MITSUBISHI ELECTRIC

Q Series Large Type Base Unit/ I/O Module/Blank Cover

User's Manual

Q35BL
Q38BL
Q65BL
Q68BL
Q55BL
QX11L
QX21L
QY11AL
QY13L
QY23L
QY51PL
QG69L

Thank you for purchasing the Mitsubishi programmable controller MELSEC-Q series.

Prior to use, please read this and relevant manuals thorougly to fully understand the product.

MELSEC-Q
Mitsubishi Programmable Controller

MODEL	Q-LARGE-U-E
MODEL CODE	13JZ08
IB(NA)-0800408-I(1501)MEE	

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REVISIONS

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

Print date	*Manual number	Revision
Jan., 2008	IB(NA)-0800408-A	First edition
Mar., 2008	IB(NA)-0800408-B	Correction Section 1.1, 1.3, 5.4.3
Sep., 2009	IB(NA)-0800408-C	Revision due to the support for Universal model QCPU Addition model QX21L, QY11AL Correction GENERIC TERMS AND ABBREVIATIONS, Section 1.1, 1.2, 1.3, 2.1, 3.2.1, 3.2.2, 4.1, 8.2
May, 2010	IB(NA)-0800408-D	External connections are reviewed according to IEC 60617. Correction GENERIC TERMS AND ABBREVIATIONS, Section 1.1, 1.2, 1.4, 2.3, 3.2.1, 3.2.2, 5.5, 6.1, 7.1 Addition CONDITIONS OF USE FOR THE PRODUCT
Apr., 2011	IB(NA)-0800408-E	Addition model QY51PL Correction GENERIC TERMS AND ABBREVIATIONS, Section 1.1, 1.3, 2.1, 2.2, 3.2.1, 3.2.2, 4.1, 8.2
Oct., 2011	IB(NA)-0800408-F	Revision on the new functions of the Universal model QCPU whose serial number (first 5 digits) is "13102" or later Correction GENERIC TERMS AND ABBREVIATIONS, Section 2.1, 2.3
Oct., 2013	IB(NA)-0800408-G	Descriptions are added according to UL508. Correction Section 3.2.1
May, 2014	IB(NA)-0800408-H	Addition of descriptions of cUL.

Print date	*Manual number	Revision
Jan., 2015	IB(NA)-0800408-I	Correction GENERIC TERMS AND ABBREVIATIONS, Section 1.2, 2.4, 3.2.1, 4.1, 5.3, 7.2, 8.1, 8.2, 8.3

Japanese manual version IB-0800407-H

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GENERIC TERMS AND ABBREVIATIONS

Unless otherwise specified, this manual uses the following generic terms and abbreviations to explain the Q series large type base units, Q series large type I/O modules and Q series large type blank cover.

Generic term/abbreviation	Description
Q series large type base unit	Generic term for Q series large type main base unit and Q series large type extension base units
Q series large type main base unit	Generic term for Q35BL and Q38BL MELSEC-Q series main base units
Q series large type extension base unit	Generic term for Q65BL, Q68BL, and Q55BL MELSEC-Q series extension base units
Q series large type I/O module	Generic term for QX11L, QX21L, QY11AL, QY13L, QY23L, and QY51PL MELSEC-Q series I/O modules
Q series large type blank cover	Abbreviation for QG69L MELSEC-Q series blank cover
Q series	Abbreviation for Mitsubishi MELSEC-Q series programmable controller
A/QnA series	Abbreviation for Mitsubishi MELSEC-A/QnA series programmable controller
High Performance model QCPU	Generic term for Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, and Q25HCPU
Universal model QCPU	Generic term for Q00UCPU, Q01UCPU, Q02UCPU, Q03UDCPU, Q03UDVCPU, Q03UDECPU, Q04UDHCPU, Q04UDVCPU, Q04UDEHCPU, Q06UDHCPU, Q06UDVCPU, Q06UDEHCPU, Q10UDHCPU, Q10UDEHCPU, Q13UDHCPU, Q13UDVCPU, Q13UDEHCPU, Q20UDHCPU, Q20UDEHCPU, Q26UDHCPU, Q26UDVCPU, Q26UDEHCPU, Q50UDEHCPU, and Q100UDEHCPU
MELSECNET/H remote I/O module	General term for QJ72LP25-25, QJ72LP25G, QJ72LP25GE, and QJ72BR15
Q3□B	Generic term for Q33B, Q35B, Q38B, and Q312B main base units on which CPU module (except Q00JCPU and Q00UJCPU), Q series power supply module, Q series I/O module, and intelligent function module can be mounted
Q3□DB	Generic term for Q35DB, Q38DB, and Q312DB multiple CPU high speed main base units on which CPU module (except Q00JCPU and Q00UJCPU), Q series power supply module, Q series I/O module, and intelligent function module can be mounted
Q5□B	Generic term for Q52B and Q55B extension base units on which Q series I/O module and intelligent function module can be mounted
Q6□B	Generic term for Q63B, Q65B, Q68B, and Q612B extension base units on which Q series power supply module, Q series I/O module, and intelligent function module can be mounted
QA1S5□B	Another term for QA1S51B extension base unit on which AnS series I/O module and special function module can be mounted

Generic term/abbreviation	Description
QA1S6□B	Generic term for QA1S65B and QA1S68B extension base units on which AnS series power supply module, AnS series I/O module, and special function module can be mounted
QA6□B	Generic term for QA65B and QA68B extension base units on which A series power supply module, A series I/O module, and special function module can be mounted
A5□B	Generic term for A52B, A55B, and A58B extension base units on which A series I/O module and special function module can be mounted without power supply
A6□B	Generic term for A62B, A65B, and A68B extension base units requiring power supply on which A series I/O module and special function module can be mounted
QA6ADP	Abbreviation for QA6ADP QA conversion adapter module
QA6ADP+A5□B/A6□B	Abbreviation for A large type extension base unit on which QA6ADP is mounted
Power supply module	Generic term for Q61P-A1, Q61P-A2, Q61P, Q61P-D, Q62P, Q63P, Q64P, Q64PN power supply modules
SRAM card	Generic term for the Q2MEM-1MBS, Q2MEM-2MBS, Q3MEM-4MBS, and Q3MEM-8MBS SRAM cards
38-point terminal block	Abbreviation for MELSEC-A series 38-point terminal block

1. OVERVIEW

1.1 Overview

These products are used to utilize 38-point terminal block mounted on existing A series I/O module without change when replacing the A/QnA series by the Q series.
The following table shows the corresponding models for replacement.

A series I/O module model to be replaced	Q series large type I/O module replacement model
AX11	QX11L
AX21	QX21L
AY10A, AY11A	QY11AL
AY13	QY13L
AY23	QY23L
AY41, AY41P, AY51, AY51-S1	QY51PL

This User's Manual explains specifications, component devices, part names, settings, mounting, and installation of the Q series large type base unit, Q series large type I/O module, and Q series large type blank cover.
For contents not explained in this manual such as SAFETY PRECAUTIONS, EMC and Low Voltage Directives, and general specifications, refer to QCPU User's Manual (Hardware Design, Maintenance and Inspection) SH-080483ENG.

1.2 Features

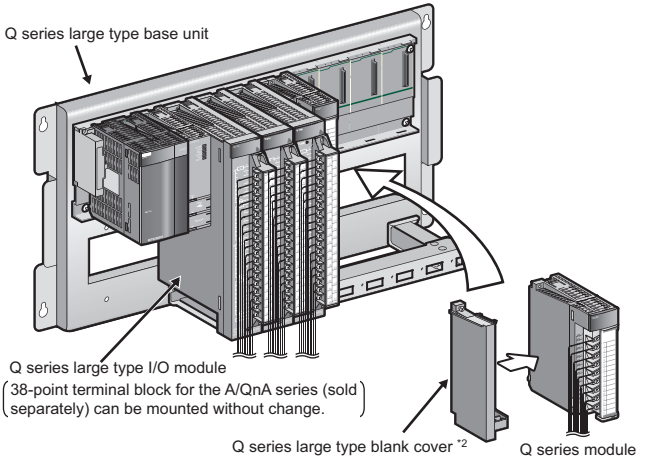
This section explains features of the Q series large type base unit, Q series large type I/O module, and Q series large type blank cover.

(1) The 38-point terminal block used for the A/QnA series can be mounted on the Q series large type I/O module.
This eliminates wiring change when replacing the A/QnA series.

(2) The Q series large type I/O module has performance specifications equivalent to the A/QnA series.

(3) Since the A/QnA series base unit has the same mounting dimensions with the Q series large type base unit, the mounting holes can be utilized.

(4) The Q series large type I/O module and Q series module can be mounted together on the Q series large type base unit.
The renewal tool*1 manufactured by MITSUBISHI ELECTRIC ENGINEERING COMPANY LIMITED (hereafter, abbreviated as renewal tool) can be mounted on the Q series module, and a connector and terminal block used with the A/QnA series can be used without wiring change.



*1 : For information on the renewal tool, contact the nearest Mitsubishi Electric sales office or salesperson.
*2 : To mount Q series module on the I/O slot of Q series large type base unit, always attach Q series large type blank cover.

1.3 Supplied Parts

The following tables show parts supplied with each module.

(1) Q series large type main base unit

Product	Model	Quantity	Remarks
Q series large type main base unit	Q35BL	1	-
	Q38BL		
Fixture	-	1	-
Fixture attachment screw	-	4	M4×10 screws
This manual	-	1	-
Safety Guidelines	IB-0800423	1	-

(2) Q series large type extension base unit

Product	Model	Quantity	Remarks
Q series large type extension base unit	Q65BL	1	-
	Q68BL		
	Q55BL		
Fixture	-	1	-
Fixture attachment screw	-	4	M4×10 screws
This manual	-	1	-

(3) Q series large type I/O module

Product	Model	Quantity	Remarks
Q series large type I/O module	QX11L	1	-
	QX21L		
	QY11AL		
	QY13L		
	QY23L		
	QY51PL		
Dustproof cover for fuse replacement window	-	1	Supplied with the QY23L only.

(4) Q series large type blank cover

Product	Model	Quantity	Remarks
Q series large type blank cover	QG69L	1	-

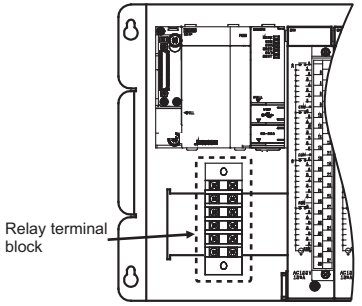
1.4 Related Parts (Sold Separately)

Purchase the following related parts when necessary.

(1) 38-point terminal block for I/O module
The Q series large type I/O module does not include 38-point terminal block.
To use this product in new system, purchase the following product.

Model	Manufacturer
K14K 08H 075 000 03	Mitsubishi Electric System & Service Co., Ltd.

(2) Relay terminal block for power supply wiring
When the terminal block on power supply module mounted on the Q series large type base unit cannot be wired using wiring to the power supply module used with the A/QnA series, purchase the following terminal block and relay the wiring to the power supply module.



Model	Manufacturer
ML-20 (The number of poles: 6 pieces)	SATO PARTS CO.,LTD

2. SYSTEM CONFIGURATION

2.1 System Configuration

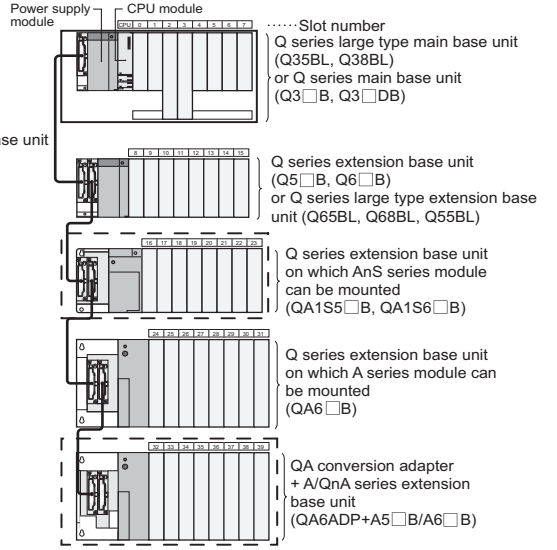
This section explains system configuration when using the Q series large type base unit.
The following modules can be mounted on the CPU slot of the Q series large type base unit.

