

Installation and Maintenance Manual

Water-Cooled Thermo-Con for Rack Mounting

HECR-W Series



1 Read Before Using

Thank you for purchasing SMC's Thermo-con (hereinafter referred to as the "product"). This "Installation and Maintenance Manual" (hereinafter referred to as "this manual") briefly explains the essential safety instruction procedures to start and stop the product and reset its alarms. Read this manual before using and keep it in a safe place for future reference.

2 Safety Instructions

This manual contains essential information which must be observed for the protection of users and others from injury and/or equipment damage.

- The level of potential hazard is indicated by labels of "Caution", "Warning" or "Danger", followed by important safety information.
- To ensure safety of personnel and equipment the safety instructions in this manual and the product catalogue must be observed, along with other relevant safety practices.

	Caution	If instructions are not followed there is a possibility of injury or equipment damage.	
	Warning	If instructions are not followed there is a possibility of serious injury or loss of life.	
Danger		In extreme conditions, there is a possibility of serious injury or loss of life.	

• This manual provides the following symbols in addition to "Danger", "Warning", and "Caution" to present warning details in an easy-tounderstand manner

		This symbol warns you of potential electrical shock.
		This symbol warns you of potential burns.

Danger

- During operation or maintenance of the product, do not disable the interlock function of any device. Otherwise unexpected personnel injury or damage to the product may occur.
- When turning on/off the power observe the procedure in Section 6. Otherwise unexpected malfunction or danger may occur.
- When maintaining, cleaning or in case of emergency, turn off the power source
- After identifying a problem be sure to check the cause and take necessary countermeasures before turning on the power.
- The product is operated at high voltage.

A Warning

• The compatibility of equipment is the responsibility of the person who designs the system or decides its specifications.

Since the products specified here can be used in various operating conditions, their compatibility with the specific system must be based on specifications or after analysis and/or tests to meet specific requirements.

Only trained personnel should handle or operate the product.

Transportation, installation and maintenance of the product can be dangerous and should be done by persons who have full knowledge and experience on the product and system. Cover panels of the product should be opened only by qualified service technicians or qualified personnel.

- Do not modify or reconstruct the unit.
- Read all warning and caution labels carefully and keep them in mind. Do not peel off or rub alert warning and caution labels. Confirm locations of alert warning and caution labels.

2 Safety Instructions (continued)

- Do not service machinery/equipment or attempt to remove components until safety is confirmed.
- 1) Inspection and maintenance of machinery/equipment should only be performed after confirmation of safe locked-out positions.
- 2) Switch off electrical supplies and ensure any high temperature parts have cooled to ambient temperature.
- 3) Before machinery/equipment is re-started, ensure all safety measures are taken so the product and system can be started in a safe manner.
- 4) Do not use this product outdoors (indoor use only).
- Do not use this product outside of the specifications. Contact SMC if it is to be used in any of the following conditions.
- 1) Conditions and environments beyond the given specifications.
- 2) Installations in conjunction with atomic energy, railway, air navigation, vehicles, medical equipment, food and beverage, recreation equipment, emergency stop circuits, press applications, or safety equipment.
- If abnormal conditions occur, such as abnormal noise or smoke, or water leakage, take the following actions.
- 1) Shut down power.

2) Contact an authorised SMC dealer for repair.

A Caution

- · After shutting down the power supply, ensure a time interval at least 3sec between ON and OFF. Restarting the product within that interval may lead to malfunction.
- Do not use devices that generate electromagnetic radiation such as cellular phones near the product. There is a possibility that this could lead the product to malfunction.
- This unit has several interlock functions, which activate when a dangerous operation or condition occurs to stop the product and make it safe. This is a function to protect personnel and restrict operation that may cause damage to the product or facility.
- · When disposing of the product, contact an industrial waste disposal company. To minimize the risk, drain the fluid from the product. Fluid left inside can lead to accidents and damage can result during transportation.

3 Specifications (continued)

Item	Sp	ec.		
Model No.	HECR008-W	HECR012-W		
Over voltage category	Cate	gory II		
Pollution degree	Pollution	degree II		
Limitation of hazardous substance	RoHS comp	liant products		
Acoustic noise	48	dBA		
Cooling method	Water	cooled		
Auto tuning, Off set function, Learning control function, External tuning control function, Temperature sensor fine control function, Setting value memory functi Upper / lower temperature limit alarm function, Output shut off alarm, Communication.				
Input operation and indications	Membrane key sheet LCD display panel (with back light) Output shut off alarm, Upper / lower temperature limit alarm : Relay contact specification DC30V, 1A			
Communications	RS-232C / RS-485 Communications: Setting of target temperature, Reading of the value detected by temperature sensor Reading of warning status. Setting and of off-set value. Setting and reading of			
Temp. sensor	Resistance thermometer sensor (Pt100Ω, (Both internal sensor and external sensor)			
Painting color	Urbar	n white		
Mass (at dry)	Approx 20kg	Approx 21kg		
Option With flow switch: Low flow rate alarm occurs at less than 0.7L/min NPT fitting: Fluid IN/OUT fittings With foot and no rack bracket High head pump				
Contents of package	Thermo-con 1pc Installation and Maintenance Manual 1pc Power supply connector 1pc			

3.3 Performance Charts

Values on the performance charts are not guaranteed values but representative values. Allow margins for safety when selecting the model.

