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Inverter Controlled Water Chiller AKW**9



Features

- **Enhancement of highly accurate temperature control**
 - The oil temperature is controlled within $\pm 0.1^{\circ}\text{C}$ under a wider operation range than the previous model as an optional function.
- **Extension of cooling capacity control range**
 - Control with loads from 0% (no load) to 100% achieved
- **Environment friendly unit, countering global warming**
 - Adopts a DAIKIN original IPM motor which is a super-energy-efficient technology
 - Achieves 30% energy savings compared to the AKW 8 series (measured by DAIKIN)
 - Adopts R410A refrigerant which does not contribute to ozone depletion
- **Low noise level for a better working environment**
 - Achieves a lower noise level than the AKW 8 series

AKZW8	AKW9 Series
65 dB (A)	60 dB (A) AKW149/189
	61 dB (A) AKW329/359
	62 dB (A) AKW439/459

Nomenclature

AKW ** 9 - ** **

1 2 3 4

1 Standard type

AKW: High-accuracy inverter controlled oil cooling unit
[Circulation type, for clean fresh water (tap water)]

2 Cooling capacity (kW)

14: 1.4 kW 56: 5.6 kW
18: 1.8 kW 90: 9.0 kW
32: 3.2 kW
35: 3.5 kW
43: 4.3 kW
45: 4.5 kW

3 Symbol of series

(Symbol to represent model change)
9: "9" series

4 Symbol of option type (B/C/171)/Non-standard number

Options and their combinations

AKW149 to 459

Option symbol	With breaker	Compliance with CE	With cover
-B	✓	-	-
-C	-	✓	-
-BC	✓	✓	-
-171	-	-	✓

AKW569-909

Option symbol	With breaker	Compliance with CE	Different voltage type (1)	Different voltage type (2)	Different voltage type (3)
-B	✓	-	-	-	-
-C	-	✓	-	-	-
-046	-	-	✓	-	-
-047	✓	-	-	✓	-
-048	✓	-	-	-	✓
-BC	✓	✓	-	-	-
-001	✓	-	✓	-	-
-002	-	✓	✓	-	-
-005	✓	✓	✓	-	-
-017	✓	✓	-	✓	-
-032	✓	✓	-	-	✓

Different voltage type (1) With transformer AC 220, 230 V 50/60 Hz
 Different voltage type (2) With transformer AC 380, 400, 415 V 50/60 Hz
 Different voltage type (3) With transformer AC 440, 460, 480 V 50/60 Hz
 (Please consult us for different voltage specifications.)

Applications

- Semiconductor production equipment, Laser cutting machines/Laser oscillators, Electrical discharge machines/Beam welding machines, Various analyzing apparatus/ Medical equipment, etc.

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Specifications

		With pump/tank			Without pump/tank			With pump/tank					
Equivalent horsepower of chiller HP		0.5	1.2	1.5	0.5	1.2	1.5	2.0		3.0			
Model name		AKW149 (-171)	AKW329 (-171)	AKW439 (-171)	AKW189	AKW359	AKW459	AKW569	AKW569-C	AKW909	AKW909-C		
Cooling capacity (50/60 Hz) *1 kW		1.4/1.4	3.2/3.2	4.3/4.3	1.8/1.8	3.5/3.5	4.5/4.5	5.6/5.6		9.0/9.0			
Power supply *2		Three-phase AC 200/200·220 V 50/60 Hz											
Power voltage		Three-phase AC 200/200·220 V 50/60 Hz											
		DC 12/24 V											
Max. power consumption Max. current consumption	200 V 50 Hz	1.20 kW/4.5 A	1.71 kW/6.4 A	1.97 kW/7.4 A	0.79 kW/3.2 A	1.29 kW/5.2 A	1.59 kW/6.1 A	2.95 kW/9.5 A	3.24 kW/11.1 A	4.60 kW/14.3 A	4.62 kW/15.2 A		
	200 V 60 Hz	1.36 kW/4.8 A	1.87 kW/6.6 A	2.20 kW/7.8 A	0.79 kW/3.2 A	1.29 kW/5.0 A	1.61 kW/6.0 A	3.15 kW/9.8 A	3.54 kW/10.9 A	4.91 kW/15.0 A	4.92 kW/15.0 A		
	220 V 60 Hz	1.36 kW/4.8 A	1.87 kW/6.6 A	2.20 kW/7.8 A	0.79 kW/3.0 A	1.29 kW/4.7 A	1.61 kW/5.4 A	3.14 kW/9.0 A	3.54 kW/10.4 A	4.90 kW/13.7 A	4.92 kW/14.1 A		
External paint color		Ivory white											
External dimensions (H × W × D) mm		690 × 360 × 700	815 × 360 × 700	915 × 360 × 700	650 × 360 × 440	775 × 360 × 440	875 × 360 × 440	1,197 × 470 × 500		1,309 × 560 × 620			
Compressor (Hermetic DC swing type)		Equivalent to 0.4 kW	Equivalent to 0.75 kW	Equivalent to 1.1 kW	Equivalent to 0.4 kW	Equivalent to 0.75 kW	Equivalent to 1.1 kW	Equivalent to 1.5 kW		Equivalent to 2.2 kW			
Evaporator		Brazen plate type											
Condenser		Cross-fin-coil type											
Propeller fan	Motor capacity W	54					100						
Water pump	Model	Immersion type multistage pump					-						
	Head (50/60 Hz) *3	25/37 m	24/36 m			-							
	Motor capacity (50/60 Hz) kW	0.33/0.52					0.55/0.55 0.43/0.74 0.75/0.75 0.43/0.74						
Temperature control (Selectable)	Synchronization type	Standard	Room temperature or machine temperature *4 (Set to room temperature by default)										
		Controlled object	Water temperature in the tank			Outlet water temperature			Water temperature in tank, outlet water temperature				
	Fixed type	Synchronization range	-9.9 to +9.9K										
		Controlled object	Water temperature in the tank			Outlet water temperature			Water temperature in tank, outlet water temperature				
Range °C	10 to 40					5 to 45							
Refrigerant control		Rotation speed control of compressor by inverter + Opening rate control of electric expansion valve											
Refrigerant (HFC R410A (GWP:2090)) Changed volume kg		0.49	0.72	0.98	0.49	0.72	0.98	1.02		1.48			
Protection devices		A set of overcurrent relay (for a pump motor, only for models with a pump), reverse-phase protection device, restart prevention timer, low room temperature protection thermostat, high fluid temperature protection thermostat, low fluid temperature protection thermostat, discharge pipe temperature thermostat, condenser temperature thermostat, refrigerant leakage detector, inverter protection device, high pressure switch (-C type only), compressor thermal protector (-C type only), intake pipe temperature thermostat (antifreeze), and circuit breaker (-B type only)											
Operation range	Room temperature °C	10 to 40 (*5: 5 to 40)					5 to 45						
	Water temperature in the tank °C	10 to 40 (*5: 5 to 40)					-						
	Outlet water temperature °C	-					10 to 40 (*5: 5 to 40)						
	Permissible circulating water volume *6 L/min	6 to 15	10 to 20	10 to 30	6 to 15	10 to 20	10 to 30	13 to 30		25 to 45			
	Rated circulating water volume L/min	10	15			10	15		25		40		
	Acceptable fluid *7	Fresh water (tap water)											
Max. pressure in a MPa cooling water circuit	-					0.5							
External pressure loss (50/60 Hz)		0.24/0.36	0.21/0.34			-		0.14/0.36	0.24/0.38	0.13/0.36	0.14/0.28		
Connecting pipe size MPa		Refer to the outline drawing.											
Tank capacity L		10			-			15		20			
Noise level (Value equivalent to measurement in an anechoic chamber) dB (A) (Front 1 m, height 1 m)		60	61	62	60	61	62	65		67			
Permissible transport vibration		Up and down vibration 14.7 m/s ² (1.5G) × 2.5 hr (7.5 to 100 Hz sweep/5 min.)											
Mass kg		61	65	68	36	40	43	92		115	111		
Items prepared by the customer	Molded-case circuit breaker (Rated current) A	-					10					15	20

Note: *1 The cooling capacity indicates the value at the standard point. This unit has about ±5% of product tolerance.

*2 Use a commercial power supply for the power source. The use of an inverter power supply may cause burn damage to the machine.

*3 Value at the rated circulating water volume, with tolerance of ±7%

*4 The machine temperature synchronization thermistor available as an option is required for this function.

