



# OIL COOLING UNIT

## AKZ/AKZJ 8 SERIES

Use of new refrigerant R410A

Use of super energy-efficient technology and  
IPM motor unique to Daikin  
More advanced inverter oil cooling unit

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# 8 SERIES



AKZ 8 series  
(Circulating type)

AKZJ 8 series  
(Immersion type)

DAIKIN INDUSTRIES, LTD.  
Oil Hydraulic Division  
Oil Hydraulic Equipment

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# FUSION TECHNOLOGY FOR CONTROL

The fusion of “hydraulic technology” and “inverter technology” achieves more advanced high-accuracy temperature regulation and energy saving performance.

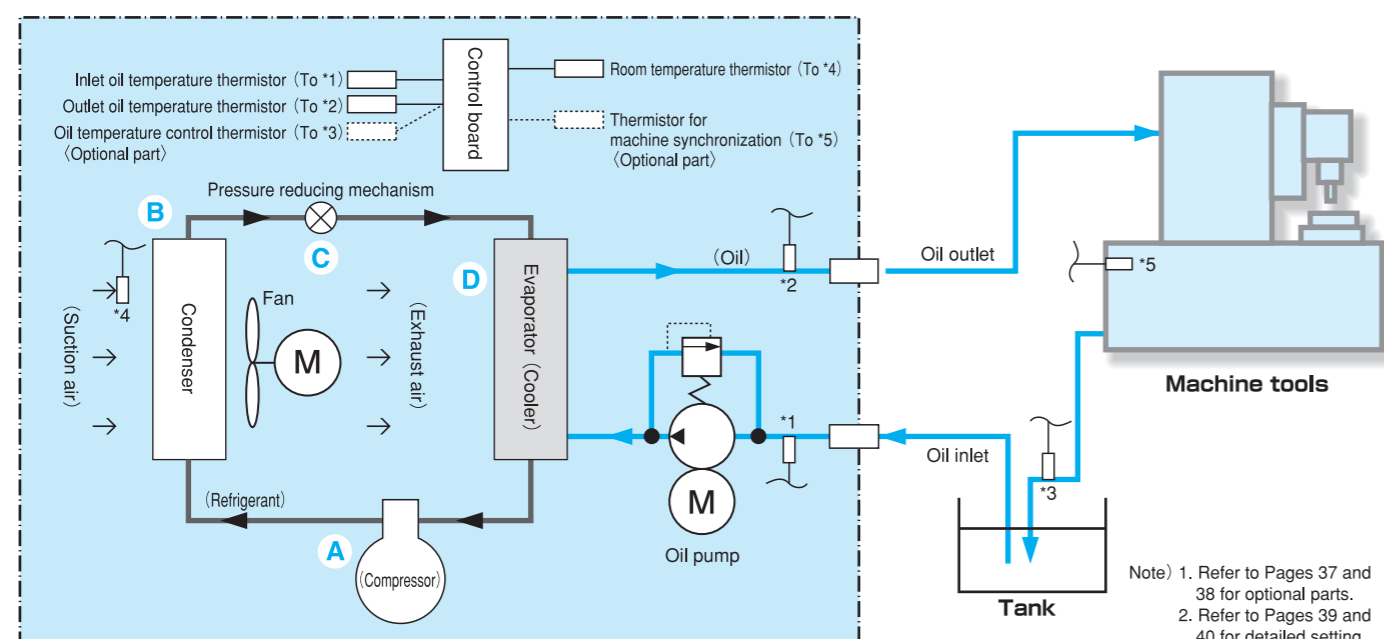
Shorter delivery of a product is enabled by developing individual specifications for general purpose into menus.

Daikin aims at the production of environmentally-friendly products through energy saving efforts at production sites and reduction of waste by recycling of material.

Daikin is in pursuit of further energy saving technology and more versatile functions. In these attempts, a more advanced energy-efficient inverter “Oil Cooling Unit” 8 series was developed with the super energy-efficient technology combined with the IPM motor unique to Daikin used in air conditioners.

In the hope that your machine tools operate in the optimum conditions at all times, Daikin developed Oil Cooling Unit which is supported by the excellent hybrid system. Please try Daikin’s Oil Cooling Unit materializing the technical strength and our passion for providing the best technology to you.

## Common Information Principle of Oil Cooling Unit and overall system diagram



### [Refrigerating cycle]

- A: Refrigerant gas is converted into compressed gas at high temperature and high pressure by a compressor so that gas can be easily cooled and liquefied by a condenser.
- B: In the condenser, the gas at high temperature and high pressure made in the compressor is cooled with air and converted into liquid at high temperature and high pressure.
- C: The pressure reduction mechanism reduces the pressure of the liquid at high temperature and high pressure and converts it into liquid at low temperature and low pressure by squeezing it so that it can be easily evaporated in a cooler.
- D: In the cooler, liquid at low temperature and low pressure made in the pressure reduction mechanism removes heat from oil, evaporates (cools oil), and is converted into gas at low temperature and low pressure.

Note) 1. Refer to Pages 37 and 38 for optional parts.  
2. Refer to Pages 39 and 40 for detailed setting and others.

## Why machine tools require Oil Cooling Unit?

### Latest machine tools needs

#### High-speed rotation: Improving surface roughness and accuracy

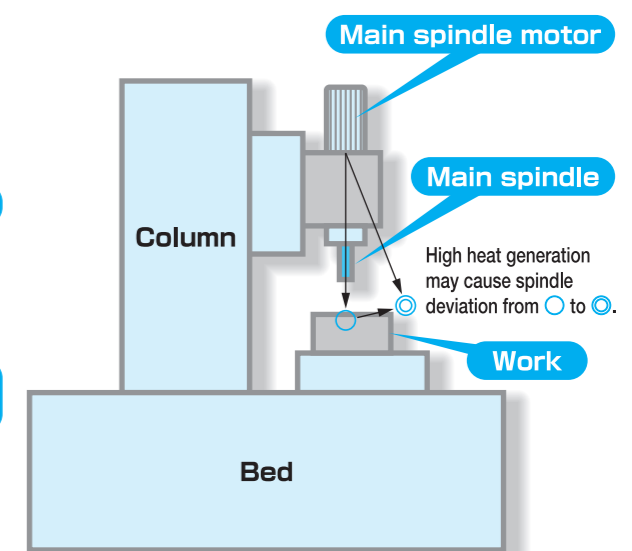
Heat is generated at headstock bearings and gears. The entire main spindle is warmed and the spindle deviates from the center of the column and the head, which results in poor accuracy. It is because there are differences in temperature among machine parts. Oil Cooling Unit can control heat generation at the headstock, and the deviation can be corrected. Oil Cooling Unit lubricates the headstock gears and removes the heat generated. It is helpful to improve machine accuracy. (AKZ8 series)

#### Increased machining accuracy of work and extension of tool life

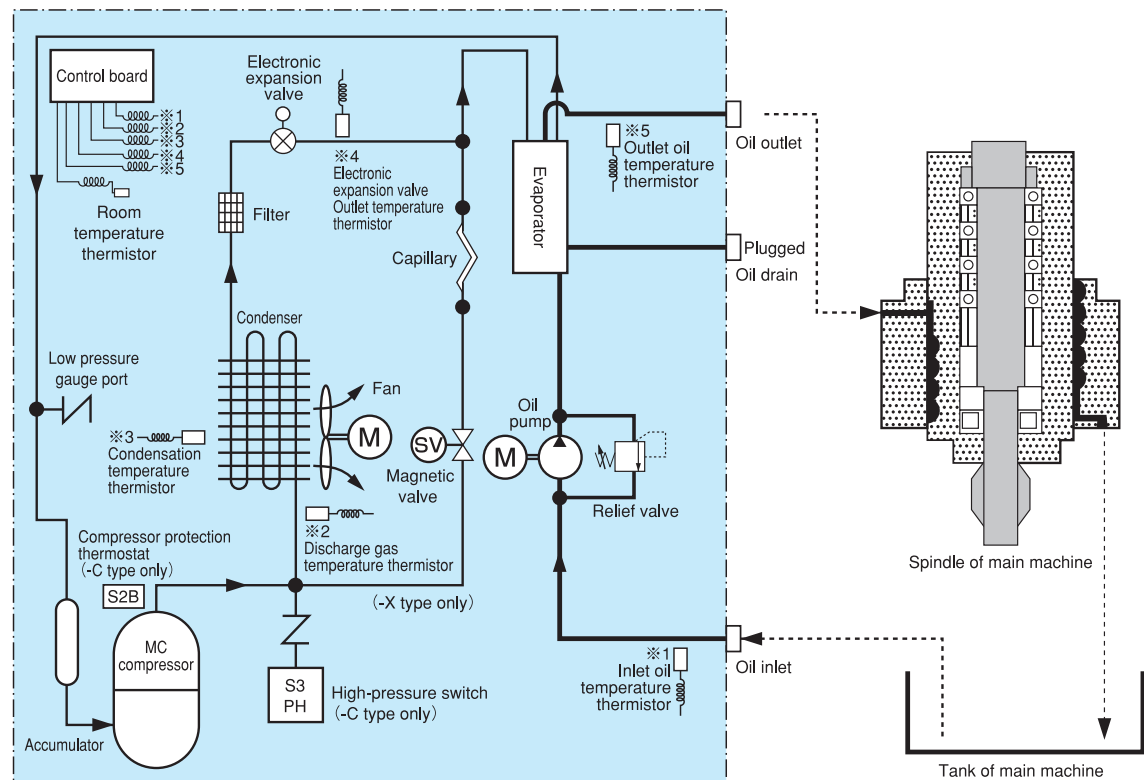
Highly accurate processing can be attained by controlling temperature of cutting and grinding fluids. In addition, longer tool life can be attained and deterioration of coolant can be reduced. Oil Cooling Unit contributes to improve machine operation efficiency. (AKZJ8 series)

#### Controlling oil temperature to optimum value according to heat generation of main machine

Oil Cooling Unit compressor frequency valuable control gives appropriate cooling capacity according to the heat generated on the main machine side to meet the operating condition. The fluid temperature can be controlled accurately depending on load fluctuation from lowest to highest. Unlike the conventional non-inverter Oil Cooling Unit, the cooling capacity can be controlled in a wider range. Not only inlet fluid oil temperature control; but outlet fluid oil temperature control, return fluid oil temperature control, room temperature tuning, machine temperature tuning, and other operation modes can be selected according to the conditions of main machine.



# AKZ Series piping system diagram



Principle Piping system diagram

# Common Information Description of model symbols



- Standard type (Basic type of Oil Cooling Unit)**  
AKZ : High-accuracy inverter machine, circulating type  
Main shaft / for lubricant  
AKZJ : High-accuracy inverter machine, immersion open type  
Cutting for cutting and grinding liquid (oil)
- Nominal capacity (kW) × 10**  
Adopted from the numeric sequence of JIS Z 8601 (2 digits)  
Ex.) "14" represents the nominal capacity 1.4 kW  
14, 18, 32, 35, 43, 45, 56, 90, etc.
- Symbol of series (Symbol to represent model change)**  
6, 7, 8, ...
- Symbol of menu (B, C, E, H, T, X)**  
Individual specifications for general purpose are set as a menu so as to eliminate the need to design the individual specifications in each case and to allow a shorter delivery of a product.  
\* For the combination of menus, please contact us for detailed information.
- Individual order symbol (Four alphanumeric characters)**  
Non-standard type according to individual specifications not incorporated in the menu.  
\* Please consult us for special specifications (such as compliance with UL, processing for tropical region type).

Principle Description of model symbols

## Specifications of standard, menu, and non-standard types

### AKZ8 (Circulating type)

	Standard type	Menu	Non-standard	Remarks
Use of low-viscosity oil	<input type="radio"/>			Viscosity of oil for use : 1.4 – 200 mm <sup>2</sup> /S
Relief pressure : 0.5Mpa	<input type="radio"/>			Pump relief open pressure
With timer	<input type="radio"/>			99-hour timer
With outlet temperature sensor	<input type="radio"/>			
With breaker		B		
Compliance with CE		C		European Safety Standard
Different voltages (With transformer)		E*		The type "E" marked with "*" includes three voltage types (E1, E2, E3) as listed on the right. E1:AC220,230V 50/60Hz E2:AC380,400,415V 50/60Hz E3:AC440,460,480V 50/60Hz
With heater		H		
With tank		T1, T		T1 (AKZ148·AKZ328·AKZ438) , T (AKZ568, AKZ908)
Low load control		X		Cooling capacity control range : 0-100% (AKZ148, AKZ328, AKZ438, AKZ568) (Excluding Type H)
Relief pressure : 0.98 Mpa			<input type="radio"/>	Unit with separately installed pump
Relief pressure : 1.47 Mpa			<input type="radio"/>	Unit with separately installed pump
Use of twin pump			<input type="radio"/>	Unit with separately installed pump
Specified painting color			<input type="radio"/>	
With extension board for serial / parallel communication			SP	Standard type of AKZ148, AKZ328, AKZ438, and -C, -E*, -T* types

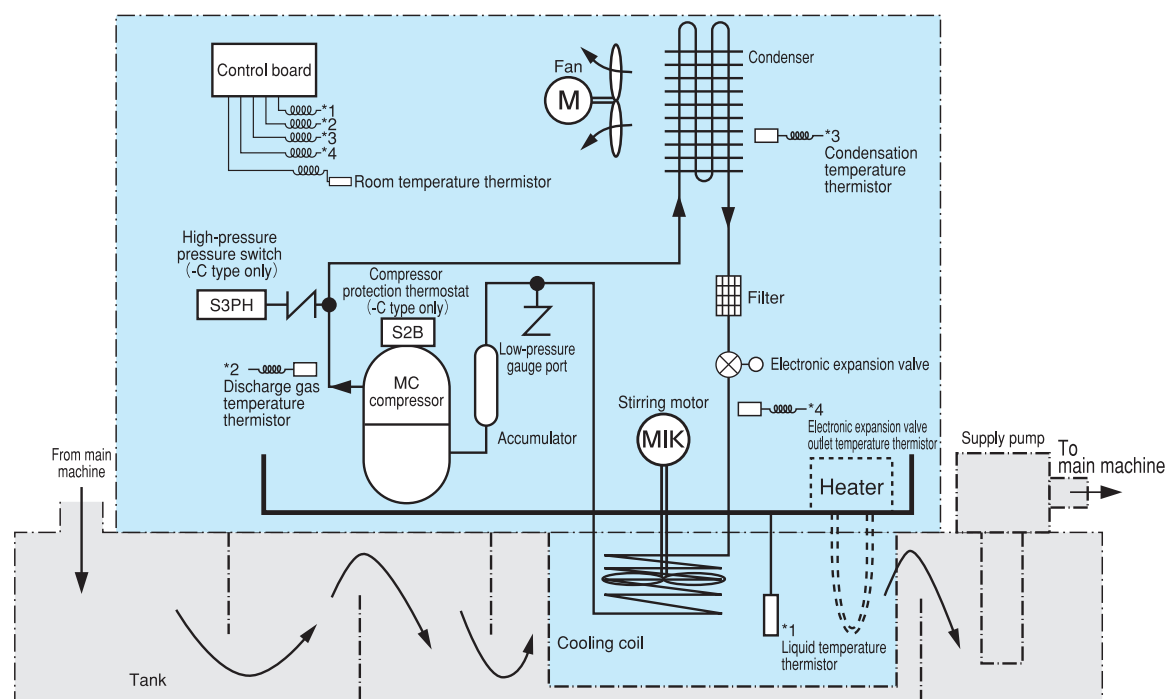
### AKZJ8 (Immersion type)

	Standard type	Menu	Non-standard	Remarks
Use of low-viscosity oil (liquid)	<input type="radio"/>			Viscosity of oil for use : 0.5 – 200 mm <sup>2</sup> /S
With timer	<input type="radio"/>			99-hour timer
With breaker		B		
Compliance with CE		C		European Safety Standard
Different voltages (With transformer)		E*		The type "E" marked with "*" includes three voltage types (E1, E2, E3) as listed on the right. E1:AC220,230V 50/60Hz E2:AC380,400,415V 50/60Hz E3:AC440,460,480V 50/60Hz
With heater		H		
Specified painting color			<input type="radio"/>	
With extension board for serial / parallel communication			SP	Standard type of AKZJ188, AKZJ358, AKZJ458, and -C, -E* types

### Optional parts (Refer to Pages 37 and 38)

- Thermistor for machine synchronization (Lead wire length: 5m, 10m, 15m)
- Thermistor for oil temperature control (Lead wire length: 5m, 10m)
- Extension board for main machine communication (Serial communication, serial / parallel communication enabled)

# AKZJ series system piping diagram



Note) 1. The area included in a frame is the area to be locally prepared and installed.  
2. The heater is used only on AKZJ-H.

OIL COOLING UNIT

# AKZ 8

Circulation type SERIES



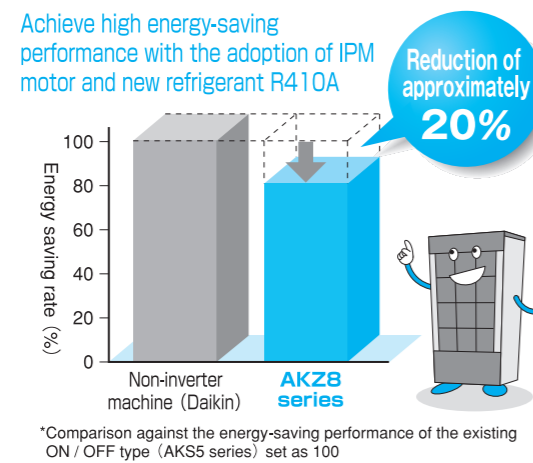
AKZ 8 series Features

## AKZ 8 Overview

- High-accuracy type by inverter control of compressor and control by electronic expansion valve
- Circulating Oil Cooling Unit (Incorporated circulating pump)
- Enclosed cooler
- New refrigerant R410A (Ozone Depletion Potential [ODP]: 0)
- Enable the temperature control in low-load zone by the increased control range of cooling capacity  
<Existing type: 10 - 100%, → 8 series: 0 - 100% (5 - 100% on some types)>
- Wider operating temperature range (Room temperature: 5 - 45°C, Inlet oil temperature: 5 - 50°C)

## AKZ 8 Features

### Achieve high energy-saving performance



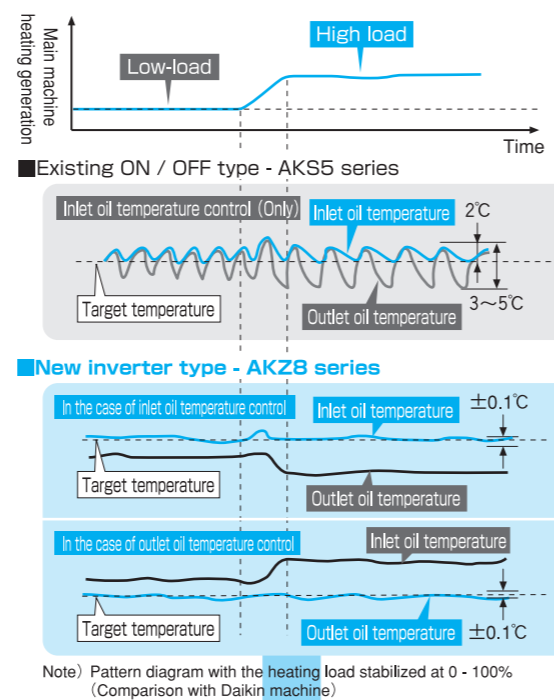
### Achieve low-noise operation

**68dB (A) → 62dB (A)**  
in AKZ 1.2HP class

Value equivalent as measured in an anechoic chamber

It is generally known that ordinary conversation can be conducted with a person one meter away in an environment at a noise level of 60dB (A).

### Achieve high-accuracy temperature control



Inverter control maintains your machine at optimum operating conditions at all times and improves the machining accuracy of the machine.

## AKZ 8 Features

### Extension of cooling capacity control range

Achieve the low-load control at 0 - 100% (except AKZ908).

### Assure relief pressure of 0.5Mpa as the standard

0.3Mpa on the existing type  
→ Significant solution of piping pressure loss

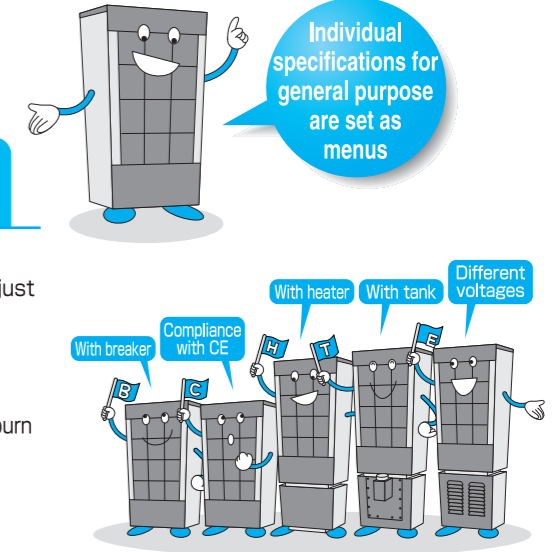
### Use of low-viscosity pump as the standard

Viscosity range of oil for use: 1.4 - 200 mm<sup>2</sup>/s

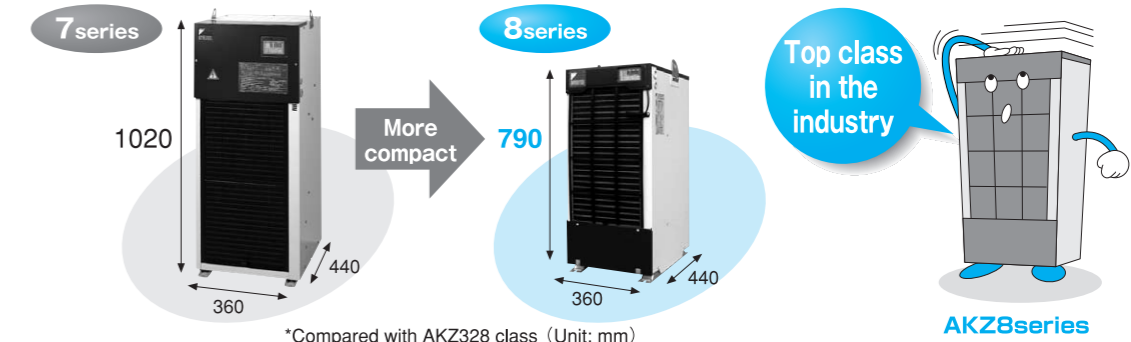
### New convenient function in addition to the current oil temperature warning function

- Auto tuning function  
Since the temperature control gain is automatically set just by operating the main machine at no load for 10 to 20 minutes, the trial run adjusting time is greatly reduced.
- Refrigerant gas shortage detection function  
When the refrigerant gas leak status occurs (cooling disabled), alarm signals are output. Indirectly prevent the burn of spindle.
- 99-hour timer function (ON timer)  
The operation start time can be set in a range between 0 and 99 hours (Unit in hour).

Five types of menu machines in addition to the standard type enable a shorter delivery of product



### Compact design of top class in the industry

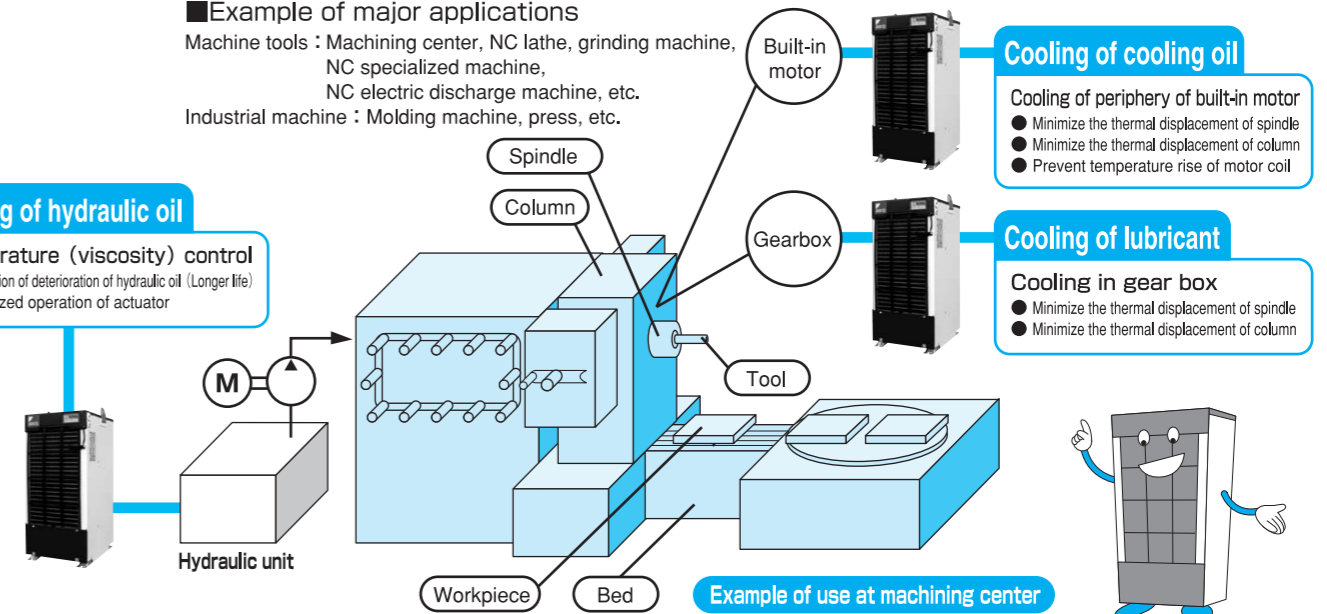


## AKZ 8 Applications

- Example of major applications
- Machine tools : Machining center, NC lathe, grinding machine, NC specialized machine, NC electric discharge machine, 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 actuator



## Specifications (AKZ148·328·438)

Oil Cooling Unit horsepower (HP)	0.5					1.2					1.5										
	AKZ148					AKZ328					AKZ438										
Model name	Standard	-B	-C	-Y <sup>9)</sup>	-H	-T1 <sup>*8)</sup>	-E <sup>*3)</sup>	Standard	-B	-C	-Y <sup>9)</sup>	-H	-T1 <sup>*8)</sup>	-E <sup>*3)</sup>	Standard	-B	-C	-Y <sup>9)</sup>	-H	-T1 <sup>*8)</sup>	-E <sup>*3)</sup>
Cooling capacity (50/60Hz) <sup>*1)</sup> kW	1.3/1.4					2.8/3.2					3.8/4.3										
Heater kW	1					1					1										
Supply power <sup>*2)</sup>	Three phase AC 200/200·220V 50/60Hz					*3					Three phase AC 200/200·220V 50/60Hz					*3					
Circuit voltage	Main circuit																				
	Operating circuit																				
Max. power consumption	200V 50Hz					1.20kVA/3.5A					1.70kVA/5.3A					2.31kVA/6.6A					
	200V 60Hz					1.32kVA/3.7A					1.73kVA/5.5A					2.35kVA/6.8A					
Max. consumption current	220V 60Hz					1.33kVA/3.9A					1.75kVA/5.7A					2.45kVA/7.0A					
	2.6kVA					2.6kVA					2.6kVA										
Transformer capacity	—					2.6kVA					—					2.6kVA					
Exterior color	White																				
Outside dimensions (HXWXD) mm	650X360X440	950X360X440	820X360X465	950X360X440	790X360X440	1090X360X440	1055X360X465	1090X360X440	990X360X440	1290X360X440	1225X360X465	1290X360X440	1290X360X440	1290X360X440	1290X360X440	1290X360X440	1290X360X440	1290X360X440	1290X360X440	1290X360X440	1290X360X440
Compressor (Totally enclosed DC swing type)	Equivalent to 0.4kW					Equivalent to 0.75kW					Equivalent to 1.1kW										
Evaporator	Shell-end coil type																				
Condenser	Cross-fin coil type																				
Propeller fan	Motor																				
Oil pump	Motor																				
	Theoretical discharge rate L/min	12/14.4					24/28.8					24/28.8									
Open pressure MPa	0.5					0.6					0.6										
Temperature adjust (Selectable)	Syn-chronization type																				
	Standard																				
	Room temperature or machine temperature *4 (Set to "Room temperature: Mode 3" by default)																				
	Object to be controlled																				
Refrigerant control	Standard																				
	Room temperature or machine temperature *4 (Set to "Room temperature: Mode 3" by default)																				
	Object to be controlled																				
	Inlet oil temperature or outlet oil temperature (Set to "Inlet oil temperature" by default)																				
Protection equipment	Syn-chronization type																				
	Standard																				
Room temperature or machine temperature *4 (Set to "Room temperature: Mode 3" by default)																					
Object to be controlled																					
Inlet oil temperature or outlet oil temperature (Set to "Inlet oil temperature" by default)																					
—9.9~+9.9 against the standard temperature (Set at 0.0 by default)																					
Object to be controlled																					
Inlet oil temperature or outlet oil temperature																					
5~50																					
Compressor revolutions by inverter + Opening of electric expansion valve																					
0.49																					
0.72																					
0.98																					
A set of overcurrent relay (motor for pump), reverse-phase protection equipment, restart prevention timer, low room-temperature protection thermostat, high room-temperature protection thermostat, low oil-temperature protection thermostat, relief valve for pump, discharge tube temperature thermostat, condenser temperature thermostat, refrigerant leak detector, and inverter protection equipment. High-pressure switch (-C type only), compressor protection thermostat (-C type only), overheat prevention temperature thermostat (-H type only), boil-dry protection switch (-H type only)																					
Room temperature °C																					
5~45																					
Inlet oil temperature °C																					
5~50																					
Oil viscosity mm <sup>2</sup> /s																					
1.4~200 (ISO VG2~32)																					
Product external pressure loss																					
0.5MPa or less																					
Discharge side																					
-30.7kPa or less																					
Suction side																					
-30.7kPa or less																					
Lubricant, hydraulic oil of mineral oil (Not usable for hydraulic oil of ester phosphate, water, water-soluble liquid, drugs, food products, fuel, cutting liquid, grinding liquid, etc.)																					
Oil inlet																					
Rc3/4																					
Oil outlet																					
Rc3/4 Rc1 1/4 Rc3/4 Rc1 1/4 Rc3/4 Rc1 1/4 Rc3/4																					
Oil drain																					
Rc1/4 (Plugged)																					
Noise value (Value measured at 1m high in front, value equivalent as measured in anechoic chamber) dB (A)																					
62																					
65																					
Transport vibration performance																					
Up down 14.7m/S <sup>2</sup> (1.5G) X2.5 hr (10~100Hz sweep / 5 min.)																					
Mass kg																					
52 53 62 65 110 58 60 68 73 116 67 77 82 125																					
Molded-case circuit breaker (Rated current) A																					
-10 -10																					
Oil tank (Capacity) L																					
— — 15 — — 20 — — — — 20 — —																					
To be prepared locally																					
Molded-case circuit breaker (Rated current) A																					
10 (Required for types other than -B type)																					

Note) \*1. The cooling capacity represents the value at the standard point (inlet oil temperature: 35°C, room temperature: 35°C, oil for use: ISO VG32). The tolerance of the product is approx. ±5%.  
 \*2. Be sure to 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 three types of different voltages (-E1, -E2, -E3 types) according to the supply voltage. (Refer to Page 4 for details.)  
 \*4. The machine synchronization thermistor optionally available is required for this function. (Refer to Page 37 for details.)  
 \*5. The MSDS (Material Safety Data Sheet) of refrigerant R410A is attached to -C type.  
 \*6. The molded-case circuit breaker is not supplied with this product. Please prepare it by yourself.  
 \*7. Existing machines of 1HP class (AKS105AK, AKZ (S) 257 class) were integrated into AKZ328 of 1.2HP class.  
 \*8. The yellow line on the tank oil level gauge shows the highest oil level and the red line the lowest oil level.  
 \*9. The types -X and -H cannot be selected simultaneously.

