

Oil Cooling Unit AKJ※※9 (Immersion Type for Cooling Coolant)



Features

- **Immersion type oil cooling unit for coolant**
(to be mounted directly on the tank, not provided with the circulating pump)
- **High energy-saving performance achieved**
Achieves high energy-saving performance with the adoption of a Daikin original IPM motor and R410A refrigerant with high COP characteristics.
- **Further downsizing a compact design of the top class in the industry**
Installation compatibility with conventional products is secured.
- **Enhanced support for shallow tanks with the reduced cooling coil depth**
The cooling capacity is equivalent to that of conventional products.
- **Extension of cooling capacity control range**
The coolant temperature can be controlled within $\pm 0.1^{\circ}\text{C}$ over the entire cooling load range (from 0 to 100% load) and this helps to increase the accuracy of machine tools.

Nomenclature

AKJ ※※ 9 - ※※※

1

2

3

4

1 Oil cooling unit identification code

AKJ: High-accuracy inverter controlled oil cooling unit
Immersion type for cutting/grinding fluid (oil)

2 Cooling capacity (kW)

18: 1.8 kW
35: 3.5 kW
45: 4.5 kW
56: 5.6 kW
90: 9.0 kW

3 Symbol of series (Symbol to represent model change)

9: "9" series

4 Symbol of option type

Options and their combinations (Refer to the following table.)

Special specifications

-※※※ (3-digit number), C※※※ (3-digit number), etc.
Please consult us about detailed information.

Options and their combinations

■ AKJ9 (Immersion type)

Symbol of option type	With breaker	Compliance with CE	With heater	Different voltage type (1)	Different voltage type (2)	Different voltage type (3)
-B	✓	-	-	-	-	-
-C	-	✓	-	-	-	-
-H	-	-	✓	-	-	-
-046	-	-	-	✓	-	-
-047	✓	-	-	-	✓	-
-048	✓	-	-	-	-	✓
-BC	✓	✓	-	-	-	-
-BH	✓	-	✓	-	-	-
-CH	-	✓	✓	-	-	-
-BCH	✓	✓	✓	-	-	-
-001	✓	-	-	✓	-	-
-002	-	✓	-	✓	-	-
-003	-	-	✓	✓	-	-
-005	✓	✓	-	✓	-	-
-006	✓	-	✓	✓	-	-
-008	-	✓	✓	✓	-	-
-011	✓	✓	✓	✓	-	-
-017	✓	✓	-	-	✓	-
-018	✓	-	✓	-	✓	-
-023	✓	✓	✓	-	✓	-
-032	✓	✓	-	-	-	✓
-033	✓	-	✓	-	-	✓
-038	✓	✓	✓	-	-	✓

Different voltage type (1) Without transformer

AC 220, 230 V

50/60 Hz

Different voltage type (2) With transformer

AC 380, 400, 415 V

50/60 Hz, With breaker

Different voltage type (3) With transformer

AC 440, 460, 480V

50/60 Hz, With breaker

Contact Details

Before using the product, please check the guide pages at the front of this catalog.

Internet

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Applications

■ Examples of major applications

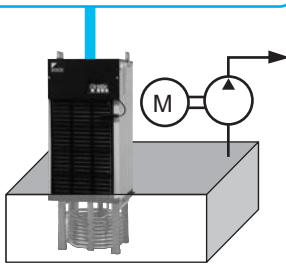
Machine tools: Machining centers, NC lathes, grinding machines,
NC specialized machines, NC electric discharge machines, etc.

Industrial machines: ... Molding machines, presses, etc.

