Shimaden, Temperature and Humidity Control Specialists

°C
%RH
SHIMADEN

Series MCM57/MRM57

SHIMADEN MODULE TYPE TEMPERATURE CONTROLLER

MCM57
communication module

MRM57
temperature controller module

CE approved

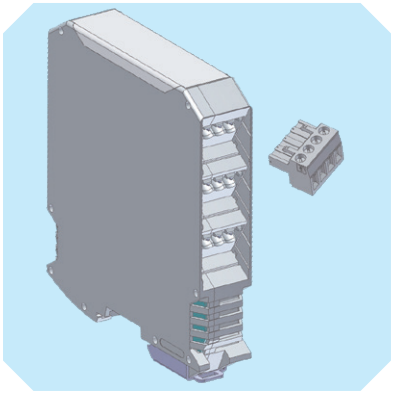
BASIC FEATURES

The MCM57/MRM57 Series temperature controllers are multi-loop temperature controllers with module structure and 2 CH input/output.

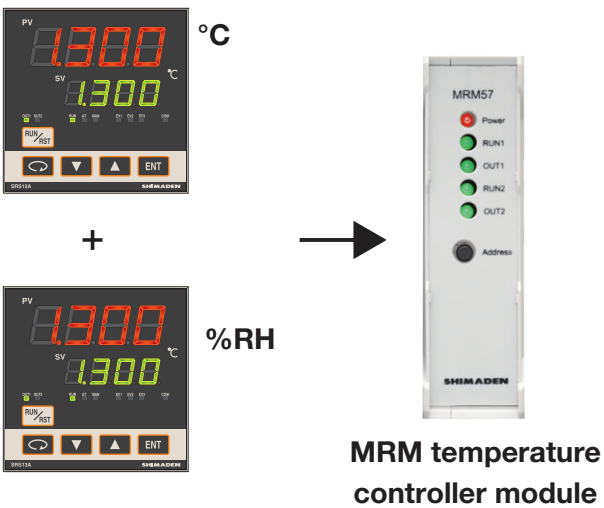
FEATURES

- Approved by CE Marking
- Its thin width of 22.6 mm enables multiple continuous mounting.
- Mounting a DIN rail conserves space, and is suitable for narrow installation space.

- Works as a converter, importing analog values (thermocouple or RTD) into PC or PLC
- Adopting European-style terminal blocks reduces the burden of wiring. Their detachable structure simplifies mounting and replacing.



- A single controller works as two controllers with different control functions (2IN_2OUT control/ cascade control).



