KCM-LCD2 Dual-Channel PID Temperature Controller User Manual

⚠ SAFETY INFORMATION

WARNING — ELECTRIC SHOCK HAZARD: Disconnect all power sources and follow applicable lockout/tagout procedures before wiring or servicing the controller. Do not touch terminals or internal components while power is applied. Failure to follow these instructions can result in serious injury or death.

CAUTION — EQUIPMENT DAMAGE: Before applying power, verify that the supply voltage matches the controller's rating label. Before operating the process, set SN to match the connected sensor or input signal.

WARNING — OVERHEATING HAZARD: Do not use this controller as the sole means of overtemperature protection. Provide an independent high-limit shutdown and other protective devices as required by the process design and applicable codes.

I. Overview

The KCM-LCD2 Series is an intelligent dual-channel PID controller designed for precise, synchronized temperature and process control. Each channel features dedicated sensor inputs, setpoints, PID loops, and auto-tuning routines, operating with complete isolation to eliminate cross-channel interference.

The controller provides three selectable control algorithms (Standard Temperature PID, Fuzzy PID, and Pressure PID) and supports advanced process modes based on single-channel values, inter-channel differential, or dual-channel averaging. On models equipped with analog outputs, channels can be field-configured for closed-loop PID control or linear signal retransmission.

II. Technical Specifications

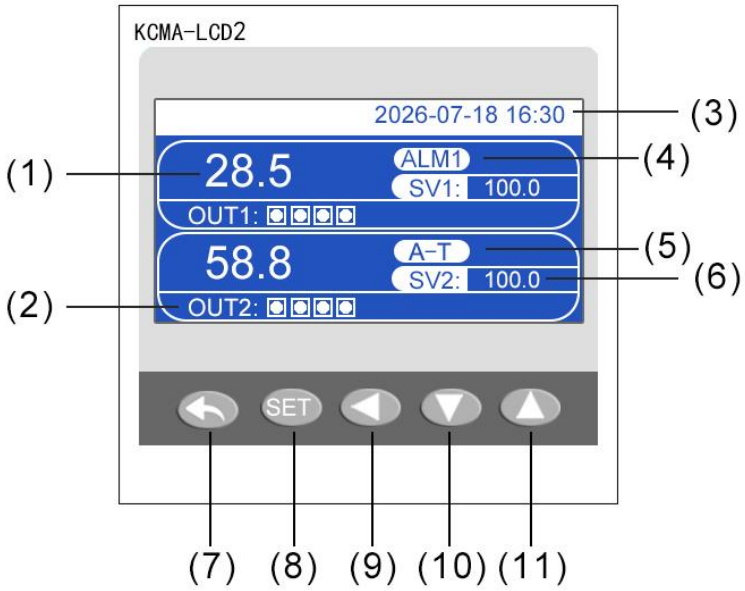
1. **Measurement Accuracy:** ±0.5% of Full Scale (F.S.) ±1 digit
2. **Supported Inputs:**
   Temperature-input models: Selectable Cu50 or Pt100 RTD input, Type K, E, J, T, or S thermocouple input.
   Analog-input models: 0–5 V or 4–20 mA, fixed by the installed hardware. Display range: -1999 to 9999.
3. **Control Output (Hardware Dependent):**
   - Relay (SPST, 3 A @ 220 VAC max., resistive load)
   - Solid-state relay (SSR) output
   - Analog output: 4–20 mA or 0–10 V, depending on the installed hardware.

   Verify the output type and electrical ratings on the controller's label before wiring.
4. **Power Supply:** 85-242 V AC/DC (universal switching), 50/60Hz or Low-Voltage Option: 24 VDC
5. **Communication (Optional):** RS232/485 serial port with standard Modbus-RTU protocol
6. **Operating Environment:** 0 to 50.0°C (32 to 122°F), relative humidity ≤ 85%, in an area free from corrosive gases and strong electromagnetic interference.

III. Front Panel and Wiring

1. **PV Display:** Show the measured value for Channel 1 (CH1) and Channel 2 (CH2). The measured variable depends on the connected sensor, such as temperature, pressure, level, or humidity.
2. **Output bar graphs:** Show the control output as a percentage. Each bar graph has 10 segments.
3. **System time:** Appears only on models with the recording option.
4. **Alarm indicators (ALM):** Illuminates when the channel alarm relay is energized.
5. **Auto-tune indicators (AT):** Illuminates while PID auto-tuning is in progress on the channel.