*5 A unit that can be used at a room temperature of 5 to 40°C or a tank outlet water temperature of 5 to 40°C is available as an option. Please consult us for details.

*6 Use the unit with a circulating water volume within the permissible range.

*7 Use fluid that satisfies the water quality standard for clean fresh water (tap water) level indicated on Page L-34. (Taken from Guideline of Water Quality for Refrigeration and Air Conditioning Equipment (JRA-GL-02-1994).)

*8 Value at the rated circulating water volume

*9 Configuration without pump/tank is also possible with 2.0 and 3.0 horsepower specifications. Please consult us.

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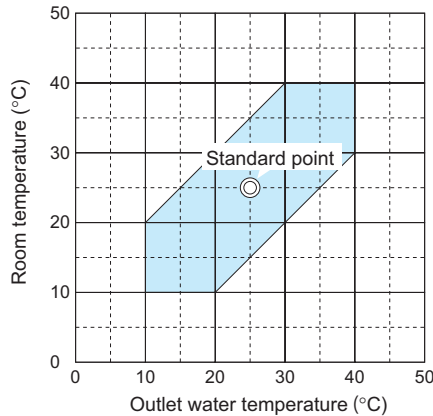
Operation range

Note: 1. The mark◎ shows the standard point.

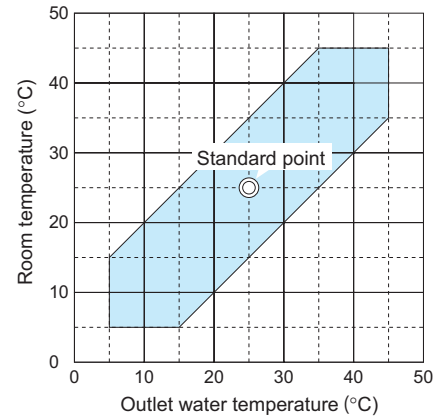
2. Be sure to use the unit within the range of use specified in [].

(Use outside this range may cause unit failure.)

■ AKW149, 189, 329, 359, 439, 459



■ AKW569, 909



Water quality standard * Use water that satisfies the following standard for tap water level.

Guideline of Water Quality for Refrigeration and Air Conditioning Equipment (JRA GL02E-1994)

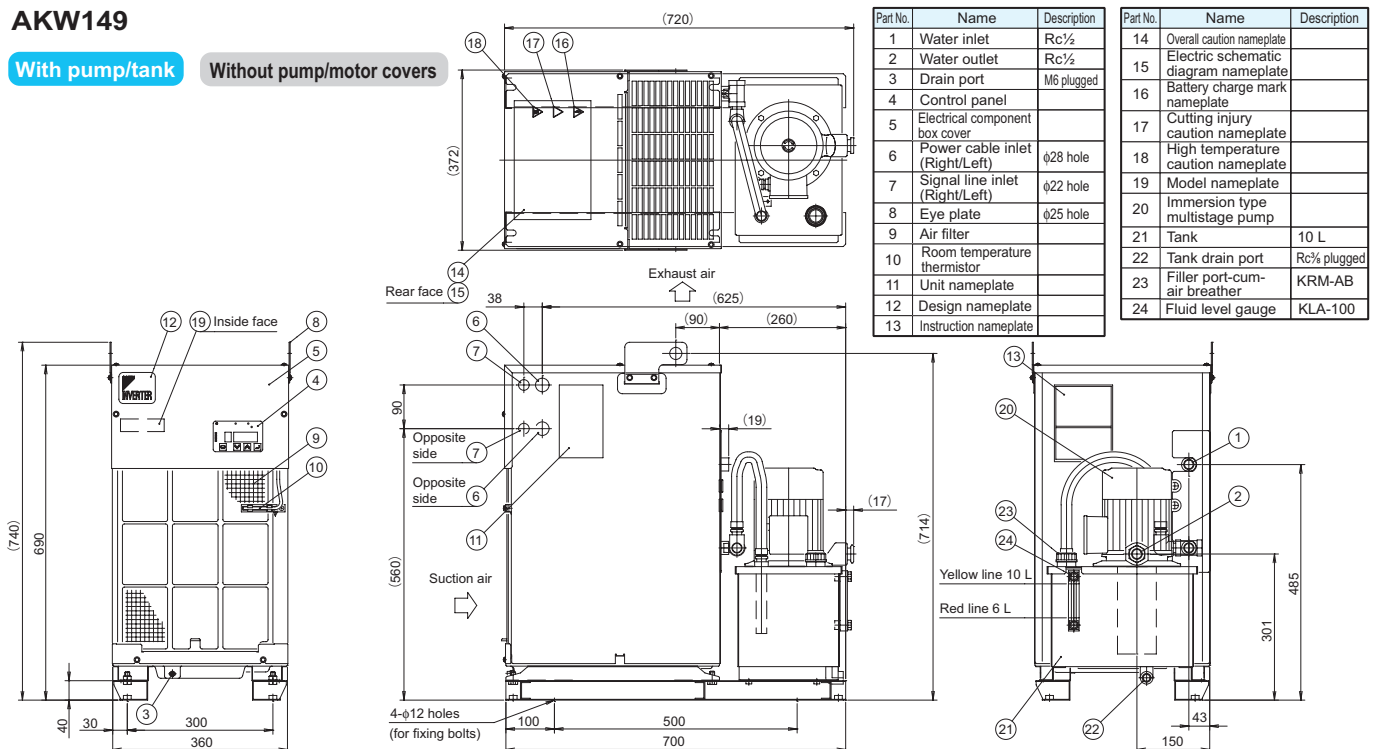
	Item	Chemical formula	Water quality standard	Unit
Standard items	pH	-	6.5 to 8.2	pH (25°C)
	Electrical conductivity	-	0.2 to 30	ms/m (25°C)
	Chloride ion	Cl ⁻	50 maximum	mg/L (ppm)
	Sulfate ion	SO ₄ ²⁻	50 maximum	mg/L (ppm)
	Acid consumption (pH4.8)	CaCO ₃	50 maximum	mg/L (ppm)
	Total hardness	-	70 maximum	mg/L (ppm)
	Calcium hardness	CaCO ₃	50 maximum	mg/L (ppm)
	Ionic silica	SiO ₂	30 maximum	mg/L (ppm)
Reference items	Iron	Fe	0.3 maximum	mg/L (ppm)
	Copper	Cu	0.1 maximum	mg/L (ppm)
	Sulfide ion	S ²⁻	Not to be detected	mg/L (ppm)
	Ammonium ion	NH ₄ ⁺	0.1 maximum	mg/L (ppm)
	Residual chlorine	Cl	0.3 maximum	mg/L (ppm)
	Free carbon dioxide	CO ₂	4.0 maximum	mg/L (ppm)
	Stability index	-	6.0 to 7.0	-

