

Max. 1024-point measurement, control,  
and monitoring

# MODULAR CONTROLLERS

QX1 series



Internally mounted control system for multi-point measurement,  
control, and monitoring functionality

**Shinko**



# Multi-point controller for infinite possibilities



Max. 1024-point measurement and control

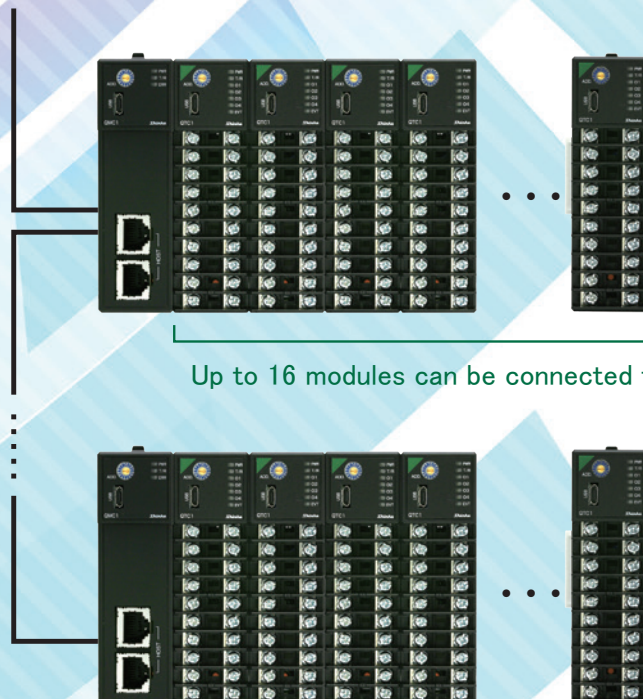


PLC



Touch screen

Connect up to  
16 units to one bus  
(QMC1 required)



Up to 16 modules can be connected to a unit.

# 1

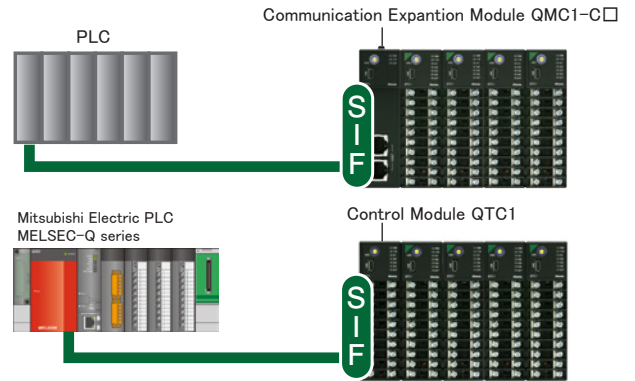
## Program-less connections to PLCs for reduced work (SIF function)

The Smart InterFace (SIF) function (program-less PLC communication function) enables direct connectivity to PLCs from various manufacturers.

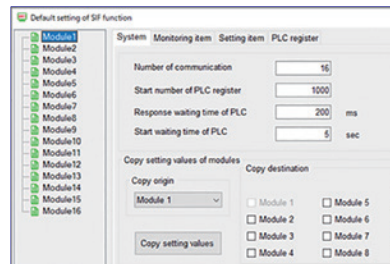
(Connect up to 1 unit to one bus)

Supported PLC	Manufacturer	Resister	Communication command	
	Mitsubishi Electric	D resister	QR/QW	(*)
	Mitsubishi Electric	R resister	QR/QW	
	Mitsubishi Electric	D resister	WR/WW	
	Mitsubishi Electric	R resister	WR/WW	
	OMRON	DM resister	FINS command	
	KEYENCE	DM resister	RDS/WRS	

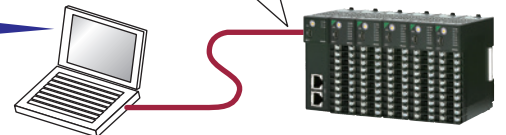
(\*) The SIF function of the control module QTC1 is exclusively for Mitsubishi Electric Corporation PLC D register QR/QW.



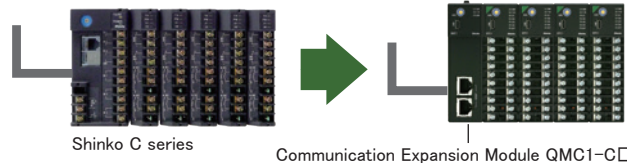
Settings can be easily changed using the console software, making it possible to manage multiple modules at once.  
OS: Windows 10 Windows 11 (Japanese/English)



Commercially available cables (Micro USB Type-B) can be used as connecting cables.



Please use Communication Expansion Module QMC1-C□ when replacing Shinko C series devices.



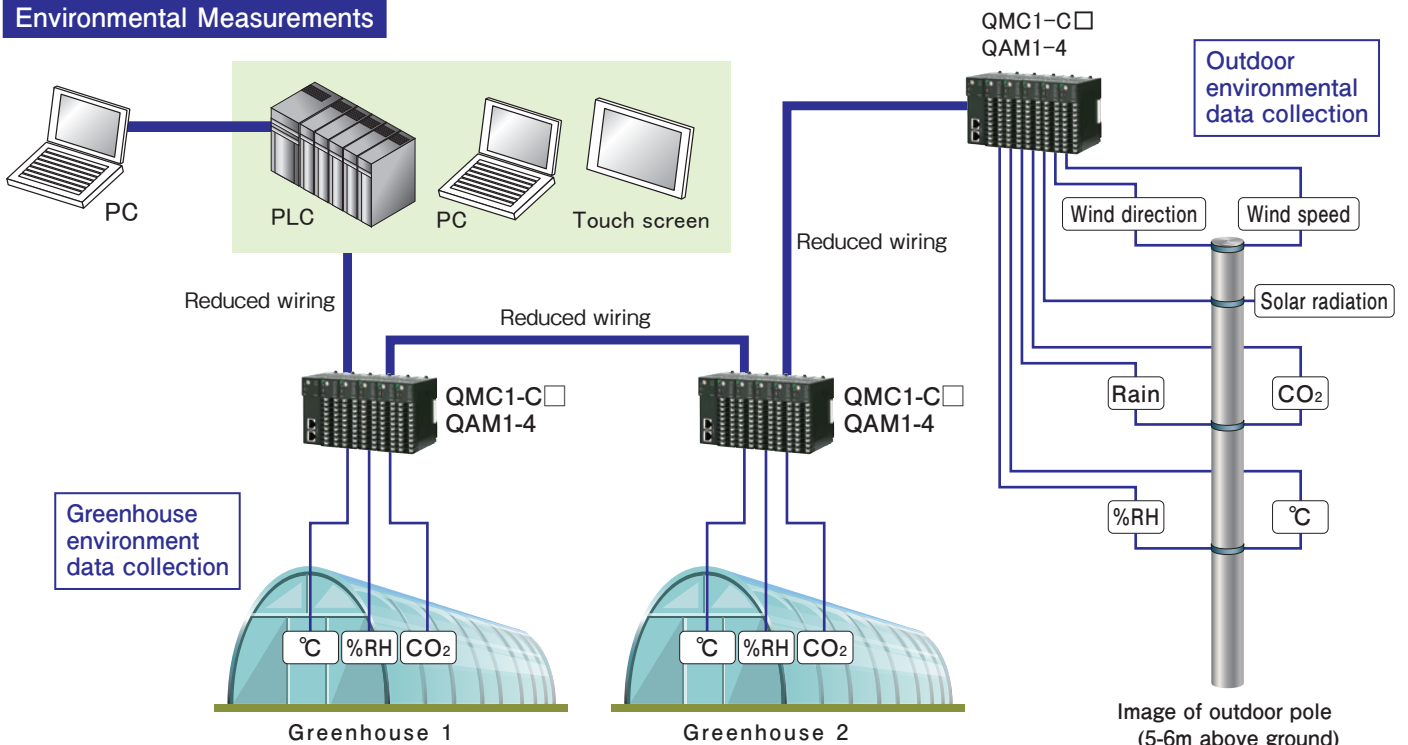
Some communication commands are different. When replacing the C series with the QX1 series, please contact us.

# 2

## Usable as an analog module for reducing initial costs and wiring

Using the QMC1-C□+QAM1-4 series as an analog module helps reduce initial costs and wiring work.

