Hot Plate

Model KW-4AH



Owner's Manual

LIMITATION OF LIABILITY

In no event shall CHEMAT TECHNOLOGY INC. be held responsible nor liable for any direct, indirect, incidental, special or consequential damages or costs whatsoever resulting from or related to the use or misuse of the Hot Plate KW-4AH, even if CHEMAT TECHNOLOGY INC. has been advised, know, or should be aware of the possibility of such damages.

CHEMAT TECHNOLOGY INC. emphasizes the importance of consulting experienced and qualified professionals to assure the best results of using the Hot Plate KW-4AH.

I. Safety Precautions

1. **ALWAYS** wear safety glasses and other appropriate protection when operating this equipment.

2. **DO NOT** immerse the unit in liquid for cleaning.

3. Spills may damage the top and lead to thermal failure. Unplug the unit and remove spills promptly.

4. **DO NOT** modify or substitute the grounded power plug. Use only properly grounded outlets to avoid shock hazard.

5. **DO NOT** modify the unit electrically or mechanically as personal injury or product damage may occur.

II. Controls and Functions

A schematic of the control panel is shown in Figure 1.

The function of each switch is described as follows:

1. RED POWER SWITCH: Turns hotplate ON and OFF.
2. ARROWS: Increase or decrease set point temperature.
3. DISPLAY: PV Indicates Process Value

   SV Indicates desired setting temperature

   The setting is accepted automatically after approximately 2 seconds.
4. RED LIGHT: Indicates hot plate is heating. When light flashes and goes out hot plate has reached indicated temperature.
5  &  Change function and parameters.

   (For details see OMRAN operational manual)

III. Operations

1. Make sure hot plate is turned **OFF** before plugging it in.

2. Plug the power cord into the electrical socket.
3. Turn **ON** the power switch.
4. If desired, use arrow keys to change SV.
5. When actual temperature reaches SV: hot plate is *ready-for-use*.
6. Turn power switch **OFF** when operations are finished.

IV. Features

1. Manual Load Operation
2. Process Control: Program
3. Temperature Resolution: 0.1^0 C
4. Temperature Range:

   -30 – 300^0C

   -30 - 600^0C

5. Substrate Size: 6 inch

LIMITED ONE YEAR GUARANTEE

KW-4AH HOT PLATE

Chemat Technology Inc. warrants the KW-4AH Hotplate against defects in materials and workmanship, under normal use from the confirmed date of purchase, by the original purchaser. Upon written notice of any defects, Chemat Technology Inc. will either repair the faulty product or components thereof. Any warranty stated hereunder is extended to the original purchaser and is not transferable.

Chemat Technology Inc. does not assume liability for consequential damages or liability as a result of our product's use. Chemat Technology Inc. liability extends, but not exceeds, the original selling price of the equipment. In addition, there is no assumption of liability as a consequence of any such events under the terms of this guarantee, in the following:

1. Shipment to or from the customer of Chemat Technology Inc.
2. Improper environment, temperature extremes, electrical power surges or failure, or other misuse or negligence.
3. Adjustment or repair by personnel not authorized by Chemat Technology Inc.
4. Improper installation or failure to follow installation instructions.
5. Forces beyond the control of Chemat Technology Inc. including but not limited to an act of God, war, insurrection, civil disturbance, natural disasters, labor disputes or government regulations.

In order to obtain service under this guarantee, you must first call Chemat Technology Inc. Mechanical Engineering department and obtain a Return Authorization number before shipping the product to Chemat Technology Inc. (1-800) 475-3628)

●Input type

	Input type	Input	Setting	Setting range
Platinum resistance thermometer type	Platinum resistance thermometer	Pt100	0	-200 to 850 (°C) / -300 to 1500 (°F)
			1	-199.9 to 500.0 (°C) / -199.9 to 900.0 (°F)
			2	0.0 to 100.0 (°C) / 0.0 to 210.0 (°F)
		JPt100	3	-199.9 to 500.0 (°C) / -199.9 to 900.0 (°F)
			4	0.0 to 100.0 (°C) / 0.0 to 210.0 (°F)