External dimension diagram

AKW149

With pump/tank

Without pump/motor covers



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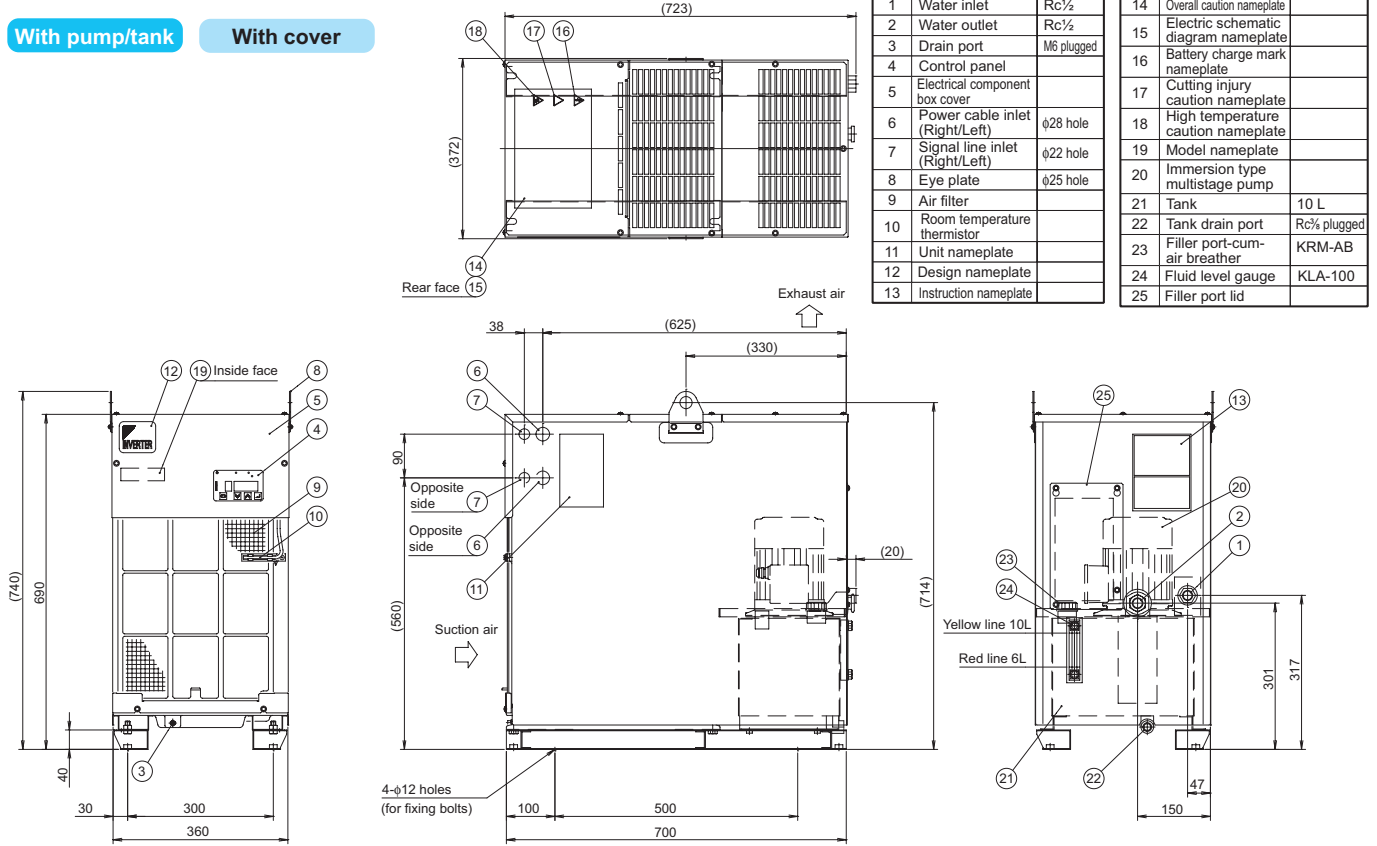
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Dimensional outline drawing

AKW149-171

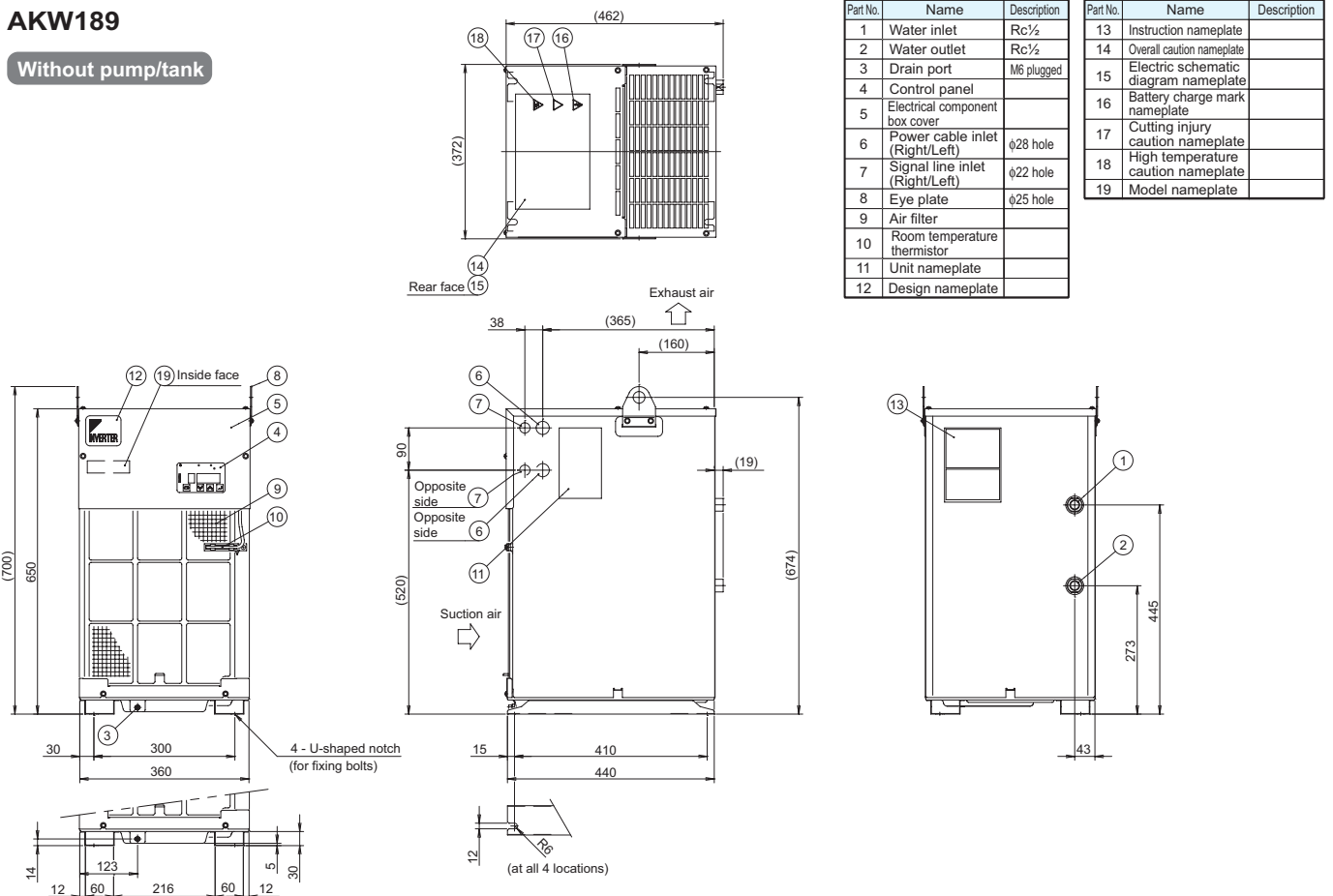
With pump/tank

With cover



AKW189

Without pump/tank



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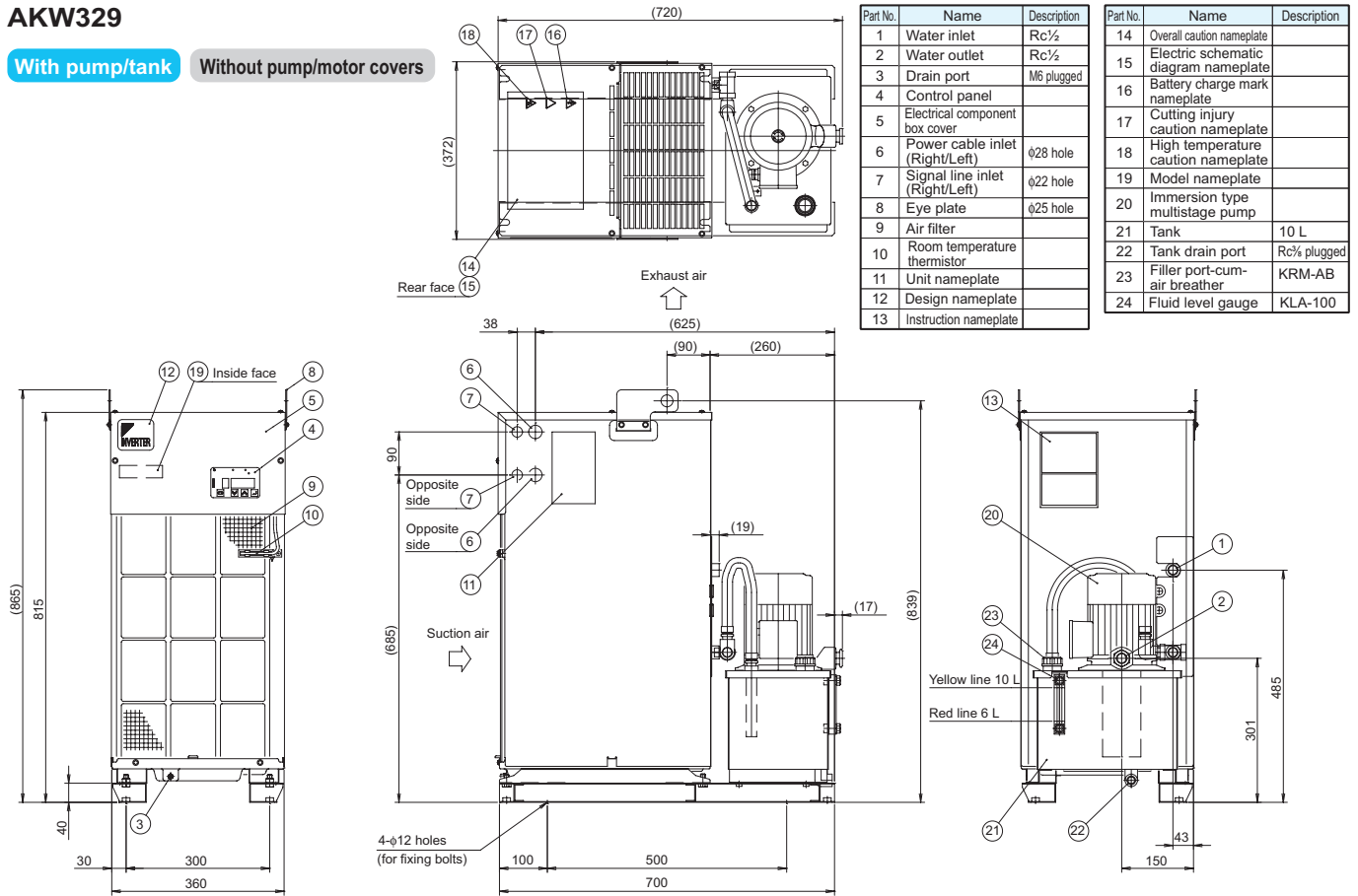
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External dimension diagram

