NP368-A
(P-E18-24)

Temperature Control Equipment

Thermo-chillers

Standard Type *HRS Series/HRS090 Series*

1.1 kW to 5.9 kW With heating function 41 to 104°F

Temperature stability: ± 0.18°F (± 0.1°C)

9 kW With heating function 41 to 95°F

Temperature stability: ± 0.9°F (± 0.5°C)

Lightweight/Compact

Rack Mount Type *HRR Series*

1.2 kW to 3.0 kW With heating function

Temperature stability: ± 0.18°F (± 0.1°C)

Multiple chillers can be mounted to a 19-inch rack.

Standard Type *HRS100/150 Series*

10 kW/15 kW With heating function 41 to 95°F

Temperature stability: ± 1.8°F (± 1.0°C)

A large model designed for outdoor use (HRS series)

Inverter Type *HRSH090 Series*

9.5 kW to 11 kW With heating function 41 to 104°F

Temperature stability: ± 0.18°F (± 0.1°C)

A model designed for indoor use (HRSH series)

Lightweight and compact triple inverter model
Outstanding energy saving due to the triple inverter

Inverter Type *HRSH Series*

10 kW to 28 kW With heating function 41 to 95°F

Temperature stability: ± 0.18°F (± 0.1°C)

Basic Type *HRSE Series*

1.0 kW to 2.2 kW 50 to 86°F

Temperature stability: ± 3.6°F (± 2.0°C)

Convenient cooling

High-performance Type *HRZ, HRZD, HRW Series*

1.0 kW to 30 kW With heating function

Temperature stability: ± 0.018 to 0.054°F

High-performance type for semiconductor manufacturing equipment, etc.

SEMATECH S2-93, S8-95 | SEMI Standard S2-0703, S8-0701, F47-0200

Peltier-type Thermo-cons

Thermo-con *HECR/HEC Series*

140 W to 1200 W With heating function 50 to 140°F

Temperature stability: ± 0.018 to 0.054°F (± 0.01 to 0.03°C)

High-precision temperature control type for semiconductor manufacturing equipment, medical equipment, etc.

CONTENTS

Thermo-chiller Variations

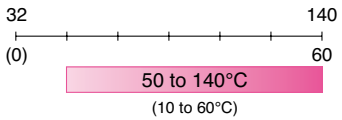
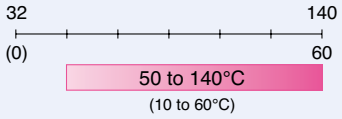
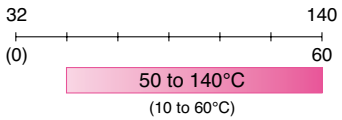
Series	Features	Cooling method	Temperature stability	Cooling capacity [kW]																						
				0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.2	1.8	2.4	3	5	6	9	10	15	20	25	28	30
Thermo-chiller Rack Mount Type ***HRR Series*** New  Equivalent to 7U Equivalent to 9U	• Mountable in a 19-inch rack • Space can be saved by mounting multiple pieces of equipment together in a single rack. • Comes with a built-in bypass valve and particle filter as standard • Built-in DI filter (option) specifications • Performance and functions: Equivalent to the HRS	Air-cooled/ Water-cooled refrigeration	± 0.18°F (± 0.1°C)									●	●	●	●											
Thermo-chiller Basic Type ***HRSE Series*** 	• Simple function and performance Thermo-chiller of the basic type • Complete with energy-saving triple control! Reduces power consumption by 33% • Compact and lightweight: 70.55 lb (100 VAC) • Maintenance-free: Magnet pump • Low-noise design: 55 dB (A)	Air-cooled refrigeration	± 3.6°F (± 2.0°C)									● 1.2 kW	● 1.6 kW	● 2.2 kW												
Thermo-chiller Standard Type ***HRS Series*** 	• With this chiller, cooling water can be obtained anywhere it is required because of easy installation and easy operation. • For a wide range of applications, such as laser machine tools, analytical equipment, LCD manufacturing equipment, mold temperature control, etc. • Compact: W 14.84 x H 24.2 x D 19.7 in, 88.2 lb (HRS012/018/024) • Timer function, Low liquid level protection, Power failure auto-restart, Anti-freezing function, etc. • Self diagnosis function • No heater is required, as the circulating fluid is heated using only the heat exhausted by the refrigerating circuit. • Low-noise design: 70 dB (A) (HRS100/150) • Outdoor installation: IPX4 (HRS100/150)	Air-cooled/ Water-cooled refrigeration	± 0.18°F (± 0.1°C)									●	●	●	●	●	●									
Thermo-chiller Standard Type ***HRS090 Series*** 		Air-cooled/ Water-cooled refrigeration	± 0.9°F (± 0.5°C)															●								
Thermo-chiller Standard Type ***HRS100/150 Series*** 			± 1.8°F (± 1.0°C)																●	●						
Thermo-chiller Inverter Type ***HRSH090 Series*** 	• Power consumption reduced by 53% Complete with energy-saving triple inverter! • Compact, Space saving: W 14.84 x H 42.52 x D 38.2 in • Low-noise design: Max. 66 dB • Max. ambient temperature: 113°F (45°C)	Air-cooled/ Water-cooled refrigeration	± 0.18°F (± 0.1°C)															●								
Thermo-chiller Inverter Type ***HRSH Series*** 	• Complete with energy-saving triple inverter! • Outdoor installation: IPX4 • Max. ambient temperature: 113°F (45°C) • Space saving and lightweight: 617.3 lb. (25 kW type)	Air-cooled/ Water-cooled refrigeration	± 0.18°F (± 0.1°C)																●	●	●	●	●			
Thermo-chiller High-performance Type ***HRZ Series*** **Thermo-chiller High-performance Inverter Type** ***HRZ Series*** 	• Suitable for semiconductor processing equipment with a wide variety of features, such as high-temperature stability, a wide temperature range, failure diagnosis, external communication, etc. • Suited to the short innovation cycle of semiconductor equipment, Capable of responding flexibly to changes in the process conditions • Compliant with various safety standards • It is possible to select the inverter type. Energy saving is achieved through use of a DC inverter compressor.	Water-cooled refrigeration	± 0.18°F (± 0.1°C)								●		● 2 kW		● 4 kW			● 8 kW	●						
Dual Thermo-chiller **High-performance Inverter Type** ***HRZD Series*** 	• Temperatures for 2 systems can be controlled separately by one chiller. • Double inverter type: Substantially more energy is saved by using a DC inverter refrigerator and inverter pump. • Space saving: Footprint reduced by 23% • Reduced wiring, piping, and labor: Single power cable, Single facility-water piping system	Water-cooled refrigeration	± 0.18°F (± 0.1°C)															● 9.5 kW × 2ch								
Water-cooled Thermo-chiller High-performance Type ***HRW Series*** **Water-cooled Thermo-chiller High-performance Inverter Type** ***HRW Series*** 	• Direct heat exchanger for in-plant circulating fluid • Can control the temperature over a wide range since a compressor is not required. • Suitable for semiconductor processing equipment with a wide variety of features, such as high-temperature stability, a wide temperature range, failure diagnosis, external communication, etc. • It is possible to select the inverter type.	Water-cooled type	± 0.54°F (± 0.3°C)										● 2 kW					● 8 kW		●				●	

