ORION

冷熱と真空でイノベーション
Innovating with Thermal Control and Vacuum

Heavy Duty Chiller with Built-In Water Tank

Cooling Capacity :
57/60kW, 66.0/69.0kW, 70.0/73.0kW, 96.0kW

Cooling Capacity :
7.9/8.7kW, 9.8/10.4kW, 29.2/31.4kW

Cooling Capacity :
12.2～48.0kW

Energy savings and high precision control

Jul. 2018 | D-RG10E
Heavy Duty Chiller with Built-In Water Tank Catalog

Striving to Make Products that Move You

ORION Reliability & One Stop Service

With ORION's One Stop Service, we aim to be your best partner with our motto of providing consistent service throughout, from initially hearing about particular details, to providing periodic maintenance.

*Specific service offerings may differ depending on the country, region, or model.

Energy Saving Proposal → **Best Match Proposal** → **Lending Service** → **Post-Delivery Initial Test Run Confirmation** → **One Month Inspection Visit** → **Paid Fixed-Term Inspections & Maintenance**

We have the equipment that meets your needs! See page 11 for details.

We offer free loans of demo machinery. Feel free to contact us with any inquiries.

Energy Saving Proposal Example: Change-up from RKL-3750V-C1 to RKE3750B-V

Energy Savings 67%

Reduction in CO_2 Output 4,075kg-CO_2/year

Effective Savings 149,100yen/year

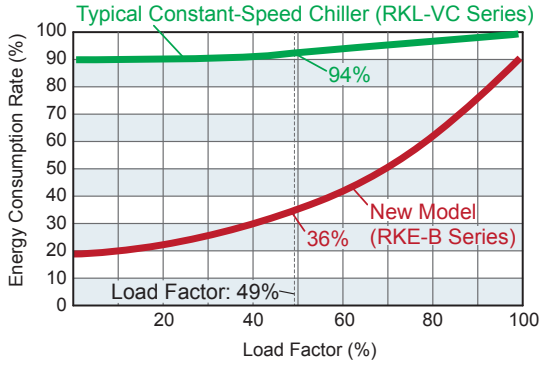
Energy Saving Points — **Control that Adapts to Fluctuations in Cooling Load**

●Comparison Conditions

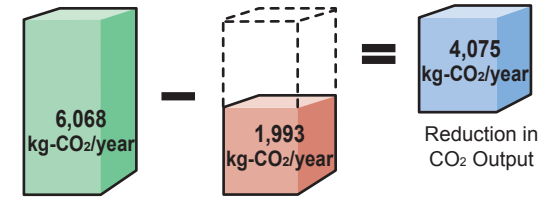
Compared Models:
RKL-3750V-C1 (HB Control *1)
RKE3750B-V (Inverter Chiller)

Water Temp. Setting:	20 °C
Maximum Load:	10.2 kW
Minimum Load:	1.8 kW
Average Load:	6 kW
Operating Time:	10 hours/day (250 days/year)
Electricity Cost:	15 yen/kWh

●Power Consumption Rate According to Chiller Load Factor

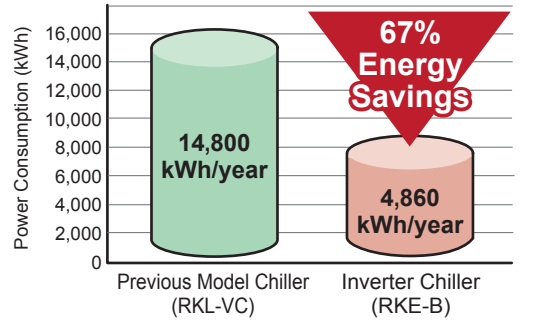


●Reduction in CO_2 Output



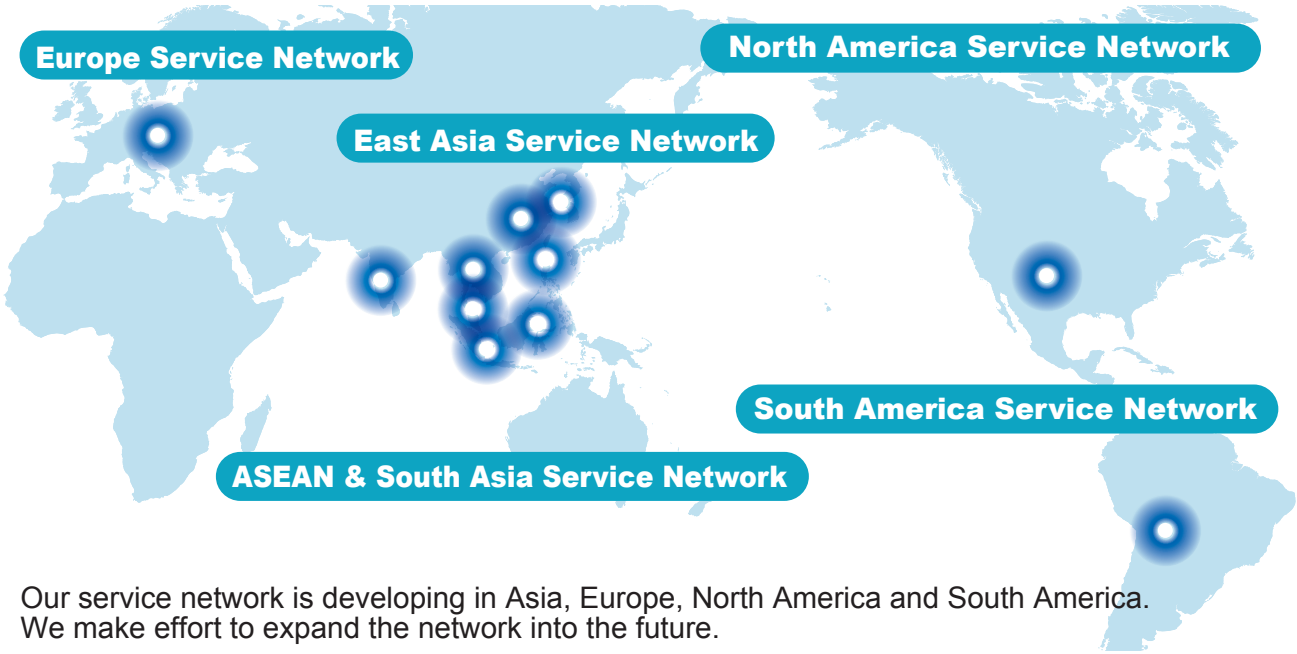
Amount of Energy Savings (Calculation)
Difference in Power Consumption:
14,800 kWh – 4,860 kWh = 9,940 kWh
Effective Reduction in Energy Cost:
9,940 kWh/year × 15 yen/kWh = 149,100 yen/year

●Yearly Power Consumption Comparison



*1 HB Control = Hot Gas Bypass Control. Fluid temperature is controlled by bypassing high-temperature refrigerant gas to the evaporator.
*2 The CO_2 emission coefficient used is 0.410, which is the average of 8 power companies.

Global Service Network



Our service network is developing in Asia, Europe, North America and South America.
We make effort to expand the network into the future.

East Asia Service Network

ORION Machinery (Shanghai) Co., Ltd. (China)
Dongguan Orion Machinery Co., Ltd. (China)
ORION (HONG KONG) Co., Ltd. (Hong Kong)
ORION KOREA Co., Ltd. (South Korea)
Taiwan Orion Industry Co., Ltd. (Taiwan)

ASEAN Service Training Center

ORION Machinery Asia Co., Ltd. (Thailand)

Europe Service Network

Europe Customer Support Center
Limko N.V. (Belgium)
Italy U.K. Germany France
Sweden Norway Hungary Czech

ASEAN & South Asia Service Network

Siam Seimitsu (Thailand)
iwatech Malaysia (Malaysia)
iwatech Singapore (Singapore)
VE & JA (Vietnam)
Tan Dai Phu Sy (Vietnam)
MESCO (Philippines)
PT. S-Tech (Indonesia)
GEM Orion Machinery (P) Ltd. (India)

North America Service Network

North America Customer Support Center
ORION Machinery North America (US)
Over 150 locations throughout US, Canada and Mexico.

South America Service Network

A&M Engenharia (Brazil)

Products

Air Dryer

Chiller

Precision Air Processor

CONTENTS

RKE-B Series

Energy Saving Specs. Are Top Class in the Industry!

	Air Cooled	Water Cooled
Cooling Capacity	12.2 – 48.0 kW	
Operable Ambient Temp.	-20 – 45 ˚C [Air Cooled]	2 – 45 ˚C [Water Cooled]
Operable Liquid Temp. Range	3 – 35 ˚C	
Temp. Control Precision	±0.1 ˚C	


RKE3750B-V

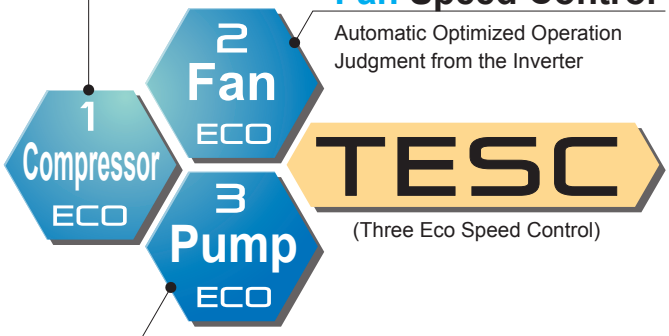

RKE11000B-V

Energy Saving Points

Three Optimized TESC (TESC Eco Speed Control) Built In

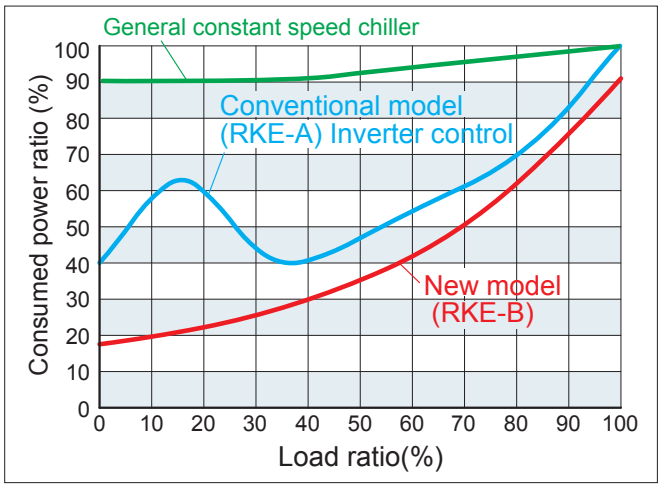
Compressor Speed Control
DC Inverter Drive with Automatic Optimized Operation Judgment

Fan Speed Control
Automatic Optimized Operation Judgment from the Inverter



(Three Eco Speed Control)

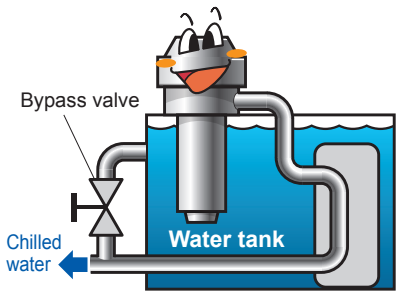
Pump Speed Control
Operates at the minimum speed needed to achieve the required flow rate. Reduces water supply waste.



Our units can maintain control at low loads that were previously difficult to work with and, as the graph shows, even compared with previous inverter driven chillers, we've achieved energy savings!

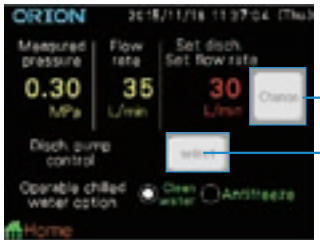
Pump Is Also Inverter Driven

■ Inverter Drive for the Compressor, Fan, and Now Also the Pump!
Being able to achieve just the required flow rate eliminates waste, even without bypass-valve control.

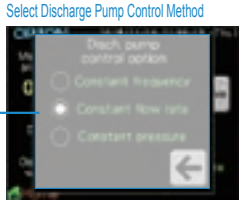


■ Choose the Desired Pump Control Method
In addition to setting the operating frequency, setting the flow rate based on an estimated flow rate standard, or setting the water pressure are also possible. Operation possible at the optimum flow rate or pressure in accordance with the load.

Change Settings

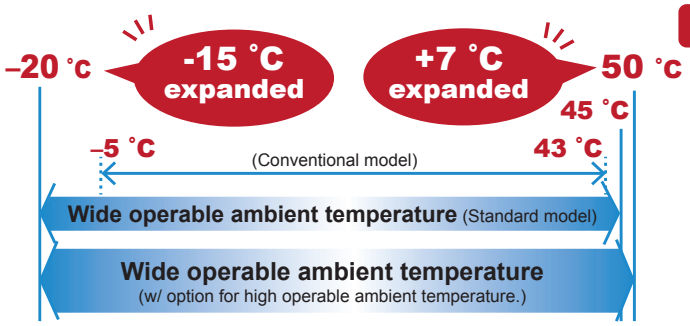


Select Discharge Pump Control Method

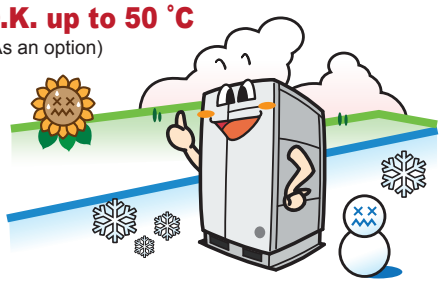


Wide operable ambient temperature

Can withstand summer temperatures up to 50 ˚C with our special-spec. Our chillers can also exhibit maximum performance in factory environments where hot air flow tends to accumulate. In winter temperatures as low as -20 ˚C, you can count on our air cooled models continuing to perform, even in outside installations.



Summer **O.K. up to 50 ˚C**
(As an option)

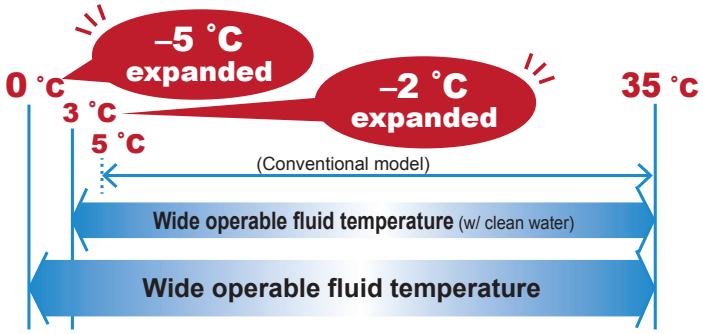


Winter **O.K. down to –20 ˚C** (Air cooled model)

* When setting antifreeze operating mode.

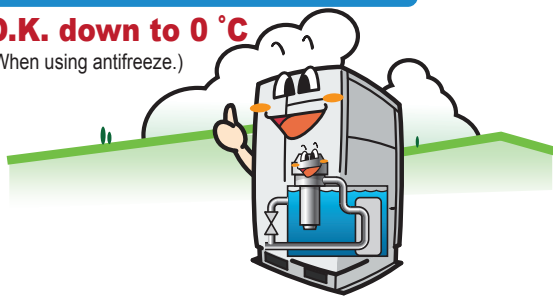
Wide operable fluid temperature

Operable fluid temperature range : 3 ˚C – 35 ˚C
Low fluid temperature expanded to 3 ˚C



* When operating with a 30 % to 40 % solution of industrial-use ethylene glycol.

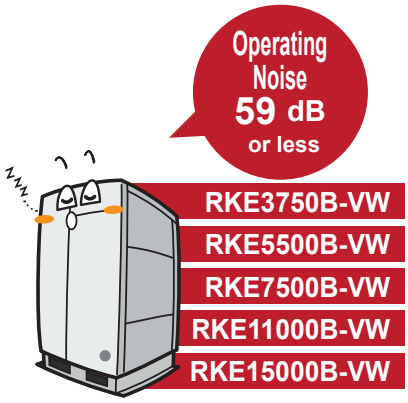
Operable fluid temperature range
O.K. down to 0 ˚C
(When using antifreeze.)



Low Noise and Noise Reducing Design

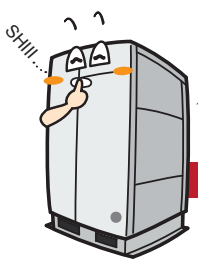
Ideal inverter fan speed control through optimized refrigeration cycle control. Achieves much lower operating noise levels.

* Operating noise measured from a distance of 1 m from the front of the unit at a height of 1 m.



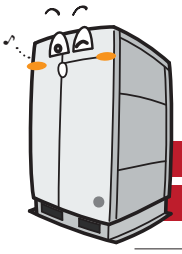
Operating Noise **59 dB** or less

- RKE3750B-VW
- RKE5500B-VW
- RKE7500B-VW
- RKE11000B-VW
- RKE15000B-VW



Operating Noise **60 dB** or less

- RKE3750B-V



Operating Noise **63 dB** or less

- RKE5500B-V
- RKE7500B-V

RKE11000B-V 69 dB
RKE15000B-V 68 dB

Specifications RKE-B Series Air-Cooled Models

Specifications

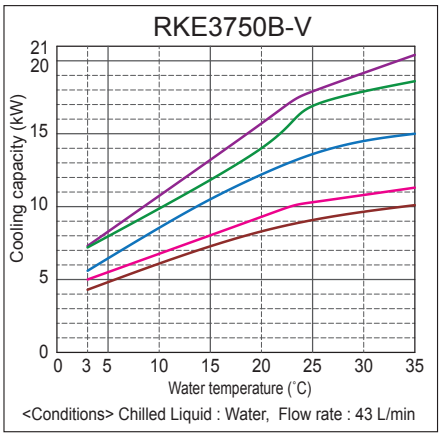
Model				RKE3750B-V G1 • G2(w/ casters)	RKE5500B-V	RKE7500B-V	RKE11000B-V	RKE15000B-V
Performance specifications	Cooling capacity *1		kW	12.2	20.3	25.0	37.2	48.0
	Heating capacity *8		kW	2.8	3.7		8.0	10.0
	Operable ambient temperature range		˚C	-20 – 45 (w/ option: -20 – 50)				
	Operable fluid temperature range		˚C	3 – 35 (w/ brine: 0 – 35) *7				
	Control accuracy *4			±0.1 ˚C (Energy saving mode: ±2.0 ˚C)				
	Operating flow rate		L / min	15 – 60	60 – 170		100 – 230	
Power specifications	Power source *2		V (Hz)	Three phase 200 – 220 ±10% (50/60)				
	Power source *2		kW	5.4	9.8	10.2	14.4	18.1
	Power source *		A	16.5	30.1	33.5	47.0	56.3
	Power capacity *3		kVA	7.0	11.0	11.8	19.5	22.0
	Breaker capacity *6		A	30	50		75	100
Operation control method				Compressor speed control				
Equipment details	Compressor	Construction		Fully sealed rotary type (inverter driven)			Fully sealed scroll type (inverter driven)	
		Output	kW	1.7	3.0	4.6	7.46	11.19
	Condenser			Fin and tube forced air cooling				
	Heat exchanger	Construction		Plate type heat exchanger				
		Material		SUS316 (Brazing: Cu)				
	Discharge pump	Construction		Multistage centrifugal immersion type				
		Output	kW	1.1 (Inverter driven)	1.5 (Inverter driven)		4.0 (Inverter driven)	
	Fan motor	Output	kW	0.4 (Inverter driven)	0.75 (Inverter driven)		0.4 × 2 (Inverter driven)	
	Water tank capacity		L	approx. 60	approx. 90		approx. 100	
	Refrigerant			R410A				
Outside dimensions (H×D×W)			mm	G1 : 1410 (G2 : 1536) × 752 × 720	1700 × 854 × 870		1700 × 854 × 1380	1800 × 854 × 1610
Unit mass (dry weight)			kg	G1: 200 • G2: 205	280	290	415	460
Operating noise level (50/60 Hz) *5			dB	60	63		69	68

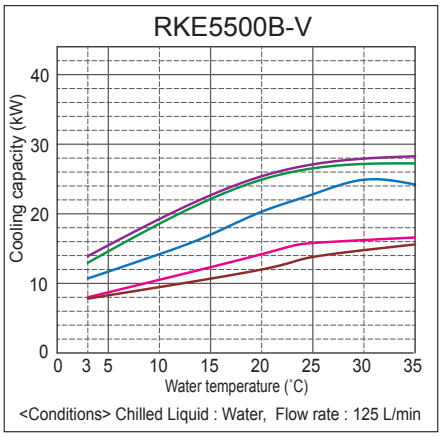
*1, Operating conditions: Chilled water temp.: 20 ˚C, Cooling water temp.: 32 ˚C (water cooled units only), Ambient temp.: 32 ˚C. Cooling capacity is at least 95% of listed figures. *2, Source voltage phase unbalance should be less than ±3%. *3, The figure noted is when operating at the highest capacity in the normal operating range. *4, Continuous current load fluctuation within ±10%, and with stable ambient temp. and power supply, etc. Does not include starting times or when the cooling load is too small, in which case the compressor may cycle on and off. *5, Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. *6, Unit comes with a built-in multi-purpose overload and short circuit protection breaker. *7, For liquid temperature settings of 0 to 3 °C, use a 30 to 40% solution of industrial-use ethylene glycol. *8, At time of startup only. Will differ depending on ambient temperature.

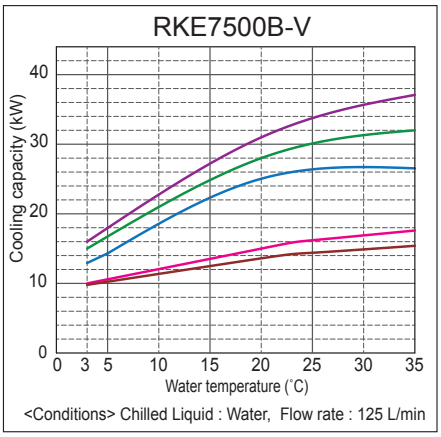
Note 1: The recommended liquid (chilled water) that can be used is either clean water or a 30 to 40% ethylene glycol solution. Note that there will be a 10% reduction in cooling capacity if using a 30 to 40% ethylene glycol solution. Alternatively, if deionized water is to be used, it should have an electrical conductivity of at least 1 µS/cm.