6. **SV Display:** Show the setpoint for each channel. The setpoint is labeled SV on the main display and SP in the parameter menu.
7. **Return key (↩):** Returns to the main display from the parameter menu. While editing a value, cancels the change without saving.
8. **SET key:** Press and hold for 3 seconds to open the parameter menu. Press to edit a selected parameter or save a change.
9. **SET Key:** Press for approximately 1 second to edit the setpoint (SP). Press and hold until LOCK appears to access the parameter menu; see Section 5 for the hold-time discrepancy in the source manual.
10. **Shift/Page key (◄):** Selects the digit to edit. In the parameter menu, changes pages.
11. **Down key (▼):** Decreases a value when editing a parameter or setpoint, or adjusting the output manually. In the parameter menu, moves through the menu items.



12. **Up key (▲):** Increases a value when editing a parameter or setpoint, or adjusting the output manually. In the parameter menu, moves through the menu items.

IV. Parameter Reference

Table 4-1

No.	Symbol	Name	Range	Description	Default
level 1 menu: global & system parameters (common to both channels)					
0	LOCK	Parameter Lock	0 ~ 50	Controls access to parameter settings: • LOCK = 18: Parameter editing is enabled. • Other values: Editing of other parameters is disabled.	18
1	ADDR	Modbus Address	0 ~ 255	Sets the controller's communication address.	1
	GAP	Data Logging Interval	0 ~ 3600 s	Sets the interval between recorded samples, in seconds. Available only on models with a recording interface.	1
2	BAUD	Baud Rate	0 ~ 3	Selects the baud rate: 0: 4800 bps; 1: 9600 bps; 2: 19200 bps; 3: 38400 bps.	1
3	PARI	Parity	0 ~ 2	Selects parity: 0: None; 1: Odd; 2: Even.	—
Level 2 menu: channel configuration parameters (independently configured for CH1 & CH2)					
4	SP	Setpoint	PS-L ~ PS-H	Sets the target process value for the selected channel.	—
5	SN	Input Type	Selectable	Selects the input type, subject to the installed hardware: • RTD: Cu50 or Pt100 • Thermocouple: Type K, E, J, T, S • Linear Analog: 4–20 mA DC / 0–5 VDC	—

				(hardware dependent)	
6	AT	Auto-Tune	0 ~ 1	OFF: Auto-tuning is disabled. ON: Starts auto-tuning. See Section 6.	0
7	C/F	Temperature Units	C / F	C: Celsius (°C). F: Fahrenheit (°F).	—
8	SC	Sensor Offset	-50.0 ~ 50.0	Applies an offset to the measured value to compensate for sensor error.	0.0
9	PS-H	Input Scale High Limit	PS-L ~ 9999	Sets the upper display range limit and the maximum setpoint.	9999
10	PS-L	Input Scale Low Limit	0 ~ PS-H	Sets the lower display range limit and the minimum setpoint.	0
11	FILT	Input Filter	0 ~ 80	Sets the first-order input filter. Higher values provide more filtering but slow the response to changes in the measured value.	20
12	DP	Decimal Point Position	0 ~ 3	Sets the number of decimal places: 0: 0000 1: 000.0 2: 00.00 3: 0.000. Also determines the scaling of register values that use decimal places; see Appendix 3.	1
13	OP	Output Mode	0 ~ 11	Selects PID control or analog retransmission. Modes 0–11 are supported; see Table 4-2.	0
14	ALG	PID Control Algorithm	0 ~ 2	0: Standard PID 1: Fuzzy PID 2: Pressure PID	0
15	ARW	Anti-Reset Windup	0–100	Anti-reset windup limits integral accumulation during output saturation to prevent overshoot	50
16	T	Proportional Cycle Time	1 ~ 120 s	Sets the time-proportioning cycle for relay or SSR outputs in PID mode. Shorter cycles can improve control, but increase switching frequency. Does not apply to continuous analog outputs.	10
17	HY	Control Hysteresis	0.1 ~ 50.0	Switching differential (deadband) for On/Off control (when P = 0). A smaller value provides tighter control, but causes more frequent relay cycling, shortening mechanical contact life.	1.0
18	P	Proportional Band (P)	0 ~ 999.9	Sets the proportional band. Smaller values produce a faster response; larger values produce a slower response. Set P = 0 for on/off control.	50.0
19	I	Integral Time (Reset)	0 ~ 9999 s	Sets the integral time in seconds. Integral action reduces steady-state error. Smaller nonzero values increase integral action; larger values reduce it. Set I = 0 to disable integral action.	100
20	D	Derivative Time (Rate)	0 ~ 9999 s	Sets the derivative time in seconds. Derivative action responds to the rate of change of the process value to improve stability. Larger values increase derivative action.	30
21	PIDL	PID Output Low Limit	0.0 ~ PIDH %	Sets the minimum PID control output, as a percentage.	0.0
22	PIDH	PID Output	PIDL ~	Sets the maximum PID control output, as a	100.0