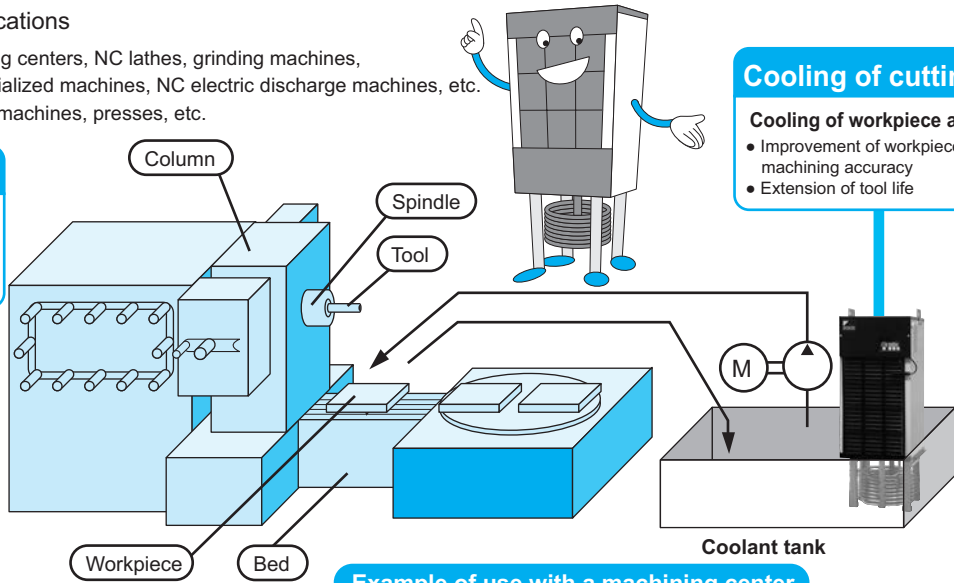
Cooling of hydraulic oil

Temperature (viscosity) control

- Prevention of deterioration of hydraulic oil (Longer life)
- Stabilized operation of actuators



Hydraulic unit



Cooling of cutting oil

Cooling of workpiece and tool

- Improvement of workpiece machining accuracy
- Extension of tool life

Coolant tank

Example of use with a machining center

Specifications (AKJ189/359/459)

Oil cooling unit horsepower			HP		0.5					1.2					1.5												
Model name			AKJ189					AKJ359					AKJ459														
			Standard	-B	-C	-H	Different voltage specifications *1	Standard	-B	-C	-H	Different voltage specifications *1	Standard	-B	-C	-H	Different voltage specifications *1										
Cooling capacity (50/60 Hz) *1			kW		1.6/1.8					3.2/3.5					4.2/4.5												
Heater			kW		-					1					-												
Power supply *2			Three-phase AC 200/200・220 V 50/60 Hz					*3					Three-phase AC 200/200・220 V 50/60 Hz					*3									
Power voltage			Main circuit							DC 12/24 V																	
			Operation circuit																								
Max. power consumption Max. current consumption	When cooling	200 V 50 Hz	0.82 kW/3.3 A					*8	1.37 kW/5.2 A					*8	1.46 kW/5.6 A					*8							
		200 V 60 Hz	0.83 kW/3.2 A						1.38 kW/5.1 A						1.48 kW/5.4 A												
		220 V 60 Hz	0.83 kW/3.0 A						1.39 kW/4.8 A						1.48 kW/5.1 A												
	When heating	200 V 50 Hz	-	1.20 kW/3.8 A			-	-	-	1.20 kW/3.8 A	-	-	-	1.20 kW/3.8 A	-	-	-	1.20 kW/3.8 A	-								
		200 V 60 Hz	-	1.20 kW/3.8 A			-	-	-	1.20 kW/3.8 A	-	-	-	1.20 kW/3.8 A	-	-	-	1.20 kW/3.8 A	-								
		220 V 60 Hz	-	1.44 kW/4.2 A			-	-	-	1.44 kW/4.2 A	-	-	-	1.44 kW/4.2 A	-	-	-	1.44 kW/4.2 A	-								
Transformer capacity			-					2.14 kVA					2.14 kVA					-					2.14 kVA				
External paint color								Ivory white																			
External dimensions (H × W × D)			mm					920 × 360 × 440					1,045 × 360 × 440					1,200 × 360 × 440									
Compressor (Hermetic DC swing type)			Equivalent to 0.4 kW					Equivalent to 0.75 kW					Equivalent to 1.1 kW														
Evaporator								Open coil type																			
Condenser								Cross-fin-coil type																			
Propeller fan			Motor							54 W																	
Agitator			Motor							3-phase, 60 W, 4-pole motor																	
Temperature control (Selectable)	Synchronization type	Standard	Room temperature or machine temperature *4 (Set to room temperature by default)																								
		Controlled object	Tank fluid temperature																								
	Fixed type	Synchronization range	-9.9 to +9.9 against the reference temperature (Set at 0.0 by default)																								
		Controlled object K	Tank fluid temperature																								
Oil temperature controller resolution								5 to 50																			
Capacity control range								±0.1℃																			
Timer function								0 to 100%																			
Refrigerant control								ON timer: 1 to 999 hours (1-hour unit setting)																			
Refrigerant (R410A) *5 Filling volume			kg		0.55					0.76					0.99												
Protection devices/protective functions								A set of internal thermistor (for agitator), discharge pipe temperature thermistor, condenser temperature thermistor, reverse-phase protection device, restart prevention timer, low room temperature protection thermistor, high fluid temperature protection thermistor, low fluid temperature protection thermistor, refrigerant leakage detector, inverter protection device, circuit breaker (-B type only), high-pressure switch (-C type only), compressor thermal protector (-C type only), overheat prevention temperature thermistor (-H type only), fuse (-H type only)																			
Operation range	Room temperature	℃						5 to 45																			
	Tank fluid temperature	℃						5 to 50																			
	Oil viscosity	mm²/s						0.5 to 200																			
Acceptable oils								Water-soluble cutting/grinding fluid, cutting/grinding oil, lubrication oil, hydraulic oil, industrial water (Cannot be used for chemicals, food products or fuel)																			
Noise level (Value equivalent to measurement in an anechoic chamber) (Front 1 m, height 1 m) dB (A)								62																			
Permissible transport vibration								Up and down vibration 14.7 m/S² (1.5 G) × 2.5 hr (7.5 to 100 Hz sweep/5 min.)																			
Ingress protection *6								IP2X																			
Mass			kg		38 40 60					44 46 66					50 52 72												
Molded-case circuit breaker (Rated current)			A		- 10 -					- 10 -					- 10 -												
Items prepared by the customer	Molded-case circuit breaker (Rated current)	A						10 (Required for types other than -B type) *7																			
	Device other than molded-case circuit breaker							Tank, supply pump, float switch, return filter																			