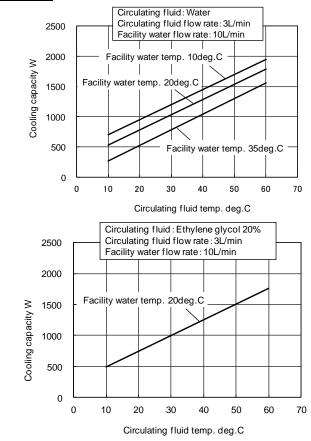
3 Specifications

3.1 General Description and Intended Use

This product uses a built in pump to circulate liquid (water or 20% EG) at a constant temperature, controlled by Thermo-Electric (Peltier) Modules. This circulating fluid cools parts of the customer's machine that generates heat. 3.2 General Specifications

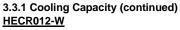
Item		Sp	ec.		
Mode	el No.	HECR008-W	HECR012-W		
Oper	ation temp. range	10.0 to 60.0 °C (No	dew condensation)		
Indic	ation temp. range	-9.9 to	80.0 °C		
Ambi	ient environment	Temp: 10 to 35 °C Humidity : 35 to 80%RH Altitude : up to 1000m Environment : No corrosive gas, solvent si	Humidity : 35 to 80%RH		
Stora	age environment	Temp :-40 to 70 °C (No dew condensation Humidity : 5 to 95%RH Environment : No corrosive gas, solvent so	<i></i>		
Accu	racy related to temp	Indication accuracy: +/- 0.2 °C. Temperature drift: +/- 0.2°C Stability: +/- 0.01 to 0.03 °C (Circulating fluid OUT is directly	connected with IN)		
Cooling capacity (Set Temp. 20°C and Facility water Temp. 20°C, 10L/min)		Approx. 800W (Circulating fluid flow rate 3L/min)	Approx. 1200W (Circulating fluid flow rate 3L/min)		
Circulating fluid system	Circulating fluid	Water, Ethylene glycol solution up to 20%			
	Tank capacity	Approx.1.3L			
atinç /ste	Pump capacity	Refer to perfo	ormance chart.		
s	Port size	IN/OUT: Rc3/8, Dra	ain: CPC PLCD16004		
ö	Wetted materials	Stainless steel, EPDM, NBR, Ceramic,	PPE, PPS, Carbon, Polyethylene, POM		
٢	Required flow rate	10 to 1	5 L/min		
Facility water system	Temperature range	10 to	35 °C		
ity v /stei	Pressure range	1.0MPa	a or less		
s	Port size	IN/OUT	T: Rc3/8		
ш	Wetted materials	SUS	5304		
Power supply		Single phase AC100 to 240V(+/- 10%), 50/60Hz	Single phase AC200 to 240V(+/- 10%) 50/60Hz		
Current consumption		Max.10A(100V) Max.4A(240V)	Max.7A (200V) Max.6A (240V)		
Inrus	h current	50A o	or less		
Over	current protection	14A circuit protector			
Volta	ige interruptions	20ms	or less		
Insul	ation resistance	50MΩ or more (DC500V)			

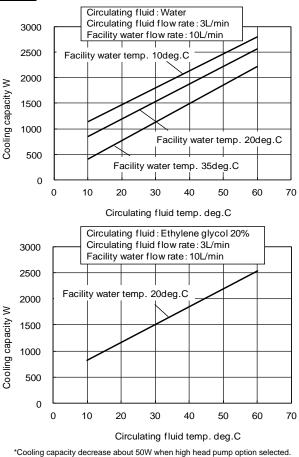
3.3.1 Cooling Capacity HECR008-W

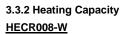


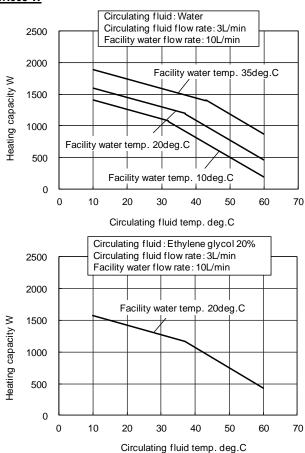
*Cooling capacity decrease about 50W when high head pump option selected.