		High Limit	100.0 %	percentage.	
23	PB-H	Retransmission Scale High	PS-L ~ 9999	Sets the process value corresponding to the high end of the retransmission output. See Section 4.2.2.	9999
24	PB-L	Retransmission Scale Low	0 ~ PS-H	Sets the process value corresponding to the low end of the retransmission output. See Section 4.2.2.	0
25	OUTH	Output High Limit	OUTL ~ 220	Set the high and low limits of the analog control or retransmission output.	200
26	OUTL	Output Low Limit	0 ~ OUTH	Current output: Each count represents 0.1 mA. Set OUTL = 40 and OUTH = 200 for 4–20 mA. Voltage output: Each count represents 0.05 V. Set OUTL = 0 and OUTH = 200 for 0–10 V.	40
27	ALP	Alarm Operating Mode	0 ~ 8	Selects the alarm mode. Set ALP = 0 to disable the alarm. See Table 4-3 for modes 1–8.	0
28	ALM	Primary Alarm Setpoint	Sensor range	Sets the primary alarm threshold. Its function depends on ALP.	—
29	ALM-L	Secondary Alarm Setpoint	Sensor range	Lower threshold setting for band alarms. Active only when ALP is configured for Mode 5 or 6.	—
30	AL-HY	Alarm Hysteresis	0.1 ~ 50.0	Sets the switching differential between the alarm trip and reset thresholds to prevent relay chatter.	0.5

4.1 On/Off Control — Relay and SSR Outputs

Set P = 0 to use on/off control instead of PID control. The output switches at the thresholds below, based on the setpoint (SP), hysteresis (HY), and output mode (OP).

Table 4-1A: Main Control (OUT Terminal) On/Off Switching Logic			
Control Action	Settings	Output Turns OFF	Output Turns ON
Heating (reverse-acting)	P = 0; OP = 0	Measured Value ≥ SP	Measured Value ≤ SP − HY
Cooling (direct-acting)	P = 0; OP = 1	Measured Value ≤ SP	Measured Value ≥ SP + HY

Sensor and input fault indications

-HH-: The input is above range. An open thermocouple can also cause this indication.

-LL-: The input is below range. For example, a 4–20 mA input below 4 mA produces this indication.

Application Examples:

Heating: To turn the heater on at or below 90°C and off at or above 100°C, set SP = 100, HY = 10.0, OP = 0, P = 0.

Cooling: To turn the cooling output on at or above 100°C and off at or below 90°C, set SP = 90, HY = 10.0, OP = 1, P = 0.

4.2 Analog Output Operating Modes (4–20 mA / 0–10 VDC)

On models with analog outputs, set OP separately for each channel to select PID control or retransmission. In retransmission mode, the output represents a measured or calculated value rather than a PID control demand.

4.2.1 Output Modes

Mode	Output Mode	Description
OP = 0	Heating PID Control (Reverse-Acting)	Controls the selected channel at SP. Output decreases as PV rises.
OP = 1	Cooling PID Control (Direct-Acting)	Controls the selected channel at SP. Output increases as PV rises.
OP = 2	Temperature Difference PID Control (Reverse-Acting)	Controls PV1 − PV2 at SP. Output decreases as the difference increases.
OP = 3	Temperature Difference PID Control (Direct-Acting)	Controls PV1 − PV2 at SP. Output increases as the difference increases.
OP = 4	Average PID Control (Reverse-Acting)	Controls (PV1 + PV2) / 2 at SP. Output decreases as the average rises.
OP = 5	Average PID Control (Direct-Acting)	Controls (PV1 + PV2) / 2 at SP. Output increases as the average rises.
OP = 6	Channel PV Retransmission	Retransmits the selected channel's PV.
OP = 7	Absolute Temperature Difference Retransmission	Retransmits |PV1 − PV2|, regardless of which channel reads higher.
OP = 8	Signed Temperature Difference Retransmission	Retransmits PV1 − PV2, including its sign.
OP = 9	Maximum Value Retransmission	Retransmits the higher of PV1 and PV2.
OP = 10	Minimum Value Retransmission	Retransmits the lower of PV1 and PV2.
OP = 11	Average Value Retransmission	Retransmits (PV1 + PV2) / 2.

Notes: The signed-difference modes above show Channel 1. For Channel 2, the difference is PV2 − PV1. In retransmission modes, PB-L and PB-H set the output scale.

4.2.2 Direct-Acting vs. Reverse-Acting Retransmission Scaling

PB-L is the process value at the low end of the output signal; PB-H is the process value at the high end. For a 4–20 mA output, these endpoints are 4 mA and 20 mA, respectively. Their assignments do not change when the scale is reversed.

Set the signal endpoints with OUTL and OUTH: use 4.0 and 20.0 for 4–20 mA, or 0 and 20.0 for 0–10 V.

Direct scaling (PB-H > PB-L): Output increases as the process value increases.

Reverse scaling (PB-H < PB-L): Output decreases as the process value increases.