- High Performance model QCPU
- Universal model QCPU (except Q00UJCPU)
- MELSECNET/H remote I/O module

(1) System configuration using the High Performance model QCPU and Universal model QCPU

■ Main base unit

■ Extension base unit



For a combination of the CPU modules and base units, refer to the "Precautions" section.

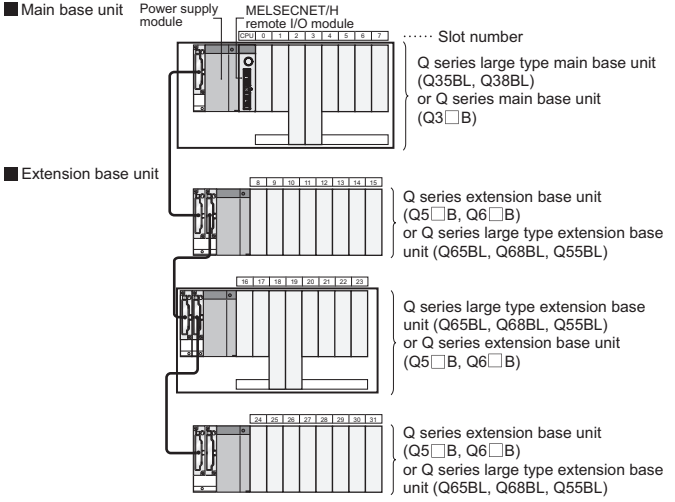
The following table shows restrictions on system configuration.

Maximum number of extension stages of extension base units	Q00UCPU, Q01UCPU, Q02UCPU: 4 extension stages Modules other than the above: 7 extension stages	
Maximum number of mountable I/O modules	Q00UCPU, Q01UCPU: 24 modules Q02UCPU: 36 modules Modules other than the above: 64 modules	
Applicable main base unit model	Q33B, Q35B, Q38B, Q312B, Q35DB, Q38DB, Q312DB, Q35BL, Q38BL	
Applicable extension base unit model	Model requiring no power supply module	Q52B, Q55B, QA6ADP+A5□B, Q55BL
	Model requiring Q series power supply module	Q63B, Q65B, Q68B, Q612B, Q65BL, Q68BL
	Model requiring no AnS series power supply module	QA1S51B
	Model requiring AnS series power supply module	QA1S65B, QA1S68B
	Model requiring A series power supply module	QA65B, QA68B, QA6ADP+A6□B
Extension cable model	QC05B, QC06B, QC12B, QC30B, QC50B, QC100B	
Q series power supply module model	Q61P-A1, Q61P-A2, Q61P, Q61P-D, Q62P, Q63P, Q64P, Q64PN	
AnS series power supply module model	A1S61PN, A1S62PN, A1S63P	
A series power supply module model	A61P, A61PN, A62P, A63P, A61PEU, A62PEU	

■ Precautions

- Use extension cable so that the overall extension length can be within 13.2m (43.31 ft.).
- Do not install the extension cable together with the main circuit (high voltage and high current) line or bring them close to each other.
  Keep a distance of 100mm (3.94 inch) or more between them.
- Set the number of extension stages so that the number is not duplicated with another.
- When using extension base units on which AnS/A series modules can be mounted together with the other units, follow the instructions described below.
  • Connect the units in order of Q5□B/Q6□B → QA1S5□B/QA1S6□B → QA6□B → QA6ADP+A5□B/A6□B from the nearest position of the main base unit.
  • The QA1S6□B and QA6ADP+A5□B/A6□B cannot be used together.
  • The QA1S51B, which does not have an extension cable connector (OUT), cannot be used with the QA6□B and QA6ADP+A5□B/A6□B.
- Assign module I/O number with putting each series in block so that the order can be "from Q series to A series" or "from A series to Q series". Failure to do so causes an error "SP.UNIT LAY ERR." (error code: 2120). In addition, do not duplicate the I/O number.
- Connect the extension cable from OUT of the extension cable connector on the base unit to IN of the extension base unit on the next stage.
- If the number of mounted modules exceeds the maximum number of mountable I/O modules, an error "SP.UNIT LAY ERR." (error code: 2124) occurs.
- To construct a multiple CPU system, use a main base unit, Q3□B or Q3□DB.
- To use the Universal model QCPU with the extension base units QA1S5□B, QA1S6□B, QA6□B, and QA6ADP+A5□B/A6□B, use the Universal model QCPU whose serial number (first five digits) is "13102" or later.

(2) System configuration using the MELSECNET/H remote I/O module



The following table shows restrictions on system configuration.

Maximum number of extension stages of extension base units	7 extension stages	
Maximum number of mountable I/O modules	64 modules	
Applicable main base unit model	Q33B, Q35B, Q38B, Q312B, Q35BL, Q38BL	
Applicable extension base unit model	Model requiring no power supply module	Q52B, Q55B, Q55BL
	Model requiring Q series power supply module	Q63B, Q65B, Q68B, Q612B, Q65BL, Q68BL
Extension cable model	QC05B, QC06B, QC12B, QC30B, QC50B, QC100B	
Q series power supply module model	Q61P-A1, Q61P-A2, Q61P, Q61P-D, Q62P, Q63P, Q64P, Q64PN	

■ Precautions

- Use extension cable so that the overall extension length can be within 13.2m (43.31 ft.).
- Do not install the extension cable together with the main circuit (high voltage and high current) line or bring them close to each other.
  Keep a distance of 100mm (3.94 inch) or more between them.
- Set the number of extension stages so that the number is not duplicated with another.
- Connect the extension cable from OUT of the extension cable connector on the base unit to IN of the extension base unit on the next stage.
- If the number of mounted modules exceeds the maximum number of mountable I/O modules, an error "SP.UNIT LAY ERR." (error code: 2124) occurs.

2.2 Precautions for System Configuration

This section explains precautions for using the products.

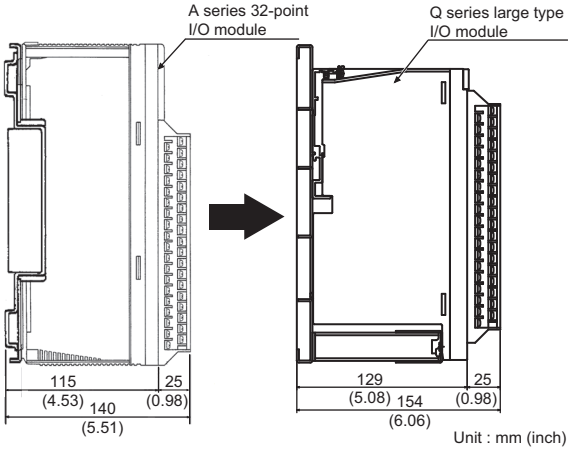
(1) A multiple CPU system cannot be constructed using the Q series large type main base unit.

(2) To construct a multiple CPU system with the Q series large type extension base unit, use a main base unit, Q3□B or Q3□DB.
For the configuration of a multiple CPU system, refer to QCPU User's Manual (Multiple CPU System).
When read the manual, regard the descriptions for the Q5□B/Q6□B as the ones for the Q5□BL/Q6□BL because the handing of the Q series large type extension base unit is the same as that of the Q5□B/Q6□B.

(3) To mount the Q series module on Q series large type base unit, always attach the Q series large type blank cover.
(unnecessary for a module mounted on CPU slot and power supply module.)

(4) To mount the Q series module between Q series large type I/O modules, wire the Q series module beforehand.

(5) The Q series large type I/O module is larger than A series 32-point I/O module in depth by 14mm (0.55 inch).Before replacing the A/QnA series, check if there is enough space for depth.



(6) Since the A series and Q series differ in rated output current of power supply module (24VDC), when the power supply module is used as external supply power for I/O module with the A series, another external power supply may be required in replacement from the A series.

2.3 Modules that cannot be Mounted on the Q Series Large Type Base Unit

This section explains modules that cannot be mounted on the Q series large type base unit.

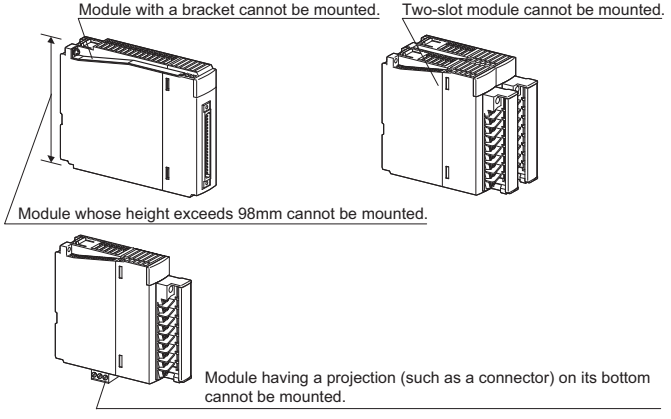
(1) Two-slot module

Example Such as Q64TCRTBW, Q64TCTTBW, Q64TCTTBW, Q64TCTTBWN, QD70D4, QD70D8, QJ71LP21S-25, and QJ71GP21S-SX

(2) Module on which the Q series large type blank cover cannot be attached

- Module whose height exceeds 98mm (3.86 inch)
- Module with a bracket on its top
- Module having a projection (such as a connector) on its bottom
- Module on which the Q7BAT-SET has been mounted

Example Such as Q66AD-DG, Q66DA-G, Q68AD-G, Q68RD3-G, Q68TD-G-H02, Q64AD2DA, QD75M1, QD75MH1, QD75M2, QD75MH2, QD75M4, QD75MH4, and the QJ71WS96 on which the Q7BAT-SET has been mounted



3. SPECIFICATIONS

3.1 Specifications of the Q Series Large Type Base Unit

The following tables show performance specifications of the Q series large type base unit.

(1) Q series large type main base unit

Item		Model	
		Q35BL	Q38BL
Number of mountable I/O modules		5	8
Extendability		Extendable	
Applicable module		Q series module, Q series large type I/O module	
5 VDC internal current consumption		0.11A	0.12A
External dimensions	H	240mm (9.45 inch)	
	W	382mm (15.04 inch)	480mm (18.90 inch)
	D	110mm (4.33 inch)	
Weight		1.87kg	2.35kg
DIN rail installation		Not installable	

(2) Q series large type extension base unit (with power supply)

Item		Model	
		Q65BL	Q68BL
Number of mountable I/O modules		5	8
Extendability		Extendable	
Applicable module		Q series module, Q series large type I/O module	
5 VDC internal current consumption		0.11A	0.12A
External dimensions	H	240mm (9.45 inch)	
	W	352mm (13.86 inch)	466mm (18.35 inch)
	D	110mm (4.33 inch)	
Weight		1.81kg	2.32kg
DIN rail installation		Not installable	

(3) Q series large type extension base unit (without power supply)

Item		Model
		Q55BL
Number of mountable I/O modules		5
Extendability		Extendable
Applicable module		Q series module, Q series large type I/O module
5 VDC internal current consumption		0.10A
External dimensions	H	240mm (9.45 inch)
	W	297mm (11.69 inch)
	D	110mm (4.33 inch)
Weight		1.59kg
DIN rail installation		Not installable

3.2 Specifications of the Q Series Large Type I/O Module

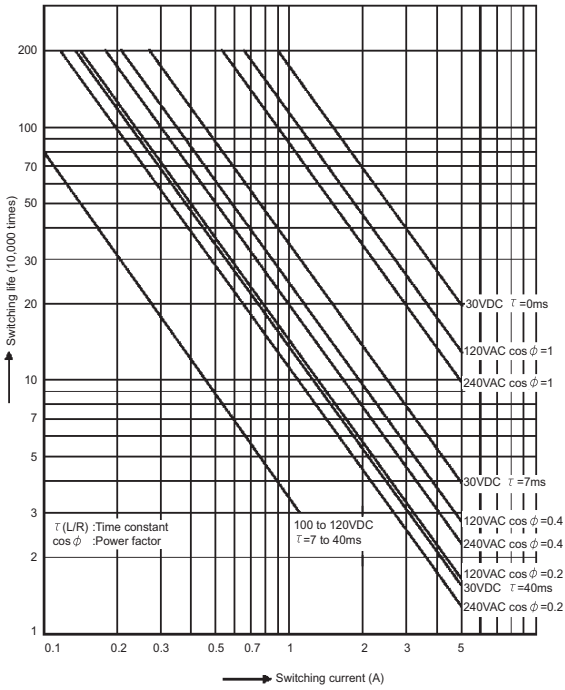
This section explains performance specifications and precautions for selecting the Q series large type I/O module.