### Environmental Measurements



# Administrative support

## 1 Failure prediction maintenance

### Failure prediction maintenance

Check usage statuses using the following measurement functions.

1. Cumulative heater energization time (QTC1)
2. Cumulative module energization time (QMC1, QTC1)
3. Cumulative relay contact open/close count (QTC1)

In the event of an error, the error number and energization time are saved. The 10 most recent errors are saved. (Error history: Can be checked with console software) (QTC1)

Items	CH1	CH2	CH3	CH4
Content of error history 1	384	384	384	384
Energizing integrated time of error history 1	790	790	790	787
Content of error history 2	384	384	384	384
Energizing integrated time of error history 2	790	790	790	787
Content of error history 3	384	384	384	384
Energizing integrated time of error history 3	789	789	789	787
Content of error history 4	384	384	384	256
Energizing integrated time of error history 4	766	789	766	787
Content of error history 5	256	256	256	384
Energizing integrated time of error history 5	766	789	766	787
Content of error history 6	640	384	384	256
Energizing integrated time of error history 6	764	787	763	787
Content of error history 7	384	384	256	384
Energizing integrated time of error history 7	764	766	763	787
Content of error history 8	384	256	384	384
Energizing integrated time of error history 8	763	766	763	766
Content of error history 9	256	384	384	384
Energizing integrated time of error history 9	763	765	758	765
Content of error history 10	384	256	256	384
Energizing integrated time of error history 10	762	765	758	765

The input difference detection function makes it possible to monitor for input differences between channels.

### Risk avoidance in case of emergency

The output selection function can be used to switch between outputs. For example, in the event of a CH1 output failure, it switches to CH2 output.

A signal can be output if heater burnout is detected. (QTC1)

[Heater burnout alarm options:

Single-phase, 3-phase (3-phase: QTC1-2 only)]

Alarm output signal can be output or control can be started or stopped.

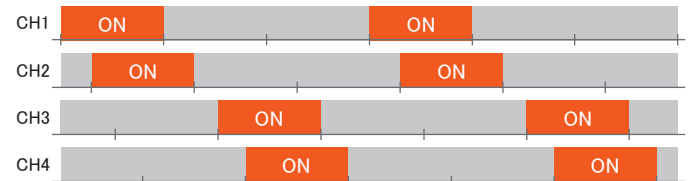
[Event input/output (optional)]

## 2 Peak power suppression function for lower power equipment costs

### Peak power suppression function

The total current can be set for the module, and power suppression control can be performed when the sum of the current values set for each channel is less than or equal to the total current. This can help minimize investments in power equipment.

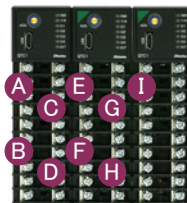
#### Example of peak power suppression function output timing



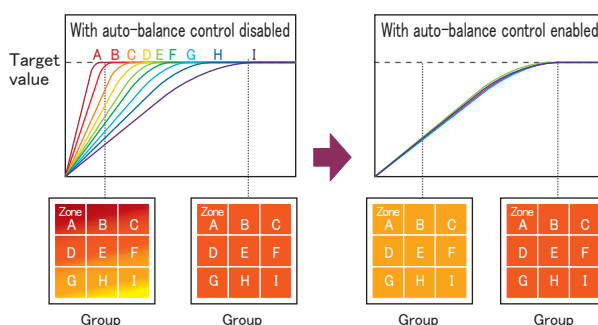
## 3 Improved product quality

### Multi-zone connection (Auto-balance control)

Take advantage of uniform control of multiple control locations (zones) of a control target (group) through linking. This helps prevent partial burning and mechanical distortion while also reducing adverse effects on product quality.

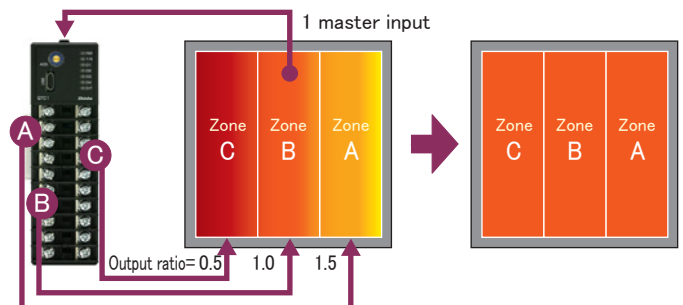


Auto-balance control works with multiple connected modules.



### Individual output amount settings (output gain, bias control)

If required distributions of output amount are known in advance, such as when controlling heaters in multiple locations (zones) for a single input point, uniform control of multiple zones is possible. Combining output selection functions reduces the number of input terminals needed, initial costs can also be reduced.





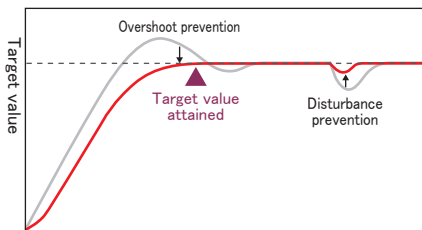
# Rich functions

## 1 Five included control methods for reduced manual labor

Control characteristics vary depending on the control target.  
The QX1 series includes five control methods to meet a variety of control characteristics.

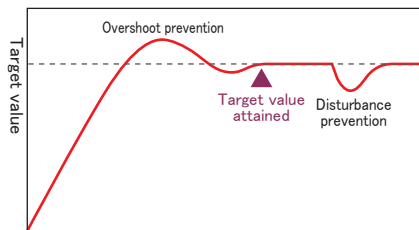
### 2DOF PID control

In addition to target value tracking and disturbance responsiveness, this well-balanced system reduces overshooting.  
(When using default control action.)



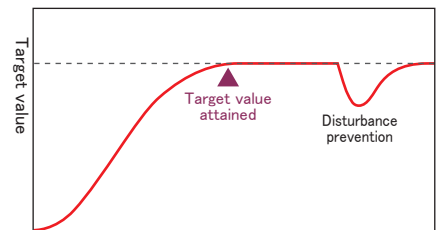
### Fast-PID control

This control method emphasizes target value tracking.  
This control method works best when replacing the controller with a Shinko product.  
(Doing so provides better performance.)



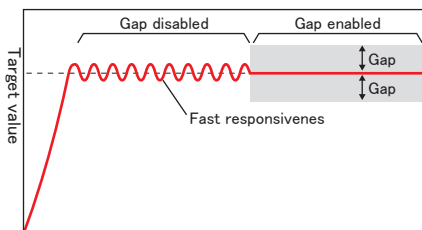
### Slow-PID control

This control method prioritizes preventing overshooting rather than time of attaining a target value.



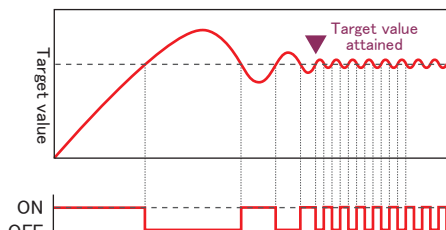
### Gap-PID control

This control method is effective with fast responses such as for flow rates and valves. (Deviation characteristics are provided within the gap.)



### ON-OFF control

This control method is selected for operating devices that turn heaters and other equipment on or off.

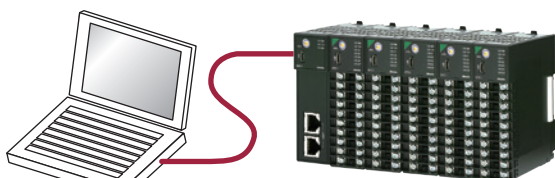


## 2 Maintenance improvements

The numerous LEDs allow users to visually check statuses and errors on-site.  
The plug is removable, making wiring easy. (connector type)



Settings can be easily changed using the console software, making it possible to manage multiple modules at once.  
OS: Windows 10 Windows 11 (Japanese/English)



Commercially available cables (Micro USB Type-B) can be used as connecting cables.

## 3 Heating/cooling control

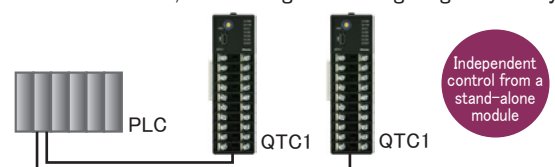
Heating/Cooling control is performed with CH1 used as the heating-side input and CH2 as the cooling-side input.  
(Up to 2 loops are possible with the QTC1-4.)