3 Specifications (continued)





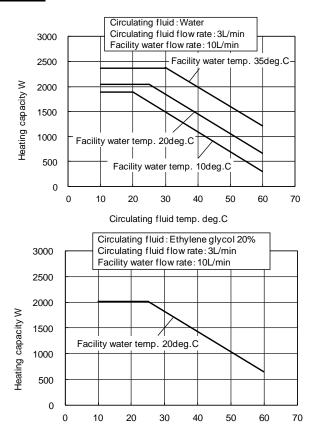




HECR-TF2Z573EN

First Edition: 2022 Mar

3 Specifications (continued 3.3.2 Heating Capacity (continued) HECR012-W



Circulating fluid temp. deg.C

3.3.3 Pump Capacity HECR008/012-W

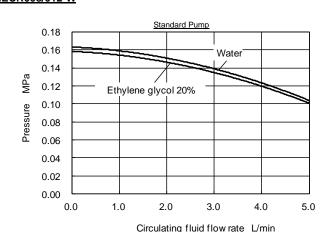
MP

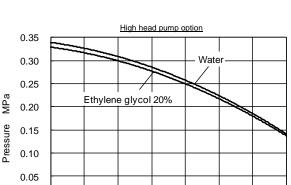
Ire

0.00

0.0

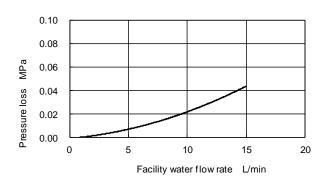
1.0



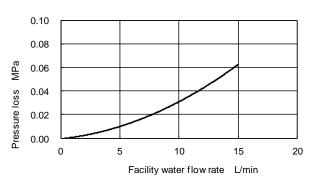




3.3.4 Pressure Loss in Facility Water Circuit HECR008-W







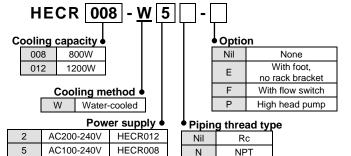
3.4 Connector Specifications

5.4 Connector	opeen	leanene		
Description	No.	Sig	gnal	Style and Part No.
		HECR008-W	HECR012-W	N L
Power supply connector	N	AC100 to 240V	AC200 to 240V	
(IEC60320,C14)	L	AC100 to 240V	AC200 to 240V	
	E	F	ΡĒ	E
		RS-232C	RS-485	
	1	Unused	BUS +	54321
Communication connector	2	RXD (RD)	Unused	
Note: Always	3	TXD (SD)	Unused	
use shielded cable connected	4	Unused	Unused	9876
to this connector.	5	SG	SG	D-sub 9 pin (socket type)
	6-8	Unused	Unused	Fixed screw: M2.6
	9	Unused	BUS -	
	1-2	Unused		
	3-5	PT	RTD	
Signal •	6		Alarm a contact uring Alarm)	
External	7	Output Cutoff	Alarm Common	8 1
temperature sensor	8		Alarm b contact uring Alarm)	0 0 0
connector Note: Always use shielded	9		Alarm a contact uring Alarm)	15 9
cable connected	10	Temperature	Alarm Common	D-sub 15 pin (Socket type) Fixed screw: M2.6
to this connector.	11		Alarm b contact uring Alarm)	TINED SCIEW. IVIZ.0
	12-14	Un	used	
	15	F	G	

3 Specifications (continued)

3.5 Model number of product

The product can be ordered with the model number configured as shown below



3.6 Product Serial Number Code

The production serial number code printed on the label indicates the year and month of production as per the following table:

	Month	Jan	Feb	Mar	Apr	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Year	\searrow	0	Р	Q	R	S	Т	U	V	Х	У	Ζ
2019	Х	Хо	XP	XQ	XR	XS	ХT	XU	XV	XX	Ху	XZ
2020	у	yo	yР	уQ	уR	yS	уT	уU	уV	yХ	уу	уZ
2021	Z	Zo	ZP	ZQ	ZR	ZS	ZT	ZU	ZV	ZX	Zy	ZZ
2022	А	Ao	AP	AQ	AR	AS	AT	AU	AV	AX	Ay	AZ
2023	В	Во	BP	BQ	BR	BS	ΒT	BU	BV	ΒX	By	ΒZ
2024	С	Со										
2025	D											

4 Special Features

Auto tuning

This function sets the values necessary for the control system such as PID (proportional band, integral time, derivative time and ratio of cooling/ heating gain) automatically.

If the controlled temperature fluctuates constantly after reaching the target temperature, perform auto tuning. Controller calculates optimum control PID and set automatically. Auto tuning may require time depending on the conditions.