For details, refer to the **Web Catalog.**

Set temperature range °F (°C)	Pump capacity	Pump type	Power supply	Circulating fluid	Environment	International standards
32 (0) 50 to 95°F (10 to 35°C) 140 (60)	0.74 cfm 21 L/min	Magnet pump (Mechanical seal pump for high-pressure pump mounted type)	Single-phase 200 to 230 VAC (50/60 Hz)	Tap water Ethylene glycol aqueous solution (15%)	Indoor use	CE cMETus (Air-cooled: Option U Water-cooled: Standard)
32 (0) 50 to 86°F (10 to 30°C) 140 (60)	0.88 cfm 25 L/min	Magnet pump	Single-phase 100 VAC (50/60 Hz) Single-phase 200 VAC (50/60 Hz) Single-phase 230 VAC (50/60 Hz)	Tap water Ethylene glycol aqueous solution (15%)	Indoor use	CE (Only 230 VAC type)
32 (0) 41 to 104°F (5 to 40°C) 140 (60)	1.48 cfm 42 L/min	Magnet pump (Mechanical seal pump for high-pressure pump mounted type)	Single-phase 100 VAC (50/60 Hz) Single-phase 115 VAC (60 Hz) Single-phase 200 to 230 VAC (50/60 Hz)	Tap water Deionized water Ethylene glycol aqueous solution (15%)	Indoor use	CE cMETus (Only 60 Hz)
32 (0) 41 to 95°F (5 to 35°C) 140 (60)	2.4 cfm 68 L/min	Mechanical seal pump	3-phase 200 VAC (50 Hz) 3-phase 200 to 230 VAC (60 Hz) 3-phase 380 to 415 VAC (50/60 Hz)	Tap water Deionized water Ethylene glycol aqueous solution (15%)	Indoor use	CE (400 V as standard)
32 (0) 41 to 95°F (5 to 35°C) 140 (60)	2.4 cfm 68 L/min				Outdoor installation IPX4	CE (400 V as standard)
32 (0) 41 to 104°F (5 to 40°C) 140 (60)	2.12 cfm 60 L/min	Mechanical seal pump	3-phase 200 VAC (50 Hz) 3-phase 200 to 230 VAC (60 Hz) 3-phase 380 to 415 VAC (50/60 Hz)	Tap water Deionized water Ethylene glycol aqueous solution (15%)	Indoor use	CE (400 V as standard, 200 V as an option) ETL (Only 200 V as an option)
32 (0) 41 to 95°F (5 to 35°C) 140 (60)	6.36 cfm 180 L/min	Immersion pump	3-phase 200 VAC (50 Hz) 3-phase 200 to 230 VAC (60 Hz) 3-phase 380 to 415 VAC (50/60 Hz)	Tap water Deionized water Ethylene glycol aqueous solution (15%)	Outdoor installation IPX4	CE (400 V as standard, 200 V as an option) cMETus (Only 200 V as an option)
[High-performance type] –22 (–30) -4 to 104°F 194 (90) 68 to 194°F -4 to 194°F [Inverter type] 50 to 140°F -4 to 194°F	1.41 cfm 40 L/min	Immersion pump	3-phase 200 VAC (50 Hz) 3-phase 200 to 208 VAC (60 Hz)	Fluorinated fluid Tap water Deionized water Ethylene glycol aqueous solution (60%)	Indoor use	CE SEMATECH S2-93, S8-95 SEMI Standard S2-0703, S8-0701, F47-0200
–22 (–30) –22 to 194°F (–30 to 90°C) 194 (90)	1.41 cfm 40 L/min	Immersion pump	3-phase 200 VAC (50 Hz) 3-phase 200 to 208 VAC (60 Hz)	Fluorinated fluid Ethylene glycol aqueous solution (60%)	Indoor use	CE SEMI Standard S2-0706, S8-0308, F47-0706
–22 (–30) 68 to 194°F (20 to 90°C) 194 (90)	1.77 cfm 50 L/min	Immersion pump	3-phase 200 VAC (50 Hz) 3-phase 200 to 208 VAC (60 Hz)	Fluorinated fluid Tap water Deionized water Ethylene glycol aqueous solution (60%)	Indoor use	CE SEMATECH S2-93, S8-95 SEMI Standard S2-0703, S8-1103, F47-0200

Peltier-type Thermo-con Variations

Series	Features	Cooling method	Temperature stability	Cooling capacity [kW]								
				0.1	0.2	0.3	0.4	0.5	0.6	0.8	1.0	1.2
Thermo-con ***HEC Series*** 	• For applications requiring high-precision temperature control • High-precision, refrigerant-free temperature control equipment that uses a Peltier device • Simple structure and high reliability • Can easily be built into equipment due to its compact and low-vibration design	Air-cooled Peltier-type	±0.01 to 0.03°C		●				●			
		Water-cooled Peltier-type		●		●			●			●
Thermo-con Rack Mount Type ***HECR Series*** 	• Mountable in a 19-inch rack Saves space by allowing multiple pieces of equipment to be mounted together in a rack. • Learning control function • Low vibration, Low noise	Air-cooled Peltier-type	±0.01 to 0.03°C		●		●	●		●	●	
		Water-cooled Peltier-type								●		●
Chemical Thermo-con ***HED Series*** 	• Heat exchanger for direct temperature control that uses a Peltier device • Compatible with a wide range of chemical liquids through the use of a fluororesin heat exchanger	Water-cooled Peltier-type	±0.1°C			●		●		●		

	Set temperature range [°C]	Pump capacity	Pump type	Power supply	Circulating fluid	Environment	International standards
		100 VAC Up to 0.35 cfm (10 L/min)	Magnet pump	Single-phase 100 to 240 VAC (50/60 Hz)	Tap water Ethylene glycol aqueous solution (20%)	Indoor use	CE cMETus ETL
		200 VAC Up to 0.81 cfm (23 L/min)		Single-phase 100 to 240 VAC (50/60 Hz) 0.1 kW, 0.3 kW	Tap water Ethylene glycol aqueous solution (20%)		CE cMETus (Excluding HEC006, 012)
				Single-phase 200 to 220 VAC (50/60 Hz) 0.6 kW, 1.2 kW	Fluorinated fluid Tap water		
		0.21 cfm (6 L/min)	Magnet pump	Single-phase 100 to 240 VAC (50/60 Hz) 0.2 to 0.8 kW Single-phase 200 to 240 VAC (50/60 Hz) 1 kW, 1.2 kW	Tap water Ethylene glycol aqueous solution (20%)	Indoor use	CE cMETus
		—	—	Single-phase 200 to 220 VAC (50/60 Hz)	Deionized water Chemical liquid	Indoor use	CE SEMI Standard S2-0706, F47-0706