## 4 Cascade control

MV is calculated from SV and PV of CH1, and is used as SV of CH2, with which CH2 control computation is carried out, then outputs from CH2 control output.  
(Up to 2 loops are possible with the QTC1-4.)

## 5 High functionality even when used independently

When used independently, the QTC1 can be used for control or to communicate with a host, and adding monitoring targets is easy.



## Model

Control Module (2ch)  
QTC1-2Control Module (4ch)  
QTC1-4

## Model name

QTC1-2		<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		- <input type="checkbox"/>	<input type="checkbox"/>	
QTC1-4		<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	- <input type="checkbox"/>	<input type="checkbox"/>	
Power supply / communication options	0											No options
	P											With power supply / upper communication function
	C											With power supply / CUNet communication function
Wiring method	T											Terminal block type
	C											Connector type
CH1 control output		<input type="checkbox"/>										See output code table
CH2 control output		<input type="checkbox"/>										
CH3 control output (*1)			<input type="checkbox"/>									
CH4 control output (*1)				<input type="checkbox"/>								
CH1 input						<input type="checkbox"/>						See input code table
CH2 input							<input type="checkbox"/>					
CH3 input (*1)								<input type="checkbox"/>				
CH4 input (*1)									<input type="checkbox"/>			
Heater burnout alarm options(*2)										0	No options	
										2	4 points CT, 20 A (*3) (*4)	
										A	4 points CT, 100 A (*3) (*4)	
Event input/output options										0	No options	
										1	Event input (4 points)(*5) (*6)	
										2	Event output (4 points) (*5) (*6)	

(\*1) For the QTC1-2, CH3 and CH4 are not available.

(\*2) Cannot be added to Direct current output type, DC voltage output type, or DC voltage output type.

(\*3) CT and connector harness are sold separately.

(\*4) Single-phase or 3-phase is available for the QTC1-2.

(\*5) Connector harness is sold separately.

(\*6) For the QTC1-2, Event input/output (2 points)

### Input code table

Code	Input Type	Range			
M	Thermocouple K	-200 to 1370°C	M	RTD Pt100	-328.0 to 1562.0°F
	Thermocouple K	-200.0 to 400.0°C		DC voltage input 0 to 1 V DC	-32768 to 32767
	Thermocouple J	-200 to 1000°C		Direct current input 4 to 20 mA DC (Externally mounted shunt resistor)	-32768 to 32767
	Thermocouple R	0 to 1760°C		Direct current input 0 to 20 mA DC (Externally mounted shunt resistor)	-32768 to 32767
	Thermocouple S	0 to 1760°C	A	Direct current input 4 to 20 mA DC (Built-in shunt resistor)	-32768 to 32767
	Thermocouple B	0 to 1820°C		Direct current input 0 to 20 mA DC (Built-in shunt resistor)	-32768 to 32767
	Thermocouple E	-200 to 800°C		DC voltage input 0 to 5 V DC	-32768 to 32767
	Thermocouple T	-200.0 to 400.0°C		DC voltage input 1 to 5 V DC	-32768 to 32767
	Thermocouple N	-200 to 1300°C	V	DC voltage input 0 to 10 V DC	-32768 to 32767
	Thermocouple PL-II	0 to 1390°C			
	Thermocouple C	0 to 2315°C			
	Thermocouple K	-328 to 2498 F			
	Thermocouple K	-328.0 to 752.0 F			
	Thermocouple J	-328 to 1832 F			
	Thermocouple R	32 to 3200 F			
	Thermocouple S	32 to 3200 F			
	Thermocouple B	32 to 3308 F			
	Thermocouple E	-328 to 1472 F			
	Thermocouple T	-328.0 to 752.0 F			
	Thermocouple N	-328 to 2372 F			
Thermocouple PL-II	32 to 2534 F				
Thermocouple C	32 to 4199 F				
RTD Pt100	-200.0 to 850.0°C				

Output Codes table	
Code	Output Type
R	Relay contact output
S	Non-contact voltage output (for driving SSR)
A	Direct current output, 4 to 20 mA DC
0	Direct current output, 0 to 20 mA DC
V	DC voltage output, 0 to 1 V DC
1	DC voltage output, 0 to 5 V DC
2	DC voltage output, 1 to 5 V DC
3	DC voltage output, 0 to 10 V DC
C	Open collector output

## Specifications

### Rated Scale

Input (TC)	Scale Range		Resolution	Input (RTD)	Scale Range		Resolution
K	-200 to 1370°C	-328 to 2498°F	1°C(°F)	Pt100	-200.0 to 850.0°C	-328.0 to 1562.0°F	0.1°C(°F)
	-200.0 to 400.0°C	-328.0 to 752.0°F	0.1°C(°F)				
J	-200 to 1000°C	-328 to 1832°F	1°C(°F)				
R	0 to 1760°C	32 to 3200°F	1°C(°F)				
S	0 to 1760°C	32 to 3200°F	1°C(°F)	Input (DC)	Scale Range		Resolution
B	0 to 1820°C	32 to 3308°F	1°C(°F)				
E	-200 to 800°C	-328 to 1472°F	1°C(°F)				
T	-200.0 to 400.0°C	-328.0 to 752.0°F	0.1°C(°F)				
N	-200 to 1300°C	-328 to 2372°F	1°C(°F)				
PL-II	0 to 1390°C	32 to 2534°F	1°C(°F)				
C	0 to 2315°C	32 to 4199°F	1°C(°F)				

(\*) Scalable

Input	Thermocouple (TC)	K, J, R, S, B, E, T, N, C, PL- II External resistance: 100 Ω or less (However, B input: 40 Ω or less)
	RTD	Pt100, 3-wire type Allowable input lead wire resistance: 10 Ω or less per wire
	Direct current (mA DC)	0 to 20 mA DC, 4 to 20 mA DC Input impedance: 50 Ω (Shunt resistance) Allowable input current: 50 mA or less
	DC voltage (V DC)	0 to 1 V DC Input impedance: 1 MΩ or more Allowable input voltage: 5 V DC or less Allowable signal source resistance: 2 kΩ or less
		0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC Input impedance: 100 kΩ or more Allowable input voltage: 15 V DC or less Allowable signal source resistance: 100 Ω or less
Base accuracy	At ambient temperature of 23°C and mounting angle of ±5 degrees	
	Thermocouple	Within ±0.2% of each input span However, below 0°C (32°F): Within ±0.4% of each input span R, S inputs, 0 to 200°C (32 to 392°F): Within ±6°C (12°F) B input, 0 to 300°C (32 to 572°F): Accuracy is not guaranteed.
	RTD	Within ±0.1% of each input span
	Direct current	Within ±0.2% of each input span
	DC voltage	Within ±0.2% of each input span
Cold junction temperature compensation accuracy	Within ±1°C at -10 to 55°C	
Effect of ambient temperature	Thermocouple input (no decimal point):	Within ±100 ppm/°C of each input span Below 0°C (32°F): Within ±200 ppm/°C of each input span
	Thermocouple input (decimal point):	Within ±200 ppm/°C of each input span Below 0°C (32°F): Within ±400 ppm/°C of each input span
	Others :	Within ±100 ppm/°C of each input span
Effects of electromagnetic interference	Within ±1% of each input span	
Input sampling period	20 ms (with only DC voltage input and Direct current input enabled) 50 ms (with only DC voltage input and Direct current input enabled) 125 ms Note: Fixed to 125 ms regardless of settings for thermocouple input and RTD input	
Control action	2DOF PID control A control method that offers both tracking characteristics with SV changes, and disturbance suppression. This method offers the same disturbance responsiveness as Fast-PID control as well as control actions with reduced overshooting.	
	Fast-PID control This general PID control method is used for constant value control (SV control at a single value). <ul style="list-style-type: none"> <li>· P control: When integral time and derivative time are set to 0.</li> <li>· PI control: When derivative time is set to 0.</li> <li>· PD control: When integral time is set to 0.</li> <li>· Deviation PID control: When the proportional gain 2DOF coefficient (α) is set to 1.00 and the derivative 2DOF coefficient (γ, Cd) is set to 1.00.</li> </ul>	
	Slow-PID control This control method is effective for processes where generating overshoot is not desired, and processes where the PV does not easily decrease after having exceeded the SV.	

