



ORIGINAL INSTRUCTIONS

# 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.

	<b>Caution</b>	If instructions are not followed there is a possibility of injury or equipment damage.
	<b>Warning</b>	If instructions are not followed there is a possibility of serious injury or loss of life.
	<b>Danger</b>	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-to-understand 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.

#### 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.

#### 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)

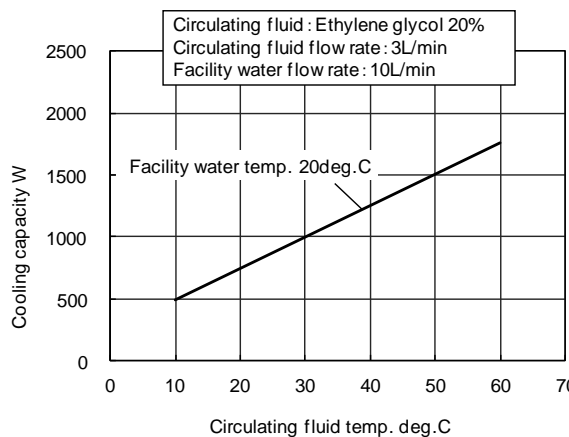
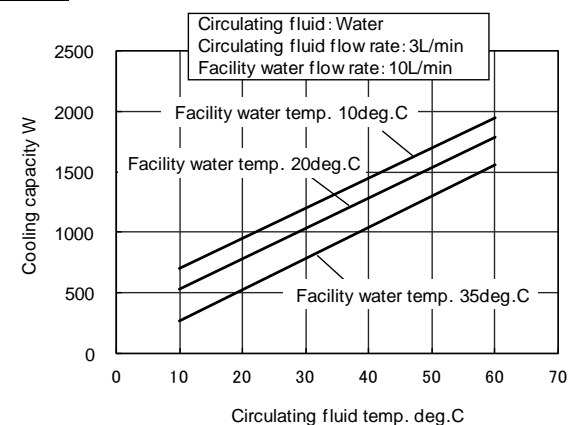
Item	Spec.	
Model No.	HECR008-W	HECR012-W
Over voltage category	Category II	
Pollution degree	Pollution degree II	
Limitation of hazardous substance	RoHS compliant products	
Acoustic noise	48dBA	
Cooling method	Water cooled	
Main functions	Auto tuning, Off set function, Learning control function, External tuning control function, Temperature sensor fine control function, Setting value memory function, 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 control operation, Setting and reading of PID values, Reading of output ratio. For operation by communication, it is necessary to order "Communication Manual". Use shielded cable for serial communications.	
Temp. sensor	Resistance thermometer sensor (Pt100Ω, 3-wire, class A, 1mA) (Both internal sensor and external sensor)	
Painting color	Urban 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.

##### 3.3.1 Cooling Capacity

###### HECR008-W

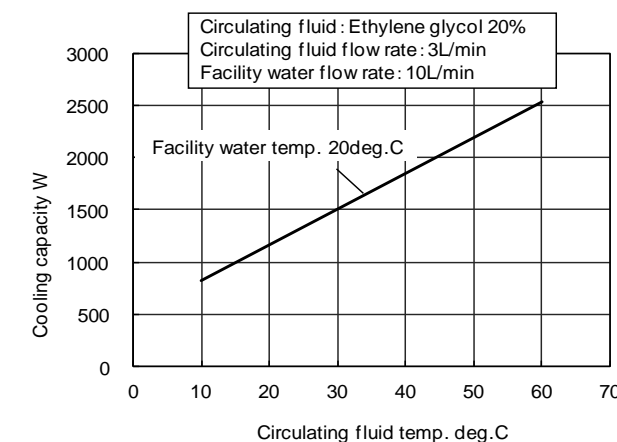
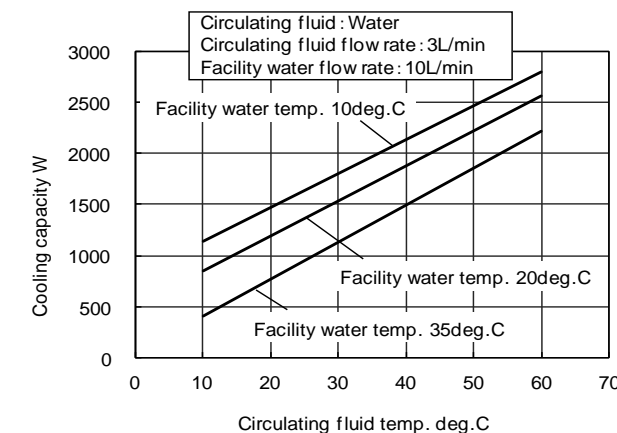