- 1) Select "2" in control operation.
- 2) Pressing [AT] key to light "AT" indicator and start auto tuning.
- 3) Pressing [AT] key stops auto tuning. ("AT" indicator turns off)
- 4) " AT" indicator turns off when auto tuning is complete. If not completed after 20min. [ERR19] (AT abnormal) occurs.
- Offset function

This function controls the temperature slide by an offset value from set point temperature. When the circulating fluid travels to the target object, a certain deviation occurs between the temperature just before the object and the set temperature of the product due to the influence of ambient temperature on the piping. In this case, if the deviation is input as the offset value, the temperature of the circulating fluid just before the object can match with the setting value. Internal sensor value for the alarm does not include the offset value. For example, if -0.15 °C is set here, the actual reference temperature for control is lower than the indicated SV by 0.15 °C. Internal sensor value for the alarm does not include the offset value.

• Learning control function

This function lets the product measure the temperature of circulating fluid flowing before temperature target object by an external temperature sensor and adjusts the offset function automatically to the set value at a certain sampling interval. The external temperature sensor needs to be prepared separately by the customer.

- 1) Install an external temperature sensor to the target object.
- 2) Select "3" in control operation.
- 3) Thermo-con controls the external sensor value to the set point.

4) When the temperature is not stable, then set the sampling interval larger.

Circulating fluid flow rate	L/min

3.0

4.0

5.0

6.0

70

2.0

4 Special Features (continued)

External tuning control function

This function makes the temperature of circulating fluid consistent to the external (ambient) temperature all times. This function lets the product measure the temperature from a temperature sensor mounted in the customer preferred location, then it adjust the temperature of the fluid automatically to the temperature detected by the sensor. The separate temperature sensor needs to be prepared separately by the customer.

- 1) Install an external temperature sensor to the room.
- 2) Select "4" in control operation.
- 3) Thermo-con controls the fluid temperature to the ambient temperature.
- When the temperature is not stable, then set the sampling interval larger.

• Temperature sensor fine control function

This is a function to finely control the measurement temperature of the control sensor within the range of -9.99 to 9.99 °C separate from offset function. Control sensor can be corrected by inputting difference (calibration value) between temperature of standard and that of control sensor. For example, if -0.15 °C is set here, the actual reference temperature for control is lower than the indicated SV by 0.15 °C.

Internal sensor value for alarm = Internal sensor value - Fine control value

- Setting value memory function
- Even if the power is turned off the set values are saved and will be restored at power on.
- Upper / Lower temperature limit alarm function
- This function raises an alarm when temperature of the circulating fluid is out of allowable upper and lower range. When the alarm is raised, WRN is indicated on LCD. If circulating fluid temperature returns to within allowable upper/ lower range, this alarm is automatically cancelled. The allowable upper and lower range of temperature can be set between 0.1 and 10 °C.
- Output shut off alarm function

The product has a self-check function that can detect faults with the product and interrupts the output to the thermo modules, stopping operation (However, operation continues with ERR 15 and ERR 18). This function gives an alarm if a critical error happens, the display shows ERR and an alarm number. At the same time, the warning output connector gives an output through a relay contact. This warning cannot be removed unless the power is cycled. When the power is being cycled leave at least 3 seconds between turning the power off and turning the power back on.

5 Installation

5.1 Installation

A Caution

- · Pay special attention to the safety of all personnel when installing and transporting the product
- Do not install the product unless the safety instructions have been read and understood.
- The product is heavy, be careful when installing or moving the product.
- · Always transport the product using both handles.
- Leakage from the product may damage peripheral equipment. Install a drain pan under the product to capture leakage. Furthermore, mount devices like a leak sensor on the installed drain pan to detect leakage so that it can alert operators around the area.
- · Install the product above 0.6m from the floor.

5.2 Environment

Caution

- Do not use in an environment where the product is directly exposed to water, oil, corrosive gases, chemicals, salt water or steam.
- The product should be installed upright on a stable base.
- Do not install the product in a location where the air inlet and air outlet vents are blocked. Also do not use the product in a sealed enclosure. • Do not use in an explosive atmosphere.
- Do not mount the product in a location where it can be exposed to
- prolonged sunlight. Use a protective cover. • Do not mount the product in a location where it is subject to strong vibrations and/or shock. Check the product specifications
- Do not use the product where it can be exposed to strong electrical or magnetic emissions.
- Do not mount the product in a location where it is exposed to noise sources (such as discharging equipment, large relay and thyristor).
- Do not mount the product in a location with an altitude of more than 1000 meters
- · Do not mount the product where it is exposed to materials such as silicone, which may generate harmful gas.

5 Installation (continued)

First Edition: 2022. Mar

- Install the product in a location where the ambient temperature range is between 10 to 35°C and the relative humidity range is between 35 to 80%. No dew condensation is allowed on the unit.
- · Do not mount the product in a location exposed to radiant heat.

5.3 Mounting

- When mounting the product to a cabinet, use a design which shall hold the weight at the bottom. Ensure safety with transportation test if the product is to be installed on a transportation device such as a trailer.
- Mount the product using the fixing holes in the front of the product. Use M5,M6 screws (bolts) or equivalent to the fix the product.