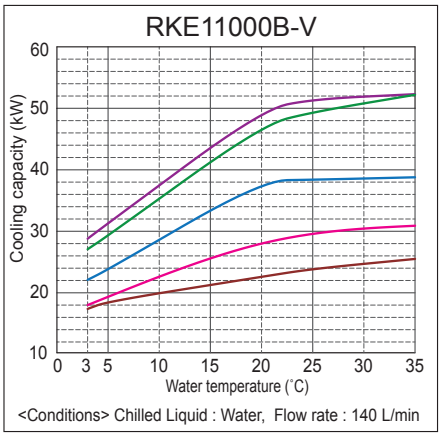
Note 2: Heat output from the unit (in kW) is approx. 1.3 times that of the cooling capacity.(Air cooled models)

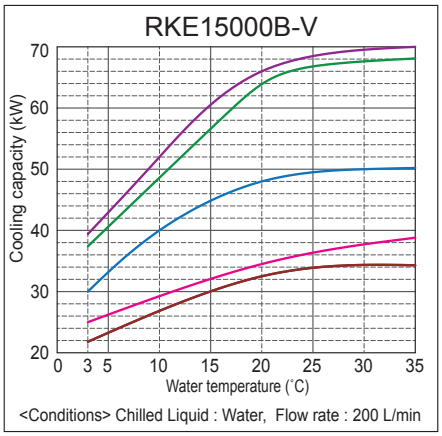
Cooling Capacity Diagram





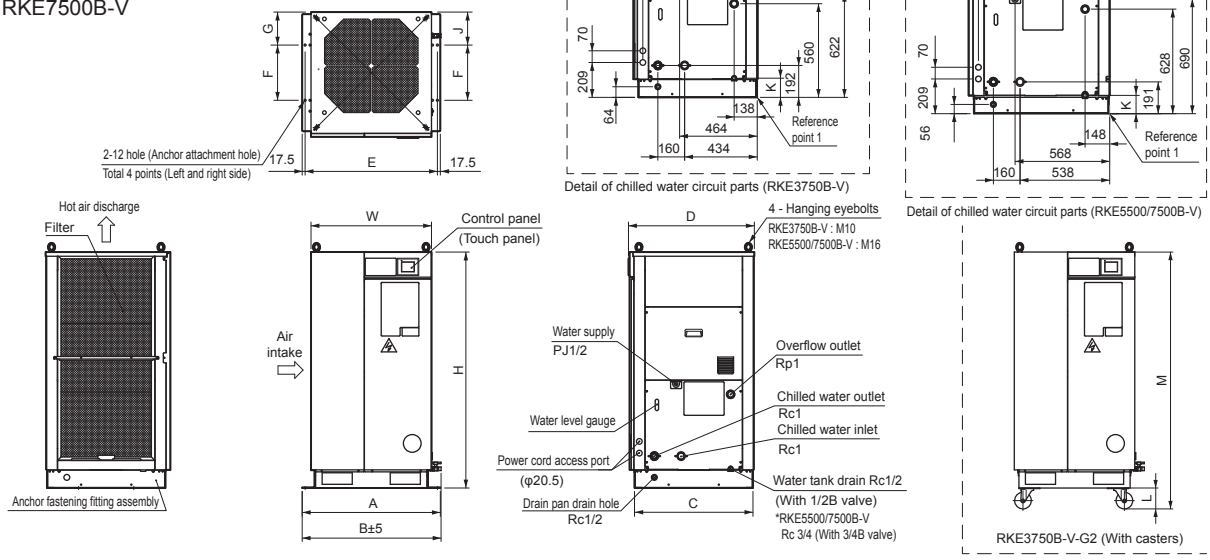




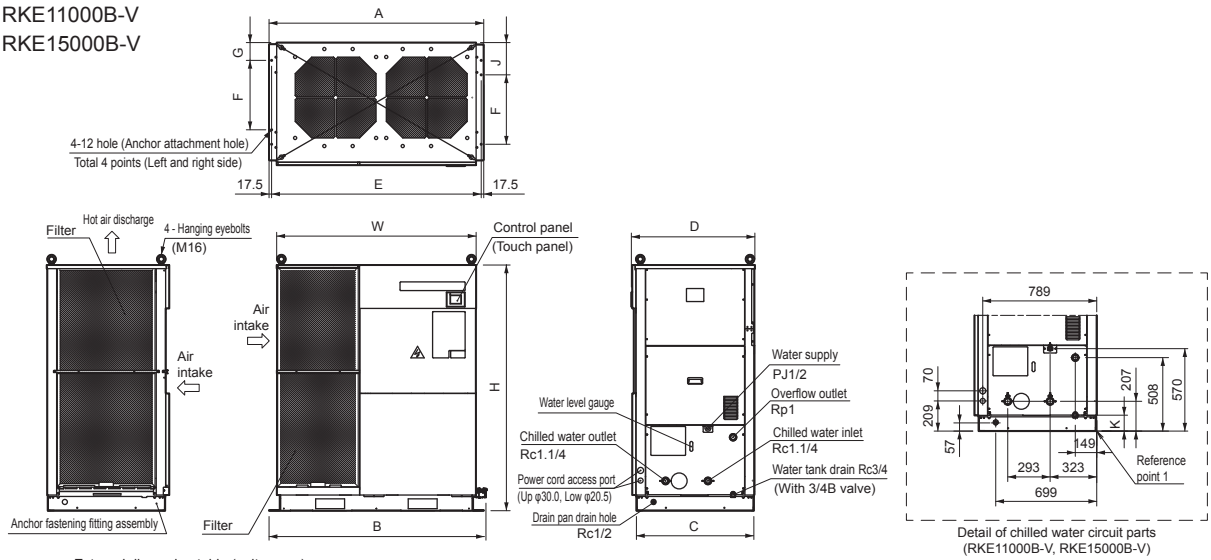


External Dimensions (Units: mm)

RKE3750B-V
RKE5500B-V
RKE7500B-V



RKE11000B-V
RKE15000B-V

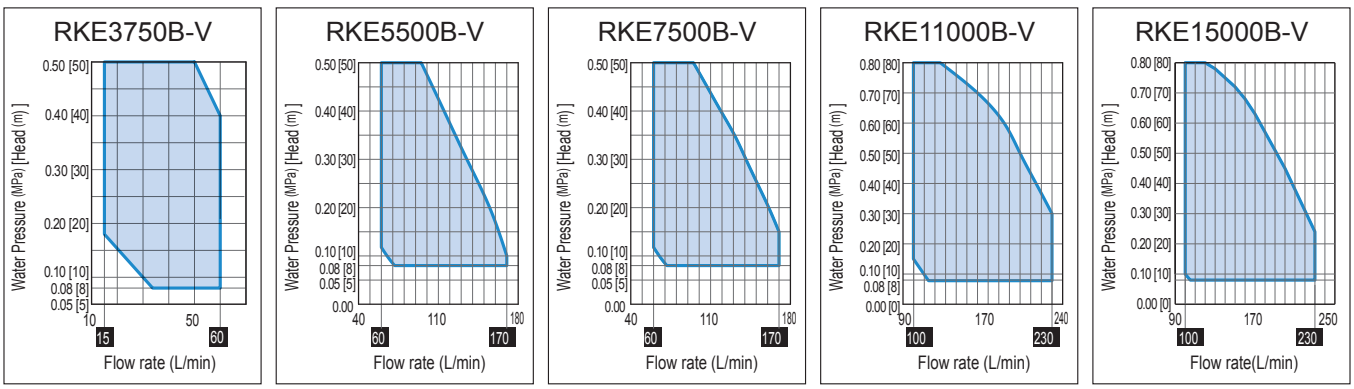


External dimension table (units : mm)

Model	W	H	A	B	C	D	E	F	G	J	K	L	M
RKE3750B-V	720	1410	826	830	708	752	791	330	197	197	115	126	1536
RKE5500B-V	870	1700	975	990	812	854	940	480	121	221	110	-	-
RKE7500B-V													
RKE11000B-V	1380	1700	1485	1500	812	854	1450	480	123	223	110	-	-
RKE15000B-V	1610	1800	1715	1730	812	854	1680	480	124	224	110	-	-

Chilled Water Flow Chart

* The illustration shows the actual measured flow rate value when the bypass valve is closed.
* Flow rate changes based on inverter frequency
* The shaded area indicates the range possible for the adjusted frequency value.
* The flow rate and pressures indicated are those displayed on the chiller.



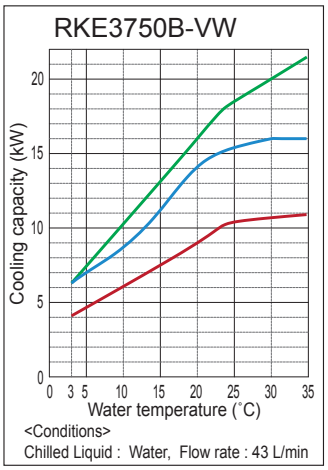
Specifications RKE-B Series Water-Cooled Models

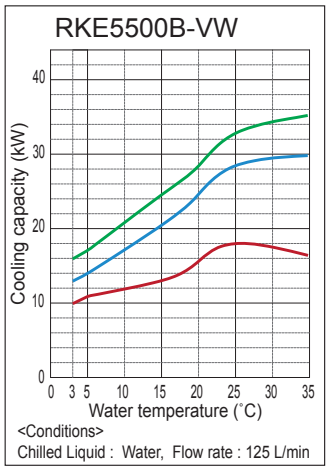
Specifications

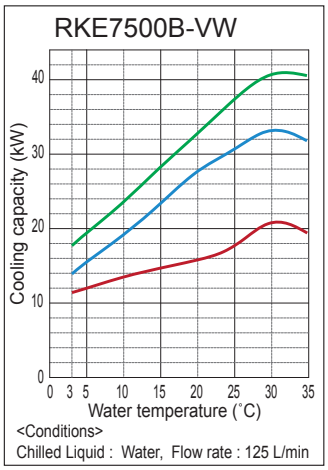
Model				RKE3750B-VW G1/G2 (w/ casters)	RKE5500B-VW	RKE7500B-VW	RKE11000B-VW	RKE15000B-VW
Performance specifications	Cooling capacity *1		kW	14.1	23.4	27.3	43.0	48.0
	Heating capacity *8		kW	2.8	3.0	3.1	9.1	10.0
	Operable ambient temperature range		˚C	2 – 45 (w/ option: 2 – 50)				2 – 45
	Cooling water temperature range		˚C	5 – 45				
	Operable fluid temperature range		˚C	2 – 45 (w/ option: 2 – 50) *7				
	Control accuracy *4			±0.1 ˚C (Energy saving mode: ±2.0 ˚C)				
	Operating flow rate		L/min	15 – 60	60 – 170		100 – 230	
Power specifications	Power source *2		V (Hz)	Three phase 200 ±10% (50) / 200 – 220 ±10% (60)				
	Power consumption *1		kW	5.1	8.8	10.1	12.7	15.3
	Electric current *1		A	19.2	31.8	33.0	41.0	48.2
	Power capacity *3		kVA	8.0	12.2	12.6	17.5	19.5
	Breaker capacity *6		A	30	50		75	
Operation control method				Compressor speed control				
Equipment details	Compressor	Construction		Fully sealed rotary type (inverter driven)			Fully sealed scroll type (inverter driven)	
		Output	kW	1.7	3.0	4.6	7.46	11.19
	Condenser			Double pipe water cooling				
	Heat exchanger	Construction		Plate type heat exchanger				
		Material		SUS316 (Brazing: Cu)				
	Discharge pump	Construction		Multistage centrifugal immersion type				
		Output	kW	1.1 (Inverter driven)	2.0 (Inverter driven)		2.5 (Inverter driven)	3.7 (Inverter driven)
	Water tank capacity		L	approx. 60	approx. 90		approx. 100	
	Refrigerant			R410A				
Outside dimensions (H×D×W)			mm	G1 : 1410 (G2 : 1536) × 752 × 720	1700 × 854 × 870		1410 × 854 × 1380	
Unit mass (dry weight)			kg	G1 : 200 • G2 : 205	280	290	405	
Operating noise level (50/60 Hz) *5			dB	58	59			

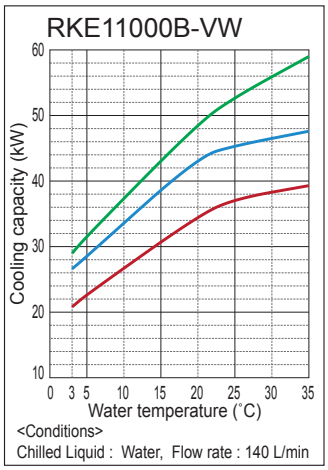
*1, Operating conditions: Chilled water temp.: 20 ˚C, Cooling water temp.: 32 ˚C (water cooled units only), Ambient temp.: 32 ˚C. Cooling capacity is at least 95% of listed figures. *2, Source voltage phase unbalance should be less than ±3%. *3, The figure noted is when operating at the highest capacity in the normal operating range. *4, Continuous current load fluctuation within ±10%, and with stable ambient temp. and power supply, etc. Does not include starting times or when the cooling load is too small, in which case the compressor may cycle on and off. *5, Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. *6, Unit comes with a built-in multi-purpose overload and short circuit protection breaker. *7, For liquid temperature settings of 0 to 3 °C, use a 30 to 40% solution of industrial-use ethylene glycol. *8, At time of startup only. Will differ depending on ambient temperature.
Note 1: The recommended liquid (chilled water) that can be used is either clean water or a 30 to 40% ethylene glycol solution. Note that there will be a 10% reduction in cooling capacity if using a 30 to 40% ethylene glycol solution. Alternatively, if deionized water is to be used, it should have an electrical conductivity of at least 1 µS/cm.

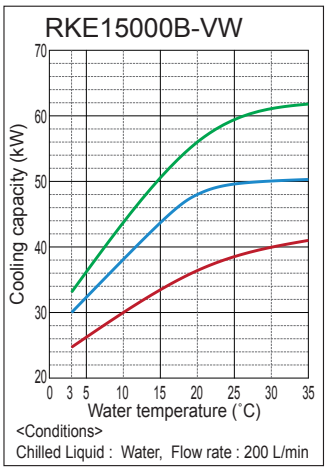
Cooling Capacity Diagram: Air Cooled Model Cooling Power Comparison Diagram





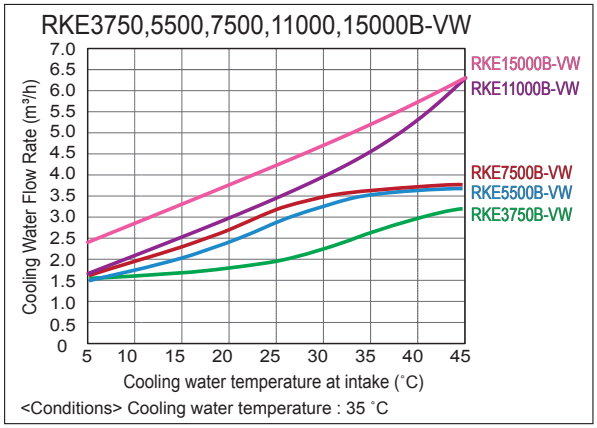






Cooling water temperature at intake 5 °C
Cooling water temperature at intake 32 °C
Cooling water temperature at intake 45 °C

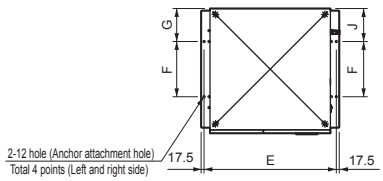
Cooling Water Flow Rate (For the water cooled condenser)

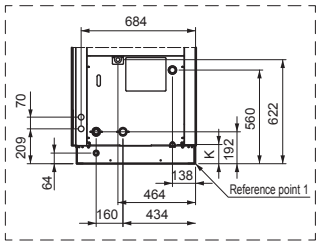


* Actual cooling water flow rate will depend on the water temperature.
* Ensure the required quantity of water as shown in the graphs below.

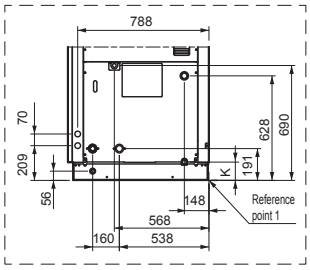
External Dimensions (Units: mm)

RKE3750B-VW
RKE5500B-VW
RKE7500B-VW

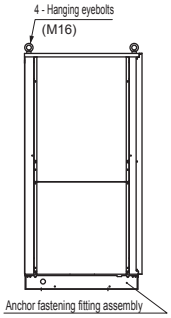




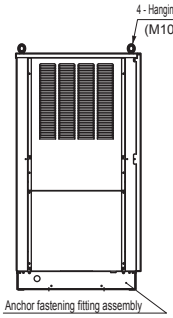
Detail of chilled water circuit parts (RKE3750B-VW)



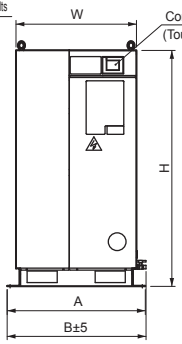
Detail of chilled water circuit parts (RKE5500/7500B-VW)

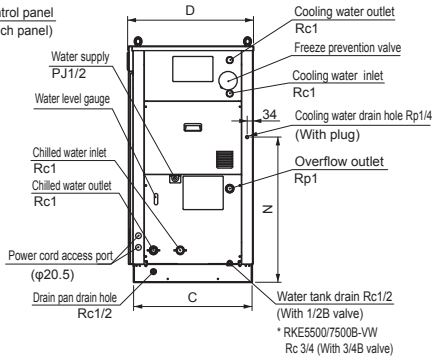


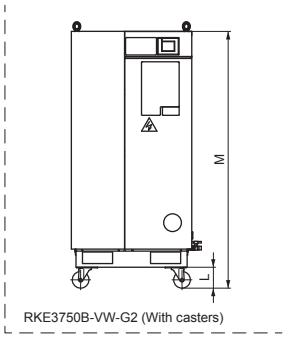
RKE5500B-VW
RKE7500B-VW



RKE3750B-VW

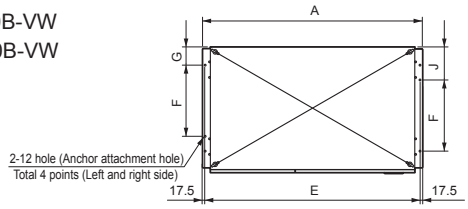


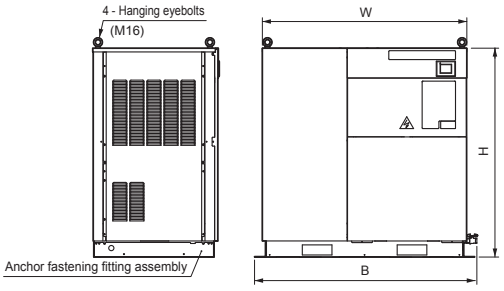


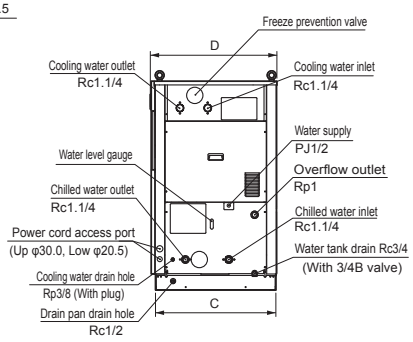


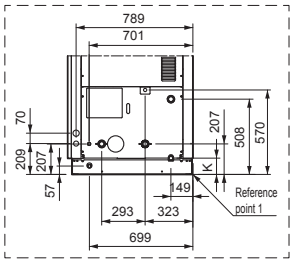
RKE3750B-VW-G2 (With casters)

RKE11000B-VW
RKE15000B-VW









Detail of chilled water circuit parts
(RKE11000B-VW, RKE15000B-VW)

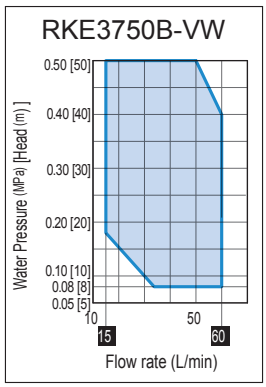
External dimension table (units : mm)

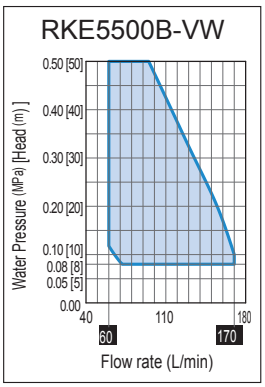
Model	W	H	A	B	C	D	E	F	G	J	K	L	M	N
RKE3750B-VW	720	1410	826	830	708	752	791	330	197	197	115	126	1536	869
RKE5500B-VW RKE7500B-VW	870	1700	975	990	812	854	940	480	121	221	110	-	-	939
RKE11000B-VW	1380	1410	1485	1500	812	854	1450	480	123	223	110	-	-	*
RKE15000B-VW	1380	1410	1485	1500	812	854	1450	480	123	223	110	-	-	-

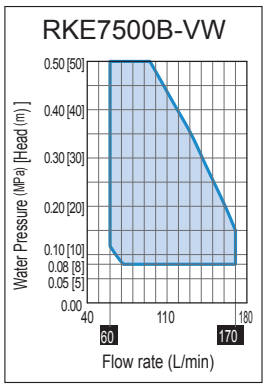
* See External dimensions

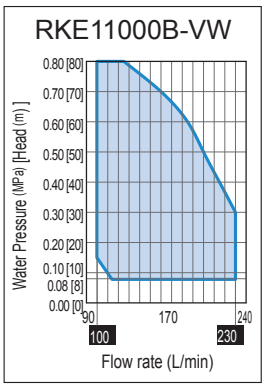
Chilled Water Flow Chart

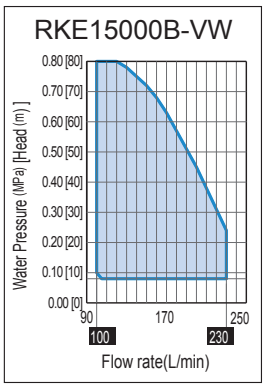
* The illustration shows the actual measured flow rate value when the bypass valve is closed.
* Flow rate changes based on inverter frequency
* The shaded area indicates the range possible for the adjusted frequency value.
* The flow rate and pressures indicated are those displayed on the chiller.









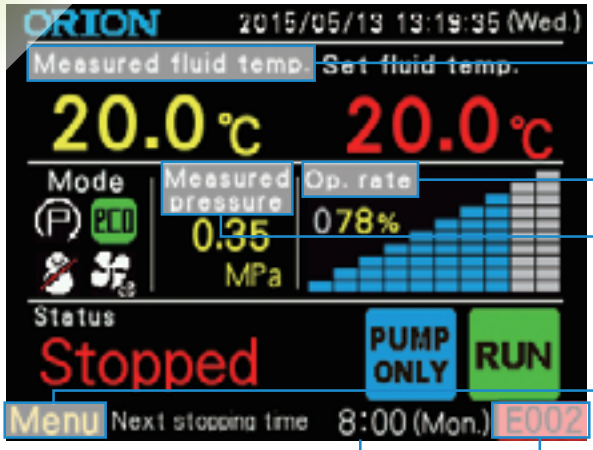


RKE-B Series Standard-Equipped Functionality

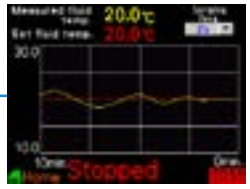
ORION produces a variety of products geared toward making our Inverter Chillers meet the wide-ranging needs of all of our customers.

Intelligent Touch Panel

Various settings and operating conditions can be visually and intuitively checked and operated via the touch panel controller. The displayed language can be changed to English, Japanese or Chinese.



① Graph display



Touching the "Measured Fluid Temp." button will change the display to the Graph Screen where changes in fluid temperature will be graphed over a particular time period (up to 53 hours) in order to better aid in fluid temperature management.

② Unit operating ratio (Power indicator)

The compressor operating state is indicated on a 10 level bar graph which shows the level of energy saving at a glance.
Touching the "Op. rate" button brings up the Monitor Screen where operating conditions can be easily checked.

③ Measured Pressure

Touch "Measured Pressure" to change the discharge pump control option between frequency, flow rate, and pressure.

④ Menu

Touching "Menu" will bring up a menu of useful functions for easy confirmation and setting of Parameters, Alarm History, Main Components, Accumulated Time, Timer Function, etc.

⑤ Timer Setting

Touching "0 : 00" on the display allows stop and start times to be set. Actions can be repeated or set according to the day.

⑥ Easy Maintenance/Alarm Display

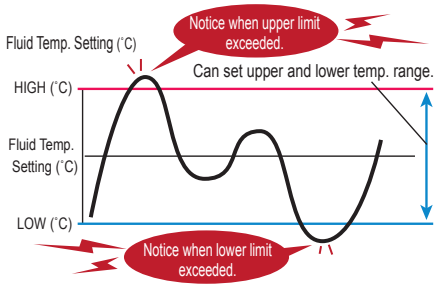
Alarm numbers are displayed when alarm conditions occur.
Touching the "Details" button will bring up further details about the alarm and information on what measures to take.

Displayed language can be changed to English, Japanese or Chinese.

English language mode　Japanese language mode　Chinese language mode

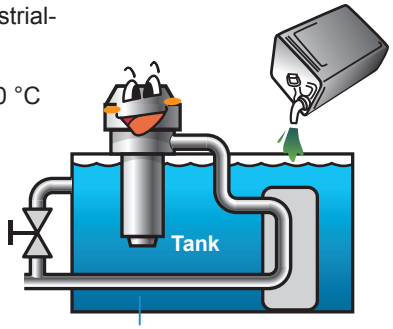
Fluid temperature upper/lower limit warning.

