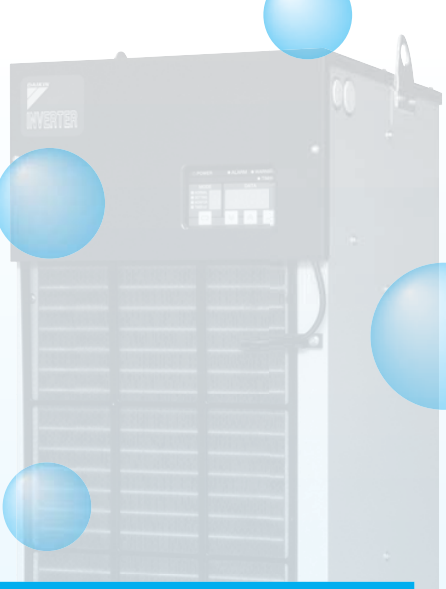
L



OIL COOLING EQUIPMENT

● Oil cooling unit, inverter controlled chiller (Air-cooled type)

Product name	Model name	Range of cooling capacity at standard point kW (0 1 2 3 4 5 6 7 8 9 10)	Page
AKZ9 Series Circulating type oil cooling unit for machine tool spindles	AKZ149	Operation at 50 Hz Operation at 60 Hz	L-3
	AKZ329	Operation at 50 Hz Operation at 60 Hz	
	AKZ439	Operation at 50 Hz Operation at 60 Hz	
	AKZ569	Operation at 50 Hz Operation at 60 Hz	
	AKZ909	Operation at 50 Hz Operation at 60 Hz	
AKZJ8 Series Immersion type oil cooling unit for coolant	AKZJ188	Operation at 50 Hz Operation at 60 Hz	L-19
	AKJZ358	Operation at 50 Hz Operation at 60 Hz	
	AKJZ458	Operation at 50 Hz Operation at 60 Hz	
	AKJZ568	Operation at 50 Hz Operation at 60 Hz	
	AKJZ908	Operation at 50 Hz Operation at 60 Hz	
AKC9 Series Circulating type oil cooling unit for coolant	AKC359	Operation at 50 Hz Operation at 60 Hz	L-26
	AKC569	Operation at 50 Hz Operation at 60 Hz	
AKW9 Series Inverter controlled chiller	AKW149	Operation at 50 Hz Operation at 60 Hz	L-38
	AKW329	Operation at 50 Hz Operation at 60 Hz	
	AKW439	Operation at 50 Hz Operation at 60 Hz	
	AKW189	Operation at 50 Hz Operation at 60 Hz	
	AKW359	Operation at 50 Hz Operation at 60 Hz	
	AKW459	Operation at 50 Hz Operation at 60 Hz	

● LT cooler (Water-cooled type)

Product name	Model name	Range of cooling capacity kW (1 2 3 4 5 10 100)	Page
LT cooler	LT0403		L-44
	LT0504		
	LT0707		
	LT1010		
	LT1515		
	LT2020		
	LT3030		
	LT5060		

