

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



Features

- **This is an immersion-type oil cooling unit mounted directly on the coolant tank.**
It is a cooler that is placed on the coolant tank and cools the fluid inside the tank directly with a cooling coil. The circulation pump is not provided as an accessory and must be prepared separately.
- **Highly accurate temperature control model by inverter control**
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.
- **Further downsizing from the previous model to achieve top class in the industry**
The height became shorter than previous model for more space ability with keeping same mounting foot print.
- **Enhanced support for shallow tanks with the reduced cooling coil depth**
Installation in shallower tanks when compared to previous products has been enabled by reducing the height of the immersion section within the tank, while maintaining the equivalent cooling performance.
- **Extension of cooling capacity control range**
Temperature control of $\pm 0.1^{\circ}\text{C}$ has been realized over a load range from 0% (no load) to 100%.
- **Achieve high energy-saving performance**
Achieve high energy-saving performance with the adoption of a Daikin original IPM motor and R410A refrigerant for high COP characteristics.

Nomenclature

AKJ	※※	9	-	※※※
1	2	3	4	

1 Oil cooling unit identification code

AKJ: High-precision inverter units, immersion type
For cutting/grinding fluid (oil)

2 Cooling capacity (kW)

18: 1.8 kW	56: 5.6 kW
35: 3.5 kW	90: 9.0 kW
45: 4.5 kW	150: 15.0 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.

Specifications of standard, optional, and non-standard types

■ 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

Different voltage type (2) With transformer

Different voltage type (3) With transformer

AC 220, 230 V

AC 380, 400, 415 V

AC 440, 460, 480V

50/60 Hz

50/60 Hz, With breaker

50/60 Hz, With breaker

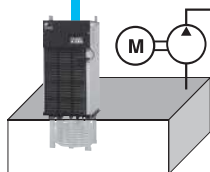
Applications

■ Example of major applications

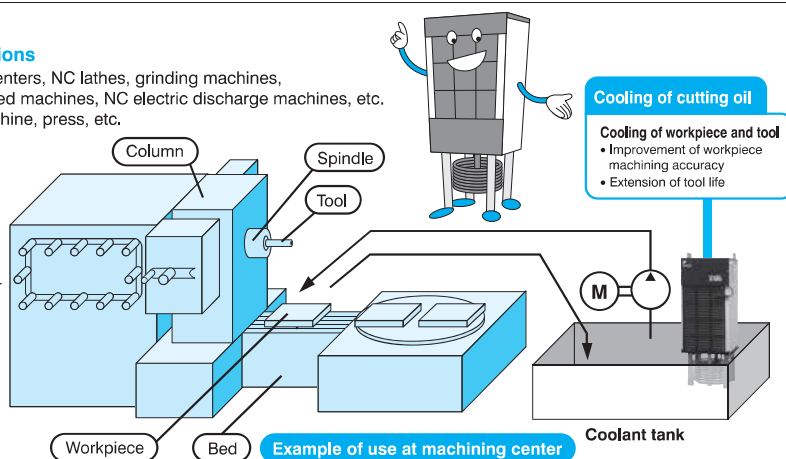
Machine tools: Machining centers, NC lathes, grinding machines, NC specialized machines, NC electric discharge machines, etc.
Industrial machine: Molding machine, press, etc.

Cooling of hydraulic oil

- Temperature (viscosity) control**
- Prevention of deterioration of hydraulic oil (Longer life)
 - Stabilized operation of actuators



Hydraulic Units



Example of use at machining center

Cooling of cutting oil

- Cooling of workpiece and tool**
- Improvement of workpiece machining accuracy
 - Extension of tool life