\*Cooling capacity decrease about 50W when high head pump option selected.

#### 3 Specifications (continued)

##### 3.3.1 Cooling Capacity (continued)

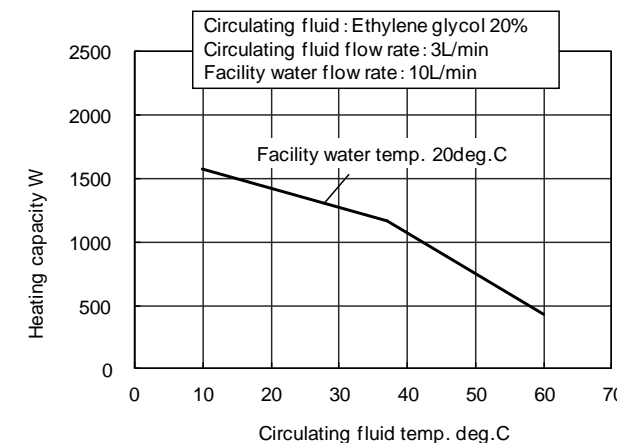
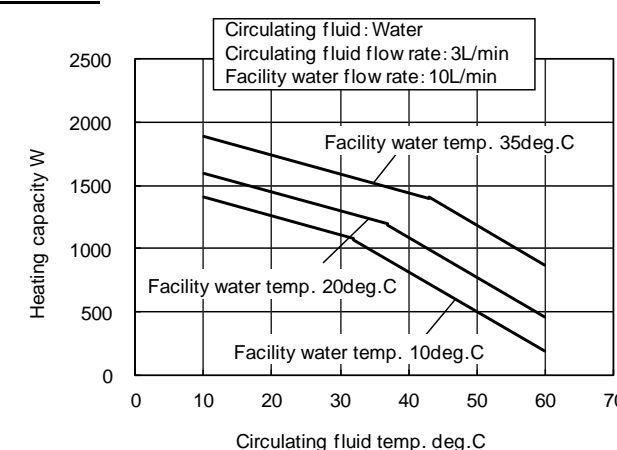
###### HECR012-W



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

##### 3.3.2 Heating Capacity

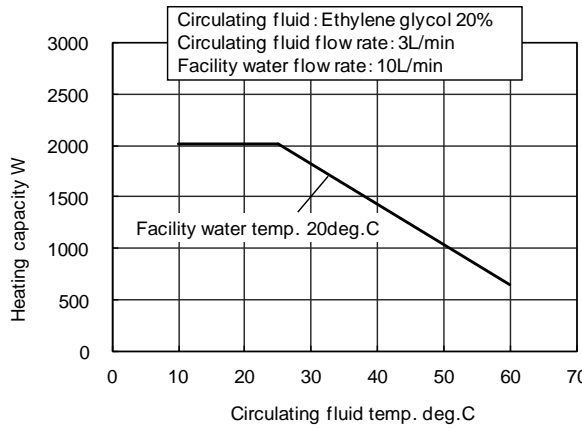
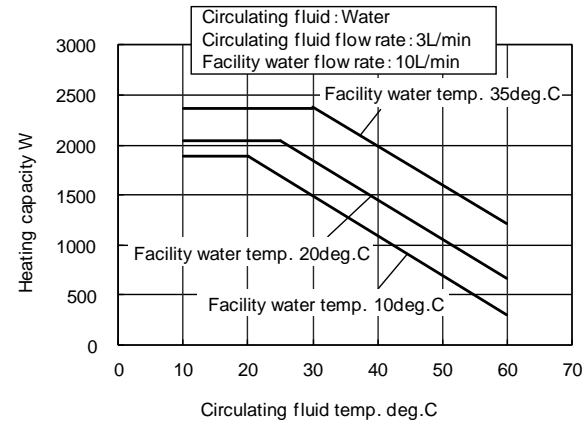
###### HECR008-W