AKW329

With pump/tank

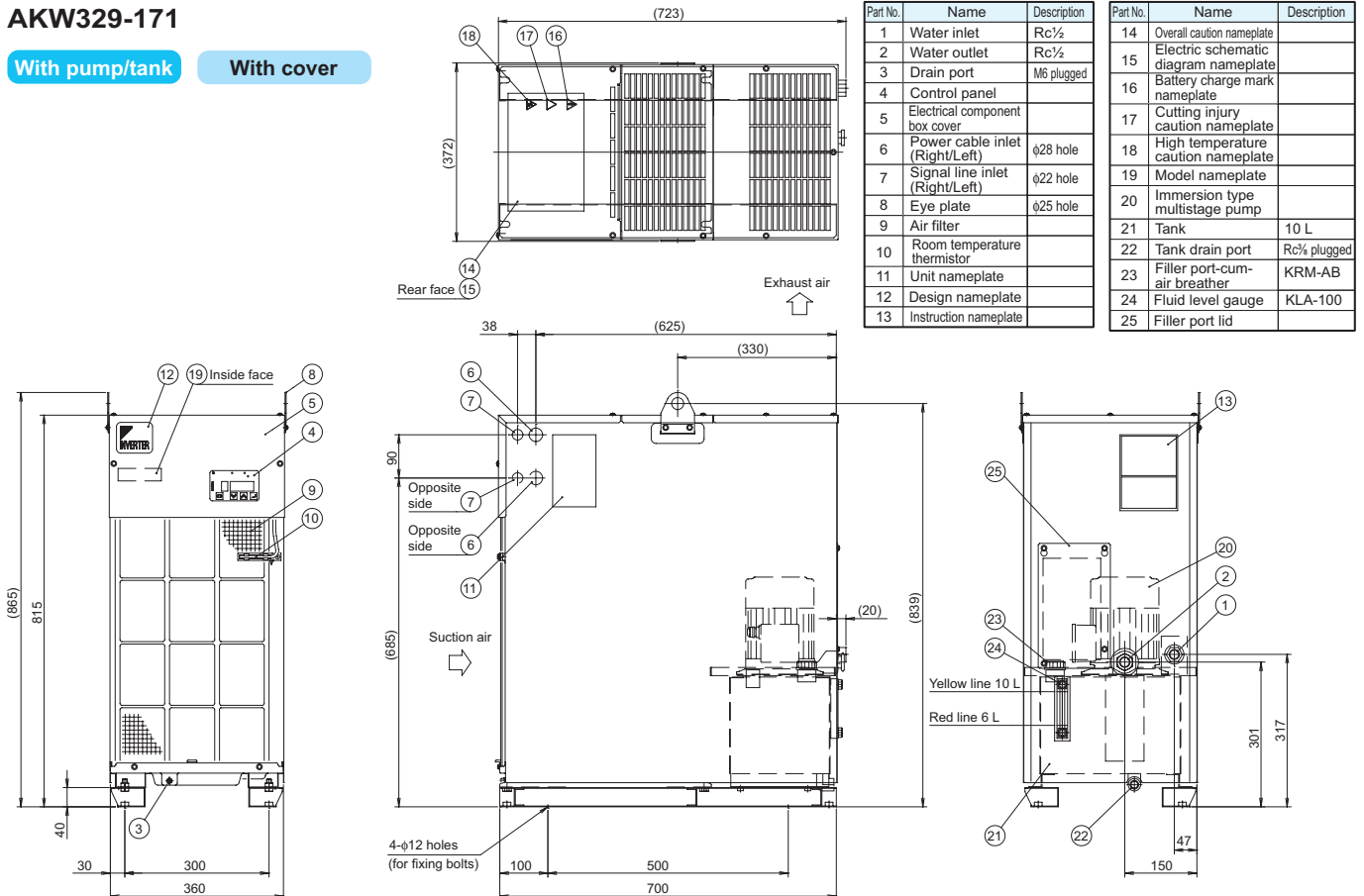
Without pump/motor covers



AKW329-171

With pump/tank

With cover



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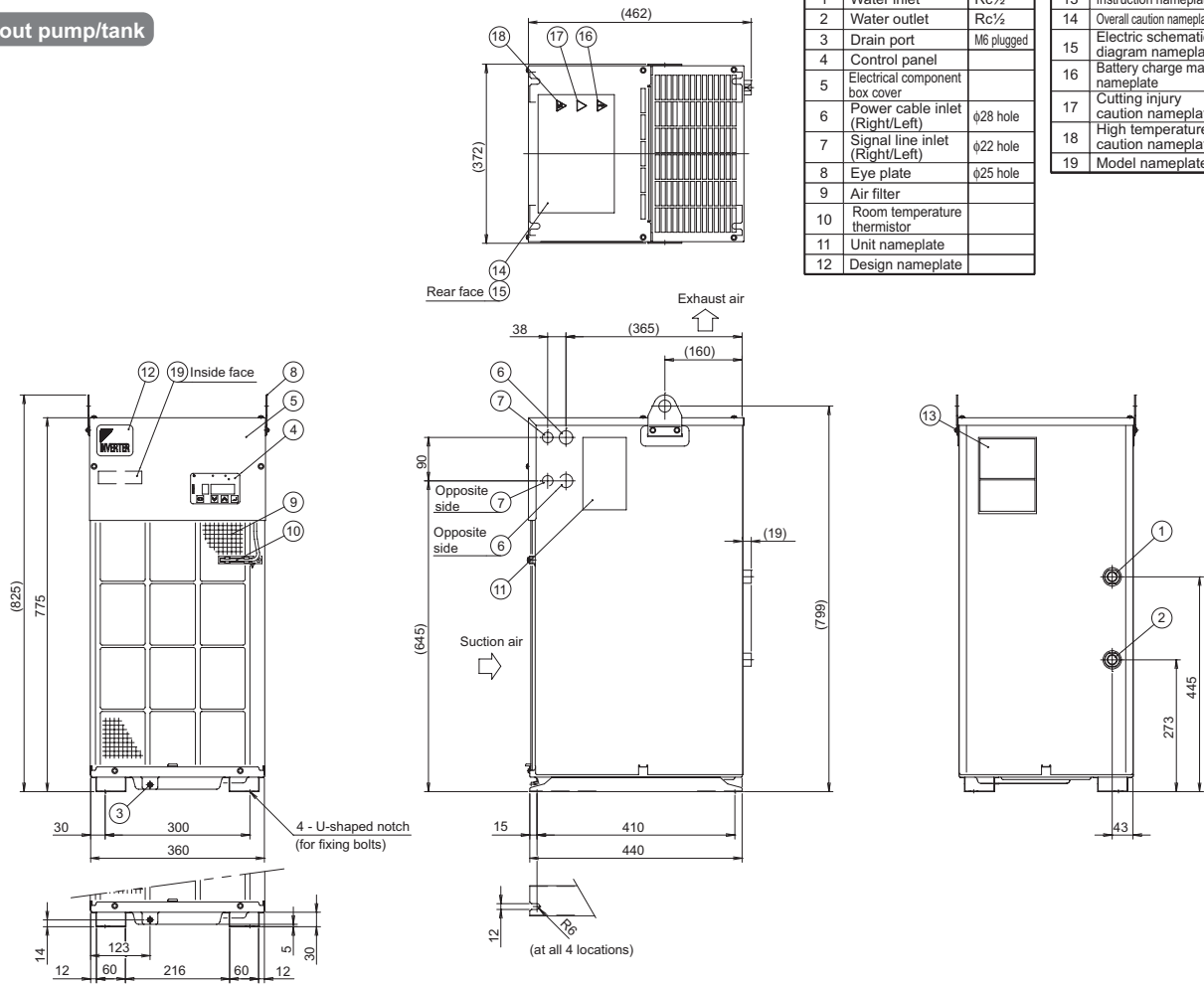
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External dimension diagram