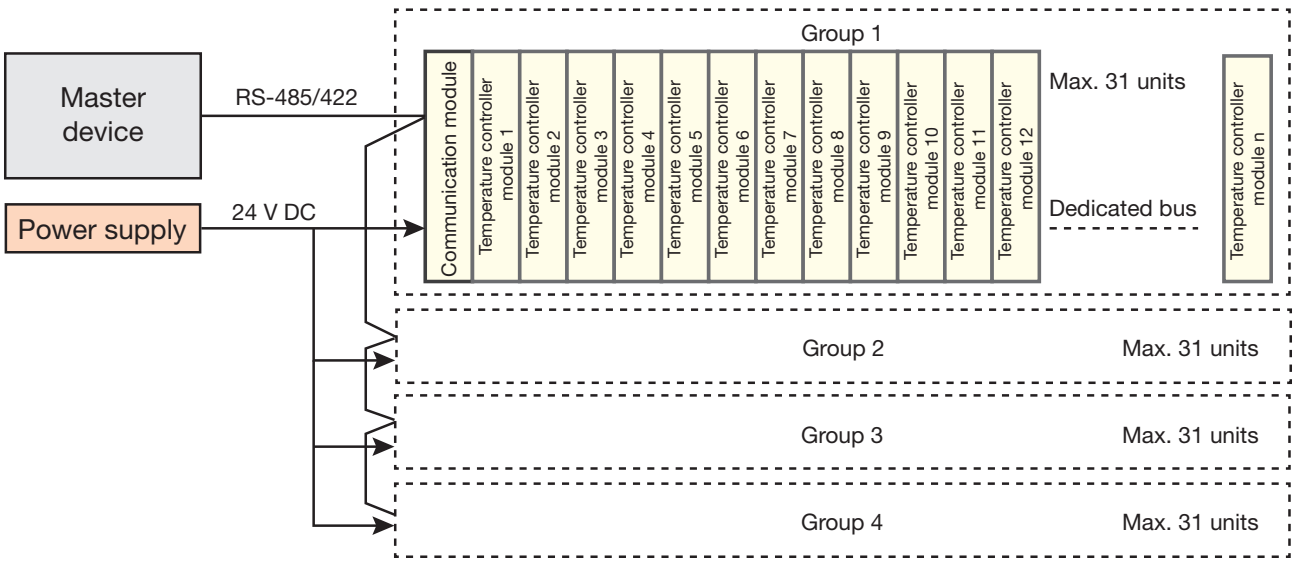
MRM temperature controller module

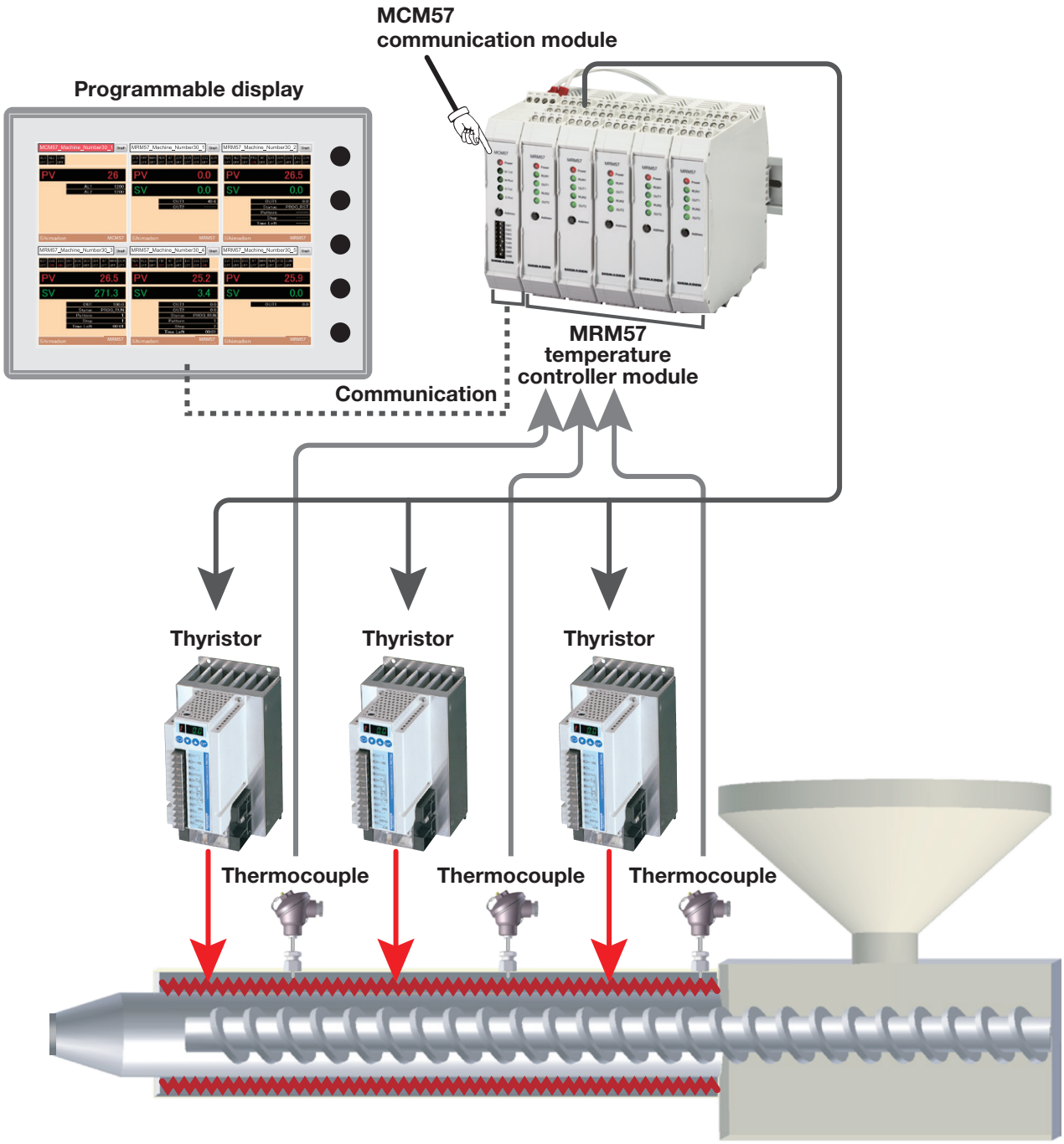
- 31 units can be connected in a single group. A maximum of 4 groups can be connected to a single master device.
- Control mode can be selected: 1 input and 2 outputs/2 inputs and 2 outputs/cascade
- Sampling cycle: 500 ms
- Multi SV value setting: SV can be set up to 3 values.
  SV No. 1–3
- Multi PID: PID No. 1–3 (3 types)
- Standard-equipped with EV functions (2 CH × 2 circuits)
- Optional functions
  - Program function: Up to 4 patterns and 32 steps
  - External control input: 3 points (1 input)
  - Analog output: 1 point

EQUIPMENT CONFIGURATION

MCM57/MRM57 Series temperature controllers consist of communication modules and temperature controller modules; a single temperature controller module supports 2-loop temperature control. The temperature controller modules for which initial setup has been completed can be operated independently. However, monitoring the current values or changing the parameter settings requires a communication module. A communication module manages the group, supporting links between a master device (PLC, PC, etc.) and temperature controller modules. Communication between a master device and a communication module is done through RS-485 or RS-422; a communication module and temperature controller modules communicate through a dedicated bus. A maximum of 31 temperature controller modules can be connected in a single group. A maximum of 4 groups can be connected to a single master device.