Accessories List

● : Standard ◆ : Option ★ : Optional accessory

		Outline	HRR	HRSE	HRS	HRS090	HRSH090	HRS100/150	HRSH	HRZ	HRZD	HRW	HECR	HEC
Temperature Control	PID control	The deviation value between the discharge temperature (PV value) and the circulating fluid set temperature (SV value), the integral value, and the differential value are the minimum values for temperature control.In general, the operation of the refrigeration circuit is complex, but it provides excellent temperature stability.	●		●	●	●	●	●	●	●	●	●	●
	ON/OFF control	When the discharge temperature (PV value) is higher than the circulating fluid set temperature (SV value) the compressor turns ON (start). And when the discharge temperature (PV value) is lower than the circulating fluid set temperature (SV value), the compressor turns OFF (stop). The provided temperature stability is not excellent, but the operation of the refrigeration circuit is simple.		●										
	Thermoelectric device (Peltier device)	There may be a slight difference in temperature between the two sides of the Peltier device (plate type) depending on the applied direct current voltage. By controlling the applied voltage, high-precision heating and cooling temperature control is possible.											●	●
	With heater	This product comes equipped with a heater suitable for the user's manufacturing processes (temperature rising processes).								●*1	●	●		
Energy Saving	Inverter compressor	This compressor can be used to control the number of rotations according to the heat load, resulting in energy savings.					●		●	●*1	●			
	Inverter fan	This cooling fan (air-cooled type) can be used to control the number of rotations according to the heat load, resulting in energy savings.					●		●					
	Inverter pump	This pump can be used to control the circulating fluid discharge pressure according to the user's piping resistance, resulting in energy savings.					●		●	●	●	●		
Maintenance	Alarm	This product is programmed with a more than sufficient number of alarm codes and messages to be used for failure diagnosis. Notifications are made before any major problems occur.	●	●	●	●	●	●	●	●	●	●	●	●
	With level switch	Sufficient levels of circulating fluid are necessary for retaining a stable temperature. The built-in level switch can be used to detect the liquid level in the tank and inform you of refills.	●		●	●	●	●	●	●	●	●	●	● ◆
	With fluid fill port	Water can be supplied from the external fluid fill port.	●	●	●	●	●	◆	◆	●	●	●	●	●
	With automatic water fill function	By opening the user's stopcock (for water), water can be supplied automatically via the built-in solenoid valve, ball tap, etc.			◆	◆		●	●					
Safety	Anti-quake bracket	This bracket can be used to reduce product damage in the case of an earthquake. An anchor bolt suitable for the flooring material should be prepared separately by the user.	*2 ★	★	★	●	●		●	★		★		
	With earth leakage breaker with handle	This product comes equipped with an earth leakage breaker with handle which is compliant with international standards (safety standards).							◆	●	●	●		
	Drain pan (With water leakage sensor)	The housing of the standard model has a drain pan construction (with a water leakage sensor). The large drain pan helps prevent the overflowing of fluid in the case of leakage.								●	●	●		
	With earth leakage breaker	This product comes with a leakage breaker which is able to safely and automatically stop the supply power in the case of a short-circuit, over current, or electrical leakage.			◆	◆	◆	◆	◆					
	Drain pan set (With water leakage sensor)	This drain pan can be used to detect leakage before it happens.[For the HRS (1.1 to 9 kW) and HRSH (9 kW) types] Be sure to install and wire in combination with the attached water leakage sensor.			★	★	★							
	Particle filter set	This set can be used to filter foreign matter from the circulating fluid. (Nominal filtration rating: 5 µm, 75 µm)	●	★	★	★	★	★	★					
	Contaminant filter	This filter (Filtration: 20 µm) can be used to eliminate any dust which is contained in the circulating fluid circuit.										★		
	Connector cover	This product can be used for protecting the connector on the rear side.			★									
	Relief valve set	This product prevents abnormal rises in circulating fluid pressure.						★						
Convenient Functions	Heating function	When the circulating fluid temperature is set above room temperature, it has a sufficient heating capacity. However, the heating capacity depends on the temperature. Consider the radiation rate and heat capacity of the user's equipment and check beforehand whether the required capacity can be provided by the product.	●		●	●	●	●	●	●	●	●	●	●
	With flow sensor/ flow switch	Sufficient levels of circulating fluid are necessary for retaining a stable temperature. The built-in flow sensor and flow switch can be used to detect the flow rate, which is then displayed on the display panel. Adjustments can be made after the value has been confirmed.	●	●						●	●	●	◆	◆
	With casters	The casters installed underneath the product allow for it to be easily moved to where cooling is required.		●	●	●	●							
	With casters and adjuster feet	This product comes with unfixed casters and adjuster feet.It can be installed level even on slight inclines.						◆ ★	◆ ★	●	●	●		
	Mountable in a 19-inch rack	Space saving can be realized as multiple chillers can be mounted on a 19-inch rack (EIA Standards).	●										●	
	With feet and no rack mounting brackets	For use in locations other than racks	◆										◆	
	Piping conversion fitting (NPT thread or G thread)	This product can be used to exchange the Rc threads on the circulating fluid outlet and return port as well as the facility water inlet/outlet to G threads or NPT threads.	◆ ★		◆ ★	◆ ★	◆ ★	◆ ★	◆ ★				◆	◆

*1 Some models
*2 Only when option Y is selected

● : Standard ◆ : Option ★ : Optional accessory

		Outline	HRR	HRSE	HRS	HRS090	HRSH090	HRS100/150	HRSH	HRZ	HRZD	HRW	HECR	HEC
Convenient Functions	NPT fitting	An adapter is included to change the connection ports (Rc) of circulating fluid piping and facility water piping to NPT threads.								◆		◆		
	Circulating fluid automatic recovery	The circulating fluid inside the piping of the user's equipment can be recovered into a sub-tank of the thermo-chiller by external communication or the operation display panel.								◆		◆		
	Power supply cable	An approximately 3 m long cable is available for users who require a cable with a length longer than that of the standard cable. Please use with a retaining clip (HRS-S0074).	★		★								★	★
	Replaceable dustproof filter set	The cleaning of a dirty (standard) dustproof filter is both difficult and time-consuming. To eliminate the need for such labor, disposable type filters can be used instead.		★	★									
Communication Functions	RS-232C	The standard model can be used for one-on-one communication with a PC, etc. Refer to the separate Operation Manual (Communication function) for more details.	●		●	●	●	●	●				●	●
	RS-485	The standard model can be used to communicate with the master computer together with other terminal devices. Refer to the separate Operation Manual (Communication function) for more details.	●		●	●	●	●	●	●	●	●	●	●
	Analog communication	This is a method of communicating with external devices using voltage output (0 to 10 V). This enables the output of PV values (measured temperature, etc.) and the reception of SV values (set temperature), etc.			★					◆	●	◆		
	DeviceNet communication	This product has a communication function (With DeviceNet communication function) which allows for the use of open networks owned by Open DeviceNet Vendor Association, Inc.								◆		◆		
	Digital I/O (Contact input/output)	Input and output signals such as alarm signals, operation signals, etc. can be retrieved by the user's sequence control device. Refer to the separate Operation Manual (Communication function) for more details.	●		●	●	●	●	●	●	●	●	●	●
	With external switch inlet	This product comes equipped with an input terminal for the retrieval of the user's sequence control ON/OFF signals (external switch).	●		●	●	●	●	●					
For Special Applications	Applicable to deionized water piping	Easy-to-dissolve copper type materials are not used for the wetted parts of the circulating fluid circuit. Select this when using the deionized water with a conductivity of 1 MΩ·cm or more (1 μs/cm or less).	◆		◆	◆	◆					●		
	High-pressure pump mounted	A built-in pump with a high lifting height (discharge pressure) is used. Consider the piping resistance of the user's equipment and check beforehand whether the required flow can be provided by the product.	◆	◆	◆								◆	
	High-temperature environment specification	This product makes use at ambient temperatures of up to 113°F (45°C) possible.			◆									
	DI control kit/Electric resistance control set	This product can be used to display, maintain, and control the electric resistivity of the circulating fluid (deionized water). The function differs according to the model. Refer to the Operation Manual for details.			★					◆		◆		
	Electric resistance sensor set				★									
	Electric conductivity control set	This set can be used to display and control the electric conductivity of the circulating fluid.	◆			★	★	★	★					
	DI filter set	It is possible to retain the level of electric resistance by flowing the circulating fluid through the ion replacement resin (DI filter).	◆		★					★		★		
	Insulating material for DI filter	Insulating the DI filter helps prevent reduced cooling capacity due to condensation and reduced heating capacity due to radiation.								★		★		
	Bypass piping set	Sufficient levels of circulating fluid are necessary for retaining a stable temperature. If the levels are insufficient, open this bypass piping to secure the flow rate.	●	★	★	★	★	★	★	★	★	★		
	Separately-installed power transformer	Installing this transformer where the user's power voltage differs will allow for the conversion of the current.		★	★									
	Snow protection hood	This is a stainless steel snow protection hood for air-cooled chillers. According to the mounting direction of the snow protection hood, four ventilation directions —front, rear, left, and right—can be selected.						★	★					
	4-port manifold	4-branching the circulating fluid allows for a maximum of 4 temperature controls with 1 thermo-chiller unit.								★		★		
Circulating Fluid	60% ethylene glycol aqueous solution	The ethylene glycol type circulating fluid can be used as is. The fluid can be used even when diluted to 15%.	★	★	★	★	★	★	★	★		★	★	★
	Ethylene glycol aqueous solution concentration meter	This meter can be used to control the condensation of ethylene glycol solution regularly.	★	★	★	★	★	★	★	★	★	★	★	★