Control action	Gap-PID control If the PV is noisy or if there is hysteresis in the operation unit, a slight fluctuation may be maintained near the deviation of 0. In such cases, a dead band is usually used, but since control is not performed within dead bands, the PV changes in the event of a disturbance. In this way, this control method ensures deviation characteristics in dead bands and allows for disturbance responses.	
	Item	Setting Range
	Proportional band (P)	1 to Input span <sup>°C</sup> (°F) or 0.1 to Input span <sup>°C</sup> (°F) When direct current and DC voltage input 0.10 to 100.00% or 0.1 to 1000.0%
	Integral time (I)	0 to 3600 sec or 0.0 to 2000.0 sec 1 to 3600 sec or 0.1 to 2000.0 sec (When Slow-PID control is selected) The setting range varies depending on the selected integral/ derivative decimal point position.
	Derivative time (D)	0 to 3600 sec or 0.0 to 2000.0 sec The setting range varies depending on the selected integral/ derivative decimal point position.
	Proportional gain 2DOF coefficient (α)	0.00 to 1.00
	Integral 2DOF coefficient (β)	0.00 to 10.00
	Derivative 2DOF coefficient (γ, Cd)	0.00 to 1.00
	Proportional cycle	0.1 to 100.0 sec
	Output high limit, output low limit	0.0 to 100.0% Direct current output: -5.0 to 105.0%
Control range	Gap width (*)	0.0 to 10.0% Proportional band × Gap width
	Gap coefficient (*)	0.0 to 1.0
	(*) With Gap-PID control only	
	ON-OFF control Control method that operates with only two values of ON and OFF.	
	Item	Setting Range
	ON/OFF hysteresis	0.1 to 1000.0 <sup>°C</sup> (0.1 to 1800.0 <sup>°F</sup> ) Direct current input, DC voltage input: 1 to 10000
	When the control range below is exceeded, the control output is turned off. Control range for thermocouple input (no decimal point) Input range low limit -50 <sup>°C</sup> (90 <sup>°F</sup> ) to Input range high limit +50 <sup>°C</sup> (90 <sup>°F</sup> ) Control range for thermocouple input (with decimal point) and RTD input Input range low limit -(Input span × 1 %) <sup>°C</sup> (°F) to Input range high limit +50.0 <sup>°C</sup> (90.0 <sup>°F</sup> ) Control range for direct current and DC voltage input Scaling low limit -Scaling width × 10% to Scaling high limit + Scaling width × 10%	
	Relay contact output: 1a Control capacity: 3 A 250 V AC (resistive load) 1 A 250 V AC (inductive load cos φ = 0.4) Electrical life: 100,000 cycles Minimum applicable load: 10 mA 5 V DC	
	Non-contact voltage output (for driving SSR)	12 V DC ± 15% Max. 40 mA (short circuit protected) * The power supply is not electrically insulated from the output.
	Direct current output	4 to 20 mA DC, 0 to 20 mA DC (Resolution: 12000) Load resistance: Maximum 550 Ω * The power supply is not electrically insulated from the output.
Control output	DC voltage output:	0 to 1 V DC, 0 to 5 V DC, 1 to 5 V DC, 1 to 10 V DC (Resolution: 12000) Allowable load resistance: 1 kΩ or more * The power supply is not electrically insulated from the output.
	Open collector output (NPN):	Allowable load current: 100 mA or less Load voltage: 30 V DC or less
	Alarm Function, Loop Break Alarm, Set Value Ramp Function, Power-On Return Action Selection, Non-Volatile IC Memory Data Save Selection, Automatic/Manual Control Switching, Sensor Correction Coefficient, Sensor Correction, Control Function Selection, Extension Function Selection, Output Gain/Bias Function, Input Calculation Function, Input Difference Detection Function	
	Standard functions	
	Optional functions	
	Heater Burnout Alarm, Event Input, Event Output	

Power Supply / Host Communication function (QTC1-2P/QTC1-4P)	Communication line	EIA RS-485 compliant		
	Communication method	Half-duplex communication		
	Communication speed	Selecting 9600, 19200, 38400, or 57600 bps is possible using the DIP switches. (Factory default: 57600 bps)		
	Synchronization method	Start-stop synchronization		
	Data bit	Data bits: 8		
	Parity	Selecting even, odd, or no parity is possible using the communication specification selection DIP switch. (Factory default : Even)		
	Stop bit	Selecting 1 or 2 is possible using the communication specification selection DIP switch. (Factory default: 1)		
	Response delay time setting	0 to 1000 ms (Factory default: 0 ms) The response from the module after receiving a command from the host can be delayed.		
	Data structure	Communication protocol	MODBUS RTU	
		Start bit	1	
Data bit		8		
Parity		Enabled (even, odd), Disabled		
	Stop bit	1 or 2		
Smart InterFace (SIF) Function (Program-less communication function)	This function enables a serial communication connection with Mitsubishi Electric MELSEC-Q series PLCs and writes/reads various data to/from the PLC register using the PLC communication protocol. The communication protocol uses QW and QR commands, and PLCs capable of using A-compatible 1C frame AnA/AnU common commands (QR/QW) (D resistor) are supported.			
Power supply / CUNet communication function (QTC1-2C/QTC1-4C)	Connection type	Multi-drop		
	Communication method	2-wire half-duplex		
	Synchronization method	Bit-synchronous		
	Error detection	CRC-16		
	Number of occupied slave addresses	1		
	Maximum number of connected nodes	64 nodes		
	Communication speed, Communication distance	Communication speed	Maximum network length	
		12 Mbps	100m	
		6 Mbps	200m	
		3 Mbps	300m	
	Isolation method	Pulse transformer isolation		
	Impedance	100 Ω		
Termination resistance	Last connection, set by CUNet slave This instrument is not equipped.			
Attached functions	Power failure countermeasures, Self-diagnosis, Automatic cold junction compensation, PV filter time constant setting, Moving average count setting, CH enable/disable selection, Overscale, Underscale, Sensor error, Cold junction error, ADC error, Warm-up display, Cumulative contact open/close count measurement function, Cumulative energization time measurement function, Cumulative heater energization time measurement function, Error history, Console communication			
Power supply voltage	24 V DC Allowable voltage fluctuation range: 20 to 28 V DC			

## Accessories (Sold Separately)

Product Name	Model
Shunt resistor 50 Ω	RES-S01-050
Termination resistor 100 Ω	RES-S07-100
Front terminal cover	TC-QTC
CT for 20 A	CTL-6-S-H (*1)
CT for 100 A	CTL-12-S36-10L1U (*1)
Connector harness for heater burnout alarm	WQ (*1)
Connector harness for event input/output	EVQ (*2)

(\*1) For heater burnout alarm (heater burnout alarm option symbols: 2, A)

(\*2) For event input or event output (event input/output option symbols: 1, 2)

When using only event input 1, 2 or event output 1, 2, one is required; when using event inputs 1 to 4 or event outputs 1 to 4, two are required.

## Communication Expansion Module QMC1-C□



### Model name

QMC1	-□ □ -□	
Communication type	C4	RS-422A
	C5	RS-485 (*1)
Event input/output options	0	No options
	1	Event input 4 points (*2)
	2	Event output 4 points (*2)
	3	Event input 2 points, Event output 2 points (*2)
Communication protocol	0	Console selection (MODBUS RTU / SIF) (*1)
	1	C series compatible

(\*1): When connecting to an OMRON PLC or Keyence PLC using the SIF function (Smart InterFace, program-less communication function), it cannot be connected using the RS-485 communication type (QMC1-C5□). Use communication type RS-422A(QMC1-C4□).  
 (\*2): The plug side connector of the event input/output connector is sold separately.