Configuration diagram

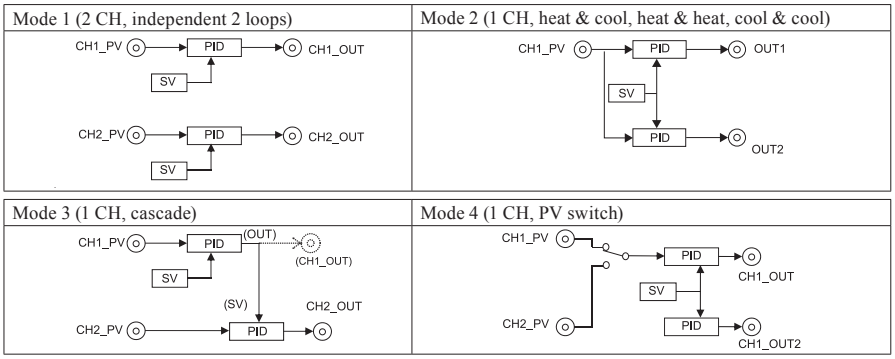



MCM57
communication module
Programmable display
MRM57
temperature
controller module
Communication
Thyristor
Thyristor
Thyristor
Thermocouple
Thermocouple
Thermocouple

■ Configuration

• System mode: These temperature controllers have 2 inputs and outputs, normally controlled by 2-loop independent control. However, the modules can construct the following systems according to the settings.

Mode 1: 2 inputs and 2 outputs, 2 channels, independent 2-loop control
Mode 2: 1 input and 2 outputs, 1 channel, heat & cool, heat & heat, cool & cool
Mode 3: 2 inputs and 1 output, 1 channel, cascade control
Mode 4: 2 inputs and 2 outputs, 1 channel, PV switchover control
* In mode 4, the CH1 side must be allocated to a minimum temperature measuring range.
* In mode 4, the measuring range that constitutes a proportional band is the range between the CH1 lower limit value and the CH2 higher limit value.



■ Temperature controller module

■ Display

• Status display: LED lamp display
Red: Power
Green: CH1-RUN, CH2-RUN, CH1-OUT, CH2-OUT

■ Setting

• Address setting: By pushbutton switch operation
Automatic allocation function allocates 2 consecutive addresses to a single module.

■ Input

• Input type: Specified when ordered from multi (TC/Pt/mV) or voltage (V)
• Thermocouple: B, R, S, K, E, J, T, N, PL II, WRe5-26, {U, L, (DIN43710)}
Gold-iron/chromel (AuFe-Cr)
Input resistance: 500kΩ minimum
External resistance tolerable range: 100Ω maximum
Burnout function: Standard-equipped (upscale)
Cold junction temperature compensation: ±3°C (ambient temperature 5–45°C)
• RTD: Pt100/JPt100, 3-wire type
Amperage: 0.25 mA
Lead wire tolerable resistance range: Below 5Ω/1 wire (All wires should have the same resistance.)
• Voltage mV: -10–10, 0–10, 0–20, 0–50, 10–50, 0–100 mV DC
V: -1–1, 0–1, 0–2, 0–5, 1–5, 0–10 V DC
Input resistance: 500kΩ minimum
Current input (0–20, 4–20 mA DC) requires external receiving impedance (250Ω).
• Input scaling function: Possible during voltage (mV, V) input
Scaling range: -2000–10000 digits
Span: 10–10000 digits
Decimal point position: None, 1/2/3 digits following decimal point
(With or without a decimal point is selectable during sensor input.)
• Sampling cycle: 0.5 sec.

- Input accuracy: ±0.25%FS ± 1 digit (excluding cold junction temperature guaranteed accuracy of thermocouple input)
- PV bias: -2000–2000 digits
- PV filter: 0–10000 sec.
- PV gain: -5.00–+5.00%
- Isolation: Insulated from control output and AO. Uninsulated from other input/output, power supply, and system.

■ Control

- Control method: Expert PID control with auto-tuning function
- Control output/rating
  - Transistor output: Transistor open collector/24 V DC, 100 mA
  - Current output: 4–20 mA DC/maximum load resistance 500Ω
  - SSR drive voltage: 12 V ± 1.5 V DC/maximum load current 30 mA
  - Voltage output: 0–10 V DC/maximum load current 2 mA
- Output resolution: 1/13000
- Output accuracy: ±1.0%FS (5–100% output)
- Control parameter
  - Proportional band (P): OFF, 0.1–1000.0%FS (ON-OFF action when OFF)
  - Integral time (I): OFF, 1–6000 sec. (P/PD action when OFF)
  - Derivative time (D): OFF, 1–3600 sec. (P/PI action when OFF)
  - Target value function (SF): OFF, 0.01–1.00 sec.
  - Hysteresis mode: Selection from two types: CENT mode/SVOF mode
  - ON/OFF action hysteresis: 1–999 digits (valid when P = OFF)
  - Manual reset: -50.0–50.0% (valid when I = OFF)
  - Higher/lower limits output limiter: Lower limit: 0.0–99.9%, higher limit: 0.1–100.0% (Lower limit values are less than higher limit values.)
  - Proportional cycle: 1–120 sec. (during transistor open collector output or SSR drive voltage output)
  - Dead band: -2000–5000 digits (overlaps when the digit is negative)
  - Cascade mode: Cascade mode has 3 selectable types of calculation methods.
    - Mode 1: SV2 = (OUT 1/100) × (Scale_H - Scale_L) + Scale_L
    - Mode 2: SV2 = SV + Bias
    - Mode 3: SV2 = PV1 + Bias
  - Cascade scale: CH2 measuring range
  - Switchover point: The rising temperature at which PV switches from CH1 to CH2 (set within the overlapping range between CH1 and CH2 measuring ranges)
  - Switchover hysteresis: The falling temperature at which PV switches from CH2 to CH1 is specified by a decremental value from the switchover point (set within 0–1000 digits).
- Manual control
  - Output setting range: 0.0–100.0%, setting resolution: 0.1%
  - Manual/automatic switch: Balanceless bumpless (within proportional band range)
- Soft start: Set individually for CH1 and CH2
  OFF, 1–120 sec.
- AT point: Execution SV value
- Control output characteristics: RA (reverse action characteristics)/DA (direct action characteristics) is switched by communication or external control input.
  Set individually for CH1 and CH2
  Heating action for RA (reverse action characteristics)
  Cooling action for DA (direct action characteristics)
- Isolation: Uninsulated from other control output and AO. Insulated from other input/output, power supply, and system.
- Others: Different output types cannot be set to CH1 and CH2 within a single module.