3.2.1 Precautions for selection

(1) Maximum switching frequency when the module drives Inductive load.
The maximum switching frequency when output module drives L load must be on for 1 second or longer and off for 1 second or longer.

(2) Precautions for using the contact output module
When using the contact output module, consider the following.
- Relay life (contact switching life)
- Effects to relay life due to connected load
- Measures against back EMF

(a) Relay life (contact switching life)
Applicable module model: QY11AL, QY13L
The relay life depends on the operating environment. Before using the module, consider the operating environment.
The relay lifes shown in the next page are actual service values, not guaranteed values. Therefore, replace the module well in advance as the actual switching life may be shorter than the switching life.



Operating environment	Switching life
Rated switching voltage/current, rated load	100 thousand times
200VAC 1.5A, 240VAC 1A (COSϕ = 0.7)	100 thousand times
200VAC 0.4A, 240VAC 0.3A (COSϕ = 0.7)	300 thousand times
200VAC 1A, 240VAC 0.5A (COSϕ = 0.35)	100 thousand times
200VAC 0.3A, 240VAC 0.15A (COSϕ = 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

Point

When using a module in an application for high switching frequency, the relay life will be short. Therefore, consider using a triac output module.

(b) Effects to relay life due to connected load

The actual relay life may be much shorter than the relay life shown above due to the characteristics of inrush current through the load. ((2)(a) in this section) Also, the inrush current may cause contact welding.

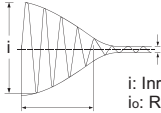
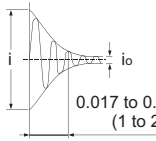
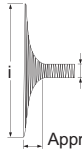
Take the following measures to prevent shortening of the relay life and the contact welding.

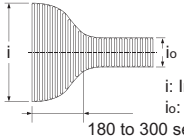
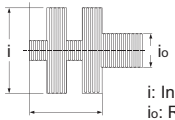
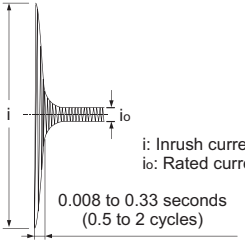
- Select a load so that the inrush current may be within the rated current value of the module in consideration of increase of the inrush current.
- Connect an external relay that can withstand the inrush current.

The relation between the representative load and the inrush current is shown to the next page.

Select a load so that the inrush current (i) and the rated current (io) will be within the rated switching current in specifications of the module.

The time that the inrush current flows may be long depending on the load.

Load type	Signal waveform diagram	Inrush current (i)/ rated current (io)
Inductive load	Load of a solenoid  i: Inrush current io: Rated current 0.07 to 0.1 seconds	Approx. 10 to 20 times
	Load of an electromagnetic contactor  i: Inrush current io: Rated current 0.017 to 0.033 seconds (1 to 2 cycles)	Approx. 3 to 10 times
Lamp load	Load of an incandescent bulb  i: Inrush current io: Rated current Approx. 0.33 seconds	Approx. 3 to 10 times

Load type	Signal waveform diagram	Inrush current (i)/ rated current (io)
Lamp load	Load of a mercury lamp  	Approx. 3 times*1
	Load of a fluorescent  	Approx. 5 to 10 times
Capacitive load	Capacitive load*2  	Approx. 20 to 40 times

*1: Typical electric-discharge lamp circuit includes discharge tubes, transformers, choke coils, and capacitors. Therefore, note that the inrush current may flow 20 to 40 times as large as the rated current in the case of high power factor and low power impedance.

*2: When the wiring of the circuit is long, take care of the wire capacity.

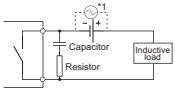
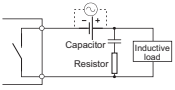
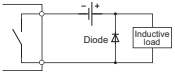
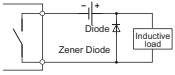
(c) Measures against back EMF

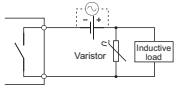
Configure a contact protection circuit for extending the contact life, preventing noise when the contact is cut off, and suppressing the generation of carbide and nitric acid due to arc discharge.

An Incorrect contact protection circuit may cause contact welding.

Also, when using the contact protection circuit, the recovery time may be long.

The representative examples of the contact protection circuit are shown below.

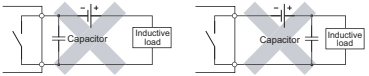
Circuit example		Method for selecting elements	Remarks
Capacitor + Resistor method (CR method)	 	Refer to the following for constants of the capacitor and resistor. Note that the following values may differ depending on a nature of the load and a variation of characteristics. • Capacitor : 0.5 to 1 (μF) 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.
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.

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.

*1: When using AC power, impedance of CR must be larger enough than it of the load. (prevention of a malfunction due to leak current from the CR)

Point

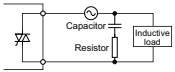
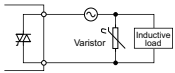
(1) Avoid providing a contact protection circuits shown below.
These circuit are effective for preventing an arc at shut-off. However, the contact welding may occur because the charge current flows to capacitor when the contact turns on or off.
A DC inductive load is usually harder for switching than a resistor load, but if a proper protection circuit is configured, the performance will be similar to the resistor load.



(2) A protection circuit must be provided closely to a load or contact (module). If their distance is far, the protection circuit may not be effective. Appropriate distance is within 50 cm.

(3) Notes on using the triac output module

(a) Measures against back electromotive power
If the wiring to the load is long, take measures against back electromotive power on the load side as well.
Otherwise, the effect of the surge suppressor in the output module may be imperfect.

Circuit example		Element selection method	Remarks
Capacitor + resistor method (CR method)		The standard capacitor and resistor constants are shown below. Note that they may differ depending on the load nature and characteristics variation. • Capacitor 0.5 to 1 (μF) with respect to load current 1A • Resistor 0.5 to 1 (Ω) with respect to supply voltage 1V Use a capacitor with withstand voltage greater than the rated voltage. Use a capacitor without polarity.	When the load is a relay solenoid, the return time is delayed.
Varistor method		Select the cut voltage of the varistor so it meets the following conditions. • Vc > supply voltage × 1.5 (V) × √2 Note that if an element with too high Vc is selected, the effect is weakened.	The return time is delayed slightly.

(4) Operating altitude
Do not use I/O modules under environment where atmospheric pressure equal to or higher than 0m (0 ft.) altitude is pressurized. Doing so may cause a malfunction.
When using them under such environment, please consult your sales representative.

(5) Output module with fuse
For wiring and short-circuit current of output module with fuse, satisfy the following values.
If not satisfied, the fuse cannot protect the module. Then, connect protection fuse outside.

Item	When a load is 100/200VAC
Wiring length	3m (9.84 ft.) or more
Wire size	$2mm^2$ or less
Transformer capacity	2KVA or less

However, a fuse connected to output module cannot protect against overload.
As measures against overload, connect a fuse per point outside.

(6) Precautions for connecting to the uninterruptible power supply (UPS)
Use line-interactive UPS whose power distortion is 5% or less.
Do not use an UPS of online commercial feeding system.

(7) Precautions for using the QX11L, QX21L

(a) When setting PLC parameter with GX Developer (SW □D5C-GPPW-E), make sure of the following points.
- Always set the I/O assignment type "Input".
- Do not change the response time (default: 10ms)

(b) When the QX21L and the power supply module (wide voltage range from 100 to 240VAC) use the same external power supply, use the input voltage within the range of 200 to 240VAC.
If a voltage goes below 200VAC(-15%), the input may turn off while the CPU module continues its operation.

(8) Protection functions

The following table describes the overload protection function and the overheat protection function of the QY51PL.

Function	Description
Overload protection function*1	• If the output module detects overcurrent, it limits output current by the current limiter operation.*2 • For the overcurrent detection value and the limited current, refer to "Overload protection function" on specifications of module. • When the load current become lower than the overcurrent detection value, the module returns to normal operation.
Overheat protection function*1	• If overcurrent keeps flowing due to overload, heat is generated inside the module. When high heat is detected inside the module, the output is turned off. • For the number of output points where the overheat protection function can be simultaneously activated, refer to "Overheat protection function" in the specifications table of each module. • After heat goes down, the module returns to normal operation.

*1: This function is for protecting the internal circuit of the module, not for protecting external devices.
Also, leaving the failure too long may rise the internal temperature of the module, resulting in deterioration of output elements and/or discoloration of a case and printed circuit board. When the failure occurs, turn off the corresponding outputs immediately to remove the causes.

*2: This operation limits overcurrent to a constant value and keeps outputting it.

(9) Operating ambient temperature

Use the product within the range of 0 to 55℃.

(9) Température ambiante de fonctionnement

Utiliser ce produit sur une gamme de température entre 0 et 55 ℃.

(10) Wiring a terminal block

The table below shows applicable solderless terminals connected to the terminal block. When wiring, use applicable wires and an appropriate tightening torque.
Use UL listed solderless terminals and, for processing, use a tool recommended by their manufacturer.

Solderless terminal		Wire			
Model	Tightening torque	Diameter	Type	Material	Temperature rating
Refer to Section 3.2.2.			Stranded	Copper	75℃ or more

(10) Câblage d'une plaque à bornes

Le tableau ci-dessous indique quelles bornes sans soudure on doit utiliser pour les raccordements sur la plaque à bornes. Pour le câblage, utiliser les fils et couples de serrage prescrits.
Utiliser les bornes sans soudure répertoriées par UL et, pour le montage, utiliser l'outil recommandé par le fabricant de ces bornes.

Borne sans soudure		*Fil*			
Modèle	*Couple de serrage*	*Diamètre*	*Type*	*Matériau*	*Gamme de température*
Se reporter à la section 3.2.2.			*Torsadé*	*Cuivre*	*75 ℃ ou plus*

3.2.2 Specifications of the Q series large type I/O module

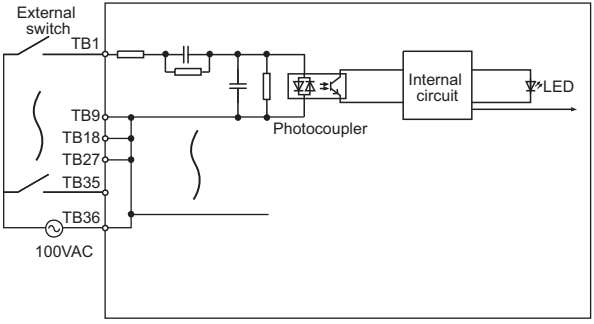
The following table shows performance specifications of the Q series large type I/O module.