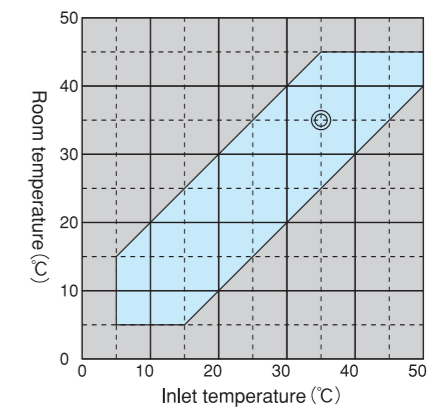
## Specifications (AKZ568·908)

Oil Cooling Unit horsepower (HP)	2.0					3.0														
	AKZ568					AKZ908														
Model name	Standard	-B	-C	-Y <sup>9)</sup>	-H	-T <sup>*8)</sup>	-E <sup>*3)</sup>	Standard	-B	-C	-H	-T <sup>*8)</sup>	-E <sup>*3)</sup>							
Cooling capacity (50/60Hz) <sup>*1)</sup> kW	5.0/5.6					8.0/9.0														
Heater kW	2					3														
Supply power <sup>*2)</sup>	Three phase AC 200/200·220V 50/60Hz					*3					Three phase AC 200/200·220V 50/60Hz					*3				
Circuit voltage	Main circuit																			
	Operating circuit																			
Max. power consumption	200V 50Hz					3.21kVA/9.4A					5.02kVA/15.2A									
	200V 60Hz					3.30kVA/9.5A					5.14kVA/15.6A									
Max. consumption current	220V 60Hz					3.34kVA/9.2A					5.20kVA/14.5A									
	5kVA					5kVA					6kVA									
Transformer capacity	—					5kVA					—					6kVA				
Exterior color	White																			
Outside dimensions (HXWXD) mm	1110X470X500	1410X470X560	1375X470X580	1360X470X590	1220X560X620	1520X560X680	1485X560X700	1470X560X695	1470X560X695	1470X560X695	1470X560X695	1470X560X695	1470X560X695							
Compressor (Totally enclosed DC swing type)	Equivalent to 1.5kW					Equivalent to 2.2kW														
Evaporator	Shell-end coil type																			
Condenser	Cross-fin coil type																			
Propeller fan	Motor																			
Oil pump	Motor																			
	Theoretical discharge rate L/min	30/36					0.75kW X4P													
Open pressure MPa	0.6					0.6														
Temperature adjust (Selectable)	Syn-chronization type																			
	Standard																			
	Room temperature or machine temperature *4 (Set to "Room temperature: Mode 3" by default)																			
	Object to be controlled																			
Refrigerant control	Standard																			
	Room temperature or machine temperature *4 (Set to "Room temperature: Mode 3" by default)																			
	Object to be controlled																			
	Inlet oil temperature or outlet oil temperature (Set to "Inlet oil temperature" by default)																			
—9.9~+9.9 against the standard temperature (Set at 0.0 by default)																				
Object to be controlled																				
Inlet oil temperature or outlet oil temperature																				
5~50																				
Compressor revolutions by inverter + Opening of electric expansion valve																				
1.25																				
1.53																				
A set of overcurrent relay (motor for pump), reverse-phase protection equipment, restart prevention timer, low room-temperature protection thermostat, high room-temperature protection thermostat, low oil-temperature protection thermostat, relief valve for pump, discharge tube temperature thermostat, condenser temperature thermostat, refrigerant leak detector, and inverter protection equipment. High-pressure switch (-C type only), compressor protection thermostat (-C type only), overheat prevention temperature thermostat (-H type only), boil-dry protection switch (-H type only)																				
Room temperature °C																				
5~45																				
Inlet oil temperature °C																				
5~50																				
Oil viscosity mm <sup>2</sup> /s																				
1.4~200 (ISO VG2~32)																				
Product external pressure loss																				
0.5MPa or less																				
Discharge side																				
-30.7kPa or less																				
Suction side																				
-30.7kPa or less																				
Lubricant, hydraulic oil of mineral oil (Not usable for hydraulic oil of ester phosphate, water, water-soluble liquid, drugs, food products, fuel, cutting liquid, grinding liquid, etc.)																				
Oil inlet																				
Rc 1 1/4 Rc 1 Rc 1 1/4 Rc 1 1/4 Rc 1 1/4 Rc 1 Rc 1 1/4																				
Oil outlet																				
Rc 1 1/4																				
Oil drain																				
Rc1/4 (Plugged)																				
Noise value (Value measured at 1m high in front, value equivalent as measured in anechoic chamber) dB (A)																				
65																				
67																				
Transport vibration performance																				
Up down 14.7m/S <sup>2</sup> (1.5G) X2.5 hr (10~100Hz sweep / 5 min.)																				
Mass kg																				
97 100 115 130 182 125 150 160 210																				
Molded-case circuit breaker (Rated current) A																				
-15 -15																				
Oil tank (Capacity) L																				
— — — 50 — — — — — 70 — —																				
To be prepared locally																				
Molded-case circuit breaker (Rated current) A																				
15 (Required for types other than -B type)																				
20 (Required for types other than -B type)																				

Note) \*1. The cooling capacity represents the value at the standard point (inlet oil temperature: 35°C, room temperature: 35°C, oil for use: ISO VG32). The tolerance of the product is approx. ±5%.  
 \*2. Be sure to 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 three types of different voltages (-E1, -E2, -E3 types) according to the supply voltage. (Refer to Page 4 for details.)  
 \*4. The machine synchronization thermistor optionally available is required for this function. (Refer to Page 37 for details.)  
 \*5. The MSDS (Material Safety Data Sheet) of refrigerant R410A is attached to -C type.  
 \*6. The molded-case circuit breaker is not supplied with this product. Please prepare it by yourself.  
 \*7. Existing machines of 1HP class (AKS105AK, AKZ (S) 257 class) were integrated into AKZ328 of 1.2HP class.  
 \*8. The yellow line on the tank oil level gauge shows the highest oil level and the red line the lowest oil level.  
 \*9. The types -X and -H cannot be selected simultaneously.

### Range of use

Note) 1. The mark ◎ shows the standard point.  
 2. Be sure to use the machine at the range of use specified in  .  
 (The use outside the use range may cause machine failure.)



# AKZ8 SERIES

Outside dimension diagram

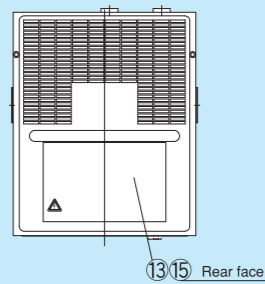
## AKZ148(-B,-C)

Standard specifications

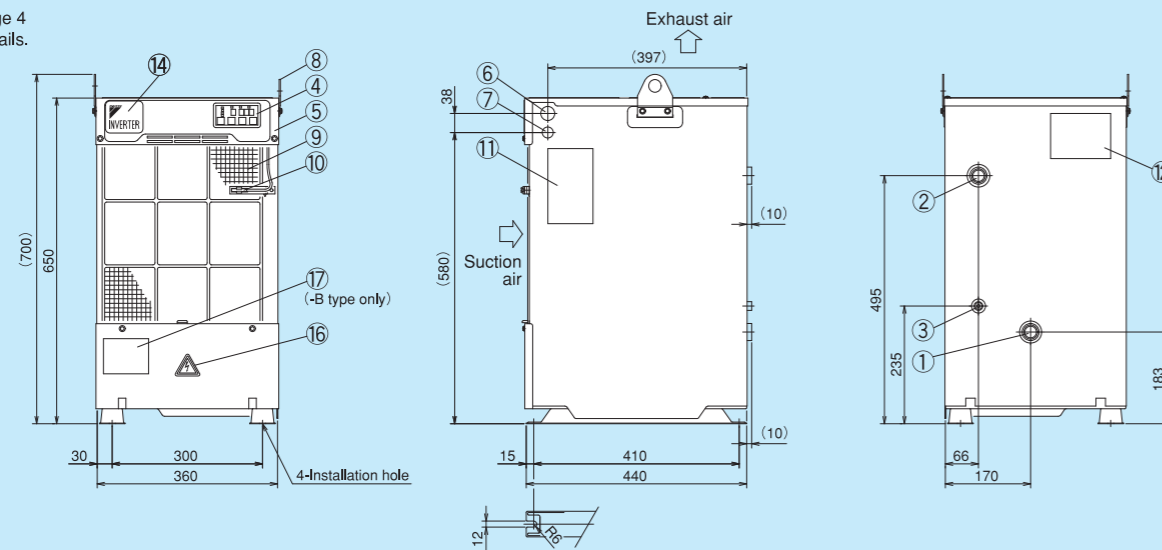
With breaker

Compliance with CE

Note) Refer to Page 4 for more details.



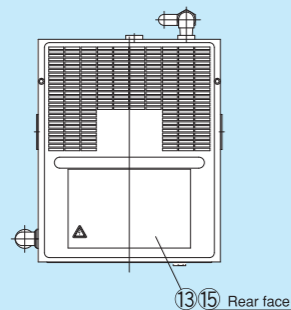
Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc3/4	11	Machine faceplate	
2	Oil outlet	Rc3/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Top panel		15	Electric schematic diagram faceplate	
6	Power supply inlet (Right / Left)	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet (Right / Left)	φ22 Hole	17	Breaker caution plate	-B type only
8	Eye plate	φ25 Hole			
9	Air filter				
10	Room temperature thermistor				



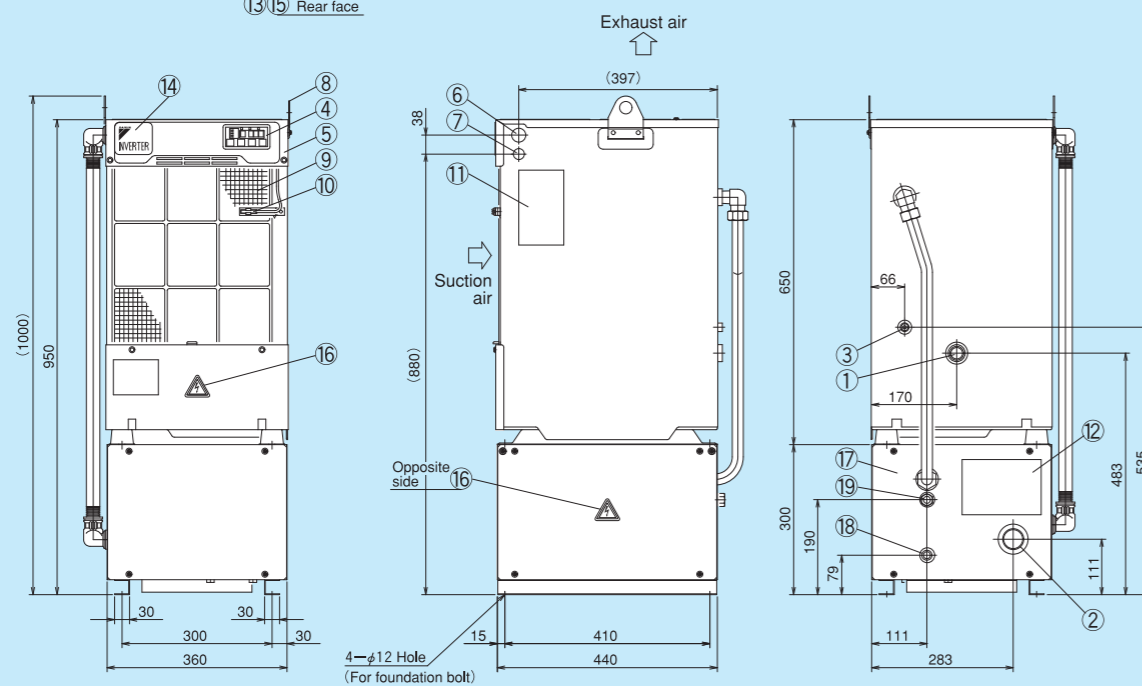
## AKZ148-H

With heater

Note) Refer to Page 4 for more details.



Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc3/4	11	Machine faceplate	
2	Oil outlet	Rc1 1/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Top panel		15	Electric schematic diagram faceplate	
6	Power supply inlet	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet	φ22 Hole	17	Heater box	
8	Eye plate	φ25 Hole	18	Heater drain	Rc1/4
9	Air filter		19	Air bleeder	Rc1/4
10	Room temperature thermistor				



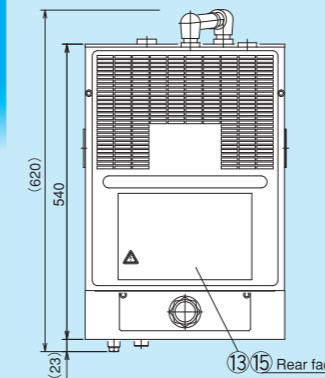
# AKZ8 SERIES

Outside dimension diagram

## AKZ148-T1

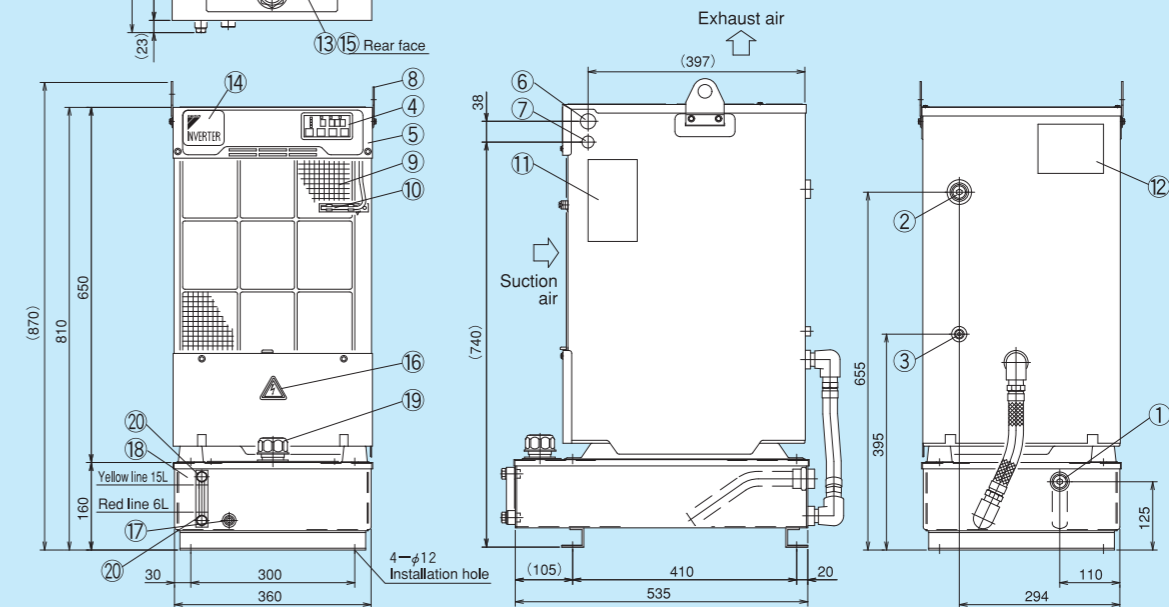
With tank

Note) Refer to Page 4 for more details.



Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc3/4	11	Machine faceplate	
2	Oil outlet	Rc3/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Top panel		15	Electric schematic diagram faceplate	
6	Power supply inlet (Right / Left)	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet (Right / Left)	φ22 Hole	17	Tank drain	Rc3/8 Plugged
8	Eye plate	φ25 Hole	18	Oil tank	15L
9	Air filter		19	Oil hole-cum-air bleeder	HY-06T
10	Room temperature thermistor		20	Oil level gauge*	KLA-80A

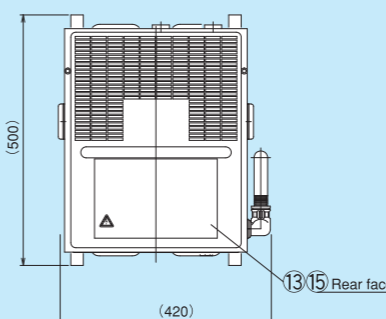
\*The yellow line on the oil level gauge shows the highest oil level and the red line the lowest oil level.



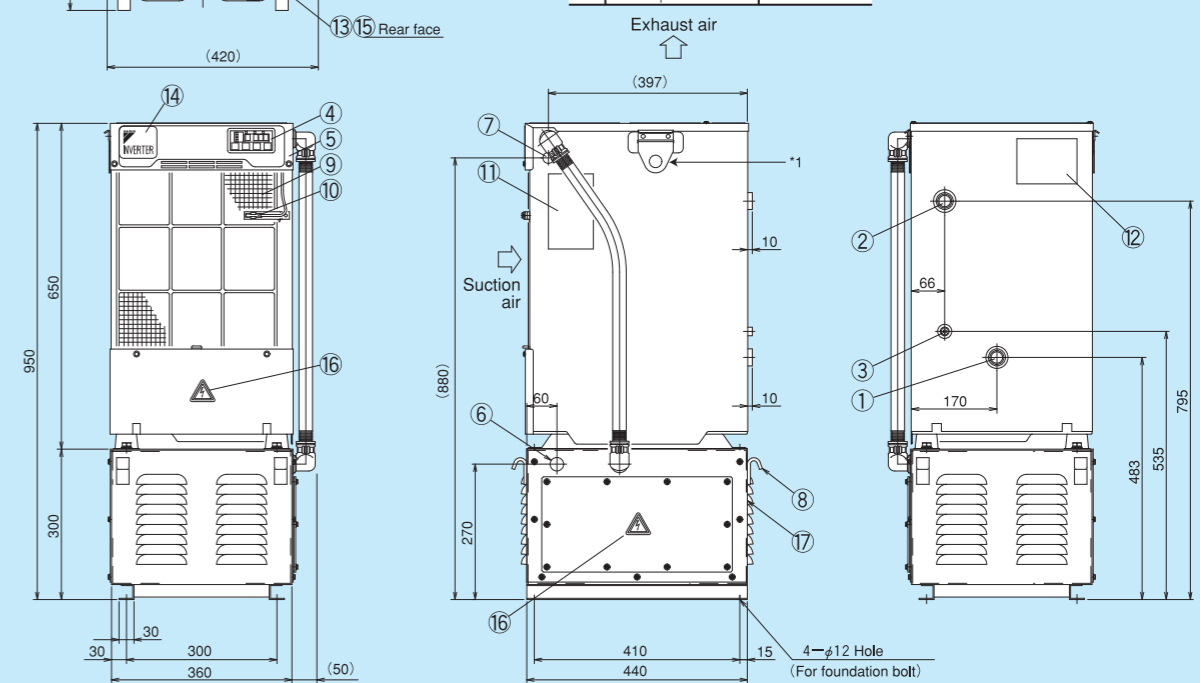
## AKZ148-E

Different voltages (With transformer)

Note) Refer to Page 4 for more details.



Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc3/4	11	Machine faceplate	
2	Oil outlet	Rc3/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Top panel		15	Electric schematic diagram faceplate	
6	Power supply inlet	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet	φ22 Hole	17	Transformer box	
8	Hanger				
9	Air filter				
10	Room temperature thermistor				



# AKZ8 SERIES

Outside dimension diagram

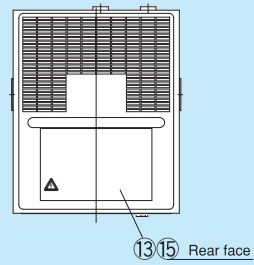
## AKZ328(-B,-C)

Standard specifications

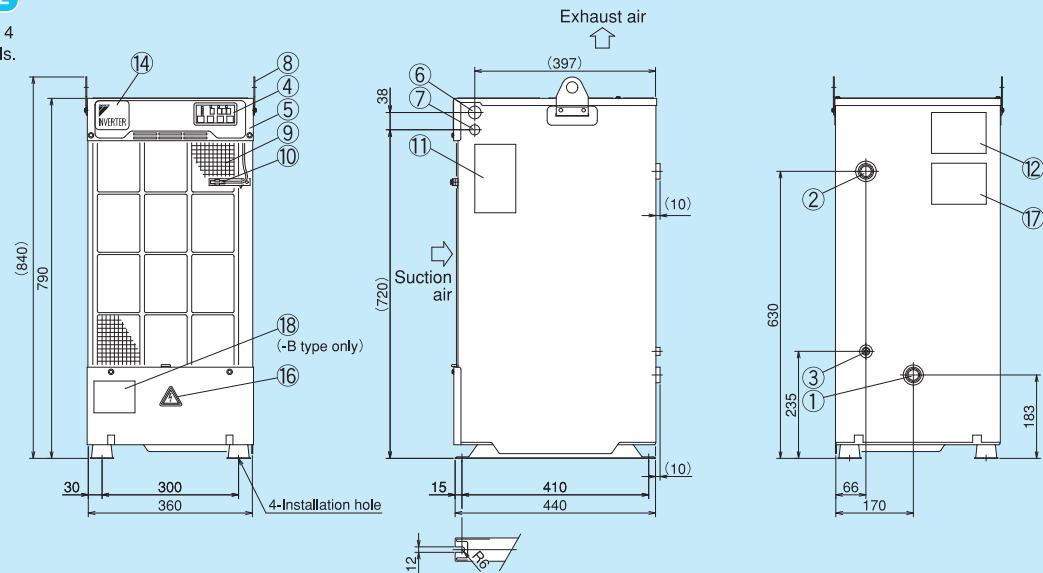
With breaker

Compliance with CE

Note) Refer to Page 4 for more details.



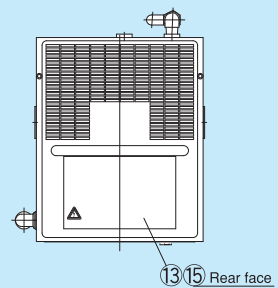
Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc3/4	11	Machine faceplate	
2	Oil outlet	Rc3/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Top panel		15	Electric schematic diagram faceplate	
6	Power supply inlet (Right / Left)	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet (Right / Left)	φ22 Hole	17	Caution plate	
8	Eye plate	φ25 Hole	18	Breaker caution plate	-B type only
9	Air filter				
10	Room temperature thermistor				



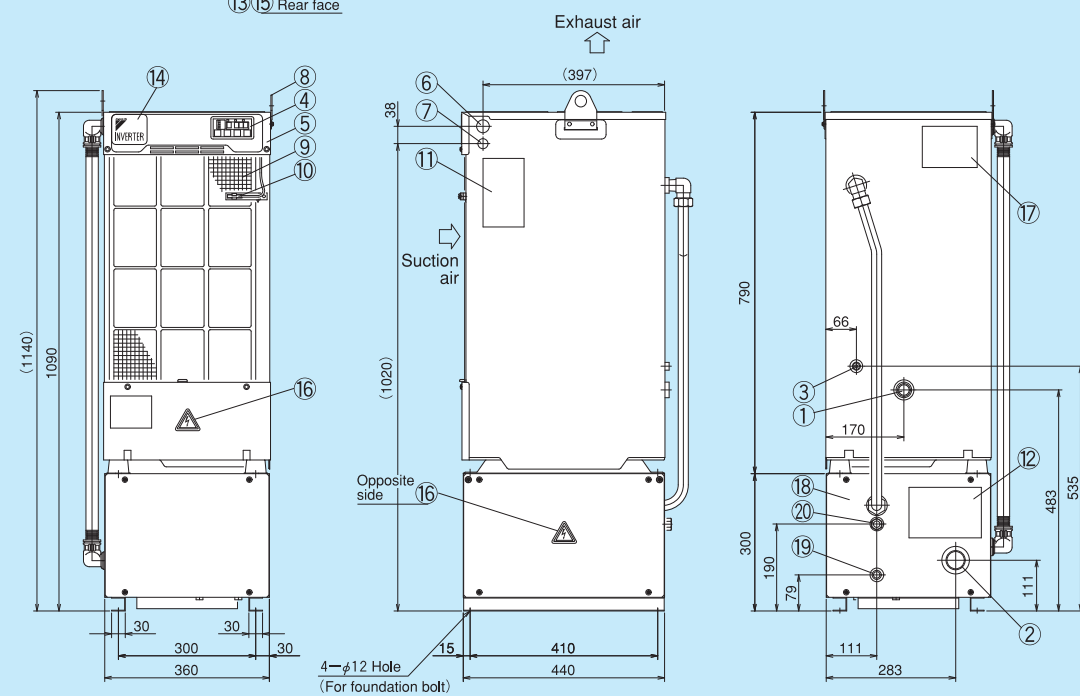
## AKZ328-H

With heater

Note) Refer to Page 4 for more details.



Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc3/4	11	Machine faceplate	
2	Oil outlet	Rc1 1/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Top panel		15	Electric schematic diagram faceplate	
6	Power supply inlet	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet	φ22 Hole	17	Caution plate	
8	Eye plate	φ25 Hole	18	Heater box	
9	Air filter		19	Heater drain	Rc1/4
10	Room temperature thermistor		20	Air bleeder	Rc1/4



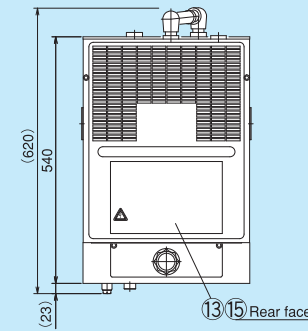
# AKZ8 SERIES

Outside dimension diagram

## AKZ328-T1

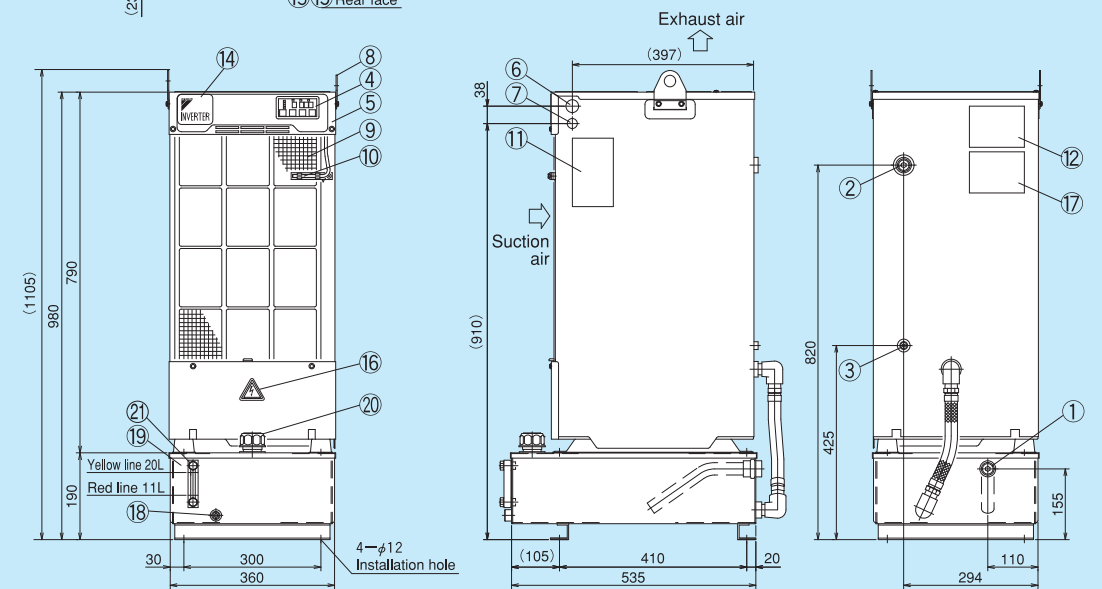
With tank

Note) Refer to Page 4 for more details.



Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc3/4	11	Machine faceplate	
2	Oil outlet	Rc3/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Top panel		15	Electric schematic diagram faceplate	
6	Power supply inlet (Right / Left)	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet (Right / Left)	φ22 Hole	17	Caution plate	
8	Eye plate	φ25 Hole	18	Tank drain	Rc3/8 Plugged
9	Air filter		19	Oil tank	20L
10	Room temperature thermistor		20	Oil hole-cum-air bleeder	HY-06T
			21	Oil level gauge*	KLA-80A

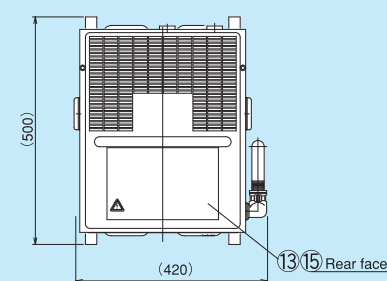
\*The yellow line on the oil level gauge shows the highest oil level and the red line the lowest oil level.



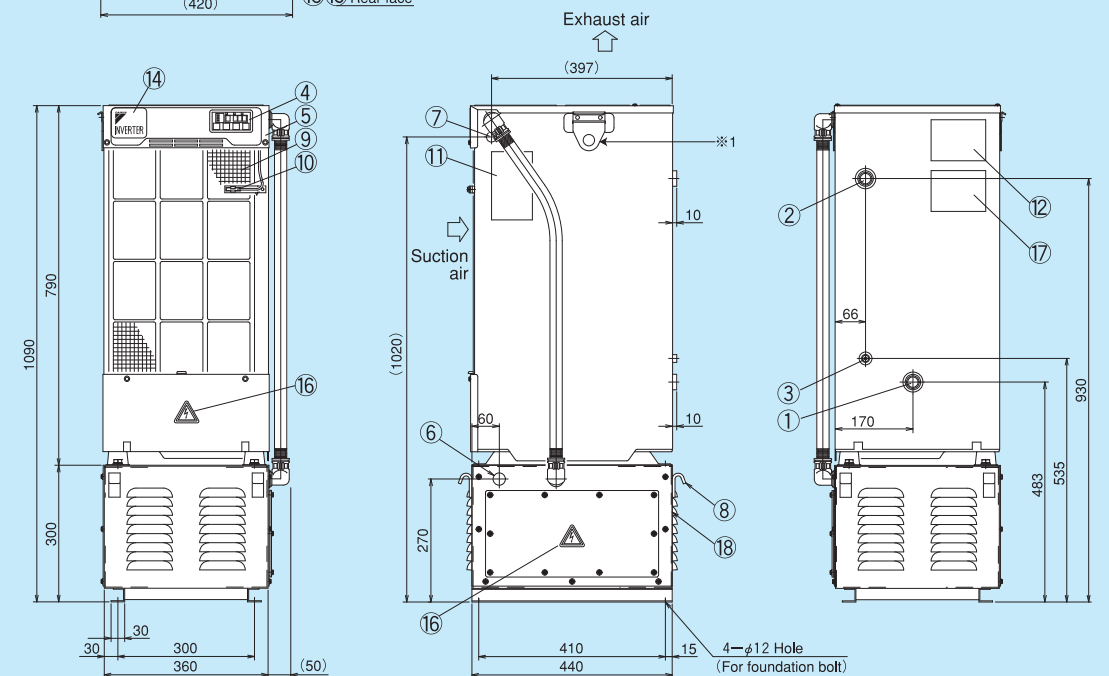
## AKZ328-E※

Different voltages (With transformer)

Note) Refer to Page 4 for more details.



Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc3/4	11	Machine faceplate	
2	Oil outlet	Rc3/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Top panel		15	Electric schematic diagram faceplate	
6	Power supply inlet	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet	φ22 Hole	17	Caution plate	
8	Hanger		18	Transformer box	
9	Air filter				
10	Room temperature thermistor				



Note) \*1. The hanging fitting is located below. Do not use this fitting for hanging.

# AKZ8 SERIES

Outside dimension diagram

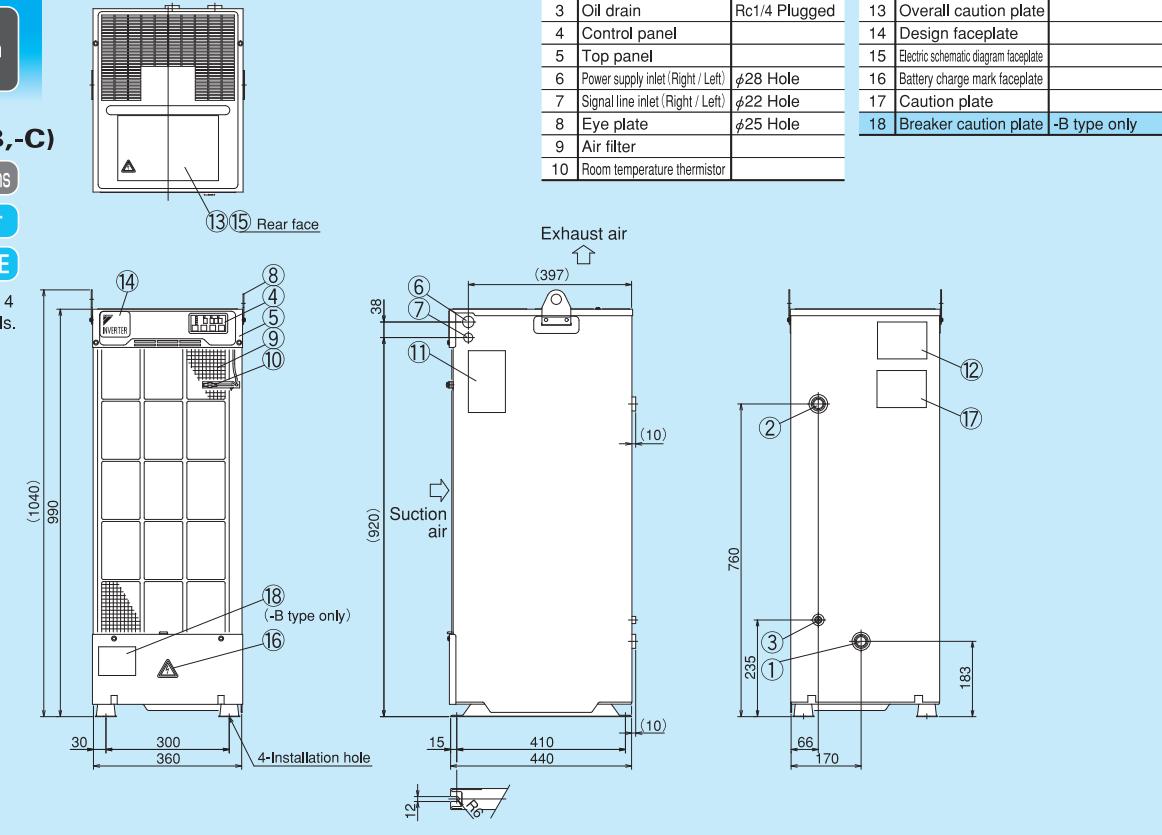
## AKZ438(-B,-C)

Standard specifications

With breaker

Compliance with CE

Note) Refer to Page 4 for more details.