■ Event output

- No. of output: 2 points per channel (EV1 and EV2), a total of 4 points
- Event type: Set to each EV from the types below
  (NON): No assignment

(HD): Higher limit deviation alarm
(LD): Lower limit deviation alarm
(OD): Outside higher/lower limits deviation alarm
(ID): Inside higher/lower limits deviation alarm
(HA): Higher limit absolute value alarm
(LA): Lower limit absolute value alarm
(SO): Scaleover
(RUN): RUN signal
(ROT1): Output 1 inversion signal (only during transistor open collector output)
(COM): Communication direct operation
(STPS): Step signal
(PTNS): Pattern signal
(ENDS): Program end signal
(HOLD): Hold signal
(PROG): Program signal
(U_SL): Upslope signal
(D_SL): Downslope signal
(GUA): Guarantee soak signal

- Event setting range
  Absolute value: Within measuring range (both higher and lower limits)
  Deviation: -2000–2000 digits (both higher and lower limits)
  Higher/lower limits deviation: 0–2000 digits (both inside and outside)
- Event action: ON-OFF action
- Hysteresis: 1–1000 digits
- Standby action: Separately set from the 4 types below
  No standby
  Standby 1 (when starting power, when STBY [RST] → EXE [RUN])
  Standby 2 (when starting power, when STBY [RST] → EXE [RUN], when execution SV is changed)
  Control mode (No standby: Alarms are not output when there is input abnormality.)
- Output specifications/rating: Transistor open collector/24 V DC, 100 mA
- Output updating cycle: 0.5 sec.
- Latching function: Alarm action holding function (assignable to deviation alarm/absolute value alarm)
  Selection from ON (valid)/OFF (invalid)
  Latching is cancelled by DI or communication.
- Output characteristics: Selection from NO/NC
- Isolation: Insulated from control output and AO. Uninsulated from other input/output, power supply, and system.

■ Program function (option)

- No. of pattern: Maximum 4 patterns (settable to 1, 2, or 4)
- No. of step: Maximum 8 steps (4 patterns), 16 steps (2 patterns), or 32 steps (1 pattern),
  The total no. of steps is 32.
- No. of PID types: Maximum 3 types
- Time setting: 0 min. 0 sec.–99 min. 59 sec./1 step or 0 h. 0 min.–99 h. 59 min./1 step
- Setting resolution: 1 min. or 1 sec.
- Time accuracy: ±(set time × 0.005 + 0.5 sec.)
- Step setting parameters: SV, Step time, PID No.
- No. of pattern executions: Maximum 10000 times
- PV start: ON/OFF
- Guarantee soak: OFF/1–1000 digits
- Hold: Possible by external control input or communication
- Advance: Possible by external control input or communication
- Power failure compensation: Without (Settings are maintained, but elapsed time/execution step/no. of executions are reset.)

■ External control input (DI) (option)

- No. of input: 3 points (DI1, DI2, and DI3), exclusive selection with analog output

• DI assignment type: Set to each DI from the types below

(non):	No assignment:	
(RUN1):	Control execution/stop:	Level action
(RUN2):	Control execution/stop:	Edge action
(MAN):	Manual output:	Level action
(AT):	Auto-tuning execution:	Edge action
(ESV2):	External selection 2 bit:	Level action
(ACT1):	Output 1 output characteristics (RA/DA):	Level action
(ACT2):	Output 2 output characteristics (RA/DA):	Level action
(PROG):	Program:	Level action
(HLD):	Hold signal:	Level action
(ADV):	Advance:	Edge action
(PTN2):	Start pattern selection 2 bit:	Level action
(PTN3):	Start pattern selection 3 bit:	Level action
(L_RS):	Latching release:	Edge action

* When a collision between communication and DI occurs, level-action functions give priority to DI; edge-action functions handle both.

• Action input: Non-voltage contact or open collector, approx. 5 V DC, 1 mA maximum

• Minimum input holding time: 0.5 sec.

• Isolation: Insulated from control output and AO. Uninsulated from other input/output, power supply, and system.

■ Analog output (AO) (option)

• No. of output: 1 point per channel

• Output type: Selection from measured value, set value (execution SV), or control output

• Output specifications/rating: Current: 4–20 mA DC (maximum load resistance 300Ω)
Voltage: 0–10 V DC (maximum load current 2 mA)
Voltage: 0–10 mV DC (output resistance 10Ω)

• Output scaling: Within measuring range or output range (Reverse scaling is possible.)