🛕 Caution

• Be sure to correctly tighten all screws to the required torque. (M5:3.0Nm, M6:5.2Nm)

5.4 Piping

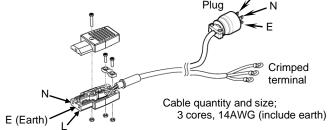
- Ensure that the power source and the power supply of the product is turned off (or the power plug must come off)
- Ensure the flow rate of the circulating fluid is as high as possible to maintain the temperature stability. Therefore, the length of the external piping should be minimized and internal diameter should be as large as possible. Piping must have sufficient strength for the maximum discharge pressure of the circulating circuit.
- Likewise, if a tube is bent or multiple elbow fittings are used, the piping resistance will increase and the flow rate will decrease. If the flow rate falls, the temperature stability will decrease.
- If installing a tank externally, only a sealed tank should be used. Do not use an open tank.

A Caution

- Ensure that the INLET and OUTLET for circulating fluid and facility water are connected correctly. If any valves are used ensure that they do not restrict the flow, otherwise low flow may cause an alarm.
- When installing piping or fittings, ensure sealant material does not enter inside the port. When using seal tape, leave 1.5 to 2 threads exposed on the end of the pipe/fitting.
- Be sure to correctly tighten the fitting fittings to the required torque (Rc1/4:12 to 14 N·m, Rc3/8:15 to 20N·m).

5.5 Wiring

- Ensure that the power source and the power supply of the product is turned off before connecting the various connectors and power supply cable.
- Supply disconnecting device according to IEC60974-1 and IEC60947-3 for the product must be provided in the end system.
- Do not install the disconnecting device in the place where the operation is difficult. And also the switch of the disconnecting device must comply with the direction of the switch specified by IEC60447.
 Preparation and wiring of power supply cable:
- 1) Strip the sheath from both ends of the cable.
- Disassemble the power supply connector. Crimp one end of the cable to L, N, E inside of the connector, then reassemble the power supply connector.
- 3) Connect the other end of the cable to a plug or terminals (e.g. crimped terminal).



- Ensure that there is enough space between the power supply cable and the communication cable of the product and power cables of other equipment.
- Ensure the power supply and ground connections are made correctly.
- Be sure to provide the grounding. The PE line of the power supply cable is available for grounding. Do not connect the ground in common with the ones for equipment that generates strong electromagnetic noise or high frequency.

5 Installation (continued)

- When an external temperature sensor is connected, connect the sensor with a shield cable. Use a platinum resistant temperature sensor (Pt100ohm, 3-wiring type, class A, 1mA).
- Connect the host to this unit with a twisted pair shield cable when applying communication function or external sensor and alarm output function.
- When using the Communication connector and Signal/External temperature sensor, connect the circuit separated from the mains circuit by reinforced insulation.
- Ensure that external instruments connecting to this product provide the enclosure complied with UL61010-1 and use the cable which provide flame resistance (over VW-1).

5.6 Preparation for facility water

- When the flow rate of facility water is not specified range, acoustic noise or vibration may be generated, or outlet of facility water become hot.
- When the flow rate of the facility water is not enough, cooling capacity will decline. Meanwhile, when the flow rate is extremely small, alarm (ERR14) may occur and the temperature of the facility water might be extremely high. If a resin tubing is used for piping under these circumstances, the tubing might get softened and exploded. Therefore, be sure to cool the facility water over time and flow the facility water with a proper flow rate.

Caution

- Keep the facility water temperature between 10 and 35°C. (No dew condensation). Note that the cooling and heating capacity is changed depending on facility water temperature. Also, if lower-temperature facility water is supplied, dew may condense in the product and the equipment could be damaged. Keep the temperature above the atmospheric pressure dew point.
- The maximum operating pressure is 1.0MPa. Keep the pressure as low as possible to prevent water hammer.

5.7 Filling the product

- 1. Ensure that the power source and the power supply of the product is turned off (or the power plug must come off).
- 2. Remove the reservoir cap.

(When setting the product again, confirm the level of fluid does not exceed the "H" mark)

- If using Ethylene Glycol, refer to the suppliers Material Safety Data Sheet (MSDS) and wear Personal Protective Equipment (PPE) as appropriate.
- 4. Fill the circulating fluid into the reservoir. Stop filling once the level of fluid reaches the "H" mark.
- 5. Turn on the power switch to fill the piping with the fluid.
- 6. When the piping is filled with the circulating fluid, the level of the reservoir decreases and low fluid level alarm (ERR20) arises accordingly. Then, turn off the power supply once again.
- 7. Repeat the step from 4 to 6 until ERR20 alarm doesn't appear anymore.
- 8. Then, replace the cap on the reservoir and tighten it securely.
- 9. Keep the fluid level between H and L of the level indicator.

Danger

• Never touch the power switch with wet hands to avoid electrical shock.