4.2.3 Example: Temperature Difference Retransmission

Example — reverse-scaled temperature difference

This example assumes both channels are set to °C and OUT1 is a current output with OUTL = 40 and OUTH = 200. The required signal is 4 mA at a temperature difference of 10°C and 20 mA at 5°C. For a signed difference of ΔT = PV1 − PV2, set the following Channel 1 parameters:

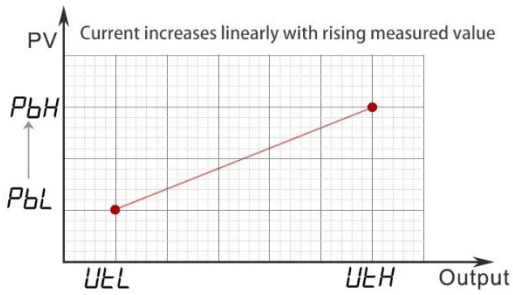
OP = 8: Signed temperature difference retransmission.

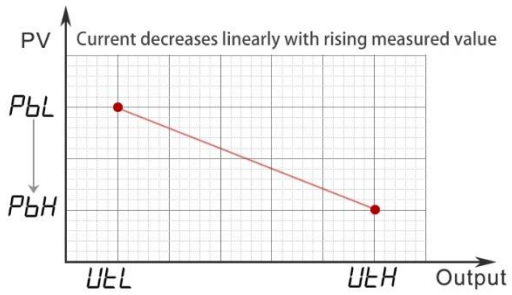
PB-H = 5: 20 mA at ΔT = 5°C.

PB-L = 10: 4 mA at ΔT = 10°C.

The output varies linearly between these points. For direct scaling (4 mA at 5°C and 20 mA at 10°C), set PB-H = 10 and PB-L = 5.

To use the magnitude of the temperature difference regardless of which channel reads higher, select OP = 7 instead. Change the parameters for the channel whose OUT terminal is used.





4.3 Alarm Output Operating Modes & Logic

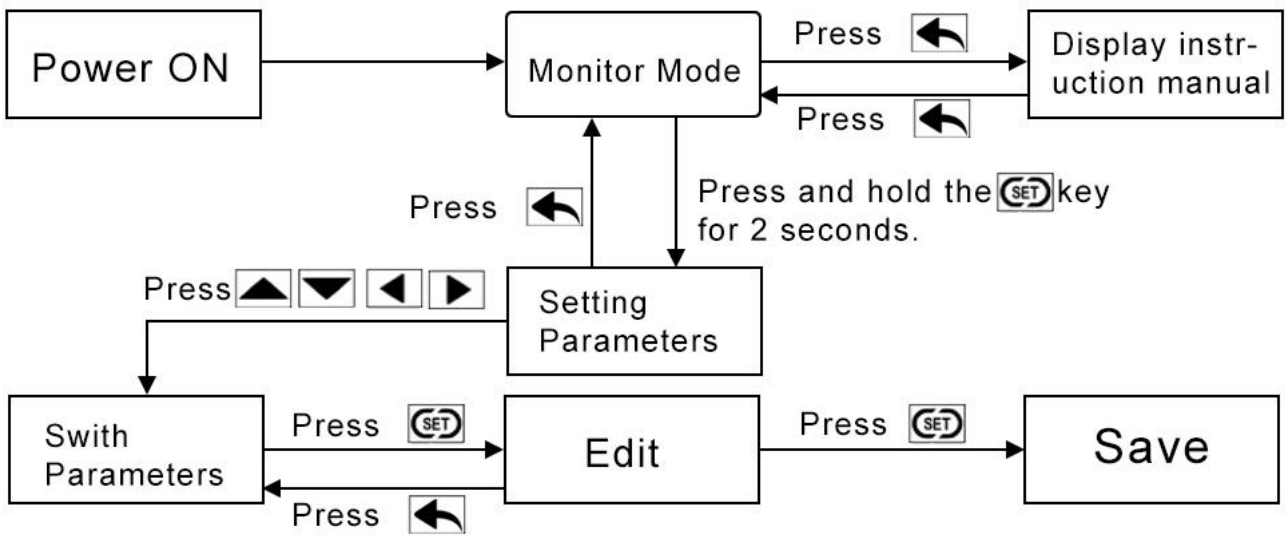
Optional alarm relay rating: 220 V, less than 3 A, resistive load. Set ALP to select the alarm mode. The table below shows when the alarm relay energizes and resets, using the process value (PV), setpoint (SP), alarm thresholds (ALM and ALM-L), and alarm hysteresis (AL-HY).