Oil Cooling Unit

Inline type cooling unit for spindle/lubrication oil

AKZ9 Series
For lubrication oil
For hydraulic oil

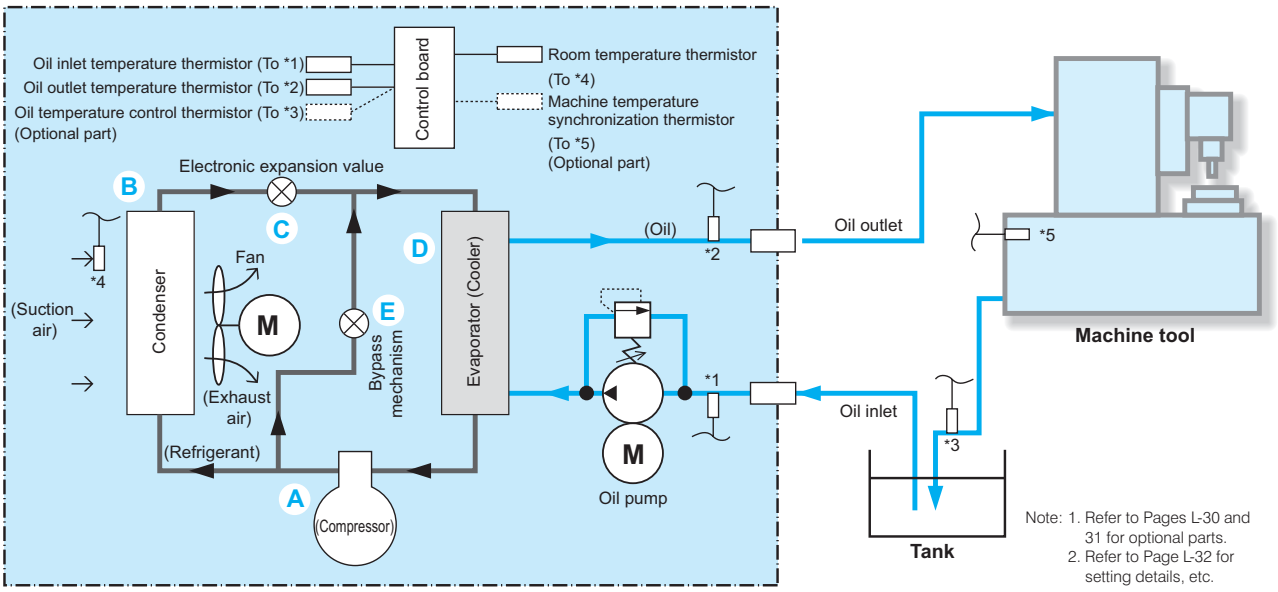
Immersion type cooling unit for coolant

AKZJ 8 Series
For cutting oil (fluid)
For grinding oil (fluid)

Inline type cooling unit for coolant
(Can be retrofitted to an existing tank)

AKC9 Series
For cutting oil (fluid)
For grinding oil (fluid)

Principle of oil cooling unit and overall system diagram



Note: 1. Refer to Pages L-30 and 31 for optional parts.
2. Refer to Page L-32 for setting details, etc.

[Refrigerating cycle]

A: Refrigerant gas is converted into compressed gas at high temperature and high pressure by a compressor so that the gas can be easily cooled and liquefied by a condenser.

B: In the condenser, the gas at high temperature and high pressure generated in the compressor is cooled with air and converted into liquid at high temperature and high pressure.

C: The electronic expansion valve reduces the pressure of the liquid at high temperature and high pressure and converts it into liquid at low temperature and low pressure by throttling it so that it can be easily vaporized in a cooler.

D: In the cooler, liquid at low temperature and low pressure generated by the electronic expansion valve absorbs heat from the oil, evaporates (cools the oil), and is converted into gas at low temperature and low pressure.

E: The bypass mechanism controls the cooling capacity by adjusting the volume of gas at high temperature and high pressure supplied to the cooler when heat load is low.

Inverter Controlled Chiller AKW※※9

Features

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

AKZW8
65 dB (A)

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

Nomenclature

AKW	※※	9	-※※※
1	2	3	4

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

2 Cooling capacity (kW)
14: 1.4 kW
18: 1.8 kW
32: 3.2 kW
35: 3.5 kW
43: 4.3 kW
45: 4.5 kW

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

4 Symbol of option type (C/H/171)/Non-standard number
Options and their combinations

Symbol of option type	With breaker	Compliance with CE	With cover
-B	✓	–	–
-C	–	✓	–
-171	–	–	✓
-BC	✓	✓	–
B171	✓	–	✓
C171	–	✓	✓
D171	✓	✓	✓

Special specifications (different voltages, with casters, etc.)
-※※※ (3-digit number), C※※※ (3-digit number), etc.
Please consult us about detailed information.
[-049: 400 VAC 50 Hz 3-phase power supply, CE compliant type]

