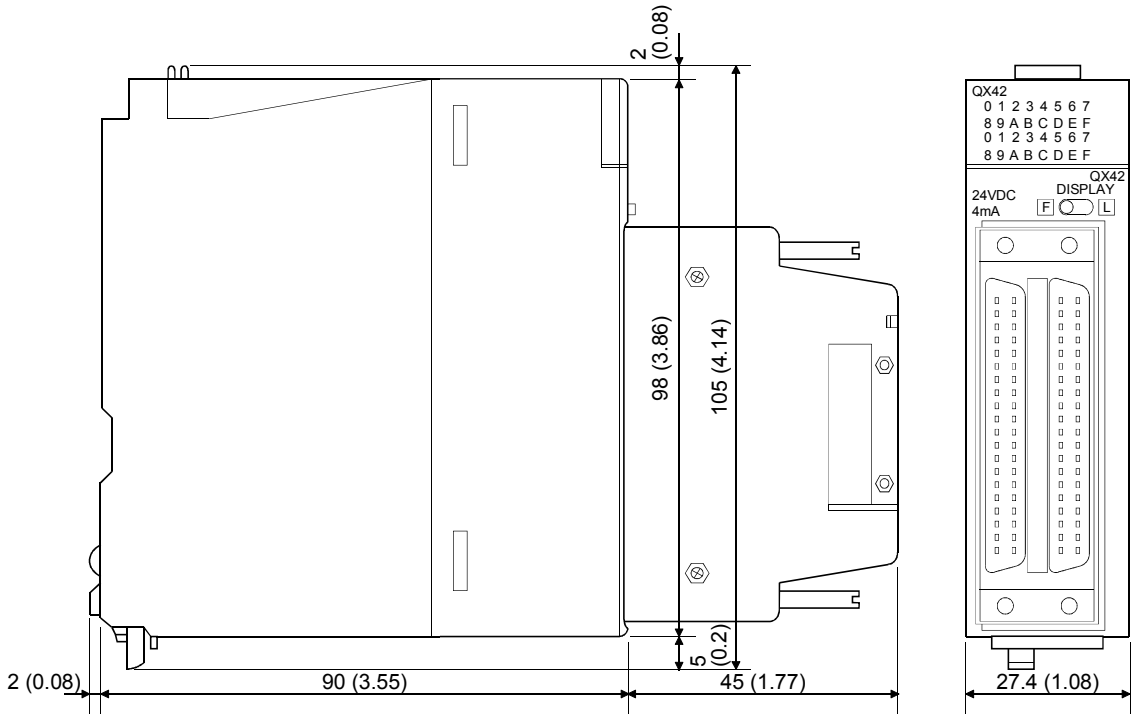
(2) 40-pin connector type

(a) 32-point I/O module



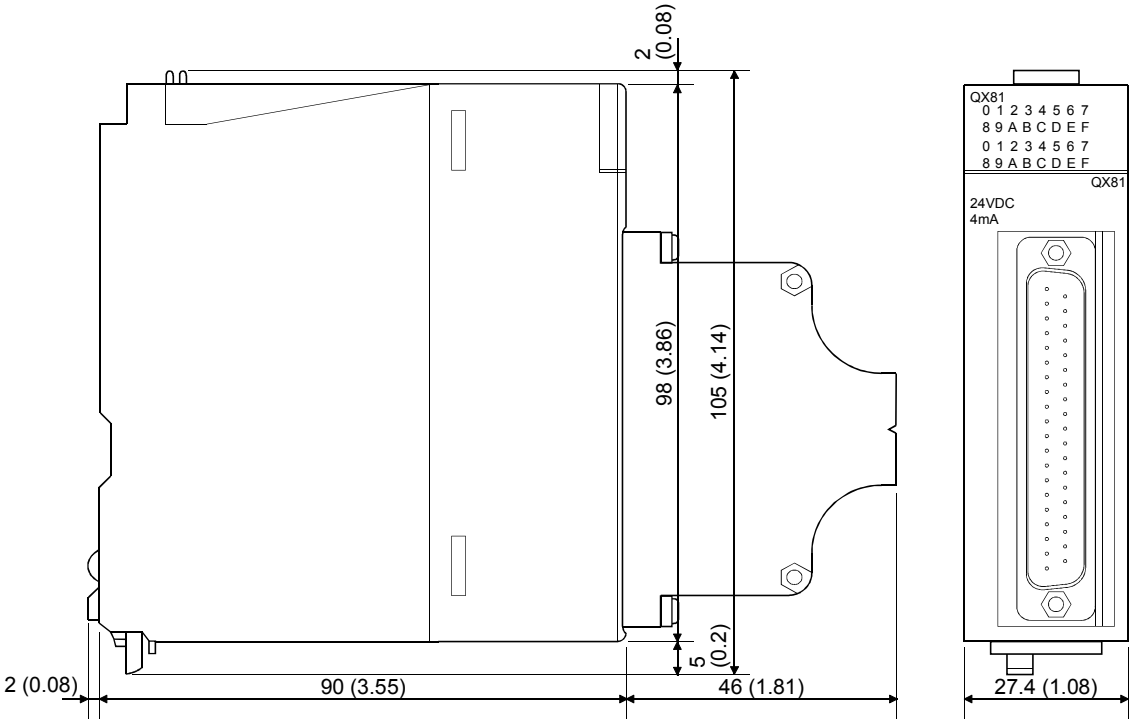
Unit: mm (inch)