A warning message can be displayed or an audible alarm sounded when the fluid temperature goes beyond a set upper or lower limit beyond the set temperature.



Expanded Fluid Temp. Operating Range

When operating with a 30% to 40% solution of industrial-use ethylene glycol, operation with liquid temperatures down to 0 °C is possible.*



Max 30% – 40% concentrated solution of ethylene glycol.

* Note that when doing so, there will be a 10% drop in cooling capacity.

Earth Leakage Breaker (ELB)

To help insure safety, as a preventive measure, the unit includes an earth leakage breaker as standard equipment.

* See pages 11 to 12 for details.

Casters

RKE3750B-V(W)-G2 models include casters as standard equipment. Casters are sold as option equipment for RKE5500B-V(W) and RKE7500B-V(W) models.

RKE-B Series Optional Equipment

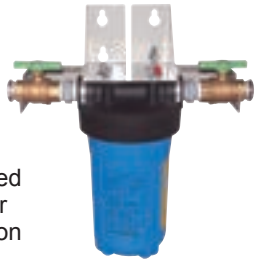
We have a wide-ranging lineup of optional equipment to meet every need.

On-Site Installed Optional Items

See pages 11 to 14 for details.

Water Filter Equipment

Use to prevent clogging in the water circuits of your chiller or other equipment and can also be used as a prefilter for water purification equipment.



Ion Exchange Resin Purifying Equipment

●For Circulating Water Systems

When installed as a bypass circuit within the chilled water circulation circuit, it can prevent rises in electrical conductivity in the circulating water.

●For Water Supply and Purification

Can suppress sharp rises in electrical conductivity of circulating water that occurs when supplying water to the water tank.

Remote Control (Wired)

Remote Control Sets include cables. The set model number differs depending on the cable length. (Max cable lengths: 20 m, 50 m, 100 m.)

Snow Protection Hood

The Snow Protection Hood supports outside installations in snowy regions.

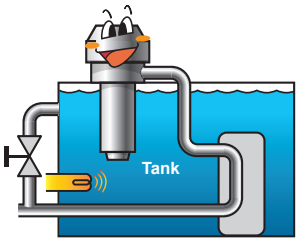
Ventilation Hood

The Ventilation Hood supports outside installations. The hood also helps to keep dust and dirt out of the unit.

Factory Installed Options

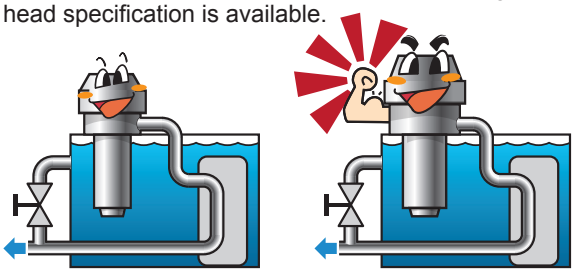
Heater

At time when the fluid temperature is rising, the heater should be used if high-precision control is required even when the load is low (and there is not the minimum amount of heat required for inverter control).



Discharge Pump for High Head Applications

High flow rate pump built in. A built in pump supporting a higher head specification is available.

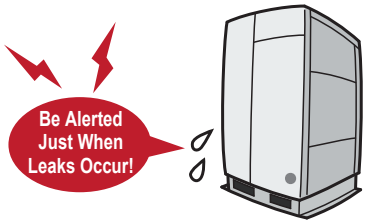


Cleanroom (Leakage Alarm Spec.)

Leakage Alarm Spec. models are available for use in cleanrooms.

Leakage Detection Spec.

If for some reason a water leak occurs, an alarm will be activated.



* See pages 11 to 12 for details.

External Surface Paint Thickness

The thickness of the applied outer surface paint can be changed to suit particular applications or needs.

Meets the Demands of World Markets

CE Marking

See pages 15 and 16 for details.

Other International Standards

Please consult our sales staff regarding any of your particular needs.

RoHS

Please ask our sales staff for further details.

RKE-B Series Equipment List

	Function	
	Item Detail	
Operating Environment	Low Temperature Heat Transfer Fluid / Nybrine (Z-1) 30−40% Concentration *1	
	Max 40% concentrated solution of ethylene glycol. *1	
	Deionized water. Electrical Conductivity: 1 μS/cm or higher.	
	Working Fluid (chilled water) Temperature	3 – 35 ˚C
		0 – 35 ˚C
	Operable Ambient Temp. Range	Low temp. area spec.: -20 ˚C to 45 ˚C (air cooled), 2 ˚C to 45 ˚C (water cooled)
		High temp. area spec.: to 50 ˚C
	Freeze-Prevention Mode	This function operates the discharge pump in order to prevent water temperature drops and freezing during winter months when unit operations is stopped. When enabled, the discharge pump will operate when the water temperature falls to 3 ˚C or below.
	Warm Up Mode	This function will automatically operate the discharge pump when the unit is otherwise not operating when the ambient temperature is low, for example during winter months, in order to prevent the water temperature from dropping too much and in order to help maintain the set water temperature. When this mode is enabled, the water temperature can be set within the temperature range of 10 ˚C to 35 ˚C as desired.
	Low Noise Mode *2	This function will limit the upper speed of the fan and the fan ventilation noise level will be decreased.
	Outside Installation	IPX4 Equiv. Rating
	Snow Protection Mode	When enabled, and when the unit is stopped, the fan will periodically and automatically start in order to blow fallen snow from the upper exhaust port.
	Snow Protection Hood	Prevents falling snow from entering the fan intake.
	Wind Shield	Consider a wind speed of 8 m/s or higher as a guideline.
	Cleanroom (Leakage Alarm Spec.)	In addition to the standard specification, leakage sensors, pressure resistant piping, refrigerant piping insulation, and water piping insulation are added.
	Water Leakage Detection	Leak detector built in.
	Vibration Reducing Base	Reduces transmission of vibration from the chiller.
Chilled Water Circuit	Discharge Pump Specs.	High flow rate pump built in. Can replace the built in high pressure pump.
	Relief Valve (Pressure valve)	Can provide equipment-side pressure protection.
	Water Tank Water-Level Alarm (Lower limit alarm)	Used to avoid water shortages due to evaporation.
	Water Supply Port Open/Close	A ball tap is provided in the water tank in order to maintain a uniform water level.
		A ball valve is added to the water supply port.
	Chilled Water Inlet/Outlet Open/Close	Gate valves are added to the chilled water inlet and outlet ports.
		Compression fittings are added to the chilled water inlet and outlet ports.
	Chilled Water Circuit Water Filter	Water Filter "A" Assembly
		Water Filter "B" Assembly
		Water Filter "C" Assembly
	Deionized Water Equipment for Chilled Water Circulation Circuit	Water Purifier "C" Assembly
		Water Purifier "D" Assembly
		Water Purifier "E" Assembly
	Deionized Water Equipment for Chilled Water Supply and Supply Circuits	Purification assembly for supply water.
	Cooling Water (Condenser circuit) Inlet/Outlet Open/Close	Gate valves are added to the cooling water inlet and outlet ports.
		Compression fittings are added to the cooling water inlet and outlet ports.
Power Supply and Control Specs	Primary Power Supply Voltage	4 voltages : Three-phase 200 V-220 V (50/60 Hz), 3 voltages : Three-phase 200 V (50/60 Hz), Three-phase 220 V (60 Hz)
		Three-phase 230 V (50 Hz), 380 V • 400 V • 415 V • 440 V • 480 V (50/60 Hz)
	Overload Safety Devices	The unit comes with a built in multipurpose overload and short circuit protection breaker.
	Power Outage Recovery Operation Settings	Can choose the recovery pattern after power outage. (Manual recovery•Automatic recovery•Remote operation priority)
	Operation Action Settings	Can enable or disable operation from among the main unit, remote control, external communications, or remote switch.
	Alarm Signal Output Options	Can choose the state of contacts of the remote alarm signal output. (Contacts either ON or OFF during alarm condition.)
	Action on Compressor Related Alarm	In cases where an alarm signal has been generated, this setting allows the user to choose whether the unit will completely shut down or if components that are able to operate will continue to do so.
	Audible Alarm Enable/Disable	Audible alarm can be enabled or disabled for each audible alarm or warning.

*1 : Note that there will be a 10% reduction in cooling capacity. *2 : Note that there will be max. 20% reduction in cooling capacity. *3 : Copper alloy is used for wetted parts on standard units.

= On-Site Installed Optional Items (Model Number) ◆ = Factory Installed Options

Comments	Model (RKE Series)									
	3750B-V	5500B-V	7500B-V	11000B-V	15000B-V	3750B-VW	5500B-VW	7500B-VW	11000B-VW	15000B-VW
Cannot be mixed with deionized water.	Operation Possible									
	Operation Possible									
Wetted parts are copper-free. *3	◆									
	Standard									
Please operate with a 30% to 40% solution of industrial-use ethylene glycol.	Standard									
Be careful of freezing at low temperatures as well as abnormal temperature rises due to placement in direct sunlight.	Standard									
	04105977010	04106046010		04106400010	04107416010	04105977020	04106046020		04106717010	–
Can be enabled or disabled via the intelligent touch panel. * Cannot be used at the same time as the warming up mode.	Standard Equipment									
Can be enabled or disabled via the intelligent touch panel. * Cannot be used at the same time as the freeze-prevention mode.	Standard Equipment									
Can change between normal or low operation modes via the intelligent touch panel.	Standard Equipment					–				
Installation in direct sunlight, strong wind (8 m/sec or higher), contact with falling snow, or freezing conditions requires further measures.	Standard									
Can be turned on or off via the intelligent touch panel.	Standard Equipment					–				
	03108111010	03108121010		03108887010	03109803010	–				
	03108110010	03108120010		03108881010	03109802010	–				
Perticulate is not taken account.	◆									
	◆									
	0A003386000	0A003433000		0A003805000	0A004173000	0A003386000	0A003433000		0A003805000	0A003805000
Specify the required flow rate and pressure.	◆									
Specify the relief pressure.	◆									
	Standard Equipment									
	Standard Equipment									
Standard chiller port size, brass or stainless steel.	◆									
Standard chiller port size, brass or stainless steel.	◆									
	◆									
Filtration Rating: 100 µm (5 µm, 10 µm, 20 µm, and 50 µm are available as special order options.)	04100489010	–				04100489010	–			
	–	04100491010		–			04100491010		–	
	–			04100490010		–			04100490010	
Water Quality: 10 µS/cm or lower	04100614010	–				04100614010	–			
	–	04100597010		–			04100597010		–	
	–			04100437010		–			04100437010	
Including electrical conductivity gauge and flow regulating valve.	04100522010									
Standard chiller size, brass or stainless steel.	–					◆				
	–					◆				
	4 Voltages					3 Voltages				
	◆									
	Current Sensitivity : 30 mA			Current Sensitivity : 100 mA		Current Sensitivity : 30 mA				Current Sensitivity : 100 mA
Action to be taken after recovery can be enabled or disabled via the intelligent touch panel.	Standard Equipment									
Can be enabled or disabled via the intelligent touch panel.	Standard Equipment									
The relay action can be set to ON or OFF via the intelligent touch panel.	Standard Equipment									
Can be set via the intelligent touch panel.	Standard Equipment									
The audible alarm can be enabled or disabled via the intelligent touch panel.	Standard Equipment									

RKE-B Series Equipment List

	Item Detail	Function
Power Supply and Control Specs	Independent Pump Operation / Control Setting	Pump-only operation can be enabled/disabled via the main unit, remote control, external communications signal, or the remote switch.
	Settings Lock Setting	Control from each of the following can be enabled or disabled: Main Unit, Remote Control, or External Communications Signal.
	Fluid (Chilled Water) Temp. Upper/ Lower Limit Warning Option	The method of abnormal fluid (chilled water) temperature detection can be selected. Can enable or disable the alarm and standby sequence for relative value and absolute value alarms. * Regarding the standby sequence, the alarm will be output after startup until the fluid temperature has initially reached a normal value and then later goes outside the normal range.
	Fluid (Chilled Water) Temp. Upper/Lower Limit Warning / Absolute Value Upper Limit	The warning will occur if the water temperature goes above this set temperature regardless of the actual set water temperature. Will be active when the "Fluid (Chilled Water) Temperature Upper/Lower Limit Warning" Absolute Value has been selected.
	Fluid (Chilled Water) Temp. Upper/Lower Limit Warning / Absolute Value Lower Limit	The warning will occur if the water temperature goes below this set temperature regardless of the actual set water temperature. Will be active when the "Fluid (Chilled Water) Temperature Upper/Lower Limit Warning" Absolute Value has been selected.
	Time Elapsed Warning: Time Setting	A warning will be output if the select time is exceeded. This will be useful, for example, maintenance timing management. The unit can continue to operate when this occurs.
	Intelligent Touch Panel Display Functions	Time and Date Display (Year/Month/Date/ Hour:Min (Day)) / Measured Water Temperature, Set Water Temperature, and a graph of the measured water temperature.) Parameter Mode Display / Water Pressure • Flow Rate • Discharge Pump Operating Frequency and Operating Conditions Display. Japanese • English • Chinese Display (Selectable)
	Remote Control	By connecting the remote control unit, the main unit can be operated and controlled (limited control) and operating parameters can be displayed on the Intelligent Touch Panel from an area away from the main unit.
	Communications Functions	As many as 32 chiller units can be connected via RS-422A or RS-485. USB connection is also possible to 1 unit. Note that USB operation cannot be combined with RS422/485 operation.
	Communications Software	Starting and stopping of operation, and monitoring of changing water temperature is possible via PC.
	Communications Device Address	Enables communications functions and selects the address number of the unit when multiple units are connected together. Units can be set with address values from 0 to 31 as desired.
	Settings Lock	Changes to the water temperature setting and other parameter settings can be locked out.
	Temperature Warning Signal Output Option	Determines the open/closed state of contacts when a temperature warning signal is present.
	External Signal Operation	Operation Signal Terminal Block *1
		Alarm Signal Terminal Block *1
		Remote Operation (No-voltage contacts) *2
		Remote Operation (24 Vdc input) *2 Only available as factory installed options.
		Remote Operation (200 Vac input) *2 Only available as factory installed options.
Other	Casters	2 freewheeling casters with lock, 2 freewheeling casters without lock
		With lock
		With leveling foot
	External Surface Coating Thickness	Polyester resin, min. 30 µm
		Polyester resin, min. 45 µm (Salt-corrosion prevention spec.)
	Color Designation * Specify the color designation as a JPMA No. or Munsell No (including a color sample).	
	Packaging for Export	Basic plywood packaging
	Water Temperature Control Accuracy	±0.1 ˚C
	Heating Functionality	Used to raise the temperature during unit startup. (Built in 200 Vac electric heater.) * ON/OFF control to the set fluid temperature minus 2 ˚C ±0.5 ˚C.
	Inspection Manual	Japanese
		English
	Test Results Chart	Japanese
		English
	Initial Inspection	

<Please Note> *1 : In addition, there are contacts for the temperature warning signal. *2 : There are 2 operating modes -- unit operation, and pump-only operation. *3 : Comes as standard equipment on G-2 spec models only. *4 : Also available as optional equipment from the manufacturer. *5 : Please consult your dealer if high precision control is required even under low loads (the minimum amount of heat required to maintain inverter control).

= On-Site Installed Optional Items (Model Number) ◆ = Factory Installed Options

	Comments	Model (RKE Series)									
		3750B-V	5500B-V	7500B-V	11000B-V	15000B-V	3750B-VW	5500B-VW	7500B-VW	11000B-VW	15000B-VW
	Can be enabled or disabled via the intelligent touch panel.	Standard Equipment Models									
	Can be enabled or disabled via the intelligent touch panel.	Standard Equipment Models									
	Can be set from the intelligent touch panel.	Standard Equipment Models									
	Water temperature setting can be set from the intelligent touch panel.	Standard Equipment Models									
	Water temperature setting can be set from the intelligent touch panel.	Standard Equipment Models									
	The number of hours (1 h to 30,000 h) can be set from the intelligent touch panel.	Standard Equipment Models									
		Standard Equipment Models									
	Max. wiring length: 20 m	03107963010			03108949010		03107963010			03108949010	
	Max. wiring length: 50 m	03107963020			03108949020		03107963020			03108949020	
	Max. wiring length: 100 m	03107963030			03108949030		03107963030			03108949030	
		Standard Equipment Models									
		04105970010									
		Standard Equipment Models									
	Can enable or disable setting changes from the intelligent touch panel.	Standard Equipment Models									
	The type of relay output (ON/OFF) when an alarm condition occurs can be selected from the intelligent touch panel.	Standard Equipment Models									
	No-voltage contacts	Standard Equipment Models									
	Voltage output (200 V output)	◆									
	No-voltage contacts	Standard Equipment Models									
	Voltage output (200 V output)	◆									
	Max. wiring length: 20 m (w/o cable)	Standard Equipment Models									
	Max. wiring length: 100 m	◆									
	Max. wiring length: 20 m	◆									
	Max. wiring length: 100 m	◆									
	Max. wiring length: 20 m	◆									
	Max. wiring length: 100 m	◆									
		*3		–		–	*3		–		–
	2 free-wheeling casters, 2 fixed casters *4	03108410010		03108407010		–	03108410010		03108407010		–
	4 free-wheeling casters *4	03108408010		03108405010		–	03108408010		03108405010		–
	4 free-wheeling casters *4	03108409010		03108406010		–	03108409010		03108406010		–
	Salt-corrosion prevention spec. (Acrylic resin, min. 45 µm) External screws are stainless steel.	Standard Equipment Models									
	Condenser and refrigerant piping are treated with a corrosion-resistant coating.	◆									
	Acrylic resin coating, at least 15 µm thick	◆									
	For other paint / coatings:	◆									
	Please consult your dealer for details regarding JIS standard packaging.	◆									
	*5	Standard Equipment Models									
	Heating output: Selectable among 2 kW, 3 kW, 4 kW, 5 kW, or 5 kW × 2.	◆									
		◆									
		◆									
		◆									
		◆									
		◆									

CE Marking Certified Chillers RKE-B (Air-Cooled Series)

CE RoHS Certified Air-Cooled Models

Compliance Standard: Low Voltage Directive (2014/35/EU) EU60204-1:2006/A1:2009; EMC Directive (2014/30/EU): Industrial Environment EN61000-6-2:2005 EN61000-6-4:2007+A1:2011

Air Cooled

Cooling Capacity	12.2 – 48.0 kW
Operable Ambient Temp.	−20 – 45 ˚C
Operable Liquid Temp. Range	3 – 35 ˚C
Temp. Control Precision	±0.1 ˚C

See page 6 for external dimensions.


RKE3750B-V

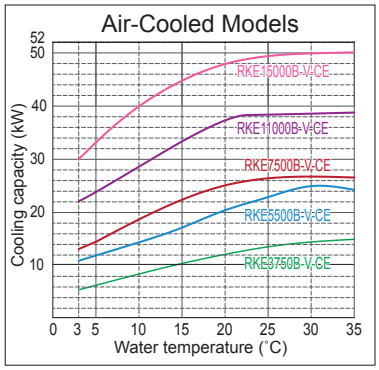

RKE11000B-V

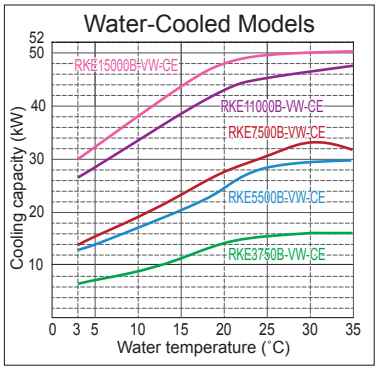
Specifications

Model				RKE3750B-V-CE G1 • G2(w/ casters)	RKE5500B-V-CE	RKE7500B-V-CE	RKE11000B-V-CE	RKE15000B-V-CE
Performance specifications	Cooling capacity *1		kW	12.2	20.3	25.0	37.2	48.0
	Heating capacity *8		kW	2.8	3.7		8.0	10.0
	Operable ambient temperature range		˚C	-20 – 45 (w/ option: -20 – 50)				
	Operable fluid temperature range		˚C	3 – 35 (w/ brine: 0 – 35) *7				
	Control accuracy *4			±0.1 ˚C (Energy saving mode: ±2.0 ˚C)				
	Operating flow rate		L / min	15 – 60	60 – 170		100 – 230	
Power specifications	Power source *2		V (Hz)	Three phase 200 – 220 ±10% (50/60)				
	Power source *2		kW	5.4	9.8	10.2	14.4	18.1
	Power source *		A	16.5	30.1	33.5	47.0	56.3
	Power capacity *3		kVA	7.0	11.0	11.8	19.5	22.0
	Breaker capacity *6		A	30	50		75	100
Operation control method				Compressor speed control				
Equipment details	Compressor	Construction		Fully sealed rotary type (inverter driven)			Fully sealed scroll type (inverter driven)	
		Output	kW	1.7	3.0	4.6	7.46	11.19
	Condenser			Fin and tube forced air cooling				
	Heat exchanger	Construction		Plate type heat exchanger				
		Material		SUS316 (Brazing: Cu)				
	Discharge pump	Construction		Multistage centrifugal immersion type				
		Output	kW	1.1 (Inverter driven)	1.5 (Inverter driven)		4.0 (Inverter driven)	
	Fan motor	Output	kW	0.4 (Inverter driven)	0.75 (Inverter driven)		0.4 × 2 (Inverter driven)	
	Water tank capacity		L	approx. 60	approx. 90		approx. 100	
	Refrigerant			R410A				
Outside dimensions (H×D×W)			mm	G1 : 1410 (G2 : 1536) × 752 × 720	1700 × 854 × 870		1700 × 854 × 1380	1800 × 854 × 1610
Unit mass (dry weight)			kg	G1:200 • G2:205	280	290	415	460
Operating noise level (50/60 Hz) *5			dB	60	63		69	68

*1, Operating conditions: Chilled water temp.: 20 ˚C, Cooling water temp.: 32 ˚C (water cooled units only), Ambient temp.: 32 ˚C. Cooling capacity is at least 95% of listed figures. *2, Source voltage phase unbalance should be less than ±3%. *3, The figure noted is when operating at the highest capacity in the normal operating range. *4, Continuous current load fluctuation within ±10%, and with stable ambient temp. and power supply, etc. Does not include starting times or when the cooling load is too small, in which case the compressor may cycle on and off. *5, Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. *6, Unit comes with a built-in multi-purpose overload and short circuit protection breaker. *7, For liquid temperature settings of 0 to 3 ˚C, use a 30 to 40% solution of industrial-use ethylene glycol. *8, At time of startup only. Will differ depending on ambient temperature.
Note 1: The recommended liquid (chilled water) that can be used is either clean water or a 30 to 40% ethylene glycol solution. Note that there will be a 10% reduction in cooling capacity if using a 30 to 40% ethylene glycol solution. Alternatively, if deionized water is to be used, it should have an electrical conductivity of at least 1 μS/cm.
Note 2: Heat output from the unit (in kW) is approx. 1.3 times that of the cooling capacity.(Air cooled models)

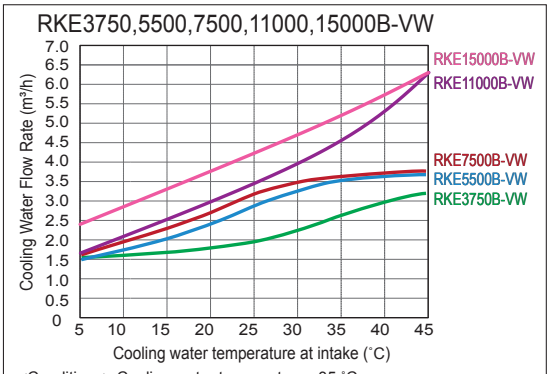
Cooling Capacity





<Conditions> • Chilled Liquid : Water
• Flow rate : RKE3750B-V(W) 43 L/min
RKE5500B-V(W) • 7500B-V(W) 125 L/min
RKE11000B-V(W) 140 L/min
RKE15000B-V(W) 200 L/min
• Ambient temperature : 32 ˚C

Cooling Water Flow Rate (For the water cooled condenser)



<Conditions> Cooling water temperature : 35 ˚C

* Actual cooling water flow rate will depend on the water temperature.
* Ensure the required quantity of water as shown in the graphs below.