	Input type	Input	Setting	Setting range
Thermocouple input type	Thermocouple	K	0	-200 to 1300 (°C) / -300 to 2300 (°F)
			1	-20.0 to 500.0 (°C) / 0.0 to 900.0 (°F)
		J	2	-100 to 850 (°C) / -100 to 1500 (°F)
			3	-20.0 to 400.0 (°C) / 0.0 to 750.0 (°F)
		T	4	-200 to 400 (°C) / -200 to 700 (°F)
		E	5	0 to 600 (°C) / 0 to 1100 (°F)
		L	6	-100 to 850 (°C) / -100 to 1500 (°F)
		U	7	-200 to 400 (°C) / -300 to 700 (°F)
		N	8	-200 to 1300 (°C) / -300 to 2300 (°F)
		R	9	0 to 1700 (°C) / 0 to 3000 (°F)
		S	10	0 to 1700 (°C) / 0 to 3000 (°F)
		B	11	100 to 1800 (°C) / 300 to 3200 (°F)
	Infrared Thermosensor ES1A	K 10 to 70°C	12	0 to 90 (°C) / 0 to 190 (°F)
		K 60 to 120°C	13	0 to 120 (°C) / 0 to 240 (°F)
		K 115 to 165°C	14	0 to 165 (°C) / 0 to 320 (°F)
		K 160 to 260°C	15	0 to 260 (°C) / 0 to 500 (°F)
	Analog input	0 to 50mV	16	Use the following ranges for scaling: -1,999 to 9,999, -199.9 to 999.9, Vary Depending on "L", "H" value

• Default = "0"

●Alarms

Setting	Alarm type	Alarm output function: Positive alarm value (X)	Alarm output function: Negative alarm value (X)
0	No alarm function	Output off	
*1 1	Deviation upper/lower limit	ON/OFF, L, H, SP	Vary with "L", "H" values
2	Deviation upper limit	ON/OFF, X, SP	ON/OFF, X, SP
3	Deviation lower limit	ON/OFF, X, SP	ON/OFF, X, SP
*1 4	Deviation upper/lower range	ON/OFF, L, H, SP	Vary with "L", "H" values
*1 5	Deviation upper/lower limit standby sequence ON	ON/OFF, L, H, SP	Vary with "L", "H" values
6	Deviation upper limit standby sequence ON	ON/OFF, X, SP	ON/OFF, X, SP
7	Deviation lower limit standby sequence ON	ON/OFF, X, SP	ON/OFF, X, SP
8	Absolute value upper limit	ON/OFF, X, 0	ON/OFF, X, 0
9	Absolute value lower limit	ON/OFF, X, 0	ON/OFF, X, 0
10	Absolute value upper limit standby sequence ON	ON/OFF, X, 0	ON/OFF, X, 0
11	Absolute value lower limit standby sequence ON	ON/OFF, X, 0	ON/OFF, X, 0

*1. Upper and lower limits can be set for parameters 1, 4 and 5 to provide for different types of alarm. These are indicated by the letter "L" and "H".
• Default = "2"

●Error display (trouble shooting)

When an error has occurred, the No.1 display alternately indicates error codes together with the current display item.

No.1 display	Meaning	Action
S.ERR (S Err)	Input error *2	Check the wiring of inputs, disconnections, shorts and input type.
	A/D converter error *2	After the correction of input error, turn the power OFF, then back ON again. If the display remains the same, the controller must be repaired. If the display is restored to normal, then a probable cause can be external noise affecting the control system. Check for external noise.
E111 (E111)	Memory error	First, turn the power OFF then back ON again. If the display remains the same, the controller must be repaired. If the display is restored to normal, then a probable cause can be external noise affecting the control system. Check for external noise.
CCCC	Display range over *2	This is not an error but, although control remains possible, this is displayed when the process value exceeds the display range. • Less than -1,999: CCCC • Greater than 9,999: AAAA
AAAA		

*2: Error shown only for "Process value" or "Process value / Set point". Not shown for other status.