(b) 64-point I/O module



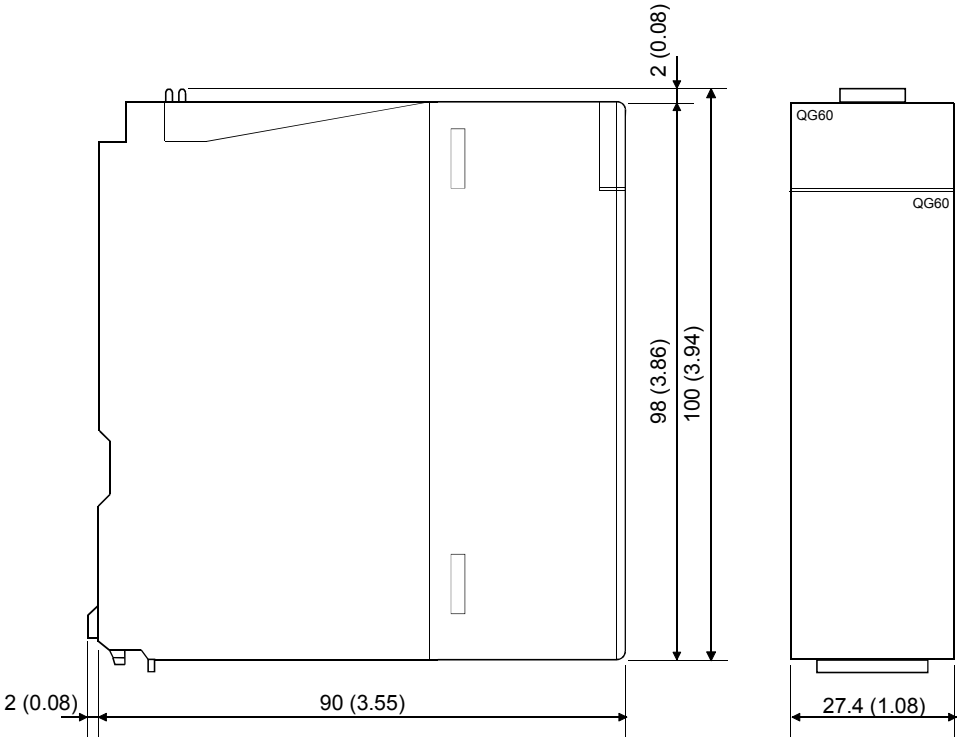
Unit: mm (inch)

(3) 37-pin D-sub connector type 32-point I/O module



Unit: mm (inch)