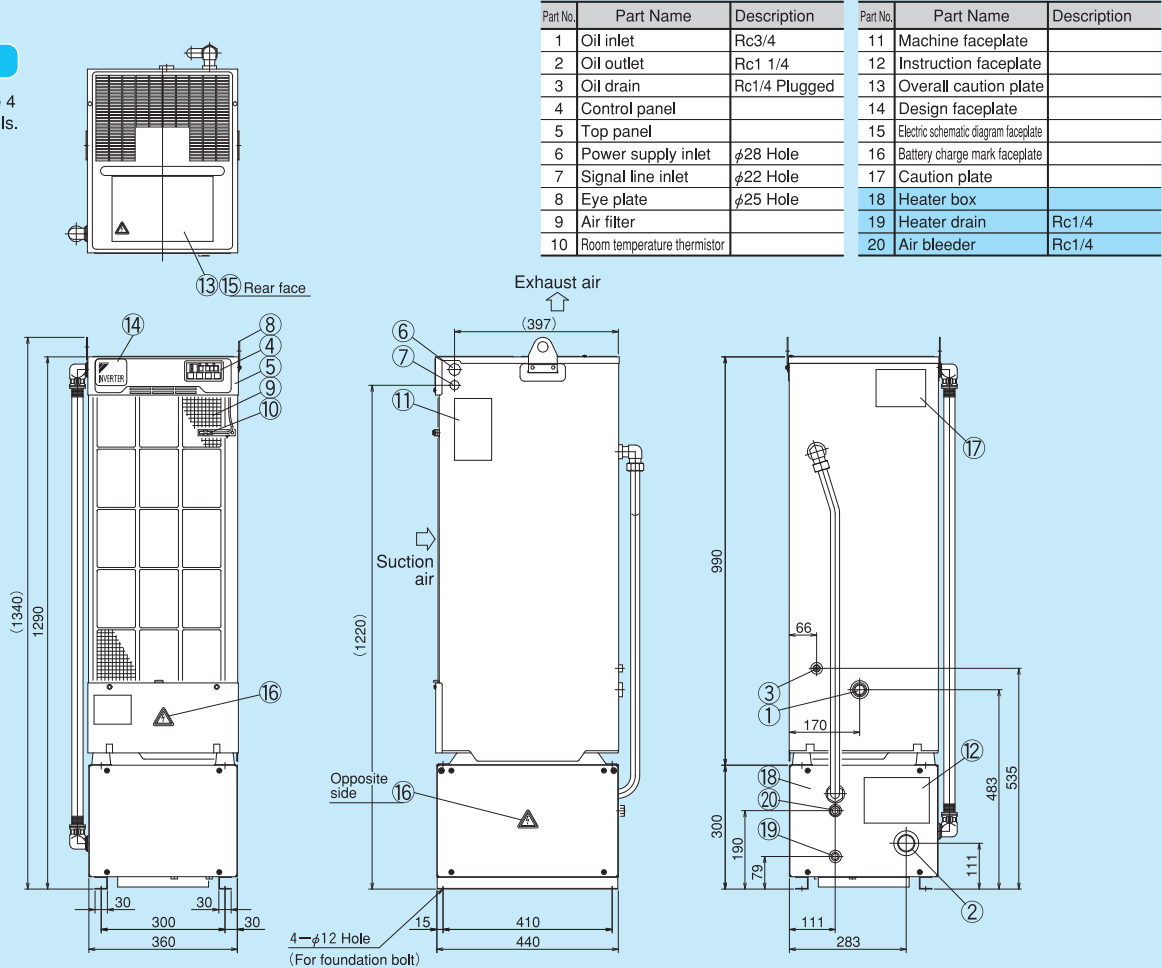
Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc3/4	11	Machine faceplate	
2	Oil outlet	Rc3/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Top panel		15	Electric schematic diagram faceplate	
6	Power supply inlet (Right / Left)	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet (Right / Left)	φ22 Hole	17	Caution plate	
8	Eye plate	φ25 Hole	18	Breaker caution plate	-B type only
9	Air filter				
10	Room temperature thermistor				

AKZ 8 series Outside dimension diagram

## AKZ438-H

With heater

Note) Refer to Page 4 for more details.



Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc3/4	11	Machine faceplate	
2	Oil outlet	Rc1 1/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Top panel		15	Electric schematic diagram faceplate	
6	Power supply inlet	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet	φ22 Hole	17	Caution plate	
8	Eye plate	φ25 Hole	18	Heater box	
9	Air filter		19	Heater drain	Rc1/4
10	Room temperature thermistor		20	Air bleeder	Rc1/4

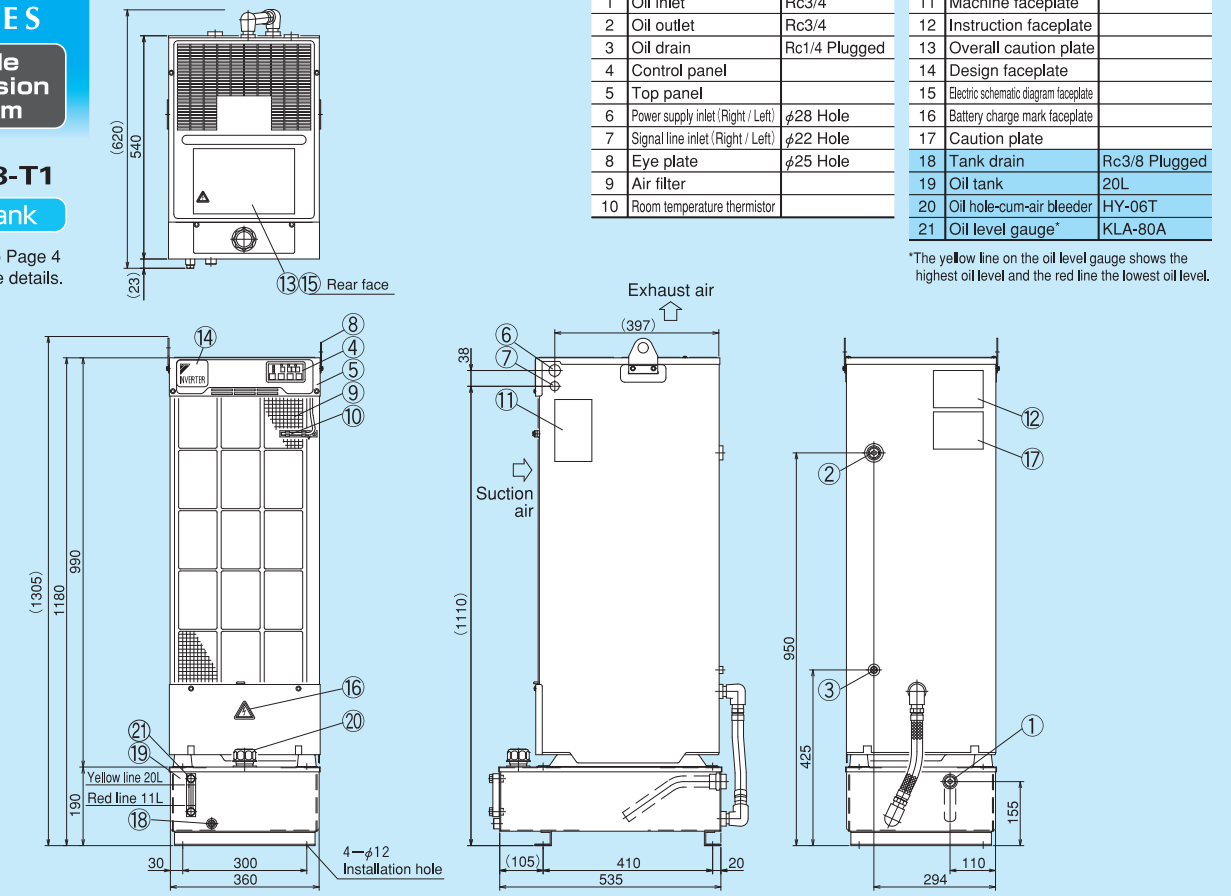
# AKZ8 SERIES

Outside dimension diagram

## AKZ438-T1

With tank

Note) Refer to Page 4 for more details.



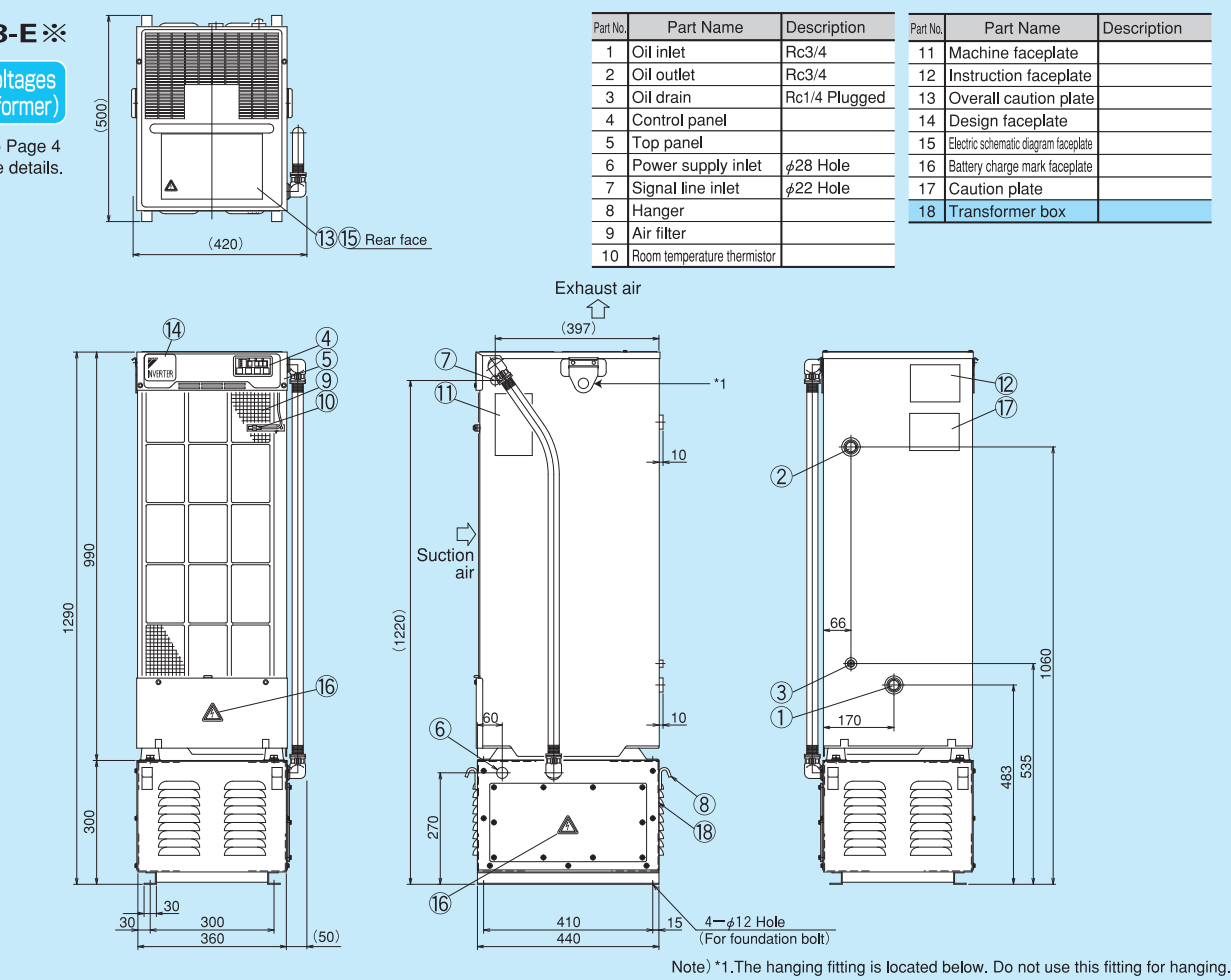
Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc3/4	11	Machine faceplate	
2	Oil outlet	Rc3/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Top panel		15	Electric schematic diagram faceplate	
6	Power supply inlet (Right / Left)	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet (Right / Left)	φ22 Hole	17	Caution plate	
8	Eye plate	φ25 Hole	18	Tank drain	Rc3/8 Plugged
9	Air filter		19	Oil tank	20L
10	Room temperature thermistor		20	Oil hole-cum-air bleeder	HY-06T
			21	Oil level gauge*	KLA-80A

\*The yellow line on the oil level gauge shows the highest oil level and the red line the lowest oil level.

## AKZ438-E※

Different voltages (With transformer)

Note) Refer to Page 4 for more details.



Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc3/4	11	Machine faceplate	
2	Oil outlet	Rc3/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Top panel		15	Electric schematic diagram faceplate	
6	Power supply inlet	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet	φ22 Hole	17	Caution plate	
8	Hanger		18	Transformer box	
9	Air filter				
10	Room temperature thermistor				

Note) \*1. The hanging fitting is located below. Do not use this fitting for hanging.

AKZ 8 series Outside dimension diagram



# AKZ8 SERIES

Outside dimension diagram

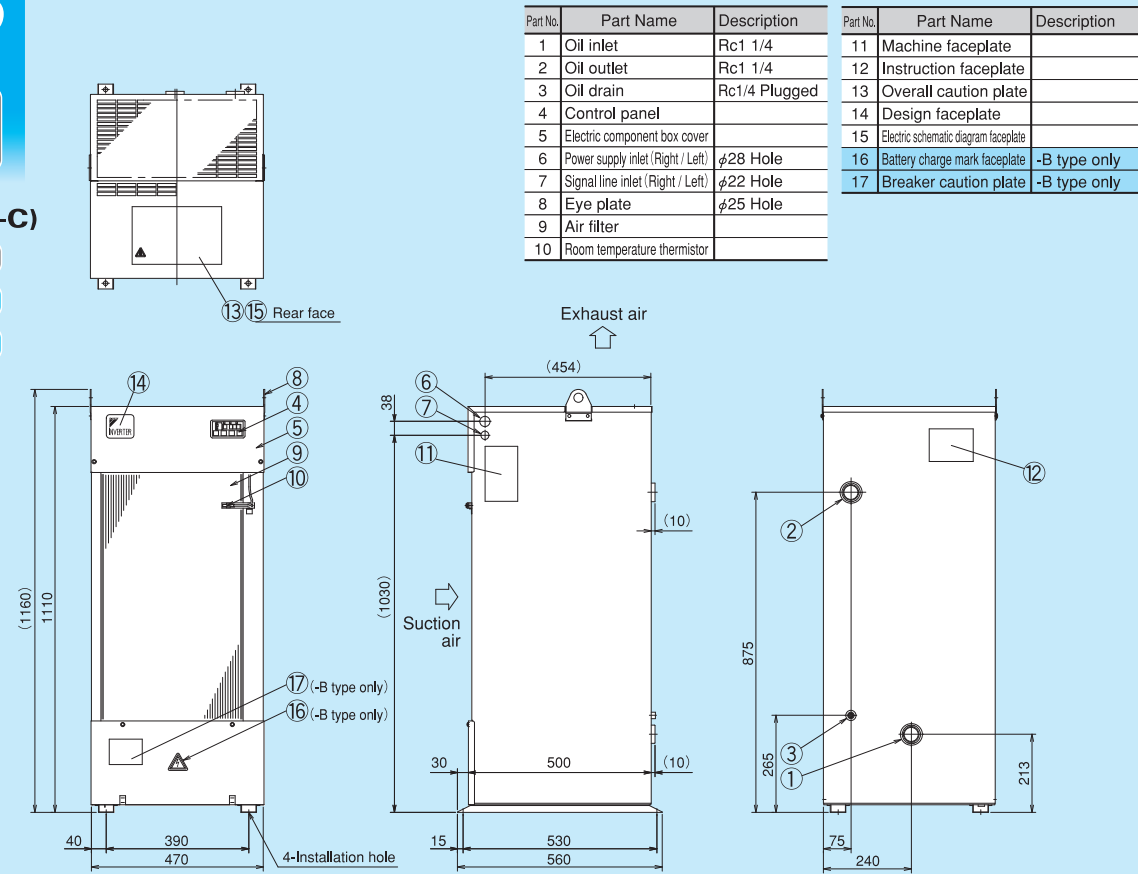
## AKZ568(-B,-C)

Standard specifications

With breaker

Compliance with CE

Note) Refer to Page 4 for more details.



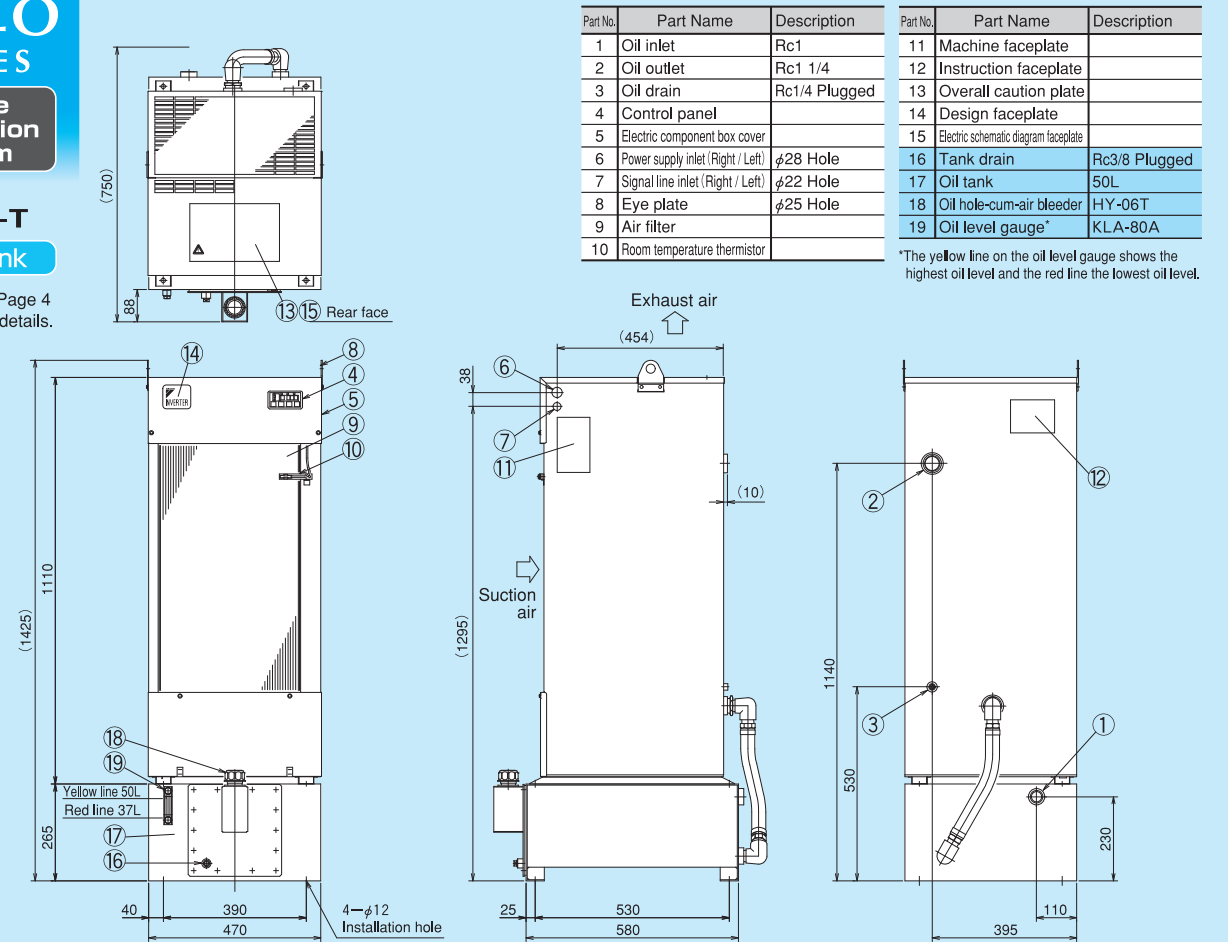
# AKZ8 SERIES

Outside dimension diagram

## AKZ568-T

With tank

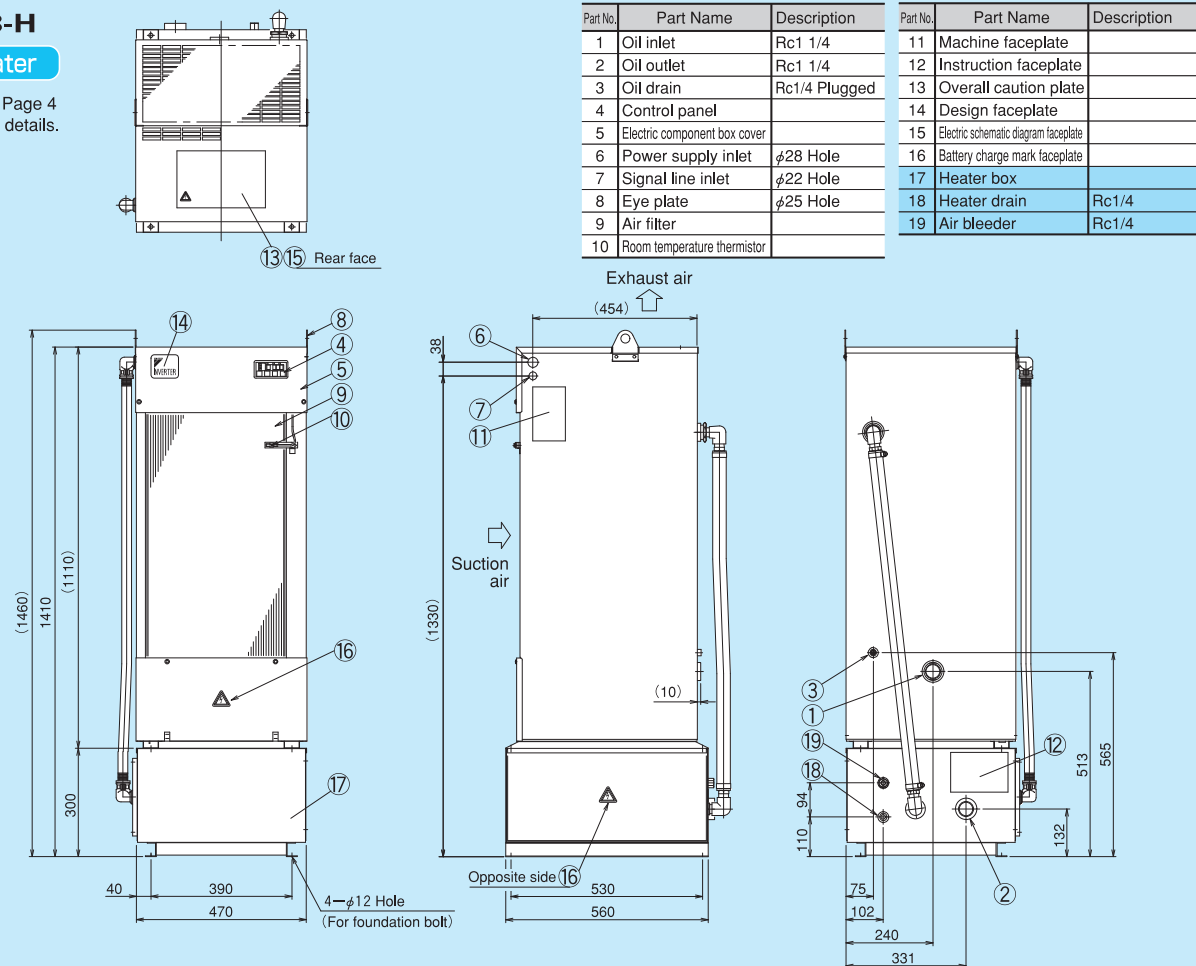
Note) Refer to Page 4 for more details.



## AKZ568-H

With heater

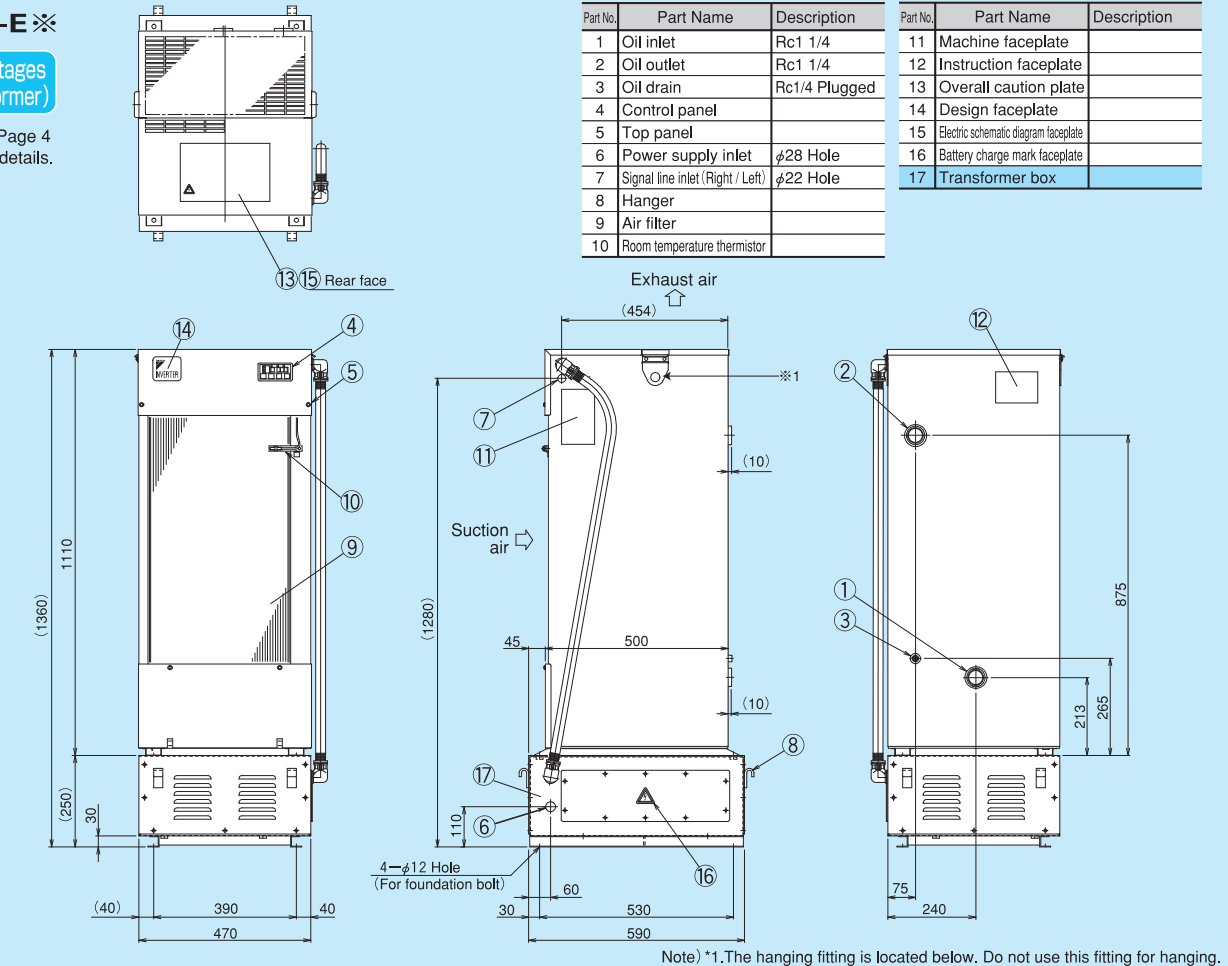
Note) Refer to Page 4 for more details.



## AKZ568-E

Different voltages (With transformer)

Note) Refer to Page 4 for more details.



# AKZ8 SERIES

Outside dimension diagram

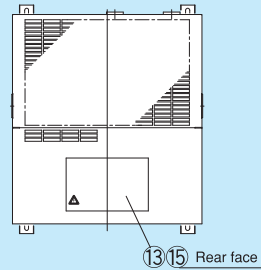
## AKZ908(-B,-C)

Standard specifications

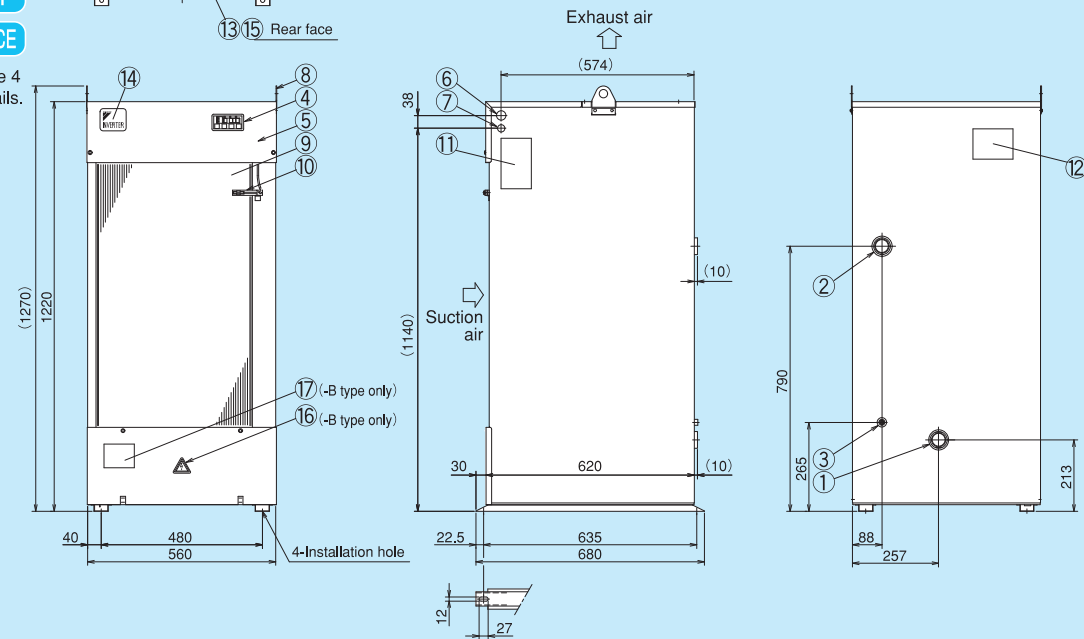
With breaker

Compliance with CE

Note) Refer to Page 4 for more details.



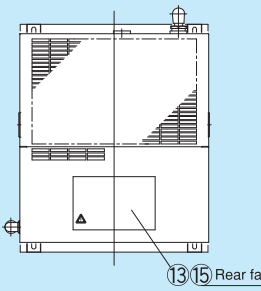
Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc1 1/4	11	Machine faceplate	
2	Oil outlet	Rc1 1/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Electric component box cover		15	Electric schematic diagram faceplate	
6	Power supply inlet (Right / Left)	φ28 Hole	16	Battery charge mark faceplate	-B type only
7	Signal line inlet (Right / Left)	φ22 Hole	17	Breaker caution plate	-B type only
8	Eye plate	φ25 Hole			
9	Air filter				
10	Room temperature thermistor				



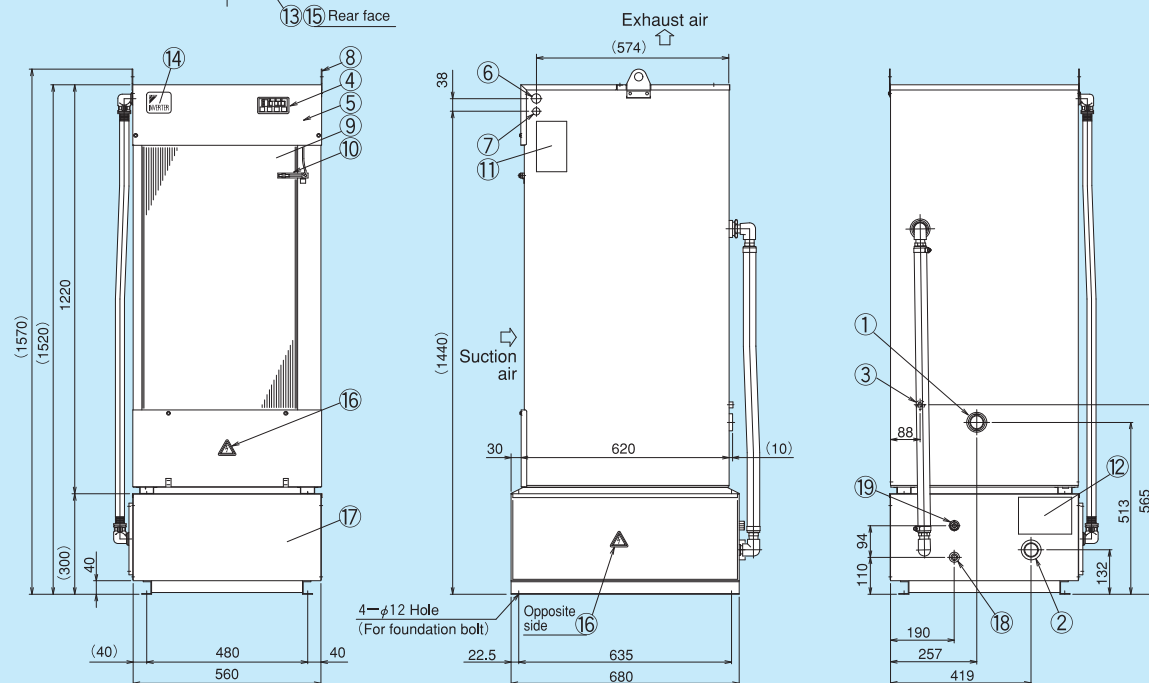
## AKZ908-H

With heater

Note) Refer to Page 4 for more details.



Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc1 1/4	11	Machine faceplate	
2	Oil outlet	Rc1 1/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Electric component box cover		15	Electric schematic diagram faceplate	
6	Power supply inlet	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet (Right / Left)	φ22 Hole	17	Heater box	
8	Eye plate	φ25 Hole	18	Heater drain	Rc1/4
9	Air filter		19	Air bleeder	Rc1/4
10	Room temperature thermistor				



# AKZ8 SERIES

Outside dimension diagram

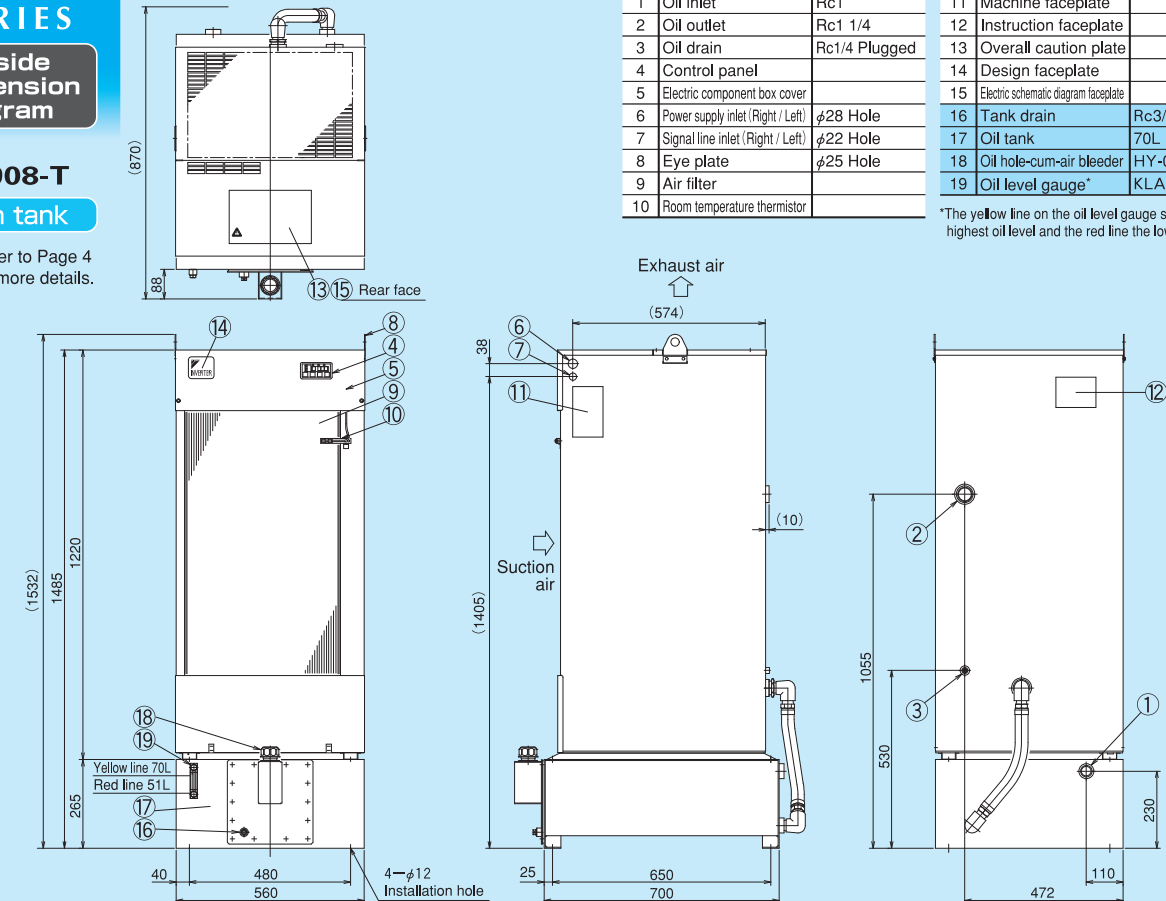
## AKZ908-T

With tank

Note) Refer to Page 4 for more details.

Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc1	11	Machine faceplate	
2	Oil outlet	Rc1 1/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Electric component box cover		15	Electric schematic diagram faceplate	
6	Power supply inlet (Right / Left)	φ28 Hole	16	Tank drain	Rc3/8 Plugged
7	Signal line inlet (Right / Left)	φ22 Hole	17	Oil tank	70L
8	Eye plate	φ25 Hole	18	Oil hole-cum-air bleeder	HY-06T
9	Air filter		19	Oil level gauge*	KLA-80A
10	Room temperature thermistor				

\*The yellow line on the oil level gauge shows the highest oil level and the red line the lowest oil level.

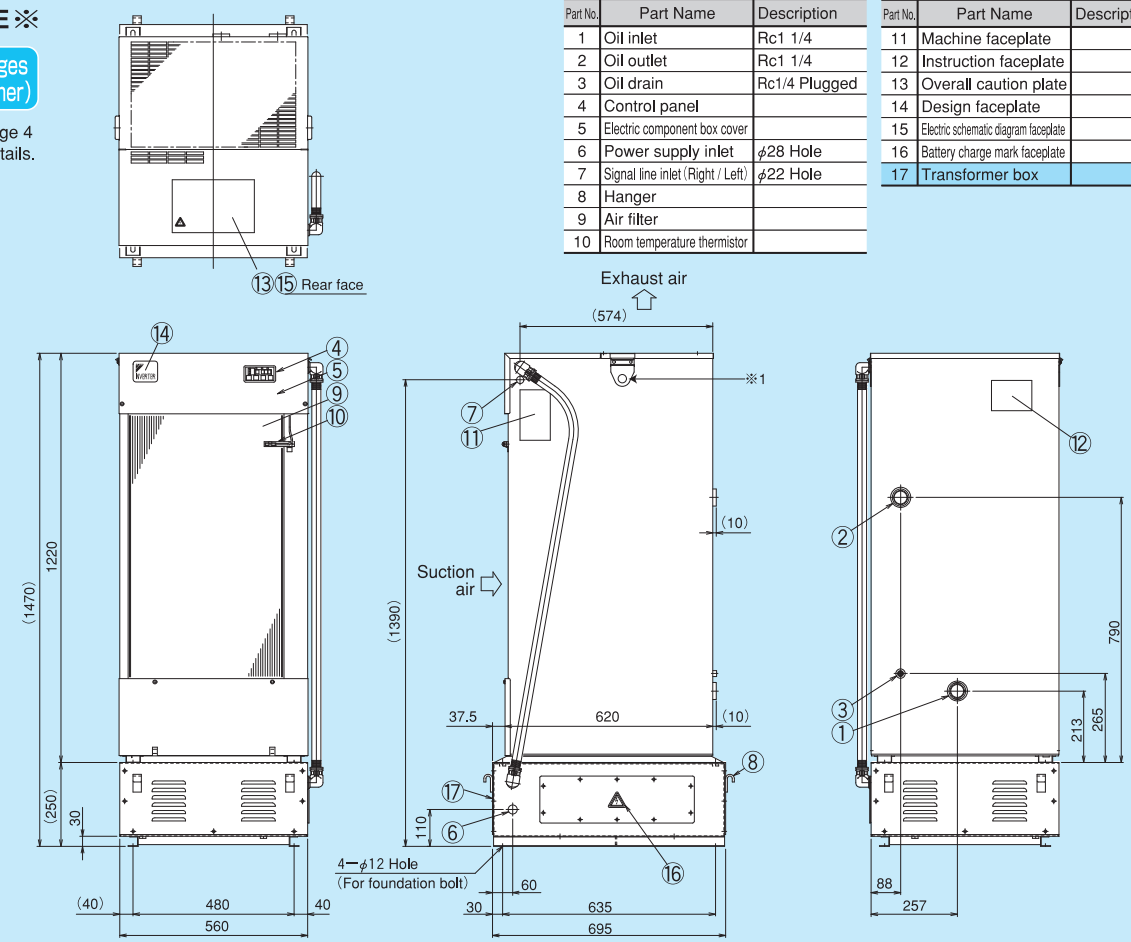


## AKZ908-E

Different voltages (With transformer)

Note) Refer to Page 4 for more details.

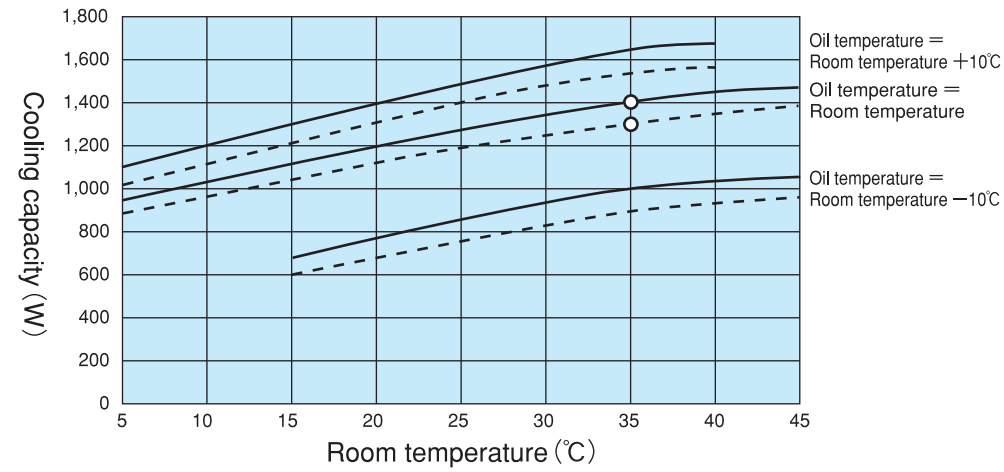
Part No.	Part Name	Description	Part No.	Part Name	Description
1	Oil inlet	Rc1 1/4	11	Machine faceplate	
2	Oil outlet	Rc1 1/4	12	Instruction faceplate	
3	Oil drain	Rc1/4 Plugged	13	Overall caution plate	
4	Control panel		14	Design faceplate	
5	Electric component box cover		15	Electric schematic diagram faceplate	
6	Power supply inlet	φ28 Hole	16	Battery charge mark faceplate	
7	Signal line inlet (Right / Left)	φ22 Hole	17	Transformer box	
8	Hanger				
9	Air filter				
10	Room temperature thermistor				



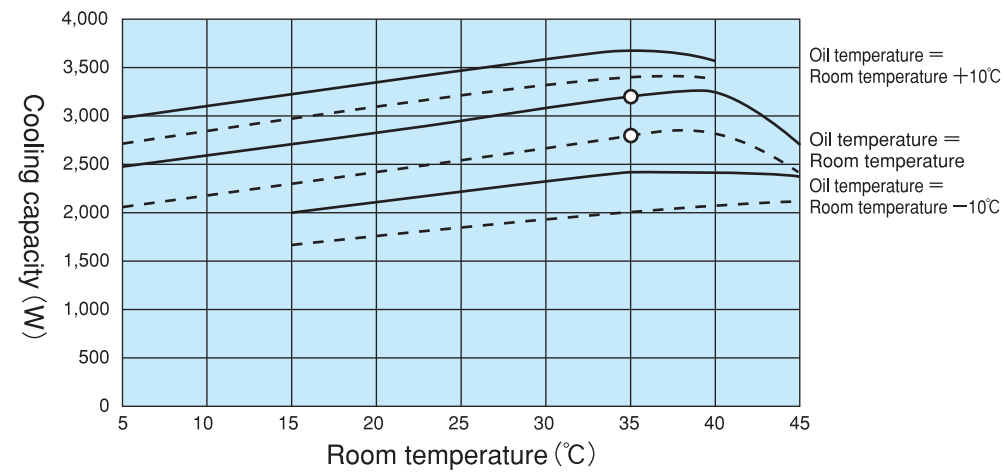
Note) \*1. The hanging fitting is located below. Do not use this fitting for hanging.

Cooling Capacity Characteristic Chart

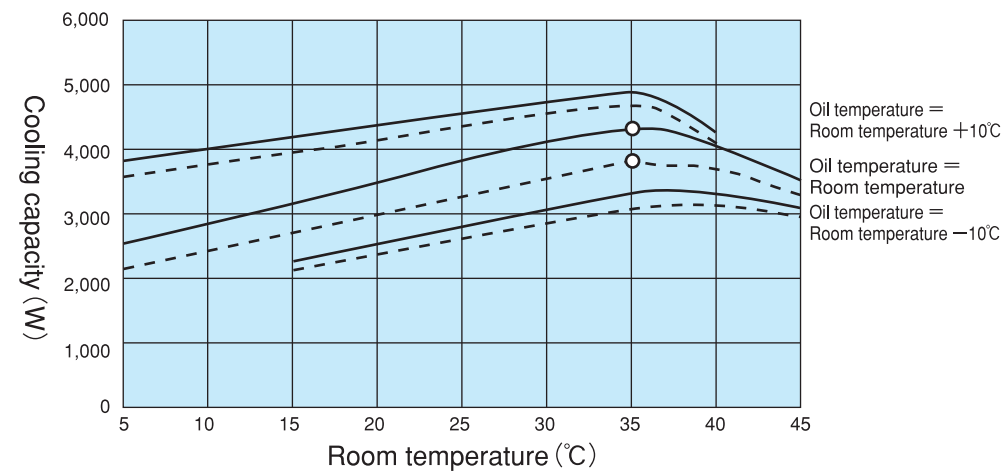
**AKZ148**



**AKZ328**

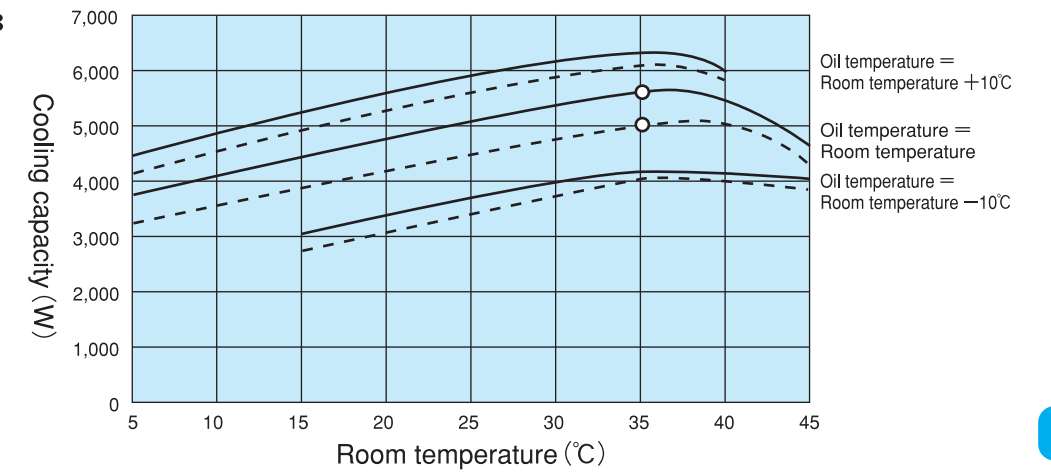


**AKZ438**

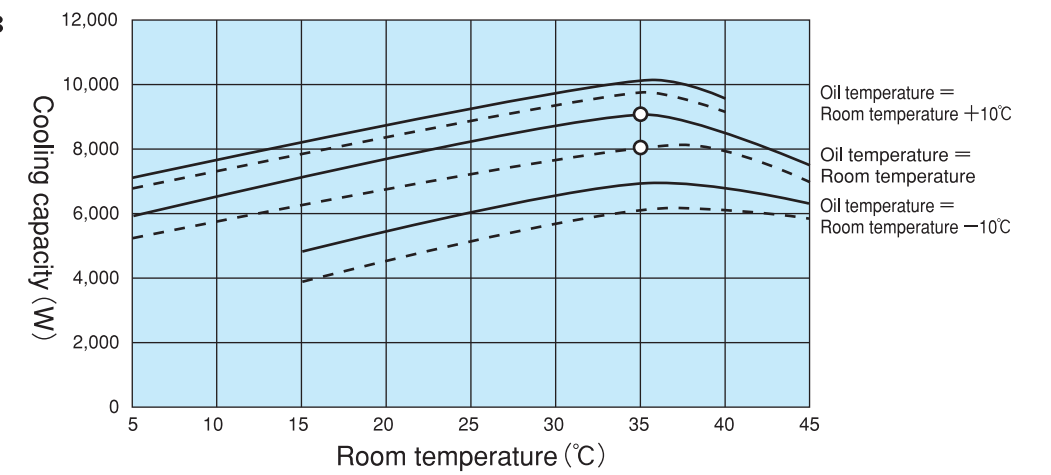


Cooling Capacity Characteristic Chart

**AKZ568**



**AKZ908**



■ Full line — : When operated at 60Hz ■ Dashed line - - - : When operated at 50Hz

1. The mark "○" shows the standard point.  
(Room temperature: 35°C Inlet oil temperature : 35°C Oil for use: ISO VG32)
2. The cooling capacity differs depending on conditions such as room temperature, inlet oil temperature, oil dynamic viscosity and other factors.

OIL COOLING UNIT

# AKZJ8

Immersion type SERIES

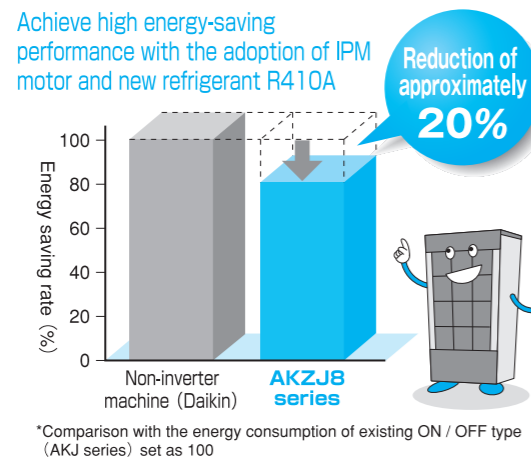


## AKZJ8 overview

- High-accuracy type by inverter control of compressor and control of electric expansion valve
- Immersion-type Oil Cooling Unit (Direct mount on the tank) The circulating pump is not included in the unit.
- Made of stainless steel Open-type cooler
- New refrigerant R410A (Ozone Depletion Potential: 0)
- Wide operating temperature range (Room temperature: 5 - 45°C, Tank liquid temperature: 5 - 50°C)

## AKZJ8 Features

### Achieve high energy-saving performance



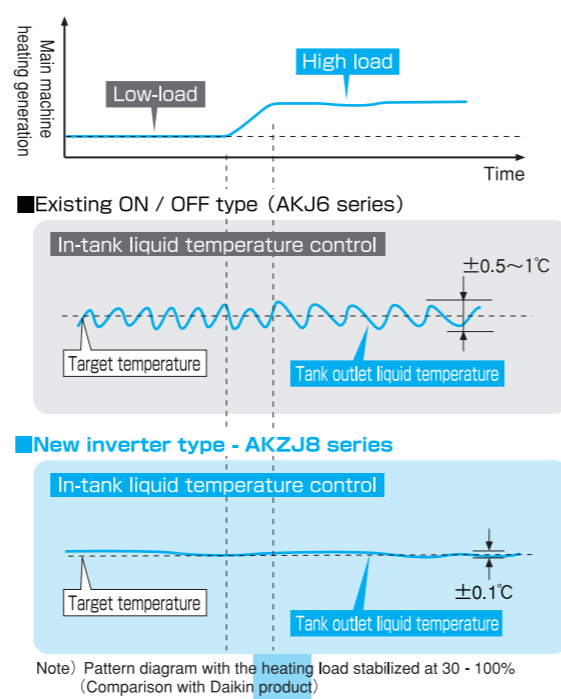
### Achieve low-noise operation

**68dB (A) → 62dB (A)**  
in AKZJ 1.2HP class  
Value equivalent as measured in an anechoic chamber

It is generally known that ordinary conversation can be conducted with a person one meter away in an environment at a noise level of 60dB (A).



### Achieve high-accuracy temperature control



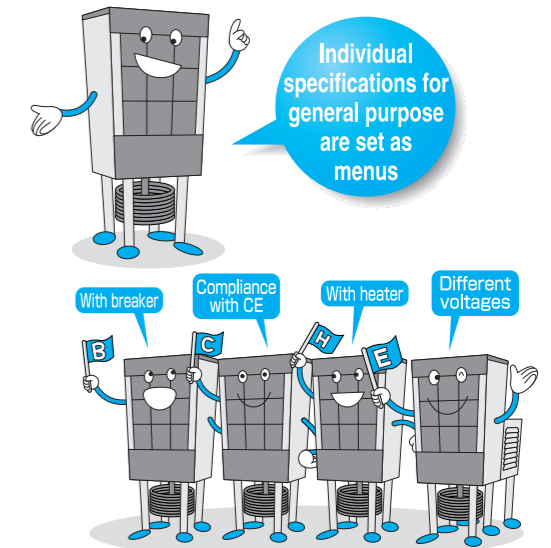
Inverter control maintains your machine at optimum operating conditions at all times and improves the machining accuracy of the machine.

## AKZJ8 Features

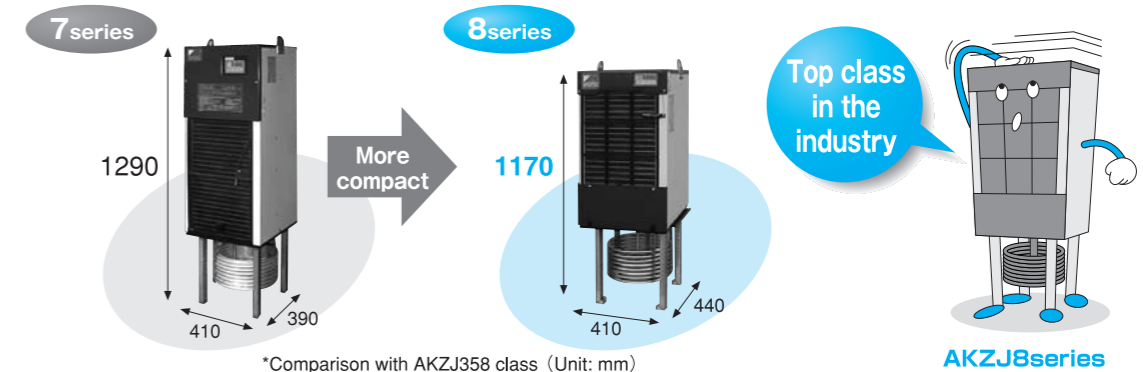
### New convenient function in addition to the current oil temperature warning function

- Auto tuning function**  
The temperature control gain is automatically set just by operating the main machine at no load for 10 to 20 minutes; the trial run adjustment time is greatly reduced.
- Refrigerant gas shortage detection function**  
When the refrigerant gas leak status occurs (cooling disabled), alarm signals are output. Indirectly prevents damage to the machine due to failure in cooling.
- 99-hour timer function (ON timer)**  
The operation start time can be set in a range between 0 and 99 hours (Unit in hours).

### Four types of menu-incorporating machines in addition to the standard type



### Compact design of top class in the industry

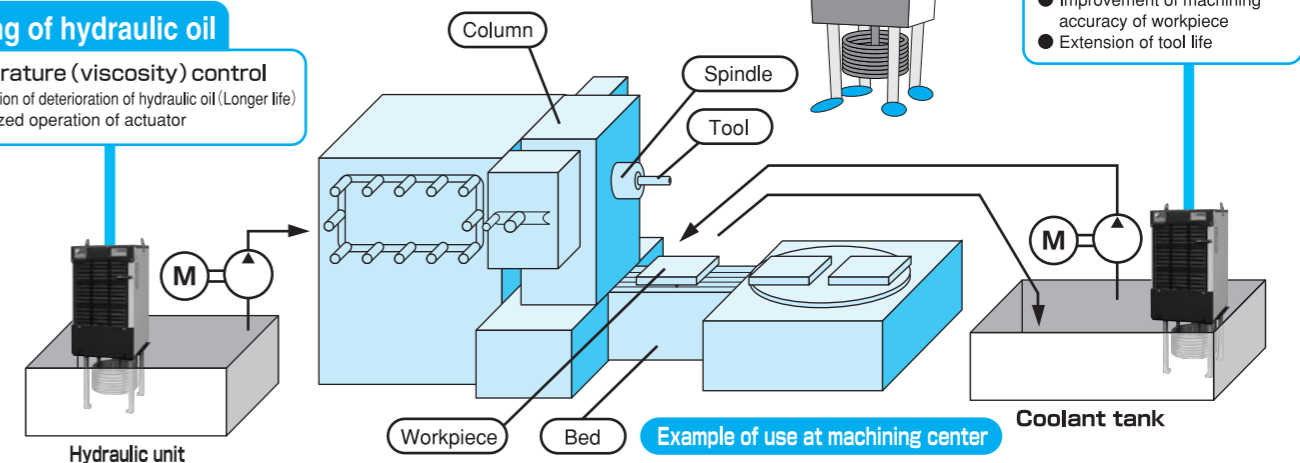


## AKZJ8 Applications

- Example of major applications
- Machine tools : Machining center, NC lathe, grinding machine, NC specialized machine, NC electric discharge machine, 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 actuator



AKZJ8  
SERIES

Specifications (AKZJ188·358·458)

Oil Cooling Unit horsepower (HP)	0.5				1.2				1.5							
	AKZJ188				AKZJ358				AKZJ458							
Model name	Standard	-B	-C	-H	-E *3	Standard	-B	-C	-H	-E *3	Standard	-B	-C	-H	-E *3	
Cooling capacity (50/60Hz) *1 kW	1.6/1.8				3.2/3.5				4.2/4.5							
Heater kW	1				1				1							
Supply power*2	Three phase AC 200/200·220V 50/60Hz				*3				Three phase AC 200/200·220V 50/60Hz				*3			
Circuit voltage	Three phase AC 00/200·220V 50/60Hz															
	DC12/24V															
Max. power consumption Max. consumption current	200V 50Hz	1.07kVA/3.1A	1.35kVA/5.7A	Same as the standard type		1.76kVA/5.2A	1.78kVA/5.8A	Same as the standard type		1.94kVA/5.7A	1.94kVA/5.9A	Same as the standard type		1.96kVA/5.8A	1.96kVA/6.3A	
	200V 60Hz	1.09kVA/3.2A	1.35kVA/5.6A	Same as the standard type		1.78kVA/5.2A	1.78kVA/5.8A	Same as the standard type		1.96kVA/5.7A	1.96kVA/5.8A	Same as the standard type		1.96kVA/5.8A	1.96kVA/6.3A	
	220V 60Hz	1.07kVA/2.8A	1.62kVA/6.1A	Same as the standard type		1.79kVA/4.9A	1.79kVA/6.3A	Same as the standard type		1.98kVA/5.3A	1.98kVA/6.3A	Same as the standard type		1.98kVA/6.3A	2.2kVA	
Transformer capacity	2.2kVA				2.2kVA				2.2kVA				2.2kVA			
Exterior color	White															
Outside dimensions (H×W×D) mm	980×360×440				980×450×630				1120×360×440				1120×450×630			
Compressor (Totally enclosed DC swing type)	Equivalent to 0.4kW				Equivalent to 0.75kW				Equivalent to 1.1kW							
Evaporator	Open coil type															
Condenser	Cross-fin coil type															
Propeller fan Motor	φ300, 75W															
Agitator Motor	1φ, 50W, 4P															
Temperature adjust (Selectable)	Syn-chroni-zation type	Standard Room temperature or machine temperature*4 (Set to "Room temperature: Mode 3" by default)														
		Object to be controlled Tank liquid temperature														
		Synchronization range K -9.9~+9.9 against the standard temperature (Set at 0.0 by default)														
Fixed type	Object to be controlled Tank liquid temperature															
	Range °C 5~50															
Refrigerant control	Compressor revolutions by inverter + Opening of electronic expansion valve															
Refrigerant (New refrigerant: R410A) *5 Filling amount kg	0.58				0.81				0.99							
Protection equipment	One set of agitator inner thermostat, reverse-phase protection equipment, restart prevention timer, low room temperature protection thermostat, high oil temperature protection thermostat, low oil temperature protection thermostat, discharge tube temperature thermostat, condenser temperature thermostat, refrigerant leak detector, and inverter protection equipment; and non-fuse breaker (-B type only), High-pressure switch (-C type only), compressor protection thermostat (-C type only), overheat prevention temperature thermostat (-H type only), fuse (-H type only)															
Operating range	Room temperature °C 5~45															
	Tank liquid temperature °C 5~50															
	Oil viscosity mm <sup>2</sup> /s 0.5~200															
Usable oil	Water-soluble cutting liquid, grinding liquid, cutting oil, grinding oil, lubricant, hydraulic oil, industrial water (Cannot be used for drugs, food products, and fuel)															
Noise value (Value measured at 1m high in front, value equivalent to measured in anechoic chamber) dB (A)	62															
Transport vibration performance	Up down 14.7m/S <sup>2</sup> (1.5G) ×2.5 hr (10~100Hz sweep / 5 min.)															
Mass kg	38	41	103	44	47	109	53	56	118							
Molded-case circuit breaker (Rated current) A	10 (Required for types other than -B type)															
To be prepared locally	Tank (400mm or more in depth), supply pump, float switch, return filter															

- Note) \*1. The cooling capacity represents the value at the standard point (inlet oil temperature: 35°C, room temperature: 35°C, oil for use: ISO VG32). The tolerance of the product is approx. ±5%.
- \*2. Always 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 three types of different voltages (-E1, -E2, -E3 types) according to the supply voltage. (Refer to Page 4 for details.)
- \*4. The machine synchronization thermistor optionally available is required for this function. (Refer to Page 37 for details.)
- \*5. The MSDS (Material Safety Data Sheet) of refrigerant R410A is attached to -C type.
- \*6. The molded-case circuit breaker is not supplied with this product. Please prepare it by yourself.
- \*7. Existing machines of 1HP class (AKJ106, AKZJ287 class) were integrated into AKZJ358 of 1.2HP class.


AKZJ8  
SERIES

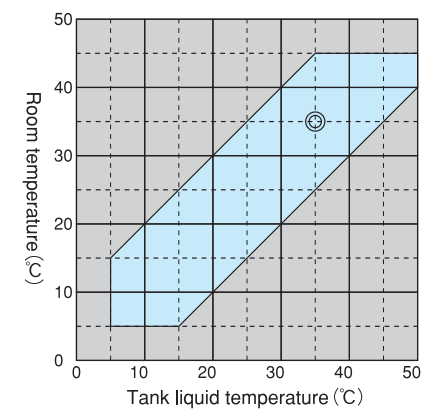
Specifications (AKZJ568·908)

Oil Cooling Unit horsepower (HP)	2.0				3.0							
	AKZJ568				AKZJ908							
Model name	Standard	-B	-C	-H	-E *3	Standard	-B	-C	-H	-E *3		
Cooling capacity (50/60Hz) *1 kW	5.0/5.6				8.0/9.0							
Heater kW	2				4							
Supply power*2	Three phase AC 200/200·220V 50/60Hz				*3				Three phase AC 200/200·220V 50/60Hz			
Circuit voltage	Three phase AC 200/200·220V 50/60Hz											
	DC12/24V											
Max. power consumption Max. consumption current	200V 50Hz	3.3kVA/9.4A	4.0kVA/11.4A	Same as the standard type		3.9kVA/11.2A	7.5kVA/21.6A	Same as the standard type		7.5kVA/21.6A		
	200V 60Hz	3.3kVA/9.4A	4.0kVA/11.4A	Same as the standard type		4.1kVA/11.7A	7.5kVA/21.6A	Same as the standard type		7.5kVA/21.6A		
	220V 60Hz	3.4kVA/9.0A	4.8kVA/12.5A	Same as the standard type		4.3kVA/11.2A	9.0kVA/23.7A	Same as the standard type		9.0kVA/23.7A		
Transformer capacity	5kVA				6kVA							
Exterior color	White											
Outside dimensions (H×W×D) mm	1450×470×500				1450×560×710				1630×560×620			
Compressor (Totally enclosed DC swing type)	Equivalent to 1.5kW				Equivalent to 2.2kW							
Evaporator	Open coil type											
Condenser	Cross-fin coil type											
Propeller fan Motor	φ400, 90W×4P				φ450, 150W×4P							
Agitator Motor	1φ, 50W, 4P											
Temperature adjust (Selectable)	Syn-chroni-zation type	Standard Room temperature or machine temperature*4 (Set to "Room temperature: Mode 3" by default)										
		Object to be controlled Tank liquid temperature										
		Synchronization range K -9.9~+9.9 against the standard temperature (Set at 0.0 by default)										
Fixed type	Object to be controlled Tank liquid temperature											
	Range °C 5~50											
Refrigerant control	Compressor revolutions by inverter + Opening of electronic expansion valve											
Refrigerant (New refrigerant: R410A) *5 Filling amount kg	1.25				1.65							
Protection equipment	One set of fan motor inner thermostat, agitator inner thermostat, reverse-phase protection equipment, restart prevention timer, low room temperature protection thermostat, high oil temperature protection thermostat, low oil temperature protection thermostat, discharge tube temperature thermostat, condenser temperature thermostat, refrigerant leak detector, and inverter protection equipment; and non-fuse breaker (-B type only), High-pressure switch (-C type only), compressor protection thermostat (-C type only), overheat prevention temperature thermostat (-H type only), fuse (-H type only)											
Operating range	Room temperature °C 5~45											
	Tank liquid temperature °C 5~50											
	Oil viscosity mm <sup>2</sup> /s 0.5~200											
Usable oil	Water-soluble cutting liquid, grinding liquid, cutting oil, grinding oil, lubricant, hydraulic oil, industrial water (Cannot be used for drugs, food products, and fuel)											
Noise value (Value measured at 1m high in front, value equivalent to measured in anechoic chamber) dB (A)	65				68							
Transport vibration performance	Up down 14.7m/S <sup>2</sup> (1.5G) ×2.5 hr (10~100Hz sweep / 5 min.)											
Mass kg	83	86	160	132	140	220						
Molded-case circuit breaker (Rated current) A	15 (Required for types other than -B type)				20 (Required for types other than -B type)							
To be prepared locally	Tank (400mm or more in depth), supply pump, float switch, return filter											

- Note) \*1 The cooling capacity represents the value at the standard point (inlet oil temperature: 35°C, room temperature: 35°C, oil for use: ISO VG32). The tolerance of the product is approx. ±5%.
- \*2 Always 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 three types of different voltages (-E1, -E2, -E3 types) according to the supply voltage. (Refer to Page 4 for details.)
- \*4 The machine synchronization thermistor optionally available is required for this function. (Refer to Page 37 for details.)
- \*5 The MSDS (Material Safety Data Sheet) of refrigerant R410A is attached to -C type.
- \*6 The molded-case circuit breaker is not supplied with this product. Please prepare it by yourself.
- \*7 Existing machines of 1HP class (AKJ106AK, AKZJ287 class) were integrated into AKZJ358 of 1.2HP class.

Range of use

- Note) 1. The mark Ⓞ shows the standard point.  
2. Always use the machine in the range of use specified above in . (Operation of the machine outside the use range may cause machine failure.)