●Initial setting level | control stopped | *8

Input type *3

Scaling upper limit (only when setting analog input)

Scaling lower limit (only when setting analog input)

Decimal point (only when setting analog input)

°C/°F selection °C=C °F=F (C stands for Celsius, F for Fahrenheit)

Set point upper limit

Set point lower limit

ON/OFF = onOF PID = PID

Standard control = Stnd Heating and cooling control = H-C (Select standard control or heating and cooling control as required)

Self-tuning ON = on Self-tuning OFF = oFF

Control period (heating) (Unit: Seconds)

Control period (cooling) (Unit: Seconds)

Direct operation = dir-d Reverse operation = dir-r Direct operation: The manipulated variable is increased in line with the increase in the PV. Reverse operation: Reverse of Direct operation

Alarm 1 type: Specified models only *3

Alarm 2 type: Specified models only *3

Initial setting level enables users to specify their preferred operating conditions (input type, alarm type, control method, etc.).

*3: Refer to the adjoining tables for details of input types and alarm types.

Hold M down for at least 3 seconds

No.1 display flushes when hold M down for more than 1 second

Hold M down for at least 1 second

POWER ON

●Operation level

PV/SP

Heater current monitor (Unit: A) *5

Run = r-Un Stop = St-oP

Alarm value 1 *4

Alarm value upper limit 1 *4

Alarm value lower limit 1 *4

Alarm value 2 *4

Alarm value upper limit 2 *4

Alarm value lower limit 2 *4

Operation level should normally be used during operations. Process value can be monitored.

Press M (less than 1 second)

Hold M and E keys down for at least 1 second

●Protect level

Operation / adjustment protect

Initial / Communication protect

Setting change protect

Key input cannot be used to modify protected data settings.

●Adjustment level

AT execute = on AT cancel = oFF

Communication write *6

Heater current monitor (Unit: A) *5

Heater burnout (Unit: A) *5

Set point 0 *7

Set point 1 *7

Temperature input shift

Input shift upper limit When infrared Thermosensor ES1A selected

Input shift lower limit When infrared Thermosensor ES1A selected

Proportional band

Integral time (Unit: sec)

Derivative time (Unit: sec)

Cooling coefficient

Dead band

Manual reset value (Unit: %)

Hysteresis (heat)

Hysteresis (cool)

Adjustment level is the input mode for control and correction settings.

*4: Applicable only to models with alarm functions
*5: Applicable only to models with the heater burnout alarm function
*6: Applicable only to models with a communications function
*7: Applicable only to models with an event function
*8: Controller does not operate during initial setting level. (Process will be stopped)

Use the following key operations for transition between levels:
Operation level → Protect level: M + E keys for at least one second
Operation level → Adjustment level: M key for less than one second
Operation level → Initial level: M key for at least three seconds
The values of grayed out parameters are shown only when set.

●Operation / Adjustment protect

The following table shows the relationship between settings and protect limits related to Operation level and Adjustment level.

Mode	Setting 0	1	2	3
Process value	○	○	○	○
Set point	○	○	○	○
Others	○	○	×	×
Adjustment level	○	×	×	×

○ : Can be displayed or changed
○ : Can be displayed
× : Can not be displayed

• No protect when set to "0"
• Default = "0"

●Initial / Communication protect

Limits transition to the Initial setting level, Communication setting level and Advanced function setting level

Setting	Initial setting level	Communication setting level
0	Transition possible (Transition to Advanced function level possible)	transition possible
1	Transition possible (Transition to Advanced function level not possible)	transition possible
2	Transition not possible	transition not possible

• Default = "1"

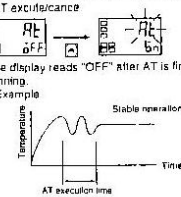
●Setting change protect

Limits changes of setting by key operations.
OFF: Key operations can be used to change settings
ON : Key operations cannot be used to change settings (Protect level settings can all be changed)

●AT (auto-tuning)

• AT for temperature adjustment
When AT is running, "on: AT excute".
To cancel AT, select "oFF: AT cancel".
• AT excute/cance

The display reads "OFF" after AT is finished running.
• Example



Run time for auto-tuning varies with the thermal capacity of the control system.

■Advanced Functionality

Only the standard functions are outlined above, 24(number of functions) additional "advanced functions" are specifically described within the E5CN datasheet and users Manual. For communications details, refer to the E5CN/GN communications User's Manual.

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