MCM57-MRM57 Series

Instruction Manual (Basic Edition)

https://www.shimaden.co.jp

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■ For questions, please contact

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MMCM57-E51-C
Jun. 2022

■ Introduction

Thank you very much for purchasing our product. Before using this product, carefully read the instructions for safety, installation site, and wiring to ensure its correct and safe use.
This Instruction Manual (Basic Edition) contains the minimum required information. Refer to the "Instruction Manual for MCM57, MRM57 Series Module-type Temperature Controller (Detailed Edition)" for corresponding parameter values, initial values, and other details.
Visit our website at https://www.shimaden.co.jp to download the free Instruction Manual for MCM57-MRM57 Series Module-type Temperature Controller (Detailed Edition).

■ Checking the supplied items

Make sure that all the items listed below are included in the delivered package.

- MCM57-MRM57 Series Module-type Temperature Controller: — 1 unit
- Instruction Manual (Basic Edition): ——— 1 copy
- Connectors for external connection: ——— 2 to 6 pcs (variable depending on options selected)
- Bus connector: ——— 1 pc
- Terminal resistor for RS-485 communication (supplied with MCM57): ——— 1 pc
- Terminal resistor for RS-422 communication (supplied with MCM57): ——— 2 pcs

■ Safety warnings and cautions

Warning

The MCM57-MRM57 Series industrial control instruments are designed for the conversion of temperature, humidity, and other physical quantities. Therefore, avoid use for conversion purposes that may cause life-threatening risks. Otherwise, take appropriate safety measures before use.
We shall not be held responsible or liable for any accident that may occur due to the failure of the user to take safety measures.

- Install this instrument in a control panel, etc., to prevent any terminal from physical contact with the operator.
- Be sure to power this instrument off before installing or uninstalling it or before inserting a hand or any conductor into its casing. Failure to comply may result in an electrical shock that may cause serious injury or death.
- Before wiring, be sure to turn the power off. Failure to comply may result in an electrical shock.
- Be sure to de-energize wired terminals or any other live parts before touching them.

■ User agreement

The MCM57-MRM57 Series is warranted for one year after purchase. In principle, avoid its use in any of the cases listed below. If its use is unavoidable, select an appropriate method of use with a sufficient safety margin in rating or performance and take appropriate safety measures against accidents that may occur.

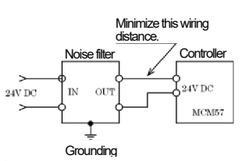
- Outdoors, in places exposed to chemical contaminants, electrical disturbances, mechanical stresses, or in sites not compliant with the "Installation site considerations" in the catalog or the instruction manual.
- Nuclear, aeronautical, astronautical, railway, vehicular, or medical equipment, or any other equipment specifically controlled under regulations.
- Equipment potentially dangerous to human life or property.
- Applications or equipment with particularly stringent safety requirements.

Caution

Where the failure of this instrument may cause damage to nearby equipment, facilities, products, etc., take safety measures, such as installing a fuse or an anti-overheating device, before use. **We shall not be held responsible or liable for any accident that may occur due to the failure of the user to take safety measures.**

- Install a switch or a circuit breaker, as a power-off method, on the external power supply circuit connected to the power terminal of this instrument . The switch or circuit breaker must be installed securely in a location close to this instrument and easily accessible to the operator and must be indicated as the power-off device for this instrument.
- About the fuse
  This instrument has no built-in fuse. Mount a fuse in the external power supply circuit connected to power terminal.
  Standard fuse rating/characteristics: 24 V DC, 160 mA per Temp Control Module
- Before wiring, be sure to tighten the terminal connection.
  Insufficient tightening may cause overheating due to contact resistance, leading to a burning accident.
- Use within the rated supply voltage.
- The user must not make any modification and/or non-standard use.
- It takes 30 minutes for this instrument to read the correct temperature after power-on. (Power on this instrument more than 30 minutes before it actually starts control.)
- To ensure safety and maintain the functions of this device, do not disassemble this device. If this device must be disassembled for replacement or repair, contact your dealer.

■ Instructions for wiring



Keep the following points in mind during wiring.

