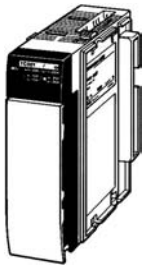
Temperature Control Units
CQM1-TC□0□

CQM1-TC00□/TC20□: Thermocouple Inputs
CQM1-TC10□/TC30□: Platinum Resistance Thermometer Inputs



- Temperature Control Units are available for either 4-loop temperature control or 2-loop temperature control, and Units with 2-loop temperature control provide a heater burnout alarm.
- Parameters can be set and data read for these Temperature Control Units by transferring commands. Therefore, only one word each is allocated to the Temperature Control Unit for inputs and outputs, enabling high-density temperature controls. Commands can be easily transferred using the TRANSFER I/O COMMAND instruction (see note 1) that was been added to the CQM1H CPU Units.

The PID with advanced feed-forward circuitry (2 degrees of freedom) assures stable temperature control. The Units can also be set to ON/OFF control.

Note: 1. Parameters can be set and data read for the CQM1-TC20□ and TC30□ using the new IOTC(––) instruction. The IOTC instruction is supported by the following combination of CPU Unit and Support Software: CX-Programmer version 2.0 or later and a CQM1H CPU Unit with a lot number of 0160 or later.

2. The SYSMAC Support Software can also be used by uploading the expansion instructions from a CPU Unit.

Performance Specifications

Item		Thermocouple input CQM1-TC00□	Platinum resistance thermometer input CQM1-TC10□	Thermocouple input CQM1-TC20□	Platinum resistance thermometer input CQM1-TC30□
Input	Input sensors and set point ranges	K: –200 to 1,300°C (–300 to 2,300°F) J: –100 to 850°C (–100 to 1,500°F)	JPt: –99.9 to 450.0°C (–99.9 to 800.0°F) Pt: –99.9 to 450.0°C (–99.9 to 800.0°F)	K, J, T, L, R, S, B (See the following table for temperature ranges.)	Pt100, JPt100 (See the following table for temperature ranges.)
	Number of control loops	Two (either 1 or 2 loops can be used)		4 loops or 2 loops with heater burnout alarm	
Control mode		ON/OFF or advanced PID control (2 degrees of freedom)		ON/OFF control, advanced PID control (2 degrees of freedom), or manual operation	
Setting and display accuracy		°C Ranges (Set point ±1% or ±3°C, whichever is larger) ±1 digit max. °F Ranges (Set point ±1% or ±6°F, whichever is larger) ±1 digit max.	°C Ranges (Set point ±1% or ±2°C, whichever is larger) ±1 digit max. °F Ranges (Set point ±1% or ±4°F, whichever is larger) ±1 digit max.	°C Ranges (Set point ±0.3% or ±1°C, whichever is larger) ±1 digit max. °F Ranges (Set point ±0.3% or ±2°F, whichever is larger) ±1 digit max.	0.1°C Ranges (Set point ±0.3% or ±0.8°C, whichever is larger) ±1 digit max. 0.1°F Ranges (Set point ±0.3% or ±1.6°F, whichever is larger) ±1 digit max. (See note 1.) 0.01°C Ranges (Set point ±0.3% or ±0.5°C, whichever is larger) ±1 digit max.
Temperature adjustment		0.8°C/°F		0.1 to 999.9°C/°F (0.1°C/°F unit)	
Proportional band		40.0°C/°F		0.1 to 999.9°C/°F (0.1°C/°F unit)	
Derivative time		240 s		0 to 3,999 s (1 s unit)	
Integral time		40 s		0 to 3,999 s (1 s unit)	
Manual output		---		0.0% to 100.0% (0.1% unit)	
Control period		20 s		1 to 99 s (1 s unit)	