Refer to Page L-21 for explanatory notes.

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Specifications (AKJ569/909)

Oil cooling unit horsepower			HP		2.0					3.0					
					AKJ569					AKJ909					
Model name			Standard		-B	-C	-H	Different voltage specifications *3	Standard		-B	-C	-H	Different voltage specifications *3	
Cooling capacity (50/60 Hz) *1			kW				5.0/5.6				8.0/9.0				
Heater			kW			—		2		—			4	—	
Power supply *2					Three-phase AC 200/200·220 V 50/60 Hz					*3		Three-phase AC 200/200·220 V 50/60 Hz			*3
Power voltage		Main circuit						DC 12/24 V							
		Operation circuit													
Max. power consumption Max. current consumption	When cooling	200 V 50 Hz	2.12 kW/7.3 A					*8	3.38 kW/10.8 A					*8	
		200 V 60 Hz	2.15 kW/7.0 A						3.43 kW/10.7 A						
		220 V 60 Hz	2.15 kW/6.6 A						3.43 kW/10.2 A						
	When heating	200 V 50 Hz		—		2.32 kW/7.1 A	—		—		4.42 kVA/13.1 A	—			
		200 V 60 Hz		—		2.33 kW/7.1 A	—		—		4.45 kVA/13.1 A	—			
		220 V 60 Hz		—		2.79 kW/7.8 A	—		—		5.33 kVA/14.4 A	—			
Transformer capacity							—	2.79 kVA			—		5.02 kVA		
External paint color					Ivory white										
External dimensions (H×W×D)			mm		1,450×470×500					1,630×560×620					
Compressor (Hermetic DC swing type)					Equivalent to 1.5 kW					Equivalent to 2.2 kW					
Evaporator					Open coil type										
Condenser					Cross-fin-coil type										
Propeller fan		Motor	100 W												
Agitator		Motor	3-phase, 60 W, 4-pole motor												
Temperature control (Selectable)	Synchronization type	Standard	Room temperature or machine temperature ** (Set to room temperature by default)												
		Controlled object	Tank fluid temperature												
		Synchronization range K	-9.9 to +9.9 against the reference temperature (Set at 0.0 by default)												
	Fixed type	Controlled object	Tank fluid temperature												
		Range °C	5 to 50												
Oil temperature controller resolution					±0.1°C										
Capacity control range					0 to 100%										
Timer function					ON timer: 1 to 999 hours (1-hour unit setting)										
Refrigerant control					Rotation speed control of compressor by inverter + Opening rate control of electric expansion valve										
Refrigerant (R410A) *5 Filling volume			kg				1.07					1.58			
Protection devices/protective functions					A set of internal thermistor (for fan motor), discharge pipe temperature thermistor, condenser temperature thermistor, internal thermistor (for agitator), reverse-phase protection device, restart prevention timer, low room temperature protection thermistor, high fluid temperature protection thermistor, low fluid temperature protection thermistor, refrigerant leakage detector, inverter protection device, Circuit breaker (-B type only) High-pressure switch (-C type only), compressor thermal protector (-C type only), overheat prevention temperature thermistor (-H type only), fuse (-H type only)										
Operation range	Room temperature	°C	5 to 45												
	Tank fluid temperature	°C	5 to 50												
	Oil viscosity	mm ² /s	0.5 to 200												
Acceptable oils					Water-soluble cutting/grinding fluid, cutting/grinding oil, lubrication oil, hydraulic oil, industrial water (Cannot be used for chemicals, food products or fuel)										
Noise level (Value equivalent to measurement in an anechoic chamber) (Front 1 m, height 1 m) dB (A)					65					68					
Permissible transport vibration					Up and down vibration 14.7 m/S ² (1.5 G) × 2.5 hr (10 to 100 Hz sweep/5 min.)										
Ingress protection *6					IP2X										
Mass			kg			72		75	97		89		93	117	
Molded-case circuit breaker (Rated current)			A		—	15		—		—	20		—		
Items prepared by the customer	Molded-case circuit breaker (Rated current)	A	15 (Required for types other than the -B type) *7					20 (Required for types other than the -B type)							
	Device other than molded-case circuit breaker		Tank, supply pump, float switch, return filter												

Note: ^{*1} The cooling capacity indicates the value at the standard point (tank fluid temperature: 35°C, room temperature: 35°C, fluid used: ISO VG32).