### Specifications

Communication lines	EIA RS-422A compliant EIA RS-485 compliant																										
Communication method	Half-duplex communication																										
Synchronization method	Start-stop synchronization																										
Communication speed	Selecting 9600, 19200, 38400, or 57600 bps is possible using the DIP switches. (Factory default: 9600 bps)																										
Data bit/ parity	Data bit: 7 bits, 8 bits (Factory default: 8 bits) Parity bit: With parity, No parity (Factory default: With parity) Parity: Even, Odd (Factory default: Even) Select by communication specification selection DIP switch																										
Stop bit	Selecting 1 or 2 is possible using the communication specification selection DIP switch. (Factory default: 1 bit)																										
Response delay time setting	0 to 1000 ms (Factory default: 0 ms) The response from the module after receiving a command from the host can be delayed.																										
Communication protocol (Set with console software)	<table><tr><td>Communication protocol</td><td>Register</td><td>Communication command</td></tr><tr><td>MODBUS RTU</td><td>—</td><td>—</td></tr><tr><td>Made by Mitsubishi Electric</td><td>D register</td><td>QR/QW</td></tr><tr><td>Made by Mitsubishi Electric</td><td>R register</td><td>QR/QW</td></tr><tr><td>Made by Mitsubishi Electric</td><td>D register</td><td>WR/WW</td></tr><tr><td>Made by Mitsubishi Electric</td><td>R register</td><td>WR/WW</td></tr><tr><td>Made by OMRON</td><td>DM register</td><td>FINS command</td></tr><tr><td>Made by Keyence</td><td>DM register</td><td>RDS/WRS</td></tr></table>			Communication protocol	Register	Communication command	MODBUS RTU	—	—	Made by Mitsubishi Electric	D register	QR/QW	Made by Mitsubishi Electric	R register	QR/QW	Made by Mitsubishi Electric	D register	WR/WW	Made by Mitsubishi Electric	R register	WR/WW	Made by OMRON	DM register	FINS command	Made by Keyence	DM register	RDS/WRS
	Communication protocol	Register	Communication command																								
	MODBUS RTU	—	—																								
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	Made by OMRON	DM register	FINS command																								
Made by Keyence	DM register	RDS/WRS																									
C series compatible protocols are selected by model name.																											
Number of connections	Control module: Max. 16 modules																										
Event Input (optional)	No. of inputs	4 or 2																									
	Input method	Voltage contact input sink method																									
	Circuit current when closed	Approx. 6 mA																									
	Reading judgment time	Approx. 100 ms																									
Event Output (optional)	No. of outputs	4 or 2																									
	Circuit	NPN open collector																									
	Maximum load voltage	30 V DC																									
	Maximum load capacity	50 mA																									
Attached functions	Power failure countermeasure, Self-diagnosis, Warm-up display, Cumulative energization time measurement function																										
Power supply voltage	24 V DC Allowable voltage fluctuation range: 20 to 28 V DC																										

### Accessories (Sold Separately)

Product Name	Model
Communication cable (USB Type A – Modular)	CMC-001-4
Communication cable [Modular – Y terminal (RS-485, 3-wire)]	CQM-001
Communication cable [Modular – Y terminal (RS-422A, 5-wire)]	CQM-002
Communication cable (Modular – Modular)	CQQ-001
Wiring connector	0225-0805 (*)

(\*): For event input/output (event input/output option symbols: 1, 2, 3)

## Communication Expansion Module QMC1-MT



### Model name

QMC1-MT
---------

### Specifications

Ethernet communication	Connects to the control module (QTC1-□ ) for Ethernet communication (MODBUS/TCP or SIF function). MODBUS/TCP Physical layer: 10BASE-T/100BASE-TX automatic recognition User layer: MODBUS/TCP Number of connections: 1										
SIF function	This function reads and writes various data to PLC registers using the communication protocol of Mitsubishi Electric Corporation's PLC MELSEC. User layer: TCP/IP Mitsubishi Electric Corporation PLC MELSEC Communication Protocol Frame: QnA compatible 3E frame (SLMP 3E frame) Code: Binary or ASCII Connectable PLC: 1 unit										
Module-to-module communication	<table border="1"> <thead> <tr> <th>Communication line</th><th>Internal Bus</th></tr> </thead> <tbody> <tr> <td>Communication method</td><td>Half-duplex communication</td></tr> <tr> <td>Synchronization method</td><td>Start-stop synchronization</td></tr> <tr> <td>Communication speed</td><td>57600 bps</td></tr> <tr> <td>Data bit/Parity/Stop bit</td><td>Data bit: 8 Parity: Even Stop bit: 1</td></tr> </tbody> </table>	Communication line	Internal Bus	Communication method	Half-duplex communication	Synchronization method	Start-stop synchronization	Communication speed	57600 bps	Data bit/Parity/Stop bit	Data bit: 8 Parity: Even Stop bit: 1
Communication line	Internal Bus										
Communication method	Half-duplex communication										
Synchronization method	Start-stop synchronization										
Communication speed	57600 bps										
Data bit/Parity/Stop bit	Data bit: 8 Parity: Even Stop bit: 1										
Attached functions	Power failure countermeasure, Watchdog timer, Warm up indication, Cumulative energization time measurement function, Console communication										
Power supply voltage	24 V DC Allowable voltage fluctuation range: 20 to 28 V DC										



## 4 points analog I/O Module QAM1-4



### Model name

QAM1-4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Power supply / communication option	0										No options
	P										With power supply / upper communication function
	C										With power supply / CUNet communication function
Wiring type	T										Terminal block type
I/O type (*)		-0									Input 4 points
		-1									Output 4 points
		-2									I/O 4 points each
Analog output 1		<input type="checkbox"/>									Refer to output code table
Analog output 2			<input type="checkbox"/>								
Analog output 3				<input type="checkbox"/>							
Analog output 4					<input type="checkbox"/>						
Analog input 1						<input type="checkbox"/>					Refer to input code table
Analog input 2							<input type="checkbox"/>				
Analog input 3								<input type="checkbox"/>			
Analog input 4									<input type="checkbox"/>		

(\*): For input-only type, output code selection is invalid.  
For output-only type, input code selection is invalid.

### Output code table

Output code	Output type
A	DC current output 4 to 20 mA DC
0	DC current output 0 to 20 mA DC
V	DC voltage output 0 to 1 V DC
1	DC voltage output 0 to 5 V DC
2	DC voltage output 1 to 5 V DC
3	DC voltage output 0 to 10 V DC
N(*)	No output

(\*): Output code N is valid only when I/O type 0 (input 4 points) is selected.

### Input code table

Input code	Input type	Range
M	Thermocouple input	K -200 to 1370°C
		K -200.0 to 400.0°C
		J -200 to 1000°C
		R 0 to 1760°C
		S 0 to 1760°C
		B 0 to 1820°C
		E -200 to 800°C
		T -200.0 to 400.0°C
		N -200 to 1300°C
		PL-II 0 to 1390°C
		C(W/Re5-26) 0 to 2315°C
		K -328 to 2498°F
		K -328.0 to 752.0°F
		J -328 to 1832°F
		R 32 to 3200°F
		S 32 to 3200°F
		B 32 to 3308°F
		E -328 to 1472°F
		T -328.0 to 752.0°F
		N -328 to 2372°F
		PL-II 32 to 2534°F
		C(W/Re5-26) 32 to 4199°F
	RTD input	Pt100 -200.0 to 850.0°C
		Pt100 -328.0 to 1562.0°F
	DC voltage input	0 to 1 V DC -2000 to 10000
		4 to 20 mA DC (External receiving resistor) -2000 to 10000
A	DC current input	0 to 20 mA DC (Built-in receiving resistor) -2000 to 10000
		0 to 20 mA DC (Built-in receiving resistor) -2000 to 10000
V	DC voltage input	0 to 5 V DC -2000 to 10000
		1 to 5 V DC -2000 to 10000
		0 to 10 V DC -2000 to 10000
N(*)	No input	

(\*): Input code N is valid only when I/O type 1 (output 4 points) is selected.