4.3.1 Alarm Modes

Table 4-3: Alarm trip and reset thresholds (Channel 1)

Mode	Alarm Type	Alarm Energizes	Alarm De-energizes
ALP = 1	Process High Alarm	PV ≥ ALM	PV < ALM − AL-HY
ALP = 2	Process Low Alarm	PV ≤ ALM	PV > ALM + AL-HY
ALP = 3	Deviation High Alarm	PV ≥ SP + ALM	PV < SP + ALM − AL-HY
ALP = 4	Deviation Low Alarm	PV ≤ SP − ALM	PV > SP − ALM + AL-HY
ALP = 5	Out-of-Band (Window) Alarm	PV ≤ ALM-L OR PV ≥ ALM	ALM-L + AL-HY < PV < ALM − AL-HY
ALP = 6	In-Band (Window) Alarm	ALM-L ≤ PV ≤ ALM	PV < ALM-L − AL-HY OR PV > ALM + AL-HY
ALP = 7	Temperature Difference High Alarm	(PV1 − PV2) ≥ ALM	(PV1 − PV2) < ALM − AL-HY
ALP = 8	Temperature Difference Low Alarm	(PV1 − PV2) ≤ ALM	(PV1 − PV2) > ALM + AL-HY

V. Parameter Configuration



Normal operation:

The main display shows both channels' process values, setpoints, output bar graphs, and alarm status.

To open the parameter menu:

- Press and hold SET for 3 seconds. See Table 4-1 for parameter descriptions.
- Each page shows up to five parameters. Use ▼ or ▲ to select a parameter.
- Press ◄ to change pages.
- To open a channel's settings, go to the end of the Level 1 menu and select the entry for CH1 or CH2, then press SET.
- Press ↩ to leave the menu and return to the main display.

To change a parameter:

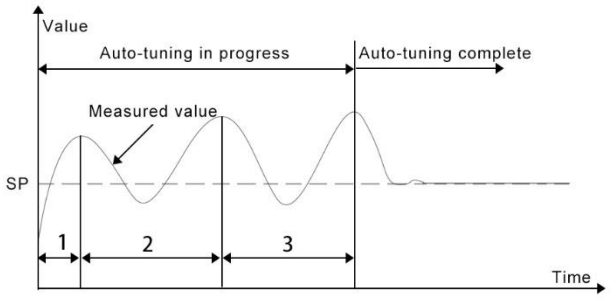
Set LOCK = 18 in the Level 1 menu to enable editing. LOCK itself can always be changed, even when other parameters are locked.

1. Select the parameter and press SET to edit it.
2. Use ◄ to select a digit, then press ▲ or ▼ to change the value.
3. Press SET to save the change and leave edit mode. To cancel without saving, press ↩.

VI. Auto-tuning (AT)

Run auto-tuning during initial setup, after significant changes to operating conditions, or if control performance deteriorates. Auto-tuning calculates and saves the proportional band (P), integral time (I), and derivative time (D) for the connected process, reducing the need for manual adjustment.

To auto-tune Channel 1:



1. **Check the system.** Verify the sensor and output wiring. Confirm that the controller displays the process temperature correctly and can control the heater.
2. **Start auto-tuning.**
   - Press and hold **SET** for 3 seconds. Open the Level 2 parameters for CH1.
   - Set SP to the required operating temperature.
   - Set HY to a value from **0.5 to 1.0** in the channel's selected temperature unit (°C or °F).
   - Set AT to **ON** and press **SET** to save. Auto-tuning starts.
   - Press ↩ to return to the main display.
3. **Monitor the process until tuning is complete.**
   - The **AT** indicator appears for CH1. The controller uses on/off control to cycle the process above and below the setpoint; see Figure 6-1.
   - Tuning typically takes **20 to 60 minutes**, depending on how quickly the process heats and cools. No manual adjustment is needed, but the process must remain supervised.
   - After three oscillation cycles, the controller calculates and saves the PID parameters.
   - When tuning is complete, the **AT** indicator disappears, AT returns to **OFF**, and the controller begins PID control.

⚠ AUTO-TUNING PRECAUTIONS

Power interruption: If power is lost during tuning, auto-tuning restarts automatically when power is restored.

Canceling auto-tuning: Set AT to OFF. Results from the interrupted cycle are not used.

Supervision: Do not leave the process unattended during auto-tuning. Monitor for overheating and be prepared to shut down the equipment if necessary.

Changing algorithms: Run auto-tuning again when switching from standard temperature PID to another algorithm, or back to standard temperature PID.