(1) QX11L AC input module

Item		Model
		QX11L
Number of input points		32 points
Insulation method		Photocoupler
Rated input voltage, frequency		100 to 120VAC (+10/-15%), 50/60Hz (±3Hz)
Input voltage distortion		Within 5%
Rated input current		10mA (100VAC, 60Hz)
Maximum number of simultaneous input points		60% (20 points) simultaneously on
Inrush current		Maximum 300mA, Within 0.3ms (at 132VAC)
On voltage/On current		80VAC or more/6mA or more
Off voltage/Off current		30VAC or less/2mA or less
Input impedance		Approx.10kΩ (60Hz), Approx.12kΩ (50Hz)
Response time	Off to On	15ms or less
	On to Off	25ms or less
Dielectric withstand voltage		1780VAC rms/3 cycles (altitude 2000m (6557.38 ft.))
Common terminal arrangement		32 points/common (common terminal: TB9, TB18, TB27, TB36)
Operation indication		On indication (LED)
External wiring system *Système de câblage externe*		38-point terminal block connector (M3×6 screws) *Connecteur de bornier 38-points (M3×6 vis)*
Applicable wire size *Taille du fil à utiliser*		0.75 to 2mm^2 (Applicable tightening torque 0.68N•m) *0,75 à 2 mm^2* *(Couple de serrage à appliquer 0,68N•m)*
Applicable solderless terminal *Borne sans soudure à utiliser*		R1.25-3, R2-3, RAV1.25-3, RAV2-3 *R1,25-3, R2-3, RAV1,25-3, RAV2-3*
5VDC internal current consumption		75mA (TYP. all points On) (0.08A is shown on the rating plate of the module.)
External dimensions		220 (8.66) (H) ×37.5 (1.48) (W) ×116.5 (4.59) (D) mm (inch)
Weight		0.33kg

Pin number	Signal name	Pin number	Signal name	Pin number	Signal name	Pin number	Signal name
TB1	X00	TB11	X09	TB21	X12	TB31	X1B
TB2	X01	TB12	X0A	TB22	X13	TB32	X1C
TB3	X02	TB13	X0B	TB23	X14	TB33	X1D
TB4	X03	TB14	X0C	TB24	X15	TB34	X1E
TB5	X04	TB15	X0D	TB25	X16	TB35	X1F
TB6	X05	TB16	X0E	TB26	X17	TB36	COM
TB7	X06	TB17	X0F	TB27	COM	TB37	Empty
TB8	X07	TB18	COM	TB28	X18	TB38	Empty
TB9	COM	TB19	X10	TB29	X19	-	-
TB10	X08	TB20	X11	TB30	X1A	-	-

External connection



English	*French*	English	*French*
100VAC	*100V ca*	Empty	*Inutilisé*
External connection	*Connexion externe*	External switch	*Commutateur externe*
Internal circuit	*Circuit interne*	Photocoupler	*Photocoupleur*
Pin number	*Broche N°*	Signal name	*Nom de signal*

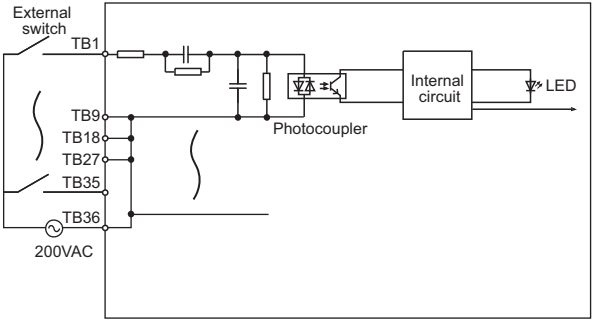
(2) QX21L AC input module

Item		Model
		QX21L
Number of input points		32 points
Insulation method		Photocoupler
Rated input voltage, frequency		200 to 240VAC (+10/-15%), 50/60Hz (±3Hz)
Input voltage distortion		Within 5%
Rated input current		10mA (220VAC, 60Hz)
Maximum number of simultaneous input points		60%(20 points) simultaneously on (at 264VAC,55℃) 100%(32 points) simultaneously on (at 264VAC,45℃)
Inrush current		Maximum 600mA, Within 0.12ms (at 264VAC)
On voltage*1/On current		160VAC or more/5.5mA or more
Off voltage*1/Off current		70VAC or less/3.5mA or less
Input impedance		Approx.22kΩ(60Hz), Approx.27kΩ(50Hz)
Response time	Off to On	15ms or less
	On to Off	25ms or less
Dielectric withstand voltage		1500VAC for 1 minute
Common terminal arrangement		32 points/common (common terminal: TB9, TB18, TB27, TB36)
Operation indication		On indication (LED)
External wiring system *Système de câblage externe*		38-point terminal block connector (M3×6 screws) *Connecteur de bornier 38-points (M3×6 vis)*
Applicable wire size *Taille du fil à utiliser*		0.75 to 2mm^2 (Applicable tightening torque 0.68N•m) *0,75 à 2 mm^2 (Couple de serrage à appliquer 0,68N•m)*
Applicable solderless terminal *Borne sans soudure à utiliser*		R1.25-3, R2-3, RAV1.25-3, RAV2-3 *R1,25-3, R2-3, RAV1,25-3, RAV2-3*
5VDC internal current consumption		75mA (TYP. all points On) (0.08A is shown on the rating plate of the module.)
External dimensions		220 (8.66) (H) ×37.5 (1.48) (W) ×116.5 (4.59) (D) mm (inch)
Weight		0.33kg

*1 : When the QX21L and the power supply module (wide voltage range from 100 to 240VAC) use the same external power supply, use the input voltage within the range of 200 to 240VAC.
If a voltage goes below 200VAC(-15%), the input may turn off while the CPU module continues its operation.

Pin number	Signal name	Pin number	Signal name	Pin number	Signal name	Pin number	Signal name
TB1	X00	TB11	X09	TB21	X12	TB31	X1B
TB2	X01	TB12	X0A	TB22	X13	TB32	X1C
TB3	X02	TB13	X0B	TB23	X14	TB33	X1D
TB4	X03	TB14	X0C	TB24	X15	TB34	X1E
TB5	X04	TB15	X0D	TB25	X16	TB35	X1F
TB6	X05	TB16	X0E	TB26	X17	TB36	COM
TB7	X06	TB17	X0F	TB27	COM	TB37	Empty
TB8	X07	TB18	COM	TB28	X18	TB38	Empty
TB9	COM	TB19	X10	TB29	X19	-	-
TB10	X08	TB20	X11	TB30	X1A	-	-

External connection



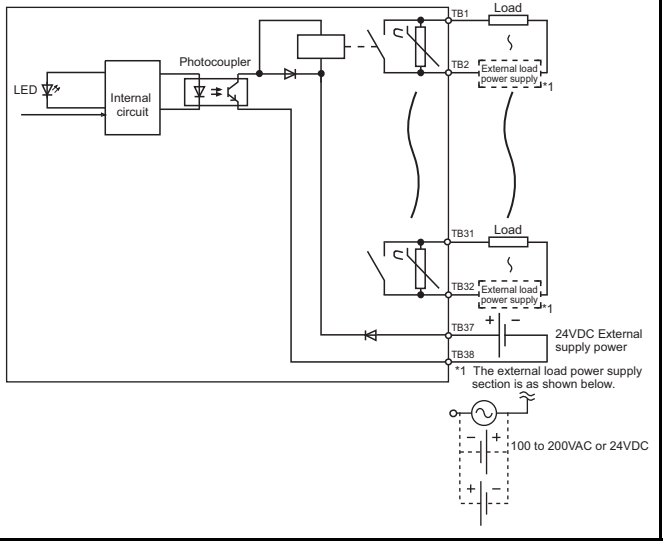
English	*French*	English	*French*
200VAC	*200V ca*	Empty	*Inutilisé*
External connection	*Connexion externe*	External switch	*Commutateur externe*
Internal circuit	*Circuit interne*	Photocoupler	*Photocoupleur*
Pin number	*Broche N°*	Signal name	*Nom de signal*

(3) QY11AL contact output module

Item		Model
		QY11AL
Number of output points		16 points
Insulation method		Photocoupler
Rated switching voltage/current		24VDC 2A(Resistance load) 240VAC 2A(COSϕ =1) /point, 16A/all points
Minimum switching load		5VDC 1mA
Maximum switching voltage		264VAC 125VDC
Leakage current at Off		0.1mA(at 200VAC 60Hz)
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 200,000 times or more
		200VAC 1.5A, 240VAC 1A (COSϕ = 0.7) 200,000 times or more
		200VAC 0.75A, 240VAC 0.5A (COSϕ = 0.35) 200,000 times or more
		24VDC 1A, 100VDC 0.1A (L/R = 7ms) 200,000 times or more
Maximum switching frequency		3600 times/hour
Surge suppressor		varistor(387 to 473V)
Dielectric withstand voltage		1500VAC for 1 minute
Relay socket		None
Common terminal arrangement		All points independent
Operation indication		On indication (LED)
External supply power	Voltage	24VDC ±10% Ripple voltage 4Vp-p or less
	Current	150mA (TYP. 24VDC all points On)
External wiring system *Système de câblage externe*		38-point terminal block connector (M3×6 screws) *Connecteur de bornier 38-points (M3×6 vis)*
Applicable wire size *Taille du fil à utiliser*		0.75 to 2mm^2 (Applicable tightening torque 0.68N•m) *0,75 à 2 mm^2 (Couple de serrage à appliquer 0,68N•m)*
Applicable solderless terminal *Borne sans soudure à utiliser*		R1.25-3, R2-3, RAV1.25-3, RAV2-3 *R1,25-3, R2-3, RAV1,25-3, RAV2-3*
5VDC internal current consumption		130mA (TYP. all points On)
External dimensions		220 (8.66) (H) ×37.5 (1.48) (W) ×116.5 (4.59) (D) mm (inch)
Weight		0.38kg

Pin number	Signal name	Pin number	Signal name	Pin number	Signal name	Pin number	Signal name
TB1	Y00	TB11	Y05	TB21	Y0A	TB31	Y0F
TB2		TB12		TB22		TB32	
TB3	Y01	TB13	Y06	TB23	Y0B	TB33	Empty
TB4		TB14		TB24		TB34	Empty
TB5	Y02	TB15	Y07	TB25	Y0C	TB35	Empty
TB6		TB16		TB26		TB36	Empty
TB7	Y03	TB17	Y08	TB27	Y0D	TB37	24VDC
TB8		TB18		TB28		TB38	0V
TB9	Y04	TB19	Y09	TB29	Y0E	-	-
TB10		TB20		TB30		-	-

External connection



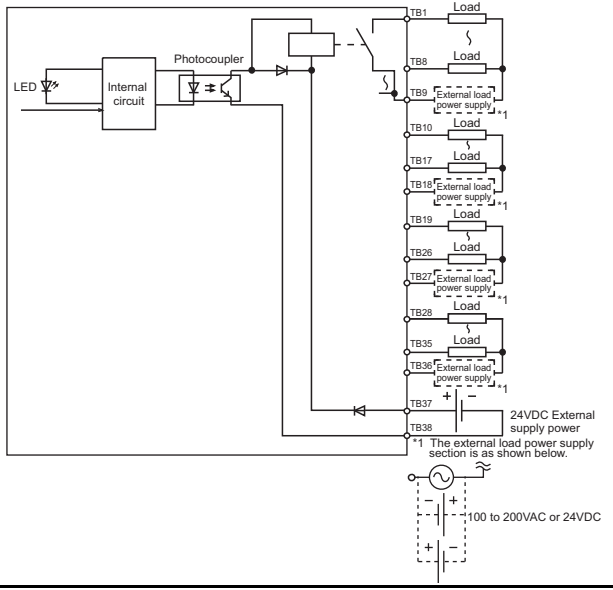
English	*French*	English	*French*
100 to 200 VAC or 24VDC	*100 à 200 V ca ou 24V cc*	24VDC	*24V cc*
24VDC External supply power	*Alimentation externe 24V cc*	Empty	*Inutilisé*
External connection	*Connexion externe*	Internal circuit	*Circuit interne*
External load power supply	*Alimentation charge externe*	Load	*Charge*
The external load power supply section is as shown below.	*La section alimentation de la charge externe est comme représenté ci-dessous.*	Photocoupler	*Photocoupleur*
Signal name	*Nom de signal*	Pin number	*Broche N°*

(4) QY13L contact output module

Item		Model
		QY13L
Number of output points		32 points
Insulation method		Photocoupler
Rated switching voltage/ current		24VDC 2A(Resistance load) 240VAC 2A(COS ϕ =1) /point, 5A/common
Minimum switching load		5VDC 1mA
Maximum switching voltage		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 200,000 times or more
		200VAC 1.5A, 240VAC 1A (COS ϕ = 0.7) 200,000 times or more
		200VAC 0.75A, 240VAC 0.5A (COS ϕ = 0.35) 200,000 times or more
		24VDC 1A, 100VDC 0.1A (L/R = 7ms) 200,000 times or more
Maximum switching frequency		3600 times/hour
Surge suppressor		None
Dielectric withstand voltage		1500VAC for 1 minute
Relay socket		None
Common terminal arrangement		8 points/common (common terminal: TB9, TB18, TB27, TB36)
Operation indication		On indication (LED)
External supply power	Voltage	24VDC ± 10% Ripple voltage 4Vp-p or less
	Current	290mA (TYP. 24VDC all points On)
External wiring system *Système de câblage externe*		38-point terminal block connector (M3×6 screws) *Connecteur de bornier 38-points (M3×6 vis)*
Applicable wire size *Taille du fil à utiliser*		0.75 to 2mm^2 (Applicable tightening torque 0.68N•m) *0,75 à 2 mm^2 (Couple de serrage à appliquer 0,68N•m)*
Applicable solderless terminal *Borne sans soudure à utiliser*		R1.25-3, R2-3, RAV1.25-3, RAV2-3 *R1,25-3, R2-3, RAV1,25-3, RAV2-3*
5VDC internal current consumption		230mA (TYP. all points On)
External dimensions		220 (8.66) (H) ×37.5 (1.48) (W) ×116.5 (4.59) (D) mm (inch)
Weight		0.45kg

