

Specifications

				HRL100-A□-40		HRL200-A□-40		HBL300-A	
		Model		CH1	CH2	CH1	CH2	CH1	CH2
Cooling method				Air-cooled refrigeration					
Refrigerant					R410A (HFC)				
Re	frigerant cha	ge	kg	1.	1.4 1.8 2.5			5	
Co	ntrol method				PID control				
Ambient temperature °C					2 to	45			
Circulating fluid				CH1: Tap water*1	, Deionized water*	9/CH2: Tap water*1	¹ , Deionized water		
	Set tempera	ture range	°C	CH1: 5 to 35/CH2: 10 to 40					
	Cooling cap	acity*2	kW	9	1*8	19	1*8	26	1*8
	Heating cap	acity ^{*3}	kW	1.5	1	4.0	1	6.0	1
	Temperature	e stability*4	°C			CH1: ±0.1	/CH2: ±0.5		
ε	Rate	d flow (Outlet pressure)	L/min	45 (0.43 MPa)	10 (0.45 MPa)	45 (0.45 MPa)	10 (0.45 MPa)	125 (0.45 MPa)	10 (0.45 MPa)
stei	capacity Ma	ximum flow rate	L/min	120	16	130	16	180	16
sys	Max Max	kimum pump head	m	50	49	55	49	68	49
<u>q</u>	Settable pre	ssure range*5	MPa	0.10 to 0.50	0.10 to 0.49	0.10 to 0.55	0.10 to 0.49	0.10 to 0.68	0.10 to 0.49
ft [Minimum ope	erating flow rate*6	L/min	20	2	25	2	40	2
bg	P Tank capacity L		42	7	42	7	60	7	
ati	Bypass circuit (With valve)			Installed					
CL	Electric conductivity setting range µS/cm		0.5 to 45 ^{*9}	0.5 to 45	0.5 to 45 ^{*9}	0.5 to 45	0.5 to 45 ^{*9}	0.5 to 45	
ü	Particle filter nominal filtration rating (Accessory) μm		5	5	5	5	5	5	
	Circulating fluid outlet, circulating fluid return port			CH1: Rc1	(Symbol F: G1, Sy	mbol N: NPT1)/Cl	H2: Rc1/2 (Symbol	F: G1/2, Symbol N	l: NPT1/2)
	Tank drain port			CH1: Rc3/4 ((Symbol F: G3/4, S	ymbol N: NPT3/4)	/CH2: Rc1/2 (Symb	ool F: G1/2, Symbo	ol N: NPT1/2)
	Fluid contact material			 CH1: Stainless steel, Copper (Heat exchanger brazing)^{*10}, Brass^{*10}, Fluororesin, PP, PBT, POM, PU, PC, PVC, EPDM, NBR, Ion replacement resin^{*9} CH2: Stainless steel, Alumina ceramic, Carbon, Fluororesin, PP, PBT, POM, PU, PVC, PPS, AS, PS, EPDM, NBR, Ion replacement resin 					
E Power supply				3-phase 380 to 415 VAC (50/60 Hz) Allowable voltage range ±10% (No continuous voltage fluctuation) 3-phase 460 to 480 VAC (60 Hz) Allowable voltage range +4%, -10% (Max. voltage less than 500 V and no continuous voltage fluctuation)					
S IS	Earth leakage	Rated current	Α	2	0	3	0	4	0
ric	breaker	Sensitivity current	mA			3	0		
ect	Rated operating current ^{*4} A		8.5		15		19		
		5.6 (5.9)		9.4 (10.2)		12.3 (13.0)			
Noise level (Front 1 m/Height 1 m) ^{*4} dB(A)			7	5	7	5	7	1	
Accessories			Operation Manual (for installation/operation) 2 pcs. (English 1 pc./Japanese 1 pc.), Particle filter set for CH1, Particle filter set for CH2, Anchor bolt fixing brackets 2 pcs. (including 6 M8 bolts)* ⁷						
Weight (dry state)*11 kg			Approx. 240 Approx. 260			x. 260	Appro	x. 330	
*1 Use fluid in condition below as the circulating fluid			tina fluid.	*	5 With the pressure	e control mode by inv	verter. If the pressure	control mode is not	