VII. Troubleshooting

Table 7-1: Troubleshooting

Symptom	Possible Cause	Corrective Action
Incorrect reading The displayed value does not match the process value or a reference measurement.	• Incorrect input type selected. • Incorrect sensor wiring or polarity.	1. Check that SN matches the connected sensor or signal. 2. Check wiring against the controller's wiring label. 3. Correct wiring or sensor faults before using SC to adjust a measurement offset.
-HH- on the display Input above range or sensor fault.	• Open thermocouple or disconnected sensor. • Input above the configured range. • Incorrect input type selected.	1. Check sensor connections and cable condition. 2. Check the sensor according to its manufacturer's instructions. 3. Verify SN and the input range settings.
-LL- on the display Input below range.	• Current below 4 mA on a 4–20 mA input. • Disconnected signal cable or loss of transmitter power. • Incorrect input type or range settings.	1. Check the signal wiring and transmitter power supply. 2. Verify the input signal using the transmitter manufacturer's test procedure. 3. Verify SN and the input range settings.

Appendix 1: Sensor Input & Control Output Terminal Wiring Guide

Wiring guidelines:

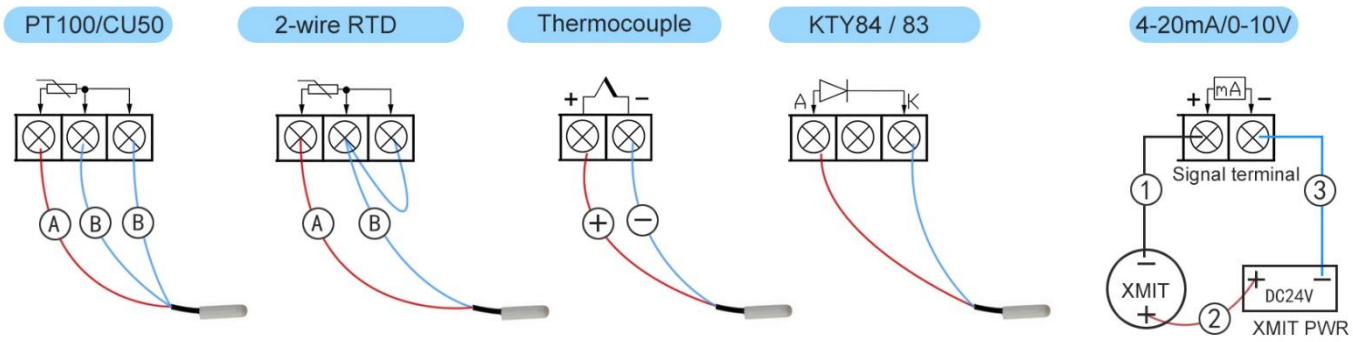
Input type: Set SN to match the sensor or signal before connecting it; see Table 4-1, item 5. Disconnect power before wiring.

Thermocouples: Observe polarity and use extension or compensating cable suitable for the thermocouple type.

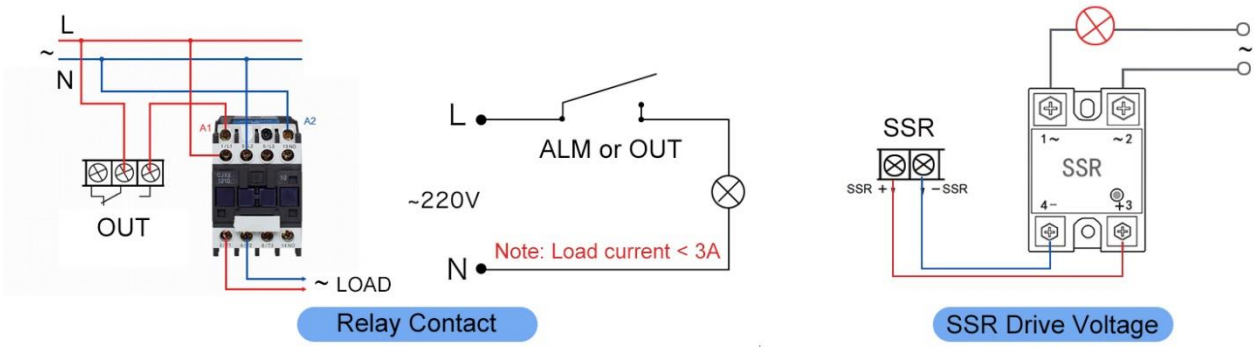
RTDs: Follow the terminal arrangement shown on the controller's wiring label. For a three-wire connection, use leads of equal gauge and length.

Analog inputs: Observe signal polarity and verify that the installed input hardware supports the transmitter's signal type.

Control outputs: Verify the output type and load rating before connecting the load. Use load protection as specified by the load manufacturer.



Controller Output Wiring Methods



To scale a transmitter input:

For a 4–20 mA or 0–5 V transmitter, set the controller's input scale to match the range on the transmitter's label. Scaling assigns engineering values to the input endpoints; it does not calibrate the sensor or transmitter.

1. Verify that the installed input hardware supports the signal, then select the applicable SN setting.
2. Set PS-H to the process value at 20 mA or 10 V.
3. Set PS-L to the process value at 4 mA or 0 V.
4. Set DP for the required number of decimal places.