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. The voltage fluctuation range should be within ±10%. If it is more than ±10%, please consult us.

^{*3} There are the following three types of different voltage specifications.

AC 220, 230 V: Option code -046 (without transformer)

AC 380, 400, 415 V: Option code -047 (with built-in transformer)

AC 440, 460, 480 V: Option code -048 (with built-in transformer)

The main circuit voltage is the transformer's secondary side voltage of AC 200 V, 50/60 Hz.

(-046 units have no transformer and therefore have the same external dimensions and mass as standard units. Their main circuit voltage is AC 220/230 V, 50/60 Hz.)

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

^{*5} The MSDS (Material Safety Data Sheet) of refrigerant R410A is attached to the -C type.

^{*6} Electric component box ingress protection: IP54 or equivalent (However, use piping conduits etc. rated at least IP54 at wiring ports.)

^{*7} The molded-case circuit breaker is not supplied with this product. Please prepare it yourself.

^{*8} The maximum power consumption/maximum current consumption of different voltage specifications are shown in the tables below.

■ AKJ189

Supply power	Power/current
380 V	1.8 A
400 V	1.7 A
415 V	1.6 A
440 V	1.5 A
460 V	1.5 A
480 V	1.4 A

■ AKJ359

Supply power	Power/current
380 V	2.8 A
400 V	2.6 A
415 V	2.5 A
440 V	2.4 A
460 V	2.3 A
480 V	2.2 A

■ AKJ459

Supply power	Power/current
380 V	3.0 A
400 V	2.8 A
415 V	2.7 A
440 V	2.6 A
460 V	2.5 A
480 V	2.6 A

■ AKJ569

Supply power	Power/current
380 V	3.9 A
400 V	3.7 A
415 V	3.6 A
440 V	3.4 A
460 V	3.2 A
480 V	3.1 A

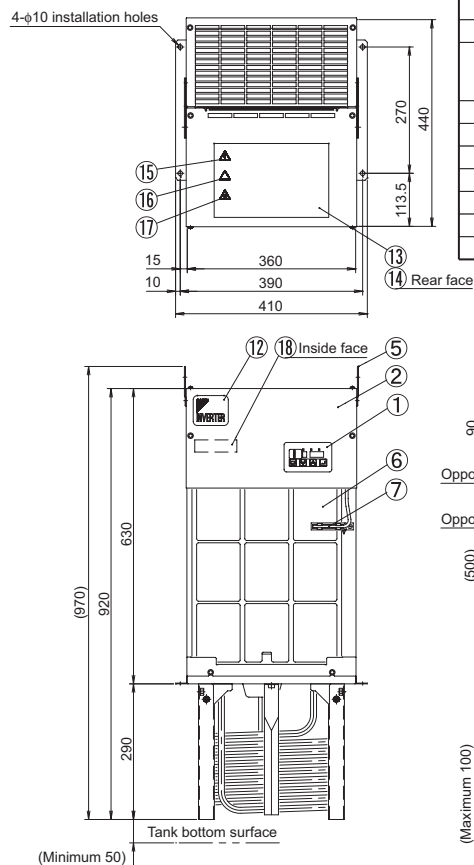
■ AKJ909

Supply power	Power/current
380 V	5.7 A
400 V	5.4 A
415 V	5.2 A
440 V	4.9 A
460 V	4.7 A
480 V	4.5 A

External dimension diagram

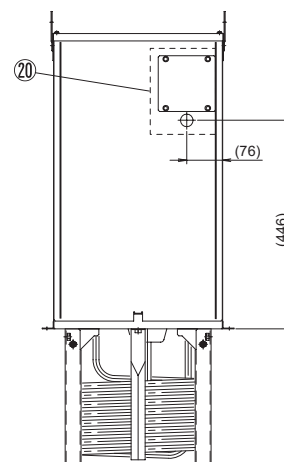
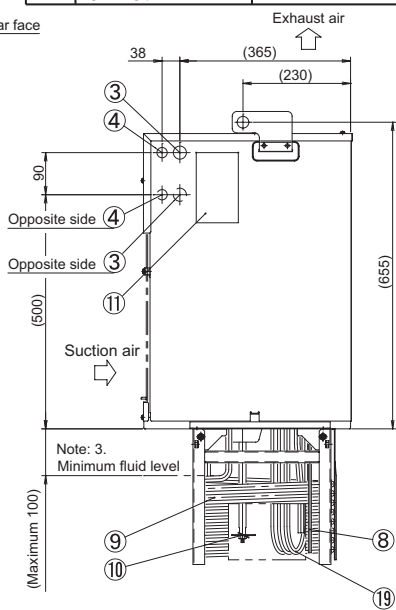
The positions of the bolt holes used for installing the product on the tank top plate are compatible with the AKZJ8 series, but the positions of the power supply/signal cable inlet ports are not.