5 Advantages of SMC Thermo-chillers

1 Lightweight, Compact

Applicable models

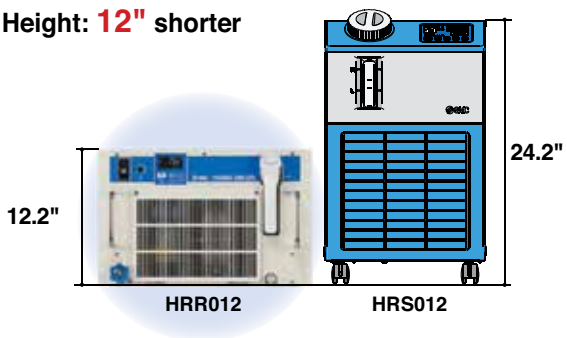
Standard type HRS012 to 060 | Inverter type HRSH090 | Inverter type HRSH100 to 300 | Rack mount type HRR

Same width for all models **14.84"**

Model	Size in.	Weight lb (kg)	Cooling capacity (60 Hz)
HRS012	W 14.84 x H 24.2 x D 19.7	88.2 (40)	1300 W
HRS018			1900 W
HRS024			2400 W
HRS030	W 14.84 x H 26 x D 19.7	103.6 (47)	3200 W
HRS050	W 14.84 x H 38.4 x D 23.3	152.1 (69)	5100 W
HRS060		161 (73)	5900 W
HRS090	W 14.84 x H 42.52 x D 38.2	300 (136)	9000 W

Rack Mount Type *HRR Series*

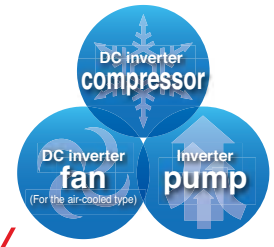
- Height: **12"** shorter



- Volume: **28%** reduction

Triple inverter

The inverter respectively controls the number of motor rotations of the compressor, fan and pump depending on the load from the user's equipment.



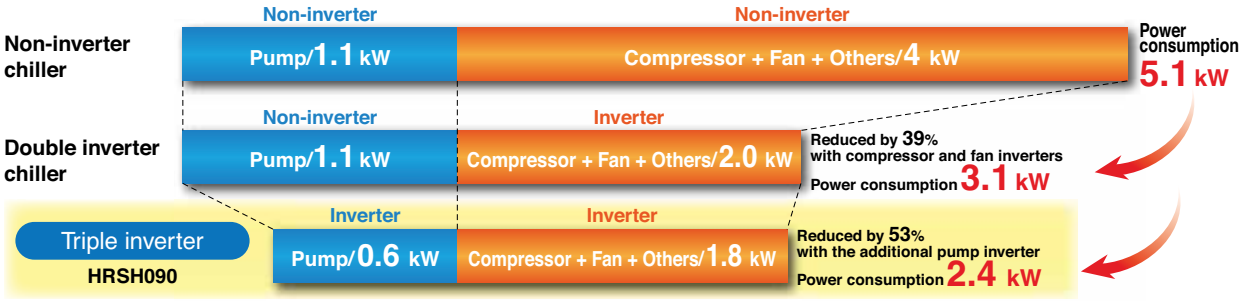
Applicable models


Inverter type
HRSH090


Inverter type
HRSH100 to 300

Power consumption reduced by 53%
compared with a non-inverter (HRS090)

With the inverter, it is possible to operate with the same performance even with the power supply of 50 Hz.



Operating ratio: Ratio of 9.5 kW (with heat load) to 0 kW (without heat load) Operating ratio: 50%, with heat load of 9.5 kW all the time

Conditions
Common conditions for non-inverter and triple inverter:
• Ambient temperature: 89.6°F • Circulating fluid temperature: 68°F • Circulating fluid flow rate: 1.24 cfm at 43.5 psi (60 Hz) • Heat load: 9.5 kW
Conditions for non-inverter chiller: Continuous operation of the compressor which can cool down 9.5 kW at 60 Hz. The pump shall be same as that of the HRSH.

Inverter pump

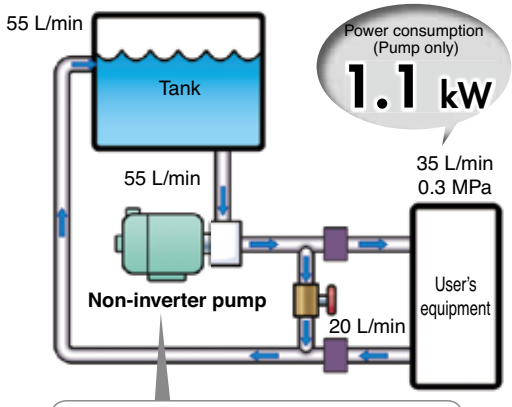
Power reducing effect of the inverter pump

Applicable models


Inverter type
HRSH090


Inverter type
HRSH100 to 300

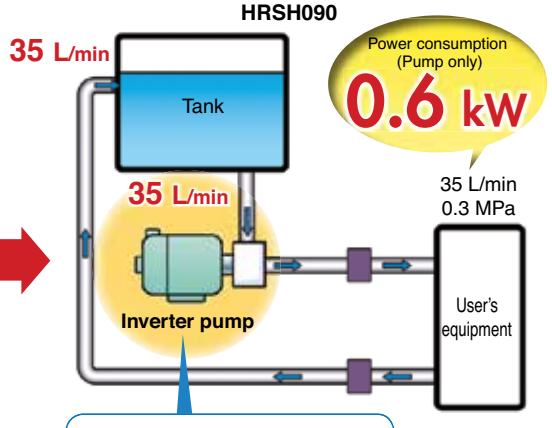
Existing model



The pump is operated at the rated output all the time. With the excess power consumption, the circuit needs to bypass 20 L/min.

Inverter pump

HRSH090



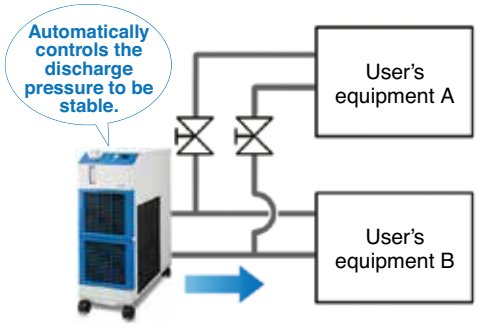
The motor rotation rate is controlled to a suitable level, for the required pressure, by the inverter pump.