CE Marking Certified Chillers RKE-B (Water-Cooled Series)

CE RoHS Certified Water-Cooled Models

Compliance Standard	Low Voltage Directive (2014/35/EU) EU60204-1:2006/A1:2009	EMC Directive (2014/30/EU): Industrial Environment EN61000-6-2:2005 EN61000-6-4:2007+A1:2011

Water Cooled

Cooling Capacity	14.1 – 48.0 kW
Operable Ambient Temp.	2 – 45 ˚C
Operable Liquid Temp. Range	3 – 35 ˚C
Temp. Control Precision	±0.1 ˚C

See page 8 for external dimensions.


RKE3750B-VW


RKE11000B-VW

Specifications

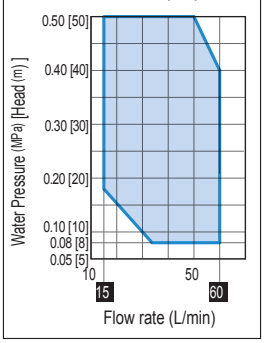
Model				RKE3750B-VW-CE G1/G2 (w/ casters)	RKE5500B-VW-CE	RKE7500B-VW-CE	RKE11000B-VW-CE	RKE15000B-VW-CE
Performance specifications	Cooling capacity *1		kW	14.1	23.4	27.3	43.0	48.0
	Heating capacity *8		kW	2.8	3.0	3.1	9.1	10.0
	Operable ambient temperature range		˚C	2 – 45 (w/ option: 2 – 50)				2 – 45
	Cooling water temperature range		˚C	5 – 45				
	Operable fluid temperature range		˚C	2 – 45 (w/ option: 2 – 50) *7				
	Control accuracy *4			±0.1 ˚C (Energy saving mode: ±2.0 ˚C)				
	Operating flow rate		L/min	15 – 60	60 – 170		100 – 230	
Power specifications	Power source *2		V (Hz)	Three phase 200 ±10% (50) / 200 – 220 ±10% (60)				
	Power consumption *1		kW	5.1	8.8	10.1	12.7	15.3
	Electric current *1		A	19.2	31.8	33.0	41.0	48.2
	Power capacity *3		kVA	8.0	12.2	12.6	17.5	19.5
	Breaker capacity *6		A	30	50		75	
Operation control method				Compressor speed control				
Equipment details	Compressor	Construction		Fully sealed rotary type (inverter driven)			Fully sealed scroll type (inverter driven)	
		Output	kW	1.7	3.0	4.6	7.46	11.19
	Condenser			Double pipe water cooling				
	Heat exchanger	Construction		Plate type heat exchanger				
		Material		SUS316 (Brazing: Cu)				
	Discharge pump	Construction		Multistage centrifugal immersion type				
		Output	kW	1.1 (Inverter driven)	2.0 (Inverter driven)		2.5 (Inverter driven)	3.7 (Inverter driven)
	Water tank capacity		L	approx. 60	approx. 90		approx. 100	
	Refrigerant			R410A				
Outside dimensions (H×D×W)			mm	G1 : 1410 (G2 : 1536) × 752 × 720	1700 × 854 × 870		1410 × 854 × 1380	
Unit mass (dry weight)			kg	G1 : 200 • G2 : 205	280	290	405	
Operating noise level (50/60 Hz) *5			dB	58	59			

*1, Operating conditions: Chilled water temp.: 20 ˚C, Cooling water temp.: 32 ˚C (water cooled units only), Ambient temp.: 32 ˚C. Cooling capacity is at least 95% of listed figures. *2, Source voltage phase unbalance should be less than ±3%. *3, The figure noted is when operating at the highest capacity in the normal operating range. *4, Continuous current load fluctuation within ±10%, and with stable ambient temp. and power supply, etc. Does not include starting times or when the cooling load is too small, in which case the compressor may cycle on and off. *5, Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. *6, Unit comes with a built-in multi-purpose overload and short circuit protection breaker. *7, For liquid temperature settings of 0 to 3 ˚C, use a 30 to 40% solution of industrial-use ethylene glycol. *8, At time of startup only. Will differ depending on ambient temperature.
Note 1: The recommended liquid (chilled water) that can be used is either clean water or a 30 to 40% ethylene glycol solution. Note that there will be a 10% reduction in cooling capacity if using a 30 to 40% ethylene glycol solution. Alternatively, if deionized water is to be used, it should have an electrical conductivity of at least 1 µS/cm.

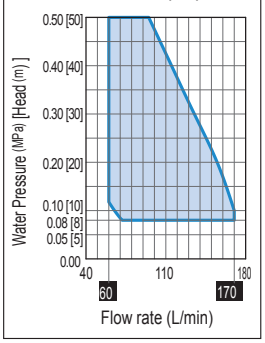
Chilled Water Flow Chart

* The illustration shows the actual measured flow rate value when the bypass valve is closed.
* Flow rate changes based on inverter frequency
* The shaded area indicates the range possible for the adjusted frequency value.
* The flow rate and pressures indicated are those displayed on the chiller.

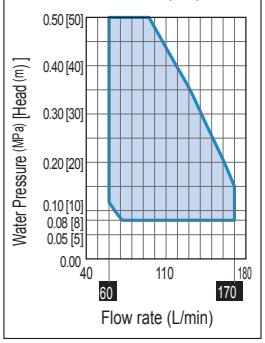
RKE3750B-V(W)-CE



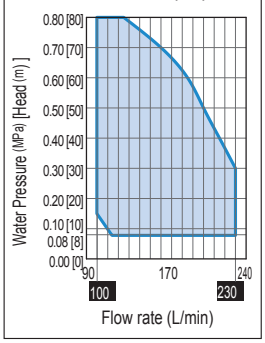
RKE5500B-V(W)-CE



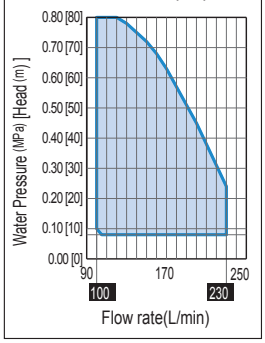
RKE7500B-V(W)-CE



RKE11000B-V(W)-CE



RKE15000B-V(W)-CE



RKE-A Series (Heavy Duty Models)

Inverter Controlled Compressor | Built-In Discharge Pump | External Warning Alarm Terminals Operation / Alarm / Remote operation | IPX4 Equiv. Rating Splash-proof | HFC Refrigerant R407C | Remote Control Panel (Optional)

Features

1. Operates with a maximum energy savings of 57%. *
   These Orion chillers respond to work loads using the least amount of energy. (* Compared with HB control models running at a 30% load)
2. Highly accurate fluid temperature control possible.
   The chiller senses the fluid temperature and adjusts the compressor speed accordingly, thus achieving fluid temperature precision control of ±0.2 – ±1.0 ˚C. (Accuracy is subject to work loads. Please consult your dealer if high accuracy is demanded.)
3. Wide range of fluid temperature control.
   Wide range of fluid temperature control.
4. Comes with built-in communications interface as standard equipment.
   Allows temperature control via RS232C or RS422 interfaces.

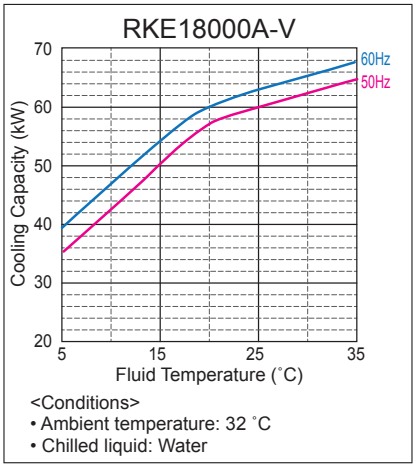
RKE18000A-VW

Specifications

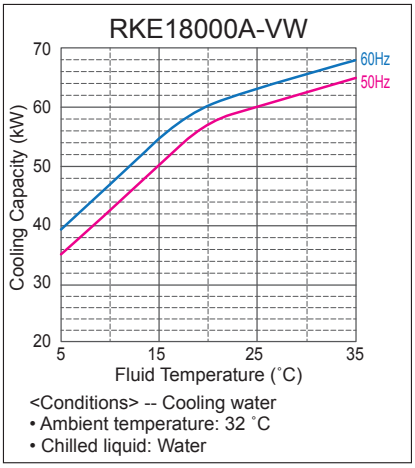
Model				Air cooled model	Water cooled model
				RKE18000A-V	RKE18000A-VW
Performance specifications	Cooling capacity (50/60 Hz) *1		kW	57/60	57/60
	Operable ambient temperature range		˚C	−5 – 43	2 – 43
	Operable fluid temperature range (fluid temperature)		˚C	5 – 35	
	Control accuracy *4			Under high accuracy setting ±1.0 ˚C (±0.5 ˚C during stable load), under energy-saving setting ±1.0 ˚C (±0.5 ˚C during stable load, ±2.0 ˚C during ON/OFF cycle mode)	
Power specifications	Power source *2		V (Hz)	Three phase 200 ±10% (50/60), 220 ±10% (60)	
	Power consumption (50/60 Hz, 220 V) *1		kW	25.5/28.0, 28.0	23/25, 25
	Electric current (50/60 Hz, 220 V) *1		A	82.2/89.8, 89.8	72/80, 80
	Power capacity *3		kVA	35	32
	Breaker capacity		A	125 *7	125 *7
Equipment details	Compressor output		kW	3.0, 7.46	3.0, 7.46
	Condenser			Fin and tube forced air cooling	Double pipe water cooling
	Heat exchanger	Construction		Plate type heat exchanger	
		Material		SUS316 grade stainless steel (brazing: copper)	
	Discharge pump	Output	kW	3.2 (inverter driven)	
		Flow rate *5	L/min	200 (Head: 50 m)	
	Fan motor output		W	750 × 2 (inverter driven)	–
	Water tank capacity		L	Approx. 160	Approx. 160
	Refrigerant			R407C	
Outside dimensions (H×D×W)			mm	1800×960×1720	1580×960×1720
Unit mass (dry weight)			kg	Approx. 660	610
Operating noise level *5			dB	69	60

*1 Operation when liquid temp. is 20 °C, ambient temp. is 32 °C, and cooling water temp. is 32 °C. Cooling capacity is at least 95% of listed figures. *2 Source voltage phase unbalance should be less than ±3%. *3 The figure noted is when the equipment is operating at the highest capacity of its normal operating range. *4 Stable load indicates continued operation with maximum load fluctuations of ±10% of the current load. (However, this is excluding loads in the 25% to 40% range.) Setting can be changed by adjusting parameter F15. (Default setting is the high-accuracy setting.) *5 Please operate with a head of 50 m or less. *6 Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. *7 Unit comes with a built-in multi-purpose overload and short circuit protection breaker. Note 1: Please install the included strainer (40 mesh) to the fluid intake port. Note 2: The recommended liquid (chilled water) that can be used is either clean water or a 30 – 40 % industrial-use ethylene glycol solution. Alternatively, if deionized water is used, it should have an electrical conductivity of at least 1 µS/cm. Note 3: Heat output of the equipment (in kW) is about 1.3 times the cooling capacity. (Air cooled only.) Note 4: RKE15000A-VW and RKE18000A-VW models are built to order items.

Cooling Capacity

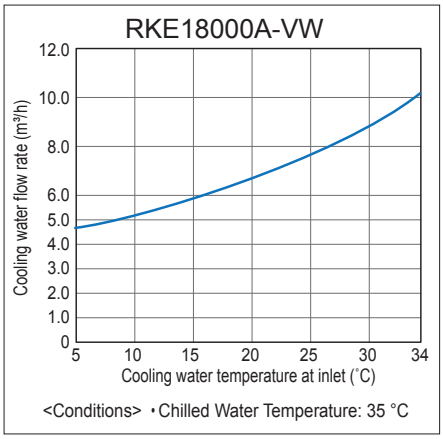


<Conditions>
• Ambient temperature: 32 ˚C
• Chilled liquid: Water



<Conditions> -- Cooling water
• Ambient temperature: 32 ˚C
• Chilled liquid: Water

Cooling Water Flow Rate (for condenser)

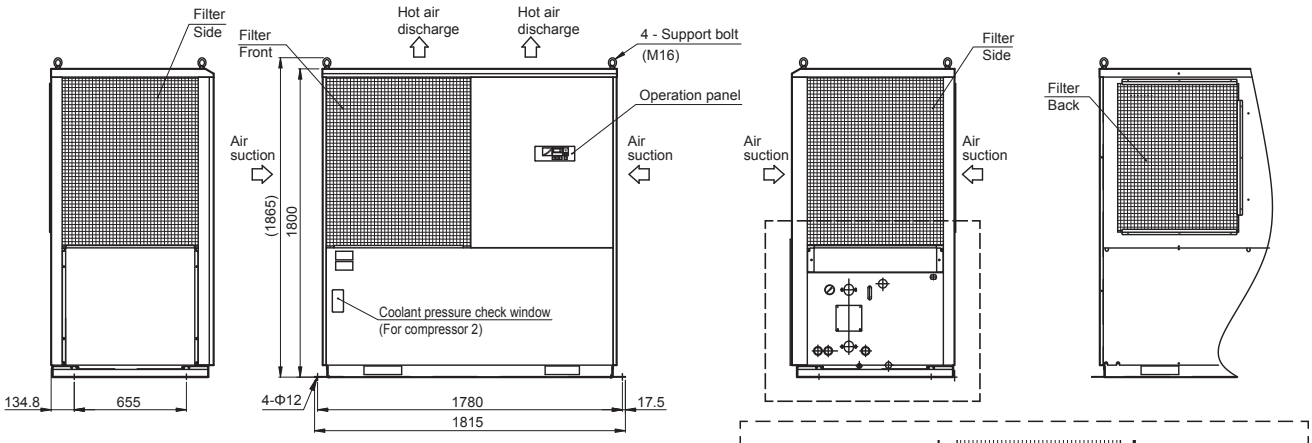


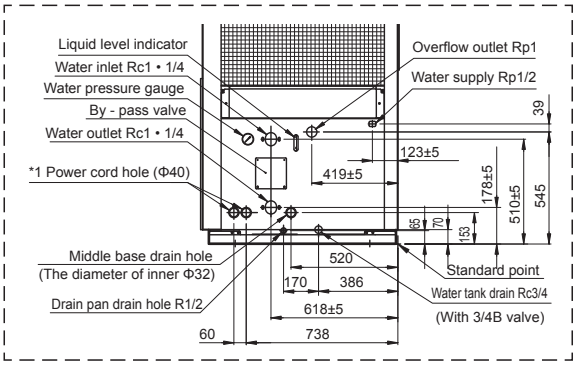
<Conditions> • Chilled Water Temperature: 35 °C

External Dimensions (Units: mm)

*1 : Put the signal lines and communication cables for respective wirings through the holes separate from the power cord hole.

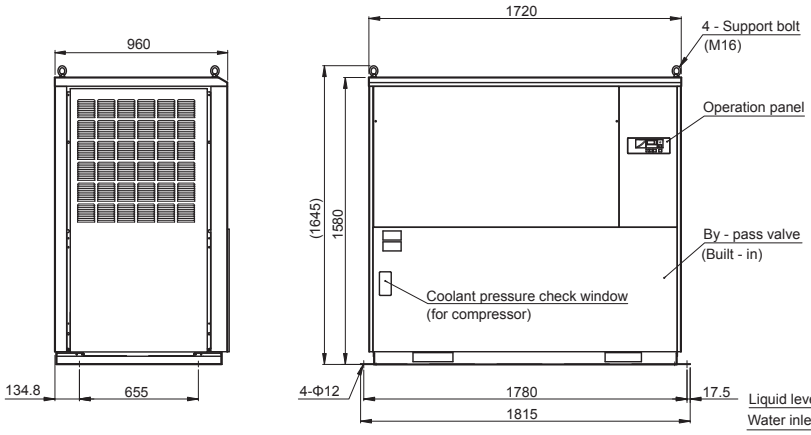
RKE18000A-V

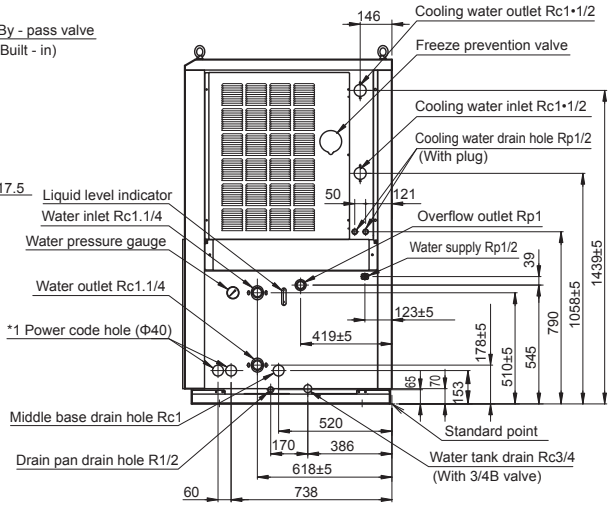




Water piping plate detail

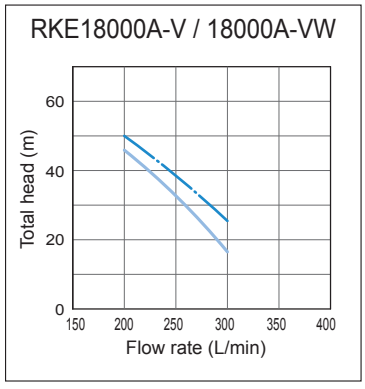
RKE18000A-VW





Chilled Water Flow Rate

* Internal (return side) head loss: 0.7 m or less.



Power frequency: 50/60 Hz

Flow rate for stand-alone pump operation

Flow rate including heat exchanger head loss

RKE-A Series (Super Heavy Duty Models)

Inverter Controlled Compressor | Built-In Discharge Pump | External Warning Alarm Terminals Operation / Alarm / Remote operation | IPX4 Equiv. Rating Splash-proof | HFC Refrigerant R407C

RKE22000A-V

Features

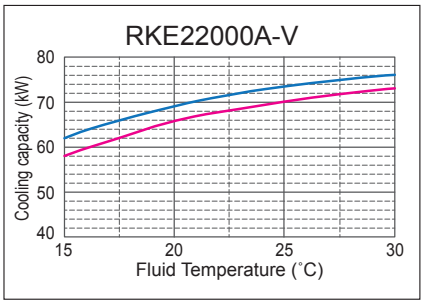
1. Operates with a maximum energy savings of 57%. *
   Orion chillers respond to work loads using the least amount of energy. (8 Compared with HB control models running at a 30% load)
2. Highly accurate fluid temperature control possible.
   The chiller senses the fluid temperature and adjusts the compressor speed accordingly, thus achieving fluid temperature precision control of ±0.2 – ±1.0 ˚C. (Accuracy is subject to work loads. Please consult your dealer if high accuracy is demanded.)
3. Wide range of fluid temperature control.
   User settings of fluid temperatures between 5 – 35 ˚C are now possible.
4. Adopted for use with environmentally friendly refrigerant.
   Uses non ozone-depleting R407C refrigerant.
5. Comes with built-in communications interface as standard equipment.
   Allows temperature control via RS232C or RS422 interfaces.
   RKE30000A-V, RKE30000A-VW models excluded.

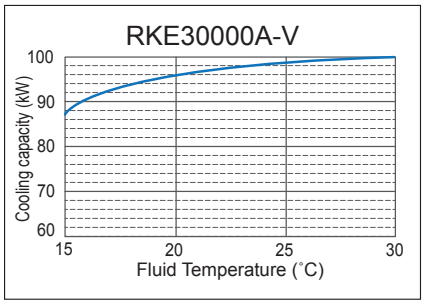
Specifications

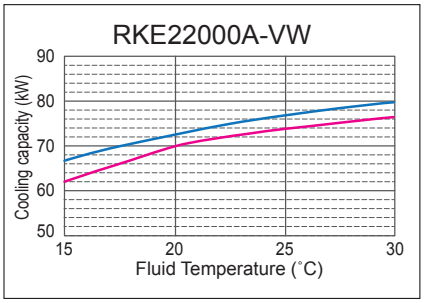
Model				Air cooled model		Water cooled model	
				RKE22000A-V	RKE30000A-V	RKE22000A-VW	RKE30000A-VW
Performance specifications	Cooling capacity (50/60 Hz) *1		kW	66.0/69.0	96.0	70.0/73.0	96
	Operable ambient temperature range		˚C	−5 – 43		2 – 43	
	Operable fluid temperature range		˚C	15 – 30			
	Control accuracy *4			Under high accuracy setting ±1.0 ˚C (±0.5 ˚C during stable load), under energy-saving setting ±1.0 ˚C (±0.5 ˚C during stable load, ±2.0 ˚C during ON/OFF cycle mode)			
Power specifications	Power source *2		V (Hz)	Three phase 200 ±10% (50/60), 220 ±10% (60)			
	Power consumption *1		kW	43.0/45, 45.8	50, 50	38.0/40.0, 40.0	43, 43
	Electric current *1		A	133/136, 136	160, 160	125/128, 128	126, 126
	Power capacity *3		kVA	50.0	60	50.0	54
	Breaker capacity		A	175 *6		175 *6	
Equipment details	Compressor output		kW	7.5, 7.46	7.5×2	7.5, 7.46	7.5×2
	Condenser			Fin and tube forced air cooling		Double pipe water cooling	
	Heat exchanger	Construction		Plate type heat exchanger			
		Material		SUS316 grade stainless steel (brazing: copper)			
	Discharge pump	Output		3.2 Inverter driven pump × 2			
		Flow rate	L/min	Minimum 400 (Head: 50 m)			
	Fan motor output		kW	2.2 (inverter driven) / 0.75 (inverter driven)		2.2 (inverter driven pump) × 2 pumps	–	–
	Water tank capacity		L	approx. 250	approx. 320	approx. 250	approx. 320
	Refrigerant			R407C			
Outside dimensions (H×D×W)			mm	2190×1240×2050	2190×1340×2350	1700×1240×2050	1700×1340×2350
Unit mass (dry weight)			kg	approx. 1050	approx. 1420	1100	1420
Operating noise level (50/60 Hz) *5			dB	71	72	61	62

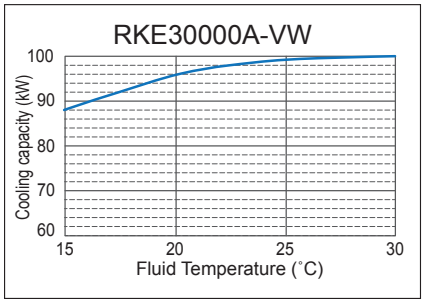
*1 When operating under these conditions: chilled water temperature is 20 ˚C, ambient temperature is 32 ˚C, cooling water temperature is 32 ˚C. Cooling capacity will be at least 95% of the noted figures. *2 Source voltage phase unbalance should be less than ±3%. *3 The figure noted is when the equipment is operating at the highest capacity of its normal operating range. *4 Stable load indicates continued operation with maximum load fluctuations of ±10% of the current load. (However, this excludes cases where the electronic capacity control valve cycles on and off.) The setting can be changed by adjusting parameter F15. (Default value: High-accuracy setting.) *5 Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. *6 Unit comes with a built-in multi-purpose overload and short circuit protection breaker. Not 4: The above four models are built-to-order items.