Applications

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

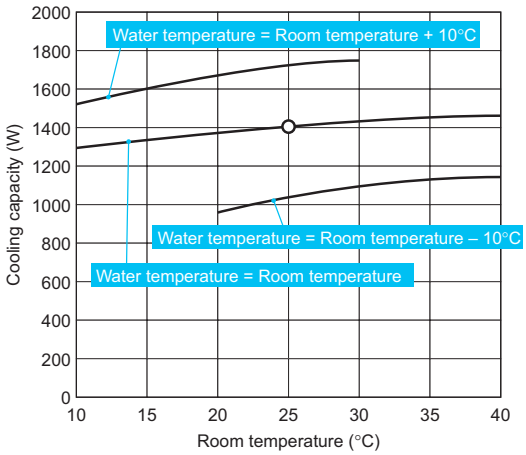
Specifications

				With pump/tank			Without pump/tank		
Equivalent horsepower of chiller			HP	0.5	1.2	1.5	0.5	1.2	1.5
Model name				AKW149 (-171)	AKW329 (-171)	AKW439 (-171)	AKW189	AKW359	AKW459
Cooling capacity (50/60 Hz) *1			kW	1.4/1.4	3.2/3.2	4.3/4.3	1.8/1.8	3.5/3.5	4.5/4.5
Power supply *2				Three-phase AC 200/200･220 V 50/60 Hz					
Power voltage		Main circuit		Three-phase AC 200/200･220 V 50/60 Hz					
		Operation circuit		DC 12/24 V					
Max. power consumption Max. current consumption		200 V 50 Hz		1.20 kW/4.5 A	1.71 kW/6.4 A	1.97 kW/7.4 A	0.79 kW/3.2 A	1.29 kW/5.2 A	1.59 kW/6.1 A
		200 V 60 Hz		1.36 kW/4.8 A	1.87 kW/6.6 A	2.20 kW/8.7 A	0.79 kW/3.2 A	1.29 kW/5.0 A	1.61 kW/6.0 A
		220 V 60 Hz		1.36 kW/4.8 A	1.87 kW/6.6 A	2.20 kW/8.7 A	0.79 kW/3.0 A	1.29 kW/4.7 A	1.61 kW/5.4 A
External paint color				Ivory white					
External dimensions (H × W × D)			mm	690 × 360 × 700	815 × 360 × 700	915 × 360 × 700	650 × 360 × 440	775 × 360 × 440	875 × 360 × 440
Compressor (Hermetic DC swing type)				Equivalent to 0.4 kW	Equivalent to 0.75 kW	Equivalent to 1.1 kW	Equivalent to 0.4 kW	Equivalent to 0.75 kW	Equivalent to 1.1 kW
Evaporator				Brazed plate type					
Condenser				Cross-fin-coil type					
Propeller fan	Motor capacity		W	54					
Water pump	Model			Immersion type multistage pump			–		
	Head (50/60 Hz) *3			25/37 m at 10 L/min	24/36 m at 15 L/min				
	Motor capacity (50/60 Hz)		kW	0.33/0.52					
Temperature control (Selectable)	Synchronization type	Standard		Room temperature or machine temperature *4 (Set to room temperature by default)					
		Controlled object		Water temperature in the tank			Outlet water temperature		
		Synchronization range		–9.9 to +9.9K					
	Fixed type	Controlled object		Water temperature in the tank			Outlet water temperature		
		Range	°C	10 to 40					
Refrigerant control				Compressor rotational speed according to inverter + Opening of electric expansion valve					
Refrigerant (R410A) Changed volume			kg	0.49	0.72	0.98	0.49	0.72	0.98
Protection devices				A set of overcurrent relay (for a pump motor, only for models with a pump), reverse-phase protection device, restart prevention timer, low room temperature protection thermistor, high fluid temperature protection thermistor, low fluid temperature protection thermistor, discharge pipe temperature thermistor, condenser temperature thermistor, refrigerant leakage detector, inverter protection device, high pressure switch (-C type only), compressor thermal protector (-C type only), and intake pipe temperature thermistor (antifreeze)					
Operation range	Room temperature		°C	10 to 40 (5 to 40 *5)					
	Water temperature in the tank		°C	10 to 40 (5 to 40 *5)			–		
	Outlet water temperature		°C	–			10 to 40 (5 to 40 *5)		
	Permissible circulating water volume *6		L/min	6 to 15	10 to 20	10 to 30	6 to 15	10 to 20	10 to 30
	Rated circulating water volume		L/min	10	15		10	15	
	Acceptable fluid *7			Fresh water (tap water)					
	Max. pressure in a cooling water circuit		MPa	–			0.5		
External pressure loss (50/60 Hz)			MPa	0.24/0.36	0.21/0.34		–		
Connecting pipe size				Refer to the outline drawing.					
Tank capacity			L	10			–		
Noise level (Value equivalent to measurement in an anechoic chamber) (Front 1 m, height 1 m)			dB (A)	60	61	62	60	61	62
Permissible transport vibration				Up and down vibration 14.7 m/s^2 (1.5G) × 2.5 hr (7.5 to 100 Hz sweep/5 min.)					
Mass			kg	61	65	68	36	40	43
Items prepared by the customer	Molded-case circuit breaker (Rated current)		A	10					