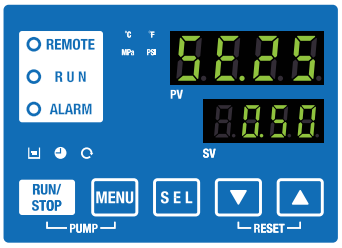
* Immersion pump is used for the inverter type HRSH100 to 300.

Circulating fluid pressure adjustable

Discharge pressure of the circulating fluid can be set with the operation panel. The inverter pump automatically controls the discharge pressure to the set pressure without adjusting the bypass piping*1 under various piping conditions. Power consumption can be reduced by this control.
(Operation to the set pump operating frequency is also possible.)

*1 Bypass piping is required depending on the flow rate.



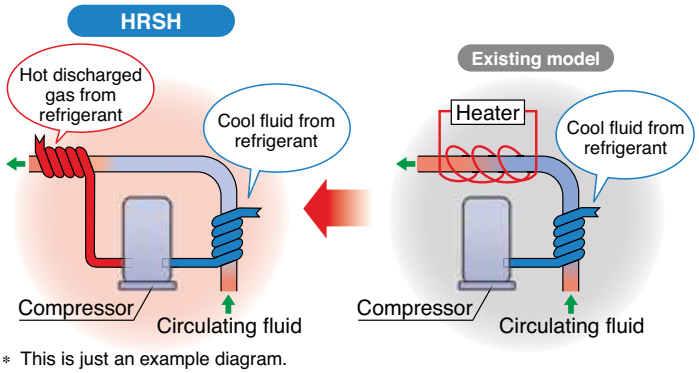


Operation display panel
(Circulating fluid discharge pressure setup screen)

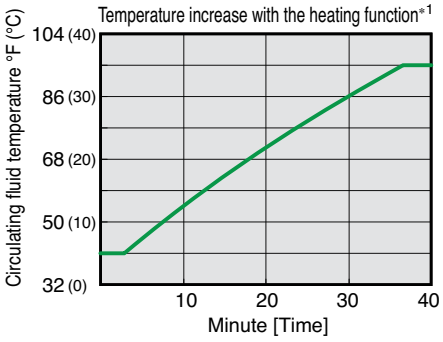
When the product is used with the flow path switched for maintenance, the pressure adjusting function controls the discharge pressure to be stable. (Secure the specified minimum flow for each branch circuit.)

Circulating fluid can be heated without a heater.

Heating method using discharged heat makes a heater unnecessary.

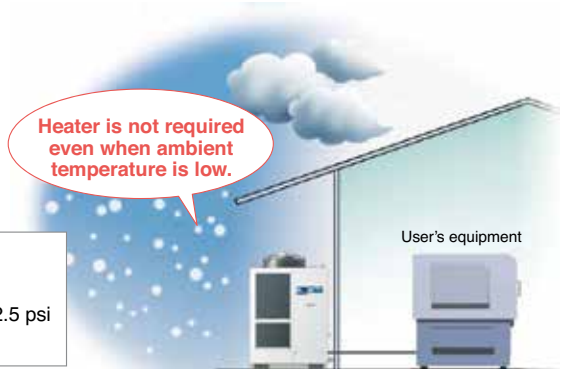


∗ This is just an example diagram.



∗1 For HRSH250-A-20

Conditions	
	Ambient temperature: 41°F (5°C)
	Power supply: 200 V 60 Hz
	Circulating fluid flow rate: 4.41cfm at 72.5 psi
	External piping: Bypass piping



Applicable models


Standard type HRS012 to 060


Standard type HRS090


Standard type HRS100/150

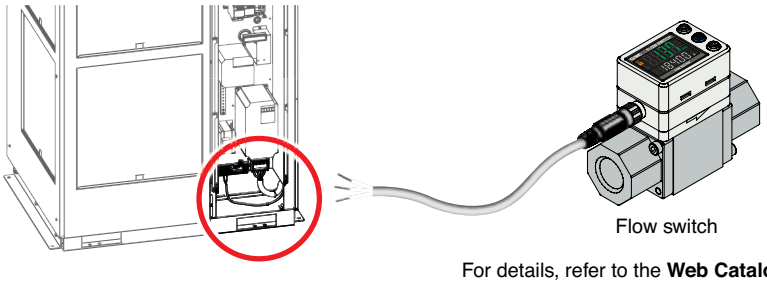

Inverter type HRSH090


Inverter type HRSH100 to 300


Rack mount type HRR

Power supply (24 VDC) available

Power can be supplied from the terminal block on the rear side to external switches, etc.



For details, refer to the **Web Catalog**.

Applicable models


Standard type HRS012 to 060


Standard type HRS090


Standard type HRS100/150


Inverter type HRSH090


Inverter type HRSH100 to 300

IPX4

IP (International Protection) is the industrial standard for “Degrees of protection provided by outer defensive enclosures of electric equipment (IP Code)” according to IEC 60529 and JIS C 0920.

IPX4: No harmful influence by water splash is acceptable from every direction.

Applicable models


Standard type HRS100/150

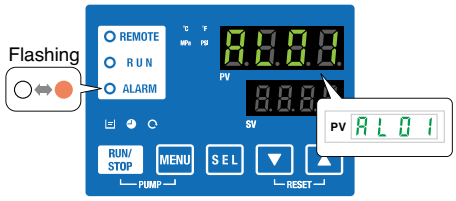

Inverter type HRSH100 to 300

4 Easier Maintenance

Easy maintenance with the check display of the operation panel

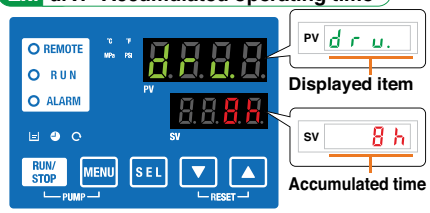
Alarm codes notify of checking times.
Notifies when to check the **pump** and **fan motor**.
Helpful for facility maintenance.

Ex. AL01 "Low level in tank"



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

Ex. drv. "Accumulated operating time"



Displayed item			
Temperature	Circulating fluid outlet temperature	Operating time	Accumulated operating time
	Circulating fluid return temperature		Accumulated operating time of pump
	Compressor gas temperature		Accumulated operating time of fan*2
Flow rate	Circulating fluid flow rate*1		Accumulated operating time of compressor
Pressure	Circulating fluid outlet pressure		Accumulated operation time of dustproof filter*2
	Compressor gas discharge pressure		
	Compressor gas return pressure		

*1 This is not measurement value. Use it for reference. (Excluding standard type HRS012 to 060)
*2 These are displayed only for air-cooled refrigeration.

Applicable models


Standard type HRS012 to 060


Standard type HRS090


Standard type HRS100/150

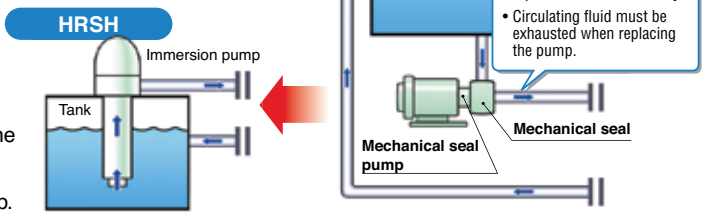

Inverter type HRSH090


Inverter type HRSH100 to 300

Reduces the maintenance hours for the pump.

A mechanical sealless immersion pump is used.