**3 Specifications (continued)**

**3.3.2 Heating Capacity (continued)**

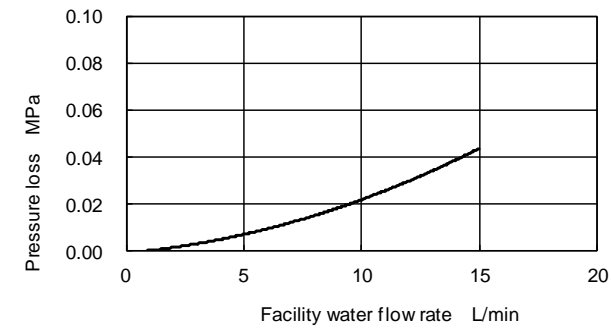
**HECR012-W**



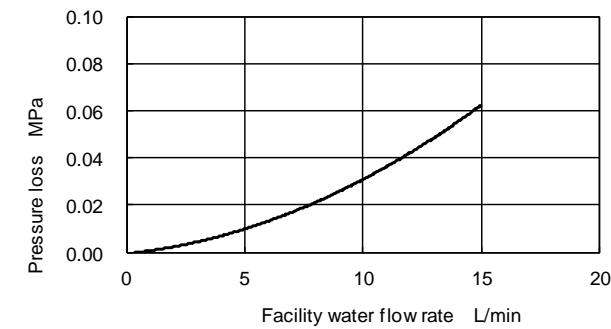
**3 Specifications (continued)**

**3.3.4 Pressure Loss in Facility Water Circuit**

**HECR008-W**

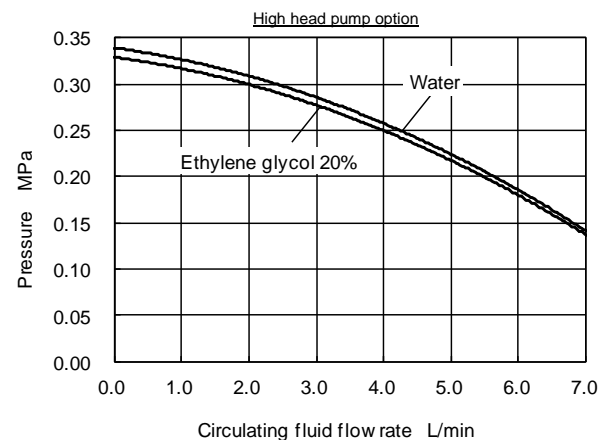
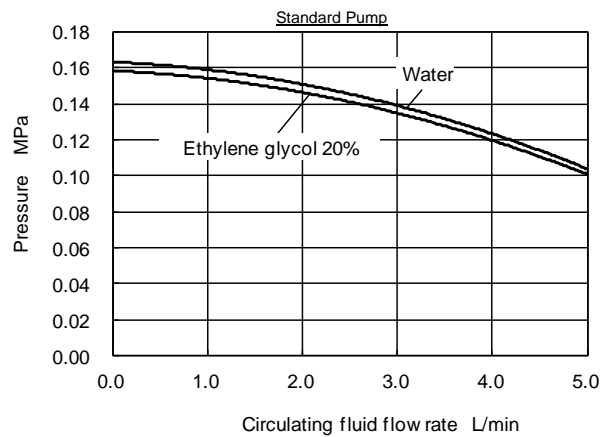