(4) Blank cover module

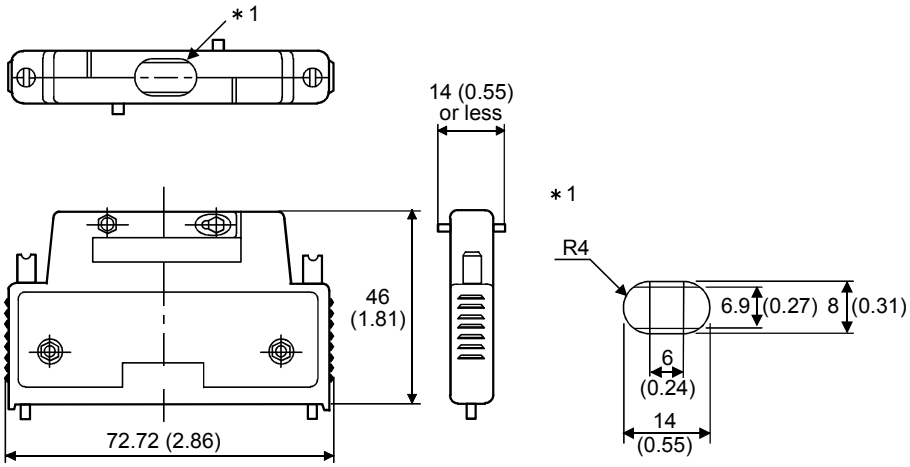


Unit: mm (inch)

Appendix 1.2 Connectors, connector/terminal block converter modules

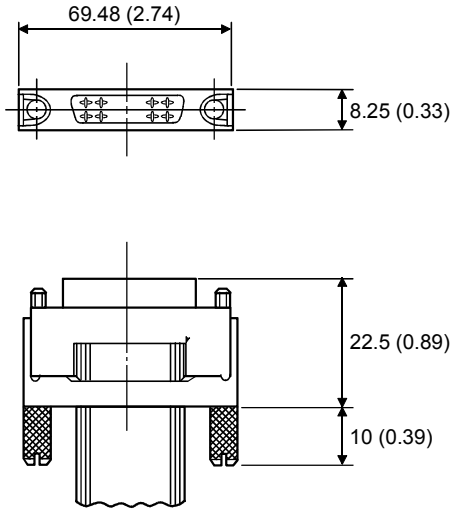
(1) 40-pin connectors

(a) A6CON1 soldering type, A6CON2 crimp-contact type 40-pin connector



Unit: mm (inch)

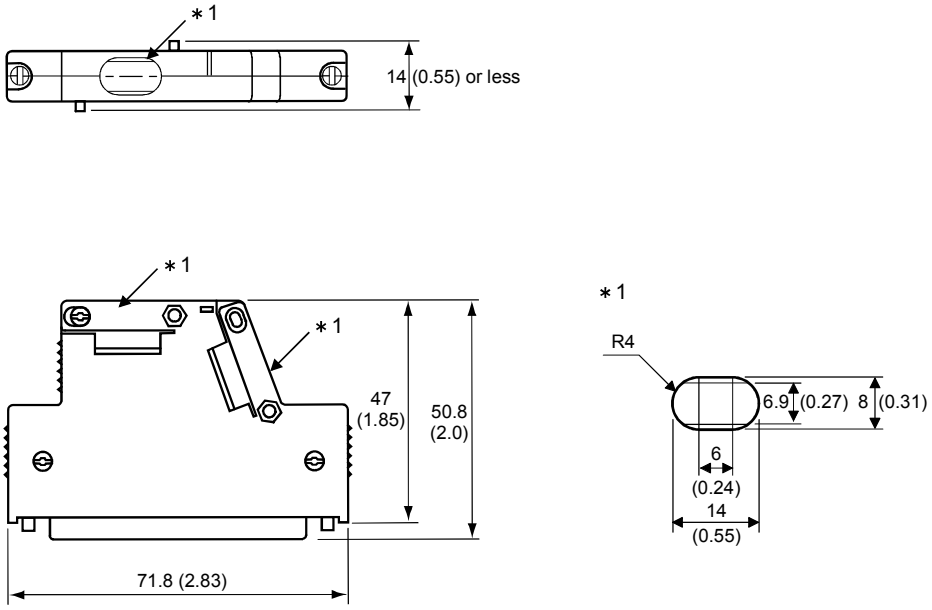
(b) A6CON3 pressure-displacement type 40-pin connector