Coolant tank

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) ¹¹		kW				1.6/1.8				3.2/3.5				4.2/4.5							
Heater		kW		—		1		—		1		—		—		1					
Supply power ¹²		Three-phase AC 200/200·220 V 50/60 Hz					*3		Three-phase AC 200/200·220 V 50/60 Hz					*3		Three-phase AC 200/200·220 V 50/60 Hz					
Power voltage		Main circuit																			
		Operating circuit							DC12/24 V												
Maximum power consumption/ maximum 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							
		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			
		200 V 60 Hz		—		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			
		Transformer capacity				—		2.14 kVA				—		2.14 kVA				—		2.14 kVA	
	Exterior 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							3φ, 60 W, 4P												
Temperature adjust (Selectable)	Synchronization type	Standard		Room temperature or machine temperature ¹⁴ (Set to “Room temperature: Mode 3” by default)																	
		Object to be controlled		Tank fluid temperature																	
	Fixed type	Synchronization range		—9.9 to +9.9 against the standard temperature (Set at 0.0 by default)																	
		Object to be controlled		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) ¹⁵ Filling amount		kg		0.55					0.76					0.99							
Protection devices/protective functions		Agitator internal thermostat, discharge pipe temperature thermostat, condenser temperature thermostat, reverse-phase protection device, restart prevention timer, low room temperature protection thermostat, high fluid temperature protection thermostat, low fluid temperature protection thermostat, refrigerant leakage detector, inverter protection device set, circuit breaker (—B type only), high-pressure pressure switch (—C type only), compressor protection thermostat (—C type only), heating prevention temperature switch (—H type only), and temperature fuse (—H type only).																			
Operating range	Room temperature		℃							5 to 45											
	Tank fluid temperature		℃							5 to 50											
	Oil viscosity		mm ² /s							0.5 to 200											
Acceptable fluid		Water-soluble cutting/grinding fluid, cutting/grinding oil, lubrication oil, hydraulic oil, industrial water (Cannot be used for drugs, food products, and fuel)																			
Operating sound (value equivalent to measurement in an anechoic chamber) (Front 1 m, height 1 m)		dB(A)							62												
Transport vibration performance		Up and down vibration 14.7 m/s ² (1.5 G) × 2.5 hr (7.5 to 100 Hz sweep/five min.)																			
Protective structure ¹⁶		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) ¹⁷																
	Device other than molded-case circuit breaker		Tank, supply pump, float switch, return filter																		

Refer to Page L-21 for explanatory notes.

Specifications (AKJ569, 909, 1509)

Oil cooling unit horsepower (HP)		2.0					3.0					5.0									
Model name		AKJ569					AKJ909					AKJ1509									
		Standard	—B	—C	—H	Different voltage specifications*	Standard	—B	—C	—H	Different voltage specifications*	Standard	—B	—C	—H	Different voltage specifications*					
Cooling capacity (50/60 Hz)**		kW		5.0/5.6			8.0/9.0			15.0/15.0											
Heater		kW		2			4			4											
Supply power**		Three-phase AC 200/200·220 V 50/60 Hz			*3		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						DC12/24 V														
	Operating circuit																				
Maximum power consumption/ maximum current consumption	When cooling	200V 50 Hz		2.77 kW/9.4 A			*8	3.38 kW/10.8 A			*8	5.40 kW/17.3 A			*8						
		200V 60 Hz		2.72 kW/9.2 A				3.43 kW/10.7 A				5.37 kW/16.9 A									
		220V 60 Hz		2.83 kW/8.9 A				3.43 kW/10.2 A				5.40 kW/15.7 A									
	When heating	200V 50 Hz		—		2.32 kW/7.1 A		—		—		4.42 kW/13.1 A		—		4.60 kW/13.8 A		—			
		200V 60 Hz		—		2.33 kW/7.1 A		—		—		4.45 kW/13.1 A		—		4.60 kW/13.7 A		—			
		220V 60 Hz		—		2.79 kW/7.8 A		—		—		5.33 kW/14.4 A		—		5.49 kW/14.9 A		—			
Transformer capacity					—		2.79 kVA		—		5.02 kVA		—		7.7 kVA						
Exterior color							Ivory white														
External dimensions (H × W × D) mm					1,440 × 470 × 500			1,615 × 560 × 620			1,960 × 735 × 725										
Compressor (Hermetic DC swing type)					Equivalent to 1.5 kW			Equivalent to 2.2 kW			Equivalent to 1.5 kW + equivalent to 2.2 kW										
Evaporator							Open coil type														
Condenser							Cross-fin coil type														
Propeller fan	Motor				100 W							100 W × 2									
Agitator	Motor						3φ, 60 W, 4P														
Temperature adjust (Selectable)	Synchronization type	Standard		Room temperature or machine temperature*4 (Set to "Room temperature: Mode 3" by default)																	
		Object to be controlled		Tank fluid temperature																	
	Fixed type	Synchronization range		—9.9 to +9.9 against the standard temperature (Set at 0.0 by default)																	
		Object to be controlled		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 amount		kg		1.07			1.58			1.07+1.58											
Protection devices/protective functions		Agitator internal thermostat, discharge pipe temperature thermostat, condenser temperature thermostat, reverse-phase protection device, restart prevention timer, low room temperature protection thermostat, high fluid temperature protection thermostat, low fluid temperature protection thermostat, refrigerant leakage detector set, circuit breaker (—B type only), high-pressure pressure switch (—C type only), compressor protection thermostat (—C type only), heating prevention temperature switch (—H type only), and temperature fuse (—H type only).																			
Operating range	Room temperature	°C					5 to 45														
	Tank fluid temperature	°C					5 to 50														
	Oil viscosity	mm²/s					0.5 to 200														
Acceptable fluid		Water-soluble cutting/grinding fluid, cutting/grinding oil, lubrication oil, hydraulic oil, industrial water (Cannot be used for drugs, food products, and fuel)																			
Operating sound (value equivalent to measurement in an anechoic chamber) (Front 1 m, height 1 m)		dB(A)		65			68			69											
Transport vibration performance		Up and down vibration 14.7 m/s² (1.5 G) × 2.5 hr (7.5 to 100 Hz sweep/five min.)																			
Protective structure*6		IP2X																			
Mass		kg		72		75		97		89		93		117		140		144		180	
Molded-case circuit breaker (Rated current)		A		—		15		—		—		20		—		—		30		—	
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)*7						30 (Required for types other than the -B type)*7					
	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 <water in the case of AKJ1509>). 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 the voltage fluctuation range is more than ±10%, please consult us.

