Circulating Fluid Temperature Controller



with power supplies in Europe, Asia, Oceania, North, Central, and South America

 Single-phase 100 VAC (50/60 Hz), 115 VAC (60 Hz)
 Single-phase 200 to 230 VAC (50/60 Hz)

HRS Series

p. 3 **Convenient functions** Self-diagnosis function p. 4 and check display Timer operation function/Unit conversion 35 types of alarm codes function/Power failure auto-restart function/ Anti-freezing operation function p. 4 Communication function p. 3 Easy maintenance Equipped with serial communication (RS232C/RS485) and contact I/Os Toolless maintenance of filter (2 inputs and 3 outputs) as standard Environmentally friendly R407C R410A as refrigerant



RoHS

Temperature stability ±0.1°C / Compact

A precision temperature control method which utilizes expansion valves and temperature sensors allowed for the realization of a product with a high temperature stability of $\pm 0.1^{\circ}$ C and a small-size tank.

Air-cooled HRSD-A-D



Refrigeration circuit

- The compressor compresses the refrigerant gas and discharges high-temperature, high-pressure refrigerant gas.
- In the case of air-cooled refrigeration, the high-temperature, high-pressure
 refrigerant gas is cooled down by fan ventilation in the air-cooled
 condenser, where it is then liquefied. In the case of water-cooled
 refrigeration, the refrigerant gas is cooled by the facility water in the facility
 water circuit in the water-cooled condenser, where it is then liquefied.
- The liquefied high-pressure refrigerant gas expands and its temperature lowers when it passes through expansion valve A, where it vaporizes after receiving heat from the circulating fluid in the evaporator.
- The vaporized refrigerant gas is sucked into the compressor and compressed again.
- When heating the circulating fluid, the high-pressure, hightemperature refrigerant gas is bypassed into the evaporator by expansion valve B to heat the circulating fluid.



■ Water-cooled HRS□-W-□



Circulating fluid circuit

- After the circulating fluid discharged from the pump is heated or cooled by the user's equipment, it returns to the thermo-chiller.
- The circulating fluid is controlled to remain at a set temperature by the refrigeration circuit. It will then be discharged to the user's equipment side again by the thermo-chiller.

Point Since the refrigeration circuit is controlled by the signals from 2 temperature sensors (for return and discharge), precise temperature control of the circulating fluid can be achieved. Therefore, there is no need for a tank with a large capacity to absorb the circulating fluid temperature difference, as high temperature stability can be achieved even with a small-size tank. This also contributes to space saving.

Facility water circuit

For water-cooled refrigeration HRS \Box -W- \Box

• The water-regulating valve opens and closes to keep the refrigerant gas pressure consistent. The facility water flow rate is controlled by the water-regulating valve.

Can be installed with both sides close to a wall



Reduced-height double condenser structure (HRS030/040/060)



A maximum reduction in the height of the product has been achieved while expanding the cooling capacity by providing overlapped air-cooled condensers.

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			(50/60 HZ)	115 VAC (50/60 HZ)	(50/60 HZ)			
	HRS012		1100/1300	•	٠		Anti-quake bracket Piping conversion fitting (For all conductions)	
			1500/1700		—	· With earth leakage	Concentration meter	
	пполо		1700/1900	—	٠	With automatic fluid	· Bypass piping set	
	HRS024	Air-cooled refrigeration Water- cooled refrigeration	2100/2400	_	•	fill function • Applicable to deionized	Power supply cable DI filter set	
	HRS030		2600/3200	_	٠	 Water piping High-pressure pump mounted (* The HRS050/ 	Electric resistance sensor set/ Electric resistance control set Electric conductivity sensor set/ Electric conductivity control set Particle filter set Drain pan set (With water leakage sensor)	(UL Standards)
	HRS040		3800/4200	_	٠	060 cannot be selected.) · SI unit only · High-temperature		to 14 for details on applicable
	HRS050		4700/5100	_	٠	environment specification (* The HRS030/040/050/060 cannot be selected.)	Connector cover Analog gateway unit Benlacement type dustroof filter set	models.
	HRS060		4900/5900	_	•		Separately-installed power transformer Filter for circulating fluid fill port	

*1 UL Standards: Applicable to only 60 Hz, To be obtained for the HRS040



units of 0.5 h up to 99.5 h. Ex.) Can be set to stop on Saturday and Sunday and restart on Monday morning







- Automatic restart after stoppage due to power failure, etc., is possible without pressing the RUNY key, and remote operation is also possible.
- Anti-freezing operation function If the circulating fluid approaches its freezing point, for example, on a cold winter night, the pump operates automatically, and the heat generated by the pump warms the circulating fluid, preventing freezing.
- Key-lock function

Can be set in advance to protect the set values from being changed by pressing keys by mistake.

- Function to output a signal for completion of preparation Notifies by communication when the temperature reaches the pre-set temperature range
- Independent operation of the pump The pump can be operated independently while the chiller is powered off. This allows you to check for leakages in piping and to remove the air.