* Flat cable arrangement is in the following sequence.
A1 → B1 → A2…

Unit: mm (inch)

(c) A6CON4 soldering type 40-pin connector (straight/diagonal out type)

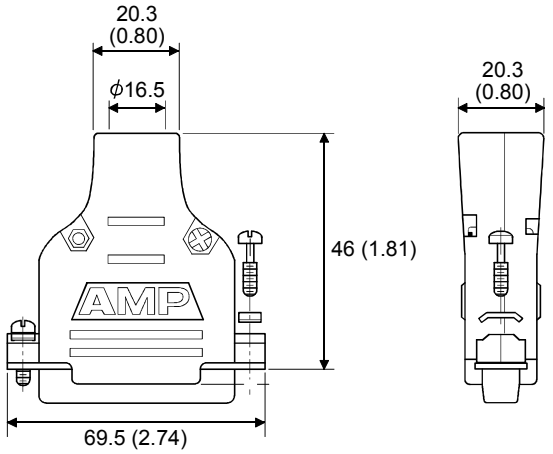


Unit: mm (inch)

If the cable diameter is thinner than the clamp portion, wind tape, etc. to secure the cable so that it will not come off the cable clamp portion.
If the cable is made of slippery material, it is recommended to take anti-slip measures by winding rubber-based tape, etc.

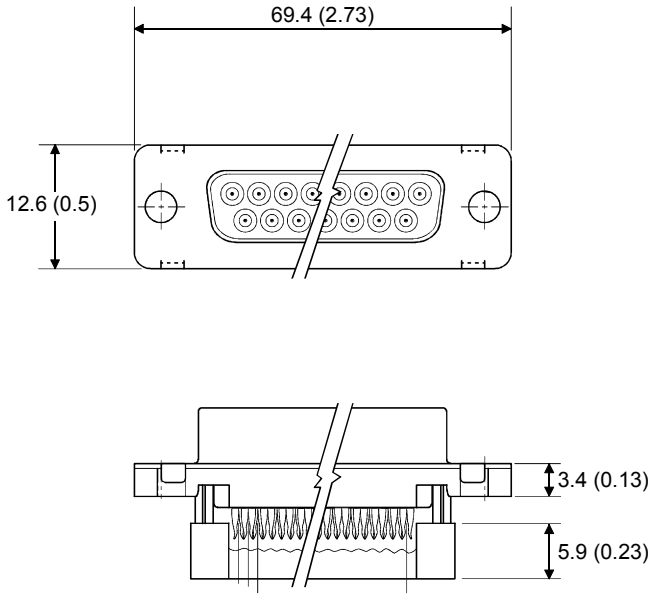
(2) 37-pin D-sub connectors

(a) A6CON1E soldering type 37-pin D sub-connector
(straight out type)
A6CON2E crimp-contact-type 37-pin D sub-connector
(straight out type)



Unit: mm (inch)

(b) A6CON3E pressure-displacement type 37-pin D-sub connector
(flat cable type)



Unit: mm (inch)