Cooling Capacity

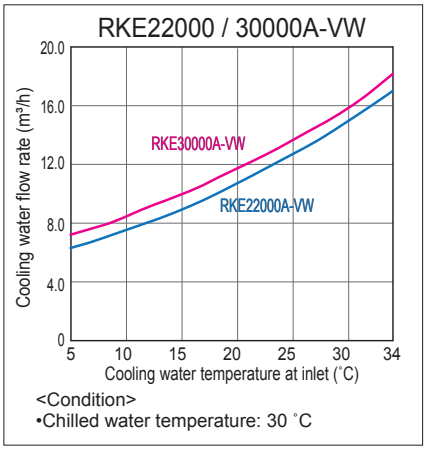








Cooling Water Flow Rate (for condenser)



<Condition>
•Chilled water temperature: 30 ˚C

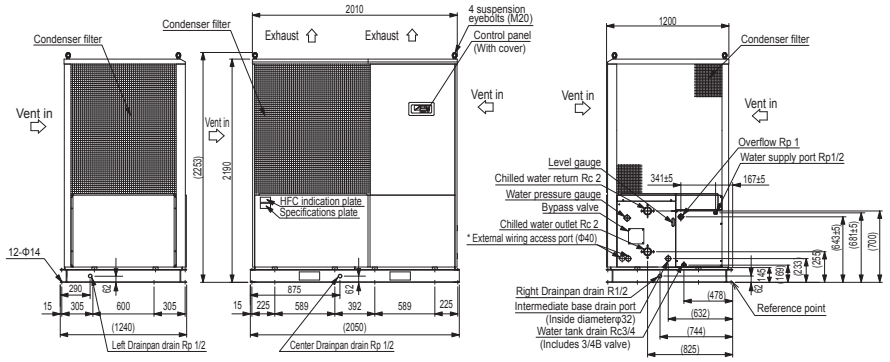
60 Hz
50 Hz

Conditions
•Ambient temperature: 32 ˚C
•Chilled liquid: Water

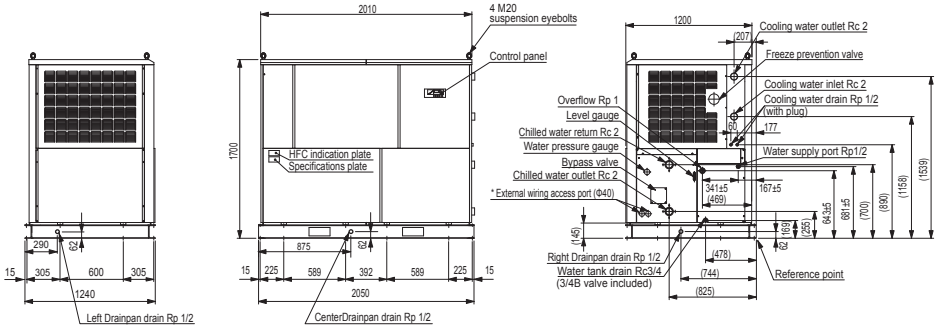
External Dimensions (Units: mm)

*1: Signal and communications related wiring should not pass through the same hole as power cables.

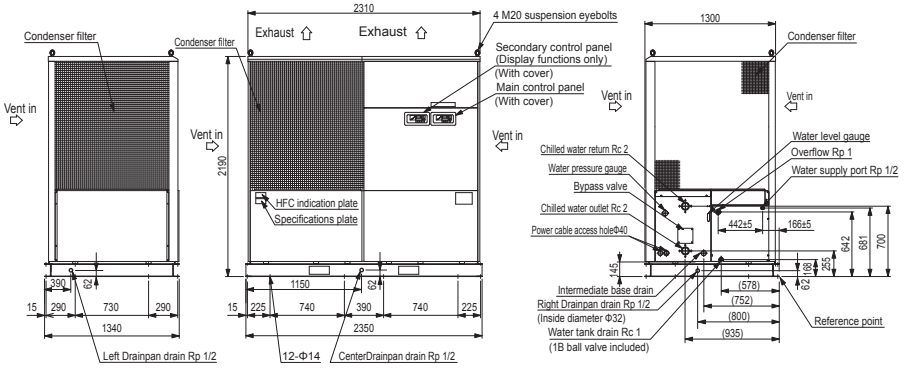
RKE22000A-V



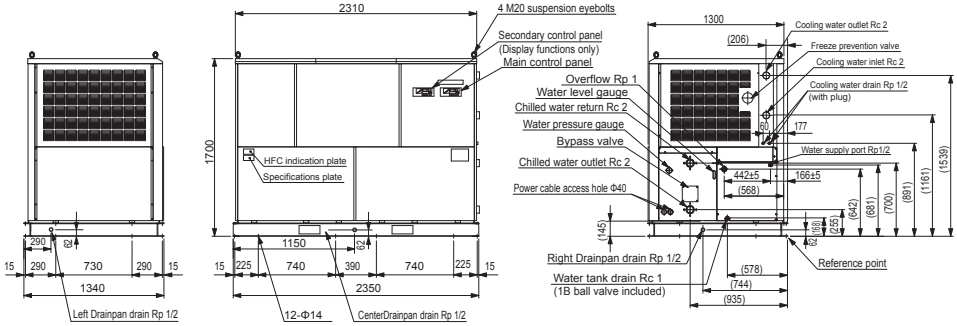
RKE22000A-VW



RKE30000A-V

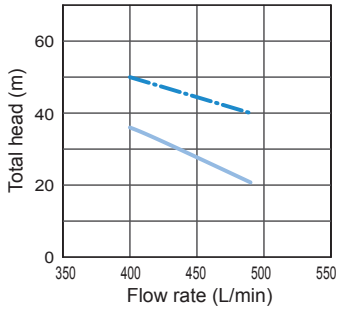


RKE30000A-VW



Chilled Water Flow Rate

RKE22000A-V
RKE22000A-VW
RKE30000A-V
RKE30000A-VW



Power frequency: 50/60 Hz
1. Installed pumps: Two 40MMF03.2 pumps
2. Internal (return side) head loss: 0.7 m or less.

Flow rate for stand-alone pump operation
Flow rate including heat exchanger head loss

RKED Series (Digital Control Models)

Digitally Controlled Compressor | Built-In Discharge Pump | External Warning Alarm Terminals Operation / Alarm / Remote operation | IPX4 Equiv. Rating Splash-proof | HFC Refrigerant R407C | Remote Control Panel (Optional)

Features

1. Digital Compressor Control for an Additional 65% in Energy Savings
   Thanks to our original digital control (LOAD/UNLOAD) technology, we have achieved high-efficiency energy savings across the full range of loads from 0% to 100%.
2. Safe and Reliable Design
   The RKED Series inherits its primary functionality from ORION chillers which have been receiving high marks from our customers. And thanks to simplified structural components, we've achieved a highly reliable chiller suitable in a wide variety of applications.
3. External communications interface included as standard equipment.
   Allows temperature control via RS232C or RS422 interfaces.

デジエコ® Digital Economy

RKED2200A-V

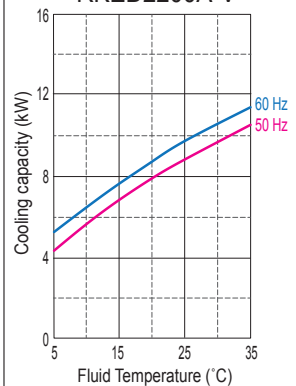
Specifications

Model				Air cooled model	Water cooled model	Air cooled model
				RKED2200A-V	RKED2200A-VW	RKED9000A-V
Performance specifications	Cooling capacity (50/60 Hz) *1		kW	7.9/8.7	9.8/10.4	29.2/31.4
	Operable ambient temperature range		˚C	−5 – 43	2 – 43	−5 – 43
	Operable temperature range (fluid temperature)		˚C	5 – 35		
	Control accuracy *4			±1.0 ˚C (during periods of a stable load: ±0.5 ˚C)		
Power specifications	Power source *2		V (Hz)	Three phase 200 ±10% (50/60), 220 ±10% (60)		
	Power consumption (50/60 Hz, 220 V) *1		kW	3.5/4.6, 4.6	2.9/3.7, 3.7	14/17, 17
	Electric current (50/60 Hz, 220 V) *1		A	12.9/15.2, 150	11.3/12.8, 12.6	45/52, 52
	Power capacity *3		kVA	6.9		20
	Breaker capacity		A	30		75 *7
Equipment details	Compressor output		kW	2.238		7.09
	Condenser			Fin and tube forced air cooling	Double pipe water cooling	Fin and tube forced air cooling
	Heat exchanger	Construction		Plate type heat exchanger		
		Material		SUS316 grade stainless steel (brazing: copper)		
	Discharge pump *5	Output	kW	0.75		2.2
		Flow rate (50/60 Hz)	L/min	28/43 (Head: 50 m)		60/125 (Head: 50 m)
	Fan motor output		W	100 (inverter driven)	–	750 (inverter driven)
	Water tank capacity		L	Approx. 95		
	Refrigerant control method			Electronic expansion valve (controlled by stepping motor)		
	Refrigerant			R407C		
Outside dimensions (H×D×W)			mm	1440×730×960		1800×850×1200
Unit mass (dry weight)			kg	240	230	435
Operating noise level (50/60 Hz) *6			dB	62/67	59/63	69/71

*1 When operating under these conditions: chilled water temperature is 20 ˚C, ambient temperature is 32 ˚C, cooling water temperature is 32 ˚C. Cooling capacity is at least 95% of listed figures. *2 Source voltage phase unbalance should be less than ±3%. *3 The figure noted is when the equipment is operating at the highest capacity of its normal operating range. *4 Stable load indicates continued operation with maximum load fluctuations of ±10% of the current load. *5 The capacity figures listed represent just one point on this model's flow-rate/head characteristic curve. Pumps differ between models; for model specific details, please refer to the pump characteristic curves. *6 Operating noise levels are from a position of 1 m in front of the unit and at a height of 1 m. *7 Unit comes with a built-in multi-purpose overload and short circuit protection breaker. Note 1: The recommended liquid (chilled water) that can be used is either clean water or a 30 – 40 % industrial-use ethylene glycol solution. Alternatively, if deionized water is used, it should have an electrical conductivity of at least 1 μS/cm. Note 2: Please install the included strainer (40 mesh) to the fluid intake port. Note 3: Heat output of the equipment (in kW) is about 1.3 times the cooling capacity. (air cooled models only)

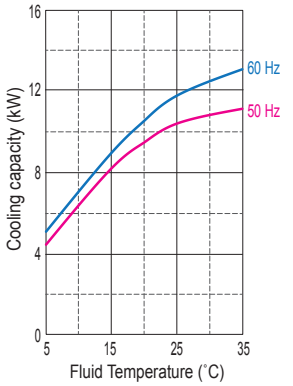
Cooling Capacity

RKED2200A-V



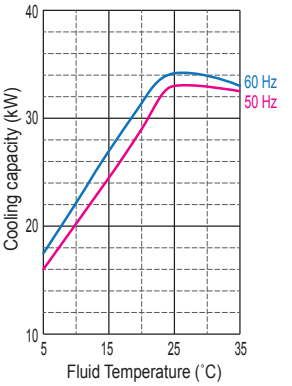
<Conditions>
•Ambient temperature: 32 ˚C
•Chilled liquid: Water

RKED2200A-VW



<Conditions>
•Ambient temperature: 32 ˚C
•Chilled liquid: Water

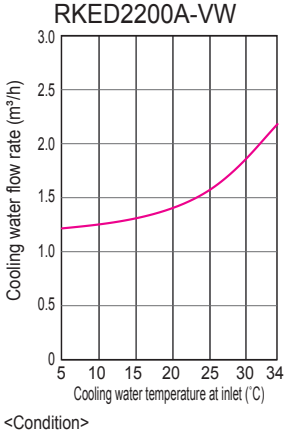
RKED9000A-V



<Conditions>
•Ambient temperature: 32 ˚C
•Chilled liquid: Water

Cooling Water Flow Rate (for condenser)

RKED2200A-VW

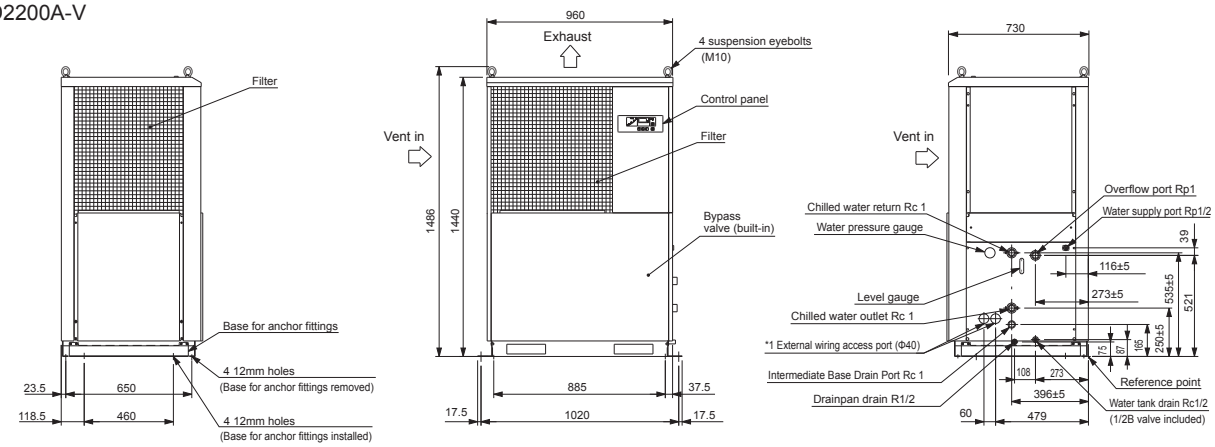


<Condition>
•Chilled water temperature: 35 ˚C

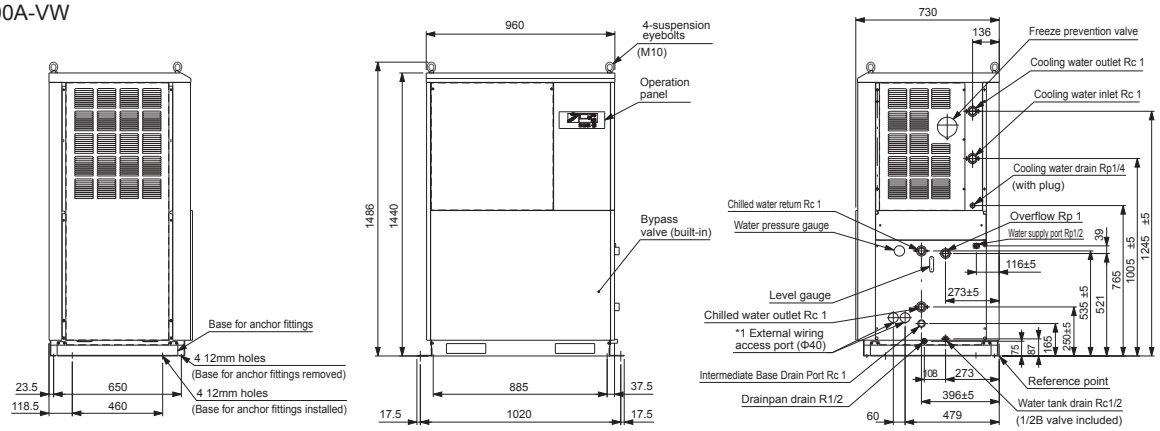
External Dimensions (Units: mm)

*1: Signal lines and power cords should be routed through different access holes.

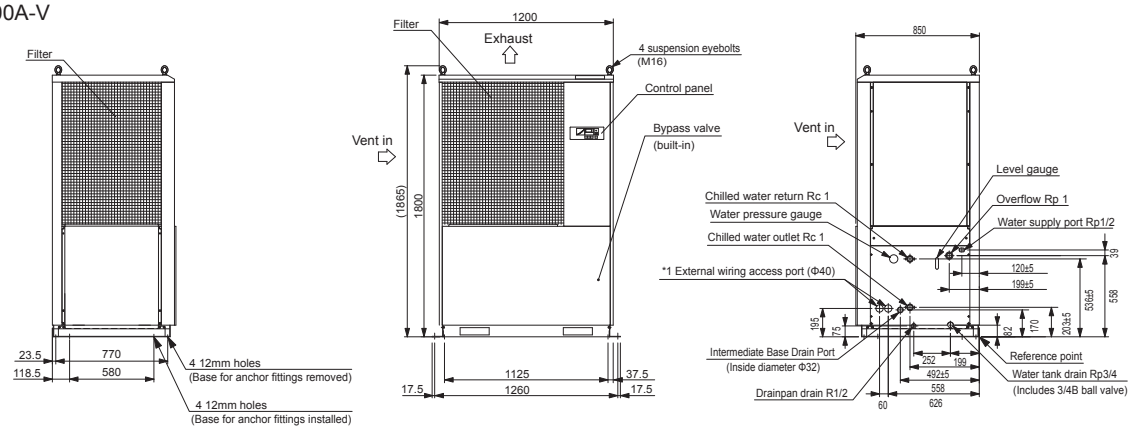
RKED2200A-V



RKED2200A-VW

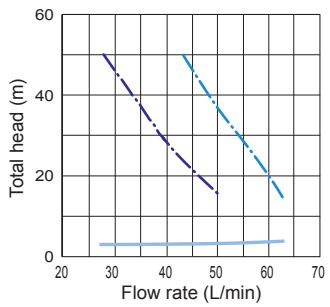


RKED9000A-V

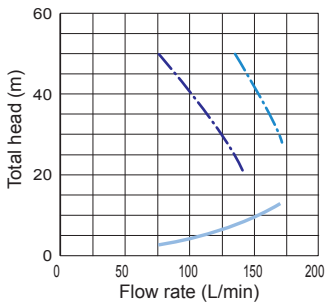


Chilled Water Flow Rate

RKED2200A-V / RKED2200A-VW



RKED9000A-V



* To estimate the evaporator head loss, the external piping resistance to the evaporator head loss and read the flow rate and pressure accordingly.

Flow Rate for Pump-Only Operation
60 Hz
50 Hz

Heat exchanger head loss

Remote Control • Communications Software • Wind Shield • Snow Protection Hood

Optional Equipment and Parts for Chillers & Unit Coolers

RKE and RKED Series

• Communications Software

Part Name	Part Number	Applicable Models
Communications Software	04091273010	RKE *1 and RKED Series

*1 Not including RKE30000A-V(W) models.

• Remote Control (Wired)

Remote Control Cable Assembly

Remote Control (Wired) Set

The Remote Control (Wired) Set does not come with a cable. Please order the Remote Control Cable Assembly.

Part Name	Part Number	Applicable Models
Remote Control (Wired) Set A	04100607010	RKED2200A-V(W) RKE18000A-V(W)
Remote Control (Wired) Set B	04100608010	RKED9000A-V RKE22000A-V(W)
Remote Control Cord Assembly (20 m)	04100541010	RKE *1 and RKED Series All Models
Remote Control Cord Assembly (50 m)	04100541020	
Remote Control Cord Assembly (100 m)	04100541030	

* Chiller models made before April 2006 require a CPU replacement in order to use this remote control. Please inform your dealer of the chiller serial number before purchasing.

*1 Not including RKE30000A-V(W) models.

• Wind Shield

* Items for RKE18000 to 30000A-V models are built-to-order.
* Please arrange a special-order number for items used with RKE22000 and 30000A-V models.

Note: Shipped via chartered transport.

Part Name	Part Number	Applicable Models
Wind Shield Assembly	03091229010	RKED2200A-V
	03091230010	RKED9000A-V
	03091363010	RKE18000A-V
	09-U0943 (Note)	RKE22000A-V
	09-U0944 (Note)	RKE30000A-V

• Snow Protection Hood

* Please arrange a special-order number for items used with RKE22000 and 30000A-V models.

Part Name	Part Number	Applicable Models
Snow Protection Hood Assembly	03091238010	RKED2200A-V
	03091238020	RKED9000A-V RKE18000A-V (2 hoods)
	09-U0945	RKE22000A-V
	09-U0946	RKE30000A-V

RKE-B Series

• Chiller Communications Software

Part Name	Part Number	Applicable Models
Communications Software	04105970	RKE3750B-V(W) RKE5500B-V(W) RKE7500B-V(W) RKE11000B-V(W) RKE15000B-V(W)

• Remote Control (Wired)

Remote Control Sets include cables. The set model number differs depending on the cable length.

Remote Control (Includes cable)	Part Number	Applicable Models
Max. cable length: 20 m	03107963010	RKE3750B-V(W) RKE5500B-V(W) RKE7500B-V(W)
Max. cable length: 50 m	03107963020	
Max. cable length: 100 m	03107963030	
Max. cable length: 20 m	03108949010	RKE11000B-V(W) RKE15000B-V(W)
Max. cable length: 50 m	03108949020	
Max. cable length: 100 m	03108949030	

• Wind Shield

The Wind Shield is used for outdoor installations. It also helps to prevent dust from entering the unit.

Part Name	Part Number	Applicable Models
Wind Shield	03108110010	RKE3750B-V
	03108120010	RKE5500B-V RKE7500B-V
	03108881010	RKE11000B-V
	03109802010	RKE15000B-V

• Snow Protection Hood

The Snow Protection Hood supports outdoor installations in snowy regions.

Part Name	Part Number	Applicable Models
Snow Protection Hood	03108111010	RKE3750B-V
	03108121010	RKE5500B-V RKE7500B-V
	03108887010	RKE11000B-V
	03109803010	RKE15000B-V

RKE-B Series
RKE-A Series
RKED Series

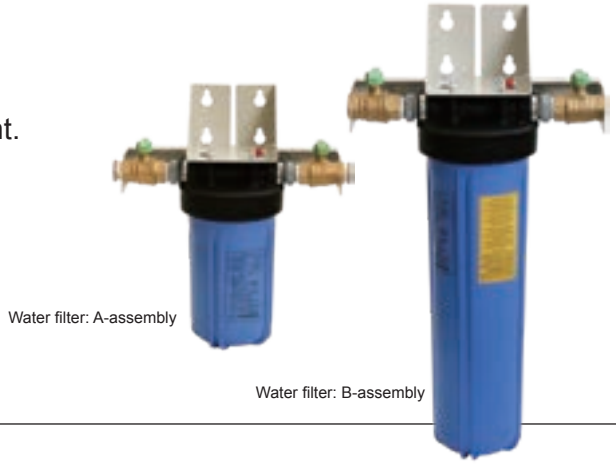
Optional Equipment

Water Filtering Equipment

Helps to prevent clogging within the water circuit of chillers and other equipment. Can also be used as a pre-filter for water purification equipment.

Features

1. Wall mount type for easy cartridge replacement.
2. Includes ball valves as standard equipment.
3. Optional stand mount available.



Water filter: A-assembly

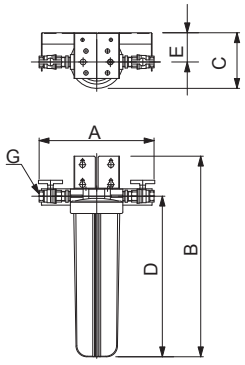
Water filter: B-assembly

■ Specifications

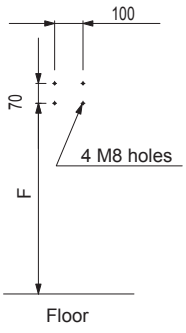
Model			Water filter: A-assembly	Water filter: B-assembly	Water filter: C-assembly
Part number			04100489010	04100491010	04100490010
Applicable models			RKED2200A-V(W) RKE3750B-V(W)	RKE5500B-V(W) RKE7500B-V(W) RKED9000A-V	RKE11000B-V(W) *2 RKE15000B-V(W) *2
Operating ranges	Maximum working pressure	MPa	0.5		
	Maximum working temperature	˚C	50		
Performance specifications	Degree of filtration	μm	100		
	Initial element pressure loss	MPa	0.02 (flow rate 43 L/min)	0.02 (flow rate 125 L/min)	0.02 (flow rate 140 L/min)
Main dimensions	Piping connection size		Rc1/2 (Rc1) *1	Rc1	Rc1•1/4
	Mass	kg	6.3	8.0	10.0
Element model number			SD-100-250-B	SD-100-500-B	
Element part number			40605000410	40605000400	
O-ring Part Number			XB673167023		

Note: Configuration for use with RKE18000A-V(W) models and higher are special order items.
*1 Can be replaced by removing the 1×½B adaptor bushing. *2 Operate with a chilled water pressure of 0.50 MPa or below.