### Specifications

#### Rated Scale

Input	Input Range		Resolution
K	-200 to 1370°C	-328 to 2498 F	1°C (°F)
K	-200.0 to 400.0°C	-328.0 to 752.0 F	0.1°C (°F)
J	-200 to 1000°C	-328 to 1832 F	1°C (°F)
R	0 to 1760°C	32 to 3200 F	1°C (°F)
S	0 to 1760°C	32 to 3200 F	1°C (°F)
B	0 to 1820°C	32 to 3308 F	1°C (°F)
E	-200 to 800°C	-328 to 1472 F	1°C (°F)
T	-200.0 to 400.0°C	-328.0 to 752.0 F	0.1°C (°F)
N	-200 to 1300°C	-328 to 2372 F	1°C (°F)
PL- II	0 to 1390°C	32 to 2534 F	1°C (°F)
C(W/Re5-26)	0 to 2315°C	32 to 4199 F	1°C (°F)
Pt100	-200.0 to 850.0°C	-328.0 to 1562.0 F	0.1°C (°F)
0 to 1 V DC	-32768 to 32767 (Scaling possible)		1
4 to 20 mA DC	-32768 to 32767 (Scaling possible)		1
0 to 20 mA DC	-32768 to 32767 (Scaling possible)		1
0 to 5 V DC	-32768 to 32767 (Scaling possible)		1
1 to 5 V DC	-32768 to 32767 (Scaling possible)		1
0 to 10 V DC	-32768 to 32767 (Scaling possible)		1

Input	Thermocouple (TC)	K, J, R, S, B, E, T, N, C (W/Re5-26) (JIS C1602-2015) PL-II (ASTM E1751M-15) External resistance: 100 Ω or less (B 40 Ω or less)
	RTD	Pt100 3-wire type (JIS C1604-2013) Allowable input lead wire resistance: 10 Ω or less per wire
	Direct current (mA DC)	0 to 20 mA DC, 4 to 20 mA DC Input impedance: 50 Ω Allowable input current: 50 mA or less
	DC voltage (V DC)	0 to 1 V DC Input impedance: 1 MΩ or more Allowable input voltage: 5 V DC or less Allowable signal source resistance: 2 kΩ or less 0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC Input impedance: 100 kΩ or more Allowable input voltage: 15 V DC or less Allowable signal source resistance: 100 Ω or less
Output	DC current output	4 to 20 mA DC, 0 to 20 mA DC Load resistance: Max. 550 Ω Non-isolated between power supply and output
	DC voltage output	0 to 1 V DC, 0 to 5 V DC, 1 to 5 V DC, 0 to 10 V DC Allowable load resistance: 1 kΩ or more Non-isolated between power supply and output
Power supply voltage	24 V DC Allowable voltage fluctuation range: 20 to 28 V DC	
Input base accuracy	Thermocouple input	When the ambient temperature is 23°C and the mounting angle is ±5 degrees Within ±0.2% of each input span Within 0°C (32°F), within ±0.4% of each input span R, S input, 0 to 200°C (32 to 392°F): Within ±6° C (12°F) B input, 0 to 300°C (32 to 572°F): Accuracy is not guaranteed.
	RTD input Direct current input DC voltage input	Within ±0.1% of each input span Within ±0.2% of each input span
Output base accuracy	When the ambient temperature is 23°C and the mounting angle is ±5 degrees Direct current input, DC voltage input: Within ±0.2% of each output span	
Cold junction compensation accuracy	Within ±1°C at -10 to 50°C	
Effect of ambient temperature	Thermocouple input (no decimal point)	Within ±100 ppm/°C of each input span Less than 0°C (32°F): Within ±200 ppm/°C of each input span
	Thermocouple input (with decimal point)	Within ±200 ppm/°C of each input span Less than 0°C (32°F): Within ±400 ppm/°C of each input span
	Other input	Within ±100 ppm/°C of each input span
	Direct current input DC voltage input	Within ±200 ppm/°C of each input span
Effect of electromagnetic interference	Within ±1% of each input span	
Input sampling period	20 ms (only direct current input and DC voltage input are valid) 50 ms (only direct current input and DC voltage input are valid) 125 ms For thermocouple input and RTD input, fixed to 125 ms	

## Digital I/O Module QDM1



### Model name

QDM1-	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Points	DI16				Input: 16 points
	DO16				Output: 16 points
	DIO8				Input: 8 points / Output: 8 points
Plus / Minus common	A				Minus common (NPN)
	B				Plus common (PNP)
Power supply / communication option	0				No option
	P				With power supply / upper communication function
	C				With power supply / CUnet communication function
Wiring type	T				Terminal block type
	C				Connector type

### Specifications

Input	Common	Plus/minus common (NPN/PNP compatible)
	Input points	8 points/16 points
	Input status indicator	Green (LED) lights up when ON
	Allowable supply voltage for input	24 V DC 10%, ripple content less than 5 %p-p
	ON voltage/ON current	15 V DC or more/3.5 mA or more
	OFF voltage/OFF current	5 V DC or less / 1 mA or less
	Input current	5.5 mA or less (at 24 V DC)
	Input resistance	Approx. 4.7 kΩ
	ON delay time	0.2 ms or less
	OFF delay time	0.5 ms or less
Output	Sampling cycle setting	1 ms, 5 ms by communication Setting range 1 to 100 ms
	Common	Minus/plus common (for NPN specification / for PNP specification)
	Output points	8 points/16 points
	Output status indicator	Green (LED) lights up when ON
	Allowable supply voltage for output	24 V DC 10%, ripple content less than 5 %p-p
	Rated output current	0.1 A/point, 1.6 A/common
	Residual voltage	1.2 V or less
	Leakage current	0.1 mA or less
	ON delay time	0.2 ms or less
	OFF delay time	0.5 ms or less
Power supply voltage	Overcurrent protection function	Limit current value when overcurrent is detected
	Output setting at communication error	Output status (hold or OFF) can be set until normal data is received in the event of communication error (lasting 1 minute or longer) (factory default: hold)
	Common	24 V DC Allowable voltage fluctuation range: 20 to 28 V DC
	Attached functions	Watchdog timer, Unapplied digital output power supply, Warm up indication, Cumulative energization time measurement function, Power Failure Countermeasure
	Sold separately	Front terminal cover: TC-QTC (*)
		Termination resistor 100 Ω: RES-S07-100
	(*)	QDM1 has the same case shape as QTC1, so the terminal cover of QTC1 is used.
	Power supply / RS-485 communication function	Perform the following operations from the external computer.
		(1) Reading and setting the DO output setting value of each CH
		(2) Reading DI input status, DO output status, and operation status of each CH
		(3) Reading and setting the digital input sampling cycle
		Communication line
		EIA RS-485
		Communication method
		Half-duplex communication
		Synchronization method
		Start-stop synchronization
		Communication protocol
		MODBUS RTU
		Communication speed
		9600 bps, 19200 bps, 38400 bps or 57600 bps can be selected by DIP switch (Factory default: 57600 bps)
		Data bit/Parity/Stop bit
		Select the following with the DIP switch Data bit: 8 Parity: Even, Odd, No parity Stop bit: 1 or 2 (Factory default: 8 bits, Even, 1 bit)
		Communication response delay time
		Set the delay time to return the response from the module after receiving the command from the host. 0 to 1000 ms (Factory default: 0 ms)
		Digital input sampling cycle
		1 to 100 ms (Factory default: 1 ms)

Output update cycle	20 ms			
Output circuit response time	100 ms or less (excluding 0 to 90 % communication cycle time)			
Setting accuracy	Same as base accuracy			
Attached functions	Warm up indication, Power failure countermeasure, Self-diagnosis, Automatic cold junction temperature compensation, PV filter time constant setting, Moving average count setting , Overscale, Underscale, Sensor Error, Cold junction error, ADC error, Cumulative energization time measurement function, Error history, Console communication, SIF communication function			
Sold separately	Shunt resistor 50 Ω : RES-S01-050 Front terminal cover: TC-QTC (*) Termination resistor 100 Ω : RES-S07-100 (*): QAM1 has the same case shape as QTC1, so the terminal cover of QTC1 is used.			
Power supply / RS-485 communication function	Perform the following operations from the external computer. (1) Reading and setting of various set values (2) PV and operation status reading (3) Change of function			
	Communication line	EIA RS-485 (C5 option)		
	Communication method	Half-duplex communication		
	Synchronization method	Start-stop synchronization		
	Communication protocol	MODBUS RTU		
	Communication speed	9600 bps, 19200 bps, 38400 bps or 57600 bps can be selected by DIP switch (Factory default: 57600bps)		
	Data bit/Parity/Stop bit	Select the following with the DIP switch Data bit: 8 Parity: Even, Odd, No parity Stop bit: 1 or 2 (Factory default : 8 bits, Even, 1 bit)		
	Communication response delay time	Set the delay time to return the response from the module after receiving the command from the host. 0 to 1000 ms		
	Power supply / CUnet communication function	Connection type	Multi-drop	
Communication method		2-wire half-duplex		
Synchronization method		Bit-synchronous		
Error detection		CRC-16		
Number of occupied slave addresses		1		
Maximum number of connected nodes		64 nodes		
Communication speed, Communication distance		Communication speed	Maximum network length	
		12Mbps	100m	
		6Mbps	200m	
		3Mbps	300m	
Isolation method		Pulse transformer isolation		
Impedance		100 Ω		
Termination resistance		Last connection, set by CUnet slave This instrument is not equipped.		