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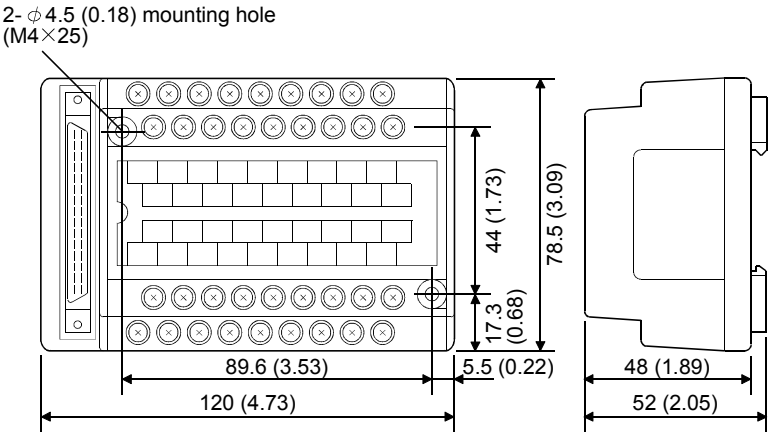
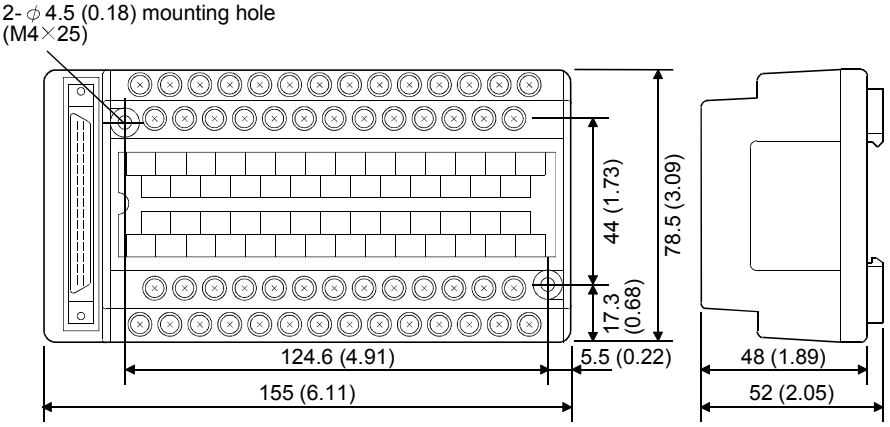
(3) A6TB □ 36 □ connector/terminal block converter module



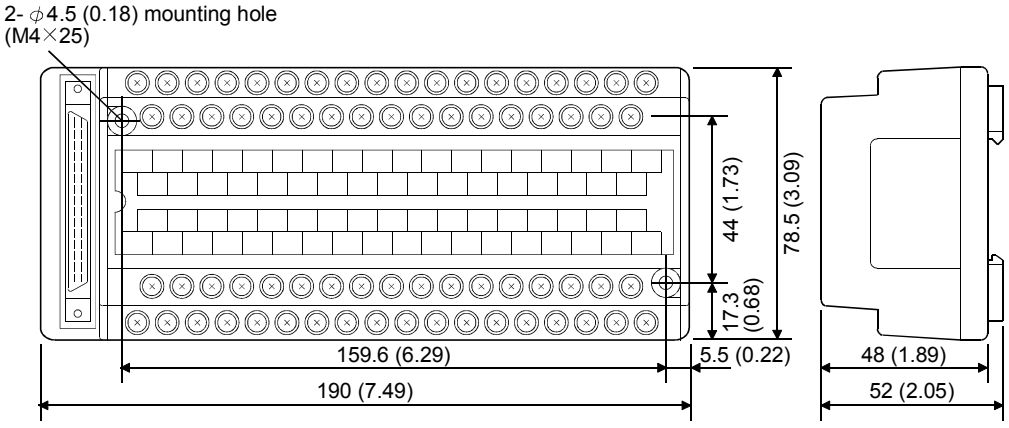
Unit: mm (inch)

(4) A6TB □ 54 □ connector/terminal block converter module



Unit: mm (inch)

(5) A6TBX70 □ connector/terminal block converter module



Unit: mm (inch)