As the pump has no external leakage of the circulating fluid, a periodic check of the pump leakage and replacement of the mechanical seal are not necessary.
There is no need to exhaust the circulating fluid when removing the pump.



Applicable models


Inverter type HRSH100 to 300

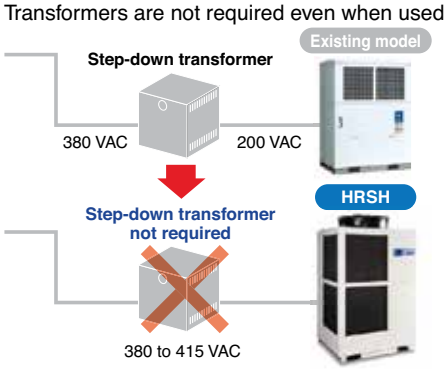
5 Global Compatibility

No transformers required

(Europe, Asia, Oceania, Central and South America)

Power supply **Applicable to 200 to 230 VAC, or 380 to 415 VAC**

Transformers are not required even when used overseas.



Applicable models


Standard type HRS012 to 060


Standard type HRS090


Standard type HRS100/150


Inverter type HRSH090


Inverter type HRSH100 to 300


Basic type HRSE


Rack mount type HRR

Conforming to international standards

SEMATECH S2-93, S8-95

SEMI Standard S2-0703, S8-0701, F47-0200

* Refer to the variations table.

Global Service Network p. 19

Temperature Control Equipment: Applications According to Industry

Applications

Semiconductor p. 14

Etching

HEC
HECR
HRZ
HRW

CMP

HEC
HECR
HED
HRZ
HRW

Coater/Developer

HEC
HECR
HRZ
HRW

Tester

HRS
HRW
HRSH
HRZ
HRR

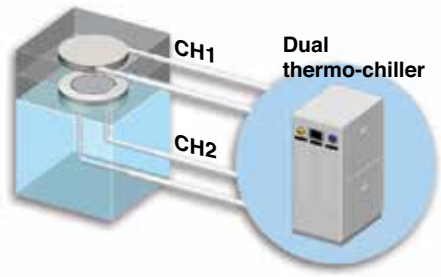
Cleaning machine

Temperature control of cleaning solution

HEC
HECR
HED
HRS
HRSH

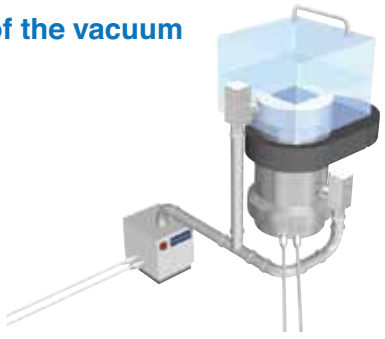
Temperature control of chamber electrode

HRW
HRZ



Cooling of the vacuum pump

HRS
HRSH

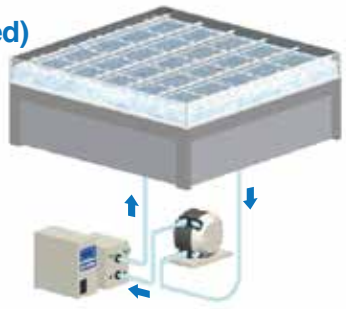


Gas cylinder cabinet

HRS
HRSH

Cleaning machine (hydrocarbon-based)

HED



Applications

Laser

p. 15

Laser beam machine/Laser welding machine

Cooling of the laser oscillation part and power source

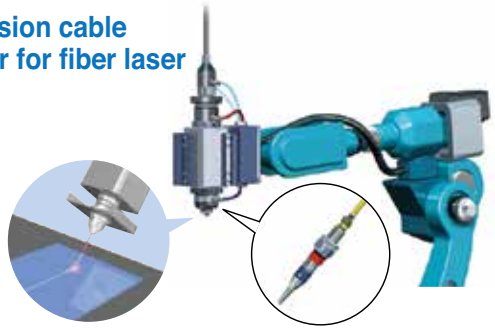
HRS
HRSH
HRR

Laser oscillator

HEC
HECR
HRS
HRSH
HRR

Transmission cable connector for fiber laser

HEC
HECR
HRS
HRR



Ultrasonic wave inspection machine

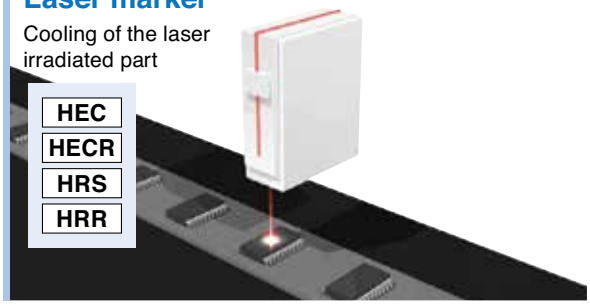
Temperature control of the ultrasonic wave laser part

HEC
HRS
HRR

Laser marker

Cooling of the laser irradiated part

HEC
HECR
HRS
HRR



Secondary battery manufacturing process

Laser welding and cutting

HRS
HRSH
HRR

3D metal printer

HRS
HRSH
HRR

Machine Tools

p. 16

Machining center

Cooling of the spindle

HRS
HRSH

Injection molding

HRS
HRSH

Temperature Control Equipment: Applications According to Industry

Applications

Welding Machines p. 17

Arc welding machine

Cooling of the torch

HRS
HRR

Resistance welding machine (spot welding)

Cooling of the welding head electrodes, transformers and transistors (thyristors)

HRS
HRSH
HRR

High-frequency induction heating equipment

Cooling of the heating coils, high-frequency power source and around inverters

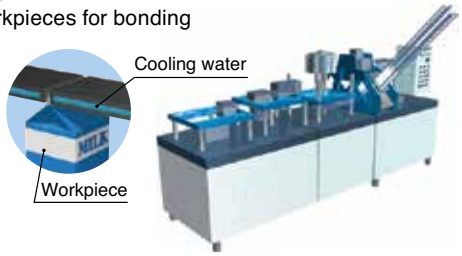
HRS
HRSH
HRR

Food Products/Packaging Machines p. 18

Packaging line (sealing of film and paper package)

Cooling of workpieces for bonding

HRS
HRSH
HRR



Atomizing device (food and cosmetics)