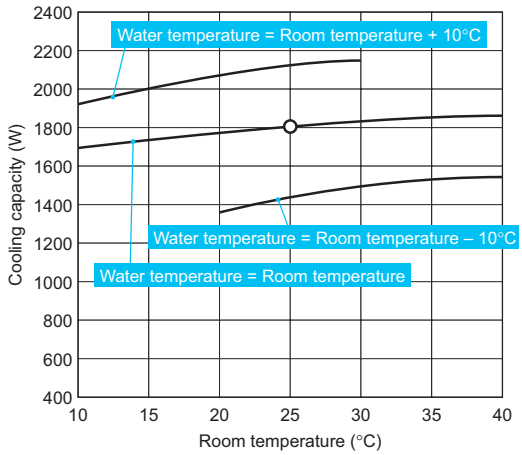
Note: *1 The cooling capacity indicates the value at the standard point. This unit has about ±5% of product tolerance.
*2 Use a commercial power supply for the power source. The use of an inverter power supply may cause burn damage to the machine.
*3 This unit has about ±7% of product tolerance.
*4 The machine temperature synchronization thermistor available as an option is required for this function.
*5 A unit that can be used at a room temperature of 5 to 40°C or a tank outlet water temperature of 5 to 40°C is available as an option. Please consult us for details.
*6 Use the unit with a circulating water volume within the permissible range.
*7 Use fluid that satisfies the water quality standard for clean fresh water (tap water) level indicated on Page L-40. (Taken from Guideline of Water Quality for Refrigeration and Air Conditioning Equipment (JRA-GL-02-1994).)