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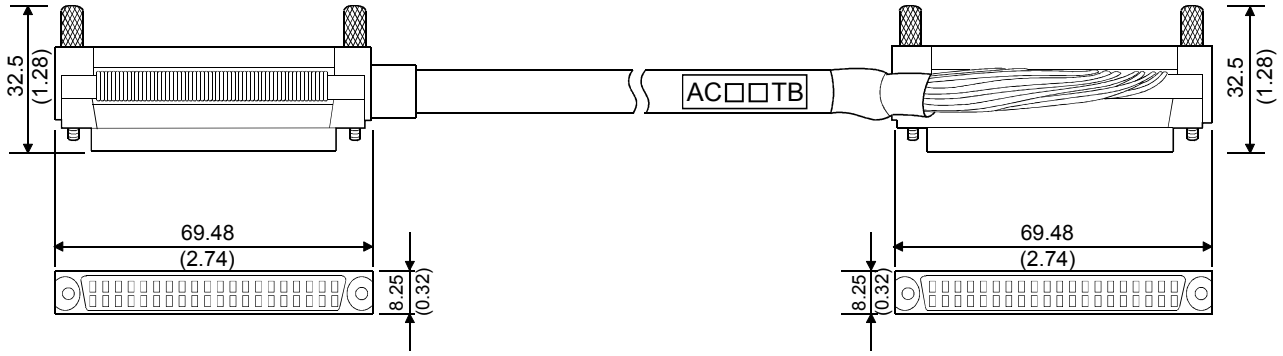
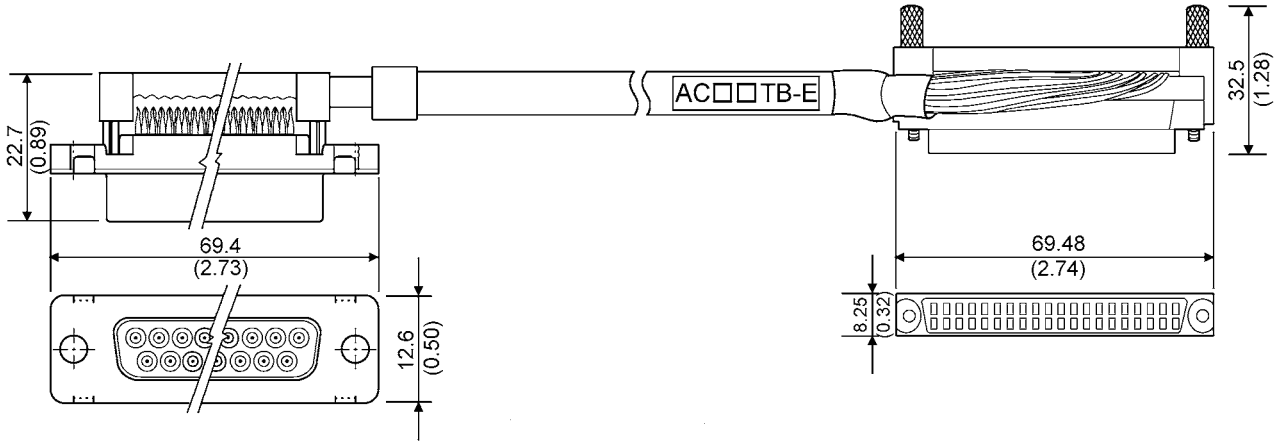
Appendix 1.3 Connector/ terminal block converter module cable.

(1) AC □ □ TB



Unit: mm (inch)

(2) AC □ □ TB-E



Unit: mm (inch)

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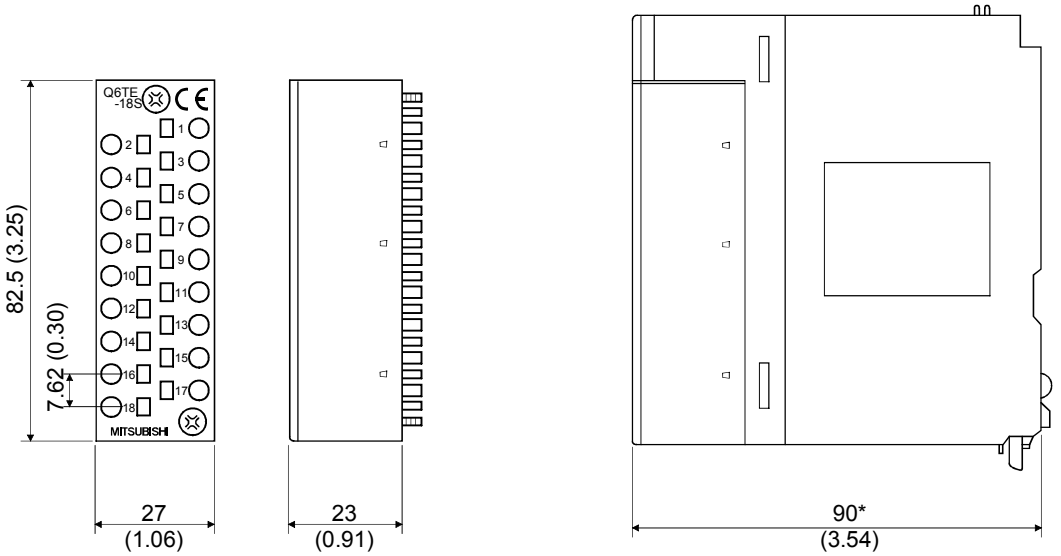
Appendix 1.4 Spring Clamp Terminal Block