AKJ189 (-B, -C, -H, -046, -047, -048)

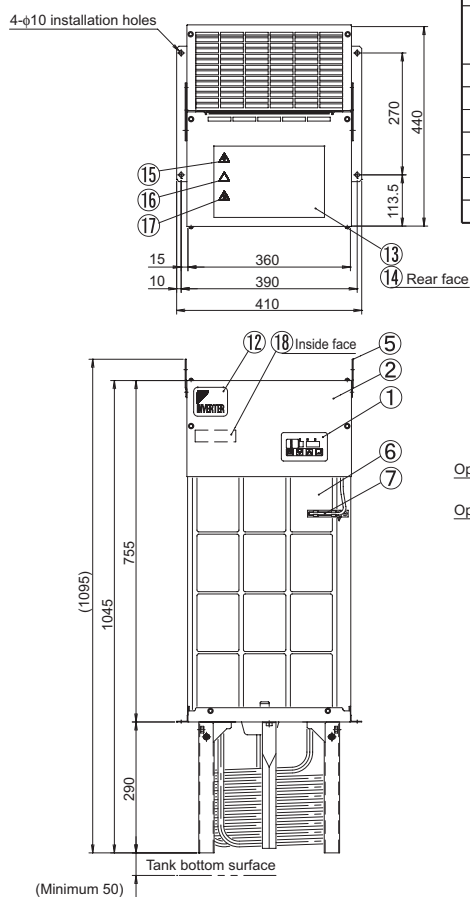


Part No.	Name	Description
1	Control panel	
2	Top panel	
3	Power supply inlet (Right/Left)	φ28 hole Different voltage option Excluding -047 and -048
4	Signal line inlet (Right/Left)	φ22 hole
5	Eye plate	φ25 hole
6	Air filter	
7	Room temperature thermistor	
8	Fluid temperature thermistor	
9	Cooling coil	
10	Agitating plate	

Part No.	Name	Description
11	Unit nameplate	
12	Overall caution nameplate	
13	Design nameplate	
14	Electric schematic diagram nameplate	
15	Battery charge mark nameplate	
16	Cutting injury caution nameplate	
17	High temperature caution nameplate	
18	Model nameplate	
19	Heater	Only for models with heater
20	Power cable inlet	φ28 hole Different voltage option Excluding -047 and -048

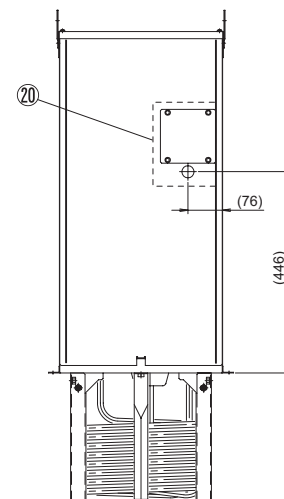
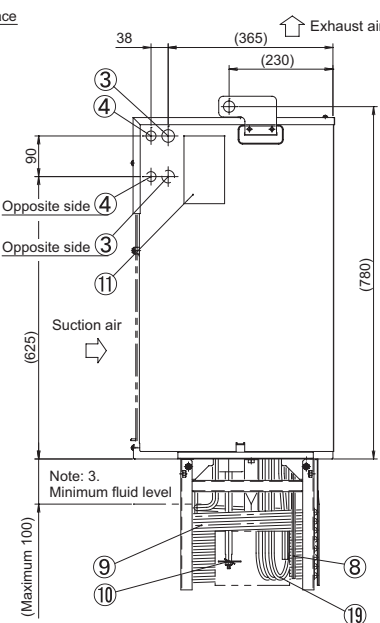


AKJ359 (-B, -C, -H, -046, -047, -048)