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

AC220, 230 V : Option code -046 (without transformer)

AC380, 400, 415 V : Option code -047 (with built-in transformer)

AC440, 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. (Refer to the catalog for each oil cooling unit for details.)

*5. The SDS (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
220V 50Hz	0.82kW / 3.0A
60Hz	0.83kW / 3.0A
230V 50Hz	0.82kW / 2.9A
60Hz	0.83kW / 2.8A
380V 50/60Hz	1.8A
400V	1.7A
415V	1.6A
440V	1.5A
460V	1.5A
480V	1.4A

■ AKJ359

Supply power	Power/current
220V 50Hz	1.38kW / 4.8A
60Hz	1.38kW / 4.8A
230V 50Hz	1.39kW / 4.6A
60Hz	1.38kW / 4.6A
380V 50/60Hz	2.8A
400V	2.6A
415V	2.5A
440V	2.4A
460V	2.3A
480V	2.2A

■ AKJ459

Supply power	Power/current
220V 50Hz	1.46kW / 5.1A
60Hz	1.48kW / 5.1A
230V 50Hz	1.46kW / 4.9A
60Hz	1.48kW / 4.7A
380V 50/60Hz	3.0A
400V	2.8A
415V	2.7A
440V	2.6A
460V	2.5A
480V	2.4A

■ AKJ569

Supply power	Power/current
220V 50Hz	2.92kW / 9.0A
60Hz	2.83kW / 8.9A
230V 50Hz	2.92kW / 8.6A
60Hz	2.83kW / 8.3A
380V 50/60Hz	4.9A
400V	4.7A
415V	4.5A
440V	4.3A
460V	4.1A
480V	3.9A