High-speed communication with QMC1 via internal bus connection	When DIP switch No. 6 for setting communication specifications is set to ON, the digital I/O data update cycle with QMC1 corresponding to this function is within 10 ms per module.		
Power supply / CUnet communication function	Connection type	Multi-drop	
	Communication method	2-wire half-duplex	
	Synchronization method	Bit-synchronous	
	Error detection	CRC-16	
	Number of occupied slave addresses	1	
	Maximum number of connected nodes	64 nodes	
	Communication speed, Communication distance	Communication speed	Maximum network length
		12Mbps	100m
		6Mbps	200m
		3Mbps	300m
	Isolation method	Pulse transformer isolation	
	Impedance	100 Ω	
	Termination resistance	Last connection, set by CUnet slave This instrument is not equipped.	

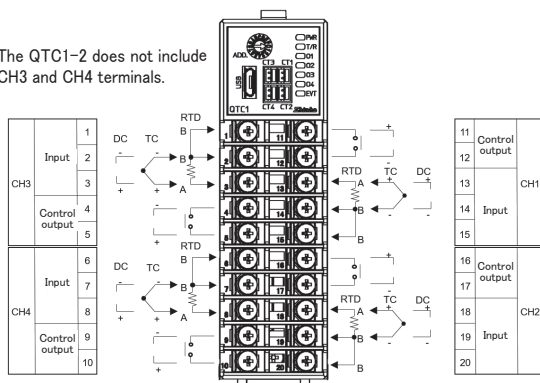


## Terminal Arrangement

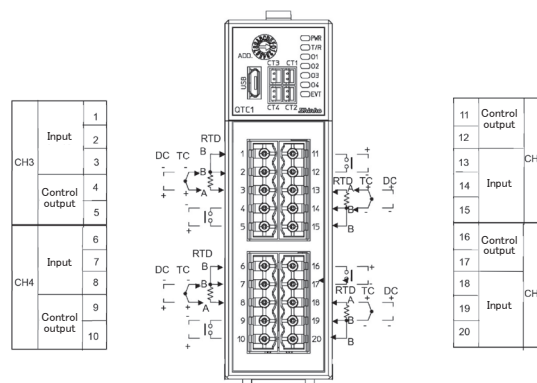
### Control Module QTC1-2/QTC1-4

#### Terminal block type

The QTC1-2 does not include CH3 and CH4 terminals.



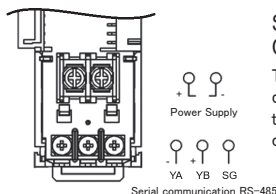
#### Connector type



#### Power supply and communication terminal arrangement

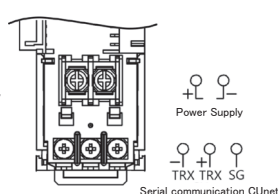
##### Serial communication RS-485

The QTC1-20 and QTC1-40 do not include a power supply terminal and RS-485 serial communication terminal.



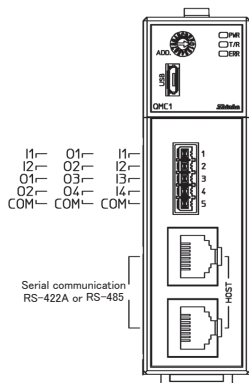
##### Serial communication CUNet

The QTC1-20 and QTC1-40 do not include a power supply terminal and CUNet serial communication terminal.



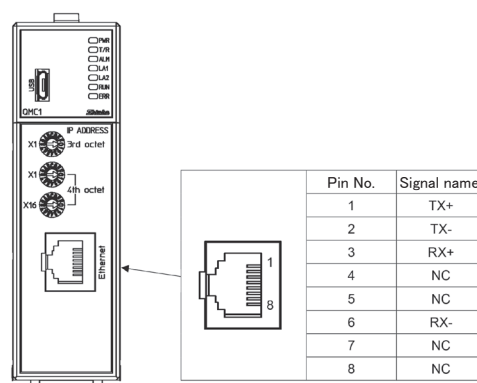
### Communication Expansion Module QMC1-C□

#### Pin assignment of event input/output and serial communication

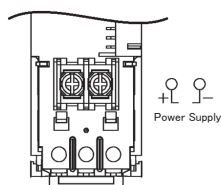


### Communication Expansion Module QMC1-MT

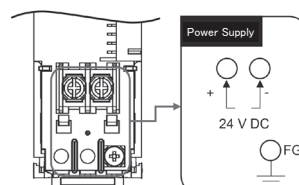
#### Pin assignment of Ethernet communication connector



#### Power supply terminal arrangement



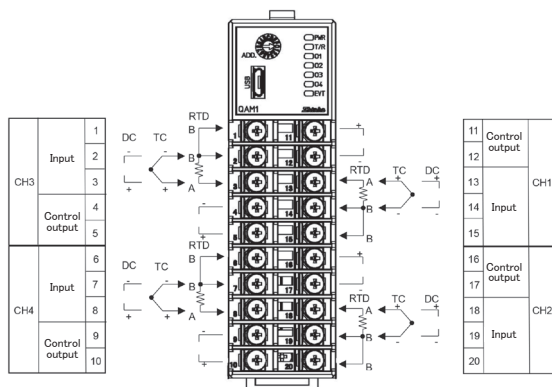
#### Power supply terminal and FG terminal arrangement



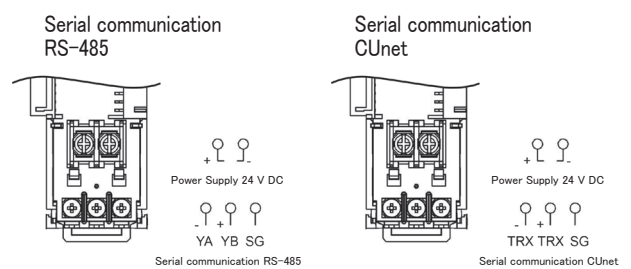
## Terminal Arrangement

### 4 points analog I/O Module QAM1-4

#### Input and output terminal arrangement



#### Power supply and communication terminal arrangement

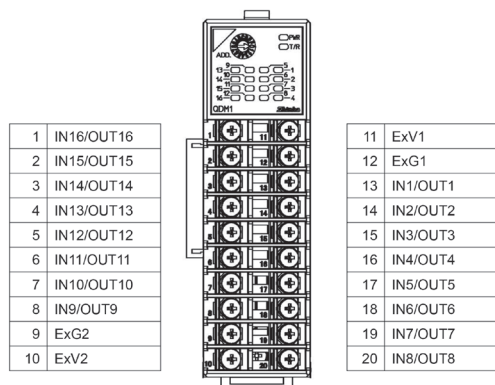


### Digital I/O Module QDM1

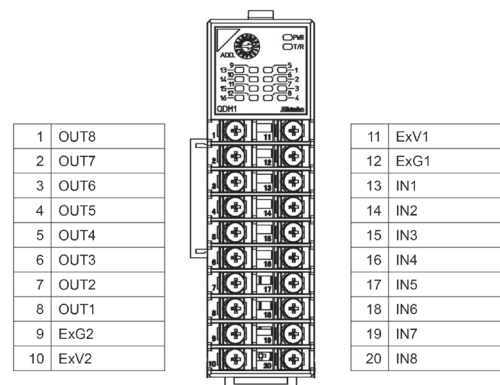
#### Input and output terminal arrangement