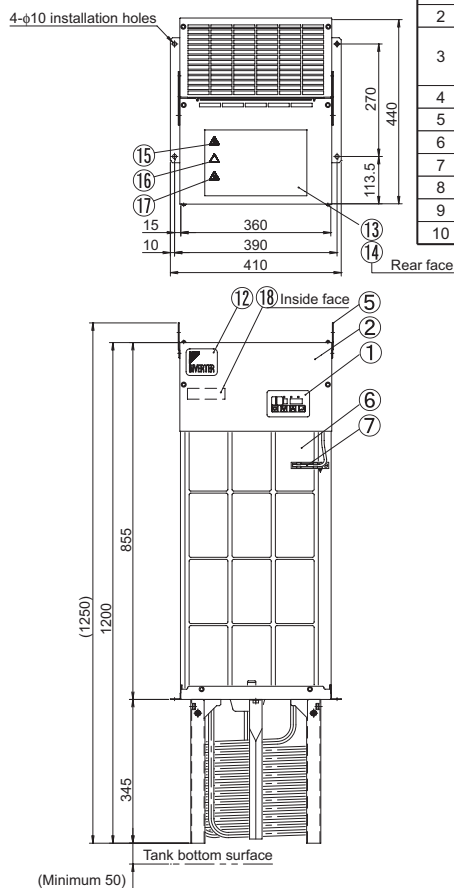
Part No.	Name	Description
1	Control panel	
2	Top panel	
3	Power supply inlet (Right/Left)	φ28 hole Different voltage option Excluding -047 and -048
4	Signal line inlet (Right/Left)	φ22 hole
5	Eye plate	φ25 hole
6	Air filter	
7	Room temperature thermistor	
8	Fluid temperature thermistor	
9	Cooling coil	
10	Agitating plate	

Part No.	Name	Description
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12	Overall caution nameplate	
13	Design nameplate	
14	Electric schematic diagram nameplate	
15	Battery charge mark nameplate	
16	Cutting injury caution nameplate	
17	High temperature caution nameplate	
18	Model nameplate	
19	Heater	Only for models with heater
20	Power cable inlet	φ28 hole Different voltage option Excluding -047 and -048



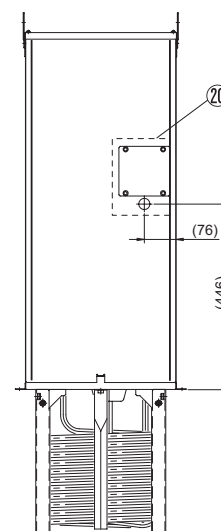
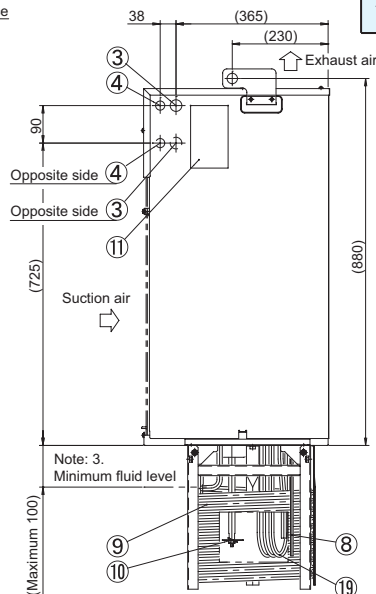
External dimension diagram

AKJ459 (-B,-C,-H,-046,-047,-048)

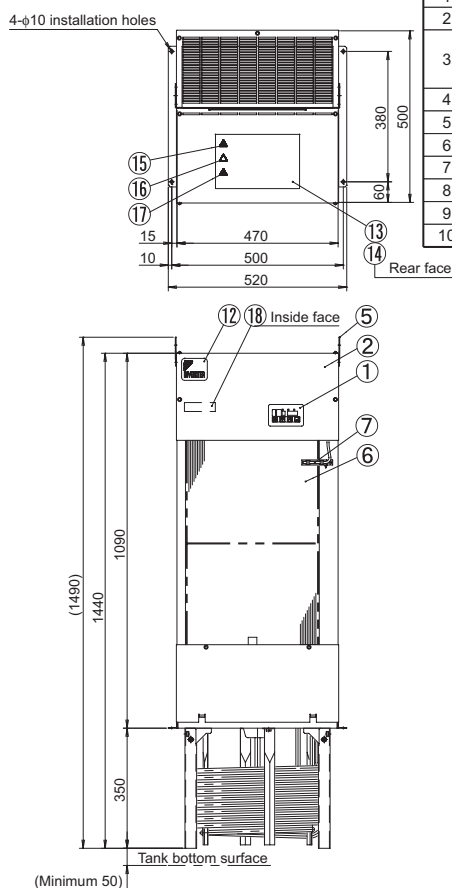


Part No.	Name	Description
1	Control panel	
2	Top panel	
3	Power supply inlet (Right/Left)	φ28 hole Different voltage option Excluding -047 and -048
4	Signal line inlet (Right/Left)	φ22 hole
5	Eye plate	φ25 hole
6	Air filter	
7	Room temperature thermistor	
8	Fluid temperature thermistor	
9	Cooling coil	
10	Agitating plate	

Part No.	Name	Description
11	Unit nameplate	
12	Overall caution nameplate	
13	Design nameplate	
14	Electric schematic diagram nameplate	
15	Battery charge mark nameplate	
16	Cutting injury caution nameplate	
17	High temperature caution nameplate	
18	Model nameplate	
19	Heater	Only for models with heater
20	Power cable inlet	φ28 hole Different voltage option Excluding -047 and -048