Temperature control of sample and device

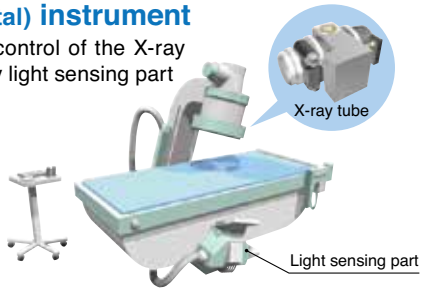
HEC
HECR
HRS
HRSH
HRR

Medical

X-ray (digital) instrument

Temperature control of the X-ray tube and X-ray light sensing part

HEC
HECR
HRS
HRR



MRI

HRS
HRR

Physical and Chemical

Temperature control of adhesive and paint material

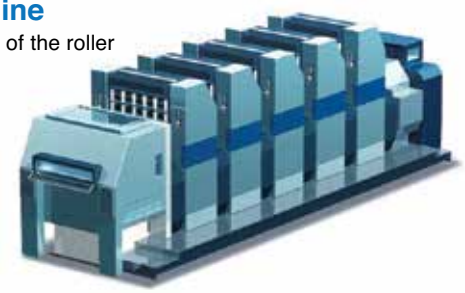
HEC
HECR
HEBC
HRS
HRSH
HRR

Printing

Printing machine

Temperature control of the roller

HRS
HRSH
HRR



Semiconductor

Semiconductor Thermo-chiller Variations

Series	Number of channels	Cooling capacity*1	Set temperature	Pump capacity*1	Temperature accuracy	Circulating fluid	Safety standards	Actual equipment
HRZD 	**2**	9.5 kW	–22 to 194°F (–30 to 90°C) –22 (–30) 32 (0) 212 (100)	1.41 cfm (40 L/min)	±0.18°F (±0.1°C)	Fluorinated fluid Ethylene glycol aqueous solution (60%)	CE, cULus, SEMI	•Etching
HRZ 	**1**	10 kW	–4 to 194°F (–20 to 90°C) –4 (–20) 32 (0) 212 (100)	1.41 cfm (40 L/min)	±0.18°F (±0.1°C)	Fluorinated fluid Tap water Deionized water Ethylene glycol aqueous solution (60%)	CE, cULus, SEMI	•Etching •CMP •CVD (MO) •PVD
HRS 	**1**	5.9 kW	41 to 104°F (5 to 40°C) –4 (–20) 32 (0) 212 (100)	1.48 cfm (42 L/min)	±0.18°F (±0.1°C)	Tap water Deionized water Ethylene glycol aqueous solution (15%)	CE, cMETus (Only 60 Hz)	•Dicer •Implant
HEC 	**1**	0.6 kW (Air-cooled) 1.2 kW (Water-cooled)	50 to 140°F (10 to 60°C) –4 (–20) 32 (0) 212 (100)	0.35 cfm (10 L/min) Air-cooled 0.81 cfm (23 L/min) Water-cooled	±0.18°F (±0.01°C)	Tap water Ethylene glycol aqueous solution (20%) Fluorinated fluid	CE, cMETus, ETL (Only air-cooled type)	•Coater/ Developer •CMP •Dicer •Cleaning •Exposure
HED 	**1**	0.75 kW	50 to 140°F (10 to 60°C) –4 (–20) 32 (0) 212 (100)	–	±0.18°F (±0.1°C)	Deionized water Chemical liquid	CE, SEMI	•CMP •Cleaning
HRW 	**1**	30 kW	68 to 194°C (20 to 90°C) –4 (–20) 32 (0) 212 (100)	1.41 cfm (40 L/min)	±0.54°F (±0.3°C)	Fluorinated fluid Tap water Deionized water Ethylene glycol aqueous solution (60%)	CE, cULus, SEMI	•Etching •CVD •PVD

*1 The maximum capacity is displayed.

Laser

Cooling location Oscillator

HRSH HRS

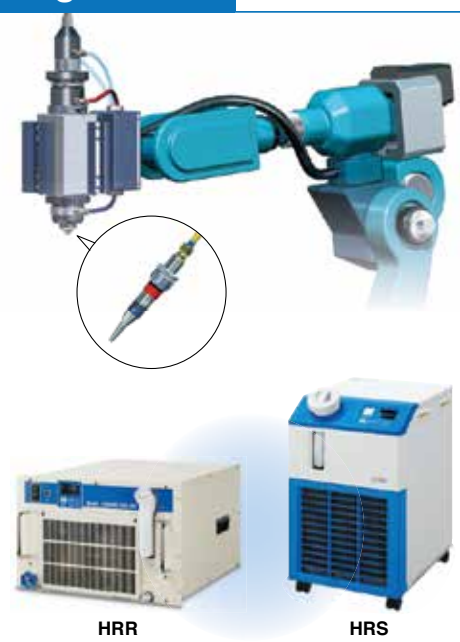
Industrial High-power Laser

Laser			Chiller	
Laser output [kW]	Energy conversion efficiency [%]	Required cooling capacity [W]*1	Chiller cooling capacity [W]	SMC chiller model
1	30	2,880	3,500	**HRS050**
	40	1,800	3,500	**HRS050**
2	30	5,640	6,000	**HRS090**
	40	3,600	6,000	**HRS090**
3	30	8,400	11,000	**HRSH100**
	40	5,400	6,000	**HRSH090**
4	30	11,400	18,000	**HRSH250**
	40	7,200	11,000	**HRS150**
5	30	14,400	15,000	**HRSH200**
	40	9,000	11,000	**HRS150**
6	30	16,800	18,000	**HRSH250**
	40	10,800	11,000	**HRS150**
7	30	19,800	24,000	**HRSH300**
	40	12,600	24,000	**HRSH300**
8	30	22,800	24,000	**HRSH300**
	40	14,400	15,000	**HRSH200**
9	40	16,200	18,000	**HRSH250**
10	40	18,000	18,000	**HRSH250**

Conditions: Circulating fluid temperature 68°F (20°C), Ambient temperature 104°F (40°C)

*1 Required cooling capacity = Laser output/Energy conversion efficiency – Laser output x 1.2

Cooling location Fiber connector



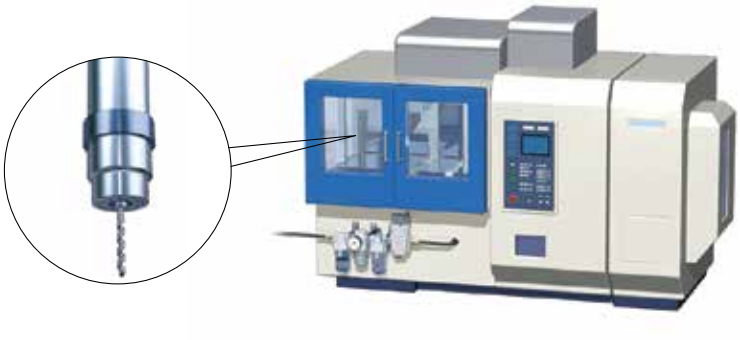
HRR HRS

Industrial High-power Laser

Laser	Chiller	
Laser output [kW]	Chiller cooling capacity [W]	SMC chiller model
1	Up to 1,200	**HRS012(-MT)** **HRR012(-MT)**
2		
3		
4		
5		
6		
7		
8		
9		
10		

Machine Tools

Cooling location Main shaft



HRS

Machine tools main shaft			Chiller	
Main shaft output [W]	Motor efficiency [%]	Required cooling capacity [W]*1	Chiller cooling capacity [W]	SMC chiller model
22,500	85	4,764	4,800	HRS050
20,000		3,529	4,300	
15,000		3,176	3,200	
10,000		2,118	2,200	
7,000		1,482	1,500	
5,000		1,059	1,100	HRS030-T

Conditions: Circulating fluid temperature 68°F (20°C), Ambient temperature 77°F (25°C)

-T: High-pressure pump mounted

*1 Required cooling capacity = Main shaft output/Motor efficiency x 1.2

Welding Machines

Cooling location Transformer/Electrode

HRSH HRS

Resistance welding machine (Spot welding)			Chiller	
Max. welding current value [A]	Allowable utilization rate [%]	Required cooling capacity [W]*1	Chiller cooling capacity [W]	SMC chiller model
6,000	3	1,500	3,500	**HRS050**
	5	1,944	3,500	**HRS050**
	7	2,292	3,500	**HRS050**
	10	2,736	3,500	**HRS050**
9,000	3	2,256	3,500	**HRS050**
	5	2,904	3,500	**HRS050**
	7	3,432	3,500	**HRS050**
	10	4,104	5,200	**HRS090**
12,000	3	3,000	3,500	**HRS050**
	5	3,864	5,200	**HRS090**
	7	4,572	5,200	**HRS090**
	10	5,472	6,000	**HRSH090**
16,000	3	3,996	5,200	**HRS090**
	5	5,160	5,200	**HRS090**
	7	6,096	7,000	**HRSH100**
	10	7,296	11,000	**HRS150**
18,000	3	4,500	5,200	**HRS090**
	5	5,796	6,000	**HRSH090**
	7	6,864	7,000	**HRSH100**
	10	8,208	11,000	**HRS150**
20,000	3	4,992	5,200	**HRS090**
	5	6,444	7,000	**HRSH100**
	7	7,620	11,000	**HRS150**
	10	9,108	11,000	**HRS150**