# AKZJ8 SERIES

Outside dimension diagram

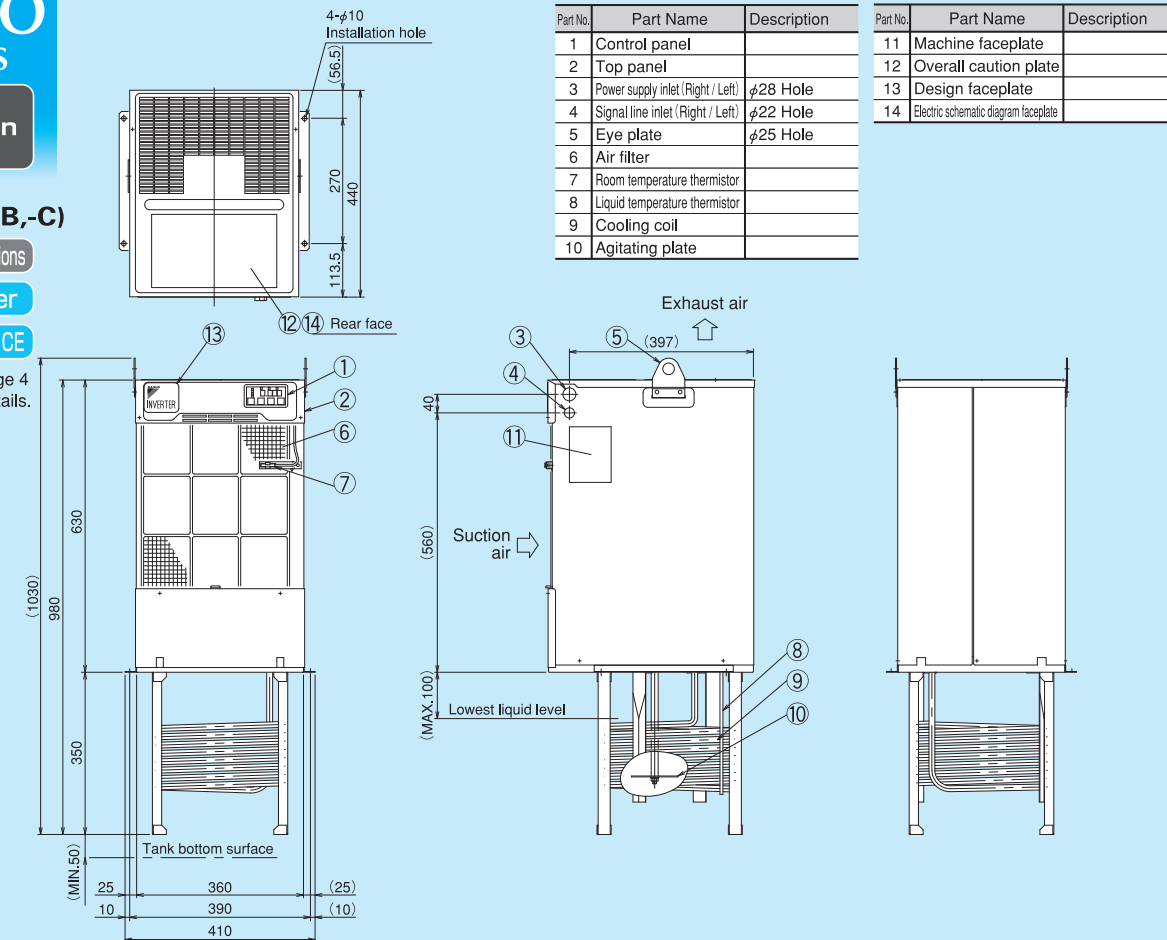
## AKZJ188(-B,-C)

Standard specifications

With breaker

Compliance with CE

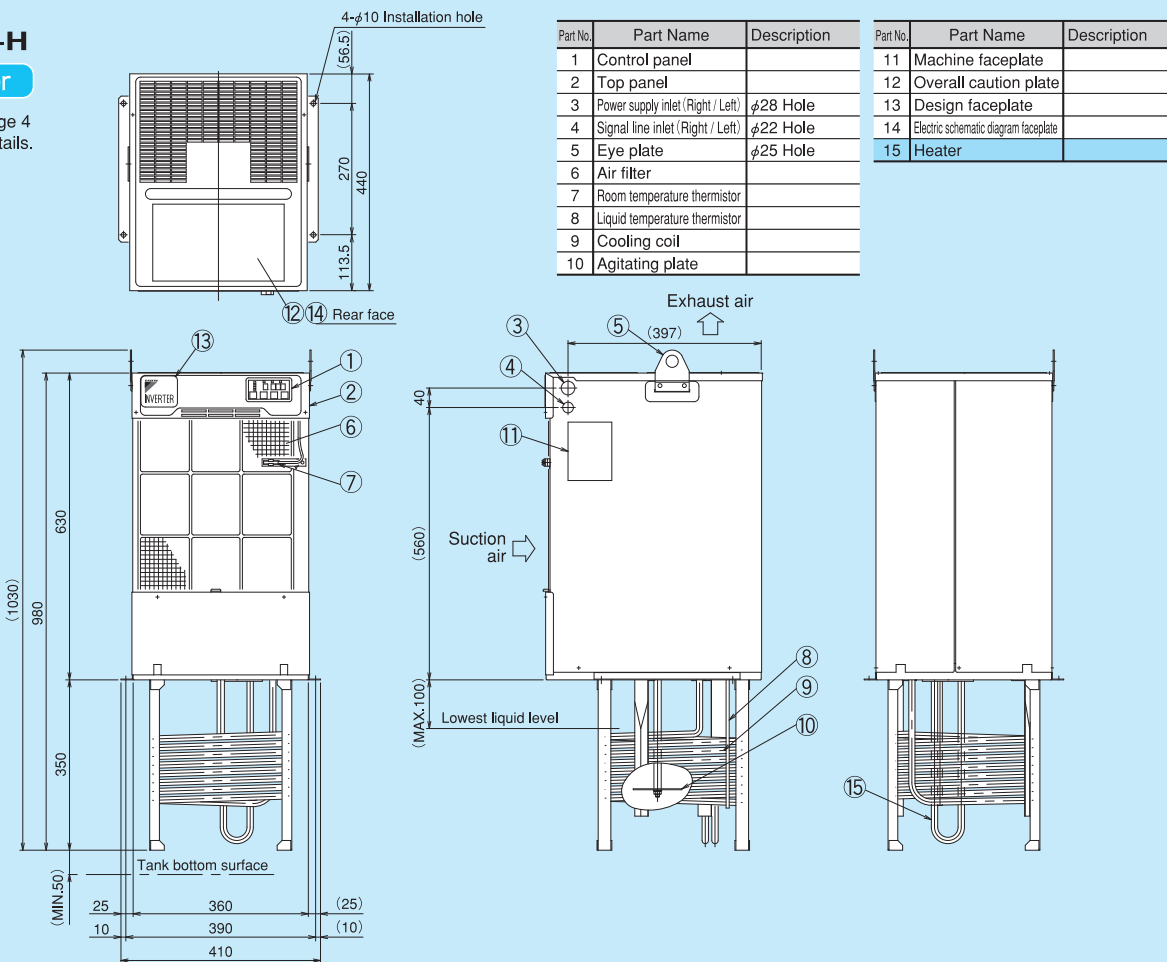
Note) Refer to Page 4 for more details.



## AKZJ188-H

With heater

Note) Refer to Page 4 for more details.



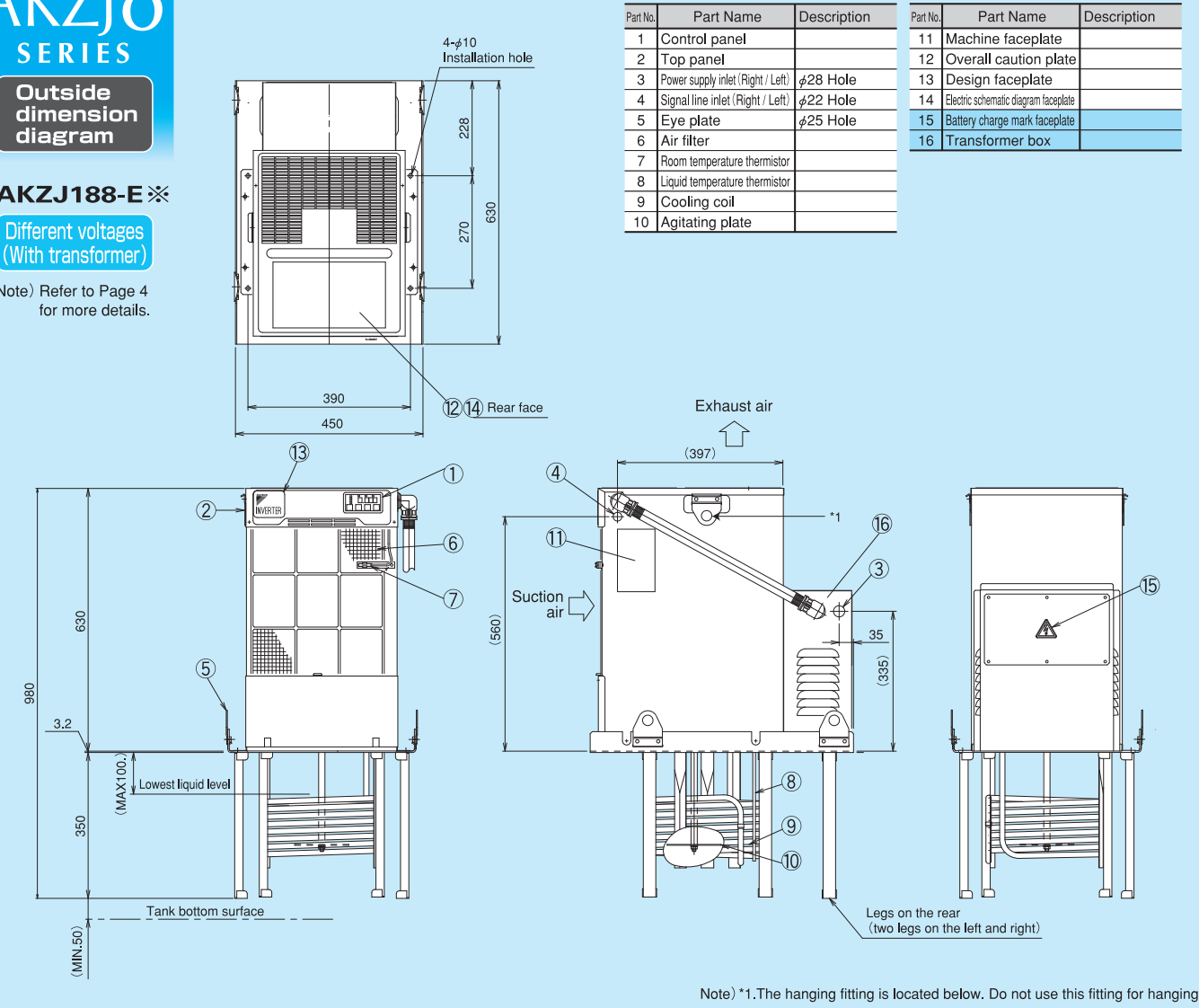
# AKZJ8 SERIES

Outside dimension diagram

## AKZJ188-E※

Different voltages (With transformer)

Note) Refer to Page 4 for more details.



Note) \*1.The hanging fitting is located below. Do not use this fitting for hanging.

# AKZJ8 SERIES

## Outside dimension diagram

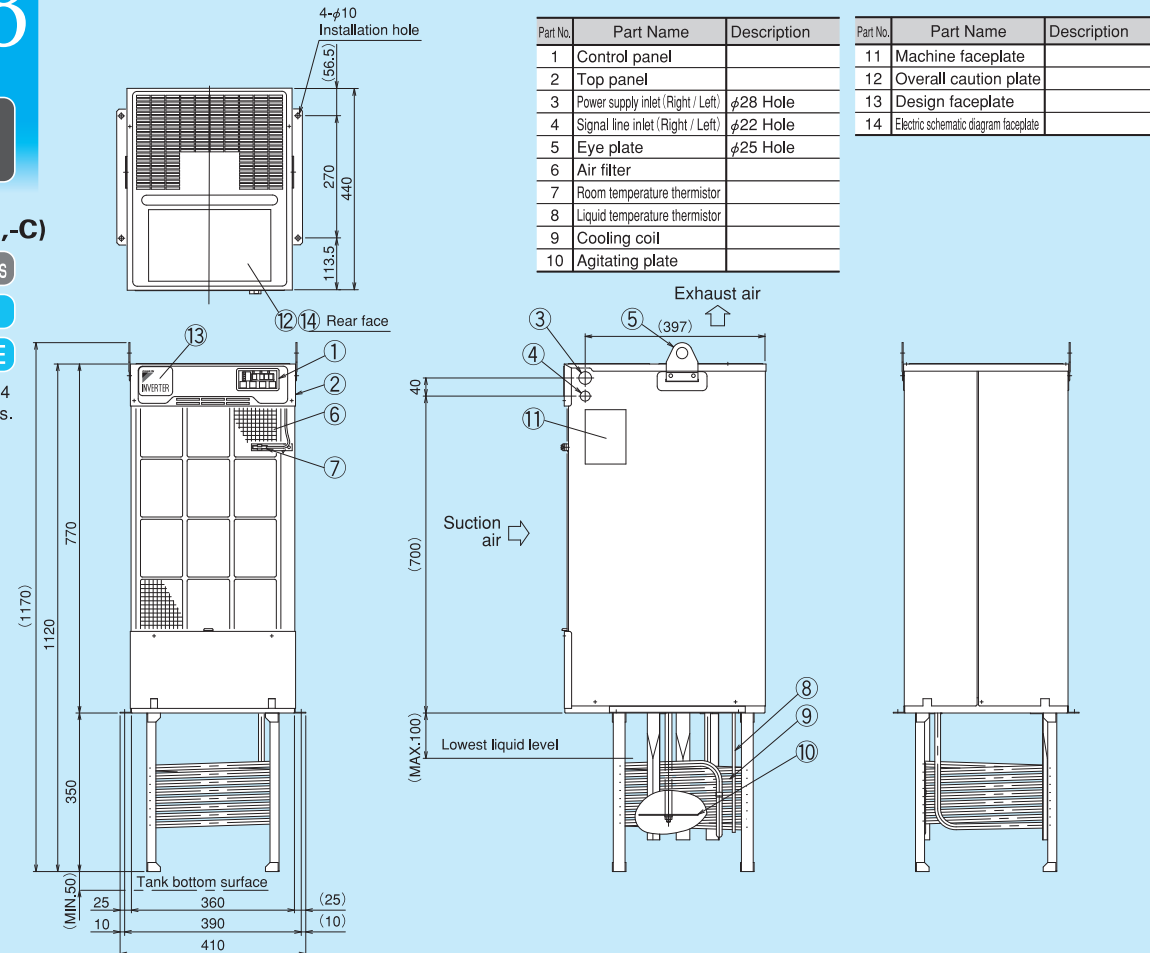
### AKZJ358(-B,-C)

Standard specifications

With breaker

Compliance with CE

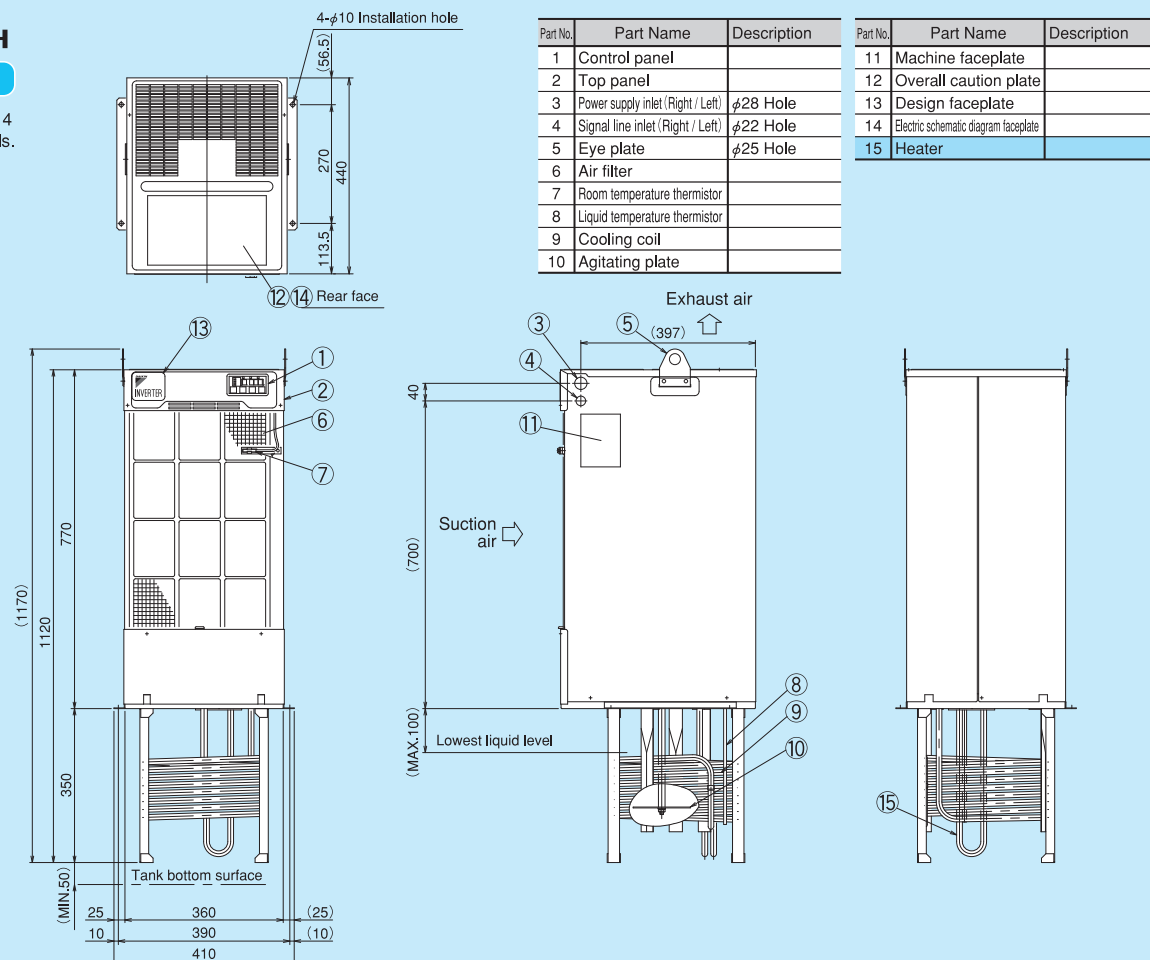
Note) Refer to Page 4 for more details.



### AKZJ358-H

With heater

Note) Refer to Page 4 for more details.



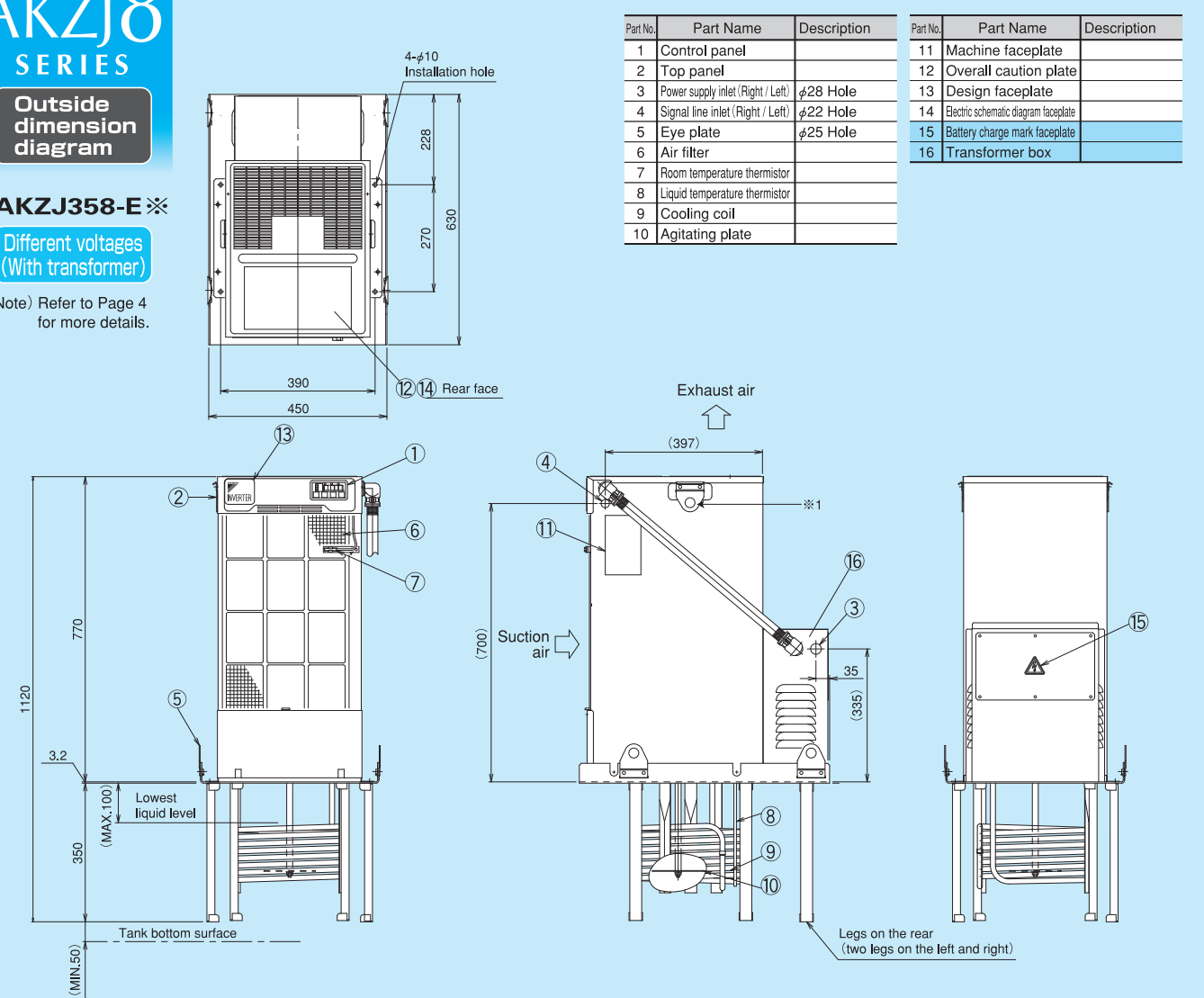
# AKZJ8 SERIES

## Outside dimension diagram

### AKZJ358-E※

Different voltages (With transformer)

Note) Refer to Page 4 for more details.



Note) \*1. The hanging fitting is located below. Do not use this fitting for hanging.

# AKZJ8 SERIES

Outside dimension diagram

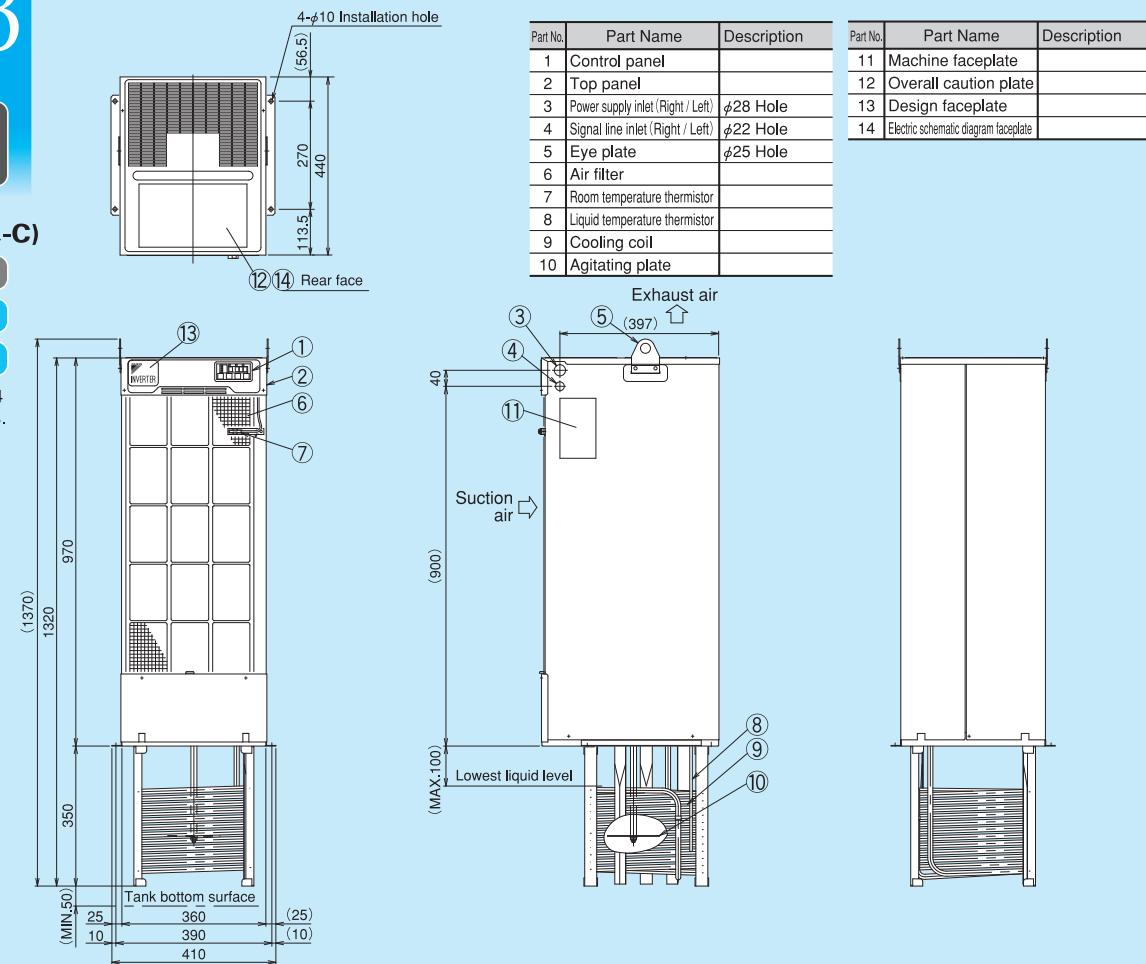
## AKZJ458(-B,-C)

Standard specifications

With breaker

Compliance with CE

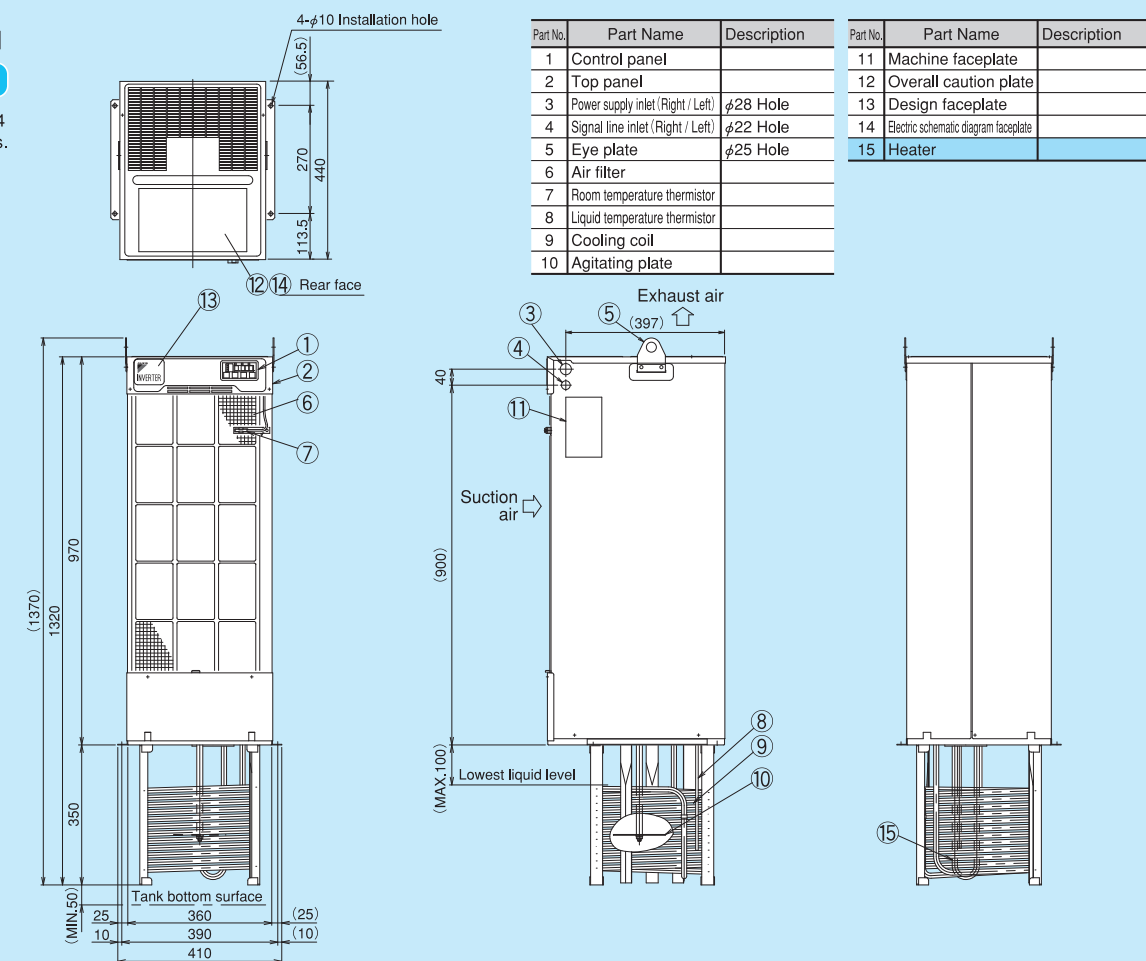
Note) Refer to Page 4 for more details.



## AKZJ458-H

With heater

Note) Refer to Page 4 for more details.



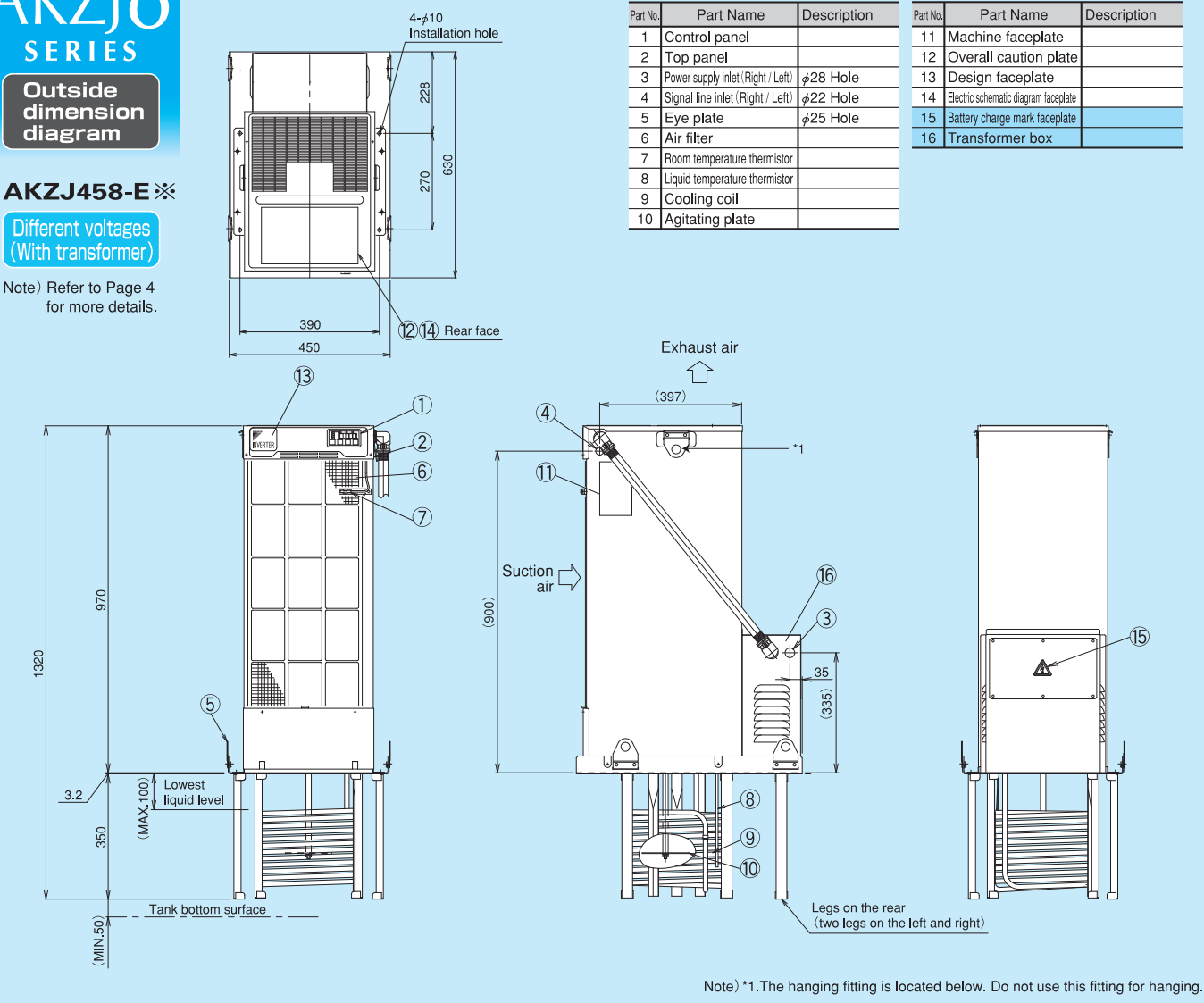
# AKZJ8 SERIES

Outside dimension diagram

## AKZJ458-E※

Different voltages (With transformer)

Note) Refer to Page 4 for more details.