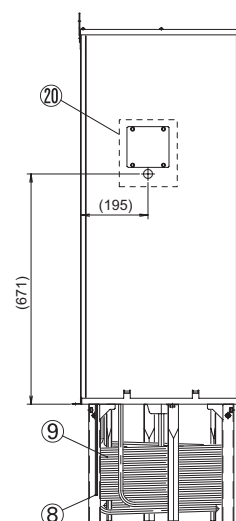
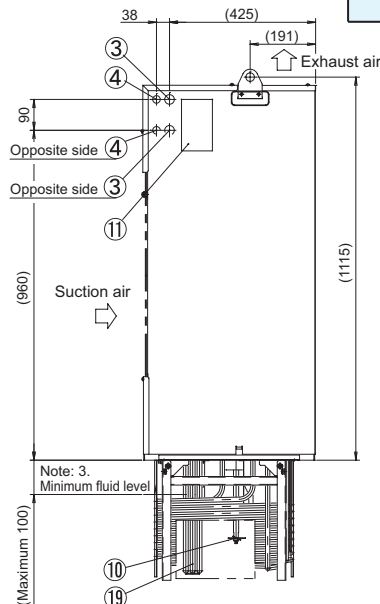


AKJ569 (-B,-C,-H,-046,-047,-048)



Part No.	Name	Description
1	Control panel	
2	Top panel	
3	Power supply inlet (Right/Left)	φ28 hole Different voltage option Excluding -047 and -048
4	Signal line inlet (Right/Left)	φ22 hole
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18	Model nameplate	
19	Heater	Only for models with heater
20	Power cable inlet	φ28 hole Different voltage option Excluding -047 and -048



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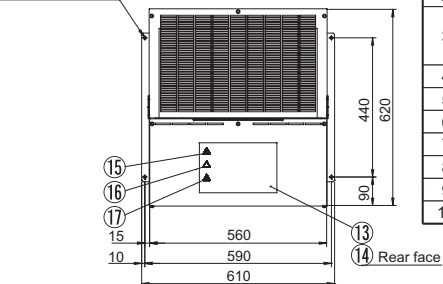
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External dimension diagram

The positions of the bolt holes used for installing the product on the tank top plate are compatible with the AKZJ8 series, but the positions of the power supply/signal cable inlet ports are not.

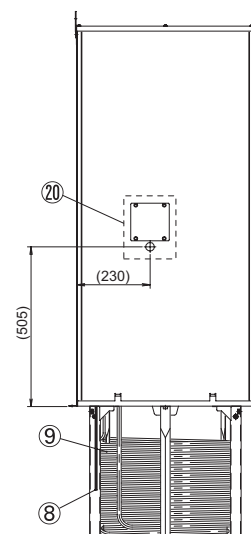
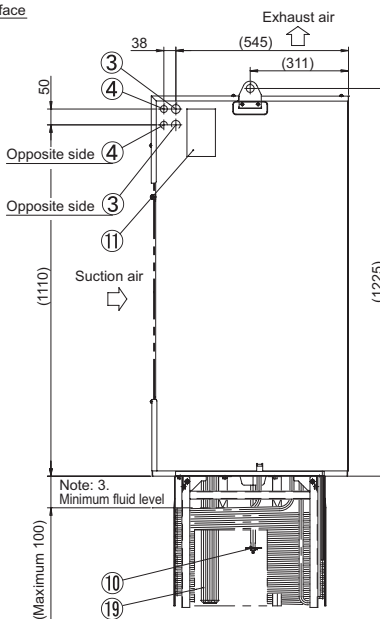
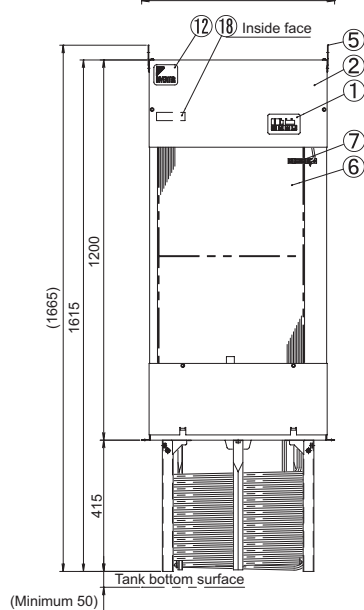
AKJ909 (-B,-C,-H,-046,-047,-048)

4-φ10 installation holes



Part No.	Name	Description
1	Control panel	
2	Top panel	
3	Power supply inlet (Right/Left)	φ28 hole Different voltage option Excluding -047 and -048
4	Signal line inlet (Right/Left)	φ22 hole
5	Eye plate	φ25 hole
6	Air filter	
7	Room temperature thermistor	
8	Fluid temperature thermistor	
9	Cooling coil	
10	Agitating plate	