(1) Q6TE-18S Installed on a module (Example: QX10)



Unit: mm(inch)

*: The depth of the module installed with a Q6TE-18S is equivalent with the factory default dimensions for that module.

Appendix 2 Compatibility with MELSEC-AnS Series I/O modules

Note that the MELSEC-Q series I/O modules and MELSEC-AnS series I/O modules are different in external terminal block configuration.
Differences in terminal block configuration are indicated below.

(1) Input modules

Terminal Block Number	QX10, QX40	QX80	A1SX10, A1SX40, A1SX80
TB9	X08	X08	COM
TB10	X09	X09	X08
TB11	X0A	X0A	X09
• • •	• • •	• • •	• • •
TB16	X0F	X0F	X0E
TB17	COM	NC	X0F
TB18	NC	COM	COM
TB19	—	—	Vacant
TB20	—	—	Vacant

(2) Output modules

Terminal Block Number	QY10	QY40P	A1SY10	A1SY40
TB9	Y08	Y08	COM1	12/24VDC
TB10	Y09	Y09	Y08	COM1
TB11	Y0A	Y0A	Y09	Y08
• • •	• • •	• • •	• • •	• • •
TB16	Y0F	Y0F	Y0E	Y0D
TB17	COM	12/24VDC	Y0F	Y0E
TB18	NC	COM	COM2	Y0F
TB19	—	—	24VDC	12/24VDC
TB20	—	—	0V	COM2

Terminal Block Number	QY50	A1SY50
TB9	Y08	12/24VDC
TB10	Y09	COM1
TB11	Y0A	Y08
•	•	•
•	•	•
•	•	•
TB16	Y0F	Y0D
TB17	12/24VDC	Y0E
TB18	COM	Y0F
TB19	—	12/24VDC
TB20	—	COM2

Terminal Block Number	QY80	A1SY80
TB9	Y08	COM1
TB10	Y09	0V
TB11	Y0A	Y08
•	•	•
•	•	•
•	•	•
TB16	Y0F	Y0D
TB17	COM	Y0E
TB18	0V	Y0F
TB19	—	COM2
TB20	—	0V

POINT

The 40-pin connector used with the MELSEC-AnS series I/O module can be used intact with the MELSEC-Q series I/O module.
The 37-pin D-sub connector used with the MELSEC-AnS series I/O module is the same in wiring as, but opposite in cable pulling direction to, the MELSEC-Q series I/O module. (The conventional cable for A6TB cannot be used.)

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MEMO

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WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.
However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.
Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.
(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.
1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.
(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not , compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

6. Product application

(1) In using the Mitsubishi MELSEC programmable controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.
(2) The Mitsubishi programmable controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or Public service purposes shall be excluded from the programmable controller applications.
In addition, applications in which human life or property that could be greatly affected, such as in aircraft, medical applications, incineration and fuel devices, manned transportation, equipment for recreation and amusement, and safety devices, shall also be excluded from the programmable controller range of applications.
However, in certain cases, some applications may be possible, providing the user consults their local Mitsubishi representative outlining the special requirements of the project, and providing that all parties concerned agree to the special circumstances, solely at the users discretion.

I/O Module Type Building Block

User's Manual

MODEL	Q-IO-U-E
MODEL CODE	13JL99
SH(NA)-080042-T(0810)MEE	

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN
NAGOYA WORKS : 1-14 , YADA-MINAMI 5-CHOME , HIGASHI-KU, NAGOYA , JAPAN