Caution

- Do not touch the surface when the set temperature is high. Temperature of the tank and the chassis near the tank could be high.
- Fluid other than water or Ethylene Glycol (up to 20%) should not be used as circulating fluid. Using such fluid may lead to leakage or damage of the pump.
- Operation of the pump with a large amount of air left in the piping for prolonged period may damage the pump. Remove air from piping before starting operation.
- If the power switch is turned on without circulating fluid, the pump could be damaged.
- Take care not to spill water over the product when supplying water to the reservoir. When a spill is made, wipe it off immediately and only supply power after it has dried. If this procedure is neglected, it may cause damage to the product.
- If a fluid with low conductivity such as DI water is used as circulating fluid, it can cause static electricity due to friction and damage the product. Take measures to minimize the static electricity from circulating fluid.
- If the product is operating for a long time with large temperature fluctuations after reaching the set temperature, the product may be damaged. Please set the PID values by using the auto-tuning function

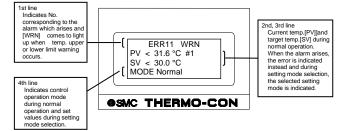
6 Operation

6.1 Power Up

When power is turned on, the software version is indicated on display panel for approx. 1 second.

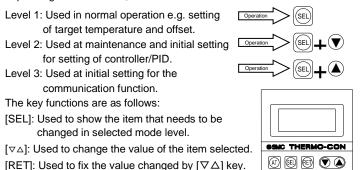
6.2 Operation

The product begins operation immediately after the power is turned on. The pump and heat exchanger will be running and the product will begin temperature control. The display will show the following information:



6.3 Settings

Three different levels of settings are available depending on the content, which needs to be set.



[AT]: Used to start auto tuning in auto tuning mode (This function works when the control operation mode is 2 in level setting 1)

Press again to return to current temperature

- When pressed during auto tuning, the auto tuning is stopped.When no input is made within 1 minute regardless of setting mode, the display returns to the current temperature indication.
- The data input is written to FRAM and memorized after the power supply is turned off.
- To return all of the setting values to default: Turn on the power supply while pressing [SEL] and [RET] keys.

6.3.1 Level 1-Settings

indication.

No.	Modes	Setting contents	Setting range (Min. increment)	Default
1	Target Temp. (No indication on display)	Sets target temp. for control.	10.0 to 60.0°C (0.1°C)	25.0
2	Control Operation	Selects control operation mode from those shown below. 0: Pump stop (No control) 1: Normal operation 2: AT(auto tuning) 3: Learn (learning control) 4: External (external tune control) 5: SeriRem (Serial remote) 5: Serial remote is displayed when choose the Modbus communication.	0,1,2,3,4,5	1
3	External Sensor Sampling Cycle	Sets sampling cycle for learning control or external tune control.	10 to 999sec (1sec)	60
4	Offset Value	Indicates the offset value of the circulating fluid temperature used as reference value by the controller (SV + Offset).	-9.99 to 9.99°C (0.01°C)	0.00
5	Allowable Upper Temp. Range	Sets upper limit of temp. range which causes a warning to occur.	0.1 to 10.0°C (0.1°C)	1.5
6	Allowable Lower Temp. Range	Sets lower limit of temp. range which causes a warning to occur.	0.1 to 10.0°C (0.1°C)	1.5
7	High Temp. Cutoff	Sets upper limit of temp. measured by the internal temp. sensor and stops operation of the product.	11.0 to 70.0°C (0.1°C)	70.0
8	Low Temp. Cutoff	Sets lower limit of temp. measured by the internal temp. sensor and stops operation of the product.	0.0 to 59.0°C (0.1°C)	0.0

	6 Operation (continued)							
,	6.3.2 Level 2–Settings							
	No.	Modes	Setting contents	Se (Mir				
	1	Fine Control of Internal Sensor	Sets the fine adjusting value to calibrate the internal temp. sensor	-9.				
	2	Fine Control of External Sensor	Sets the fine adjusting value to calibrate the external temp. sensor available optionally.	-9.				
	3	PB Range	Sets PB (Proportional Band)	0				

3	PB Range	Sets PB (Proportional Band) range used for PID control.	0.3 to 9.9°C (0.1°C)	HECR008-W 6.0 HECR012-W 8.0
4	I Constant	Sets integral time used for PID control.	1 to 999sec (1sec)	HECR008-W 18.0 HECR012-W 50.0
5	D Constant	Sets differential time used for PID control. When 0 is set, differential operation is not made.	0.0 to 99.9sec (0.1sec)	0.0
6	Heating/Cooling Ratio	Sets output ratio of cooling to heating to compensate difference of gain between them.	10 to 999% (1%)	300
7	Overload Judging Temp. Rang	Sets the temp. range for judgment of overload (accompanying abnormal output alarm ERR15).	0.1 to 9.9°C (0.1sec)	0.2
8	Overload Judging Time	Sets time for judgment of overload (accompanying abnormal output alarm ERR15). When 0 is set, the alarm doesn't arise.	0 to 99min (1min)	10
9	Output Ratio	Shows output ratio of thermo module by 1%. The prefix symbol "-" stands for cooling and no prefix stands for heating.	-100 to 100% (1%)	-
10	Upper/Lower Temp. Alarm Sequence	Determines whether or not temp. upper/lower limit alarm is output when power is turned on. On : Output Off : Not output	On, Off	Off