AKW359

Without pump/tank



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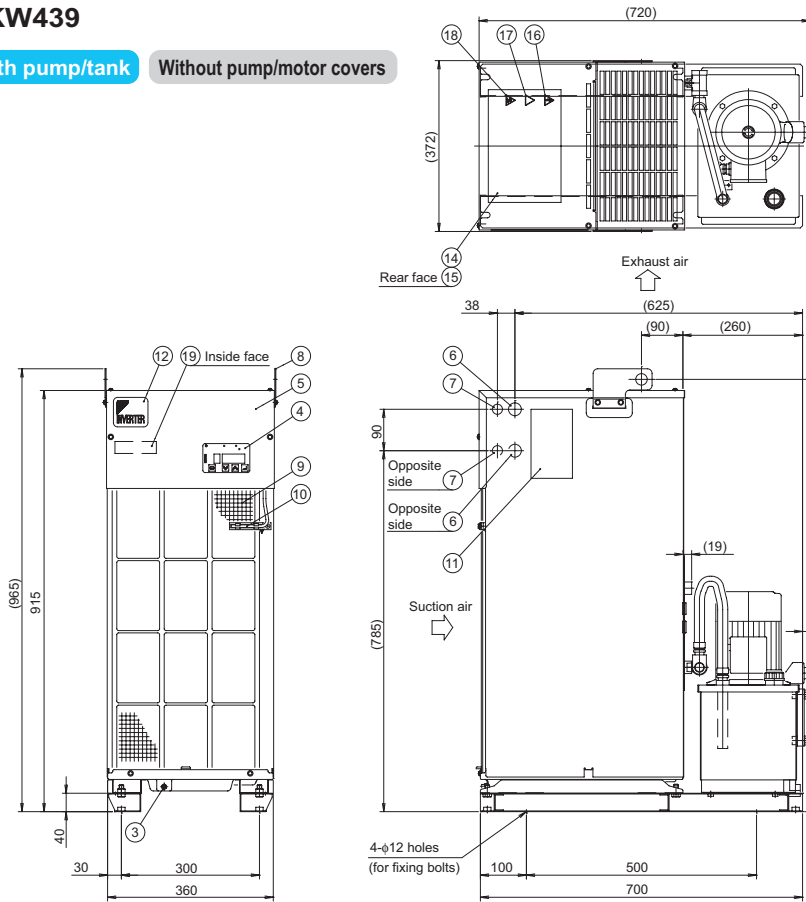
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External dimension diagram

AKW439

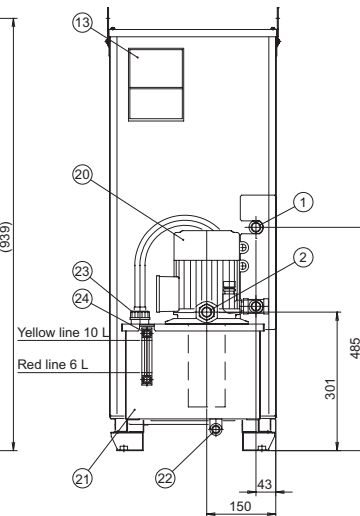
With pump/tank

Without pump/motor covers



Part No.	Name	Description
1	Water inlet	Rc½
2	Water outlet	Rc½
3	Drain port	M6 plugged
4	Control panel	
5	Electrical component box cover	
6	Power cable inlet (Right/Left)	ø28 hole
7	Signal line inlet (Right/Left)	ø22 hole
8	Eye plate	ø25 hole
9	Air filter	
10	Room temperature thermistor	
11	Unit nameplate	
12	Design nameplate	
13	Instruction nameplate	

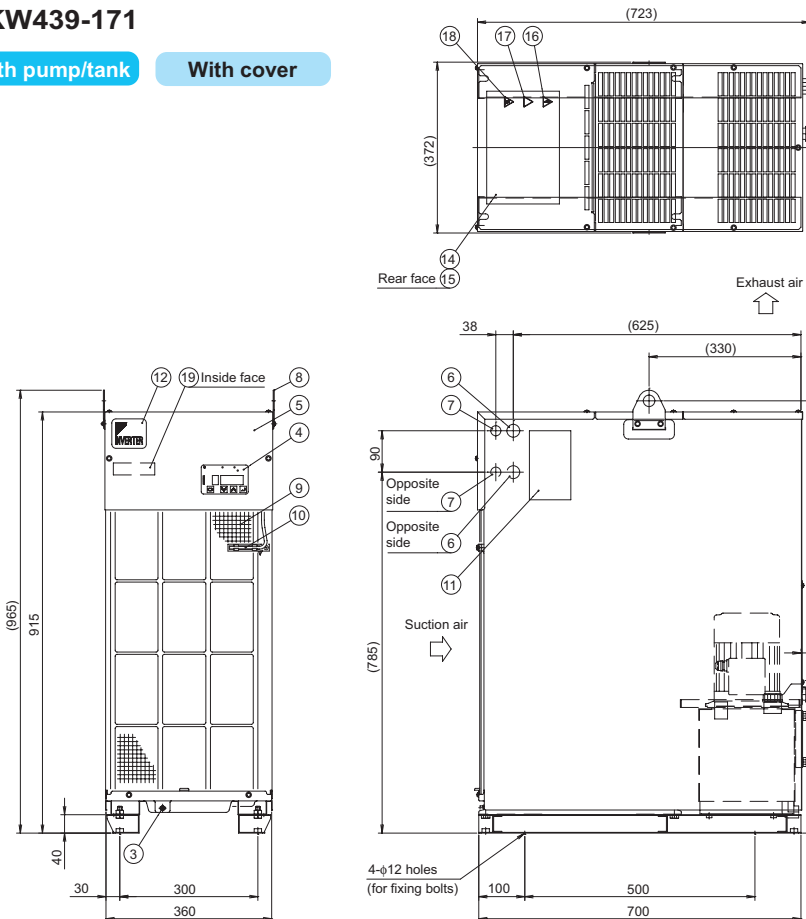
Part No.	Name	Description
14	Overall caution nameplate	
15	Electric schematic diagram nameplate	
16	Battery charge mark nameplate	
17	Cutting injury caution nameplate	
18	High temperature caution nameplate	
19	Model nameplate	
20	Immersion type multistage pump	
21	Tank	10 L
22	Tank drain port	Rc½ plugged
23	Filler port-cum-air breather	KRM-AB
24	Fluid level gauge	KLA-100



AKW439-171

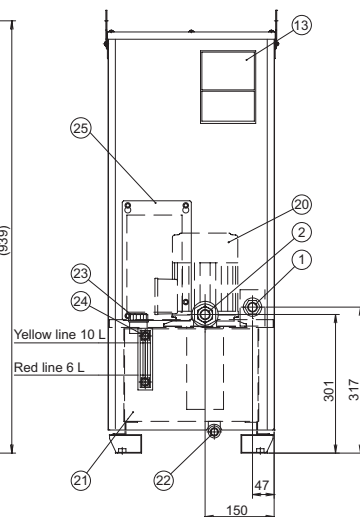
With pump/tank

With cover



Part No.	Name	Description
1	Water inlet	Rc½
2	Water outlet	Rc½
3	Drain port	M6 plugged
4	Control panel	
5	Electrical component box cover	
6	Power cable inlet (Right/Left)	ø28 hole
7	Signal line inlet (Right/Left)	ø22 hole
8	Eye plate	ø25 hole
9	Air filter	
10	Room temperature thermistor	
11	Unit nameplate	
12	Design nameplate	
13	Instruction nameplate	