■ Outside dimensions



Mounting hole positions



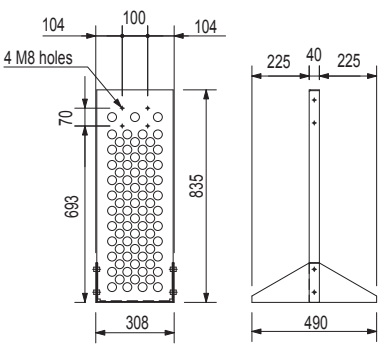
(Units:mm)

Model	Water filter:A-assembly	Water filter:B-assembly	Water filter:C-assembly
A	(435)	(405)	(449)
B	458	708	715
C	197	197	197
D	312	562	565
E	103	103	103
F	423 min.	673 min.	680 min.
G	Rc1/2	Rc1	Rc1•1/4

■ Stand Mount (optional) (Part no.: 04100569010)

- Works with all filters, Deionizer D-assembly, and Deionizer E-assembly.
- 2 filters can be mounted one over the other on a single stand allowing for space saving configurations, such as having a water filter mounted over an ion exchange filter.

Dimensions (Units : mm)



Optional Equipment

RKE-B Series
RKE-A Series
RKED Series

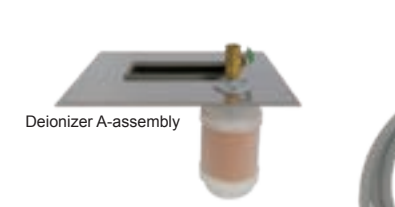
Optional Equipment

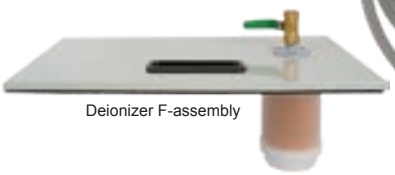
Ion Exchange Resin Purifying Equipment

Cartridge and Filter types for easy connections. Water purification without the hassle!

■ For circulating water setups

(Installed in a bypass configuration, it can help protect against rising electrical conductivity within the water circuit.)


Deionizer A-assembly


Deionizer F-assembly


Deionizer C-assembly


Deionizer D-assembly


Deionizer E-assembly


RDI-55


DI-0-10BB

Model		Deionizer C-assembly	Deionizer D-assembly	Deionizer E-assembly
Part number		04100614010	04100597010	04100437010
Applicable models		RKED2200A-V(W) RKE3750B-V(W)	RKE5500A-V(W) RKE7500A-V(W) RKED9000A-V	RKE11000B-V(W) RKE15000B-V(W) RKE18000A-V(W)
Ion Exchange Resin		RDI−150	DI−0−10BB	DI−0−20BB
Ion exchange resin part number		0A001387000	0A001108000	0A001017000
Processing capacity *1,2	L	approx. 150 L	approx. 600 L	approx. 1600 L
Water quality	μS/cm	approx. 150 L		
Working water pressure	MPa	0.05 – 0.2 *5		
Working water temperature	˚C	5 – 40		
Dimensions		Φ74.5 – H 248 mm (ion exchange resin)	Φ185 – H 449 mm	Φ185−H 592 mm
Mass	g	approx. 670 (ion exchange resin)	approx. 5700	approx. 8600
Type of installation		On the side of the unit	On a wall *4	
Inlet / Outlet piping fixture			Rc1/2	
Included parts		Spare deionizer *3 ball valve, mounting hardware hose nipple, hose band tee coupling, nipple, hose	Mounting bracket, resin nipple, socket, bushing (preassembled on the filter) filter removal wrench	

*1 Processing capacity figure based on water source standard purity level of 150 μS /cm. Capacity may vary according to water quality.
*2 Processing capacity is not based on circulating water flow system. Ion exchange resin lifespan and water quality may fluctuate depending on the properties of the wetted parts and surfaces, as well as the particular working environment.
*3 It is recommended that the initially supplied water be either water that has been purified by having passed through an ion exchange resin, or be commercially purchased deionized water. If tap water (or a similar grade of water) is used, the effective life of the ion exchange resin will be greatly reduced. In this case, please replace the ion exchange resin with the apare soon. (Ion exchange resin assemblies A, B, C, and F only.)
*4 Ion exchange resin assemblies D and E are wall mounted. Please confirm that there is a suitable installation place before installing the filter. An optional Stand Mount is available. (The mounting hole positions of Ion Exchange Resin D and E assemblies are the same as the mounting hole positions on Water Filter A and B assemblies respectively. Please refer to the Water Filter Equipment page for details regarding dimensions.)
*5 On Ion Exchange Resin D and E assemblies, if there is a chance that the water pressure within the purification vessel will exceed 0.2 MPa, a pressure reducing valve should be installed. Note : Avoid installing the ion exchange resin where it will be in direct sunlight or in places where there is a risk of it being damaged.

■ For Water Supply and Purification

(Keeps sudden rises in electrical conductivity down during water tank supply and replenishment.)

Model		Model Deionizer Assembly for Water Supply
Part number		04100522010
Applicable purifier		AP−10
Processing capacity *1,2	L	Approx. 2200
Water quality	μS/cm	1 or less
Working water pressure	MPa	0.34 or less *3
Working water pressure	˚C	5 – 40
Dimensions		Φ165 − H 851 mm
Unit mass	kg	approx. 15
Inlet connection		Universal faucet adaptor
Outlet connection		Braided hose (Φ12 × Φ18)
Ion exchange resin part number		0A001213000
Comments		Electrical conductivity gauge (0 – 3 μS/cm) included Flow regulating valve (2.2 L/min) included 3 anchor bolt holes (Φ10 mm × 3)

*1 For water tank supply and replenishment.
*2 Processing capacity figure based on water source standard purity level of 200 μS/cm. Actual processing capacity may change depending on water quality, temperature, etc.
*3 If there is a chance that the water pressure within the vessel will exceed 0.34 MPa, a pressure reducing valve should be installed. Note : Avoid installation of the deionizer where it will be in direct sunlight or in places where there is a risk of it being damaged.

Important Unloading and Placement Information — RKE-B Series

See page 30 for information on models not in the RKE-B series.

⚠ WARNING = Failure to follow instructions contained in a WARNING may result in death or serious injury.

CAUTION = Failure to follow instructions contained in a CAUTION may result in injury to the operator or damage to property.

Pre-unloading and unloading procedures

● Before Unloading

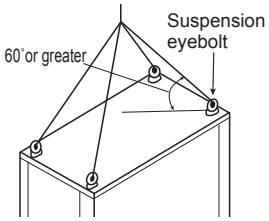
After unpacking, check the nameplate of the unit to ensure it is the correct model ordered. Also, check that the below mentioned included parts are present.

Machine Part Name	Specifications	Qty Per Unit
Y-strainer	40 mesh equiv.	1 pc
Barrel nipple	1B × 100 L (to attach the Y-strainer) Model : RKE3750 – 7500B-V/B-VW	1 pc
	1.1/4B × 100 L (to attach the Y-strainer) Model : RKE11000B-V/B-VW RKE15000B-V/B-VW	

It is possible that the unit could be damaged during shipping, transport, or other handling. When receiving the unit, check to make sure that there are no scratches or other abnormalities. If any damage or abnormality is detected, please contact the dealer where the unit was purchased.

⚠ WARNING

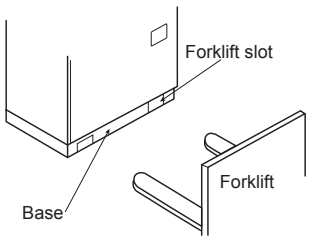
When making use of the eyebolts, suspend the unit from all 4 eyebolts and make sure there is at least a 60° angle between the top face of the unit and each of the suspension cables. Improper suspension may lead to the unit tipping over or falling, which could result in injury.



● Unloading Procedure

The unit is heavy; please be careful when transporting it. The unit has rectangular slots at its base in order to accept forklift tines. When lifting the unit by forklift, make sure the forklift tines go through the forklift slots all the way and protrude from the other side of the unit.

Model	Mass (when water tank is empty)
RKE3750B-VW-G1 : No casters	200 kg
RKE3750B-VW-G2 : Casters included	205 kg
RKE5500B-V/VW	280 kg
RKE7500B-V/VW	290 kg
RKE11000B-V	415 kg
RKE11000B-VW	405 kg
RKE15000B-V	460 kg
RKE15000B-VW	405 kg



⚠ WARNING

Installation of this equipment should be performed by your dealer or other qualified personnel. Improper installation by the end user may lead to water leakage, electric shock, and fire.

Unit Placement

● Choice of Installation Location

Choose an installation location that is free from combustible materials, areas that could lead to electric shock, or environments that could lead to unit breakdown.

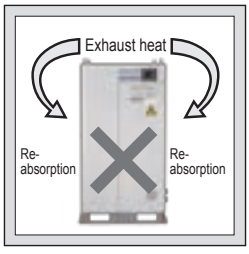
CAUTION

Install on a level surface that can adequately support the weight of the unit and fix the unit down with anchor bolts to prevent it from moving around. Not properly installing the equipment as indicated can result in water leaks or injury etc., from the unit tipping over or falling.

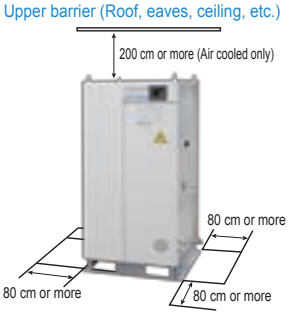
1. Ensure there is adequate space for heat ventilation as well as sufficient space for maintenance and inspection of the unit. Also note that if the unit is enclosed as in the illustration below, exhaust heat from the unit will be forced back into the unit, causing the refrigerant pressure to rise, and eventually causing the unit to stop.
2. If the unit will be installed where a wind of 8 m/s or higher will be blown on it, measures to block the wind from hitting the unit such as installation of a wind-break panel or wall is required.
3. Install out of direct sunlight and do not install where the unit would be affected by heat. Contact with direct sunlight or heat can cause the unit to perform below specified performance equal to the amount of that exposure. It can also lead to the activation of built-in safety devices which will prevent unit operation.
4. Air cooled: Operate the unit in the ambient temperature of -20 ˚C – 45 ˚C. Operating outside this temperature range can lead to breakdown of the compressor. And operating in temperatures over 45 ˚C will result in a drop in the effectiveness of thermal radiation of the condenser. Built-in safety devices may activate causing the unit to shut down. If the ambient temperature will be above 45 ˚C, install ducting, following the section on page 28, "Ducting Design Points".
   Water cooled: Operate the unit in the ambient temperature of 2 ˚C – 45 ˚C. Operating outside this temperature range can lead to breakdown of the compressor.

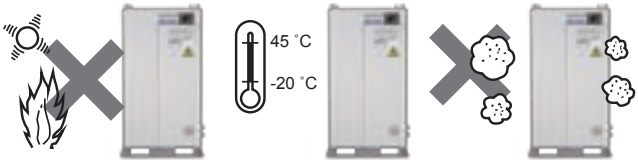
When performing ductwork, install such that the piping is not constricted along the way. Failure to follow this rule can also lead to activation of built-in safety devices which will stop unit operation.

5. Install in a place that is generally free of dust and dirt. Installation in places with heavy dust and dirt can result in reduction of unit performance.
6. Note that operating air-cooled models solely in the Snow-Protection Mode in areas that heavy snowfall will result in reduced performance. It is therefore recommended that the unit be installed away from falling snow. (Air cooled only)
7. Operate the product at a cooling water temperature within the range of 5 ˚C to 45 ˚C. If operated outside the specified range, the safety device will be activated to shoutdown the product. It can also cause the compressor to malfunction. (Water cooled only)



* If there are no obstacles within 150 cm of the front and sides of the unit, then the space from the top of the unit to the obstacle above can be as low as 100 cm or higher.



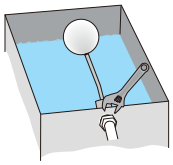


Water Supply and Drainage Construction

- **Reliably install water supply and drainage piping. Improper water supply and drainage construction could result in water spraying out, causing water damage to the surrounding area.**
- **Keep water supply pressure at or below 0.50 MPa. Too high pressure can lead to equipment damage, which may lead to water leaks, flooding of the surrounding area, and electric shock.**
- **Keep the cooling water pressure below 0.69 MPa. Higher pressure may damage the components to cause water leakage and may result in electric shock.**
- **When performing water piping, be careful to avoid the following points. Failure to do so can result in water leakage.**

1. Overtightening the piping connected to the water supply port.
2. Having external forces on the water supply port. 3. Piping installation that does not absorb vibrations of water hammer, etc.

- **When connecting piping to the water supply port, always use two tools, using one to support the ball tap valve, as shown in the illustration to the right.**



Chilled Water / Cooling Water Piping

● Piping Sizes

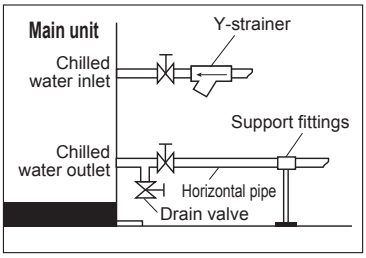
Piping diameters for each model are listed below.

Piping Item	Piping Size		
	RKE3750B-V/VW	RKE5500B-V/VW RKE7500B-V/VW	RKE11000B-V/VW RKE15000B-V/VW
Chilled water inlet	Rc1		Rc1.1/4
Chilled water outlet	Rc1		Rc1.1/4
Water tank drain	Rc1/2	Rc3/4	
Overflow port	Rp1		
Drain pan drain port	Rc1/2		
Water supply port	PJ1/2		
Cooling water inlet	Rc1 (Water cooled only)		Rc1.1/4 (Water cooled only)
Cooling water outlet	Rc1 (Water cooled only)		Rc1.1/4 (Water cooled only)

● Piping Methods

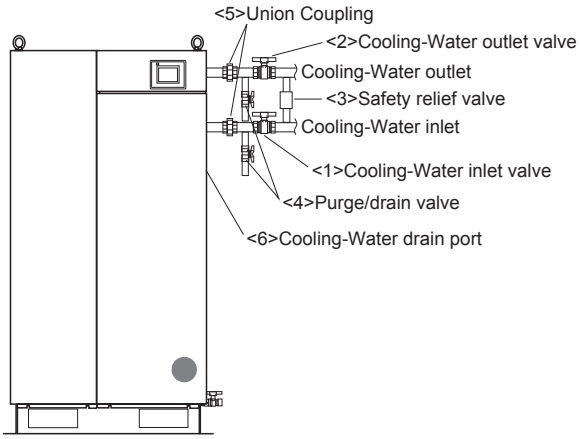
Piping installation should follow the guidelines below.

1. Check the cooling water inlet and outlet side ports.
2. Make pipe lengths as short as possible, and also avoid vertical and curved piping as much as possible.
3. When tightening piping connections, use 2 pipe wrenches or adjustable wrenches in order to grasp both sides of the joint.
4. Always install valves (customer supplied) at the chilled water inlet and outlet ports.
5. Install the included Y-strainer on the chilled water intake side port.
6. Make sure that there is no excessive weight or vibration directed on the unit from the connected piping. long horizontal piping should be supported with additional support hardware to ensure unreasonable forces are not applied directly to the unit's connection ports. Failure to properly support piping can lead to equipment damage.
7. Piping should be insulated. (Install the pipe insulation such that there is enough gap to allow the removal of the cabinet water supply port.)
8. If an automatic water supply system is to be installed, be sure to install a valve on the supply port. Also, keep water supply pressure at or below 0.50 MPa.
9. Always support water supply piping with support fittings, and make sure that piping is horizontal.



● Pipe Connection Procedure (Water cooled)

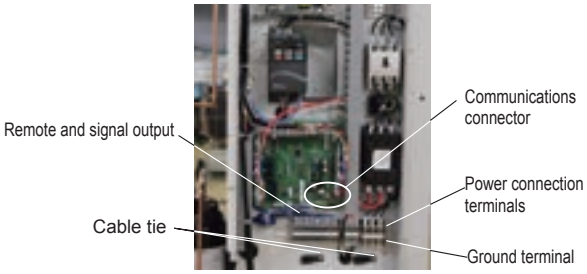
1. Confirm the positions of the Cooling Water inlet and outlet. The Cooling Water inlet and outlet are specified with stickers. (“Cooling Water inlet”, “Cooling Water Outlet”)
2. Follow the instructions below for piping work.
   (1) Mount the Cooling Water inlet valve <1> and the Cooling Water outlet valve <2>.
   (2) Be sure to mount the safety relief valve <3>. The regulating valve that is installed in the cooling water circuit performs the opening and closing of the valve automatically by detecting the refrigerant pressure. Thus, there is a possibility that the regulating valve becomes full-closed during operation. Be sure to install the safety relief valve for the water leakage prevention in the cooling water circuit, and set the cooling water inlet pressure 0.69 MPa or lower.
   (3) Install the purge/drain valve <4>.
   (4) Be sure to install the union coupling <5>. Make sure that the product and the cooling water piping can be easily disassembled when carrying out the cleaning of water-cooled condenser inside the product.



Electrical Wiring

● Correct Wiring Installation

When performing electrical wiring, be sure to carefully follow the guidelines listed below.



1. Chose a power cable based on the breaker capacity shown in the table to the right. Hook up the ground wire to the earth (ground) terminal located in the distribution box. Also, regarding the power and signal terminal block, refer to the chart on the right for the screw size and terminal block width.
2. There is a combined use overload protection and earth leakage breaker installed inside the distribution box and the specifications are in the table to the right.
3. Route the power cord through the power cord access hole, located on the lower-right part of the unit, to the inside of the terminal box. (Use 1 of the 2 available power cord access holes. The other can be used for remote control panel connections, etc.) Connect the power cord to the L1 , L2 , and L3 terminals on the terminal block. Fix the power cord in place with a cable tie.
4. Always properly ground this unit. Connect the ground wire to a proper earth/ground point that has been installed by a qualified electrician. Furthermore, the diameter of the grounding wire must be at least 2 mm². * Prepare the ground wire terminal of a size according to the screw size listed in the table to the right.
5. Ensure the source voltage is within ±10% of the specified voltage. Also make sure the source voltage phase unbalance is within ±3%.

		RKE3750B-V/VW	RKE5500, RKE7500B-V/VW	RKE11000, 15000B-V/VW
Power Source (V•Hz)	Air cooled	Three phase 200 – 220 ±10% (50/60)		
	Water cooled	Three phase 200 ±10% (50), 200 – 220 ±10% (60)		
Terminal block	Screw size Power	M5		M6
	Screw size Signal	M3		
	Terminal block width (mm) Power	12	13	17
	Terminal block width (mm) Signal	5.9		

	RKE3750B-V/VW	RKE5500, 7500B-V/VW	RKE11000B-V/VW	RKE15000B-V	RKE15000B-VW
Breaker capacity (A)	30	50	75	100	75
Current sensitivity (mA)	30			100	

	RKE3750, 5500, 7500B-V/VW	RKE11000, 15000B-V/VW
Ground terminal	M5	M6

* Phase unbalance (%) = (Maximum voltage [V] - Minimum voltage [V]) ÷ Average voltage of 3 phases (V) × 67. (Based on IEC61800-3.)

<IMPORTANT>

- Make sure the power cord does not come into contact with the refrigerant piping or any motor within the unit. Contact with hot surfaces could cause the cord to melt, resulting in an electrical short. (Secure the power cable with the cable tie inside the distribution box.)
- Never operate the unit when the water circuit is empty. Always fill the water tank and confirm the water level before operating.
- Do not attempt to perform withstand voltage tests or insulation resistance tests. Doing so can damage the semiconductors used in the chiller control board or inverter. If the tests are deemed necessary, please consult with your dealer.

If Employing Remote Control Operation

● Information Regarding Remote Operation and Communications Functions

Perform the wiring after confirming the required specifications.

* Please prepare terminals that fit M3 size screws.

1. Please confirm the unit specifications which are as follows.

Remote operation input specifications	• No-voltage contacts input (alternate switch) • Maximum cable length: 20 m • Input resistance: 1200 Ω • Open circuit voltage (Voc): DC 12 V • Short circuit current (Isc): DC 10 mA
Signal output specifications	• No-voltage relay contact output (c contact) • 250 VAC / 30 VDC 5 A (resistance load) (normally open) • 250 VAC / 30 VDC 3 A (resistance load) (normally closed) • Minimum operating current (for reference only) 5 V DC 10 mA

2. Remote operation and signal output terminals are as follows:

Remote operation terminals	Remote operation	20	
		21	
	Remote discharge pump operation	22	
		23	
Signal output terminals	Operating signal	24	When power source is cut off: 24 – 26 closed, 25 – 26 open
		25	Unit operation is stopped and the unit is operating in pump-only mode: 24 – 26 closed, 25 – 26 open
		26	Equipment operating: 24 – 26 open, 25 – 26 closed
	Alarm signal	27	When power source is cut off: 27 – 29 closed, 28 – 29 open
		28	No alarm : 27 – 29 closed, 28 – 29 open (initial setting)
		29	During alarm: 27 – 29 open, 28 – 29 closed (initial setting)
	Temp. Warning Signal	30	When power source is cut off: 30 – 32 closed, 31 – 32 open
		31	No temperature warning: 30 – 32 closed, 31 – 32 open (initial setting)
		32	During temperature warning: 30 – 32 open, 31 – 32 closed (initial setting)

●When Using Communications Functions

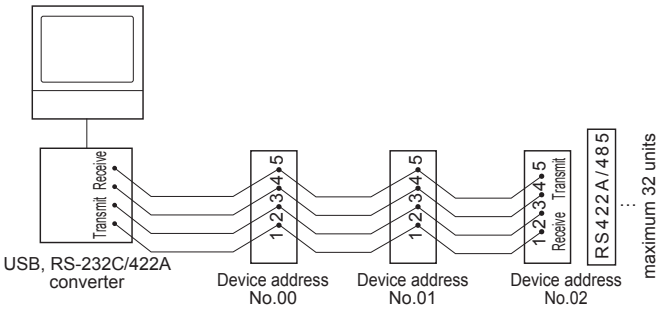
USB	• Connector: USB type B connector • Data cable max. length: 3 m. * May differ depending on specific operating conditions.
RS-422A (RS-485)	• Attach the stripped wires and use as is. • Data cable wire size: AWG16 – 26 • Data cable max. length: 100 m. (from host to terminal end) * May differ depending on specific operating conditions.

● Communications Cables and Connectors

1. USB
   <1> Compatible connector: Type B (male) connector
   <2> Maximum cable length: 3 m. However, it may be shorter depending on actual operating conditions.
2. RS-422A (RS-485)
   (1) Connector: Terminal block
   (2) Cable Gauge: AWG16 – 26 (Use AWG18 – 24 if 2 wires are to be inserted into a single terminal connection.)
   (3) Length of Insulation to Remove From Cable: 10 mm
   (4) Attaching the Cables: Use either of the following methods: Attach the stripped wires as is. When performing hookups, be careful not to allow frayed wires to come into contact with or short out nearby wiring.
   (5) Maximum Cable Length: 100 m or less -- May differ depending on operating conditions.
   (6) Connection Example

* If connecting via RS-422A/485, make the connection by purchasing and using an RS-232C/422A converter.

Example of Commercially Available Connector :
Network Supply Inc. GPNET232-485CT (Main Unit) GP-259RS (DOS/V PC 9-Pin Connector), SFN-830 (AC Adapter)



Ducting Design Points (Air cooled only)

● Ducting Design Points (For User Installed Ducting)

If the area where the unit is to be installed is narrow or has a low ceiling, the ambient temperature could raise to above 45 ˚C from the heat coming from the ventilation outlet. In such cases, ducting should be used to move the heat outside of the room or at least away from the unit so that the effects of it do not cause the temperature around the unit to rise. Take the following into consideration when planning duct work.