Tap water: Standard of The Japan Refrigeration and Air Conditioning

 Industry Association (JRA GL-02-1994)
 Ambient temperature: 32°C, ② Circulating fluid: Tap water,
 Girculating fluid temperature: CH1 20°C/CH2 25°C, ④ Circulating *2

*3

3) Circulating fluid temperature: CH1 20°C/CH2 25°C, (4) Circulating fluid flow rate: Rated flow, (5) Power supply: 400 VAC
(1) Ambient temperature: 32°C, (2) Circulating fluid: Tap water,
(3) Circulating fluid flow rate: Rated flow, (4) Power supply: 400 VAC
(1) Ambient temperature: 32°C, (2) Circulating fluid: Tap water,
(3) Circulating fluid temperature: CH1 20°C/CH2 25°C, (4) Load: Same as the cooling capacity, (5) Circulating fluid flow rate: Rated flow,
(6) Power supply: 400 VAC, (7) Piping length: Shortest *4

HRL Series

- necessary, use the flow control function or the pump output setting function.
- *6 Fluid flow rate to maintain the cooling capacity. If the actual flow rate is lower than this, adjust the bypass valve.
- *7 The anchor bolt fixing brackets (including 6 M8 bolts) are used for fixing to wooden skids when packaging the thermo-chiller. No anchor bolt is included.
 *8 Max. 1.5 kW. When 1.5 kW is applied, the cooling capacity of CH1 decreases by 0.5 kW.
- *9 For Option D1 (With electric conductivity control) only
- *10 Not included for Option D1 (With electric conductivity control)

*11 The product weight increases by 1 kg for Option D1 (With electric conductivity control).



HRL Series Dual Channel Refrigerated Thermo-chiller for Lasers

Cooling Capacity

*1 This is the cooling capacity of the CH1 side when 1 kw heat load is applied to the CH2 side.
*2 Max. 1.5 kW. When 1.5 kW is applied, the cooling capacity of CH1 decreases by 0.5 kW.



HRL300-A -40 (CH1)*1



Pump Capacity

HRL100-A -40 (CH1)



HRL300-A -40 (CH1)















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Dimensions



Anchor bolt mounting position (View A)

For piping port sizes, refer to the "Parts Description" on page 5.

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Dimensions

HRL200-A□-40



For piping port sizes, refer to the "Parts Description" on page 5.

Dimensions



Anchor bolt mounting position (View A)

For piping port sizes, refer to the "Parts Description" on page 5.

HRL Series Dual Channel Refrigerated Thermo-chiller for Lasers



Parts Description

Recommended External Piping Flow

External piping circuit is recommended as shown below.



No.	Description	Size	Recommended part no.	Note
1	Contaminant filter	Rc1 (5 μm)	Accessory	The value in () shows the nominal filtration accuracy.
2	Valve	Rc1	—	—
3	Flow meter	Rc1	—	Prepare a flow meter with an appropriate range.
4	Contaminant filter	Rc1/2 (5 μm)	Accessory	The value in () shows the nominal filtration accuracy.
5	Valve	Rc1/2	_	_

Cable Specifications

Power Supply Cable and Earth Leakage Breaker (Recommended)

	Power supply veltage	Terminal block screw diameter	Recommended crimped terminal	Cable specifications*1	Earth leakage breaker	
Model	specifications				Breaker size	Sensitivity current
					[A]	[mA]
HRL100-A□-40) M5	R5.5-5	4 cores x 5.5 mm ² (4 cores x AWG 10)	20	20
HRL200-A□-40	3-phase 380 to 415 VAC (50/60 Hz)			* Including grounding cable	30	
HRL300-A□-40	3-phase 460 to 480 VAC (60 Hz)		R8-5	4 cores x 8 mm ² (4 cores x AWG 8) * Including grounding cable	40	30

*1 An example of the cable specifications is when two kinds of vinyl insulated wires with a continuous allowable operating temperature of 70°C at 600 V, are used at an ambient temperature of 30°C. Select the proper size of cable according to an actual condition.



Operation Display Panel

Items displayed on the home screen and setting items are shown in List of check items in inspection monitor menu.