Example: For a 4–20 mA transmitter rated 0–500 psi, the display should read 0 psi at 4 mA and 500 psi at 20 mA.

Appendix 2: Modbus-RTU Communication (Optional)

1. Hardware Interface Specifications:

The optional RS-485 or RS-232 interface connects the controller to a PC or PLC for monitoring and control using Modbus RTU. Match the controller's communication settings to those of the host.

Before designing a multi-device network, verify the permitted device addresses, RS-485 bus loading, and repeater requirements. Do not use the ADDR setting range as the device capacity of a single physical bus segment.

2. Modbus Protocol Specifications:

- Baud rate: 4800, 9600, 19200, or 38400 bps, selected with BAUD.
- Serial format: 1 start bit, 8 data bits, and 1 stop bit. Select parity with PARI: none, odd, or even.
- Supported Modbus Function Codes:
  - 03H (0x03): Read Holding Registers
  - 06H (0x06): Write Single Holding Register
  - 10H (0x10): Write Multiple Holding Registers
- Data format: All register values are 16-bit signed integers. Values displayed with decimal places are scaled by 10^{DP}, using the channel's DP setting: divide by this factor when reading and multiply by it when writing. Values without decimal places are not scaled.

Example: With DP = 1, read 253 as 25.3 and write 253 to set 25.3. With DP = 2, 2530 represents 25.30. Negative values use the same scaling.

Table A3-1: Modbus Holding Register Address Map

Parameter register layout: Registers are assigned consecutively: common parameters first (0000H–0003H), followed by the 27 Channel 1 parameters (0004H–001EH), then the 27 Channel 2 parameters (001FH–0039H). To find a Channel 2 parameter address, add 001BH (27 decimal) to the address of the corresponding Channel 1 parameter.

Example: SP1 is at 0004H (holding register 40005); SP2 is at 001FH (holding register 40032).

Register	Decimal Places	Register Address (Hex)	Holding Register Reference (Siemens PLC)
Process Value (PV) — CH1 and CH2	Yes	1001H ~ 1002H	44098 ~ 44099 (CH1 and CH2)
Control Output (CH1 and CH2)	No	1101H ~ 1102H	44354 ~ 44355
Alarm Output Status (CH1 and CH2)	No	1201H ~ 1202H	44610 ~ 44611
Forced Control Output Shutdown	No	0101H ~ 0102H	40258 ~ 40259 (Write 1 to force shutdown)
Forced Alarm Output Shutdown	No	0201H ~ 0202H	40514 ~ 40515 (Write 1 to force shutdown)
level 1 menu parameters (register address equals parameter number in table 4-1)			
LOCK (Parameter Lock)	No	0000H	40001
ADDR (Station Address)	No	0001H	40002
BAUD (Baud Rate)	No	0002H	40003
PARI (Parity)	No	0003H	40004
channel 1 parameters (register address equals parameter number in table 4-1 level 2)			
SP1 ~ AL-HY 1 (CH1 Parameters)	Varies by parameter	0004H ~ 001EH	40005 ~ 40031
channel 2 parameters (corresponding channel 1 address + 001bh)			
SP2 ~ AL-HY 2 (CH2 Parameters)	Varies by parameter	001FH ~ 0039H	40032 ~ 40058

FORCED OUTPUT SHUTDOWN

Write to the shutdown register for the required channel:

Write 1: Force the corresponding control or alarm output off.

Write 0: Release the shutdown override and return the output to normal control or alarm operation. This does not necessarily turn the output on; its state depends on the current operating conditions.

Shutdown overrides are not retained through a power interruption. They clear automatically at power-up, allowing normal control and alarm operation to resume. Do not use these registers as a substitute for an independent safety shutdown.

Appendix 3: Measurement Data Logging (Paperless Recording, Optional)

The companion logger stores data on a TF card (micro SD). It supports real-time recording of multiple process signals such as temperature, humidity, level, and pressure, with a minimum logging interval of 1 second.

The logger is commonly used for environmental data monitoring and traceability in food, pharmaceutical, and chemical storage applications, including warehouses, cold rooms, medicine storage rooms, cool storage rooms, and laboratories.

Data files are generated in CSV format and can be opened directly in Excel. Dedicated software can also generate professional reports and trend curves (available from the official website).