1. Duct cross sectional area

(1) For duct that rises up:

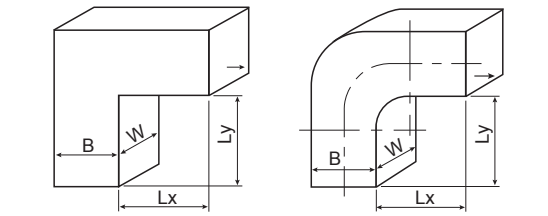
	RKE3750B-V	RKE5500, 7500B-V	RKE11000, 15000B-V
Minimum cross sectional area (m²) [B×W]	0.429	0.611	0.8
Maximum length (m)	20	20	20

(2) Rectangular ducting with bends:

○ The cross sectional area should be greater than above, and Lx and Ly should be less than 2 m. (See Fig. 1.)

○ If the length of Lx and Ly go over 2 m, then there should be a 20 cm gap between the hot exhaust air outlet from the unit and a fan should be installed on the duct outlet. Do not allow Lx and Ly to be longer than 5 m. (See Fig. 2.)

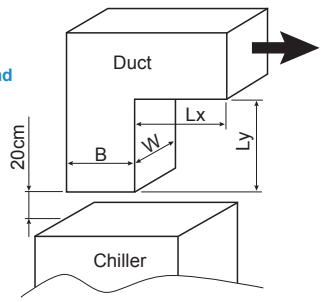
▶Fig. 1 Examples of bent rectangular ducting.



Rectangular duct with straight bend　　Rectangular duct with round bend

* The duct in the figure is one example. The particular direction the duct exhaust port goes from the unit does not matter, however the following important points must be enforced.

▶Fig. 2. : Duct installation method when Lx and Ly exceed 2 m.



Model		RKE3750B-V	RKE5500, 7500B-V	RKE11000, 15000B-V
Recommended fan	50 Hz power	EWF-50FTA (Mitsubishi Electric Corporation)	EJ-80FTC3 (Mitsubishi Electric Corporation)	EWF-50FTA (Mitsubishi Electric Corporation) × 2
	60 Hz power	EWG-50ETA (Mitsubishi Electric Corporation)	EWG-60FTA (Mitsubishi Electric Corporation)	EWG-50ETA (Mitsubishi Electric Corporation) × 2
Minimum required airflow (m³/min)		119	186	119 × 2

<IMPORTANT>

Do not have anything such as walls or other obstacles that could obstruct exhaust output within 2 m of the unit in the direction of the duct exhaust output. Failure to follow this rule will result in decreased air flow, the main unit heat ventilation will be insufficient, and built-in safety devices may activate, which would cause unit operation to stop.

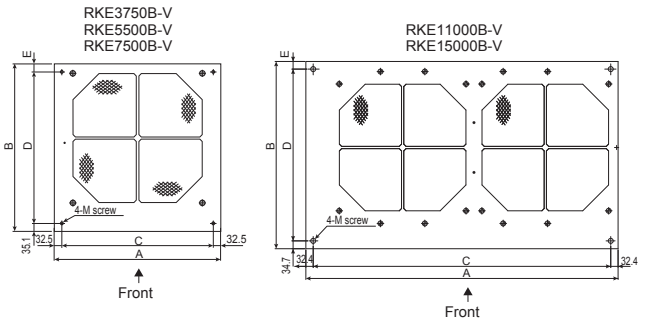
● Installing Ducting on the Unit

If ducting is to be affixed to the unit, first remove the suspension eyebolts from the top and replace them with M size bolts of the appropriate size. In this case, in order to allow for easy fan maintenance and inspection, allow for at least 50 cm of removal space above the unit.

Model	A	B	C	D	E	M screw
RKE3750B-V	720	725	655	654.6	35.3	M10
RKE5500, 7500B-V	869.5	825.2	804.5	758.6	31.5	M16
RKE11000B-V	1379	827	1314.2	758.6	33.7	M16
RKE15000B-V	1609	827	1544.2	758.6	33.7	M16

<IMPORTANT> Unit : mm

● If ducting is to be affixed directly on the unit, be sure to install support hardware along the ducting in order to prevent the unit from tipping over.



Points to Follow to Achieve Performance Specifications

● Important Points to Ensure Optimum Product Performance

1. Note the operating ranges and always operate the unit within these ranges. Operating outside the designated ranges can lead to unit breakdown.

Clause	RKE3750, 5500, 7500B-V/VW	RKE11000, 15000B-V/VW
Ambient temp. range (˚C)	-20 – 45 (Air cooled) / 2 – 45 (Water cooled)	
Fluid temp. range (˚C)	3 – 35	
Power (V•Hz)	200 – 220 ±10% (50/60 : Air cooled) 200 ±10% (50 : Water cooled), 200 – 220 ±10% (60 : Water cooled)	
Discharge pump operating pressure (Mpa)	0.08 – 0.50	0.08 – 0.80

2. Do not use aluminum parts for parts that will be wetted with the chilled water. The unit's water circuits operate with parts made of copper or copper alloys, so if user-installed wetted parts containing aluminum are present, the resulting copper ions will lead to electrolytic corrosion and copper deposits, which can cause water leakage around mechanical seals and clogging in the heat exchanger.
3. Please consult your dealer before using any corrosion inhibiting water additives. Troubles such as the water becoming dirty, or damage to the refrigeration unit from clogging etc. can result depending on the type of additive used.
4. Always apply power to the unit at least 12 hours before performing initial test runs or after the unit has been unpowered for 24 hours or more. Failure to apply power in advance as directed can lead to damage to the refrigeration compressor.
5. Operating with antifreeze rust inhibitor additives can reduce the lifespan of the mechanical seals.

<IMPORTANT>

Do not operated with the discharge pump circuit (cooling water inlet/outlet) blocked. Operating the unit with the circuit blocked can result in freezing or damage of the evaporator, breakdown of the discharge pump, disconnection of hoses, or other trouble.

- If a brine solution is to be used for freeze prevention then in order to maintain cooling capacity, using a 40% or weaker solution of ethylene glycol and water is recommended. However, note that use of a solution of 30% or less can result in decomposition of the fluid. Therefore freeze-prevention by means of automatic pump operation is recommended.
- Frequent starting and stopping can lead to unit breakdown. Allow at least 5 minutes between starting and stopping the unit. If the unit is started less than 5 minutes after stopping, warning "C064" or "C065" will be generated.
- Always fill the water tank and check the water level before operating. If the water level gauge goes below the "E" mark, alarm "E006" will occur and the unit cannot be operated.
- The water pressure at the water supply port should be 0.50 MPa or less. Too high pressure will result in the water supply failing to shut off or leakage.
- Always keep the water clean, inspect the water circuits monthly, and replace the water when necessary.
- Clean the condenser filter every month.
- Water cooled: The cooling water should be checked monthly to ensure that it is clean. The water should be changed if dirty.

Chilled Water

● Chilled Water Standards

The recommended liquid (chilled water) that can be used is either clean water (see chart below for water quality standard) or a 30 to 40% ethylene glycol solution. Alternatively, if deionized water is to be used, it should have an electrical conductivity of at least 1 µS/cm. Cooling non-approved fluids can result in equipment damage, leaking, and possible electric shock or electrical shorts.

	Item	Standard levels
Standard components	pH (25 ˚C)	6.8 – 8.0
	Conductivity (µS/cm) (25 ˚C)	1 – 400
	Chloride ion (mgCl $^-$/L)	Max. 50
	Sulphate (mgSO_4^{2-}/L)	Max. 50
	Acid consumption (pH 4.8) (mg$CaCO_3$/L)	Max. 50
	Total hardness (mg$CaCO_3$/L)	Max. 70
	Calcium hardness (mg$CaCO_3$/L)	Max. 50
	Silica ion (mgSiO_2/L)	Max. 30

	Item	Standard levels
Reference components	Iron (mgFe/L)	Max. 1.0
	Copper (mgCu/L)	Max. 1.0
	Sulfide ion (mgS^{2-}/L)	Not detected
	Ammonium ion (mgNH_4^+/L)	Max. 1.0
	Residual chlorine (mgCl/L)	Max. 0.3
	Free carbon dioxide (mgCO_2/L)	Max. 4.0

* Excerpt from JRA-GL-02-1994 guidelines from The Japan Refrigeration and Air Conditioning Industry Association.

Cooling Water

● Water Selection

Water for the water-cooled condenser may be ground water, municipal water, or cooling-tower water. Refer to the following water quality standard for guidance in selecting the water type.

● Water Quality Standard Guidelines

Primary cooling water (refrigeration unit condenser cooling water, constant temperature water for the water temperature controller, and humidification water) should meet the water quality standard as described in the chart on the right

1. Standard Concentration Levels for Primary Cooling Water
   (1) If tap water is used as the primary cooling water for water cooled equipment, then the water should meet the following water quality standard.
   (2) "○" marks in a tendency column show the factor related to either corrosion or scale generation tendency.
   (3)The 15 items listed to the right are the primary components that can lead to corrosion or scaling.

Clause		Cooling Water		Tendencies	
		Circulation water	Supplied water	Corrosion	Scaling
Standard Items	pH (25 ˚C)	6.5 to 8.2	6.0 to 8.0	○	○
	Electric conductivity (µS/cm) (25 ˚C)	800 or below	300 or below	○	○
	Chloride ion (mgCl^-/L)	200 or below	50 or below	○	
	Sulfate ion (mgSO_4^{2-}/L)	200 or below	50 or below	○	
	Acid consumption (pH4.8) (mgCaC_3/L)	100 or below	50 or below		○
	Total hardness (mg$CaCO_3$/L)	200 or below	70 or below		○
	Calcium hardness (mg$CaCO_3$/L)	150 or below	50 or below		○
	Ionic Silica (mgSiO_2/L)	50 or below	30 or below		○
Reference Items	Iron (mgFe/L)	1.0 or below	0.3 or below	○	○
	Cu (mgCu/L)	0.3 or below	0.1 or below	○	
	Sulfide ion (mgS^{2-}/L)	None detected	None detected	○	
	Ammonium ion (mgNH_4^+/L)	1.0 or below	0.1 or below	○	
	Residual chlorine (mgCl/L)	0.3 or below	0.3 or below	○	
	Free carbon dioxide (mgCO_2/L)	4.0 or below	4.0 or below	○	
	Stability index	6.0 to 7.0	–	○	○

* Excerpt from JRA-GL-02-1994 guidelines from The Japan Refrigeration and Air Conditioning Industry Association.

Important Unloading and Placement Information

RKE-A / RKED Series

See page 26 for RKE-B Series

⚠ WARNING = Failure to follow instructions contained in a WARNING may result in death or serious injury.

CAUTION = Failure to follow instructions contained in a CAUTION may result in injury to the operator or damage to property.

Pre-unloading and unloading procedures

• Before Unloading

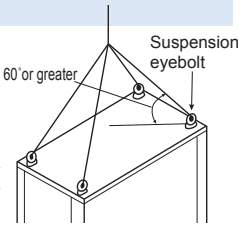
After unpacking, check the nameplate of the unit to ensure it is the correct model ordered. Also, check that the below mentioned included parts are present.

Part Name	Specifications	Qty Per Unit
Y-strainer	40 mesh equiv. Targeted models : RKED2200A-V/A-VW RKED9000A-V	1 pc.
	40 mesh equiv., 1 1/4B Targeted models : RKE1800A-V/A-VW	1 pc.
	40 mesh equiv., 2B Targeted models : RKE22000A-V/A-VW RKE30000A-V/A-VW	1 pc.
Nipple	1B (To attach the Y-strainer) Targeted models : RKED2200A-V/A-VW RKED9000A-V	1 pc.
	1 1/4B (To attach the Y-strainer) Targeted models : RKE18000A-V/A-VW	1 pc.
	2B (To attach the Y-strainer) Targeted models : RKE22000A-V/A-VW RKE30000A-V/A-VW	1 pc.

It is possible that the unit could be damaged during shipping, transport, or other handling. When receiving the unit, check to make sure that there are no scratches or other abnormalities. If any damage or abnormality is detected, please contact the dealer where the unit was purchased.

⚠ WARNING

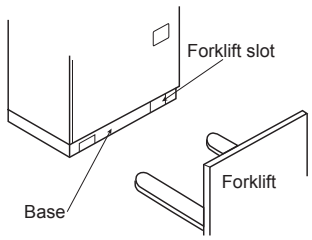
When making use of the eyebolts, suspend the unit from all 4 eyebolts and make sure there is at least a 60° angle between the top face of the unit and each of the suspension cables. Improper suspension may lead to the unit tipping over or falling, which could result in injury.



• Unloading Procedure

The unit is heavy; please be careful when transporting it. The unit has rectangular slots at its base in order to accept forklift tines. When lifting the unit by forklift, make sure the forklift tines go through the forklift slots all the way and protrude from the other side of the unit.

Model	Mass (Water Tank)
RKED2200A-V	240 kg
RKED2200A-VW	230 kg
RKED9000A-V	435 kg
RKE18000A-V	approx. 660 kg
RKE18000A-VW	610 kg
RKE22000A-V	approx. 1050 kg
RKE22000A-VW	approx. 1100 kg
RKE30000A-V	approx. 1420 kg
RKE30000A-VW	



⚠ WARNING

Installation of this equipment should be performed by your dealer or other qualified personnel. Improper installation by the end user may lead to water leakage, electric shock, and fire.

Unit Placement

• Choice of Installation Location

Choose an installation location that is free from combustible materials, areas that could lead to electric shock, or environments that could lead to unit breakdown.

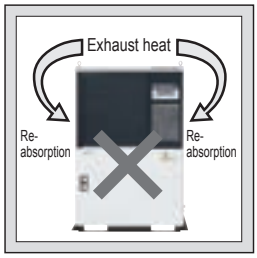
CAUTION

Install on a level surface that can adequately support the weight of the unit and fix the unit down with anchor bolts to prevent it from moving around. Not properly installing the equipment as indicated can result in water leaks or injury etc., from the unit tipping over or falling.

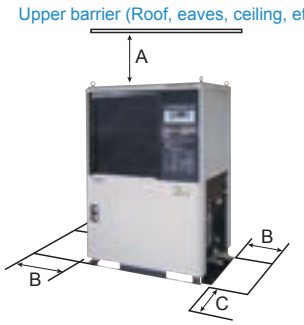
1. Ensure there is adequate space for heat ventilation as well as sufficient space for maintenance and inspection of the unit. Also note that if the unit is enclosed as in the illustration below, exhaust heat from the unit will be forced back into the unit, causing the refrigerant pressure to rise, and eventually causing the unit to stop.
2. If the unit will be installed where a wind of 8 m/s or higher will be blown on it, measures to block the wind from hitting the unit such as installation of a wind-break panel or wall is required.
3. Install out of direct sunlight and do not install where the unit would be affected by heat. Contact with direct sunlight or heat can cause the unit to perform below specified performance equal to the amount of that exposure. It can also lead to the activation of built-in safety devices which will prevent unit operation.
4. Air cooled: Operate the unit in the ambient temperature of -5 ˚C – 43 ˚C. Operating outside this temperature range can lead to breakdown of the compressor. And operating in temperatures over 43 ˚C will result in a drop in the effectiveness of thermal radiation of the condenser. Built-in safety devices may activate causing the unit to shut down. If the ambient temperature will be above 43 ˚C, install ducting, following the section on page 32, "Ducting Design Points".
   Water cooled: Operate the unit in the ambient temperature of 2 ˚C – 43 ˚C. Operating outside this temperature range can lead to breakdown of the compressor.

When performing ductwork, install such that the piping is not constricted along the way. Failure to follow this rule can also lead to activation of built-in safety devices which will stop unit operation.

5. Install in a place that is generally free of dust and dirt. Installation in places with heavy dust and dirt can result in reduction of unit performance.
6. Note that operating air-cooled models solely in the Snow-Protection Mode in areas that heavy snowfall will result in reduced performance. It is therefore recommended that the unit be installed away from falling snow. (Air cooled only)
7. Operate the product at a cooling water temperature within the range of 5 ˚C to 34 ˚C. If operated outside the specified range, the safety device will be activated to shoutdown the product. It can also cause the compressor to malfunction. (Water cooled only)



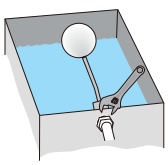
* If there are no obstacles within 150 cm of the front and sides of the unit, then the space from the top of the unit to the obstacle above can be as low as 100 cm or higher.



Item		RKED2200A-V	RKED9000A-V	RKE18000A-V	RKE22000A-V	RKE30000A-V	RKED2200A-VW	RKE18000A-VW	RKE22000A-VW	RKE30000A-VW
Maint. & Insp. Space (cm)	A	200			300		–			
	B C	80			100		80		100	
	Rear	–		10 or more	20 or more		–			
Ambient Temp. (°C)		-5 – 43					2 – 43			
Cooling Water Temp. (°C)		–	–	–	–	–	5 – 34			

Water Supply and Drainage Construction

- **Reliably install water supply and drainage piping. Improper water supply and drainage construction could result in water spraying out, causing water damage to the surrounding area.**
- **Keep water supply pressure at or below 0.50 MPa. Too high pressure can lead to equipment damage, which may lead to water leaks, flooding of the surrounding area, and electric shock.**
- **Keep the cooling water pressure below 0.69 MPa. Higher pressure may damage the components to cause water leakage and may result in electric shock.**
- **When performing water piping, be careful to avoid the following points. Failure to do so can result in water leakage.**
  1. Overtightening the piping connected to the water supply port.
  2. Having external forces on the water supply port.
  3. Piping installation that does not absorb vibrations of water hammer, etc.
- **When connecting piping to the water supply port, always use two tools, using one to support the ball tap valve, as shown in the illustration to the right.**



Chilled Water / Cooling Water Piping

● Piping Sizes

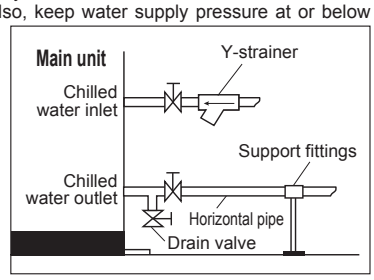
Piping diameters for each model are listed below.

Piping Item	Piping Size								
	RKED2200A-V	RKED2200A-VW	RKED9000A-V	RKE18000A-V	RKE18000A-VW	RKE22000A-V	RKE22000A-VW	RKE30000A-V	RKE30000A-VW
Chilled Water Inlet	Rc1			Rc1.1/4		Rc2			
Chilled Water Outlet	Rc1			Rc1.1/4		Rc2			
Water Tank Drain	Rc1/2		Rc3/4					Rc1	
Overflow	Rp1								
Drain Pan Drain Port	Rc1/2					Rc1/2, 3 locations			
Water Supply Port	Rp1/2								
Cooling Water Piping Inlet	–	Rc1	–	–	Rc1.1/2	–	Rc2	–	Rc2
Cooling Water Piping Outlet	–	Rc1	–	–	Rc1.1/2	–	Rc2	–	Rc2

● Piping Methods

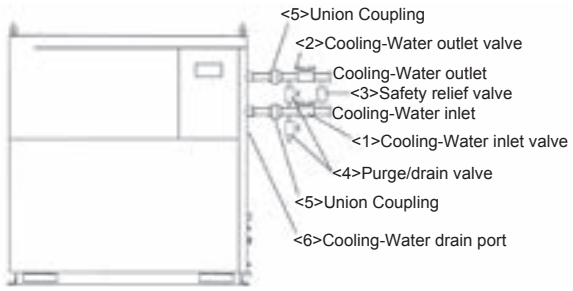
Piping installation should follow the guidelines below.

1. Check the cooling water inlet and outlet side ports.
2. Make pipe lengths as short as possible, and also avoid vertical and curved piping as much as possible.
3. When tightening piping connections, use 2 pipe wrenches or adjustable wrenches in order to grasp both sides of the joint.
4. Always install valves (customer supplied) at the chilled water inlet and outlet ports.
5. Install the included Y-strainer on the chilled water intake side port.
6. Make sure that there is no excessive weight or vibration directed on the unit from the connected piping. long horizontal piping should be supported with additional support hardware to ensure unreasonable forces are not applied directly to the unit's connection ports. Failure to properly support piping can lead to equipment damage.
7. Piping should be insulated. (Install the pipe insulation such that there is enough gap to allow the removal of the cabinet water supply port.)
8. If an automatic water supply system is to be installed, be sure to install a valve on the supply port. Also, keep water supply pressure at or below 0.50 MPa.
9. Always support water supply piping with support fittings, and make sure that piping is horizontal.



● Pipe Connection Procedure (Water cooled)

1. Confirm the positions of the Cooling Water inlet and outlet. The Cooling Water inlet and outlet are specified with stickers. (“Cooling Water inlet”, “Cooling Water Outlet”)
2. Follow the instructions below for piping work.
   (1) Mount the Cooling Water inlet valve <1> and the Cooling Water outlet valve <2>.
   (2) Be sure to mount the safety relief valve <3>. The regulating valve that is installed in the cooling water circuit performs the opening and closing of the valve automatically by detecting the refrigerant pressure. Thus, there is a possibility that the regulating valve becomes full-closed during operation. Be sure to install the safety relief valve for the water leakage prevention in the cooling water circuit, and set the cooling water inlet pressure 0.69 MPa or lower.
   (3) Install the purge/drain valve <4>.
   (4) Be sure to install the union coupling <5>. Make sure that the product and the cooling water piping can be easily disassembled when carrying out the cleaning of water-cooled condenser inside the product.

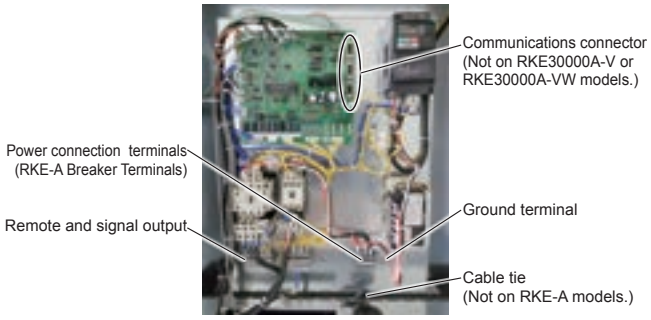


Electrical Wiring

● Correct Wiring Installation

When performing electrical wiring, be sure to carefully follow the guidelines listed below.

* Photo below shows the piping arrangement of model RKED2200A-V.



1. Chose a power cable based on the breaker capacity shown in the table to the right. Hook up the ground wire to the earth (ground) terminal located in the distribution box. Also, regarding the power and signal terminal block, refer to the chart on the right for the screw size and terminal block width.
2. Route the power cord through the power cord access hole, located on the lower-right part of the unit, to the inside of the terminal box. (Use 1 of the 2 available power cord access holes. The other can be used for remote control panel connections, etc.) Connect the power cord to the L1 , L2 , and L3 terminals on the terminal block. Fix the power cord in place with a cable tie.
3. Always properly ground this unit. Connect the ground wire to a proper earth/ground point that has been installed by a qualified electrician. Furthermore, the diameter of the grounding wire must be at least 2 mm². * Prepare the ground wire terminal of a size according to the screw size listed in the chart to the right.
4. Ensure the source voltage is within ±10% of the specified voltage. Also make sure the source voltage phase unbalance is within ±3%.

* Phase unbalance (%) = (Maximum voltage [V] - Minimum voltage [V]) ÷ Average voltage of 3 phases (V) × 67. (Based on IEC61800-3.)