• Output accuracy: ±0.3%FS (for displayed value)

• Output resolution: 1/13000

• Output updating cycle: 0.5 sec.

• Output limiter: Higher and lower limits (0.0–100.0%) are settable. However, lower limit values must be less than higher limit values.

• Isolation: Uninsulated from other AO and control output. Insulated from other input/output, power supply, and system.

■ Communication module

■ Display

• Status display: LED lamp display
Red: Power
Green: M-TXD, M-RXD, S-TXD, S-RXD

■ Setting

• Display method: Operation by 8 front panel dip switches or pushbutton switch

SW1, 2	Slave address (higher level)	OFF, OFF	: 1–62	OFF, ON	: 65–127
		ON, OFF	: 129–191	ON, ON	: 183–255
SW3	Protocol	OFF	: SHIMADEN	ON	: MODBUS-RTU
SW4, 5	Baud rate	OFF, OFF	: 4800	OFF, ON	: 9600 bps
		ON, OFF	: 19200 pps	ON, ON	: 38400 bps
SW6	Data length (invalid during MODBUS)	OFF	: 7 bit	ON	: 8 bit
SW7	Parity bit	OFF	: Non	ON	: Even
SW8	Stop bit	OFF	: 1	ON	: 2

■ Master side communication function

• Communication type: EIA standard RS-485 or RS-422 (specified when ordered)

- Communication method: Half duplex start stop synchronization
- Communication delay time: Approx. 10 msec
- Maximum connected units: 5 units including host
- Communication code: SHIMADEN: ASCII code/ MODBUS-RTU: binary code
- Protocol: SHIMADEN standard protocol/MODBUS-RTU
- Start/end character: STX (02h), ETX (03h), CR (0Dh) (SHIMADEN standard protocol)
- Error detection: CRC-16 (MODBUS-RTU), increment (SHIMADEN)
- Communication distance: Maximum 500 m (depends on conditions)
- Termination: By external 120Ω resistance

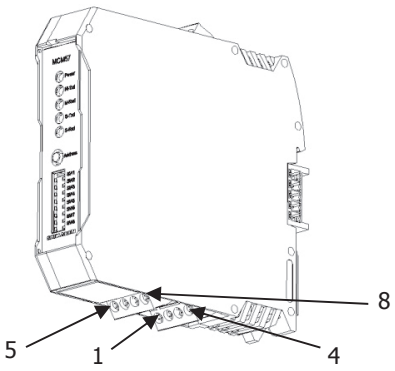
■ Temperature controller module side communication function

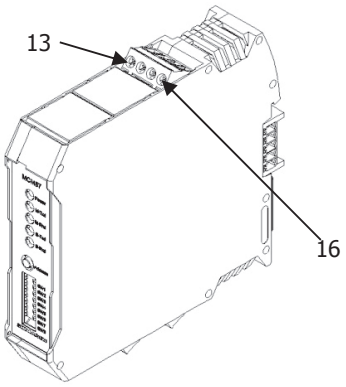
- Communication type: Dedicated bus
- Communication method: Half duplex start stop synchronization
- Maximum connected units: 32 units including communication module
- Communication code: Binary code
- Protocol: Dedicated protocol

■ General specifications

- Data storage: Non-volatile memory (EEPROM)
- Operation ambient conditions
  - Temperature: -10–50°C
  - Humidity: 90%RH maximum (no dew condensation)
  - Elevation: 2000 m maximum
  - Category: I
  - Pollution class: 2
- Storage temperature: -20–65°C
- Power supply voltage: 24 V DC ± 10%
- Applicable standard:
  - Safety: IEC61010-1 and EN61010-1
    IEC610-2-030 and EN61010-2-030
  - EMC: EN61326-1
  - RoHS: EN50581
- Insulation resistance
  - MCM57 communication module: Communication terminal and power supply terminal interval: 500 V DC, 20MΩ or above
  - MRM57 temperature controller module: Input terminal and output terminal interval: 500 V DC, 20MΩ or above
- Dielectric strength
  - MCM57 communication module: Communication terminal and power supply terminal interval: 500 V AC, for 1 min.
  - MRM57 temperature controller module: Input terminal and output terminal interval: 500 V DC, for 1 min.
- Power consumption
  - MCM57 communication module: Maximum 2 W at 24 V DC
  - MRM57 temperature controller module: Maximum 3 W at 24 V DC
- Material of case: PA66 (nylon 66)
- External dimensions: H108 × W22.6 × D113.6 mm
- Weight
  - MCM57 communication module: Approx. 120 g
  - MRM57 temperature controller module: Approx. 150 g

■ Communication module (MCM57)





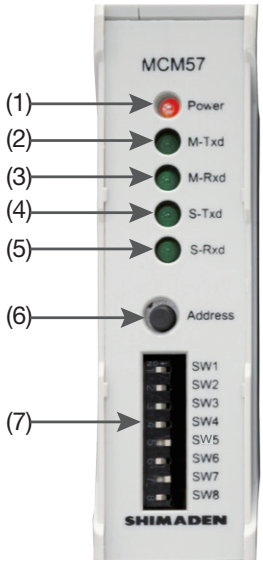
* RS-485 types do not have terminal 5–8.