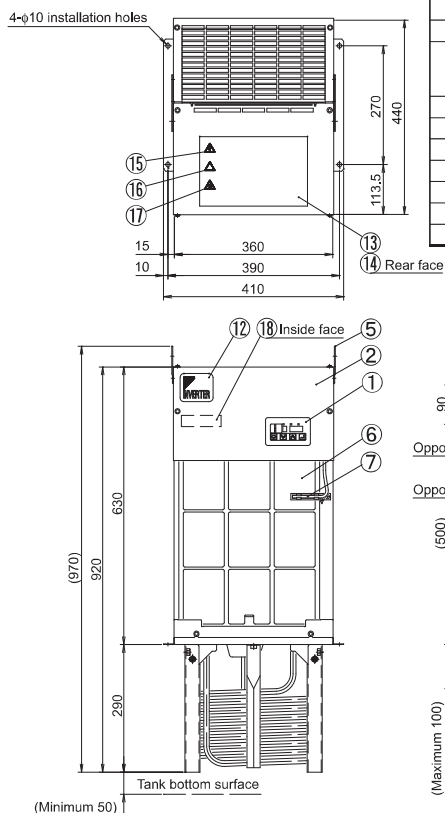
■ AKJ909

Supply power	Power/current
220V 50Hz	3.41kW / 10.3A
60Hz	3.43kW / 10.2A
230V 50Hz	3.41kW / 9.9A
60Hz	3.44kW / 9.8A
380V 50/60Hz	5.7A
400V	5.4A
415V	5.2A
440V	4.9A
460V	4.7A
480V	4.5A

■ AKJ1509

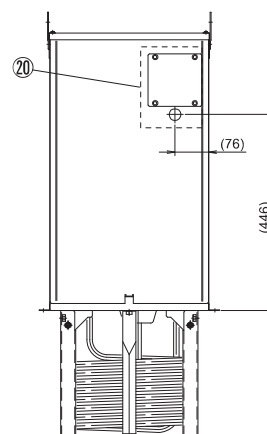
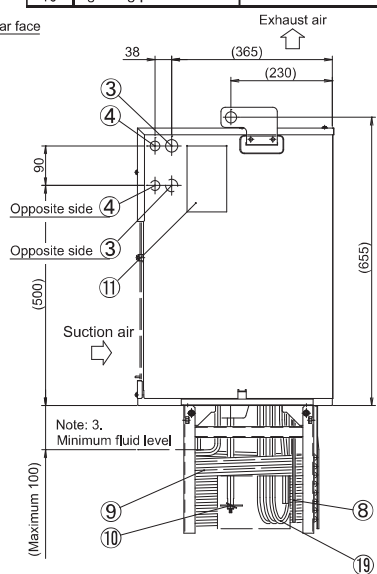
Supply power	Power/current
220V 50Hz	5.38kW / 15.8A
60Hz	5.40kW / 15.7A
230V 50Hz	5.38kW / 15.4A
60Hz	5.41kW / 15.3A
380V 50/60Hz	9.1A
400V	8.7A
415V	8.4A
440V	7.9A
460V	7.5A
480V	7.3A

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

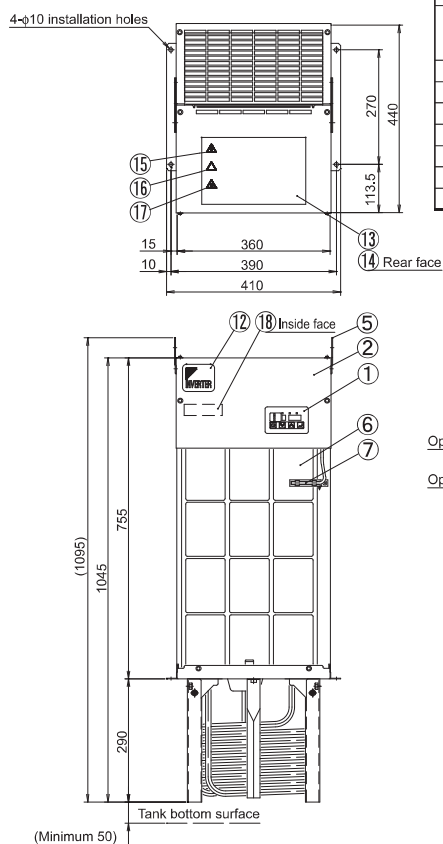


Part No.	Name	Description
1	Control panel	
2	Top panel	
3	Power supply inlet (Right/Left)	φ28 hole Different voltage option Excluding -047 and -048
4	Signal line inlet (Right/Left)	φ22 hole
5	Eye plate	φ25 hole
6	Air filter	
7	Room temperature thermistor	
8	Fluid temperature thermistor	
9	Cooling coil	
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	ø28 hole Different voltage option Excluding -047 and -048