Pin number	Signal name	Pin number	Signal name	Pin number	Signal name	Pin number	Signal name
TB1	Y00	TB11	Y09	TB21	Y12	TB31	Y1B
TB2	Y01	TB12	Y0A	TB22	Y13	TB32	Y1C
TB3	Y02	TB13	Y0B	TB23	Y14	TB33	Y1D
TB4	Y03	TB14	Y0C	TB24	Y15	TB34	Y1E
TB5	Y04	TB15	Y0D	TB25	Y16	TB35	Y1F
TB6	Y05	TB16	Y0E	TB26	Y17	TB36	COM 4
TB7	Y06	TB17	Y0F	TB27	COM 3	TB37	24VDC
TB8	Y07	TB18	COM 2	TB28	Y18	TB38	0V
TB9	COM 1	TB19	Y10	TB29	Y19	-	-
TB10	Y08	TB20	Y11	TB30	Y1A	-	-

External connection



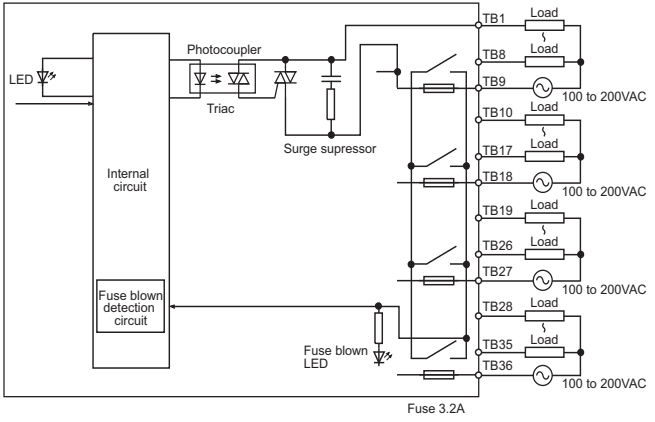
English	*French*	English	*French*
100 to 200 VAC or 24VDC	*100 à 200 V ca ou 24V cc*	24VDC	*24V cc*
24VDC External supply power	*Alimentation externe 24V cc*	Internal circuit	*Circuit interne*
External connection	*Connexion externe*	Load	*Charge*
External load power supply	*Alimentation charge externe*	Photocoupler	*Photocoupleur*
The external load power supply section is as shown below.	*La section alimentation de la charge externe est comme représenté ci-dessous.*	Pin number	*Broche N°*
Signal name	*Nom de signal*		

(5) QY23L Triac output module

Item		Model
		QY23L
Number of output points		32 points
Insulation method		Photocoupler
Rated load voltage		100 to 240VAC (+10/-15%)
Maximum load voltage		264VAC
Maximum load current		0.6A/point, 2.4A/common
Minimum load voltage/current		24VAC 100mA, 100VAC 10mA, 240VAC 10mA
Maximum inrush current		20A 10ms or less, 8A 100ms or less
Leakage current at Off		1.5mA (for 120VAC, 60Hz), 3mA (for 240VAC, 60Hz)
Maximum voltage drop at On		1.5VAC or less (100 to 600mA), 1.8VAC or less (50 to 100mA), 2VAC or less (10 to 50mA)
Response time	Off to On	1ms or less
	On to Off	1ms + 0.5 cycles or less
Surge suppressor		CR absorber (0.022μF + 47Ω)
Fuse rating		3.2A fast blow fuse (1 fuse/common) type HP-32
Fuse blown indication		Available (LED turns on by fuse blown, and a signal is output to CPU module.)
Dielectric withstand voltage		1500VAC for 1 minute
Common terminal arrangement		8 points/common (common terminal: TB9, TB18, TB27, TB36)
Operation indication		On indication (LED)
External wiring system *Système de câblage externe*		38-point terminal block connector (M3×6 screws) *Connecteur de bornier 38-points (M3×6 vis)*
Applicable wire size *Taille du fil à utiliser*		0.75 to 2mm^2 (Applicable tightening torque 0.68N•m) *0,75 à 2 mm^2 (Couple de serrage à appliquer 0,68N•m)*
Applicable solderless terminal *Borne sans soudure à utiliser*		R1.25-3, R2-3, RAV1.25-3, RAV2-3 *R1,25-3, R2-3, RAV1,25-3, RAV2-3*
5VDC internal current consumption		590mA (TYP. all points On)
External dimensions		220 (8.66)(H) ×37.5 (1.48) (W) ×116.5 (4.59) (D) mm (inch)
Weight		0.45kg

Pin number	Signal name	Pin number	Signal name	Pin number	Signal name	Pin number	Signal name
TB1	Y00	TB11	Y09	TB21	Y12	TB31	Y1B
TB2	Y01	TB12	Y0A	TB22	Y13	TB32	Y1C
TB3	Y02	TB13	Y0B	TB23	Y14	TB33	Y1D
TB4	Y03	TB14	Y0C	TB24	Y15	TB34	Y1E
TB5	Y04	TB15	Y0D	TB25	Y16	TB35	Y1F
TB6	Y05	TB16	Y0E	TB26	Y17	TB36	COM 4
TB7	Y06	TB17	Y0F	TB27	COM 3	TB37	Empty
TB8	Y07	TB18	COM 2	TB28	Y18	TB38	Empty
TB9	COM 1	TB19	Y10	TB29	Y19	-	-
TB10	Y08	TB20	Y11	TB30	Y1A	-	-

External connection



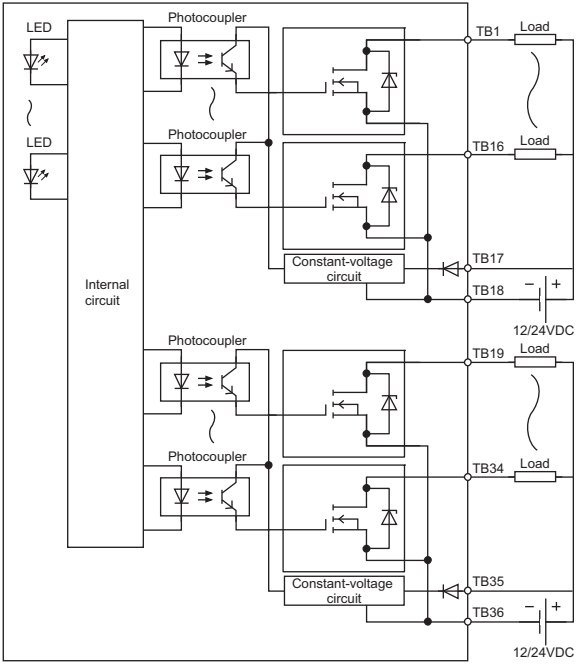
English	*French*	English	*French*
100 to 200 VAC	*de 100 à 200 V ca*	Empty	*Inutilisé*
External connection	*Connexion externe*	Internal circuit	*Circuit interne*
Fuse blown detection circuit	*Circuit de détection de fusible grillé*	Fuse 3.2A	*Fusible 3,2A*
Fuse blown LED	*LED fusible grillé*	Load	*Charge*
Surge supressor	*Limiteur de surtension*	Photocoupler	*Photocoupleur*
Pin number	*Broche N°*	Signal name	*Nom de signal*
Triac	*Triac*		

(6) QY51PL transistor output module (Sink type)

Item		Model
		QY51PL
Number of output points		32 points
Insulation method		Photocoupler
Rated load voltage		12 to 24VDC (+20/-15%)
Maximum load voltage		0.5A/point, 4A/common
Maximum inrush current		Current is limited by the overload protection function.
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	0.5ms or less
	On to Off	1ms or less (rated load, resistance load)
Surge suppressor		Zener diode
Fuse		None
External supply power	Voltage	12 to 24VDC (+20/-15%) (ripple ratio within 5%)
	Current	8mA/common (24VDC all points On)
Dielectric withstand voltage		560VAC rms/3 cycles (altitude 2000m)
Insulation resistance		10MΩ or more by insulation resistance tester
Common terminal arrangement		16 points/common
Number of occupied I/O points		32 points (I/O allocation: output 32 points)
Protection function	Overload protection function	Limited current when detecting overcurrent (overload protection) : 1.5 to 3.5A/point Activated in increments of 1 point. (☞ Section 3.2.1 (8))
	Overheat protection function	Activated in increments of 1 point. (☞ Section 3.2.1 (8))
Operation indication		On indication (LED)
External wiring system *Système de câblage externe*		38-point terminal block connector (M3×6 screws) *Connecteur de bornier 38-points (M3×6 vis)*
Applicable wire size *Taille du fil à utiliser*		0.75 to 2mm^2 (Applicable tightening torque 0.68N•m) *0,75 à 2 mm^2 (Couple de serrage à appliquer 0,68N•m)*
Applicable solderless terminal *Borne sans soudure à utiliser*		R1.25-3, R2-3, RAV1.25-3, RAV2-3 *R1,25-3, R2-3, RAV1,25-3, RAV2-3*
5VDC internal current consumption		100mA (TYP. all points On)
External dimensions		220 (8.66)(H) ×37.5 (1.48) (W) ×116.5 (4.59) (D) mm (inch)
Weight		0.28kg

Pin number	Signal name	Pin number	Signal name	Pin number	Signal name	Pin number	Signal name
TB1	Y00	TB11	Y0A	TB21	Y12	TB31	Y1C
TB2	Y01	TB12	Y0B	TB22	Y13	TB32	Y1D
TB3	Y02	TB13	Y0C	TB23	Y14	TB33	Y1E
TB4	Y03	TB14	Y0D	TB24	Y15	TB34	Y1F
TB5	Y04	TB15	Y0E	TB25	Y16	TB35	12/24VDC
TB6	Y05	TB16	Y0F	TB26	Y17	TB36	0V
TB7	Y06	TB17	12/24VDC	TB27	Y18	TB37	Empty
TB8	Y07	TB18	0V	TB28	Y19	TB38	Empty
TB9	Y08	TB19	Y10	TB29	Y1A	-	-
TB10	Y09	TB20	Y11	TB30	Y1B	-	-

External connection



English	*French*	English	*French*
12/24 VDC	*12/24 V cc*	Empty	*Inutilisé*
Constant-voltage circuit	*Circuit à tension constante*	External connection	*Connexion externe*
Internal circuit	*Circuit interne*	Load	*Charge*
Photocoupler	*Photocoupleur*	Pin number	*Broche N°*
Signal name	*Nom de signal*		

3.3 Specifications of the Q Series Large Type Blank Cover

The following table shows performance specifications of the Q series large type blank cover.

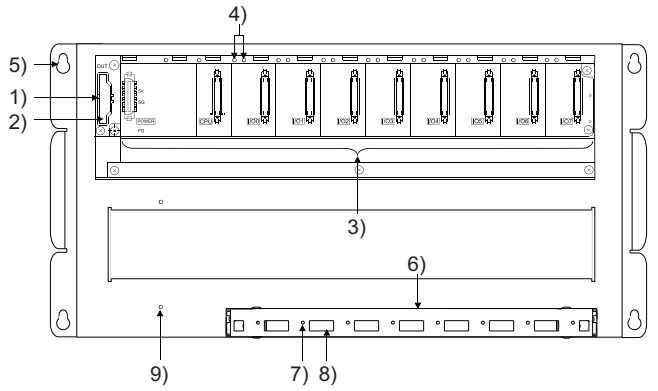
Item	Model
	QG69L
External dimensions	108 (4.25) (H) ×37.5 (1.48) (W) ×54 (2.13) (D) mm (inch)
Weight	0.03kg

4. PARTS NAMES

4.1 Parts Names

This section explains the part names of the Q series large type base unit, Q series large type I/O module, and Q series large type blank cover.