# AKZJ8 SERIES

Outside dimension diagram

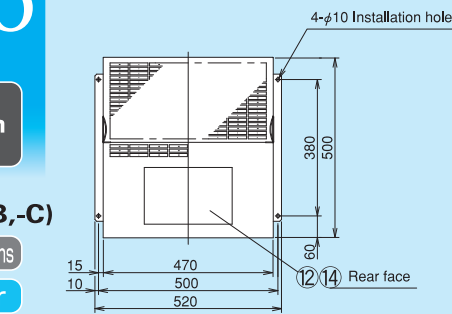
## AKZJ568(B-C)

Standard specifications

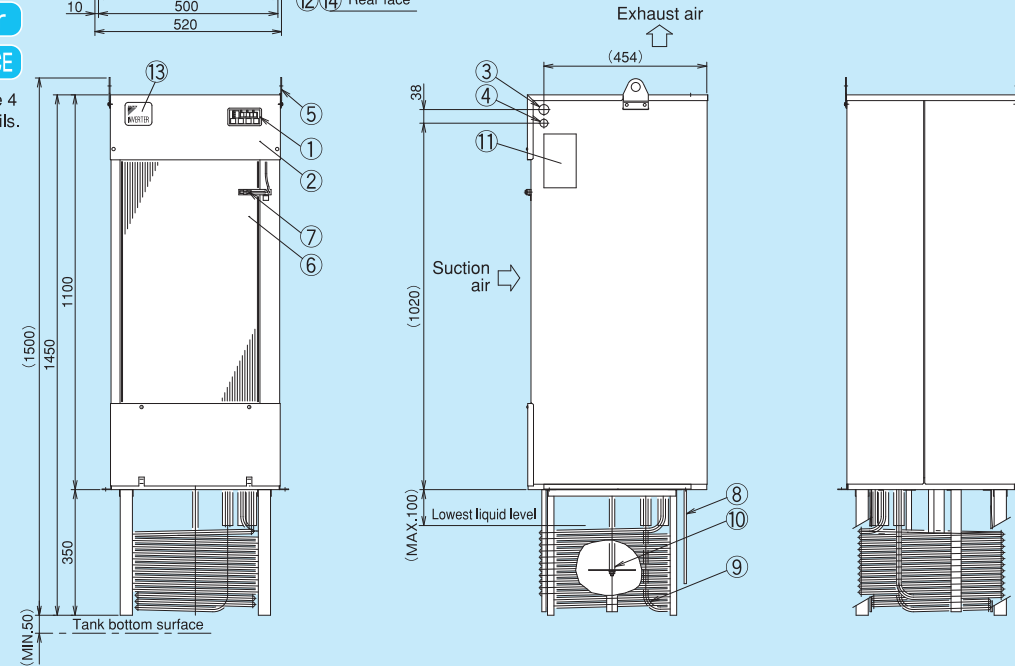
With breaker

Compliance with CE

Note) Refer to Page 4 for more details.



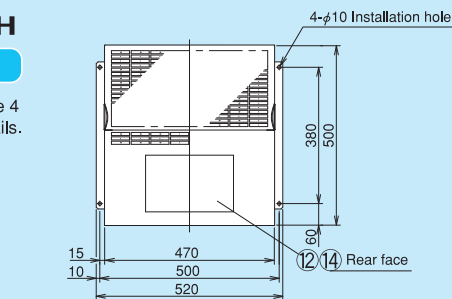
Part No.	Part Name	Description	Part No.	Part Name	Description
1	Control panel		11	Machine faceplate	
2	Electric component box cover		12	Overall caution plate	
3	Power supply inlet (Right / Left)	φ28 Hole	13	Design faceplate	
4	Signal line inlet (Right / Left)	φ22 Hole	14	Electric schematic diagram faceplate	
5	Eye plate	φ25 Hole			
6	Air filter				
7	Room temperature thermistor				
8	Liquid temperature thermistor				
9	Cooling coil				
10	Agitating plate				



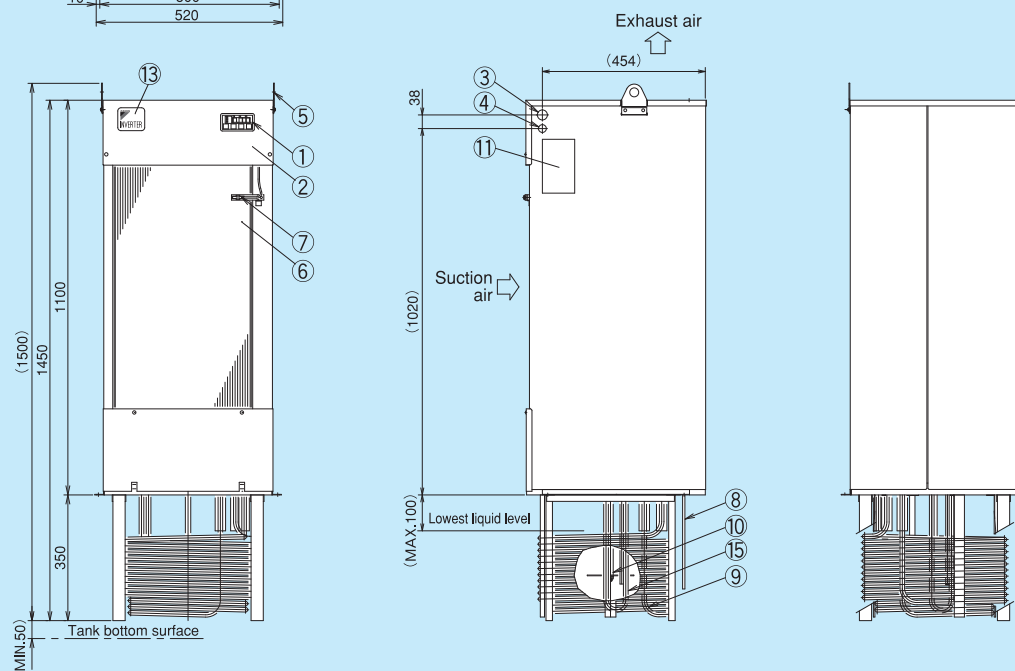
## AKZJ568-H

With heater

Note) Refer to Page 4 for more details.



Part No.	Part Name	Description	Part No.	Part Name	Description
1	Control panel		11	Machine faceplate	
2	Electric component box cover		12	Overall caution plate	
3	Power supply inlet (Right / Left)	φ28 Hole	13	Design faceplate	
4	Signal line inlet (Right / Left)	φ22 Hole	14	Electric schematic diagram faceplate	
5	Eye plate	φ25 Hole	15	Heater	
6	Air filter				
7	Room temperature thermistor				
8	Liquid temperature thermistor				
9	Cooling coil				
10	Agitating plate				



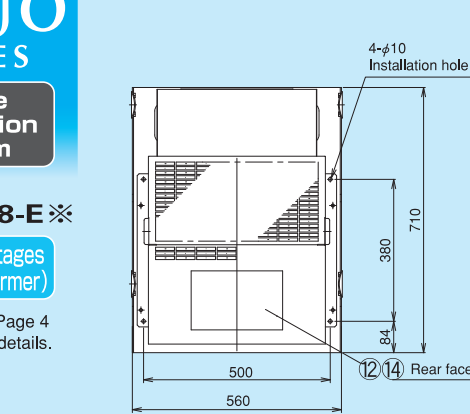
# AKZJ8 SERIES

Outside dimension diagram

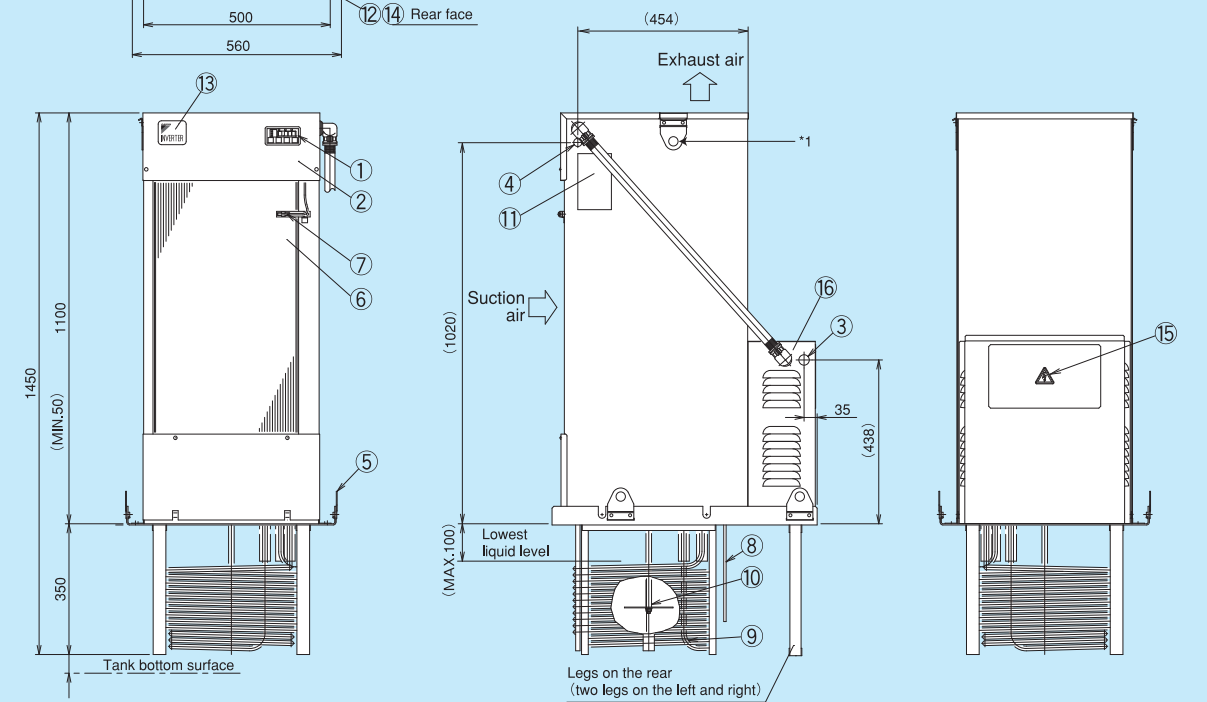
## AKZJ568-E

Different voltages (With transformer)

Note) Refer to Page 4 for more details.



Part No.	Part Name	Description	Part No.	Part Name	Description
1	Control panel		11	Machine faceplate	
2	Electric component box cover		12	Overall caution plate	
3	Power supply inlet (Right / Left)	φ28 Hole	13	Design faceplate	
4	Signal line inlet (Right / Left)	φ22 Hole	14	Electric schematic diagram faceplate	
5	Eye plate	φ25 Hole	15	Battery charge mark faceplate	
6	Air filter		16	Transformer box	
7	Room temperature thermistor				
8	Liquid temperature thermistor				
9	Cooling coil				
10	Agitating plate				



Note) \*1. The hanging fitting is located below. Do not use this fitting for hanging.

# AKZJ8 SERIES

## Outside dimension diagram

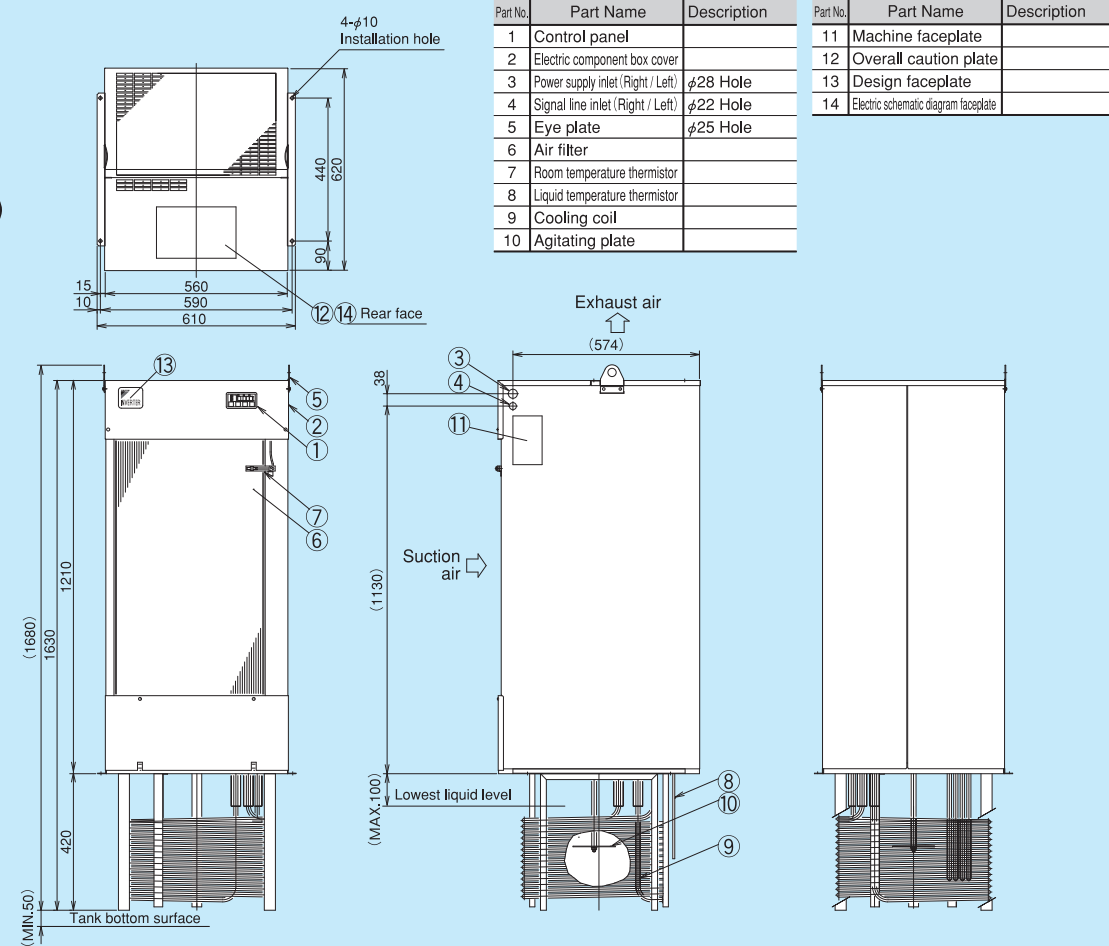
### AKZJ908-(B,-C)

Standard specifications

With breaker

Compliance with CE

Note) Refer to Page 4 for more details.



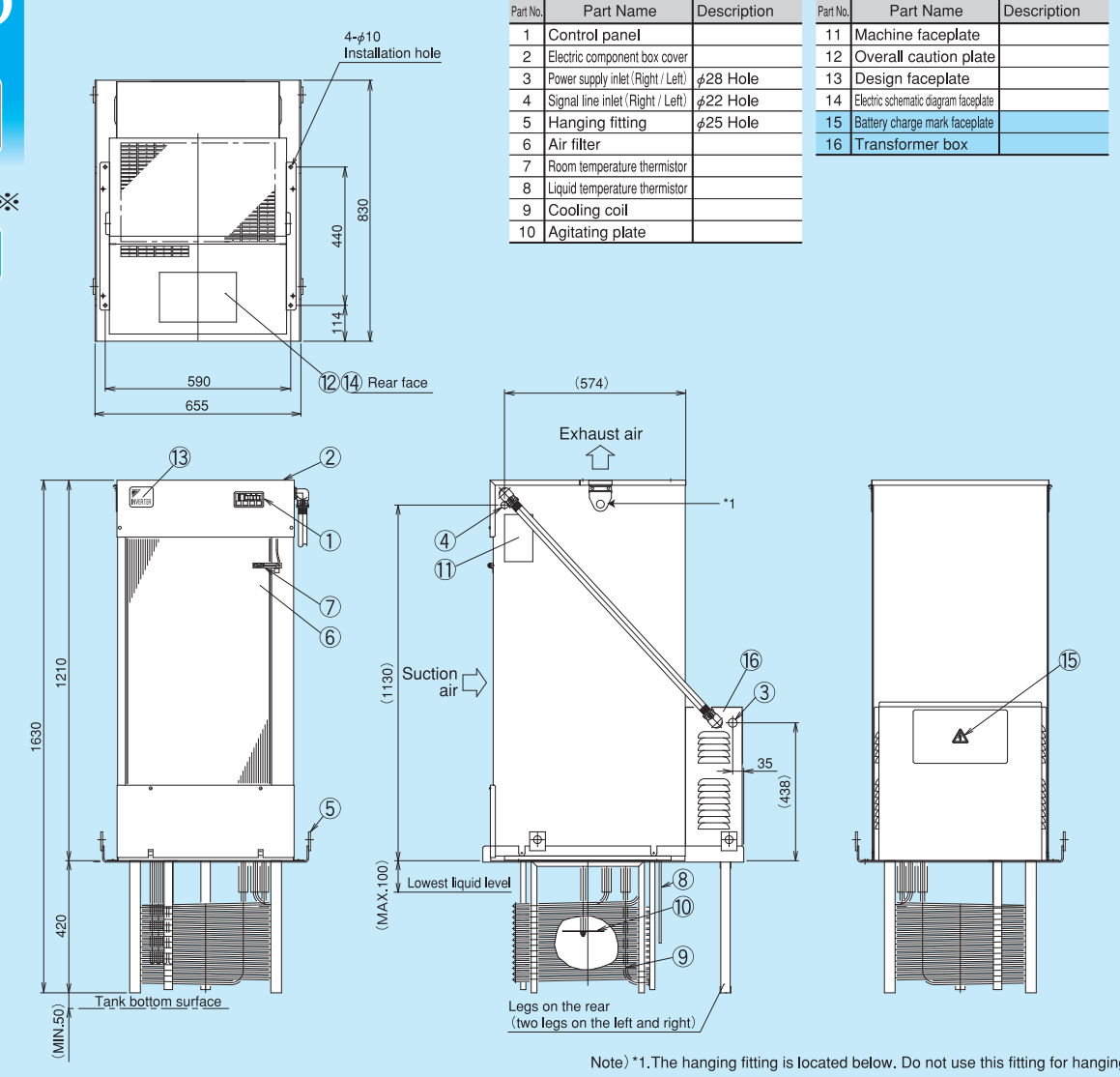
# AKZJ8 SERIES

## Outside dimension diagram

### AKZJ908-E※

Different voltages (With transformer)

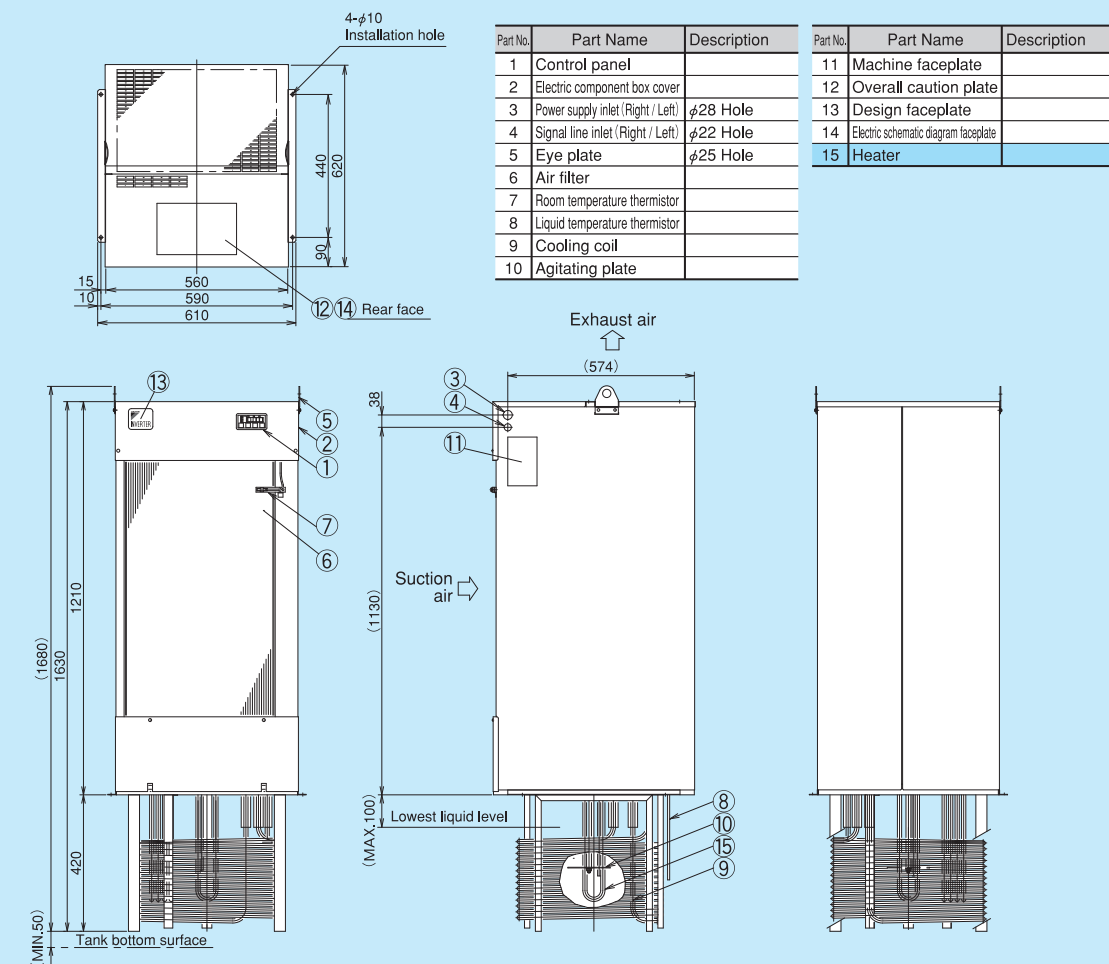
Note) Refer to Page 4 for more details.



### AKZJ908-H

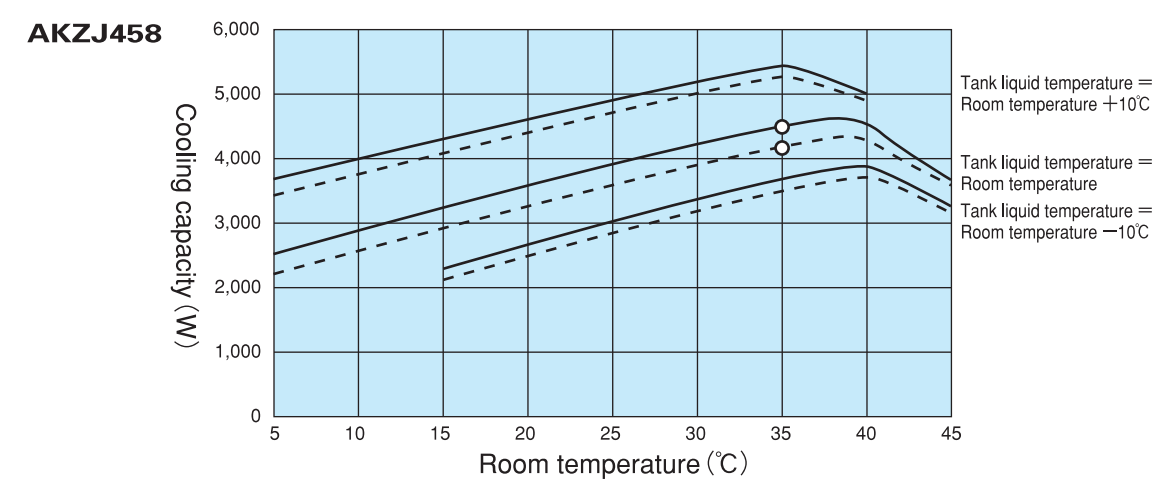
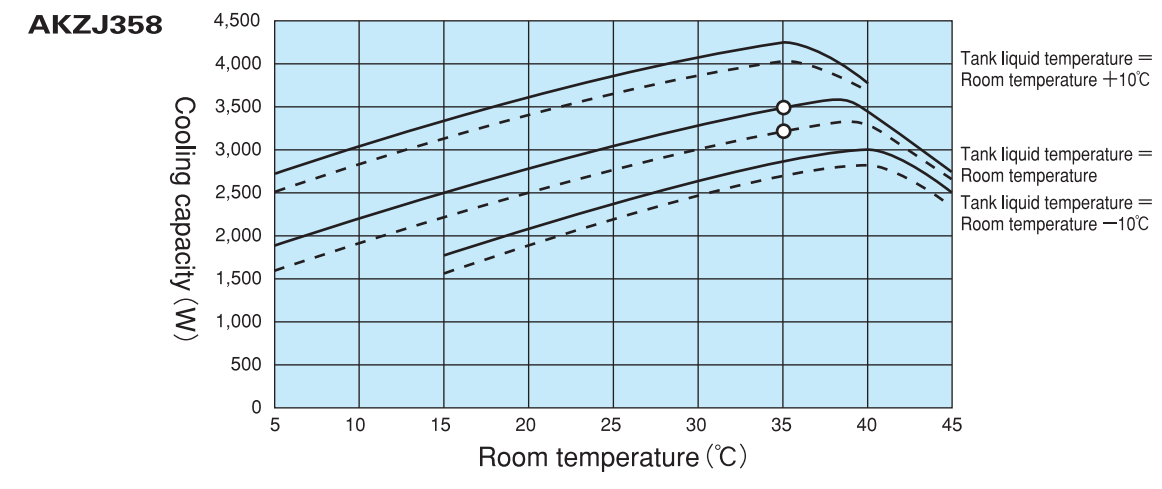
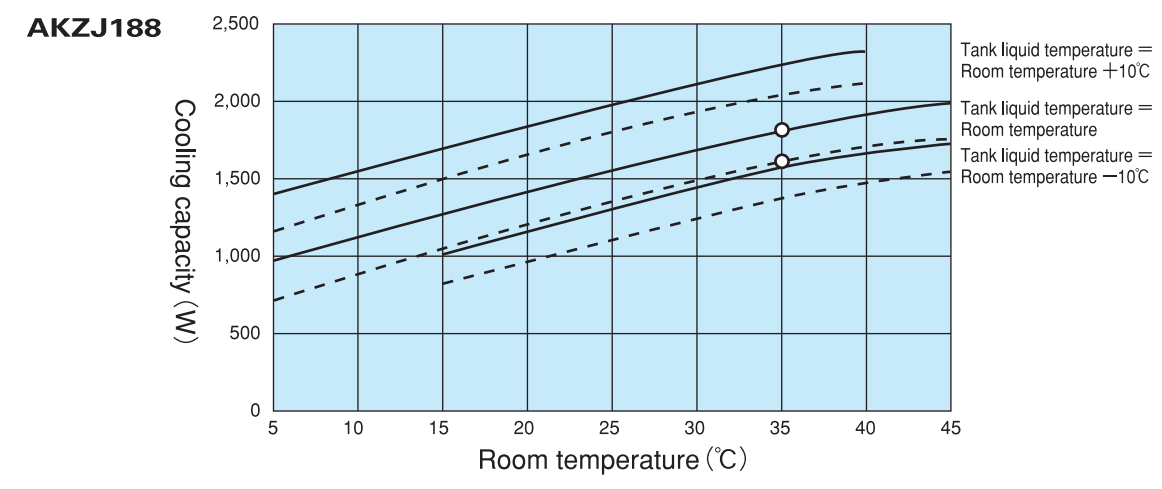
With heater

Note) Refer to Page 4 for more details.



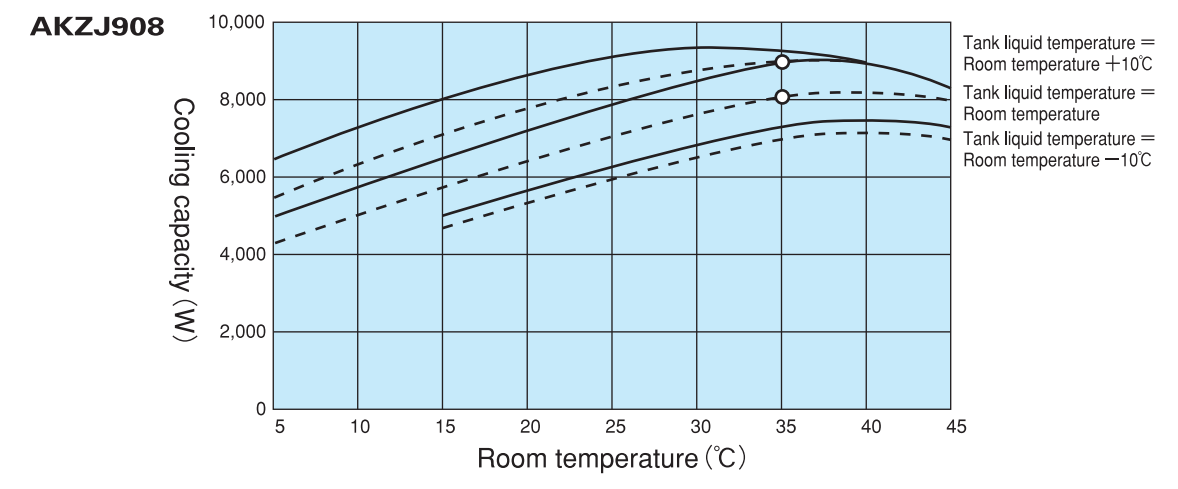
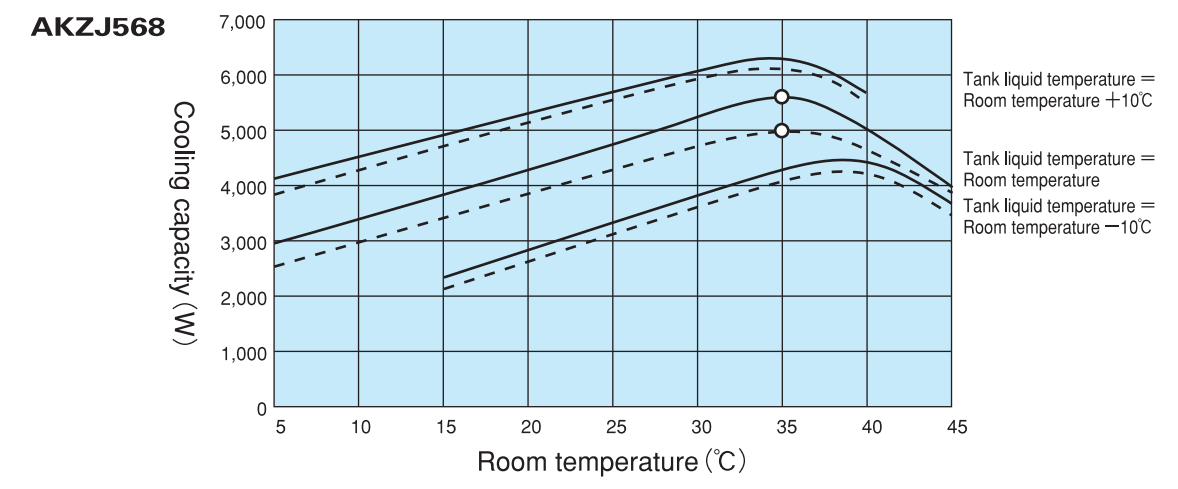
AKZJ8  
SERIES

Cooling Capacity Characteristic Chart



AKZJ8  
SERIES

Cooling Capacity Characteristic Chart



■ Full line — : When operated at 60Hz ■ Dashed line - - - : When operated at 50Hz

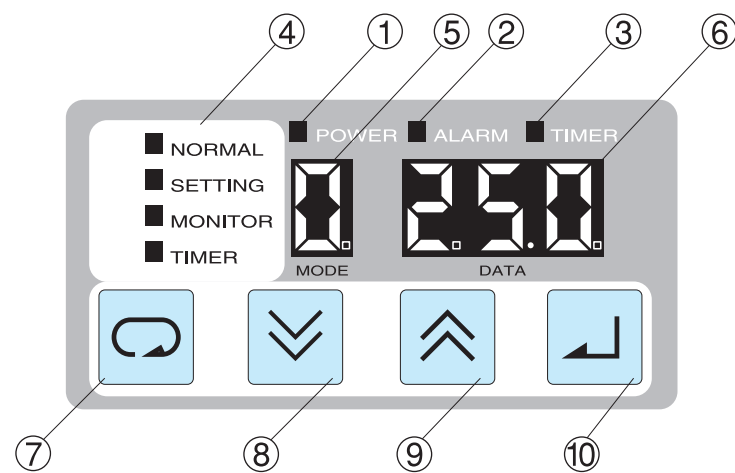
1. The mark "○" shows the standard point.  
(Room temperature: 35°C Tank liquid temperature: 35°C Oil for use: ISO VG32)
2. The cooling capacity differs depending on conditions such as room temperature, tank liquid temperature, oil dynamic viscosity and other factors.

AKZJ 8 series Cooling Capacity Characteristic Chart

AKZJ 8 series Cooling Capacity Characteristic Chart



## Part names, functions and operation of control panel

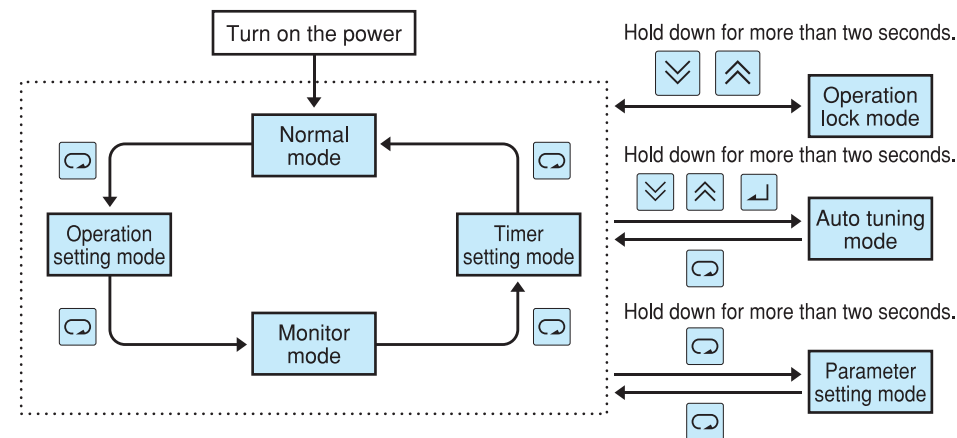


NO.	Item	Description
①	Power lamp (Green)	The lamp is turned on while power is supplied.
②	Error warning lamp (Red)	When an error occurs: Level 1 alarm: The lamp keeps blinking Level 2 alarm: The lamp is turned on
③	Timer mode lamp (Green)	The lamp keeps blinking while the machine is at a stop in the timer mode.
④	Operation mode display	Displays the mode of the control panel. NORMAL: Normal mode SETTING: Operation setting mode MONITOR: Monitor mode TIMER: Timer setting mode
⑤	Operation mode / Data No. display	Displays the current operation mode (Normal mode, Operation setting mode) or data number of the data currently displayed on the data display part.
⑥	Data display	Displays various data. The data displayed differs depending on the operation mode and data number.
⑦	[SEL] (Select) key	Selects the operation mode.
⑧	[DOWN] key	Reduces the value of the operation mode, data number, and data.
⑨	[UP] key	Increases the value of the operation mode, data number, and data.
⑩	[ENT] (Determine) key	Determines the operation mode, data number, and data to be changed.