● Communication module terminal function

Terminal number	Name	Description	
		RS-422	RS-485
1	Communication	Transmitter A (+): Connects to master receiver A (+).	Transmitter/receiver A (+): Connects to master transmitter/receiver A (+).
2		Transmitter B (-): Connects to master receiver B (-).	Transmitter/receiver B (-): Connects to master transmitter/receiver B (-).
3		Receiver A (+): Connects to master transmitter A (+).	Transmitter/receiver A (+): Connects to next-group transmitter/receiver A (+).
4		Receiver B (-): Connects to master transmitter B (-).	Transmitter/receiver B (-): Connects to next-group transmitter/receiver B (-).
5	Communication	Transmitter A (+): Connects to next-group transmitter A (+).	— — —
6		Transmitter B (-): Connects to next-group transmitter B (-).	— — —
7		Receiver A (+): Connects to next-group receiver A (+).	— — —
8		Receiver B (-): Connects to next-group receiver B (-).	— — —
13	SG	RS-422 communication ground	RS-485 communication ground
14		RS-422 communication ground	RS-485 communication ground
15	Power supply	24 V DC +	24 V DC +
16	Power supply	24 V DC -	24 V DC -

● Front surface view and function

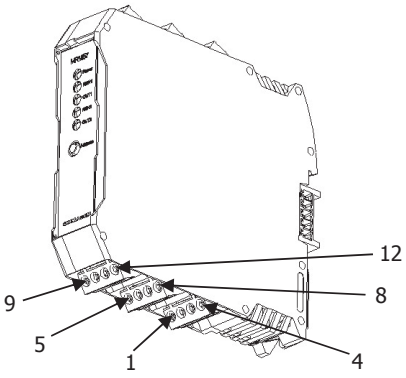
Front surface view

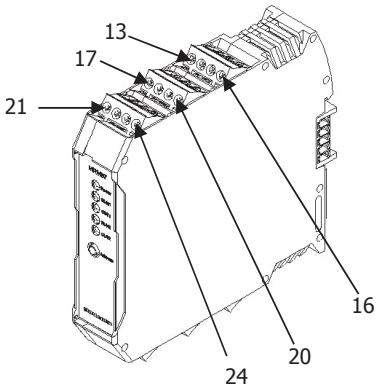


No.	Name	Function	
(1)	Power lamp	In a normal mode, the lamp is lit when power is ON. The lamp flashes during address setting mode (address initialization).	
(2)	Master transmission lamp	The lamp flashes during transmission to the master device.	
(3)	Master reception lamp	The lamp flashes during reception from the master device.	
(4)	Slave transmission lamp	The lamp flashes during transmission to temperature controller modules.	
(5)	Slave reception lamp	The lamp flashes during reception from temperature controller modules.	
(6)	Address switch (Adrs)	Pressing the button for at least 3 sec. switches to address setting mode. In address setting mode, a single push of the button acquires a slave address.	
(7)	Initialization switch	SW1	Group address setting
		SW2	
		SW3	Protocol selection
		SW4	Communication speed selection
		SW5	
		SW6	Data length selection
		SW7	Parity bit selection
		SW8	Stop bit selection

A communication module has a basic display mode and an address setting mode. These modes are switched by address switch operation. For details, see the instruction manual.

■ Temperature controller module (MRM57)



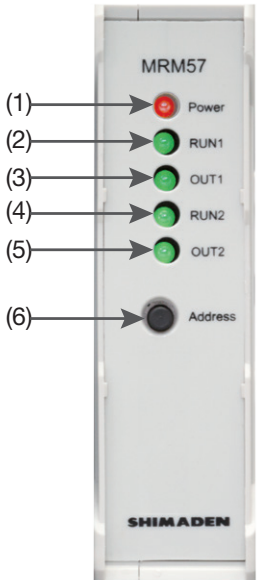


● Temperature controller module terminal function

Terminal number	Name	Description
1	CH1 PV input	+ (TC, mV, V) A (RTD)
2		- (TC, mV, V) B (RTD)
3		B (RTD)
4	CH1 EV_C	CH1 event common
5	CH2 PV	+ (TC, mV, V) A (RTD)
6		- (TC, mV, V) B (RTD)
7		B (RTD)
8	CH2 EV_C	CH2 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/AO	CH2 external control input common/CH1 analog output +
18		CH2 external control input 1/CH1 analog output -
19	CH2 DI/AO	CH2 external control input 2/CH2 analog output +
20		CH2 external control input 3/CH2 analog output -
21	CH1 OUT	Control output +
22		Control output -
23	CH2 OUT	Control output +
24		Control output -

● Front surface view and function

Front surface view



No.	Name	Function
(1)	Power lamp	In a normal mode, the lamp is lit when power is ON. The lamp flashes during address setting mode (address initialization). The lamp indicates bit 5 during address display mode.
(2)	CH1 operation lamp	In a normal mode, the lamp is lit during CH1 operation. The lamp indicates bit 4 during address display mode.
(3)	CH1 output lamp	In a normal mode, the lamp is lit during CH1 output. The lamp indicates bit 3 during address display mode.
(4)	CH2 operation lamp	In a normal mode, the lamp is lit during CH2 operation. The lamp indicates bit 2 during address display mode.
(5)	CH2 output lamp	In a normal mode, the lamp is lit during CH2 output. The lamp indicates bit 1 during address display mode.
(6)	Address switch (Adrs)	In a normal mode, a single push of the button switches to address display mode. In address setting mode, a single push of the button requests a slave address.