(1) According to "Functions of the COM Module terminals" and "Functions of the Temp Control Module terminals," ensure that there are no wires connected incorrectly.
(2) For thermocouple input, use a compensating conductor compatible with the selected type of thermocouple.
(3) For RTD input, ensure that each lead wire has a resistance of 5Ω or less and that all the three wires have the same resistance.
(4) Do not run the input signal wiring through the same conduit or duct as a high-voltage circuit.
(5) Use shield wiring (single point grounding), which provides effective protection against static induction noise.
(6) Twist the input wires at short, regular intervals to provide effective protection against electromagnetic induction noise.
(7) For power supply wiring, use a wire or cable 0.5 m^2 or more in cross-sectional area and equivalent or superior in performance to a vinyl insulated wire.
(8) Tighten the terminal screws securely in place. Tightening torque: 0.5 to 0.6 N·m (5 to 6 kgf·cm)
(9) Use a noise filter to prevent the malfunction of this instrument where it is likely to be affected by power supply noise.
Install the noise filter on a grounded panel and minimize the wiring distance between the noise filter output and the controller's power supply terminal.
(10) Countermeasure against lightning surge will be required for signal line over 30m.

■ Installation site considerations

Caution

Avoid use in any of the places listed below. Failure to comply may cause malfunction or damage to this instrument and could result in a fire.

- Places where flammable gas, corrosive gas, oil mist, or dust that deteriorates insulation is generated or abundant.
- Places exposed to excessive vibration or impact.
- Places close to a high-voltage circuit or prone to inductive interference.
- Places exposed to water droplets or direct sunlight.
- Places exposed to air blown from a heater or an air-conditioner.

This instrument is manufactured assuming use under the following conditions. Use it within the following environmental conditions:

- Indoor use
- Altitude: 2,000 m or less above sea level
- Operating temperature: -10 to 50°C
- Operating humidity: 90%RH or less, no condensation
- Transient overvoltage category: I
- Contamination level: 2 (IEC 60664)

■ Product specification code check

Check the delivered product against the following code selection tables to ensure that it is the one that you ordered.

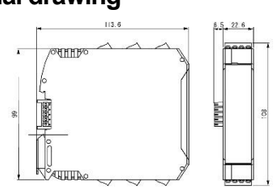
COM Module

Item	Code	Specification	
Series	MCM57-	DIN rail mountable COM Module	
Master communication method	2	EIA RS-422, 4-wire half-duplex multi-drop (connectable to up to 31 units per group)	
	5	EIA RS-485, 2-wire half-duplex multi-drop (connectable to up to 31 units per group)	
Special notes	0	N/A	
	9	Applicable	

Temp Control Module

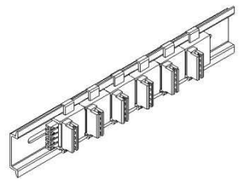
Item	Code	Specification	
Series	MRM57-	DIN rail mountable Temp Control Module with 2 event output points/CH (4 points in total)	
CH1 input	8	Multi (B, R, S, K, E, J, T, N, PLII, C(WRe5-26), U, L, Pt100, JPt100, ±10 mV, 0-10 mV, 0-20 mV, 0-50 mV, 10-50 mV, 0-100 mV)	
	6	Volt (±1 V, 0-1 V, 0-2 V, 0-5 V, 1-5 V, 0-10 V)	
CH2 input	8-	Multi (B, R, S, K, E, J, T, N, PLII, C(WRe5-26), U, L, Pt100, JPt100, ±10 mV, 0-10 mV, 0-20 mV, 0-50 mV, 10-50 mV, 0-100 mV)	
	6-	Volt (±1 V, 0-1 V, 0-2 V, 0-5 V, 1-5 V, 0-10 V)	
Control outputs (common to both CH1 and CH2)	C-	Transistor open collector/24 V DC, 100 mA	
	P-	SSR drive voltage/12 V DC, 30 mA	
	I-	Amperage/4-20 mA, max. load 500Ω	
	V-	Voltage/0-10 V, max. current 2mA	
Program	N	N/A	
	P	4 patterns, 32 steps	
Options (common to both CH1 and CH2)	00	3 DI points/CH (6 points in total), no-voltage contact input/5 V, 1 mA [standard] Note that 6 points are usable in the single-input version.	
	03	1 analog output point/CH (2 points in total), 0-10 mV, output resistance 10Ω	
	04	1 analog output point/CH (2 points in total), 4-20 mA, max. load 300Ω	
	06	1 analog output point/CH (2 points in total), 0-10 V, max. current 2 mA	
Control modes	0	2-input 2-output (2ch independent two-loop)	
	1	1-input 2-output (1ch heating and cooling, 2 heating stages, 2 cooling stages)	
	2	2-input 1-output (1ch cascade)	
	3	2-input 2-output (1ch PV switch control)	
Special notes	0	N/A	
	9	Applicable	