Conditions: Circulating fluid temperature 77°F (25°C), Ambient temperature 104°F (40°C)

*1 Required cooling capacity = Max. welding current value x $\sqrt{\text{Utilization rate}}$ x 1.2

Food Products/Packaging Machines

Cooling location Sealing machine

HRS

Package sealing machine			Chiller	
Maximum current [A]	Power supply voltage [V]	Required cooling capacity [W]*1	Chiller cooling capacity [W]	SMC chiller model
3	200	720	1,500	**HRS030-T**
5		1,200	1,500	**HRS030-T**
7		1,680	3,500	**HRS050**
10		2,400	3,500	**HRS050**
14		3,360	3,500	**HRS050**
25		6,000	6,000	**HRSH090**

Conditions: Circulating fluid temperature 68°F (20°C), Ambient temperature 104°F (40°C)

∗1 Required cooling capacity = Maximum current x Power supply voltage

-T: High-pressure pump mounted

SMC's Thermo-chiller Global Service Network

North, Central, and South America Zone Chiller Service System

With more than 60 sales branches and 7 local production facilities—and additional distributers which help provide support to Central and South America as well as the Caribbean region—SMC is able to not only fulfil customer requests for specials but also provide customers with application assistance and locally produced products.

❶ Brazil
❷ Mexico
❸ U.S.A.

Europe Zone Chiller Service System

SMC products and services are available in 46 countries. With major production facilities in Germany, the United Kingdom, and Italy—as well as their European Central Warehouse (ECW) and local subsidiaries that manufacture simple, special-order products—SMC is able to meet the needs of all customers on the European continent.

❹ Austria
❺ France
❻ Germany
❼ Italy
❽ Netherlands
❾ Russia
❿ Spain/Portugal
⓫ Turkey
⓬ U.K.

* The names of countries and regions listed in each area are alphabetically indexed.

For more details, refer to the Thermo-chiller Support Guide (PDF) on our website.

Asian Zone Chiller Service System

Covering 25 countries and regions including the ASEAN countries, Asian NIES, Australia, New Zealand, and 2 of the 4 BRIC countries—India and China—SMC's Asia service network is made up of 12 local subsidiaries, 10 production facilities, and more than 120 sales offices. Reliable support for countries such as Indonesia, Israel, and Saudi Arabia is provided by major local distributors.

- ⑬ China
- ⑭ Hong Kong
- ⑮ Indonesia
- ⑯ Japan
- ⑰ Korea
- ⑱ Malaysia
- ⑲ Philippines
- ⑳ Singapore
- ㉑ Taiwan
- ㉒ Thailand

Temperature Control Equipment - Useful Info

Access the web pages for the content below from the documents/download pull down menu at the top of the website.

https://www.smcworld.com

Model Selection

Selectable Series

HRSE: Basic type (Indoor use)
HRS: Standard type (Indoor use)
HRS100/150: Standard type (Outdoor installation: IPX4)
HRSH090: Inverter type (Indoor use)
HRSH: Inverter type (Outdoor installation: IPX4)
∗ Excludes made-to-order specifications and special specifications

Glossary of Terms

With 2 search options

· Search alphabetically
· Search by category

Temperature Control Equipment

Global Manufacturing, Distribution and Service Network

Worldwide Subsidiaries

EUROPE

AUSTRIA
SMC Pneumatik GmbH (Austria)

BELGIUM
SMC Pneumatics N.V./S.A.

BULGARIA
SMC Industrial Automation Bulgaria EOOD

CROATIA
SMC Industrijska Automatika d.o.o.

CZECH REPUBLIC
SMC Industrial Automation CZ s.r.o.

DENMARK
SMC Pneumatik A/S

ESTONIA
SMC Pneumatics Estonia

FINLAND
SMC Pneumatics Finland OY

FRANCE
SMC Pneumatique S.A.

GERMANY
SMC Pneumatik GmbH

GREECE
SMC Hellas EPE

HUNGARY
SMC Hungary Ipari Automatizálási Kft.

IRELAND
SMC Pneumatics (Ireland) Ltd.

ITALY
SMC Italia S.p.A.

KAZAKHSTAN
LLP "SMC Kazakhstan"

LATVIA
SMC Pneumatics Latvia SIA

LITHUANIA
UAB "SMC Pneumatics"

NETHERLANDS
SMC Pneumatics B.V.

NORWAY
SMC Pneumatics Norway AS

POLAND
SMC Industrial Automation Polska Sp. z o.o.

ROMANIA
SMC Romania S.r.l.

RUSSIA
SMC Pneumatik LLC.

SLOVAKIA
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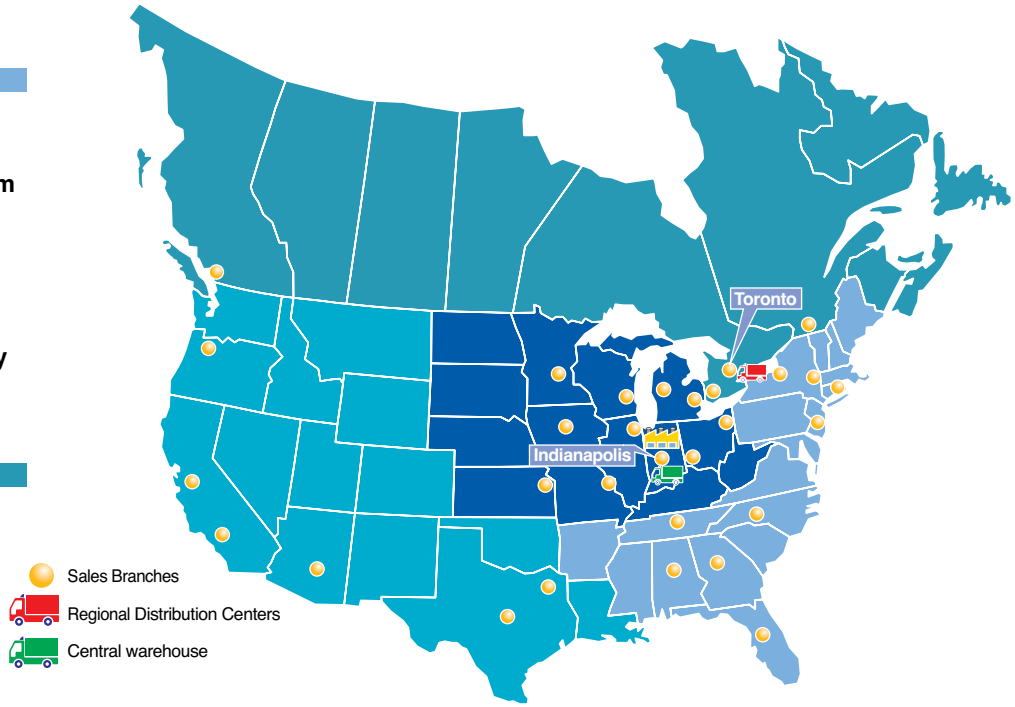

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