Part No.	Name	Description
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17	High temperature caution nameplate	
18	Model nameplate	
19	Heater	Only for models with heater
20	Power cable inlet	φ28 hole Different voltage option Excluding -047 and -048



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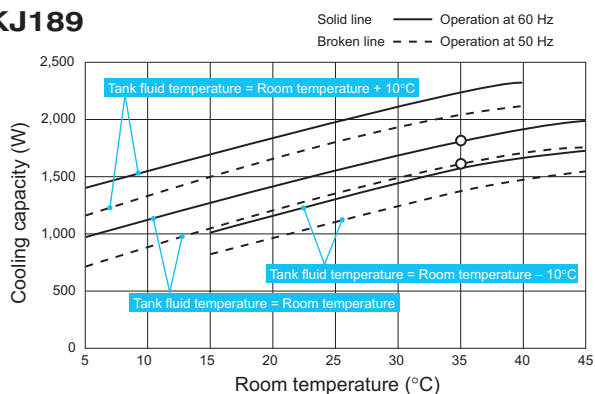
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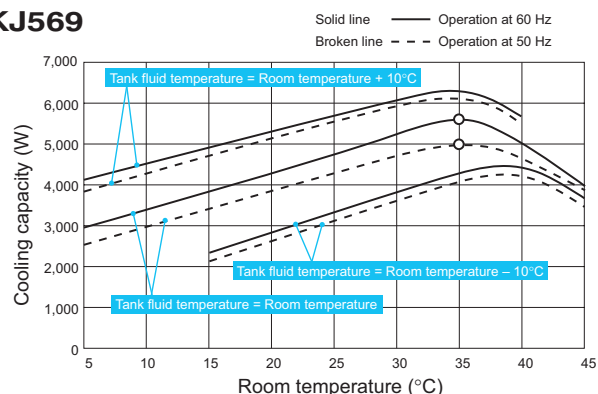
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Cooling capacity characteristic chart

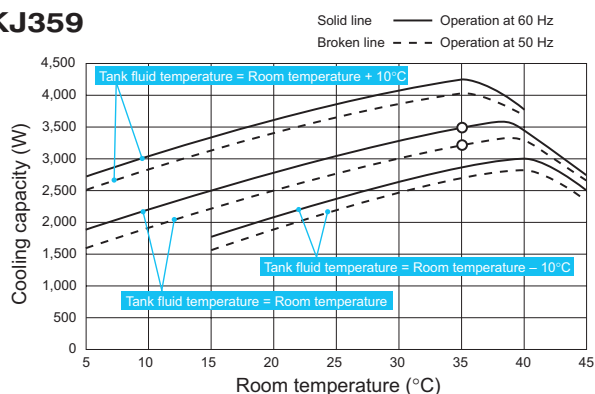
AKJ189



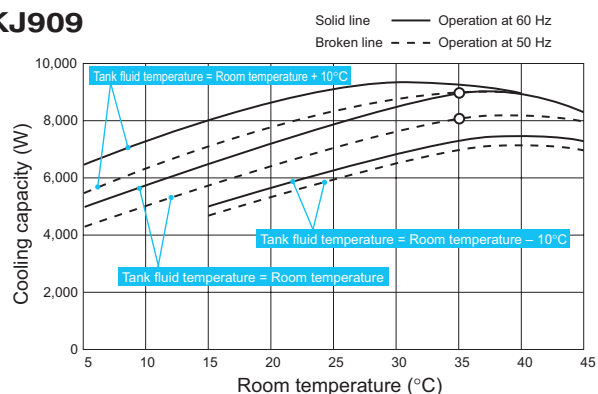
AKJ569



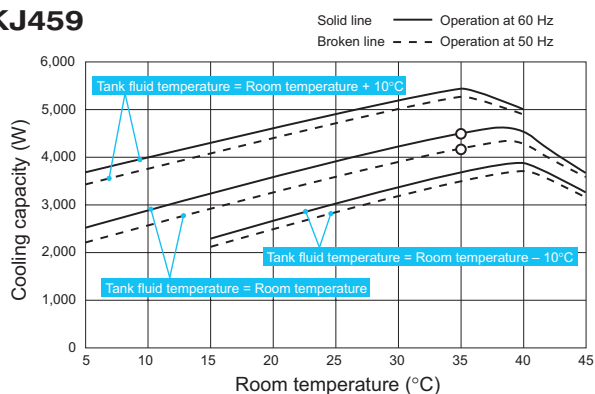
AKJ359



AKJ909



AKJ459



1. The mark "O" shows the standard point.
(Room temperature: 35°C/Oil inlet temperature: 35°C/Oil used: ISO VG32)
2. The cooling capacity varies depending on conditions such as the room temperature, tank fluid, oil dynamic viscosity and other factors.

Operation range

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

2. Be sure to use the unit within the range of use specified in L-25.
(Use outside this range may cause unit failure.)