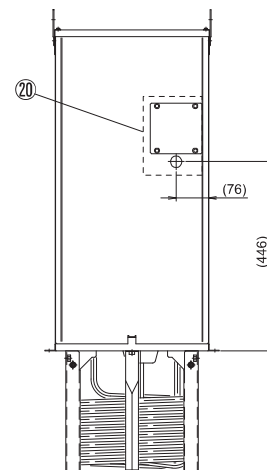
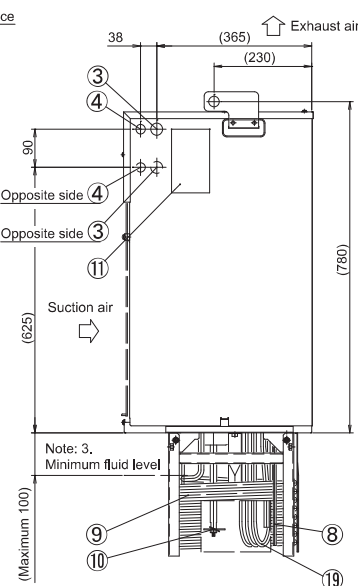


AKJ359 (-B, -C, -H, -046, -047, -048)



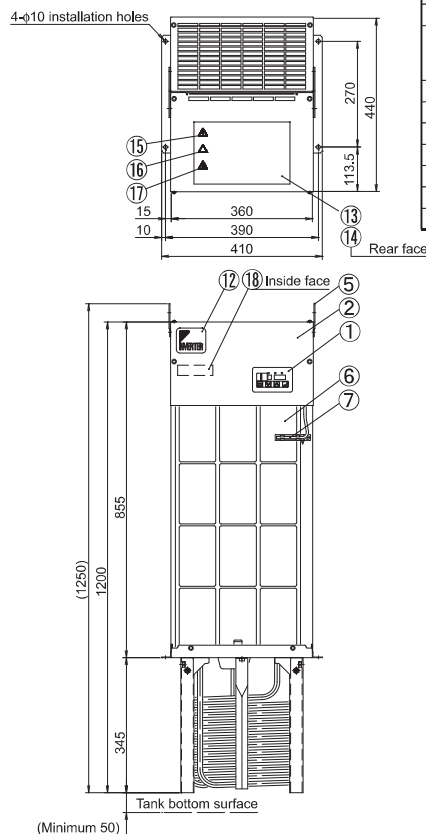
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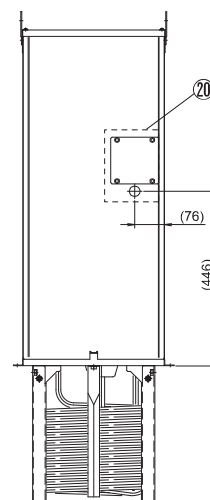
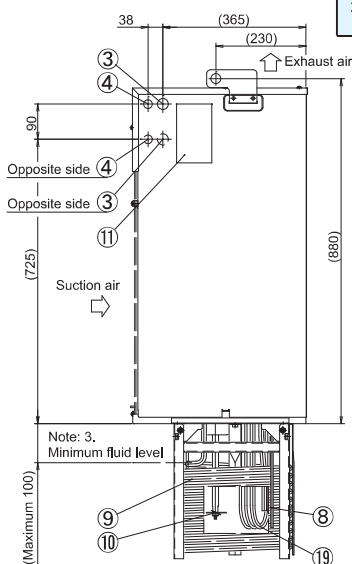
External dimension diagram