### Operation for change to each mode

A mode can be changed by operating the key in general.

To enter a special mode, hold down a number of keys in combination for more than two seconds.



**CAUTION**

- The default setting is "Operation lock mode". To start operation, perform the unlocking operation as shown above.
- The default setting for operation on the standard machine is:  
Operation mode: 3 (Room temperature synchronization, inlet oil temperature control)  
Differential temperature: 0.0 (K)

## Operation mode and setting method

### AKZ 8 Series

Mode No.	Mode name	Description	Setting temperature range	Necessary optional part
Mode 0	Inlet oil temperature, fixed temperature control	Keep the inlet oil temperature at the setting temperature within the range specified in the right column.	5~50°C	
Mode 1	Outlet oil temperature or return oil temperature control Fixed temperature control	Keep the outlet oil temperature or return oil temperature at the setting temperature within the range specified in the right column.	5~50°C	Oil temperature control thermistor (When return oil temperature is controlled)
Mode 3	Inlet oil temperature, room temperature synchronization control	Keep the inlet oil temperature at the setting temperature within the range specified in the right column.	Between Room temperature -9.9°C and Room temperature + 9.9°C	
Mode 4	Inlet oil temperature, machine temperature synchronization control	Keep the inlet oil temperature at the setting temperature within the range specified in the right column.	Between Machine temperature -9.9°C and Machine temperature+ 9.9°C	Machine synchronization thermistor
Mode 5	Outlet oil temperature or return oil temperature control Room temperature control	Keep the outlet oil temperature or return oil temperature at the setting temperature within the range specified in the right column.	Between Room temperature -9.9°C and Room temperature + 9.9°C	Oil temperature control thermistor (When return oil temperature is controlled)
Mode 6	Outlet oil temperature or return oil temperature control Machine temperature synchronization control	Keep the outlet oil temperature or return oil temperature at the setting temperature within the range specified in the right column.	Between Machine temperature -9.9°C and Machine temperature + 9.9°C	Oil temperature control thermistor (When return oil temperature is controlled) Machine synchronization thermistor

Note) 1. Modes 2, 7, and 8 cannot be used on this series. Note) 2. Refer to Page 37 for details of necessary optional parts.

### AKZJ 8 Series

Mode No.	Mode name	Description	Setting temperature range	Necessary optional part
Mode 0	Tank liquid temperature, fixed temperature control	Keep the tank liquid temperature at the setting temperature within the range specified in the right column.	5~50°C	
Mode 3	Tank liquid temperature, room temperature synchronization control		Between Room temperature -9.9°C and Room temperature + 9.9°C	
Mode 4	Tank liquid temperature, machine temperature synchronization control		Between Machine temperature -9.9°C and Machine temperature + 9.9°C	Machine synchronization thermistor

Note) 1. Mode 1, 2, and 5 through 8 cannot be used on this series. Note) 2. Refer to Page 37 for details of required optional parts.

### Setting procedure: Common to AKZ and AKZJ

Default setting: Set to "Mode: 3" and temperature to "0.0". When you use your machine at a setting other than the default setting, change the setting following the procedure shown below.

- Power ON --- Release the operation lock mode before starting operation for the first time. Hold down the key and key simultaneously for more than 2 seconds.

- Select the "Setting" mode and press the key once.

#### Change the mode

The number of the "Mode" is decreased by one. / The number of the "Mode" is increased by one.

- Press the or key for mode setting.
- Determine the value by pressing the key.

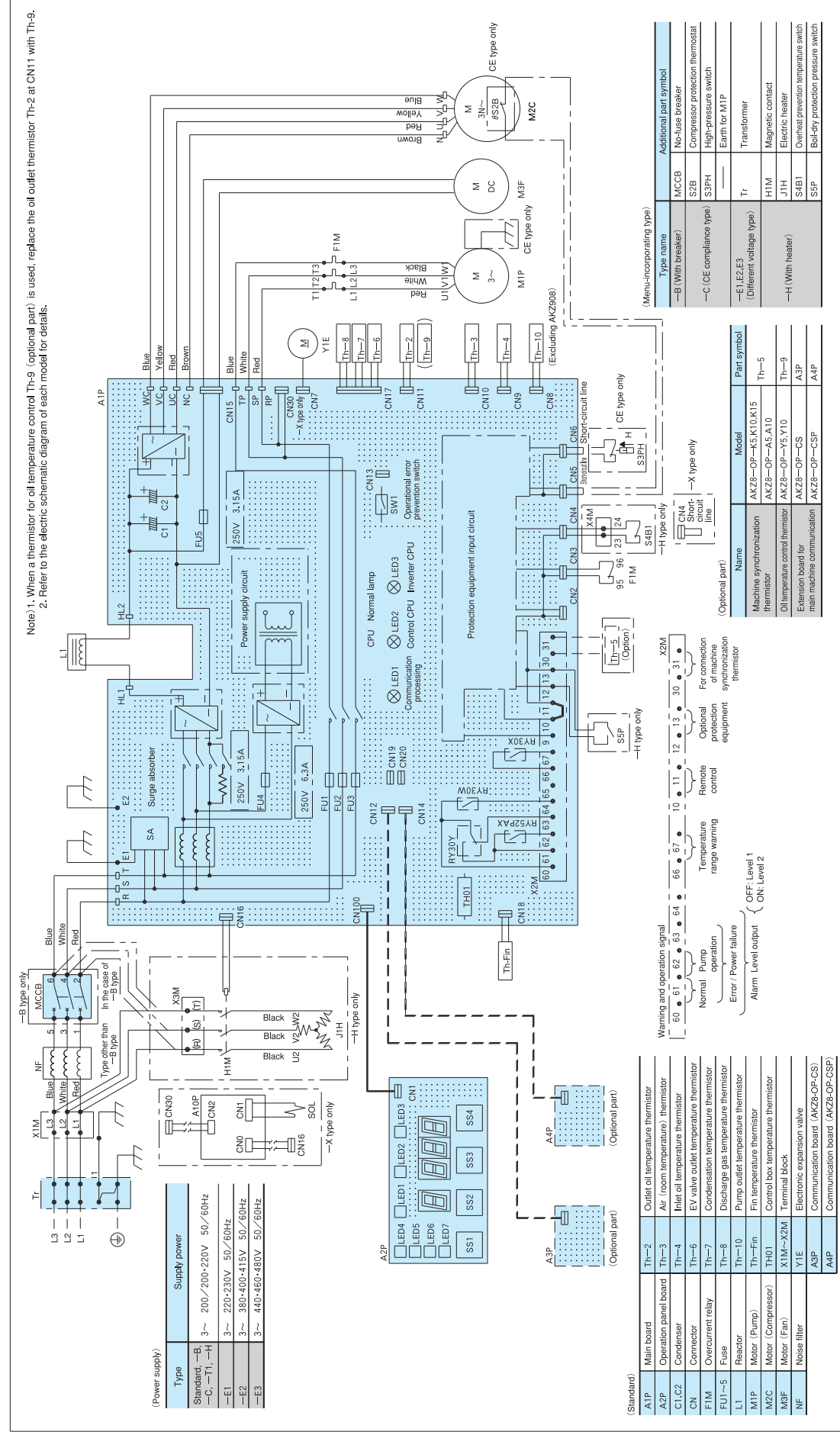
#### Change the setting temperature

The "Setting temperature" is reduced by 0.1. / The "Setting temperature" is increased by 0.1.

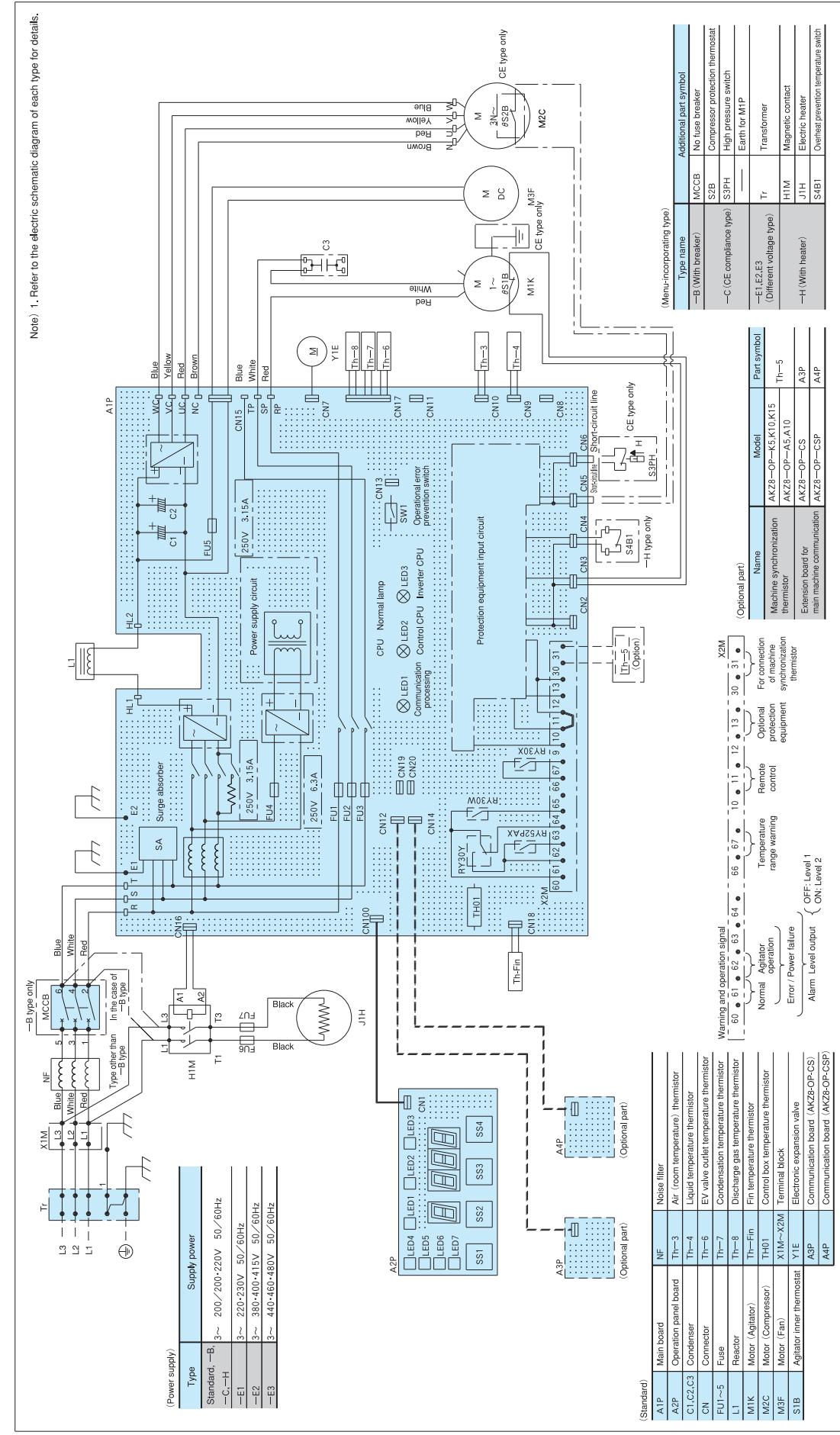
- Press the or key for temperature setting.
- Determine the value by pressing the key.

- To return to the "Normal" mode, press the key three times.

# AKZ8 series Electric Schematic Diagram (Typical diagram)



# AKZJ8 series Electric Schematic Diagram (Typical diagram)

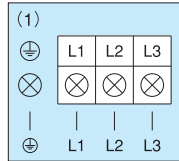


# AKZ8·AKZJ8 series Electric Wiring Connection Instruction Diagram

**1 Power supply capacity** ... Refer to the max. power consumption and max. consumption current of the specification sheet of each type.

**2 Connection to power supply terminal block (X1M, Tr)**

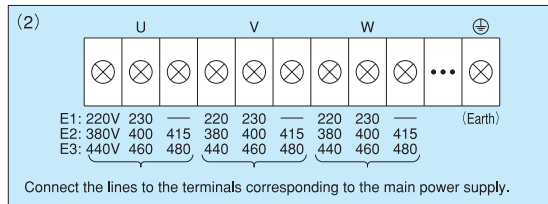
- (1) In the case of the standard type and menu-incorporating type (—B,—C,—H,—T), connect the line to X1M.
- (2) In the case of the menu-incorporating type (with transformer:—E1,—E2,—E3), connect the line to the terminal block supplied with the transformer.



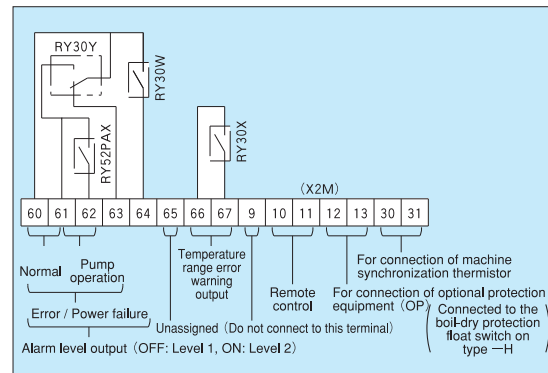
1. Screw terminal and wiring diameter

Series	Screw terminal	Wiring diameter		
		JIS cable	IEC cable	UL cable
AKZ 148,328,438,568 AKZJ188,358,458,568	M4	2.0mm <sup>2</sup> or more	2.5mm <sup>2</sup> or more	AWG#14 or more
AKZ908,AKZJ908	M5	3.5mm <sup>2</sup> or more	4.0mm <sup>2</sup> or more	AWG#12 or more

- 2. Use a round crimp-style terminal for connection.
- 3. The terminal block is for three poles and the earth wire is to be secured on the enclosure with a screw



**3 Connection to signal terminal block (X2M)**



1. Screw terminal and wiring diameter

Screw terminal	Wiring diameter		
	JIS cable	IEC cable	UL cable
M3	0.25mm <sup>2</sup> ~1.25mm <sup>2</sup>	0.3mm <sup>2</sup> ~1.5mm <sup>2</sup>	AWG#22 ~#16

- 2. Use a round crimp-style terminal for connection.
- 3. Use stranded wires for electric connection.
- 4. The wiring size is 0.5mm<sup>2</sup>~1.5mm<sup>2</sup> in the case of duplex cable according to IEC.

**4 Signal output time chart**

(1) Operation and alarm status output

Signal output	Operation status	Remote ([10]—[11]) status								
		ON				OFF				
		Normal	Level 1 error or Lock	Level 2 error	Power failure (Power OFF)	Normal	Level 1 error or Lock	Level 2 error	Power failure (Power OFF)	
Normal ("a" contact)	60—61	ON	OFF							
Error / Stop (Power OFF) ("b" contact)	60—63	ON	OFF							
Error level ("a" contact)	60—64	ON	OFF							
Pump or agitator operation ("a" contact)	61—62	ON	OFF							

(2) Temperature range warning (Oil temperature warning) status output ... Setting change is required to enable this function.

Signal output	Operation status	Temperature range check status								
		Within the setting range				Out of the setting range				
		Operation Normal	Level 1 error or Lock	Level 2 error	Power failure (Power OFF)	Operation Normal	Level 1 error or Lock	Level 2 error	Power failure (Power OFF)	
Temperature range normal ("a" contact)	66—67	ON	OFF							

- CAUTION**
- The following electric wires can be used on the terminal block for the round crimp-style terminal (1.25-3):  
Single wire:  $\phi 0.57 \sim \phi 1.44$  (AWG#22~#16)  
Stranded wire: 0.25mm<sup>2</sup>~1.25mm<sup>2</sup> (AWG#22~#16)
  - Load applicable to [60 - 64] and [66 - 67] is as follows:  
Min. applicable load: 10mV DC, 10 $\mu$ A or more  
Max. applicable load: 30V DC, 2A (Resistance load)
  - For [10] to [13], please prepare contacts to meet the condition of minimum applicable load 12V DC and 5mA.
  - When the length of the thermistor to be connected to [30] — [31] is longer than 10m, or the wiring is routed in a poor noise environment, use shielded wire.

**⚠ DANGER**

- Always install a molded case circuit breaker (to be prepared by you) of the specified capacity on the main power supply.
- Always ground the machine. Since a noise filter is installed, there is a risk of electrical shock without proper grounding.
- Before opening the electric component box, always turn off the power, and wait for 5 minutes until internal high voltage has been discharged.
- Do not energize the equipment with the electric component box kept open.

**⚠ CAUTION**

- To avoid the effects of noise, connect the power wire by cutting it to the proper length so that no excess wire comes into contact with the control board or others.
  - To perform remote control, remove the short-circuit wire between [10] and [11] and install an operation switch (to be prepared by you).
  - The mode is set to "Lock mode (Stop mode)" by default. Before starting operation, follow the procedure to release the Lock mode from the operation panel. Refer to the operation manual for the unlocking procedure.
  - The machine is provided with a tamper-proof switch (SW1) to reject the setting from the operation panel. If you want to use this function, make the necessary setting referring to the operation manual.
  - The CE-compliance type (-C) is categorized into the overvoltage category II as an auxiliary machine of the main machine. Observe the following instructions in installing the -C type machine.
    - Install a main power circuit breaker required according to EN60204-1 on the main machine control panel.
    - Supply the power through the transformer provided with basic insulation (\*).
- \* Basic insulation: Insulation provided on a live part to assure basic protection against an electric shock (According to IEC Standard 60335-1).

# Notes for installing piping outside the machine

If the external pressure loss (site piping resistance) exceeds the specified use range, there may occur phenomena such as abnormal noise of the pump (relief noise, noise of cavitation), decrease of cooling capacity and control failure of oil temperature. Keep the external pressure loss within the specified use range.

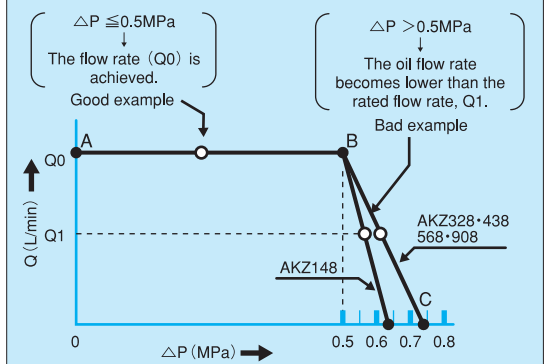
- Suction-side piping**  
Keep the suction vacuum pressure within the range between -30.7 and 0kPa.  
The use of a suction filter of 100 to 150 mesh is recommended.
- Discharge-side piping**  
Keep the pressure loss of the discharge-side piping at 0.5Mpa or less.
- Do not install a stop valve on the suction or discharge side. When a stop valve must be installed on the discharge side out of necessity, use a 0.5Mpa relief valve along with the stop valve.
- Calculation of piping resistance**  
Determine the oil piping size by calculating the piping resistance according to the following equation:

Piping resistance  $\Delta P = 0.595 \times Q \times L / D^4$   
(For use of general hydraulic oil and lubricant)

- $\Delta P$  : Piping resistance (MPa)
- $\nu$  : Dynamic coefficient of viscosity (mm<sup>2</sup>/s)  
—Refer to the Viscosity / Temperature Chart.
- Q : Flow rate (L/min)
- L : Piping length (m)
- D : Internal piping diameter (mm)

**●Relation between oil flow rate of Oil Cooling Unit and external pressure loss**

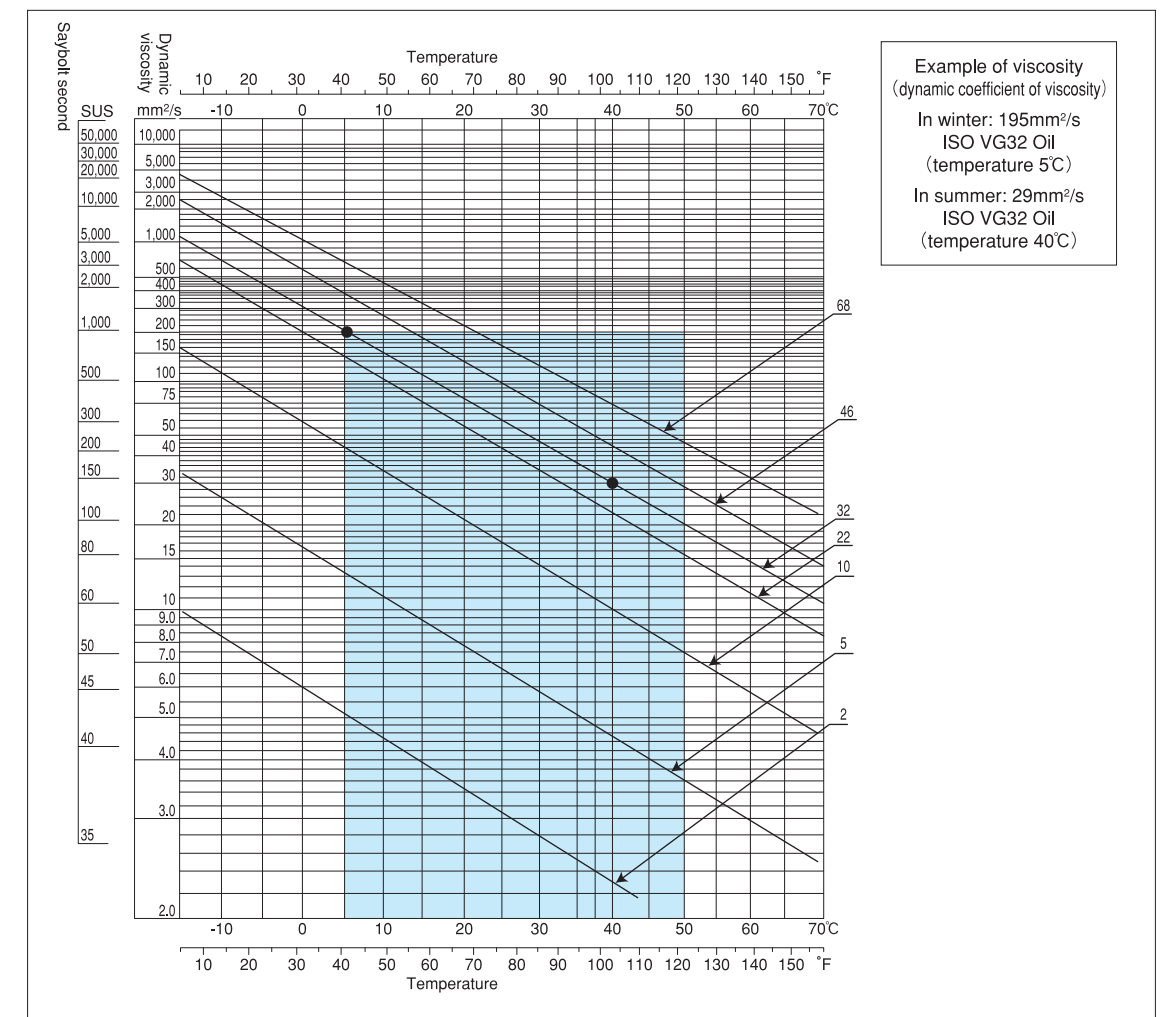
AKZ8 series Oil Cooling Unit incorporating a pump of the circulating type has the properties shown below. When the external pressure loss ( $\Delta P$ ) is 0.5 Mpa or less, the rated flow rate (Q0) is achieved, but when the external pressure loss exceeds 0.5 Mpa, the oil flow rate becomes lower than the rated flow rate.



Q (L/min) : Oil flow rate (Q0: Rated flow rate)  
 $\Delta P$  (MPa) : External pressure loss  
 A : Status when the external pressure loss is "0"  
 B : Status when the external pressure loss is "0.5Mpa" (Cracking pressure of relief valve)  
 C : Status when the external pressure loss is large and the oil flow rate is "0".

Note) When the valve on the main machine side is open fully, the outlet pressure is 0.65Mpa on AKZ148, and 0.75Mpa on AKZ328, 438, 568, and 908. Design the site piping so as to have a pressure resistance higher than the respective outlet pressure.

**■Viscosity / Temperature Chart**



## Notes for handling

● **Important notes to be observed regarding the main machine side (machine tools and industrial machine)**

- When adverse transport conditions are expected in transporting the machine overseas or elsewhere, special precautions should be taken in the packaging and transportation method so as to avoid the application of excessive force on Oil Cooling Unit (this machine).
- Oil Cooling Unit (this machine) does not incorporate a flow switch for checking the oil supply and a temperature switch for abnormal supply of oil temperature (high temperature or low temperature). So, please provide a protection device such as a flow switch and a temperature switch on the main machine side.

## Notes for operation and cooling capacity

- Do not use Oil Cooling Unit for cooling a liquid at 50°C or more. Start to operate Oil Cooling Unit at the same time as the main machine or before liquid temperature rises to 40°C.
- Do not place an object that hinders ventilation within 500mm of the suction port or discharge port.
- If the air filter is clogged, the cooling capacity is reduced. Clean the air filter (wash with hot water or clean with air) periodically once every two weeks to prevent clogging.
- If cutting powder and debris deposit and adhere to the cooling coil (evaporator) in the AKZJ8 series, the cooling capacity is reduced and failure may be caused. To avoid the adherence of deposit on the cooling coil, install an efficient return filter on the return side (liquid inlet) of the tank and periodically clean the tank inside.

## Notes regarding liquid usable with Oil Cooling Unit

- Liquid usable with Oil Cooling Unit is listed in the table below for each series. (○...usable, ×...Not usable)
- Do not use the liquid listed below as "not usable" (Marked with "×").

	Description	AKZ8 Series	AKZJ8 Series
Lubricant Mineral hydraulic oil	<ul style="list-style-type: none"> <li>The third class petroleum and fourth class petroleum of the fourth group hazardous materials specified according to the Fire Defense Law, and oil equivalent to discoloration No. 1 according to the copper corrosion test method (JIS K2513) of petroleum products</li> <li>Oil equivalent to NAS 10 level according to the pollution level</li> </ul>	○	○
Nonflammable hydraulic oil	<ul style="list-style-type: none"> <li>Ester phosphate series</li> <li>Chlorinated hydrocarbon series</li> <li>Water - Glycol series</li> <li>W-O &amp; O/W emulsion series (High-aqueous hydraulic oil)</li> </ul>	×	×
Coolant fluid	<ul style="list-style-type: none"> <li>Water-soluble cutting and grinding liquid</li> <li>Non water-soluble cutting and grinding oil</li> </ul>	×	○
Ethylene glycol (Antifreeze liquid)	Liquid not including an ingredient to cause the material SUS304 of the cooling coil (evaporator) to corrode	×	○
Water (Industrial water)		×	○
Inflammable liquid like fuel	Liquid equivalent to special flammables, alcohol, first class petroleum and second class petroleum of the fourth group hazardous materials specified according to the Fire Defense Law	×	×
Drugs	—	×	×
Liquid for food products	Drinking water, water for cooling food products, etc.	×	×

## Notes for handling

\* Before operating this equipment, read and understand the operation manual supplied with the equipment.

● **Instructions for safe operation**

(Signs and Instructions)

- [△] DANGER...Failure to observe the instruction may cause an imminent hazardous situation that may result in personal death or serious injury.
- [△] WARNING...Failure to observe the instruction may result in personal death or serious injury.
- [△] CAUTION...Failure to observe the instruction may result in personal injury or damage to the property.

① **General instructions**

- [△] DANGER] ① Use the equipment only in accordance with the intended specifications (specified in brochure, specification sheet, operation manual, caution plate).
- [△] DANGER] ② Never operate the equipment in an explosive atmosphere
- [△] DANGER] ③ Do not disassemble, repair or modify the equipment by yourself.
- [△] DANGER] ④ Always comply with the laws and regulations for safety (Industrial Safety and Health Law, Fire Defense Law, JIS B 8361 Guidelines of Hydraulic System).
- [△] WARNING] ⑤ Caution in the event of refrigerant leak
  - Ventilate a room adequately (to avoid the risk of suffocation).
  - Avoid direct contact of the refrigerant with skin (to avoid the risk of frost injury).
  - In the event of inhalation of a great deal of refrigerant, contact with skin, and refrigerant in the eye, seek medical attention immediately.
- [△] WARNING] ⑥ In the event of an abnormal condition, stop operation promptly, investigate the cause of the problem and take appropriate remedial measures.
- [△] CAUTION] ⑦ Do not operate the equipment in a special environment (in a place at high temperature, high humidity, in the presence of a great deal of dirt, dust, powder dust, steam, and oil mist).
- [△] CAUTION] ⑧ Install a flow switch and temperature switch on the main machine to protect the main shaft and others.
- [△] CAUTION] ⑨ Do not get on the equipment or place an object on the equipment.

② **Instructions for transportation**

- [△] DANGER] ① When hoisting the equipment, check its weight and use the eye plates and hangers on the equipment properly.
- [△] WARNING] ② Do not get approach the equipment while it is being hoisted and moved.
- [△] CAUTION] ③ When moving the equipment, take appropriate measures for fall prevention.
- [△] CAUTION] ④ Do not tilt the equipment 30 degrees or more while transporting the equipment (including during storage).

③ **Instructions for installation**

- [△] WARNING] ① Install the equipment on a rigid, level foundation and secure it appropriately.
- [△] CAUTION] ② Do not place an object near the suction port and discharge port of the equipment.

④ **Instructions for wiring and piping installation**

- [△] DANGER] ① Wiring and piping installation should be performed by a person with specialized knowledge and skills.
- [△] DANGER] ② Always use a commercial power supply for the power source. (The use of an inverter power supply may cause burn damage).
- [△] DANGER] ③ Connect the wiring for power supply in accordance with the electric wiring instruction diagram of the specification sheet and operation manual.
- [△] DANGER] ④ Ground the equipment properly.
- [△] WARNING] ⑤ Install the wiring in accordance with the standard by checking the electric schematic diagram.
- [△] CAUTION] ⑥ Always install a dedicated breaker (molded case circuit breaker) appropriate for the capacity of Oil Cooling Unit on the main power supply on site.
- [△] CAUTION] ⑦ Check to see that the oil piping has the pressure resistance of 1MPa or more and install the piping appropriately.

⑤ **Instructions for trial run**

- [△] CAUTION] ① Check to see that the main machine is in a safe status (not activated) before starting the trial run.
- [△] CAUTION] ② Check to see that the oil piping and electric wiring are correctly connected to the main machine and that there is no looseness in connections and joints.
- [△] CAUTION] ③ Disable the operation lock of the equipment (Oil Cooling Unit) before starting the main machine.
- [△] CAUTION] ④ Check to see that the required amount of oil is in the oil piping system and that the piping is not blocked in the middle.

⑥ **Instructions during operation**

- [△] DANGER] ① Do not splash water or liquid on the equipment.
- [△] WARNING] ② Do not push your finger or an object into gaps of the equipment.
- [△] CAUTION] ③ Do not touch the heated exhaust port of the equipment.

⑦ **Instructions for maintenance and inspection**

- [△] DANGER] ① Perform maintenance and inspection with the equipment kept open. Working in a closed status may result in suffocation due to the leak of refrigerant.
- [△] DANGER] ② Always turn off the main power supply before starting maintenance and inspection.
- [△] DANGER] ③ Wait for five minutes after turning off the main power supply and start maintenance and inspection operation.
- [△] DANGER] ④ Do not operate the equipment with the cover of the equipment opened.
- [△] CAUTION] ⑤ Wear protective gear such as gloves and an eye protector when performing maintenance, inspection and cleaning.
- [△] CAUTION] ⑥ Clean the air filter periodically (once every two weeks in general).
- [△] CAUTION] ⑦ Keep oil cleanliness to NAS 10 level or less according to the pollution level.



## Method of selection of Oil Cooling Unit

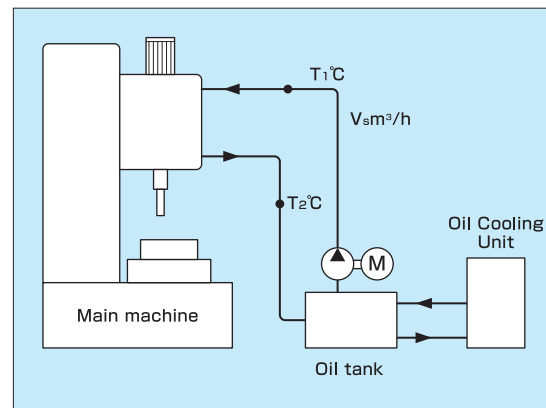
Unit conversion formula ● 1kW=860kcal/h

1. Select Oil Cooling Unit having a cooling capacity 20 to 30% larger than the heat release value from the machine tool.
2. Since the cooling capacity of Oil Cooling Unit varies with the change of liquid temperature (inlet liquid temperature) and room temperature, it is necessary to clarify the liquid temperature and room temperature conditions to select appropriate Oil Cooling Unit.
3. Three methods are shown below as a guide for estimating the heat release value from the machine tool. For determining the heat release value eventually, it is necessary to conduct tests and determine the exact heat release value for selecting appropriate Oil Cooling Unit.