■ Outline dimensional drawing

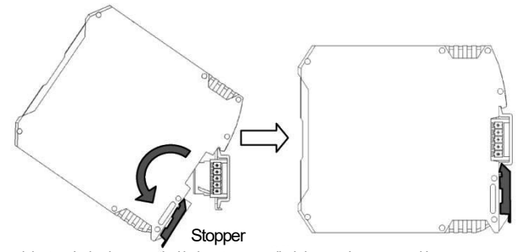


■ Installation and uninstallation

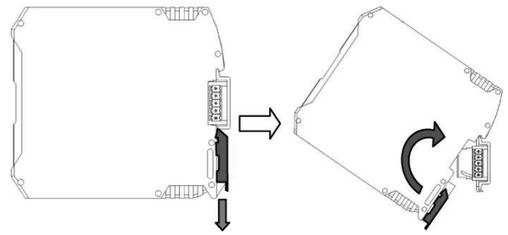
(1) Connect a sufficient number of bus connectors for one COM Module and one or more Temp Control Modules and install them on a DIN rail.



(2) First, engage the upper side of each module (the side without the stopper) with the DIN rail and slide each module diagonally into place.
Push each module in all the way until the stopper snaps into place.
(3) Repeat the above steps to connect and install multiple modules on the DIN rail.



(4) To remove a module, turn its body upward with the stopper pulled down using a screwdriver.



* There is no particular order specified for the installation/uninstallation of the COM Module and Temp Control Module(s).

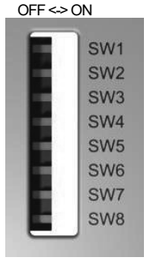
This instrument does not support hot-swapping. A module must be powered off before plugging it into a bus connector (DIN rail). Failure to comply may result in failure or malfunction of the module.

■ Setup before power-on

Use the COM Module DIP switches to set the communication conditions. The switch setting information reflects the state of the COM Module immediately after power-on. This means that any switch operation after power-on will be invalid. Hence, always set the DIP switches before power-on.

DIP switches
Left = OFF
Right = ON

OFF <-> ON



SW1-2: Group address setting
These switches are used for the address setting operation described later for automatic address assignment that determines the group slave address range.

SW1	SW2	Slave address range
OFF	OFF	1 to 62
OFF	ON	65 to 126
ON	OFF	129 to 190
ON	ON	193 to 254

SW3: Protocol setting

SW3	Protocol
OFF	SHIMADEN
ON	MODBUS-RTU

SW4-5: Communication speed (baud rate) setting

SW4	SW5	Baud rate
OFF	OFF	4,800 bps
OFF	ON	9,600 bps
ON	OFF	19,200 bps
ON	ON	38,400 bps

SW6: Data length setting (not applicable when the protocol is MODBUS-RTU)

SW6	Data length
OFF	7 bits
ON	8 bits

SW7: Parity bit setting

SW7	Parity bit
OFF	N/A (Non)
ON	Even number (Even)

SW8: Stop bit setting

SW8	Stop bit
OFF	1 bit
ON	2 bits

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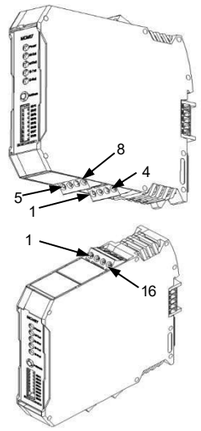
■ Terminal No. arrangement