ORDERING INFORMATION

■ Communication module

ITEM	Code		Specification
Series	MCM57-		DIN rail mount type communication module
Master communication type	2		EIA RS-422 4-wire type half duplex multi drop (Up to 31 units can be connected in a single group)
	5		EIA RS-485 2-wire type half duplex multi drop (Up to 31 units can be connected in a single group)
Remarks		0	Without
		9	With

■ Temperature controller module

Item	Code			Specification
Series	MRM57-			Event output 2 points/CH (a total of 4 points) DIN rail mount type temperature controller module
CH1 input	8			Multi (B, R, S, K, E, J, T, N, PL II, 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, PL II, 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 output (the same for CH1 and CH2)		C-		Transistor open collector: 24 V DC, 100 mA
		P-		SSR drive voltage: 12 V DC, 30 mA
		I-		Current: 4–20 mA DC, Maximum load: 500Ω
		V-		Voltage: 0–10 V DC, Maximum current: 2 mA
Program			N	Without
			P	4 patterns and 32 steps
Option (the same for CH1 and CH2)			00	DI 3 points/CH (a total of 6 points) non-voltage contact input/5 V, 1 mA (standard) When there is only 1 input, 6 DI can be used.
			03	Analog output 1 point/CH (a total of 2 points) 0–10 mV, output resistance 10Ω
			04	Analog output 1 point/CH (a total of 2 points) 4–20 mA, maximum load 300Ω
			06	Analog output 1 point/CH (a total of 2 points) 0–10 V, maximum current 2 mA
Control mode			0	2 inputs and 2 outputs (2 CH, independent 2 loops)
			1	1 input and 2 outputs (1 CH, heat & cool, heat & heat, cool & cool)
			2	2 inputs and 1 output (1 CH, cascade)
			3	2 inputs and 2 outputs (1 CH, PV switchover control)
Remarks				0 Without
				9 With

ITEM SOLD SEPARATELY

Name of Item	Model	Description
Shunt resistor	QCS003	250Ω, ±0.1%; used as external receiving impedance during current (mA) input

Input Type				Code	Measuring Range (°C)	Measuring Range (°F)
Multi input	Thermocouple	B		01 *1	0–1800°C	0–3300°F
		R		02	0–1700°C	0–3100°F
		S		03	0–1700°C	0–3100°F
		K		04 *2	-200.0–400.0°C	-300–750°F
				05	0.0–800.0°C	0–1500°F
				06	0–1200°C	0–2200°F
		E		07	0–700°C	0–1300°F
		J		08	0–600°C	0–1100°F
		T		09 *2	-200.0–200.0°C	-300–400°F
		N		10	0–1300°C	0–2300°F
		PL II		11 *3	0–1300°C	0–2300°F
		WRe5-26		12 *4	0–2300°C	0–4200°F
		U		13 *2, *5	-200.0–200.0°C	-300–400°F
		L		14 *5	0–600°C	0–1100°F
		Kelvin	K	15 *6	10.0–350.0 K	10.0–350.0 K
			AuFe-Cr	16 *7	0.0–350.0 K	0.0–350.0 K
			K	17 *6	10–350 K	10–350 K
			AuFe-Cr	18 *7	0–350 K	0–350 K
	RTD	Pt100		30	-100.0–350.0°C	-150.0–650.0°F
				31	-200–600°C	-300–1100°F
				32	-100.0–100.0°C	-150.0–200.0°F
				33	-50.0–50.0°C	-50.0–120.0°F
				34	0.0–200.0°C	0.0–400.0°F
		JPt100		35	-200–500°C	-300–1000°F
				36	-100.0–100.0°C	-150.0–200.0°F
				37	-50.0–50.0°C	-50.0–120.0°F
				38	0.0–200.0°C	0.0–400.0°F
				39	-100.0–350.0°C	-150.0–650.0°F
		Pt100		40	-200.0–550.0°C	-300–1000°F
				41	0.0–350.0°C	0.0–650.0°F
				42	0.0–550.0°C	0–1000°F
		JPt100		45	-200.0–500.0°C	-300–1000°F
				46	0.0–350.0°C	0.0–650.0°F
				47	0.0–500.0°C	0–1000°F
	Voltage (mV)	-10–10 mV		71	Initial value: 0.0–100.0 Input scaling setting range: -2000–10000 Span: 10–10000 digits Decimal point position: None, 1/2/3 digits following decimal point Lower limit value < Higher limit value Note: • If the difference between the higher limit value and lower limit value is less than +10 digits or higher than +10000 digits, the higher limit value automatically changes to +10 digits or +10000 digits. • The higher limit value cannot be set less than the lower limit value +10 digits or higher than +10000 digits. • For current input, select voltage input, install the specified 250Ω resistor to input terminals, and use code 84 (0–20 mA) or 85 (4–20 mA).	
		0–10 mV		72		
		0–20 mV		73		
		0–50 mV		74		
		10–50 mV		75		
		0–100 mV		76		
Voltage (V)		-1–1 V		81		
		0–1 V		82		
		0–2 V		83		
		0–5 V		84		
		1–5 V		85		
		0–10 V		86		

Thermocouple: B, R, S, K, E, J, T, N: JIS/IEC RTD: Pt100: JIS/IEC JPt100

*1. Thermocouple B: Accuracy guarantee not applicable to 400°C (752°F) or below.