Part No.	Name	Description
14	Overall caution nameplate	
15	Electric schematic diagram nameplate	
16	Battery charge mark nameplate	
17	Cutting injury caution nameplate	
18	High temperature caution nameplate	
19	Model nameplate	
20	Immersion type multistage pump	
21	Tank	10 L
22	Tank drain port	Rc½ plugged
23	Filler port-cum-air breather	KRM-AB
24	Fluid level gauge	KLA-100
25	Filler port lid	



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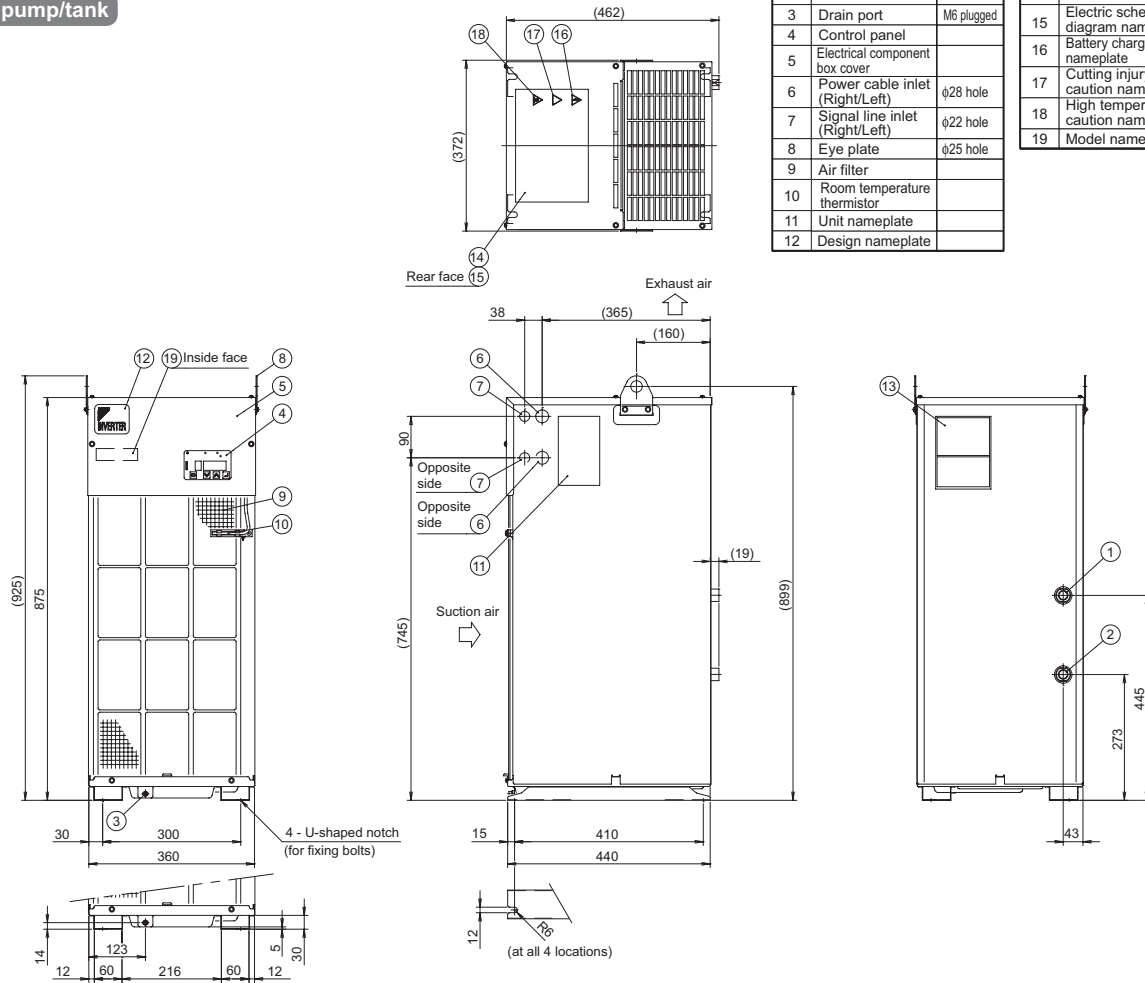
External dimension diagram

AKW459

Without pump/tank

Part No.	Name	Description
1	Water inlet	Rc $\frac{1}{2}$
2	Water outlet	Rc $\frac{1}{2}$
3	Drain port	M6 plugged
4	Control panel	
5	Electrical component box cover	
6	Power cable inlet (Right/Left)	$\phi 28$ hole
7	Signal line inlet (Right/Left)	$\phi 22$ hole
8	Eye plate	$\phi 25$ hole
9	Air filter	
10	Room temperature thermistor	
11	Unit nameplate	
12	Design nameplate	

Part No.	Name	Description
13	Instruction nameplate	
14	Overall caution nameplate	
15	Electric schematic diagram nameplate	
16	Battery charge mark nameplate	
17	Cutting injury caution nameplate	
18	High temperature caution nameplate	
19	Model nameplate	



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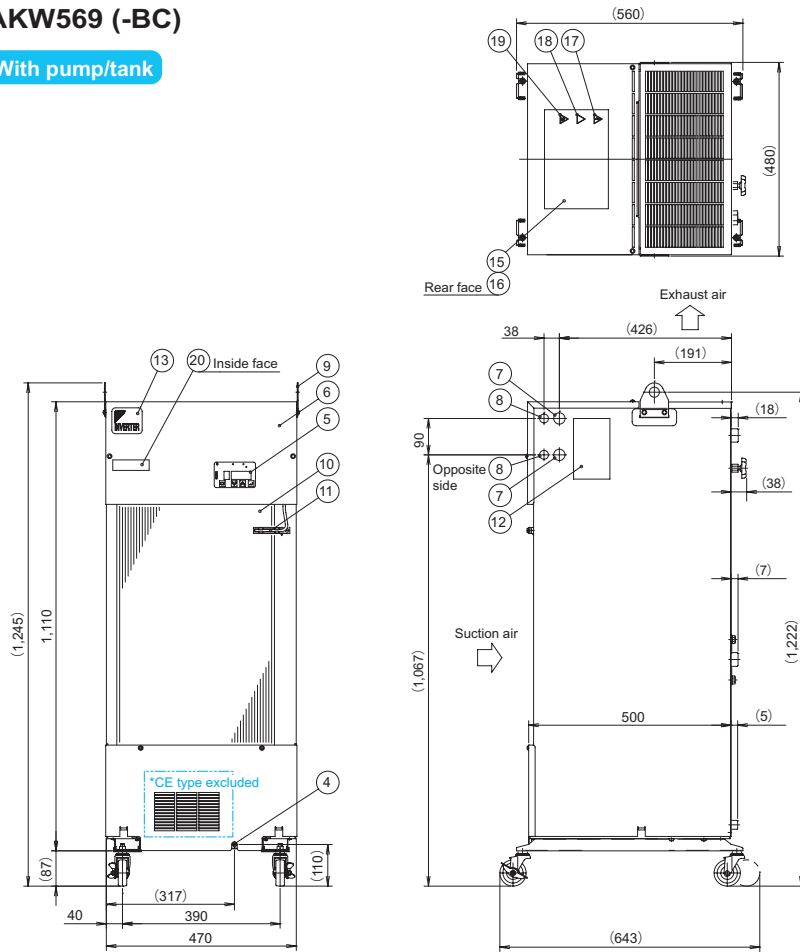
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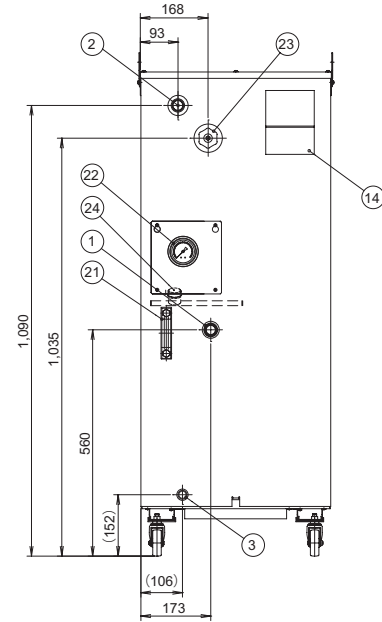
External dimension diagram

AKW569 (-BC)