.99 to 9.99°

.99 to 9.99°C

(0.01°C)

(0.01°C)

0.00

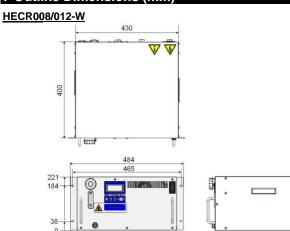
0.00

6.3.3 Level 3-Settings

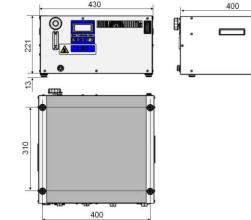
No.	Modes	Setting contents	Setting range	Default
1	Serial communications	RS-232C / RS-485	RS-232C, RS-485	RS-232C
2	Termination resistor	Sets the termination resistor (120 Ω) for RS-485 communication	On, Off	Off
3	Communication protocol	Set the Communication protocol. SMC CMD:same as existing HEC communication Modbus:Modbus communication	SMC CMD Modbus	SMC CMD
4	Unit Number	Sets the unit No. used. This is applicable only when multiple Thermo-cons are used. (Unit number 1 to F is vaild when used the Modbus communication)	0 to F (Hex decimal)	0
5	Baud Rate	Sets baud rate for communication.	600, 1200, 2400, 4800, 9600, 19200b/s	1200
6	Parity Bit	Sets parity bit for communication. None : No parity Odd : Odd Even : Even	None, Odd, Even	None
7	Data Length	Sets data length for communication.	7Bits, 8Bits	8
8	Stop Bit	Sets stop bit for communication.	1Bit, 2Bits	1

HECR-TF2Z573EN

7 Outline Dimensions (mm)

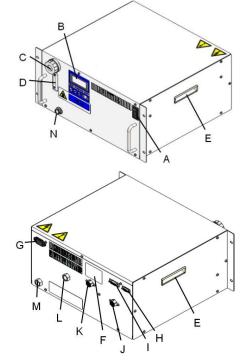


HEC008/012-W-E(option)



8 Key Parts

HECR008 / HECR012-W



Α	Power switch	Н	Communication connector
В	Display/Operation panel	1	External sensor/Alarm output connector
С	Reservoir Cap	J	Circulating fluid IN
D	Level gauge	К	Circulating fluid OUT
E	Handle	L	Facility water IN
F	Model No. label	М	Facility water OUT
G	Power supply connector	Ν	Dain port

9 Maintenance

First Edition: 2022. Mar

9.1 Daily Check

- Indication of display panel: Check temperature condition and confirm whether or not an alarm has occurred.
- 2) Confirm that the panel are free from dust. A large amount of dust may impair the performance.
- 3) Confirm there is no leakage of circulating fluid and check the condition of the piping (e.g. no tight bends or crushed pipes).
- 4) Confirm there is no abnormal sound, smell or heating from the product.
 A Caution
- When cleaning the panel use a vacuum cleaner to remove the dust. Do not use water or steam since it leads to rusting of the frame.

9.2 General Maintenance

Replace the circulating fluid regularly to avoid any problems due to algae or contamination.

<Drain circulating fluid>

- 1. Drain circulating fluid from the Drain port.
- Loosen the reservoir cap to help draining. (Do not remove the cap) 2. To drain from the piping, blow air (0.1MPa, about 1 minute) from Fluid
 - OUT to Drain port. Close the reservoir cap and Fluid IN while blowing.

🛕 Caution

- The repair and maintenance services of this unit are performed only at SMC factory. SMC does not provide on-site repair or maintenance service in a national or overseas situation.
- It is recommended to prepare spare units to minimize downtime due to those repair and maintenance services.
- Drain the fluid from the product when it is returned for the repair and maintenance service. If the fluid is left inside, an accident and damage can result during transportation.
- Do not make any modification to the product.

Description

System error 1

System error 2

Back-up data error

Temp. upper/lower limit

alarm

- Do not disassemble the product, unless required by installation instructions.
- If fluid other than water is used, wash the circulating fluid circuit with water or DI water before returning the product to SMC. Products that have not been washed may not be accepted at the factory.

is required.

Manner of reset

Restart the power supply. In the case the alarm can't be reset by above manner, repair

Initialization of FRAM or stop and restart of

The unit continues controlling and recovers

Remove a possible cause and restart. In the case the alarm can't be reset by above

normal condition at any time

nanner, repair is required.

power supply In the case the alarm can't be reset by above manner, repair is required.