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Alarm code

Self-diagnosis function and check display

Display of 35 types of alarm codes For details, refer to page 26.

Operation is monitored at all times by the integrated sensor.

Should any error occur, the self-diagnosis result is displayed by the applicable alarm code (35 types).

This makes it easier to identify the cause of the alarm. Can be used before requesting service

Changeable alarm set values

Pa*1
Pa*1

*1 Set values vary depending on the model.

Alarm codes can be used for the notification of upcoming recommended maintenance.

The codes notify you when it's time to check the pump and fan motor. Helpful for facility maintenance * A fan motor is not used in water-cooled refrigeration.



Check display

Flashing

Lights up

0

The internal temperature, pressure, and operating time of the product are displayed.

SEL

Ex. AL01 "Low level in tank"



Communication function

Serial communication (RS232C/RS485) and contact I/Os (2 inputs and 3 outputs) are equipped as standard. This allows for communication with the user's equipment and system construction, depending on the application. A 24 VDC output can be also provided and is available for use with flow switches (SMC's PF2W, etc.).

Ex. 1 Remote signal I/O through serial communication

Remote operation is enabled (to start and stop operation) through serial communication.



The alarm and status generated in the product are assigned to 3 output signals based on their contents, which can then be output.



• Output setting example Output 1: Temperature rise Output 2: Pressure rise Output 3: Operation status (start, stop, etc.)

Ex. 2 Remote operation signal input

One of the contact inputs is used for remote operation and the other is used to monitor the flow of a flow switch. This is where their alarm outputs are taken in.



Power for flow switches (24 VDC) can be supplied by the thermo-chiller.

Application Examples

A 88	Heat source	Automotive	Light electrical appliance	Food	Machinery	Medical	Semiconductor	Laser
Arc welding machines	Torch	•			•			
Resistance welding machines	Tip	•	•		•			
Laser welding machines	Oscillator	•	•		•		•	
Laser beam machines	Oscillator/ Power supply							•
Fiber lasers Oscillators Transmission cable connectors								•
Secondary battery manufacturing processes	Welded portion							•
3D metal printers Additive manufacturing								•
UV curing devices	Lamp	•	•	•		•		
X-ray instruments			•			•	•	
Electronic microscopes	Lens		•			•	•	
MRIs						•		
Laser markers	Oscillator	•	•	•		•	•	•
Ultrasonic wave inspection machines	Oscillator	•	•		•			•
Atomizing devices Crushing equipment	Blade			•				
Linear motors	Motor	•			•			
Packaging lines (food)	Dies/ Welded portions			•				

Application Examples

	Heat source	Automotive	Light electrical appliance	Food	Machinery	Medical	Semiconductor	Laser
Atomizing devices (food and cosmetics)	Sample/ Device			•	•			
Mold cooling	Mold	•	•	•		•		
Machining centers	Spindle				•			
Injection molding					•			
Temperature control of adhesive and paint materials	Paint material/ Welding materials	•	•	•				
Cooling of vacuum pumps	Pump	•					•	
Shrink fit machines	Workpiece	•			•			
Gas cylinder cabinets							•	
Testers			•				•	
Concentrating equipment	Test liquid			•		•		
Reagent cooling equipment	Reagent			•		•	•	
Cleaning machines	Cleaning solution		•				•	
Printing machines	Roller		•	•	•			
Chamber electrodes	Electrode						•	
High-frequency induction heating equipment	Power supply/ Heating coil	•			•			

Global Supply Network

SMC has a comprehensive network in the global market.

We now have a presence of more than 500 branch offices and distributors in 83 countries and regions worldwide, such as Asia, Oceania, North/Central/South America, and Europe. With this global network, we are able to provide a global supply of our substantial range of products and high-quality customer service. We also provide full support to local factories, foreign manufacturing companies, and Japanese companies in each country.





SMC Thermo-chiller Variations

Lots of variations are available according to the users' requirements.

Carias		Temperature	Set temperature					Coc	oling	capa	city [kW]					En income	International	
Sei	les	[°C]	range [°C]	1.2	1.8	2.4	3	4	5	6	9	10	15	20	25	28	Environment	standards	
	HRSE Basic type	±2.0	10 to 30	•	•	•											Indoor use	(€ (Only 230 VAC type)	
	HRS Standard type	±0.1	5 to 40	•	•	•	•	•	•	•							Indoor use	ር € . (Only 60 Hz)	
	HRS090 Standard type	±0.5	5 to 35								•						Indoor use	C € (400 V as standard)	
	HRS100/150 Standard type	±1.0	5 to 35									•	•				Outdoor installation IPX4	C € (400 V as standard)	
	HRSH090 Inverter type	±0.1	5 to 40								•						Indoor use	C E (400 V as standard, 200 V as an option) (Only 200 V as an option)	
	HRSH Inverter type	±0.1	5 to 35									•	•	•	•	•	Outdoor installation IPX4	(



Circulating Fluid/Facility Water Line Equipment



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