**HECR012-W**



**3.3.3 Pump Capacity**

**HECR008/012-W**



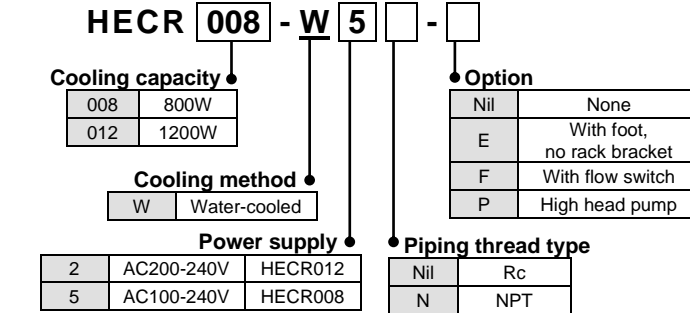
**3.4 Connector Specifications**

Description	No.	Signal	Style and Part No.
Power supply connector (IEC60320,C14)	N	HECR008-W: AC100 to 240V HECR012-W: AC200 to 240V	N L E
	L	HECR008-W: AC100 to 240V HECR012-W: AC200 to 240V	
	E	PE	
Communication connector Note: Always use shielded cable connected to this connector.	RS-232C		5 4 3 2 1 9 8 7 6 D-sub 9 pin (socket type) Fixed screw: M2.6
	1	Unused	
	2	RXD (RD)	
	3	TXD (SD)	
	4	Unused	
	5	SG	
	6-8	Unused	
	9	Unused	
	BUS -		
Signal-External temperature sensor connector Note: Always use shielded cable connected to this connector.	1-2		8 1 15 9 D-sub 15 pin (Socket type) Fixed screw: M2.6
	3-5		
	PT-RTD		
	6	Output Cutoff Alarm a contact (OPEN During Alarm)	
	7	Output Cutoff Alarm Common	
	8	Output Cutoff Alarm b contact (CLOSE During Alarm)	
	9	Temperature Alarm a contact (OPEN During Alarm)	
	10	Temperature Alarm Common	
	11	Temperature Alarm b contact (CLOSE During Alarm)	
	12-14	Unused	
	15	FG	

**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:

Year	Month											
	Jan	Feb	Mar	Apr	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	o	P	Q	R	S	T	U	V	X	y	Z	
2019	X	Xo	XP	XQ	XR	XS	XT	XU	XV	XX	Xy	XZ
2020	y	yo	yP	yQ	yR	yS	yT	yU	yV	yX	yy	yZ
2021	Z	Zo	ZP	ZQ	ZR	ZS	ZT	ZU	ZV	ZX	Zy	ZZ
2022	A	Ao	AP	AQ	AR	AS	AT	AU	AV	AX	Ay	AZ
2023	B	Bo	BP	BQ	BR	BS	BT	BU	BV	BX	By	BZ
2024	C	Co	...	...	...	...	...	...	...	...	...	...
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.

**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.
- 4) 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**



- 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**

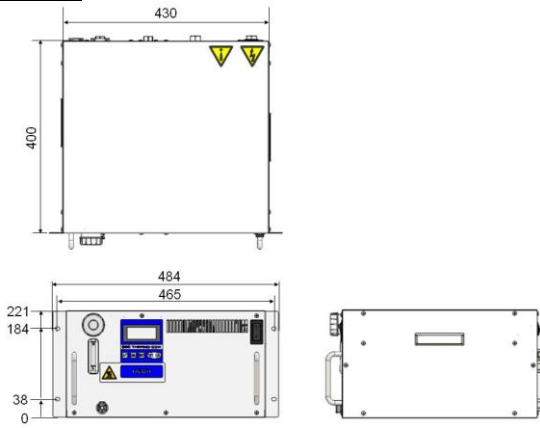


- Do not use in an environment where the product is directly exposed to water, oil, corrosive gases, chemicals, salt water or steam.
- The product should be installed upright on a stable base.
- Do not install the product in a location where the air inlet and air outlet vents are blocked. Also do not 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.