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

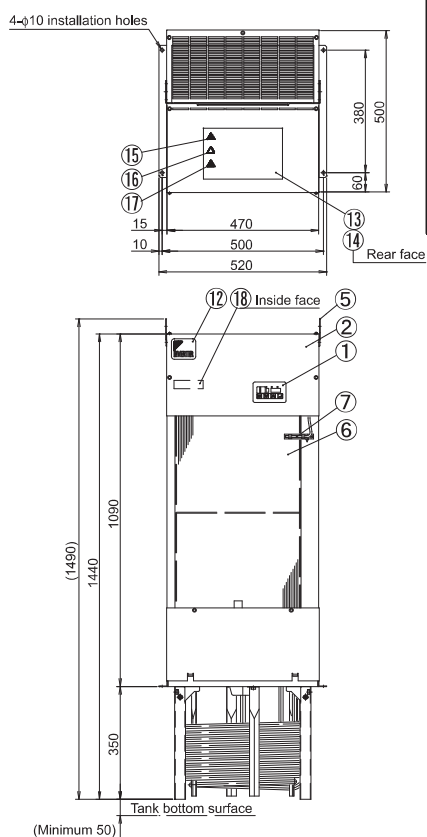


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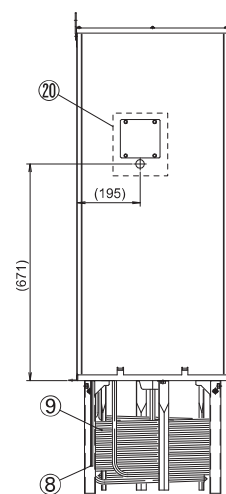
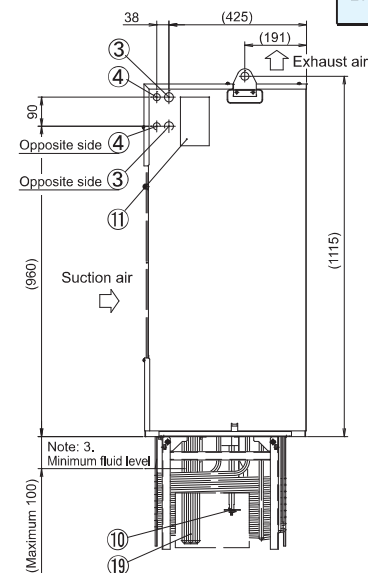


AKJ569 (-B,-C,-H,-046,-047,-048)



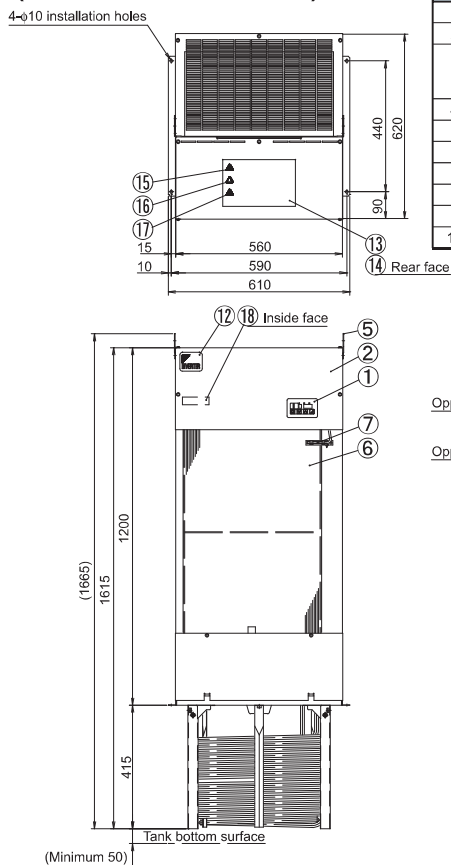
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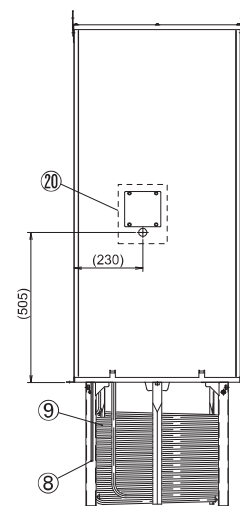
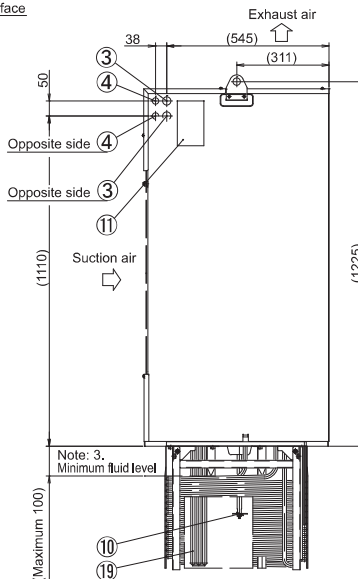
External dimension diagram