(1) COM Module

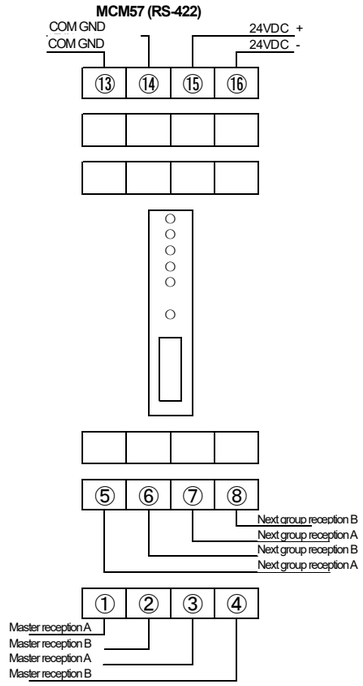


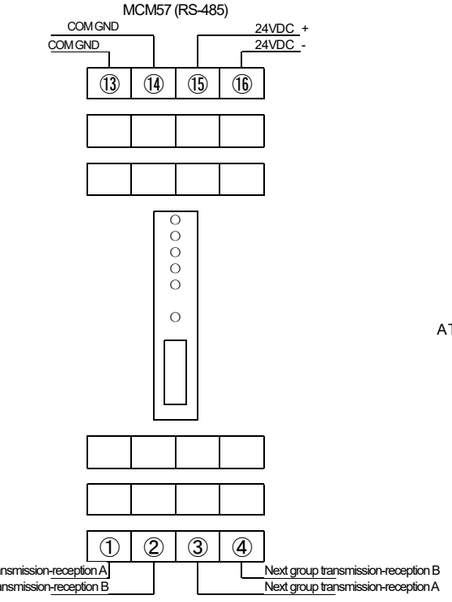
(2) Functions of the COM Module terminals

No.	Name	Description	
		RS-422	RS-485
1	COM	Connects transmission A (+) to master reception A (+).	Connects transmission-reception A (+) to master transmission-reception A (+).
2		Connects transmission B (-) to master reception B (-).	Connects transmission-reception B (-) to master transmission-reception B (-).
3		Connects reception A (+) to master transmission A (+).	Connects transmission-reception A (+) to next group transmission-reception A (+).
4		Connects reception B (-) to master transmission B (-).	Connect transmission-reception B (-) to next group transmission-reception B (-).
5	COM	Connects transmission A (+) to next group transmission A (+).	—
6		Connects transmission B (-) to next group transmission B (-).	—
7		Connects reception A (+) to next group reception A (+).	—
8		Connects reception B (-) to next group reception B (-).	—
13	SG	RS-422 COM GND	RS-485 COM GND
14		RS-422 COM GND	RS-485 COM GND
15	Power	24V DC+	24V DC+
16		24V DC-	24V DC-

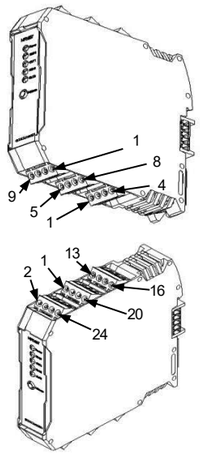
* Terminal Nos. 5 through 8 are absent in the RS-485 version.

(3) Wiring diagram





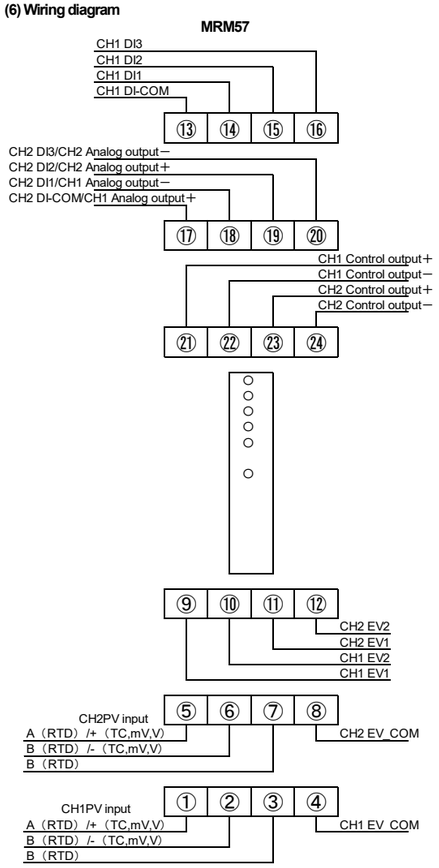
(4) Temp Control Module



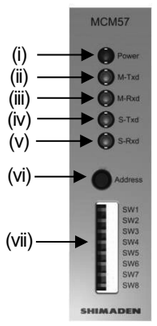
(5) Functions of the Temp Control Module terminals