With pump/tank

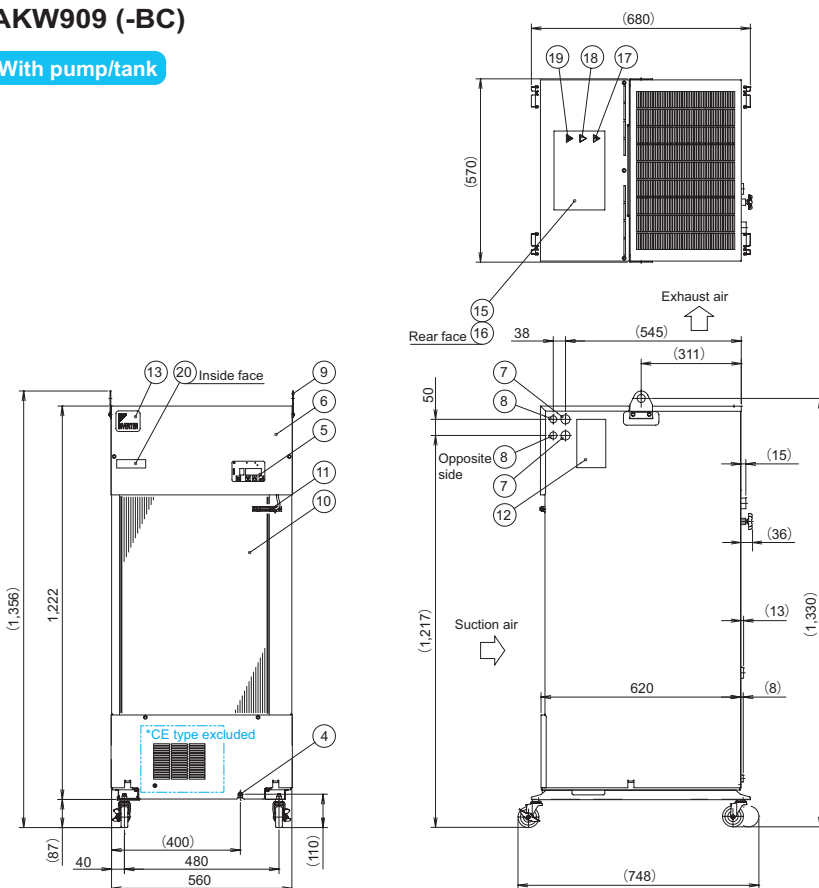


Part No.	Name	Description	Part No.	Name	Description
1	Water inlet	Rc ³ / ₄	13	Design nameplate	
2	Water outlet	Rc ³ / ₄	14	Instruction nameplate	
3	Tank drain	Rc ¹ / ₂ plugged	15	Overall caution nameplate	
4	Pump drainage	Rc ¹ / ₂ plugged	16	Electric schematic diagram nameplate	
5	Control panel		17	Battery charge mark nameplate	
6	Electrical component box cover		18	Cutting injury caution nameplate	
7	Power cable inlet (Right/Left)	φ28 hole	19	High temperature caution nameplate	
8	Signal line inlet (Right/Left)	φ22 hole	20	Model nameplate	
9	Eye plate	φ25 hole	21	Fluid level gauge	KLA-100
10	Air filter		22	Pressure gauge	
11	Room temperature thermistor		23	Glove valve	
12	Unit nameplate		24	Filler port-cum-air breather	KRM-AB

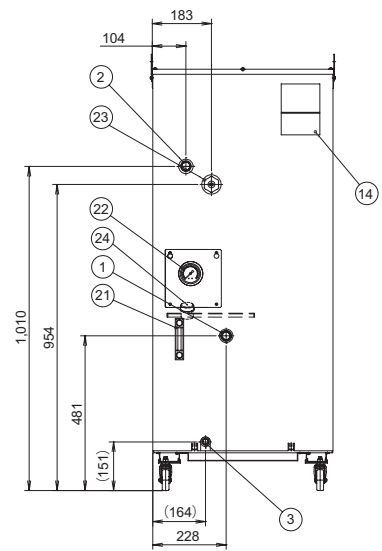


AKW909 (-BC)

With pump/tank

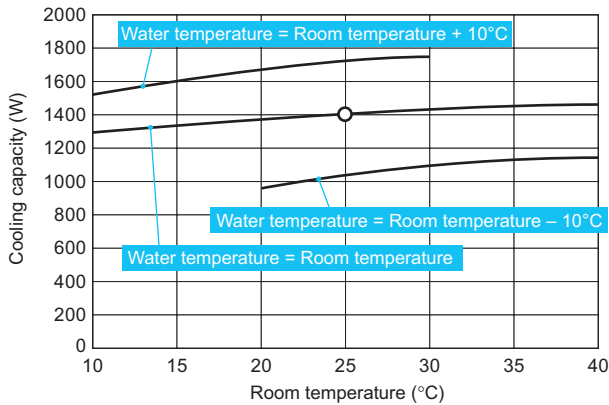


Part No.	Name	Description	Part No.	Name	Description
1	Water inlet	Rc ³ / ₄	13	Design nameplate	
2	Water outlet	Rc ³ / ₄	14	Instruction nameplate	
3	Tank drain	Rc ¹ / ₂ plugged	15	Overall caution nameplate	
4	Pump drainage	Rc ¹ / ₂ plugged	16	Electric schematic diagram nameplate	
5	Control panel		17	Battery charge mark nameplate	
6	Electrical component box cover		18	Cutting injury caution nameplate	
7	Power cable inlet (Right/Left)	φ28 hole	19	High temperature caution nameplate	
8	Signal line inlet (Right/Left)	φ22 hole	20	Model nameplate	
9	Eye plate	φ25 hole	21	Fluid level gauge	KLA-100
10	Air filter		22	Pressure gauge	
11	Room temperature thermistor		23	Glove valve	
12	Unit nameplate		24	Filler port-cum-air breather	KRM-AB