List of Check Items in Inspection Monitor Menu

No.	CH no.	Item	Explanation					
1	Common	Menu key	Touch the key to display the menu.					
2	Common	Date and time display	Displays the date and time. Press the numeric section to set the date and time.					
3		Operating condition display	Displays TEMP READY status. Displays the control status of the circulating fluid pressure.					
4		Circulating fluid present temperature	Displays the current temperature of circulating fluid.					
5		Circulating fluid set temperature	It indicates the set temperature. Press the numeric section to change the set temperature					
6	CH1	Circulating fluid discharge pressure	It indicates the discharge pressure.					
Ø		Circulating fluid flow rate	It indicates the fluid flow rate. This value is not measured by a flow meter. It should be used as a reference value (rough indication). It includes the flow rate in the bypass circuit.					
8		Circulating fluid electric conductivity	It indicates the electric conductivity.*1					
9		Operating condition display Displays TEMP READY status. Displays the control status of the circulating fluid pressure.						
10		Circulating fluid present temperature Displays the circulating fluid temperature.						
11	CLIO	Circulating fluid set temperature	temperature It indicates the set temperature. Press the numeric section to change the set temperature.					
12	CH2	Circulating fluid discharge pressure	It indicates the discharge pressure.					
13	1	Circulating fluid flow rate	It indicates the flow rate measured by a flow meter. It does not include the flow rate in the bypass circuit.					
14		Circulating fluid electric conductivity	It indicates the electric conductivity.					
15	CH1	Independent pump operation	CH1 pump operates independently while the button is pressed.					
16	CH2	2 Independent pump operation CH2 pump operates independently while the button is pressed.						
\bigcirc	Operation mode Common		To select a operation mode from the touch panel (LOCAL mode), contact input (DIO mode), or serial communication (SERIAL mode).					
18		Operating condition display	It indicates the run and stop status of the product.					
19		Run/Stop	To run/stop the product					

*1 Displayed for Option D1 (CH1 With electric conductivity control)

Alarm

This unit displays 39 types of alarms.

Alarm No.	Indication	Explanation
AL01	CH1 Low Level FLT	CH1 abnormal low tank fluid level
AL02	CH1 Low Level WRN	CH1 low tank fluid level
AL03	CH2 Low Level FLT	CH2 abnormal low tank fluid level
AL04	CH2 Low Level WRN	CH2 low tank fluid level
AL06	Fan Inverter	Fan failure
AL09	CH1 High Temp. FLT	CH1 abnormal rise of circulating fluid temperature
AL10	CH1 High Temp.	CH1 circulating fluid temperature rise
AL11	CH1 Low Temp.	CH1 circulating fluid temperature drop
AL12	CH1 TEMP READY Alarm	CH1 TEMP READY alarm
AL13	CH2 High Temp. FLT	CH2 abnormal rise in circulating fluid temperature
AL14	CH2 High Temp.	CH2 circulating fluid temperature rise
AL15	CH2 Low Temp.	CH2 circulating fluid temperature drop
AL16	CH2 TEMP READY Alarm	CH2 TEMP READY alarm
AL17	CH1 HX In High Temp. FLT	CH1 abnormal rise in heat exchanger inlet temperature
AL18	CH1 Press. Sensor	CH1 failure of circulating fluid discharge pressure sensor
AL19	CH1 High Press.	CH1 circulating fluid discharge pressure rise
AL20	CH1 Low Press.	CH1 circulating fluid discharge pressure drop
AL21	CH2 Press. Sensor	CH2 failure of circulating fluid discharge pressure sensor
AL22	CH2 High Press. Error	CH2 abnormal rise in circulating fluid discharge pressure
AL23	CH2 High Press.	CH2 circulating fluid discharge pressure rise