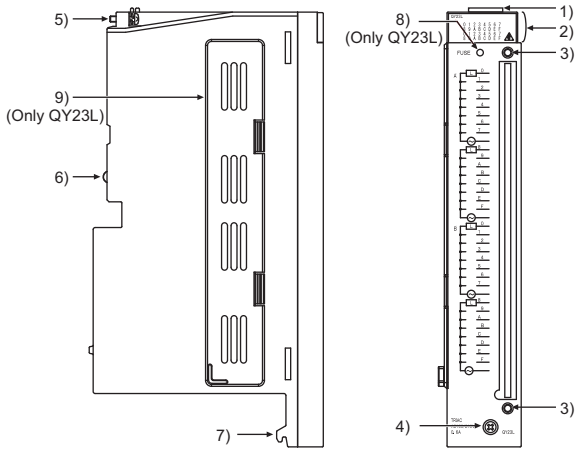
(1) Part names of the Q series large type base unit
The following explains part names of the Q series large type base unit.



Number	Name	Description
1)	Extension cable connector	Connector for connecting an extension cable (for signal communications with the extension base unit)
2)	Cover	Protective cover of extension cable connector
3)	Module connector	Connector for mounting power supply module, CPU module, Q series large type I/O module, MELSEC-Q series module
4)	Module fixing screw hole	Screw hole for fixing a module to the Q series large type base unit Screw size: M3×12 screws
5)	Base mounting hole	Hole for installing the Q series large type base unit on a panel such as control panel (The dimensions are the same as the MELSEC-A series base unit.)
6)	Fixture	Required for mounting the Q series large type I/O module.

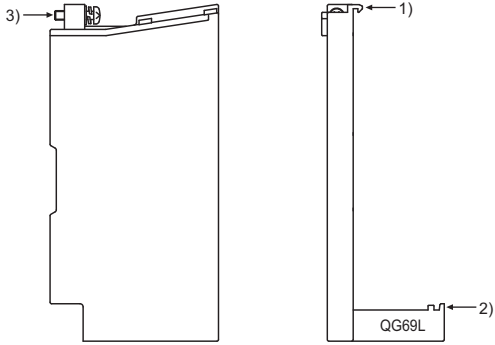
Number	Name	Description
7)	Module bottom fixing screw hole	Screw hole for fixing the bottom of the Q series large type I/O module to a fixture Screw size: M3×15 screws
8)	Module fixing hole	Hole for inserting a fixing projection on the back of the Q series large type I/O module to fix the module
9)	Relay terminal block mounting screw hole	Screw hole for fixing a relay terminal block Screw size: M4 screw

(2) Part names of the Q series large type I/O module
The following explains part names of the Q series large type I/O module.



Number	Name	Description
1)	Module fixing hook	Hook for fixing a module to the Q series large type base unit (one-touch installation)
2)	I/O indicator LED	LED for indicating the on/off status of input and output Turns on when input and output are on.
3)	Terminal block mounting screw hole	Screw hole for fixing a terminal block to a module
4)	Module bottom fixing screw	Screw for fixing the bottom of the input module or output module (M3×15 screws)
5)	Module fixing screw	Screw for fixing a module to the Q series large type base unit (M3×12 screws)
6)	Bracket	Do not touch as this may be deformed.
7)	Module fixing projection	Projection for fixing a module to the fixture of the Q series large type base unit
8)	Fuse blown indicator LED	LED for indicating fuse blown status Turns on when a fuse has blown.
9)	Dustproof cover for fuse replacement window	Dusfproof cover for attachment to fuse replacement window

(3) Part names of the Q series large type blank cover
The following explains part names the Q series large type blank cover.



Number	Name	Description
1)	Top fixing hook	Hook for fixing the Q series large type blank cover to the Q series module top
2)	Bottom fixing hook	Hook for fixing the Q series large type blank cover to the Q series module bottom
3)	Module fixing screw	Screw for fixing a module to the Q series large type base unit (M3×12 screws)

5. MOUNTING AND INSTALLATION

5.1 Handling Precautions

This section explains handling precautions for the Q series large type base unit and Q series large type I/O module.

(1) Do not disassemble the Q series large type base unit since it is precision apparatus.

(2) When handling the Q series large type base unit, hold it by the handles located at both sides of the module, not by a fixture.

(3) The Q series large type base unit cannot be installed to DIN rail. Install it to a control panel by tightening screws through the base mounting holes to the control panel.

(4) Always mount power supply module on the Q series large type extension base unit excluding the Q55BL.
When the load of a module used is light, the module may operate without power supply module; however, the operation cannot be guaranteed because of its instability.

(5) Tighten the fixture attachment screws, module fixing screws, and terminal block screws within the following range.

Location of screw	Tightening torque range
Fixture attachment screw (M4×10 screws)	1.39 to 1.89N•m
Module fixing screw (M3×12 screws)	0.36 to 0.48N•m
Module bottom fixing screw (M3×15 screws)	0.36 to 0.48N•m
I/O module terminal block screw (M3×6 screws)	0.43 to 0.57N•m
I/O module terminal block fixing screw (M4×16 screws)	1.02 to 1.38N•m

(6) Do not install the extension cable together with the main circuit (high voltage and high current) line or bring them close to each other.
Keep a distance of 100mm (3.94 inch) or more between them.

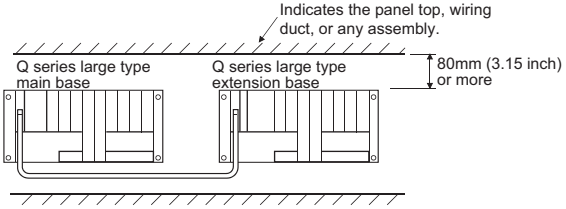
(7) Mounting modules
When installing the programmable controller in a control panel, fully consider its operability, maintainability, and environmental resistance. Securely mount all the MELSEC-Q series modules used on the base unit. For details on the mounting method, refer to the QCPU User's Manual (Hardware Design, Maintenance and Inspection).

(7) Montage des modules

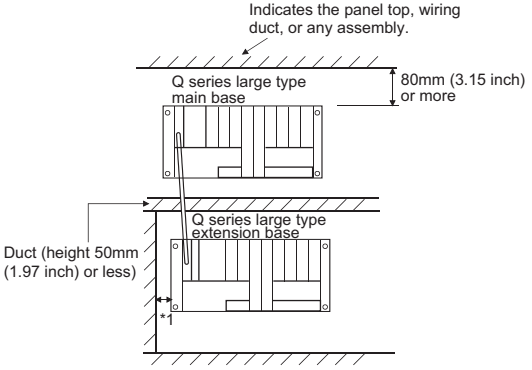
Pour installer l'automate programmable dans un tableau de commande, prendre en compte tous les aspects d'opérabilité, de maintenabilité et de résistance à l'environnement. Monter fermement sur l'unité de base tous les modules de la série MELSEC-Q à utiliser. Pour le détail de la méthode de montage, voir le QCPU User's Manual (Hardware Design, Maintenance and Inspection) (Manuel de l'utilisateur QCPU (conception du matériel, maintenance et inspection)).

5.2 Precautions for Installing the Q series Large Type Base Unit

(1) Module installation position



Parallel installation

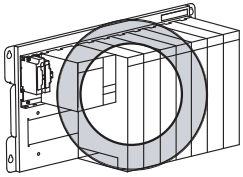


Serial installation

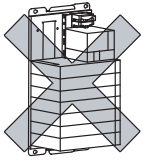
*1 : 20mm (0.79 inch) or more is required when connecting extension cable without removing adjacent modules.

(2) Module installation direction

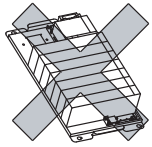
(a) install the programmable controller in the direction shown below to ensure ventilation for heat dissipation.



(b) Do not install it in the directions shown below.



Vertical position

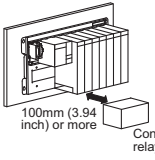


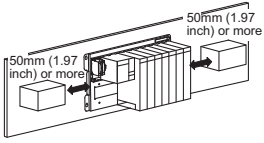
Horizontal position

(3) Install the base unit on a flat surface.
When the base unit is installed on an uneven surface, the printed-circuit board may be strained, resulting in a malfunction.

(4) Do not install the programmable controller together with a vibration source such as a large electromagnetic contactor or non-fuse breaker. Install the programmable controller to the separate panel or isolate it as far as possible.

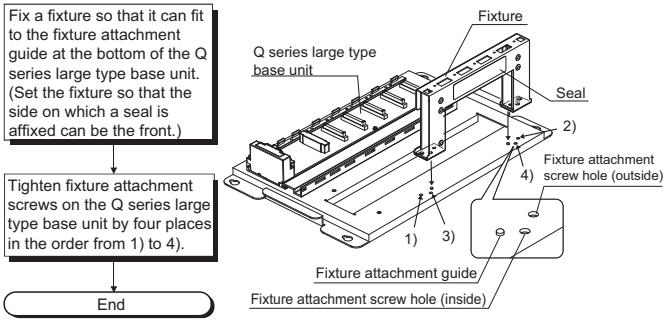
(5) Provide the following distances between the programmable controller and devices (contactor and relay) to avoid the influence of radiated noise or heat.
- Device installed in front of the programmable controller: 100mm (3.94 inch) or more
- Device installed on either side of the programmable controller: 50mm (1.97 inch) or more





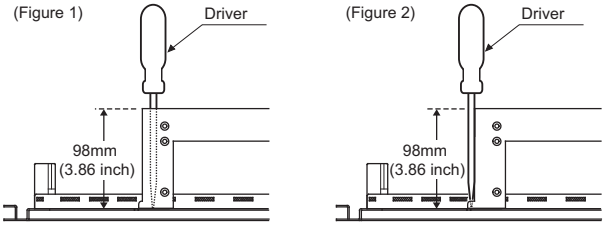
5.3 Attaching a Fixture to the Q Series Large Type Base Unit

(1) The following shows a procedure for attaching a fixture to the Q series large type base unit.



Point

1. Before installing the Q series large type base unit to a control panel, attach a fixture to the base unit.
2. Attach a fixture to the Q series large type base unit with screws as shown below.
   - Tightening the inside fixture attachment screws (Figure 1)
     Insert a driver (100mm (3.94 inch) or more) from square holes at the both top sides of the fixture and tighten the screws.
   - Tightening the outside fixture attachment screws (Figure 2)
     Tighten them from outside of the fixture.



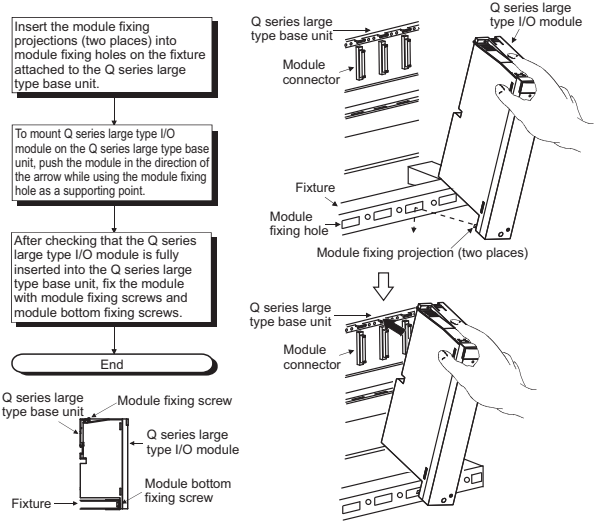
(2) When removing the fixture from the Q series large type base unit, make sure that the fixture attachment screws are completely loose beforehand.

5.4 Mounting/Removing Modules

This section explains procedures for mounting/removing the Q series large type I/O module and Q series module on/from the Q series large type base unit.