### ● Calculation method of heat release value from main machine for the selection of appropriate Oil Cooling Unit (as a general guide)

#### (1) In the case of cooling of main shaft of machining center

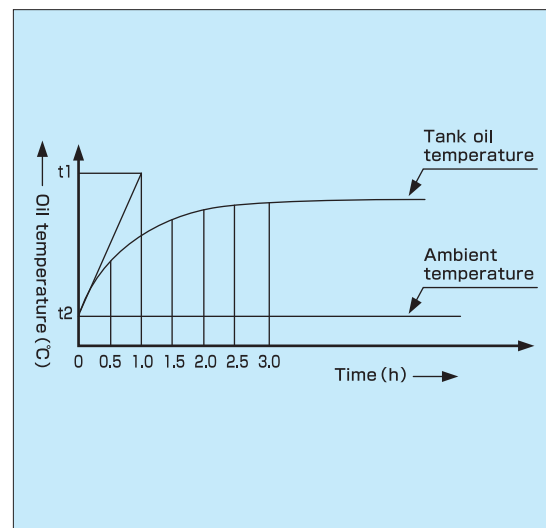
#### ● Method 1: To estimate the heat release value from the temperature difference between the supply oil and return oil



$$Q = 2.778 \times 10^{-7} C_p \cdot \gamma \cdot V_s \cdot \Delta T$$

- Q : Heat release value (kW)  
 Cp : Constant pressure specific heat (J/kg°C) ... 1967.4 J/kg°C  
 γ : Weight volume ratio (kg/m³) ... 876 kg/m³  
 Vs : Oil flow rate (m³/h)  
 ΔT : Temperature difference (°C) ... T<sub>2</sub> - T<sub>1</sub>  
 E.g.) When "Vs" is 18m³/h (30L/min) and "ΔT" is 5°C  
 $Q = 2.778 \times 10^{-7} \times 1967.4 \times 876 \times 1.8 \times 5$   
 $= 0.479 \times 1.8 \times 5 \approx 4.3 \text{ kW}$

#### ● Method 2: To estimate the heat release value from the increase rate of oil temperature in the tank



Find the maximum gradient of oil temperature increase  
 (To find the maximum gradient of the oil temperature, it is necessary to measure Δt every one minute during the first 10 minutes.)

$$Q = 2.778 \times 10^{-7} C_p \cdot \gamma \cdot V \cdot \Delta t / H$$

- Q : Heat release value (kW)  
 Cp : Constant pressure specific heat (J/kg°C) ... 1967.4 J/kg°C  
 γ : Weight volume ratio (kg/m³) ... 876 kg/m³  
 V : Total oil quantity (m³)  
 Δt : Temperature difference (°C) ... t<sub>1</sub> - t<sub>2</sub>  
 H : Time (h)  
 E.g.) When the total oil quantity is 300L (0.3m³) and "Δt" is 10°C.  
 $Q = 2.778 \times 10^{-7} \times 1967.4 \times 876 \times 0.3 \times 10$   
 $= 0.479 \times 0.3 \times 10 \approx 1.4 \text{ kW}$

#### ● Method 3: When motor output loss is considered to be the heat release value

$$Q = H \cdot \frac{\eta}{100}$$

- Q : Heat release value (kW)  
 H : Motor output (kW) ... For driving the main shaft  
 η : Motor output loss (%)  
 E.g.) When the output loss is 30% for the motor output 7.5 kW → The output loss is 30% or so in general (Cooling of main shaft head)

## Method of selection of Oil Cooling Unit

### (2) In the case of cooling of cutting and grinding liquid

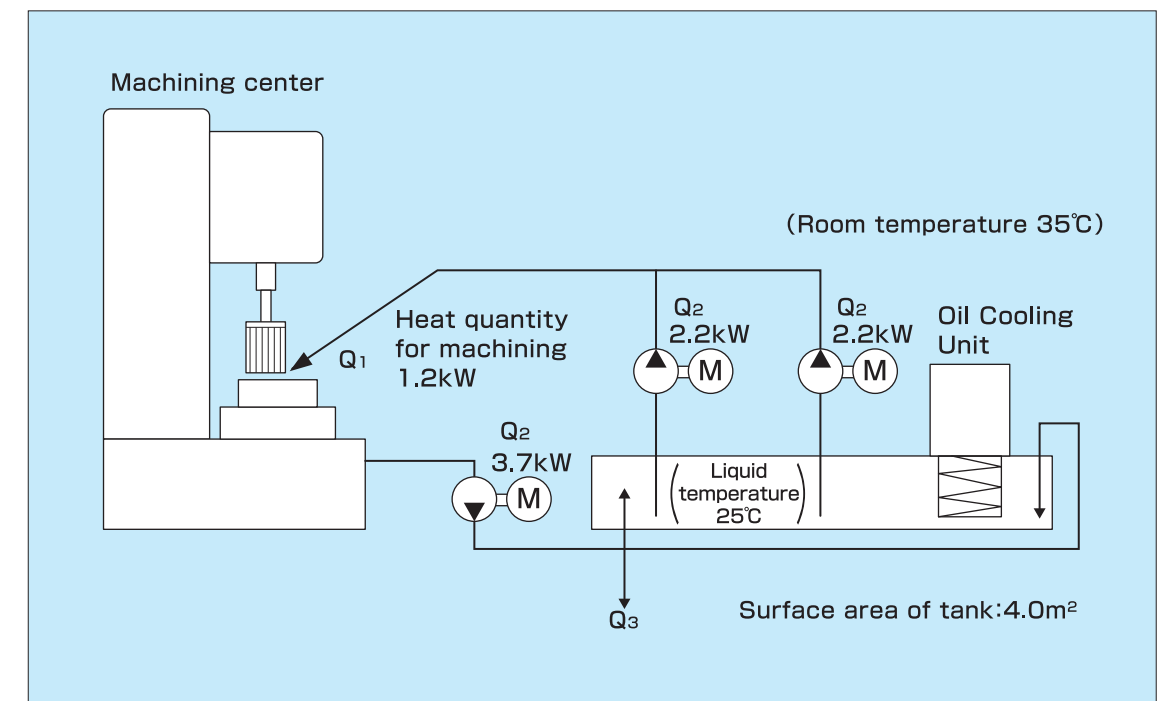
1. The heat release value from the cutting and grinding liquid system should be roughly estimated according to the following formula as the tank capacity and pump flow rate are generally large. After rough estimation, the heat release value should be determined through conducting tests on the actual machine for selecting Oil Cooling Unit.
2. Formula for rough calculation of heat release value

$$Q = Q_1 + Q_2 + Q_3$$

- Q : Heat load of the entire machine tool system  
 Q<sub>1</sub> : Heat value for machining by machine tool  
 Q<sub>2</sub> : Heat release value of pump motor for coolant pump (Heat transfer quantity to coolant liquid)  
 $Q_2 = \text{Pump motor output (kW)} \times \frac{\eta}{100}$   
 Q<sub>3</sub> : Heat balance between coolant liquid and room temperature via coolant tank  
 $Q_3 = K \cdot A \cdot \Delta T$  K : Heat transfer coefficient (W / m²·°C) , K=11.6~23.2 in general  
 A : Surface area of tank moistened surface (m²)  
 ΔT : Room temperature - Controlled liquid temperature in tank (°C)

3. Refer to Page 47 and determine the heat release value according to Method 1 or Method 2.

### General guide for heat generation



E.g.) In the diagram above,

When Q<sub>1</sub>=1.2kW

$Q_2 = (2.2 + 2.2 + 3.7) \times \frac{50}{100} \approx 4.1 \text{ kW}$  (In the case of coolant pump, "η" is 50% in general.)

$Q_3 = 20 \times 4 \times (35 - 25) / 1000 = 0.9 \text{ kW}$

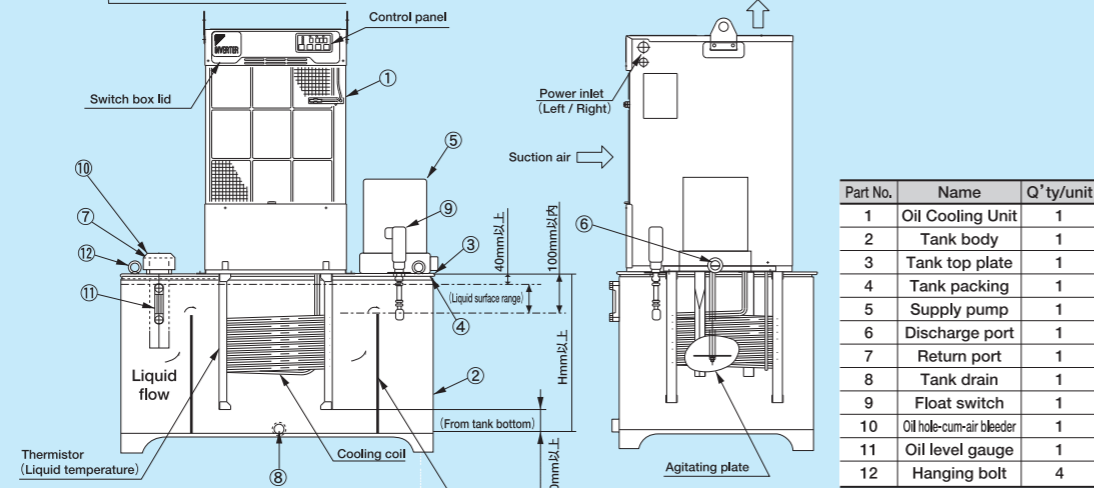
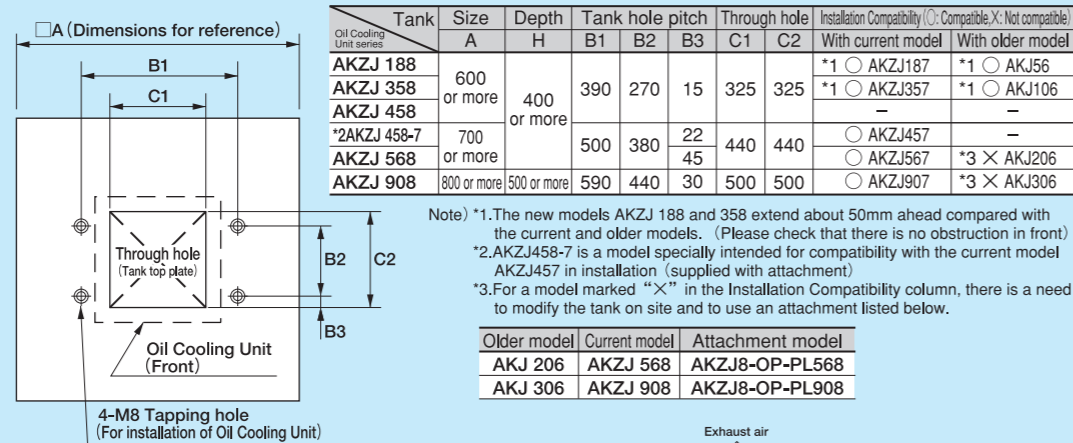
$\therefore Q = Q_1 + Q_2 + Q_3$   
 $= 1.2 + 4.1 + 0.9$   
 $= 6.2 \text{ kW}$

## AKZJ8 series Example of basic installation onto tank

### Notes for manufacturing of tank

1. Separate the liquid tank into at least three sections. Use the over-flow system and take measures so that foreign matter such as cutting powder and debris do not get directly into the suction line.
2. Arrange and locate the partition plates and piping position properly so that high-temperature liquid returned from the main machine and low-temperature liquid cooled by Oil Cooling Unit are evenly mixed.
3. Design the tank so that the tank inside can be cleaned with ease (For instance, the tank upper plate can be removed).
4. Tank material... The use of SUS is recommended for the tank material and adequate consideration should be given to the compatibility of the tank material with cooling liquid.  
(For instance, SS may be used as the tank material in combined use with coating (epoxy resin) inside the tank for grinding liquid.)

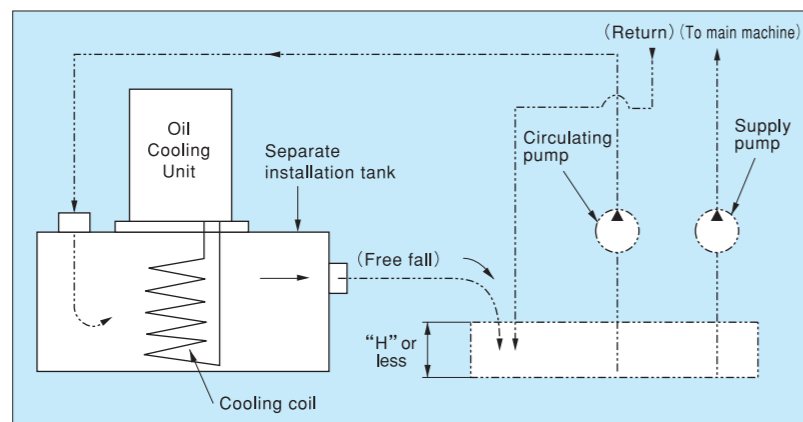
### Dimensions of installation tank (Plan view)



- Note) 1. The liquid level should be 60 to 100mm below the tank top plate.  
2. Do not expose the cooling coil extending above the liquid surface.  
3. The height of the partition plate should be higher than the lowest liquid level of the liquid level range (100mm or less from the top level).

### Separate installation type

When the tank depth is less than the dimension "H" shown in the diagram above



- Note) 1. If it is expected that cooling powder and debris will get into the tank, install efficient filters in the supply or return line.  
2. If foreign matter such as cutting powder and debris deposit and adhere onto the cooling coil, the cooling capacity is reduced and failure may result.

## Compliance of Oil Cooling Unit with Law Concerning the Recovery and Destruction of Fluorocarbons

- ◆ Daikin Group takes positive action for global environment conservation.
- ◆ Daikin takes prompt actions for the recovery and destruction of fluorocarbons by the development of the Daikin fluorocarbon recovery, transport, and destruction system throughout the nationwide network.
- ◆ For inquiries and requests for recovery of fluorocarbons, please contact the Daikin Contact Centre open 24 hours.

The Law Concerning the Recovery and Destruction of Fluorocarbons has been in force since April 1, 2002. This Law is intended to protect the ozone layer and prevent global warming and stipulates the obligation of recovery and destruction of fluorocarbons by a business owner using the product.  
The "specified products" according to the Law are categorized into Type 1 (Freezing machines and air conditioners for business use) and Type 2 (Car air conditioners). Oil Cooling Unit falls under the category of "Other devices used for freezing machines" of Type 1 according to the intent of the Law. According to this classification, every type of Oil Cooling Unit is subject to the application of the Law, whether it is newly installed or installed in the past, and regardless of the types of refrigerant for use (existing refrigerant R22 or new refrigerant R407C, R410A).  
The Law obligates each business owner (user of Oil Cooling Unit) to comply with the Law. Please note that a violator of the law will face a maximum of one year imprisonment or a fine of up to 500,000 yen.

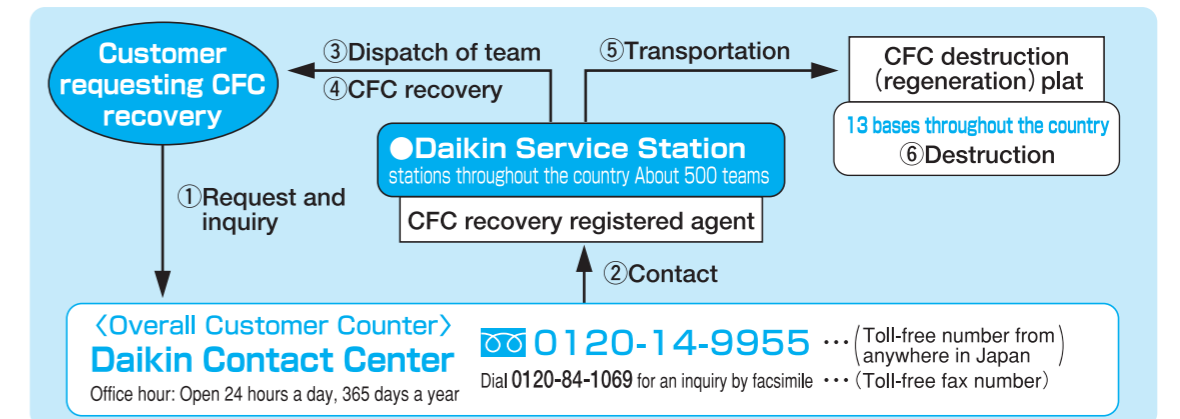
### Specific obligations and measures to be taken

Obligations of customer (Specifically, the manufacturer of main machine and end user)	<ol style="list-style-type: none"> <li>① It is prohibited to release CFC (Fluorocarbon) into the atmosphere from Oil Cooling Unit (this product).</li> <li>② To scrap Oil Cooling Unit (this product), it is required to have CFC recovered (at cost to you) by a Type-1 CFC recovery agent registered by prefectural and city governments.</li> <li>③ The "progression management system (system to control the commission and transfer of CFC in writing)" was introduced on October 1, 2007. When Oil Cooling Unit is scrapped, it is stipulated to manage the process of transfer of CFC in writing so as to carry out the thorough recovery of CFC. There is no need to manage the maintenance (servicing, repairs) of Oil Cooling Unit in writing. Note) As for a product (Oil Cooling Unit) currently being used by an end user, there is no need to attach a caution plate (label) shown below according to the Law Concerning the Recovery and Destruction of Fluorocarbons.</li> </ol>
Obligation for product as the manufacturer of Oil Cooling Unit (Daikin Industries)	○ Obligation: To attach a caution plate (label) according to the Law Concerning the Recovery and Destruction of Fluorocarbons
PR activities as the manufacturer of Oil Cooling Unit (Daikin Industries)	○ Provide information regarding the Law Concerning the Recovery and Destruction of Fluorocarbons in specification sheets and brochures of Oil Cooling Unit so as to keep customers informed of the obligation of compliance with the Law.

The overview of the Daikin CFC recovery system and information on the overall contact counter (Daikin Contact Center) is given below. Daikin recovers CFC from a Type 1 specified product not only of Daikin's products, but also those of other manufacturers. Contact the Daikin Contact Center shown below for CFC recovery.

### Overview of Daikin CFC recovery (destruction) system

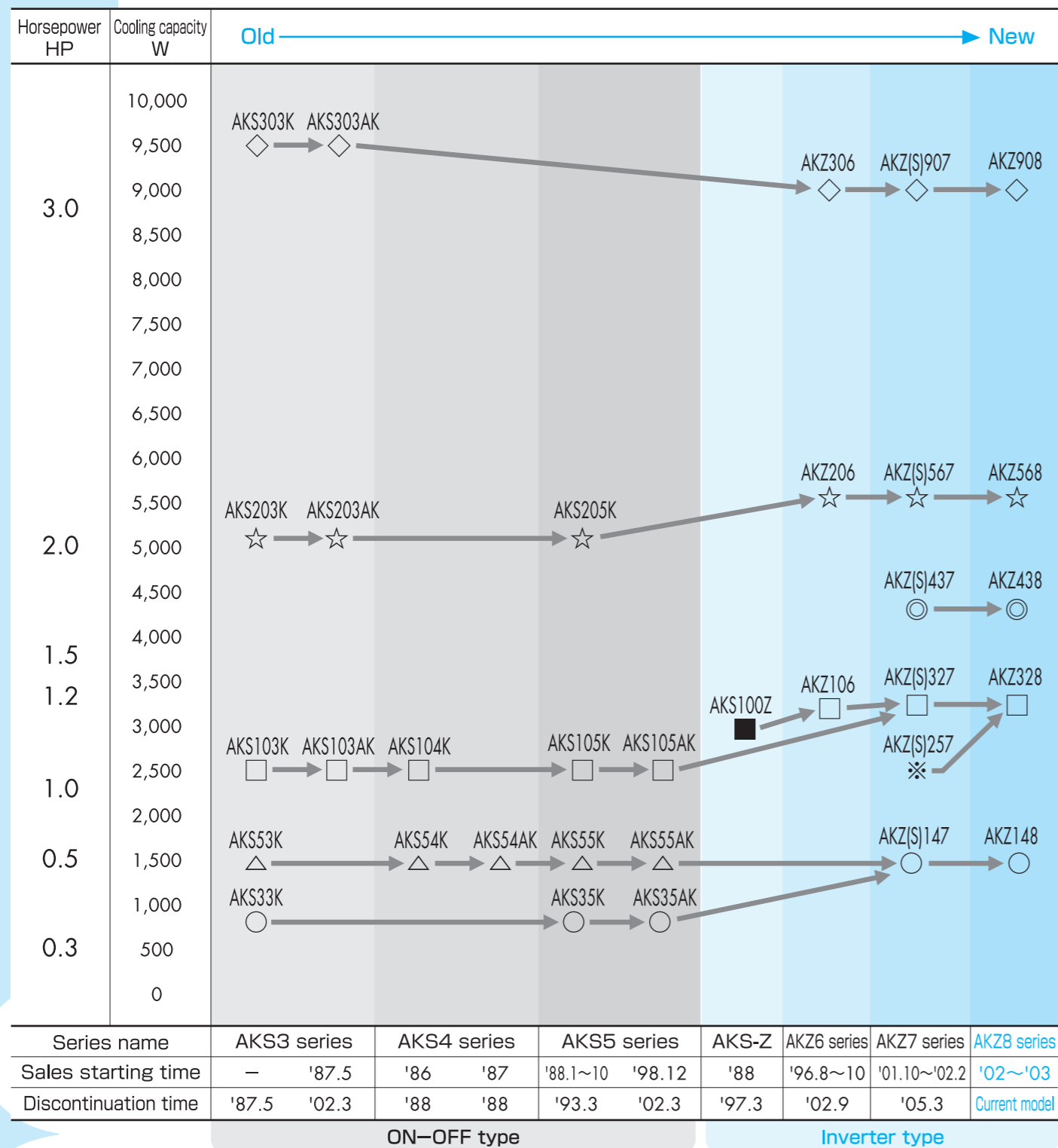
- First contact Daikin Contact Center.
- Daikin has a nationwide system of refrigerant recovery teams (about 500 teams in the Daikin Group). The team visits the site of Oil Cooling Unit to be scrapped at reasonable dispatch expenses. You don't have to pay expensive costs (for packaging, loading, transportation, etc.) to send Oil Cooling Unit back to us.
- The procedure follows steps ① through ⑥ as shown below.



- Note) ● After recovering CFC, the Oil Cooling Unit (product) itself should be scrapped by yourself as was the case in the past. (Daikin is not engaged in scrapping and disposing of the equipment body.)  
● CFC recovery (destruction) is conducted on a chargeable basis. Please contact the Daikin Contact Center for details.

Table of History of Oil Cooling Unit for cooling main shaft (Circulating type)

AKS → AKZ



Note) 1. The larger the last number of a model name, the newer the series (For instance, AKS35K is newer than AKS33K). In addition, a model having the last alphabetic characters "AK" is newer than a model ending with "K" only. (For instance, AKS35AK is newer than AKS35K).

2. The cooling capacity is represented by the value at the standard point and at 60 Hz for all models.

3. The dimensions of the equipment may be changed on a newer type and older type on some models. Please check the dimensions on the brochure and specification sheet (outline drawing) for selecting your equipment. When you are about to buy new equipment due to a failure of the equipment or for other reasons, please check the conditions of new equipment and select an appropriate type.

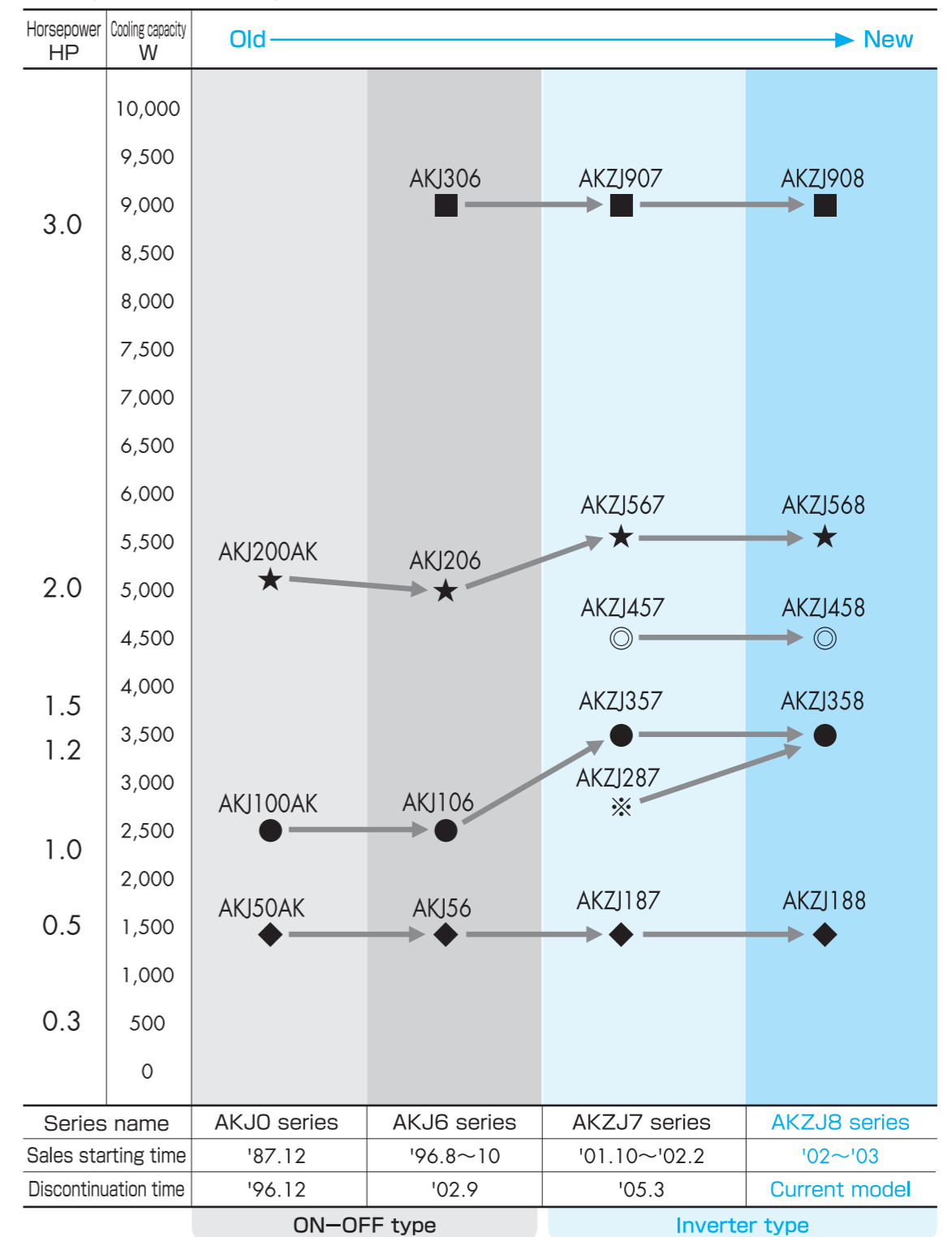
4. All the models have been changed to the inverter type since 2002.

5. AKSZ (S) "7" series uses new refrigerant R407C, AKSZ (S) "8" series uses new refrigerant R410A, and all other models use R22.

6. \*7 Existing machines of 1HP class (AKS105AK, AKZ (S) 257 class) were integrated into AKZ328 of 1.2HP class.

Table of History of Oil Cooling Unit for cutting and grinding oil (liquid) (Immersion type)

AKJ → AKZJ



Note) 1. The larger the last number of a model name, the newer the series (For instance, AKZJ358 is newer than AKZJ357).

2. The cooling capacity is represented by the value at the standard point and at 60 Hz for all models.

3. The dimensions of the equipment may be changed on a newer type and older type on some models. Please check the dimensions on the brochure and specification sheet (outline drawing) for selecting your equipment. When you are about to buy new equipment due to a failure of the equipment or for other reasons, please check the conditions of new equipment and select appropriate equipment.

4. All the models have been changed to the inverter type since 2002.

5. AKZJ "7" series uses new refrigerant R407C, AKZJ "8" series uses new refrigerant R410A, and all other models use R22.

6. \*7 Existing machines of 1HP class (AKJ100AK, AKJ106, AKZJ287 class) were integrated into AKZJ328 of 1.2HP class.

## Daikin Service Network

Daikin as a global manufacturer of air conditioning equipment can offer you

speedy delivery and safety through a broad-based network in thirteen countries all throughout the world.



For servicing of Oil Cooling Unit in Japan, contact Daikin Contact Center.

The service network extending all throughout the country is ready to offer you speedy service.

The Center is open 24 hours a day, 365 days a year to respond to your inquiries and requests for servicing.

### DAIKIN Contact Center Overall Customer Counter

If you dial 186 before dialing the number given below, it will make it easier for us to return your call quickly.  
**0120-14-9955**..... Toll-free number from anywhere in Japan  
 For inquiries by facsimile 0120-84-1069..... Toll-free fax number

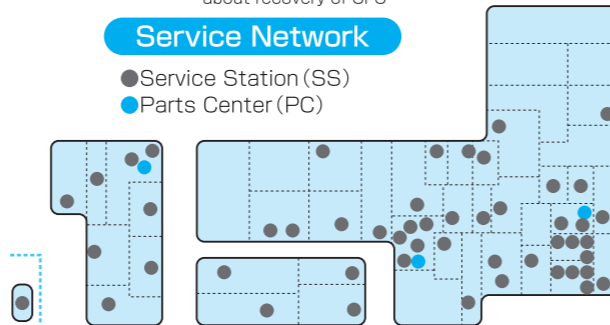
West Japan Contact Center 4-5-2 Korai-bashi, Chuo-ku, Osaka-shi, Osaka 541-0043

**24 hours and 365 days**

<Office hours>  
 ● Open 24 hours a day, 365 days a year  
 <Available service>  
 ● Consultation and inquiries about repair parts and servicing of hydraulic equipment  
 ● Consultation and inquiries about recovery of CFC

#### Service Network

- Service Station (SS)
- Parts Center (PC)



## Overseas Service Network

Please contact Daikin Sales Counter for servicing of Oil Cooling Unit in countries outside Japan. Eighteen sales agents of the Air-conditioning and Hydraulic Division of Daikin are located in thirteen countries as listed below and are ready to offer you service.

Country/Region	Company name	Address	
China	大金空調技術(北京)有限公司 DAIKIN AIR CONDITIONING TECHNOLOGY (BEIJING) CO.,LTD.	北京市東城區長安街1號東方廣場 東方經貿城東三井公樓20層 20F, TOWER E3, ORIENTAL PLAZA, NO.1 EAST CHANG AN AVE., DONG CHENG DISTRICT, BEIJING	
	大金空調技術(上海)有限公司 DAIKIN AIR CONDITIONING TECHNOLOGY (SHANGHAI) CO.,LTD.	上海市南京西路1468號中欣大廈B1 UNITED PLAZA B1, 1468 NAN JING RD (W), SHANGHAI	
	大金空調技術(廣州)有限公司 DAIKIN AIR CONDITIONING TECHNOLOGY (GUANGZHOU) CO.,LTD.	廣州市天河體育西路123號新創舉大廈18層A室 A 18/F, XINCHUANGJU BUILDING, NO.123 TIYUXI ROAD, TIANHE GUANGZHOU CHINA	
	大金工業株式会社 上海事務所 液壓控制課 DAIKIN SHANGHAI OFFICE OIL-HYDRAULICS DIV.	上海市南京西路1468號中欣大廈606室 RM.606, 1468 NAN JING RD(W) SHANGHAI CHINA	
Hong Kong	DAIKIN AIR CONDITIONING (HONG KONG) LTD.	17/F, FUTURA PLAZA, 111-113 HOW MING STREET, KWUN TONG, KOWLOON	
Korea	◎KD HYDRAULICS, LTD.	1ST FLOOR, DONGIL BLDG, 242, 2-KA, YOUNGDUNGPO-DONG, YOUNGDUNGPO-KU, SEOUL KOREA	
Taiwan	HO TAI DEVELOPMENT CO., LTD.	161 TUNG-YI STREET, TAI-SHAN HSIANG, TAIPEI HSIEN, TAIWAN	
	◎TAICIN ENTERPRISE	NO.67 KAI AN 2 STREET AN NAN CHIU TAINAN, TAIWAN	
Singapore	DAIKIN ASIA SERVICING PTE. LTD.	19 LOYANG WAY #02-21 SINGAPORE 508724	
Thailand	SIAM DAIKIN SALES CO., LTD.	49/9 MOO 5, SOI ONNUCH 55/1 (SIAM DAIKIN) ONNUCH RD, K.M.7.5, PRAVET SUBDISTRICT, PRAVET DISTRICT, BANGKOK 10250, THAILAND	
India	DAIKIN AIR CONDITIONING INDIA PVT.LTD DELHI BRANCH	F25/2, OKHLA INDUSTRIAL AREA, PHASE II NEW DELHI 110020	
Europe	Italy	DAIKIN AIR CONDITIONING ITALY S.P.A.	VIA MILANO, 6, 20097 SAN DONATO MILANESE
	France	DAIKIN AIR CONDITIONING FRANCF SA	LE CAPITOLE 55, AVENUE DES CHAMPS PIERREUX 92012 NANTERRE CEDEX, FRANCE
	Spain	DAIKIN AIR CONDITIONING SPAIN S.A.	CALLE LABASTIDA 2 28034, MADRID, SPAIN
	UK	DAIKIN AIR CONDITIONING UK., LTD.	1 RIVER COURT, ALBERT DRIVE WOKING, SURREY, GU21 5RP
Australia	DAIKIN AUSTRALIA (PTY) LTD.	77-83 ALFRED ROAD, CHIPPING NORTON, N.S.W. 2170, AUSTRALIA	
U.S.	◎ALL WORLD MACHINERY	1301 W.DIGGINS HARVARD IL 60033, USA	

◎Sales agents of hydraulic equipment.  
 Others are the sales agent of air conditioning equipment.

(30 As of July 31, 2006.)

Note) Contact the Daikin Contact Center given on the back page for servicing in Japan.