Technical Specifications

Storage Method: TF card (micro SD)

Logging Interval: minimum 1 second per sample, maximum 1 hour per sample

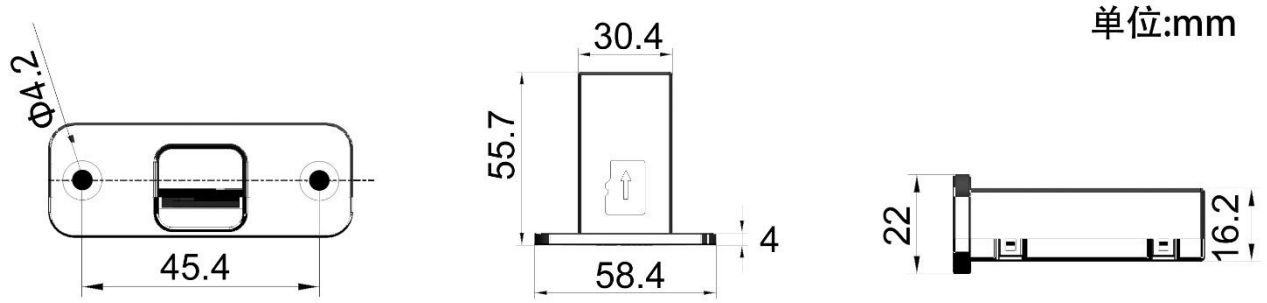
Storage Capacity: 1 GB TF card stores approximately 15.768 million records; common card sizes are 16 GB to

128 GB

Operating Environment: ambient temperature 0 to 60.0 C, relative humidity <=85%, non-corrosive atmosphere, no strong EMI

Power Supply: powered directly by controller, DC 5 V

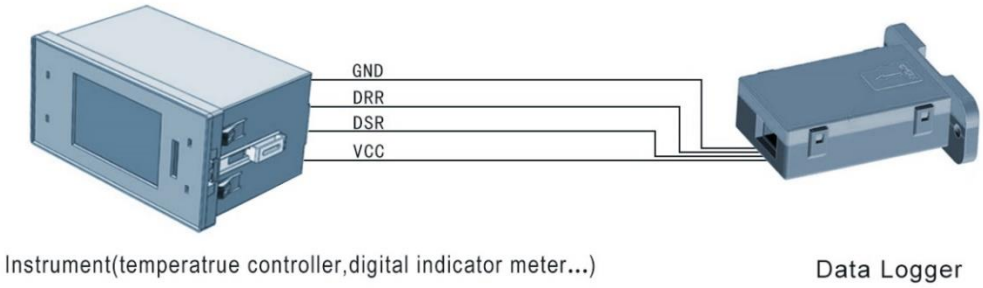
Logger Dimensions:



Logger Operation

1. **Wiring**

The logger uses a 4-wire connection: 5V, DSR, DRR, GND. Connect each wire to the controller terminals labeled 5V, DSR, DRR, and GND respectively.



2. **Power-Up**

After controller power-up, the logger enters operation automatically.

3. **Start Logging**

When powered and a TF card is inserted, the logger enters data-recording mode automatically.

4. **Set Logging Interval**

In Table 5-1 (Parameter Codes and Symbols), find parameter Interval (addr) and set recording interval:

- Set value to 1 for 1-second interval.
- Maximum value is 3600, corresponding to 1-hour interval.

5. **Set System Time**

When logger and controller are operating normally, press and hold ▼ and ▲ simultaneously to enter time-setting mode.

The display cycles through year, month, day, hour, and minute tags (see Table 6-1). For value editing, follow the standard controller key operation method.

Table 6-1

No.	Code	English	Name	Description	Range
1	YEAr	YEAR	Year	Sets year parameter	2000～2099
2	nth	MTH	Month	Sets month parameter	00～12
3	dAY	DAY	Day	Sets day parameter	00～31
4	Hour	HOUR	Hour	Sets hour parameter	00～23

5	ñ I n	MIN	Minute	Sets minute parameter	00～59

Logger Status LED Indications

1. Normal operation: green LED is steady ON; red LED flashes once quickly during data write.
2. Logger-controller link failure: green LED blinks (ON/OFF).
3. Communication interference: red and green LEDs flash simultaneously or alternately.
4. No TF card or TF card fault: red LED blinks (ON/OFF).

Appendix 4: Model Selection Guide

Specification	KCM multi-channel temperature controller							
Model	KC	□	□	□	□	□	□	□
Dimensions	96×96mm Panel cutout: 92×92mm 88×107×59mm DIN 35 rail mount	MA MR						
Channels	2 Channels		LCD2					
Alarm Relay	NONE One alarm relay per channel			□ 1				
Input Type	Thermocouple: K, E, J, R, S, T, WR25, N; RTD: Pt100, Cu50 Linear Voltage: 0–5 V, 1–5 V or Linear Current: 0–10 mA, 4–20 mA DC. (specify sensor type or calibration index when ordering)				W A M			
Main Output	Relay output 0/12 VDC drive output for SSR control 4-20 mA or 0-10 V (switchable PID / retransmission)					□ G A		
Power Supply	100 - 240V AC						□	
Optional Functions	RS-485(MODBUS-RTU) RS-232(MODBUS-RTU) Paperless logging WI-FI (MODBUS-TCP)							RS RX LG WIFI