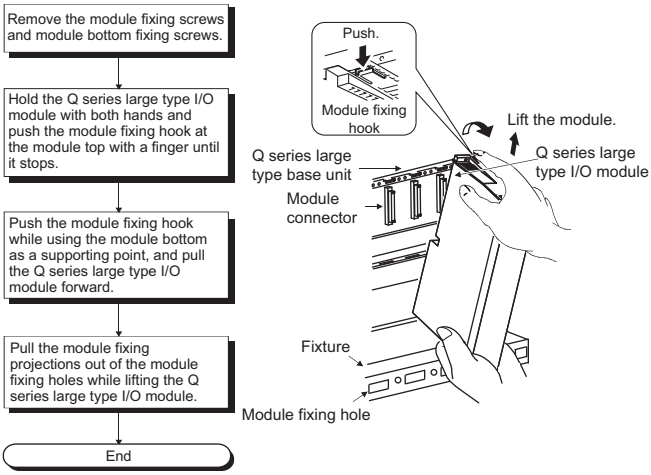
5.4.1 Mounting/removing the Q series large type I/O module

(1) The following shows a procedure for mounting the Q series large type I/O module on the Q series large type base unit.



Point
1. Always insert the module fixing projections of the Q series large type I/O module into the module fixing holes. Forced mounting without inserting the projections may damage the module connector and/or Q series large type I/O module.
2. When mounting the Q series large type I/O module on the Q series large type base unit, tighten module fixing screws and module bottom fixing screws.
3. When mounting the renewal tool on the left of the QY23L, always mount the QY23L first.

(2) The following shows a procedure for removing the Q series large type I/O module from the Q series large type base unit.



Point
1. To remove the Q series large type I/O module, always loosen the module fixing screws and module bottom fixing screws first, and then pull the module fixing projections out of the module fixing holes. Forced removal of the module may damage the module fixing projections. 2. When the renewal tool is mounted on the left of the QY23L, always remove the renewal tool first.

5.4.2 Attaching/removing the dustproof cover for fuse replacement window (QY23L only)

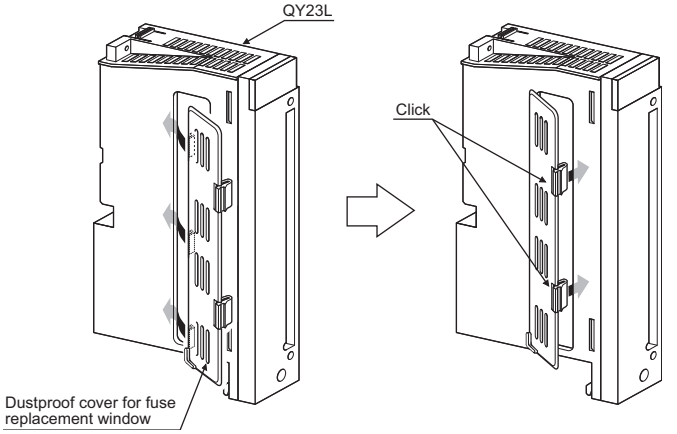
When mounting the QY23L on the Q series large type base unit in the following conditions, attach the supplied dustproof cover for fuse replacement window.

- Mounting the Q series module on the I/O slot immediate left of a slot where the QY23L is to be mounted
- Mounting the QY23L on the I/O slot leftmost on the Q series large type base unit

Not attaching the dustproof cover for fuse replacement window may cause an entry of foreign matter inside the module, resulting in a failure.

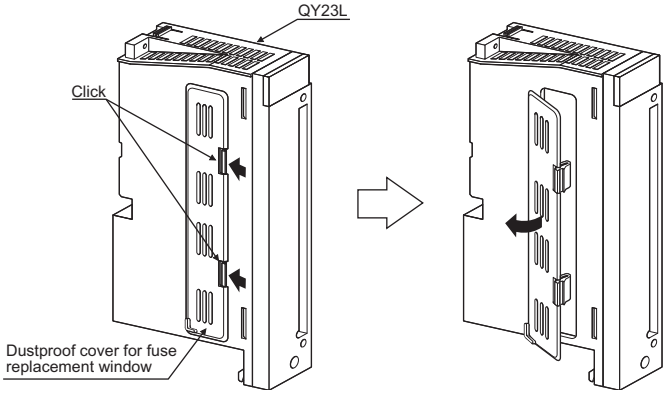
(1) Attachment

As shown below, insert the left side of dustproof cover for fuse replacement window first, and then push the two clicks on the dustproof cover into the module side.
(Make sure to attach it without a lift.)



(2) Removal

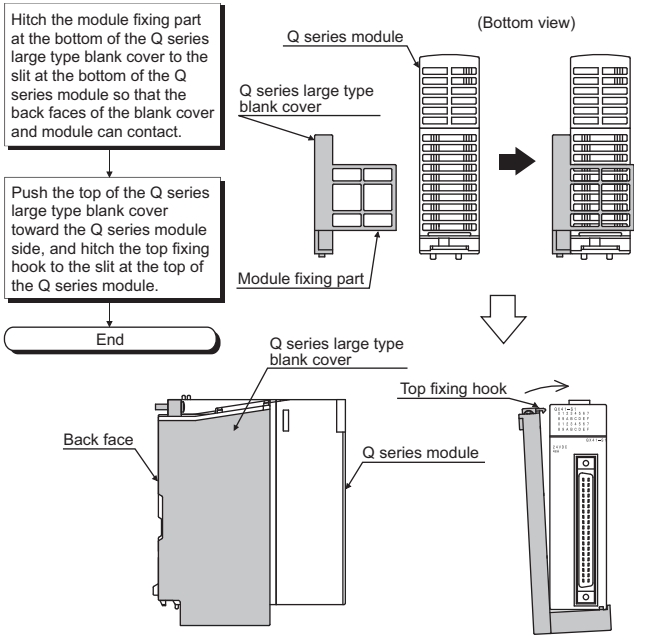
As shown below, lift the dustproof cover for fuse replacement window while pressing the two clicks on the dustproof cover in the direction of the arrows.



5.4.3 Mounting/removing the Q series module

(1) The following shows procedures for mounting the Q series module on the Q series large type base unit.

(a) Attaching the Q series large type blank cover
The following shows a procedure for attaching the Q series large type blank cover to the Q series module.



Point
When mounting the Q series module with Q series large type blank cover on the Q series large type base unit, always tighten the module fixing screws of the Q series large type blank cover.

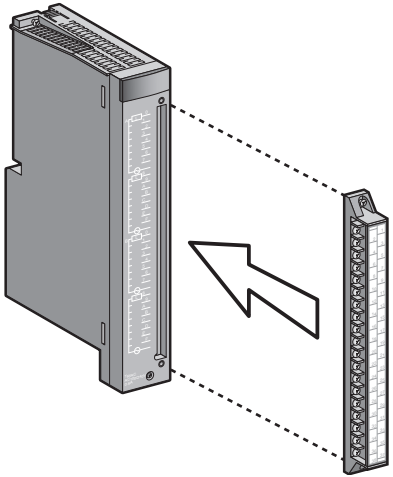
(b) Removing the Q series large type blank cover
To remove the Q series large type blank cover from the Q series module, remove the bottom fixing hook first.

(c) Mounting to/removal from the Q series large type base unit
For procedures of mounting/removing the Q series module on/from the Q series large type base unit, refer to the following manual.
☞ QCPU User's Manual (Hardware Design, Maintenance and Inspection)

5.5 Attaching/Removing the Terminal Block

This section explains the methods for attaching/removing the A series 38-point terminal block to/from the Q series large type I/O module.

(1) Attaching the terminal block
Attach the A series 38-point terminal block to the Q series large type I/O module and tighten the terminal block fixing screws by the top and bottom of the terminal block with the specified torque range.



(2) Removing the terminal block
Loose the terminal block fixing screws at the top and bottom of the terminal block and remove the terminal block.

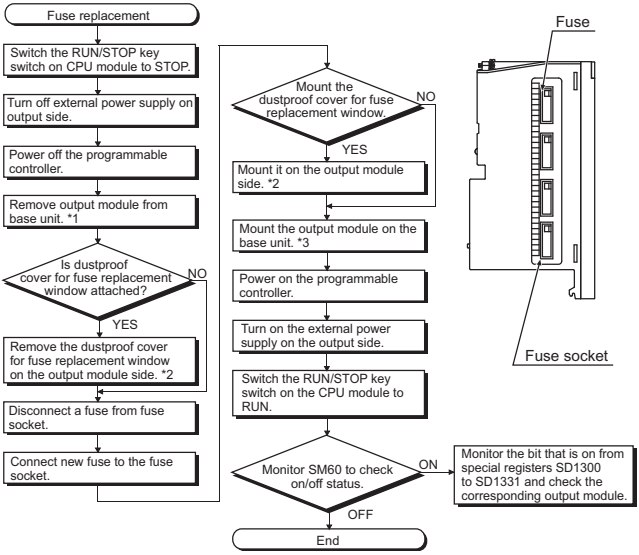
6. MAINTENANCE AND INSPECTION

6.1 Replacing Output Module Fuse

Even if a fuse is not blown, the element is gradually deteriorated due to inrush current; therefore, it should be replaced at regular intervals.

⚠ CAUTION	• When replacing a fuse, use the specified fuse. (For the fuse, refer to Section 3.2.2.) Using high capacity fuse or an electric wire may cause a fire.

The procedure for replacing a fuse is as follows.



*1 : When the renewal tool is mounted on the left of output module, always remove the renewal tool first.
*2 : For attaching/removing dustproof cover for fuse replacement window, refer to Section 5.4.2.
*3 : When mounting the renewal tool on the left of output module, always mount the output module first.

6.2 Battery Replacement

When replacing batteries used for CPU module (SRAM card), Web server module, MES interface module, be sure of the following.

(1) The Web server module and MES interface module cannot replace a battery with Q series large type blank cover mounted.
Replace the battery after removing the blank cover.
For replacement procedure of batteries, refer to the User's Manual for each module.

(2) If modules having larger depth than the CPU module are mounted on the both adjacent slots, using the following tweezers are recommended for replacing SRAM card battery.

Product	Model	Manufacturer
Plastic tweezers	NK-2539	Mitsubishi Electric System & Service Co., Ltd.

For replacement procedure of SRAM card battery, refer to the following manual.

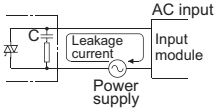
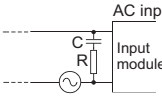
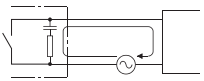
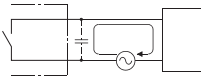
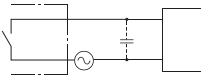
☞ QCPU User's Manual (Hardware Design, Maintenance and Inspection)

7. I/O MODULE TROUBLESHOOTING

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

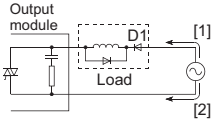
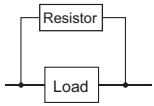
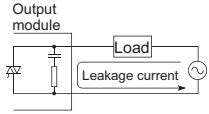
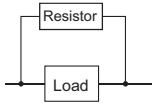
7.1 Input Circuit Troubleshooting

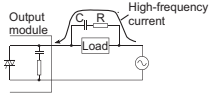
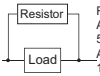
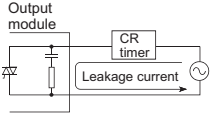
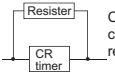
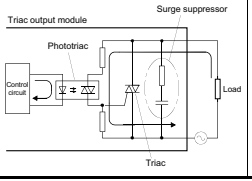
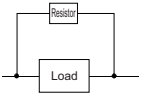
This section explains possible problems with input circuits and their corrective actions.

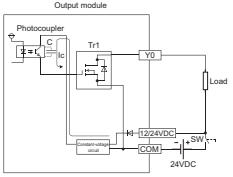
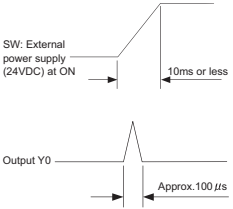
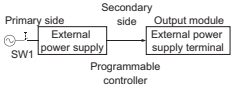
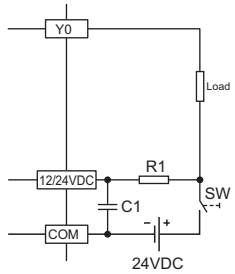
Number	Status	Cause	Corrective action
Example 1	Input signal does not turn off.	• Leakage current of input switch (such as a drive with contactless switch). 	• Connect an appropriate resistor so that the voltage across the terminals of the input module will be less than the off voltage.  Using 0.1 to 47μF + 47 to 120Ω (1/2W) as the constant of the capacitor and resistor is recommended.
Example 2	Input signal does not turn off.	• Drive with a limit switch with neon lamp 	• Same as Example 1 • Separate the circuit and create another display circuit.
Example 3	Input signal does not turn off.	• Leakage current due to line capacity of wiring cable (Line capacity C of twisted pair cable is approximately 100 pF/m). 	• Same as Example 1 (However, leakage current is not generated when the power supply is on the input device side as shown below.) 