<IMPORTANT>

- ■ Make sure the power cord does not come into contact with the refrigerant piping or any motor within the unit. Contact with hot surfaces could cause the cord to melt, resulting in an electrical short. (Secure the power cable with the cable tie inside the distribution box.)
- ■ Never operate the unit when the water circuit is empty. Always fill the water tank and confirm the water level before operating.
- ■ Do not attempt to perform withstand voltage tests or insulation resistance tests. Doing so can damage the semiconductors used in the chiller control board or inverter. If the tests are deemed necessary, please consult with your dealer.

Item			RKED2200A-V	RKED2200A-VW	RKED9000A-V	RKE18000A-V	RKE18000A-VW	RKE22000A-V	RKE22000A-VW	RKE30000A-V	RKE30000A-VW
Power Source (V•Hz)			Three-phase 200 V, 50/60 Hz; three-phase 220 V, 60 Hz								
Terminal block	Screwsize	Power	M4		M8						
		Signal	M3.5								
	Terminal block width (mm)	Power	10		19	23					
		Signal	7.5								
Breaker capacity (A)			30		75	125		175			
Current sensitivity (mA)			30		30	100					
Ground terminal			M5			M6		M8			
Ground treminal (mm²)			2 or more								

If Employing Remote Control Operation

● Information Regarding Remote Operation and Communications Functions

Perform the wiring after confirming the required specifications. * Please prepare terminals that fit M3 size screws.

1. Please confirm the unit specifications which are as follows.

Remote operation input specifications	• No-voltage contacts input (alternate switch) • Maximum cable length: 20 m • Input resistance: 1200 Ω • Open circuit voltage (Voc): DC12 V • Short circuit current (Isc): DC10 mA
Signal output specifications	• No-voltage relay contact output (a contact) • 250 VAC / 30 VDC 3 A (resistance load) (normally closed) • Minimum operating current (for reference only) 5 VDC 10 mA

2. Remote operation and signal output terminals are as follows:

Remote Operation Contacts	Remote Operation 17 18
Signal Output Contacts	13 14 Operation Signal (Closed during operation) 15 16 Alarm Signal (Closed during alarm condition)

● When Using Communications Functions

RS-232C	Connector: D sub 9 pin female connector Comm. cable max. length: 15 m. * May differ depending on specific operating conditions.
RS-422A (RS-485)	Terminal Block Comm. Cable Size: 16 to 24 AWG * If inserting 2 wires into one location on the terminal block: 18 to 24 AWG * Length of insulation to remove: 10 mm Max. comm. cable length: 100 m. (From host to the end-unit) * May differ depending on specific operating conditions.

Ducting Design Points (Air cooled only)

● Ducting Design Points (For User Installed Ducting)

If the area where the unit is to be installed is narrow or has a low ceiling, the ambient temperature could raise to above 43 ˚C from the heat coming from the ventilation outlet. In such cases, ducting should be used to move the heat outside of the room or at least away from the unit so that the effects of it do not cause the temperature around the unit to rise. Take the following into consideration when planning duct work.

1. Duct cross sectional area

(1) For duct that rises up:

Model		RKED2200A-V	RKED9000A-V	RKE18000A-V	RKE22000A-V		RKE30000A-V	
					Inverter Driven Side	Constant Speed Side	Inverter Driven Side	Constant Speed Side
Min. Cross Sectional Area (m²) [B×W]		0.303	0.519		0.922	0.519	0.922	
Max. Length (m)		20						
Recommended Fan	50 Hz Power	EWF-40DTA (Mitsubishi Elec. Co.)	EJ-80FTC3 (Mitsubishi Elec. Co.)	EWF-60FTB (Mitsubishi Elec. Co.) × 2	KG-80HTF (Mitsubishi Elec. Co.)	KG-60HTF (Mitsubishi Elec. Co.)	KG-80HTF (Mitsubishi Elec. Co.)	
	60 Hz Power	EWG-40CTA (Mitsubishi Elec. Co.)	EWG-60FTA (Mitsubishi Elec. Co.)					
Min. Req. Air Flow (m³/min)		63	186	186 × 2	385	186	385	

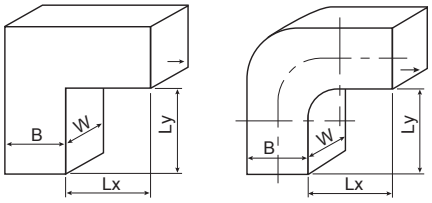
(2) Rectangular ducting with bends:

○ The cross sectional area should be greater than above, and Lx and Ly should be less than 2 m. (See Fig. 1.)

○ If the length of Lx and Ly go over 2 m, then there should be a 20 cm gap between the hot exhaust air outlet from the unit and a fan should be installed on the duct outlet. Do not allow Lx and Ly to be longer than 5 m. (See Fig. 2.)

* The duct in the figure is one example. The particular direction the duct exhaust port goes from the unit does not matter, however the following important points must be enforced.

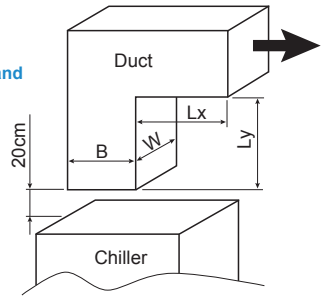
▶ Fig. 1 Examples of bent rectangular ducting.



<IMPORTANT>

Do not have anything such as walls or other obstacles that could obstruct exhaust output within 2 m of the unit in the direction of the duct exhaust output. Failure to follow this rule will result in decreased air flow, the main unit heat ventilation will be insufficient, and built-in safety devices may activate, which would cause unit operation to stop.

▶ Fig. 2. : Duct installation method when Lx and Ly exceed 2 m.



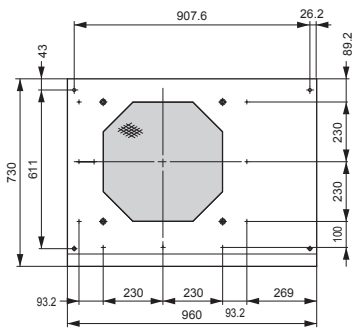
● Installing Ducting on the Unit

If ducting is to be affixed to the unit, first remove the suspension eyebolts from the top and replace them with M size bolts of the appropriate size. In this case, in order to allow for easy fan maintenance and inspection, allow for at least 50 cm of removal space above the unit.

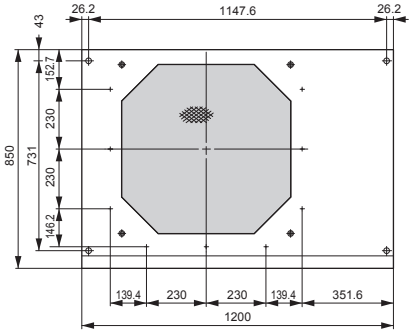
<IMPORTANT>

● If ducting is to be affixed directly on the unit, be sure to install support hardware along the ducting in order to prevent the unit from tipping over.

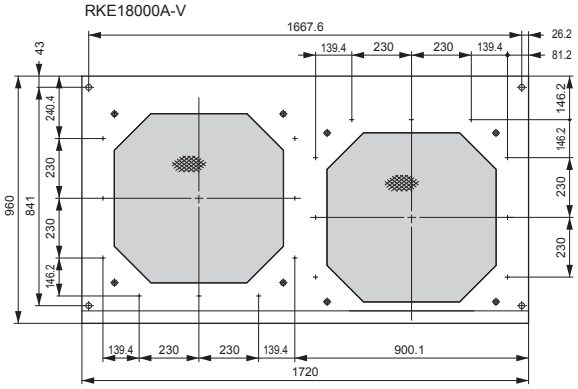
RKED2200A-V



RKED9000A-V



RKE18000A-V



Points to Follow to Achieve Performance Specifications

● Important Points to Ensure Optimum Product Performance

1. Note the operating ranges and always operate the unit within these ranges. Operating outside the designated ranges can lead to unit breakdown.

Item	RKED2200A-V	RKED2200A-VW	RKED9000A-V	RKE18000A-V	RKE18000A-VW	RKE22000A-V	RKE22000A-VW	RKE30000A-V	RKE30000A-VW
Operable Ambient Temp. Range (°C)	-5 – 43	2 – 43	-5 – 43	-5 – 43	2 – 43	-5 – 43	2 – 43	-5 – 43	2 – 43
Operable Liquid Temp. Range (°C)	5 – 35					15 – 30			
Power (V•Hz)	Three-phase 200 ±10% (50/60), three-phase 220 ±10% (60)								
Discharge Pump Operating Pressure (MPa)	0.5 or lower								

2. Do not use aluminum parts for parts that will be wetted with the chilled water. The unit's water circuits operate with parts made of copper or copper alloys, so if user-installed wetted parts containing aluminum are present, the resulting copper ions will lead to electrolytic corrosion and copper deposits, which can cause water leakage around mechanical seals and clogging in the heat exchanger.
3. Please consult your dealer before using any corrosion inhibiting water additives. Troubles such as the water becoming dirty, or damage to the refrigeration unit from clogging etc. can result depending on the type of additive used.
4. Always apply power to the unit at least 12 hours before performing initial test runs or after the unit has been unpowered for 24 hours or more. Failure to apply power in advance as directed can lead to damage to the refrigeration compressor.
5. Operating with antifreeze rust inhibitor additives can reduce the lifespan of the mechanical seals.

<IMPORTANT>

Do not operated with the discharge pump circuit (cooling water inlet/outlet) blocked. Operating the unit with the circuit blocked can result in freezing or damage of the evaporator, breakdown of the discharge pump, disconnection of hoses, or other trouble.

- If a brine solution is to be used for freeze prevention then in order to maintain cooling capacity, using a 40% or weaker solution of ethylene glycol and water is recommended. However, note that use of a solution of 30% or less can result in decomposition of the fluid. Therefore freeze-prevention by means of automatic pump operation is recommended.
- Frequent starting and stopping can lead to unit breakdown. Allow at least 5 minutes between starting and stopping the unit. If the unit is started less than 5 minutes after stopping, warning "C064" or "C065" will be generated.
- Always fill the water tank and check the water level before operating. If the water level gauge goes below the "E" mark, alarm "E006" will occur and the unit cannot be operated.
- The water pressure at the water supply port should be 0.50 MPa or less. Too high pressure will result in the water supply failing to shut off or leakage.
- Always keep the water clean, inspect the water circuits monthly, and replace the water when necessary.
- Clean the condenser filter every month.
- Water cooled: The cooling water should be checked monthly to ensure that it is clean. The water should be changed if dirty.

Chilled Water

● Chilled Water Standards

The recommended liquid (chilled water) that can be used is either clean water (see chart below for water quality standard) or a 30 to 40% ethylene glycol solution. Alternatively, if deionized water is to be used, it should have an electrical conductivity of at least 1 µS/cm. Cooling non-approved fluids can result in equipment damage, leaking, and possible electric shock or electrical shorts.

	Item	Standard levels
Standard components	pH (25 ˚C)	6.8 – 8.0
	Conductivity (µS/cm) (25 ˚C)	1 – 400
	Chloride ion (mgCl $^{-}$/L)	Max. 50
	Sulphate (mgSO_4^{2-}/L)	Max. 50
	Acid consumption (pH 4.8) (mg$CaCO_3$/L)	Max. 50
	Total hardness (mg$CaCO_3$/L)	Max. 70
	Calcium hardness (mg$CaCO_3$/L)	Max. 50
	Silica ion (mgSiO_2/L)	Max. 30

	Item	Standard levels
Reference components	Iron (mgFe/L)	Max. 1.0
	Copper (mgCu/L)	Max. 1.0
	Sulfide ion (mgS^{2-}/L)	Not detected
	Ammonium ion (mgNH_4^+/L)	Max. 1.0
	Residual chlorine (mgCl/L)	Max. 0.3
	Free carbon dioxide (mgCO_2/L)	Max. 4.0

* Excerpt from JRA-GL-02-1994 guidelines from The Japan Refrigeration and Air Conditioning Industry Association.

Cooling Water

● Water Selection

Water for the water-cooled condenser may be ground water, municipal water, or cooling-tower water. Refer to the following water quality standard for guidance in selecting the water type.

● Water Quality Standard Guidelines

Primary cooling water (refrigeration unit condenser cooling water, constant temperature water for the water temperature controller, and humidification water) should meet the water quality standard as described in the chart on the right

1. Standard Concentration Levels for Primary Cooling Water
   (1) If tap water is used as the primary cooling water for water cooled equipment, then the water should meet the following water quality standard.
   (2) "○" marks in a tendency column show the factor related to either corrosion or scale generation tendency.
   (3)The 15 items listed to the right are the primary components that can lead to corrosion or scaling.

Clause		Cooling Water		Tendencies	
		Circulation water	Supplied water	Corrosion	Scaling
Standard Items	pH (25 ˚C)	6.5 to 8.2	6.0 to 8.0	○	○
	Electric conductivity (µS/cm) (25 ˚C)	800 or below	300 or below	○	○
	Chloride ion (mgCl^-/L)	200 or below	50 or below	○	
	Sulfate ion (mgSO_4^{2-}/L)	200 or below	50 or below	○	
	Acid consumption (pH4.8) (mgCaC_3/L)	100 or below	50 or below		○
	Total hardness (mg$CaCO_3$/L)	200 or below	70 or below		○
	Calcium hardness (mg$CaCO_3$/L)	150 or below	50 or below		○
	Ionic Silica (mgSiO_2/L)	50 or below	30 or below		○
Reference Items	Iron (mgFe/L)	1.0 or below	0.3 or below	○	○
	Cu (mgCu/L)	0.3 or below	0.1 or below	○	
	Sulfide ion (mgS^{2-}/L)	None detected	None detected	○	
	Ammonium ion (mgNH_4^+/L)	1.0 or below	0.1 or below	○	
	Residual chlorine (mgCl/L)	0.3 or below	0.3 or below	○	
	Free carbon dioxide (mgCO_2/L)	4.0 or below	4.0 or below	○	
	Stability index	6.0 to 7.0	–	○	○

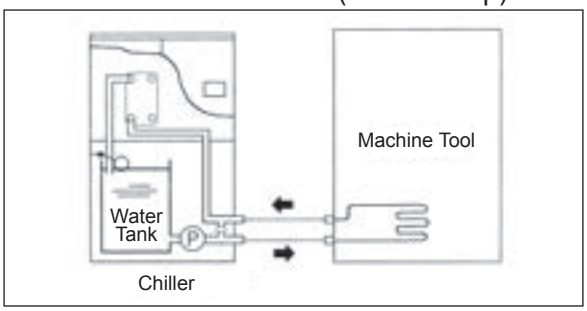
* Excerpt from JRA-GL-02-1994 guidelines from The Japan Refrigeration and Air Conditioning Industry Association.

Working Principles and Model Configurations

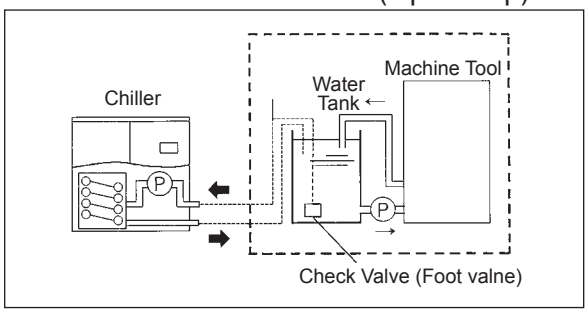
● Working principles -- Diagrams

Please refer to the D-RG12E Catalog for specifications.

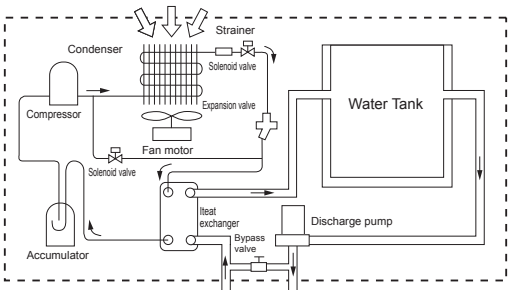
■With Built-In Water Tank (Closed loop)



■Without Built-In Water Tank (Open loop)



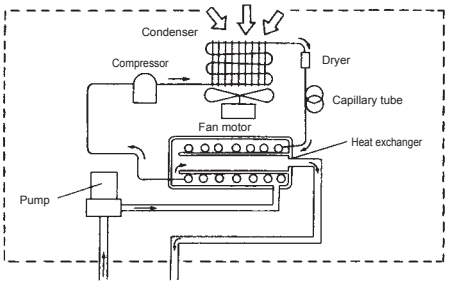
Working Principles



The pump built into the unit pumps fluid from the water tank and then through the heat exchanger. There, the fluid is cooled and then returns to the tank. This cycle is repeated and the fluid is continuously cooled until it reaches the desired set temperature, at which time the temperature regulator shuts off the chiller. And if the fluid temperature rises above the set control value, the chiller is automatically started again. In this way, the fluid temperature is maintained and the fluid is pumped out via the discharge pump.

* In addition to the discharge pump, some models are equipped with built-in circulation pumps. Please refer to individual model specifications for further details.

Working Principles



The circulation pump pumps in fluid from the water tank and then through the heat exchanger. There, the fluid is cooled and then returns to the tank. This cycle is repeated and the fluid is continuously cooled until it reaches the desired set temperature, at which time the temperature regulator shuts off the chiller. And if the fluid temperature rises above the set control value, the chiller is automatically started again. Thus, the temperature is maintained, and maintenance costs remain low.

* For models without built-in water tanks, a separate water tank must be installed. In such cases, the water tank must have a capacity suitable for the model of chiller it is to be used with. Please refer to individual model specifications for further details.

● Making the right model choice

1. Sample cooler heat calculation and model selection methods are listed below.
   Please make a model choice that best suits your operating conditions and requirements.

Example 1

Find the cooling capacity required to deal with heat generated by a piece of equipment which is to be cooled by a chilled water flow; the temperature difference between the cooling water going into and out of the equipment is known.

The equipment to be cooled is accepting a cooling water flow of 12 L/min, the water temperature going into the equipment is 17 ˚C , and the temperature of the water coming out is 20 ˚C . What is the amount of heat being generated by this equipment?

$$Q = \frac{(t_2 - t_1) \times (X \times 60) \times C}{860} = \frac{(20 - 17) \times (12 \times 60) \times 1}{860} = 2.51 \text{ kW}$$

Factoring in a 30% loss due to external piping: $2.51 \times 1.3 = 3.26$ kW

Q: Amount of heat in kW (1 kW = 860 kcal/h)
W: Weight of cooling liquid (volume x specific gravity)
C: Relative heat in kcal/kg˚C (in case of water: 1)
t2: Upper temperature (˚C)
t1: Lower temperature (˚C)
H: Required cooling time in hours
P: Power from an electric heater running 1 hour in kW
X: Water flow per minute: L/min

Example 2

In case a certain temperature drop is required in a fixed amount of time.

For example, if 40 L of 20 ˚C water is in a separate tank, what is the heat dissipation required to lower the temperature of the water to 5 ˚C in one hour ?

$$Q = \frac{W \times C \times (t_2 - t_1)}{H \times 860} = \frac{40 \times 1 \times (20 - 5)}{1 \times 860} = 0.7 \text{ kW}$$

* For coolers that have a built in water tank, use the capacity of the water tank in place of the volume of water.

Note: When making a model selection, also consider heat from external sources that might raise the temperature of the water in the water tank. In order to compensate for such external heat sources, it is recommended that an additional 20% in cooling capacity be added to the power calculation.

$Q = 0.7 \times 1.2 = 0.84$ kW

Example 3

An electric heater with a heat load of 5 kW is to be cooled. The temperature at the cooling water inlet is 17 ˚C and the temperature at the cooling water outlet is 25 ˚C . In this case, what is the circulation flow rate required?

$$X = \frac{P \times 860}{(t_2 - t_1) \times 60} = \frac{5 \times 860}{(25 - 17) \times 60} = 9.0 \text{ L/min}$$

Orion Products -- Service and Safety

● Safety Notes

1. Before using this equipment, read the operating manual thoroughly and operate the equipment correctly as directed.
2. Consult with a qualified professional or your ORION dealer for product installation and wiring.
3. Please select a product that is suitable for the desired application. Do not use for other than intended purposes. Use for other than intended purposes can lead to accidents or unit breakdown.

● Air-Cooled Spec. Models

If the condenser becomes clogged with dust or dirt, heat exchange will be greatly reduced and electricity consumption will increase. This will lead not only to decreased performance, but can also lead to the activation of built-in safety devices, and eventual damage to the equipment. For these reasons, the condenser should be cleaned on a regular basis.

● Water-Cooled Spec. Models

In general, water used to cool condensers will be well water, tap water, or water from a cooling tower. However water of insufficient quality can lead to scaling in cooling pipes resulting in lower levels of heat exchange, increased electricity consumption and lower performance. Therefore water quality should be confirmed on a regular basis.

● Recirculating Chilled Water

The recommended liquid (chilled water) that can be used is either clean water (Note 1) or a 30 to 40% ethylene glycol solution.

Alternatively, if deionized water is to be used, it should have an electrical conductivity of at least 1 µS/cm. If the quality of chilled water does not fall within the guidelines, it may result in damage of the mechanical seals, water leaks, electric leak/shock, etc.

● Product Use Limitations

1. If the unit is to be used as part of critical installations, safety devices and backup systems which can be switched to should be put into place to insure that serious accidents or losses do not occur in the event that the unit should break down or malfunction.
2. This product is designed and produced as a commodity for general manufacturing. Accordingly, the warranty does not apply to nor cover the following applications. However, in cases where the customer/user takes full responsibility and confirms the performance of the equipment in advance, and takes necessary safety precautions, please consult with ORION and we will consider if use of the unit in the desired application is appropriate.
   (1)Atomic energy, aviation, aerospace, railway works, shipping, vehicles (cars and trucks), medical applications, transportation applications, and/or any applications where it might have a great effect on human life or property.
   (2)Electricity, gas, or water supply systems, etc. where high levels of reliability and safety are demanded.

Regarding After Service

- Please contact your dealer for any repairs required after using this unit.
- Costs will be incurred by the customer for repairs conducted after the warranty period has expired. In cases where equipment function can be improved by certain service procedures, such procedures will be taken at the specific request of the customer.
- Spare parts are items necessary to maintain the proper function and operating specifications of the equipment. It is the policy of ORION to maintain a stock of replacement parts for 7 years after production of the product ceases.

Recommended Maintenance Inspections

- After having used the unit for a long time, actual performance may drop due to the effects of dirt or wear, etc. In order to realize continued best performance of this equipment, in addition to prescribed customer maintenance, it is also recommended that regular inspections be conducted. (Service and inspection fees apply.) For further information please consult with your dealer or contact ORION directly.

ORION is continuing to develop a complete and trustworthy nationwide network of expedient sales and service -- everywhere, anytime.

* ORION has wide reaching regional service bases in various countries throughout the world. Please consult your ORION dealer for details.

PERRY JOHNSON REGISTRARS, INC.

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ISO 9001
ISO 14001 (Main Factory)

ORION Machinery Co., ltd is an ISO Certified, Quality Management and Environmental Management company.

What is the ISO certification system?

ISO (International Organization for Standardization) is an established body that stipulates and certifies ISO9001 and ISO14001 directives. ISO9001 stipulates a system of Quality Management that ensures customer satisfaction and trust in a company's products and services it provides. ISO14001 stipulates a system of Environmental Management whereby production and business activities are carried out in an environmentally conscious manner.

For inquiries, please contact the following representative:

ORION MACHINERY CO.,LTD.

International Group
246, Kotaka, Suzaka-shi, Nagano-ken, 382-8502 Japan
TEL +81-(0)26-246-5664 FAX +81-(0)26-246-5022
Email: kokusai@orionkikai.co.jp

Head Office & Factory
246, Kotaka, Suzaka-shi, Nagano-ken, 382-8502 Japan
TEL +81-(0)26-245-1230 FAX +81-(0)26-245-5424
URL: http://www.orionkikai.co.jp

This catalog contains product specifications as of Jul. 2018.
- Actual product colors may vary slightly from the pictures.
- Please note that the structure or specifications of products contained in this catalog are subject to change without prior notice. Thank you for your understanding.

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