*2. Thermocouple K, T, U: Accuracy of indicated values below -100°C is ±0.7% FS.

*3. Thermocouple PL II: Platinel

*4. Thermocouple WRe5-26: ASTM E988-96

*5. Thermocouple U, L: DIN 43710

*6. Thermocouple K (Kelvin) accuracy temperature range

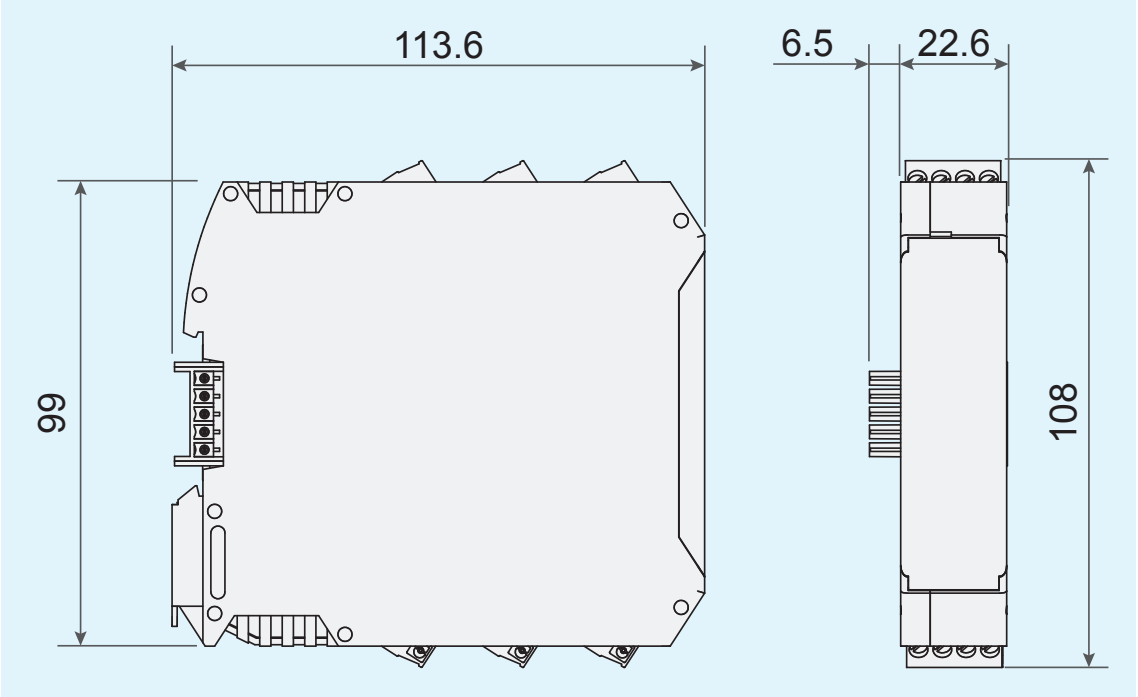
Temperature range	
10.0–30.0 K	± (2.0%FS + [CJ error × 20] K + 1 K)
30.0–70.0 K	± (1.0%FS + [CJ error × 7] K + 1 K)
70.0–170.0 K	± (0.7%FS + [CJ error × 3] K + 1 K)
170.0–270.0 K	± (0.5%FS + [CJ error × 1.5] K + 1 K)
270.0–350.0 K	± (0.3%FS + [CJ error × 1] K + 1 K)

*7. Thermocouple gold-iron/chromel (AuFe-Cr) (Kelvin) accuracy temperature range

Temperature range	
0.0–30.0 K	± (0.7%FS + [CJ error × 3] K + 1 K)
30.0–70.0 K	± (0.5%FS + [CJ error × 1.5] K + 1 K)
70.0–170.0 K	± (0.3%FS + [CJ error × 1.2] K + 1 K)
170.0–280.0 K	± (0.3%FS + [CJ error × 1] K + 1 K)
280.0–350.0 K	± (0.5%FS + [CJ error × 1] K + 1 K)

Note: Unless otherwise designated, the factory default settings are as follows:

Input	Standard/rating	Measuring range
Multi input	Thermocouple K	0.0–800.0°C
Voltage (V)	0–10 V DC	0.0–100.0 (no unit)



Unit: mm

⚠ Warning

- The MCM57/MRM57 series is designed for the control of temperature, humidity and other physical values of general industrial equipment. (It is not to be used for any purpose which regulates the prevention of serious effects on human life or safety.)

⚠ Caution

- If the possibility of loss or damage to your system or property as a result of failure of any part of the process exists, proper safety measures must be taken before the instrument is put into use so as to prevent the occurrence of trouble.

ISO9001/ISO14001 certified

(The contents of this brochure are subject to change without notice.)

Temperature and Humidity Control Specialists

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18CMCM57/MRM5710ILC