Alarm No.	Indication	Explanation
AL24	CH2 Low Press.	CH2 circulating fluid discharge pressure drop
AL25	CH2 Low Press. Error	CH2 abnormal drop in circulating fluid discharge pressure
AL26	CH2 Flow Sensor	CH2 failure of circulating fluid discharge flow sensor
AL27	CH2 High Electric Conductivity	CH2 electric conductivity increase
AL28	CH1 High Electric Conductivity	CH2 electric conductivity increase (Option D1 only)
AL30	Digital Input 1	Contact input 1 signal detection
AL31	Digital Input 2	Contact input 2 signal detection
AL34	Communication	Communication error
AL35	Ambient Temp.	Outside of the ambient temperature range
AL36	Maintenance	Maintenance alarm
AL37	Refrigeration Circuit	Compressor circuit failure
AL38	Sensor	Sensor failure
AL39	Controller	Controller failure
AL40	Compressor Inverter	Compressor inverter error
AL41	Compressor Inverter Comm.	Compressor inverter communication error
AL42	CH1 Pump Inverter	CH1 pump inverter error
AL43	CH1 Pump Inverter Comm.	CH1 pump inverter communication error
AL44	CH2 Pump Inverter	CH2 pump inverter error
AL45	CH2 Pump Inverter Comm.	CH2 pump inverter communication error

Communication Functions



*1 Make sure that the total load current is 800 mA or less. When using the power supply of this product, make sure that the total load current is 200 mA or less.

Communication Functions

Contact Input/Output, Analog Output Pin Nos.

Pin no.	Application	Division	Default setting
1	24 VDC output	Output	—
2	24 VDC input	Input	—
3	Contact input signal 1	Input	Run/Stop*1
4	Contact input signal 3	Input	Operation mode request signal (fix)*2
5	Contact output signal 6	Output	OFF*1
6	Contact output signal 1	Output	Run status signal [N.O. type] (fix)*2
7	Contact output signal 3	Output	Operation continuation "WRN" alarm signal [N.C. type] (fix)*2
8	Contact output signal 5	Output	OFF*1
9	None	—	Cannot be connected*3
10	Analog output signal 2	Output	CH2 electric conductivity*1
11	Analog output signal 1	Output	CH2 circulating fluid temperature*1
12	None	—	Cannot be connected*3
13	None	—	Cannot be connected*3
14	24 COM output (Common of contact input signal)	Output	—
15	Common of contact output signal 1, 2, 3, 4, 5	Output	—
16	Contact input signal 2	Input	External switch signal*1
17	None	—	Cannot be connected*3
18	Common of contact output signal 6	Output	—
19	Contact output signal 2	Output	Operation stop "FLT" alarm signal [N.C. type] (fix)*2
20	Contact output signal 4	Output	OFF*1
21	None	—	Cannot be connected*3
22	Common of analog output signal 2	Output	—
23	Common of analog output signal 1	Output	—
24	None	—	Cannot be connected*3
25	None	_	Cannot be connected*3

*1 It is possible to change the setting.

*2 It is not possible to change the setting. ("N.O. type/N.C. type" can be changed.)

*3 Do not connect wiring.





Communication Functions

Serial Communication

The following operations can be performed by the serial communication RS-232C/RS-485.

Writing	Bodout.
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To run/stop the product	To readout the circulating fluid temperature, pressure, flow rate and electrical conductivity (CH1*1)
To change the set value of	To readout the circulating fluid temperature, pressure, flow rate and electrical conductivity (CH2)
circulating fluid temperature	To readout the status of respective parts of the product (e.g., operation status and content of alarm)

*1 For Option D1 (CH1 With electric conductivity control)

Wiring of Interface Cable for Serial Communication





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Optional Accessories

Consumables List					
Part no.	Description	Qty.	Note		
HRS-S0213	Dustproof filter (Lower)	1	For HRL200-A: 2 pcs. are used per unit.		
HRS-S0214	Dustproof filter (Upper)	1	For HRL100/200-A: 2 pcs. are used per unit.		
HRS-S0185	Dustproof filter	1	For HRL300-A: 4 pcs. are used per unit.		
HRS-PF006	Particle filter element	1	Common to each model: For CH1		
EJ202S-005X11	Particle filter element	1	Common to each model: For CH2		
HRR-DF001	DI filter replacement cartridge	1	Common to each model: For CH2		
HRR-DF002	DI filter replacement cartridge	1	Common to each model: For CH1 Option D1 only		

Safety Instructions Be sure to read the "Handling Precautions for SMC Products" (M-E03-3) and "Operation Manual" before use.