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

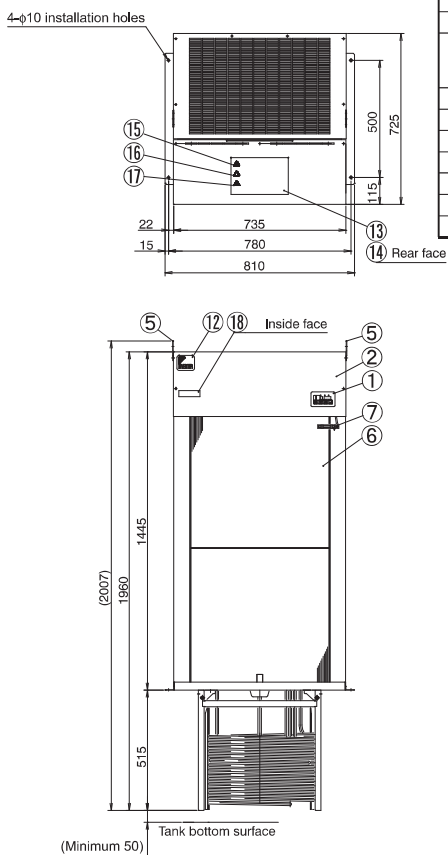


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3	Power supply inlet (Right/Left)	φ28 hole Different voltage option Excluding -047 and -048
4	Signal line inlet (Right/Left)	φ22 hole
5	Eye plate	φ25 hole
6	Air filter	
7	Room temperature thermistor	
8	Fluid temperature thermistor	
9	Cooling coil	
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

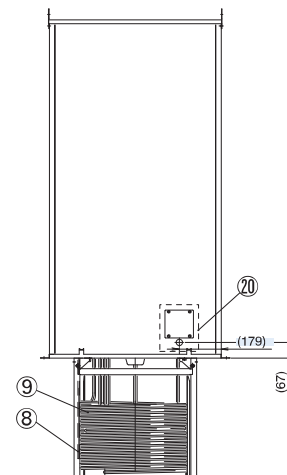
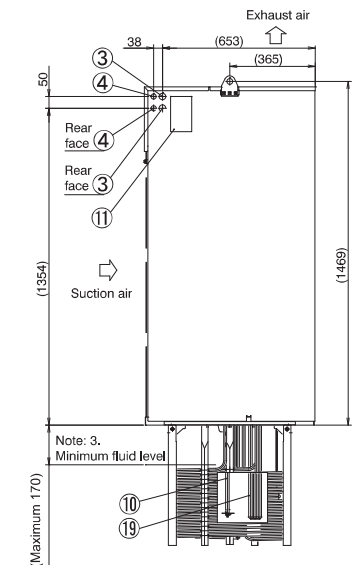


AKJ1509 (-B, -C, -H, -046, -047, -048)