No.	Name	Description
1	CH1 PV input	+ (TC, mV, V) A (RTD)
2		- (TC, mV, V) B (RTD)
3		B (RTD)
4	CH1 EV_C	Event common
5	CH2 PV input	+ (TC, mV, V) A (RTD)
6		- (TC, mV, V) B (RTD)
7		B (RTD)
8	CH2 EV_C	Event common
9	CH1 EV	Event output 1
10		Event output 2
11	CH2 EV	Event output 1
12		Event output 2
13	CH1 DI	External control input common
14		External control input 1
15		External control input 2
16		External control input 3
17	CH2 DI / CH1_AO	CH2 external control input common / CH1 analog output+
18		CH2 external control input 1 / CH1 analog output-
19	CH2 DI / CH2_AO	External control input 2 / analog output+
20		External control input 3 / analog output-
21	CH1 OUT	Control output +
22		Control output -
23	CH2 OUT	Control output +
24		Control output -

(6) Wiring diagram



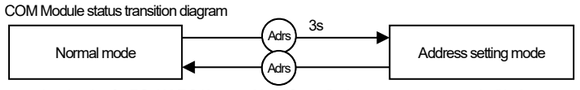
--Front view--



No.	Name	Function
(i)	Power LED	This LED remains on in the normal mode. It blinks in the address setting mode (address initialization).
(ii)	Master transmission LED	This LED blinks during transmission to the master unit.
(iii)	Master reception LED	This LED blinks during reception from the master unit.
(iv)	Slave transmission LED	This LED blinks during transmission to the Temp Control Module.
(v)	Slave reception LED	This LED blinks during reception from the Temp Control Module.
(vi)	Address Switch (Adrs)	Hold down for 3 seconds to switch from the normal mode to the address setting mode. Push once in the address setting mode to get the slave address.
(vii)	Initialization switch	SW1: Group address setting
		SW2: Group address setting
		SW3: Protocol selection
		SW4: Communication speed selection
		SW5: Communication speed selection
		SW6: Data length selection
		SW7: Parity bit selection
		SW8: Stop bit selection

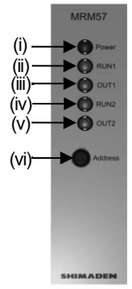
A COM Module uses address switch operations to toggle between the normal mode and the address setting mode.

COM Module status transition diagram



*For the connection drawing for RS-422/RS485, see 20-2. “Controller-host computer connection” in the Instruction Manual for MCM57-MRM57 Series Module-type Temperature Controller (Detailed Edition).

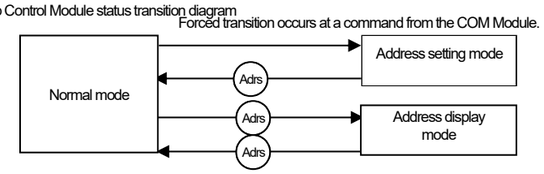
--Front view--



No.	Name	Function
(i)	Power LED	This LED remains on in the normal mode. It blinks in the address setting mode (address initialization). It indicates Bit 5 in the address display mode.
(ii)	CH1 RUN LED	This LED remains on during CH1 operation in the normal mode. It indicates Bit 4 in the address display mode.
(iii)	CH1 Output LED	This LED indicates CH1 output in the normal mode. It indicates Bit 3 in the address display mode.
(iv)	CH2 RUN LED	This LED remains on during CH2 operation in the normal mode. It indicates Bit 2 in the address display mode.
(v)	CH2 Output LED	This LED indicates CH2 output in the normal mode. It indicates Bit 1 in the address display mode.
(vi)	Address Switch (Adrs)	Push once in the normal mode to switch to the address display mode. Push once in the address setting mode to request the slave address.

A Temp Control Module uses address switch operations to toggle between the normal mode, the address setting mode, and the address display mode.

Temp Control Module status transition diagram



Otherwise, auto-return occurs in 3 min.

COM terminal resistor (supplied with MCM57)
1 pc to be used when RS-485 communication is selected.
2 pcs to be used when RS-422 communication is selected.