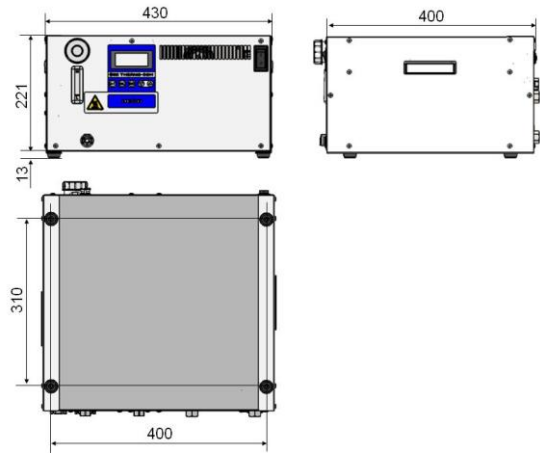


**7 Outline Dimensions (mm)**

**HECR008/012-W**

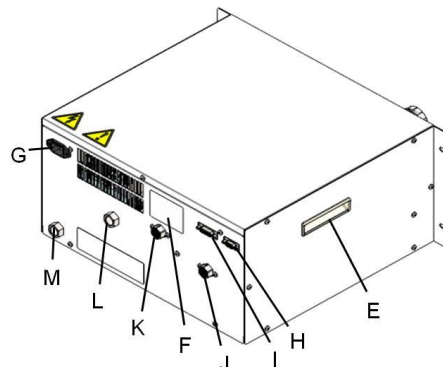
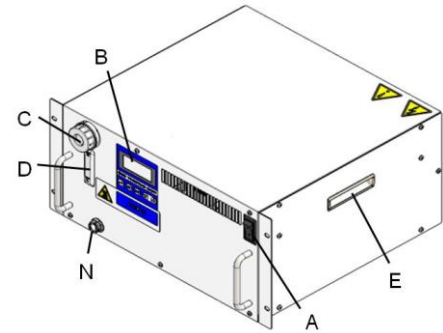


**HEC008/012-W-E(option)**



**8 Key Parts**

**HECR008 / HECR012-W**



A	Power switch	H	Communication connector
B	Display/Operation panel	I	External sensor/Alarm output connector
C	Reservoir Cap	J	Circulating fluid IN
D	Level gauge	K	Circulating fluid OUT
E	Handle	L	Facility water IN
F	Model No. label	M	Facility water OUT
G	Power supply connector	N	Dain port

**9 Maintenance**

**9.1 Daily Check**

- 1) 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.

**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.
- 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.

**10 Troubleshooting**

**10.1 How to reset the alarm**

Code	Description	Manner of reset
ERR01	System error 1	Restart the power supply. In the case the alarm can't be reset by above manner, repair is required.
ERR02	System error 2	
ERR03	Back-up data error	Initialization of FRAM or stop and restart of power supply. In the case the alarm can't be reset by above manner, repair is required.
WRN	Temp. upper/lower limit alarm	The unit continues controlling and recovers normal condition at any time.
Others		Remove a possible cause and restart. In the case the alarm can't be reset by above manner, repair is required.

**10.2 Product alarm codes**

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.

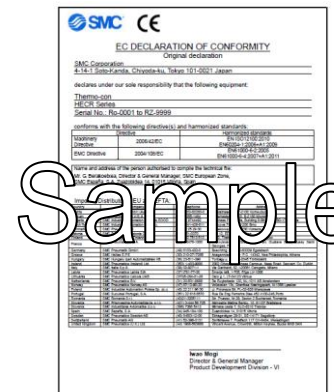
**10 Troubleshooting (continued)**

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.
ERR13	Internal temp. sensor Low temp. failure	Stop	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.
			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.
ERR14	Thermostat alarm	Stop	Facility water temp is high.	Decrease facility water temp. and increase a flow rate.
			Flow rate is zero.	If flow rate of circulating fluid is zero, the temperature of circulating fluid cannot be 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 disconnection 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 disconnection 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.

**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 [www.smcworld.com](http://www.smcworld.com) or [www.smc.eu](http://www.smc.eu) for your local distributor/importer.

**SMC Corporation**

URL : [https:// www.smcworld.com](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.  
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