Item		Thermocouple input CQM1-TC00□	Platinum resistance thermometer input CQM1-TC10□	Thermocouple input CQM1-TC20□	Platinum resistance thermometer input CQM1-TC30□
Input shift range		---		–99.9 to 999.9°C/°F (0.1°C/°F unit)	0.1°C Ranges –99.9 to 999.9°C/°F (0.1°C/°F unit) 0.01°C Ranges –9.99 to 99.99°C/°F (0.01°C/°F unit)
Sampling period		1 s		0.5 s	
Output	Output refresh period	1 s		0.5 s	
	Output form	NPN or PNP outputs (with short-circuit protection)		NPN or PNP outputs (with short-circuit protection)	
	Maximum switching capacity	100 mA, 24 V DC $^{+10\%}/_{-15\%}$		100 mA, 24 V DC $^{+10\%}/_{-15\%}$	
	Leakage current	0.3 mA max.		0.1 mA max.	
	Residual voltage	3.0 V max.		0.8 V max.	
External supply voltage		15 mA min., 24 V DC $^{+10\%}/_{-15\%}$		30 mA min., 24 V DC $^{+10\%}/_{-15\%}$	
Internal current consumption		220 mA max. at 5 V DC		190 mA max. at 5 V DC	
Heater burnout alarm	Maximum heater current	---		50 A, single-phase AC	
	Input current monitoring accuracy	---		±5 % FS ±1 digit	
	Heater burnout alarm setting	---		0.1 to 49.9 A (0.1 A unit) (See note 1.)	
	Minimum ON time for detection	---		200 ms (See note 2.)	

Note: 1. Heater burnout detection will be disabled if the alarm is set to 0.0 A. The heater burnout alarm output will turn ON if the alarm is set to 50.0 A.

2. If the control output is ON for less than 200 ms, heater burnout will not be detected and the heater current will not be measured.

Temperature Ranges

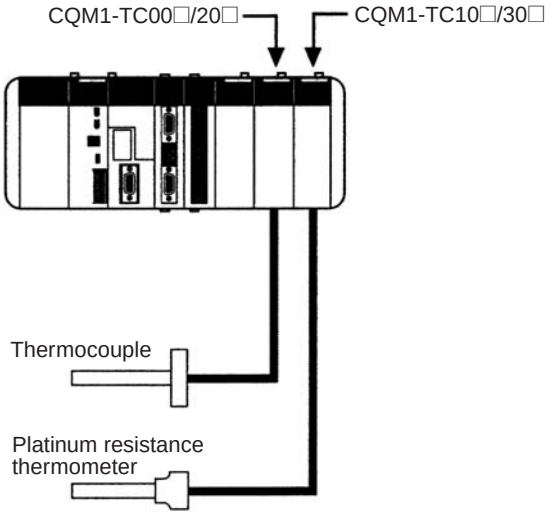
■ Units for Thermocouples

Input type	Code No.	°C	°F
K	0	–200 to 1300	–300 to 2300
K	1	0.0 to 500.0	0.0 to 900.0
J	2	–100 to 850	–100 to 1500
J	3	0.0 to 400.0	0.0 to 750.0
T	4	–200.0 to 400.0	–300.0 to 700.0
L	5	–100 to 850	–100 to 1500
L	6	0.0 to 400.0	0.0 to 750.0
R	7	0 to 1700	0 to 3000
S	8	0 to 1700	0 to 3000
B	9	100 to 1800	300 to 3200

■ Units for Platinum Resistance Thermometers

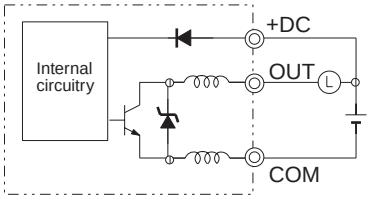
Input type	Code No.	°C	°F
Pt100	0	–200.0 to 650.0	–300.0 to 1200.0
JPt100	1	–200.0 to 650.0	–300.0 to 1200.0
Pt100	2	–20.00 to 250.00	Do not set.
JPt100	3	–20.00 to 250.00	

Example System Configuration

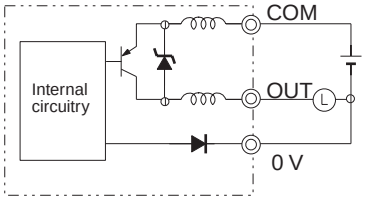


Output Circuits

CQM1-TC□01/TC□03: Sinking Outputs (NPN)



CQM1-TC□02/TC□04: Sourcing Outputs (PNP)



Current Detector Ratings

Item	E54-CT1	E54-CT3
Continuous maximum heater current	50 A	
Range for accurate measurement	0 to 30 A	0 to 50 A
Withstand voltage	1,000 VAC	
Shock resistance	50 Hz (Approx. 98 m/s^2)	
Hole diameter	5.8 mm	12.0 mm
Weight	Approx. 11.5 g	Approx. 50 g
Accessories	None	Contactors: 2 Plugs: 2