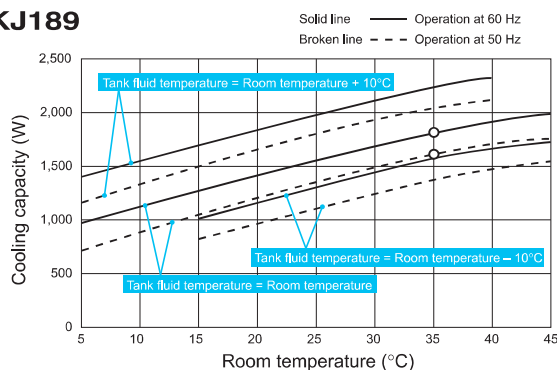
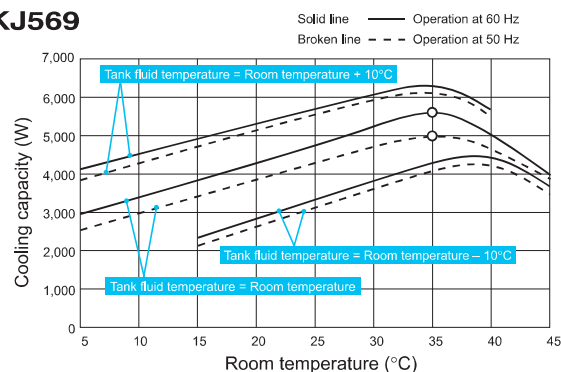
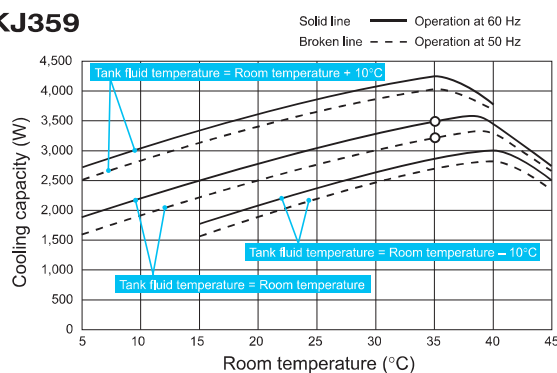
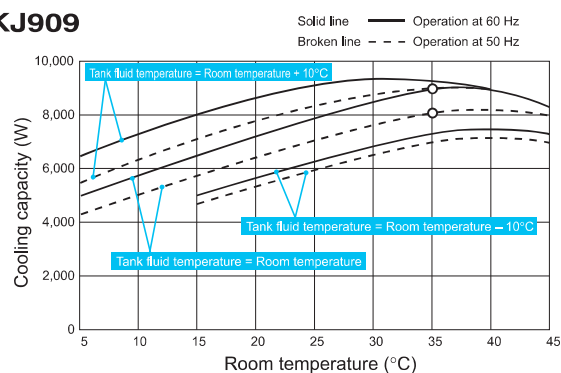
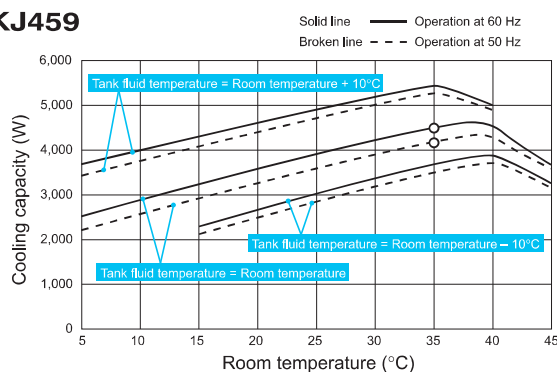
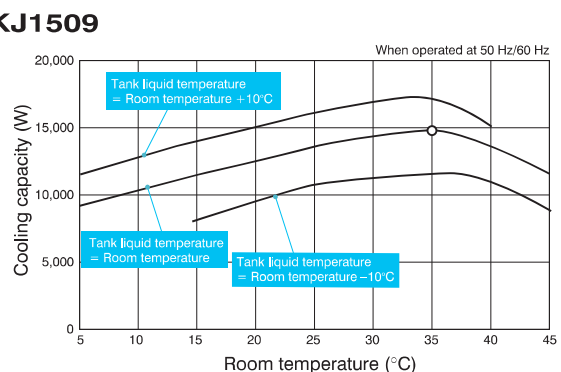


Part No.	Name	Description
1	Control panel	
2	Top panel	
3	Power supply inlet (Right/Left)	φ28 hole Different voltage option Excluding -047 and -048
4	Signal line inlet (Right/Left)	φ22 hole
5	Eye plate	φ25 hole
6	Air filter	
7	Room temperature thermistor	
8	Fluid temperature thermistor	
9	Cooling coil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



Cooling capacity characteristic chart

AKJ189

AKJ569

AKJ359

AKJ909

AKJ459

AKJ1509


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 "O" 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.)