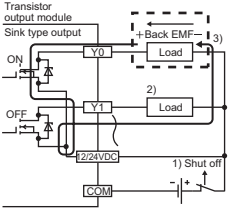
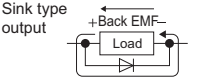
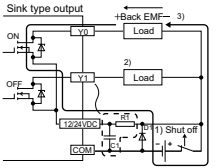
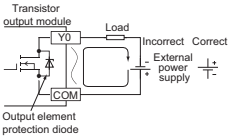
7.2 Output Circuit Troubleshooting

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

<table>
<tr><th>Number</th><th>Status</th><th>Cause</th><th>Corrective action</th></tr>
<tr><td>Example 1</td><td>Excessive voltage is applied to a load when output turns off.</td><td>• When a load is half-wave rectified inside
(This status is typical of some solenoids.)
 
• When the polarity of the power supply is [1], the capacitor is charged. When the polarity is [2], the voltage charged in capacitor + the power supply voltage is applied to both sides of D1. The maximum value of the voltage is approximately 2.2E.
(This usage does not pose problems to the output components but may deteriorate the diode built in the load, causing burnout, etc.)</td><td>• Connect a resistor of several tens of kΩ to several hundreds of kΩ to both sides of the load.
  </td></tr>
<tr><td>Example 2</td><td>A load does not turn off. (triac output)</td><td>• Leakage current due to the built-in surge suppressor
  </td><td>• Connect a resistor to both sides of the load.
(If the wiring from the output module to the load is long, be careful since there may be a leakage current due to line capacity.)
  </td></tr>
</table>

Number	Status	Cause	Corrective action
Example 3	A load turns off with a delay. (triac output)	• Leakage current due to load surge suppressor. 	• Remove the surge suppressor from both sides of the load and leave the resistor. (If the wiring from the output module to the load is long, be careful since there may be a leakage current due to line capacity.)  Recommended resistance At 100VAC: 5 to 10kΩ, 5 to 3W At 200VAC: 10 to 20kΩ, 15 to 10W
Example 4	When a load is CR timer, time period fluctuates. (triac output)		• Connect a resistor to both sides of CR timer. (If the wiring from the output module to the load is long, be careful since there may be a leakage current due to line capacity.)  Calculate the constant of the resistor by a load.
Example 5	Load is not turned off (triac output)	• When the load current is equal to or under the minimum load current of the output module, the triac does not operate and the load current flows to the phototriac as shown by an arrow in the following figure. If an inductive load is connected under this condition, surge current at OFF time is applied to the phototriac and the load may not be turned off. Also, even when the load current is greater than the minimum load current, the load may not be turned off if the load current is 25mA or less. 	• Connect a resistor to both ends of the load so that greater current than the minimum load current flows.  [Example of countermeasure] When load current 100mA is used, the resistance is determined as 1kΩ from the following formula. Resistance = 100VAC (output voltage/100mA = 1kΩ

Number	Status	Cause	Corrective action
Example 6	A load momentarily turns on when powering on the external power supply (transistor output).	An incorrect output occurs due to floating capacitance(C) between collector and emitter of photocoupler. When a high sensitivity load (such as solid state relay) is used, this incorrect output may occur.  When the rise time of voltage of the external power supply is 10ms or less, current (Ic) flows to gate of transistor (Tr1) of next stage due to floating capacitance (C) between collector and emitter of photocoupler. Then, output Y0 turns on for approx. 100μs. 	Action 1: Check that the rise time of the external power supply is 10ms or more. And then, install a switch (SW1) for turning on or off external power supply to the primary side of it.  Action 2: When installing the SW1 to the secondary side of it is required, make the rise time to 10ms or more and connect a capacitor and resistor as shown below.  R1: Several tens of ohms Power capacity ≥ (external power sup ply current *1)^2 × resistance value × (3 to 5)*2 Example R1= 40Ω, C1= 300μF Time constant = C1×R1= 300×10^{-6}×40 =12×10^{-3}[s] =12[ms] *1 Check the consumption current of the external power supply for modules used. *2 Select the power capacity of resistance to be 3 to 5 times lager than the actual power consumption.

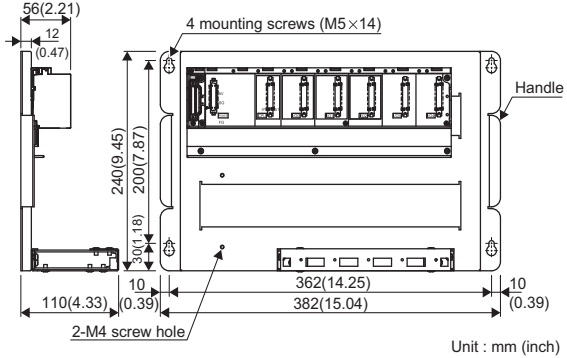
Number	Status	Cause	Corrective action
Example 7	A load momentarily turns on from off when the system is powered off (transistor output).	When an inductive load is connected, 2) Load may turn on from off due to a diversion of back EMF at 1) Shutoff. 	Take one of two actions shown below. Action 1: To suppress the back EMF, connect a diode to 3) parallel to the load where back EMF is generated.  Action 2: Configure another current path by connecting a diode across positive and negative of the external power supply. When taking the action described in "A load momentarily turns on when powering on the external power supply" (Example 5) at a time, connect a diode parallel to C1 and R1.  D1 is in the following status. • Reverse voltage VR (VRM) ··· Approximately 10 times higher than the rated voltage in the specifications Example 24VDC → Approximately 200V • Forward current IF (IFM) ····· More than twice as much as the maximum load current (common) in the specifications Example 2A/1 common → 4A or more
Example 8	The load operates due to powering on the external power supply. (transistor output)	The polarity of the external power supply is connected in reverse.  When the polarity is connected in reverse, current may flow across an output element protection diode.	Connect the polarity correctly.

8. EXTERNAL DIMENSIONS

The following shows external dimensions diagrams of the Q series large type base unit, Q series large type I/O module, Q series large type blank cover.

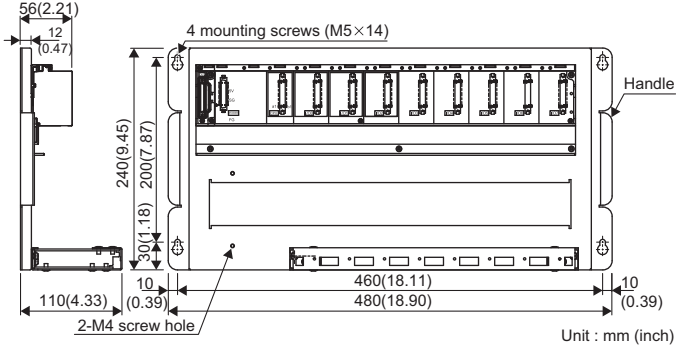
8.1 Q Series Large Type Base unit

(1) Q35BL



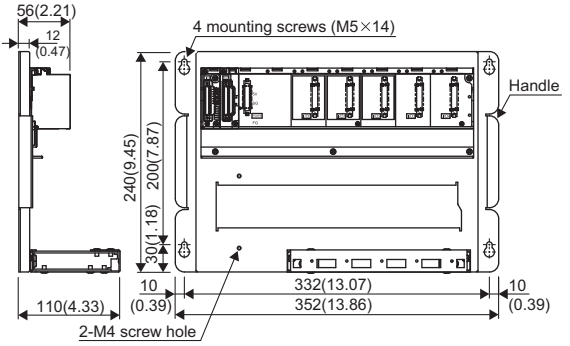
Unit : mm (inch)

(2) Q38BL



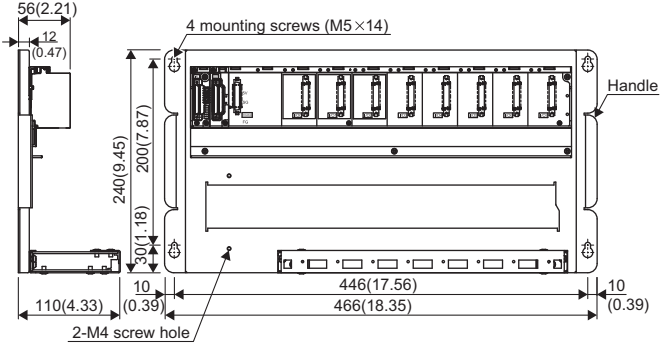
Unit : mm (inch)

(3) Q65BL



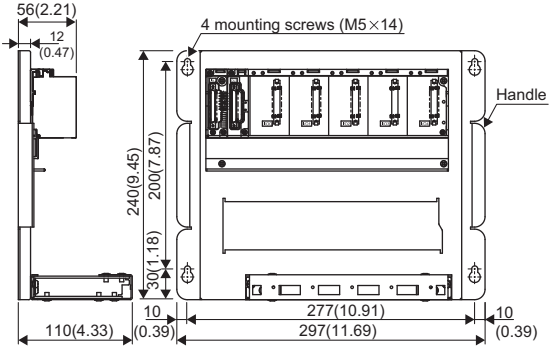
Unit : mm (inch)

(4) Q68BL



Unit : mm (inch)

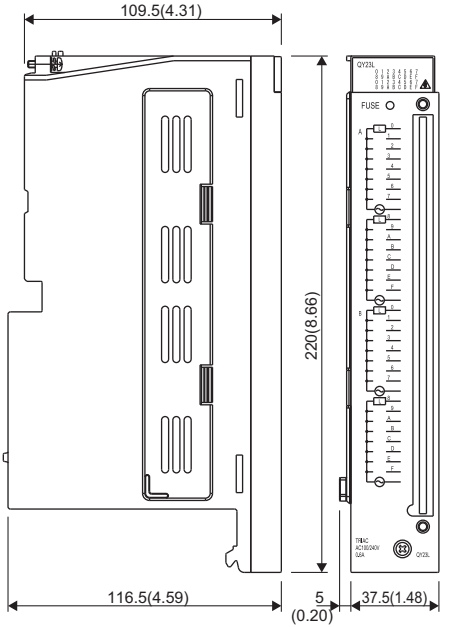
(5) Q55BL



Unit : mm (inch)

8.2 Q Series Large Type I/O Module

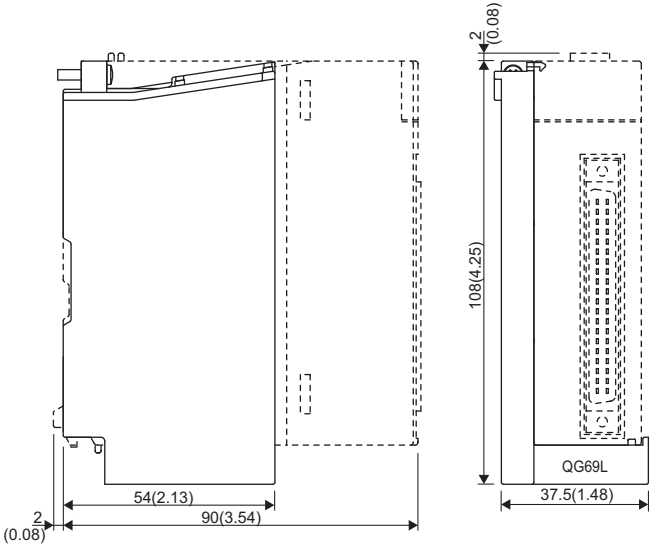
(1) QX11L, QX21L, QY11AL, QY13L, QY23L, QY51PL



Unit : mm (inch)

8.3 Q Series Large Type Blank Cover

(1) QG69L



Unit : mm (inch)

Memo

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