10 Troubleshooting (continued)

Code	Description	Operation status	Reason for alarm setting	Cause / Measure			
ERR12	Internal temp. sensor High temp. failure	Stop	Internal temp. sensor value exceeds the high temp. cutoff temperature.	Check the set value for high temp. cutoff temperature and confirm the temperature really reaches this value.			
			Flow rate of circulating fluid is zero.	If the flow rate of the circulating fluid is zero, the temperature of circulating fluid can't be detected and might increase. Confirm the flow of circulating fluid is not stopped by valves etc.			
	Internal		Internal temp. sensor value is lower than low temp. cutoff temperature.	Check the set value for low temp. cutoff temp. and confirm the temperature really reaches this value.			
ERR13	temp. sensor Low temp. failure	Stop	Flow rate of circulating fluid is zero.	If the flow rate of the circulating fluid is zero, the temperature of circulating fluid can't be detected and might decrease. Confirm the flow of circulating fluid is not stopped by valves etc.			
	Thermostat alarm	Stop	Facility water temp is high.	Decrease facility water temp. and increase a flow rate.			
ERR14			Flow rate is zero.	If flow rate of circulating fluid is zero, the temperature of circulating fluid cannot be			
			The pump breaks.	measured and the temperature of heat exchanger may increase. Ensure the circulating fluid is allowed to flow.			
ERR15	Abnormal output alarm	Continue	Cooling or heating capacity overload.	No temperature decrease when 100% cooling output. No temperature increase when 100% heating output.			
			Volume of circulating fluid is too large.	If the volume of circulating fluid system is too large, the change of temperature takes a long time. In this case, change overload judging time setting to avoid this alarm. (Refer to 6.3.2)			
ERR16	Low circulating flow rate alarm (Option)	Stop	The flow rate of the circulating fluid is 1 L/min. or less	Investigate why the flow rate of the circulating fluid is low and take countermeasures.			
ERR17	Internal temp. sensor disconnectio n alarm	Stop	High level noise entered the temp. sensor line.	Check whether unstable temperature is caused by noise. Please consult SMC if it is caused by noise.			

ERR18	External temp. sensor disconnectio n alarm	Continue	The external temp. sensor is not mounted.	For learning control or external tune control, be sure to mount the external temp. sensor.
ERR19	Abnormal auto tuning alarm	Stop	Capacity of circulating fluid is too large.	Adjust PID value (proportional band, integral time and derivative time) of setting mode Level 2 by hand.
			Overloaded during auto tuning mode	Avoid overload.
ERR20	Low fluid level alarm	Stop	Fluid level of tank is not enough.	Refill tank with fluid.
			Fluid is leaking.	Check all fluid connections connected with the product.
Temperature rises and falls +/-1 to 2 °C gradually about the set point temperature.		-	Flow rate of circulating fluid is low.	Keep the flow rate 3L/min or more.
		-	PID parameters are set incorrectly.	If the temperature cannot be stable at default value, perform auto tuning.

10.2 Product alarm codes

Others

10 Troubleshooting

Code

ERR01

ERR02

ERR03

WRN

10.1 How to reset the alarm

Code	Description	Operation status	Reason for alarm setting	Cause / Measure
WRN	Temp. upper/lower limit	Continue	Fluid temperature is out of limit range.	Product is reaching target temperature. Wait for the temperature to stabilize, then the WRN should disappear.
ERR01	System error 1	Stop	The wire inside the Thermo-con was broken due to vibration during transport.	In the case the alarm can't be reset by above manner, repair is required.
ERR02	System error 2	Stop	The FRAM data was destroyed by high- level noise.	Move the product to an environment with little noise, turn ON the power supply. If there is no alarm, it was caused by noise. Please consult with SMC.
ERR03	Back-up data error	Stop	The memory data was destroyed by high-level noise.	Move the product to an environment with little noise, turn ON the power supply. If there is no alarm, it was caused by noise. Please consult with SMC.
ERR11	DC power supply failure	Stop	DC output voltage of product is reduced.	Check the power voltage. HECR008: 100 to 240VAC HECR012: 200 to 240VAC
			The fans at the power supply stops.	Remove foreign matters which might stop the fan.

11 Declaration of Conformity

Below is a sample Declaration of Conformity(DoC) used for this product. An actual DoC will be supplied with each product.



12 Contacts

Refer to <u>www.smcworld.com</u> or <u>www.smc.eu</u> for your local distributor/ importer.

SMC Corporation

URL: https:// www.smcworld.com (Global) https:// www.smc.eu (Europe) SMC Corporation, 4-14-1, Sotokanda, Chiyoda-ku, Tokyo 101-0021, Japan Specifications are subject to change without prior notice from the manufacturer. © 2021 SMC Corporation All Rights Reserved. Template DKP50047-F-085M