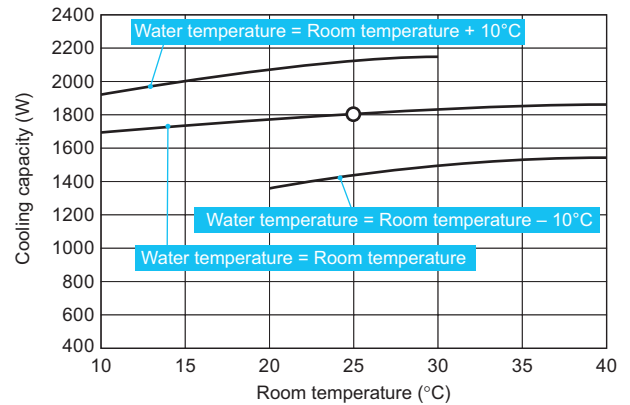


Cooling capacity characteristic chart

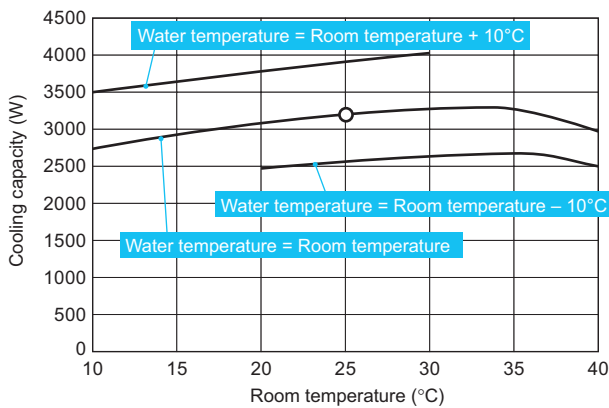
AKW149



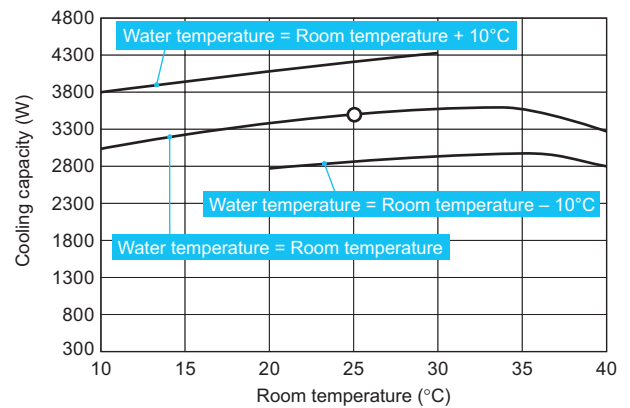
AKW189



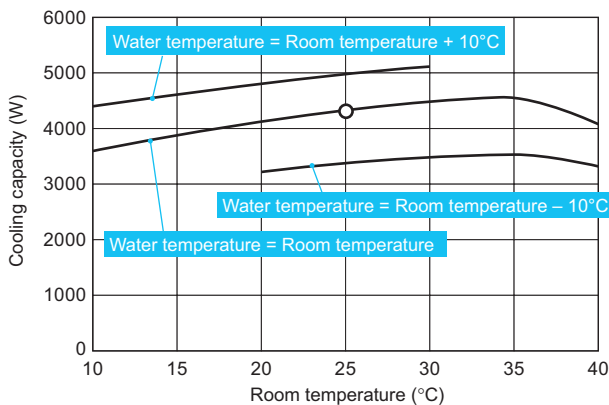
AKW329



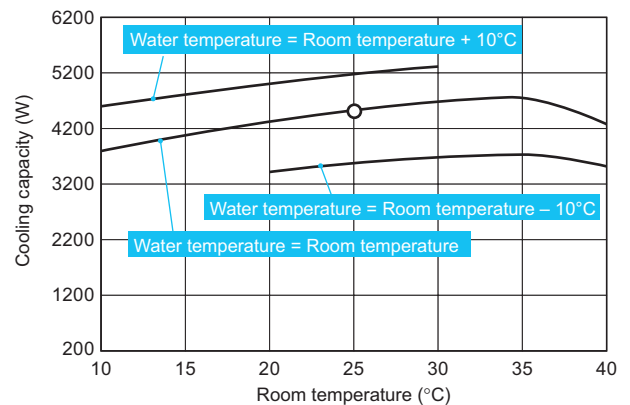
AKW359



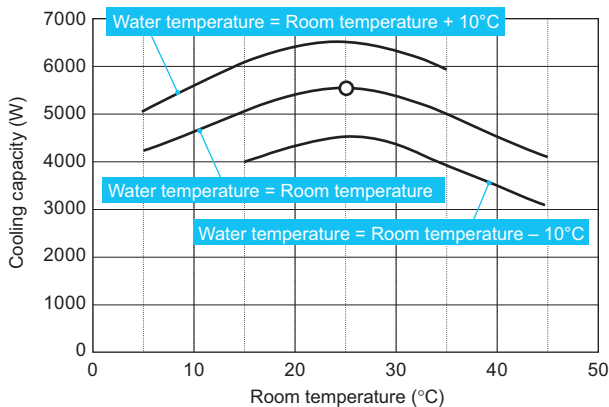
AKW439



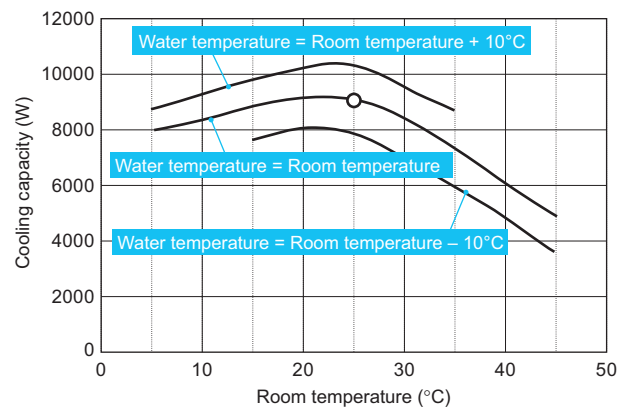
AKW459



AKW569 (-C)



AKW909 (-C)

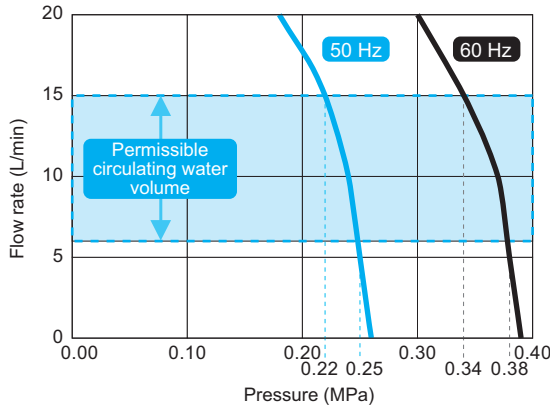


The mark "○" shows the standard point. (Room temperature: 25°C, water temperature: 25°C, 1 atm)

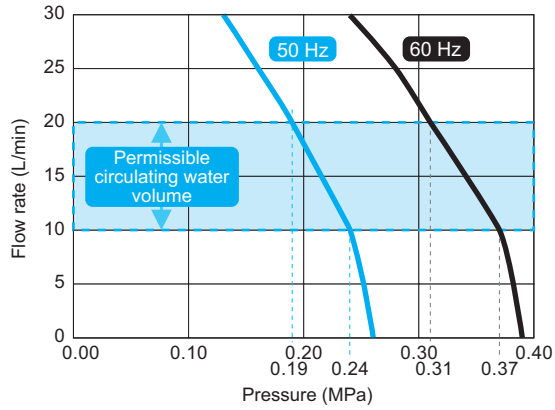
Pump flow rate characteristics

The following diagrams show the flow characteristics of the pumps with the internal pressure loss taken into account. Select the diameters and lengths of pipe by referring to the following diagrams to keep the circulating water volume maintained within the permissible range.

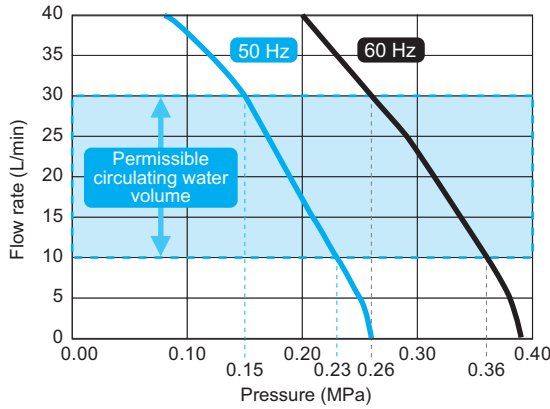
AKW149



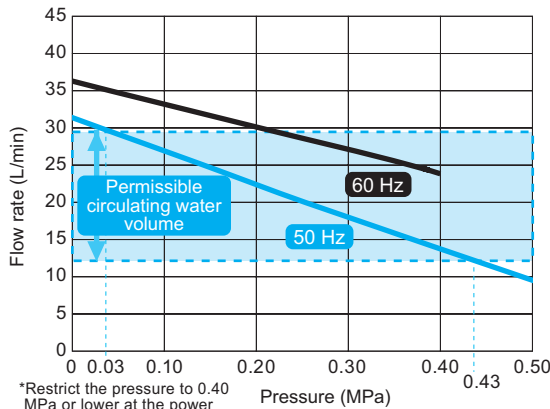
AKW329



AKW439

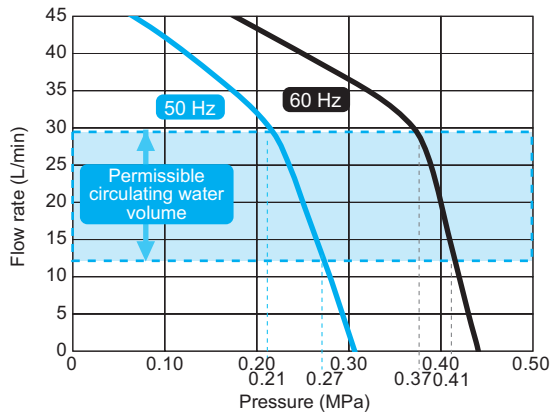


AKW569

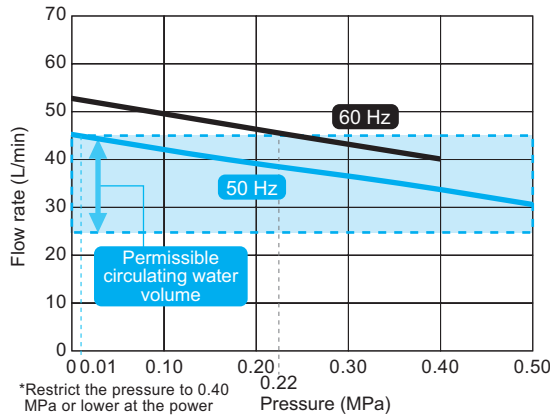


*Restrict the pressure to 0.40 MPa or lower at the power supply frequency of 60 Hz.

AKW569-C



AKW909



*Restrict the pressure to 0.40 MPa or lower at the power supply frequency of 60 Hz.

AKW909-C