#### Terminal block type

QDM1-D 16 0T

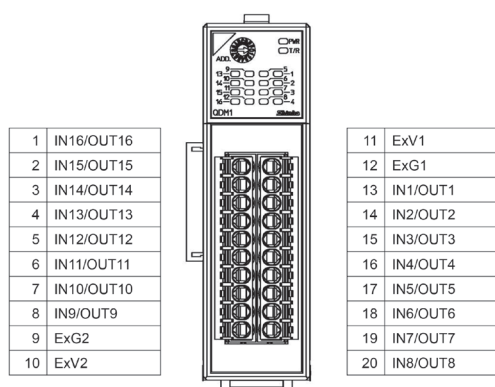


QDM1-DIO8 0T

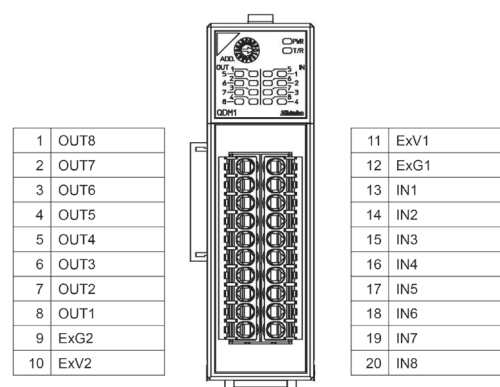


#### Connector type

QDM1-D 16 0C



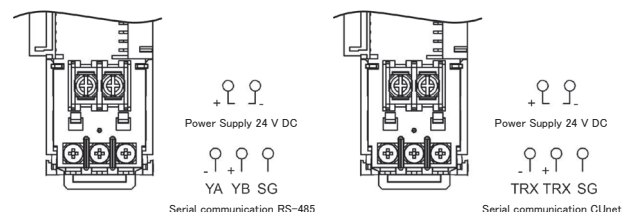
QDM1-DIO8 0C



#### Power supply and communication terminal arrangement

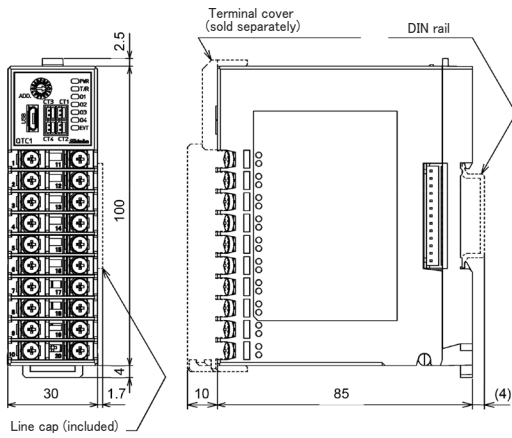
Serial communication  
RS-485

Serial communication  
CUNet

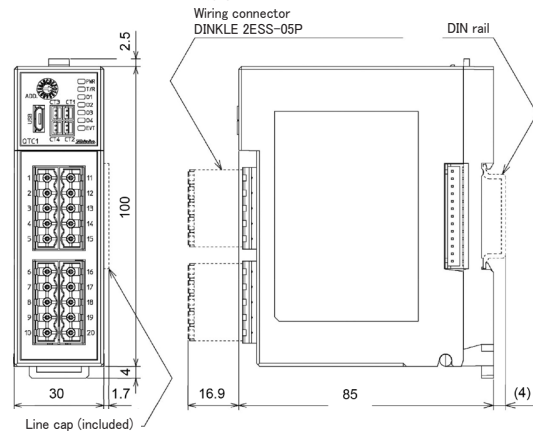


## Control Module QTC1-2/QTC1-4

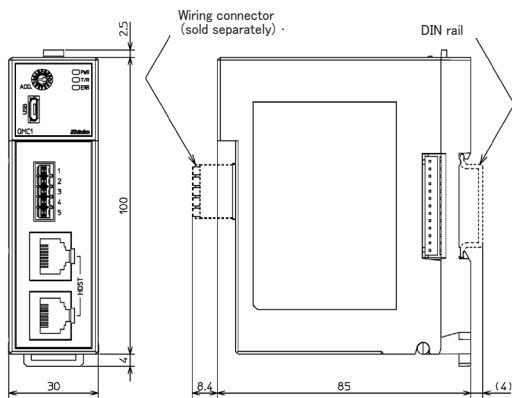
### Terminal block type



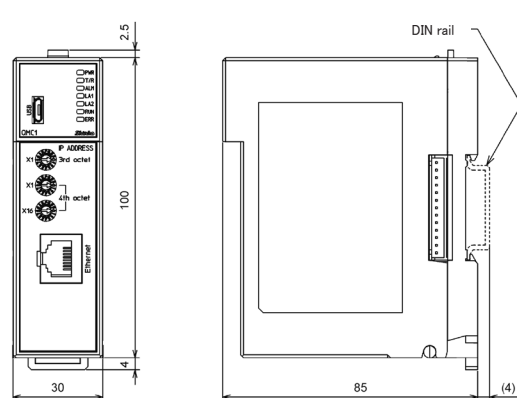
### Connector type



## Communication Expansion Module QMC1-C□

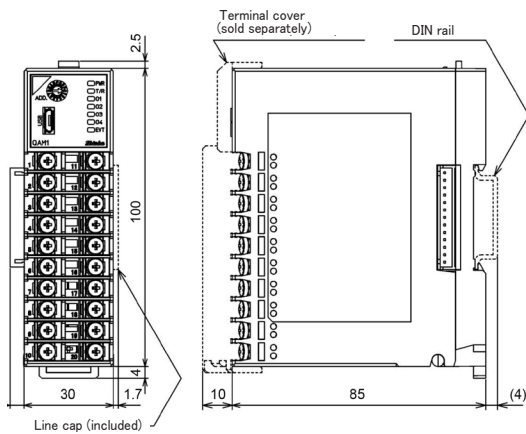


## Communication Expansion Module QMC1-MT



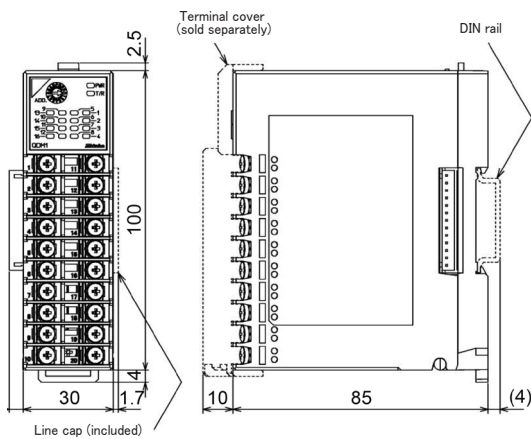


## 4 points analog I/O Module QAM1-4

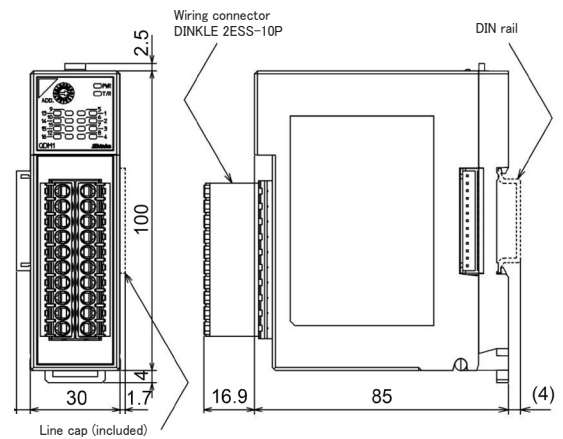


## Digital I/O Module QDM1


### Terminal block type



### Connector type





 <p>SAFETY PRECAUTIONS</p>	<ul style="list-style-type: none"><li>●To ensure safe and correct use, thoroughly read and understand the manual before using this instrument.</li><li>●This instrument is intended to be used for industrial machinery, machine tools and measuring equipment. Verify correct usage after consulting with our agency or main office regarding the purpose of use. (Never use this instrument for medical purposes in which human lives are involved.)</li><li>●External protection devices such as protection equipment against excessive temperature rise, etc. must be installed, as a malfunction of this product could result in serious damage to the system or injury to personnel. Also, proper periodic maintenance is required.</li><li>●This instrument must be used under the conditions and environment described in the manual. Shinko Technos Co., Ltd. does not accept liability for any injury, loss of life or damage occurring due to the instrument being used under conditions not otherwise stated in this manual.</li></ul>	<p style="text-align: center;"><b>Caution with respect to Export Trade Control Ordinance</b></p> <p>To avoid this instrument from being used as a component in or being utilized in the manufacture of weapons of mass destruction (i.e. military applications, military equipment), please investigate the end users and the final use of this instrument. In the case of resale, ensure that this instrument is not illegally exported.</p>
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- The photos in this catalog do not show actual usage.
- If you have any inquiries, please consult us or our agency.

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