Cooling capacity characteristic chart

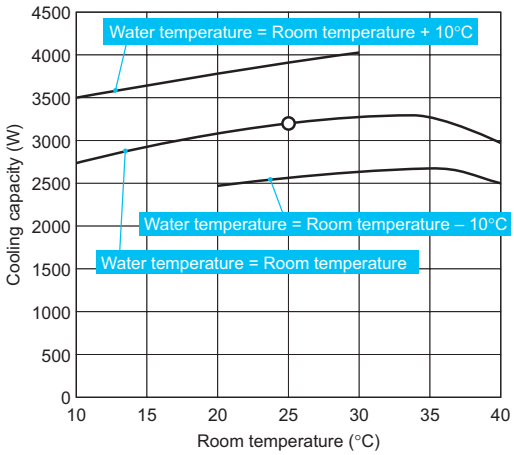
AKW149



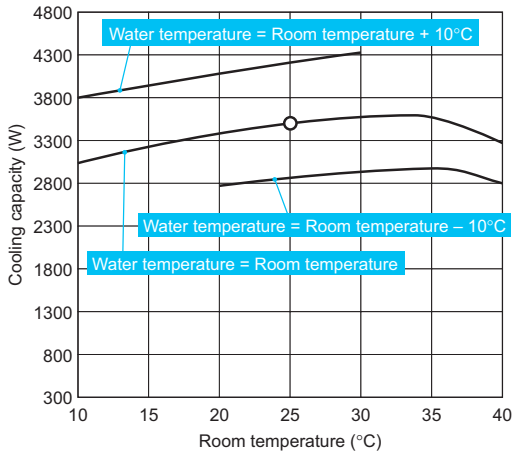
AKW189



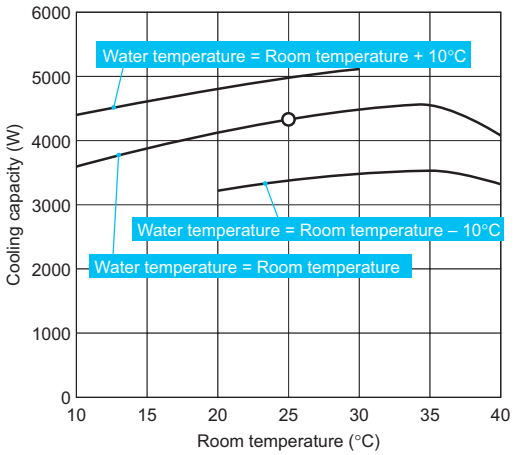
AKW329



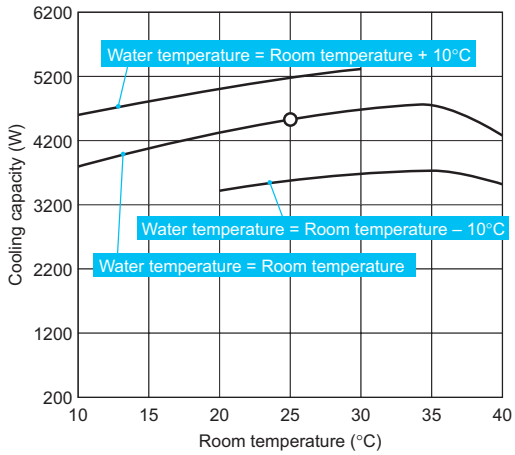
AKW359



AKW439



AKW459

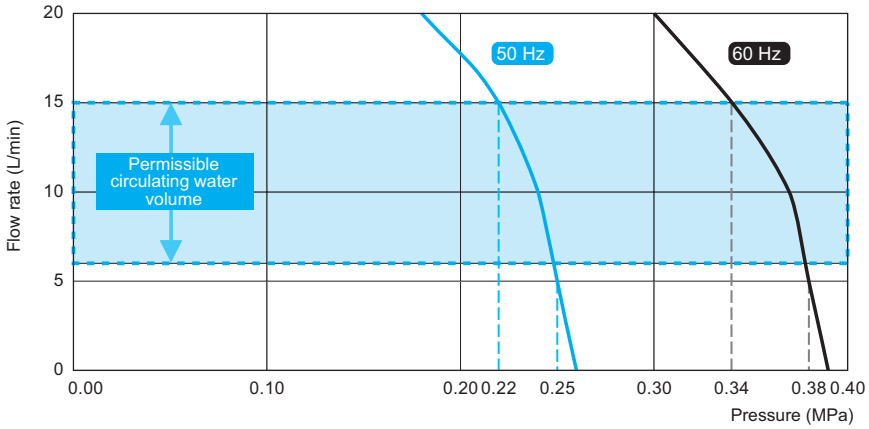


The mark "◯" shows the standard point. (Room temperature: 25°C, water temperature: 25°C)

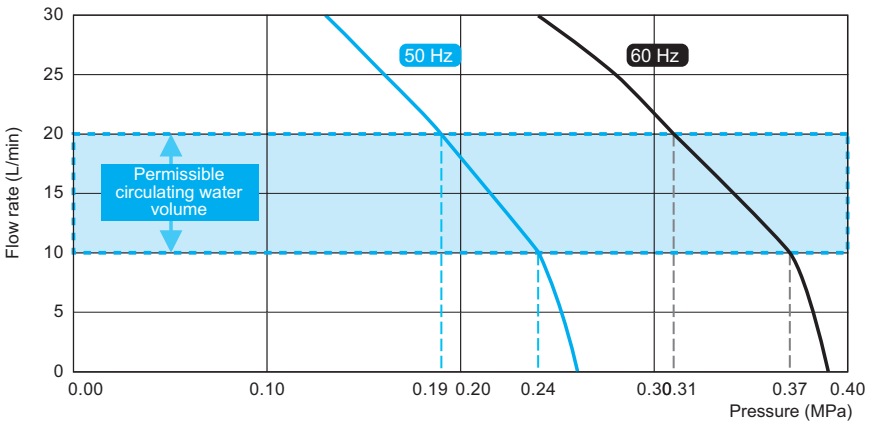
Pump flow rate characteristics

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

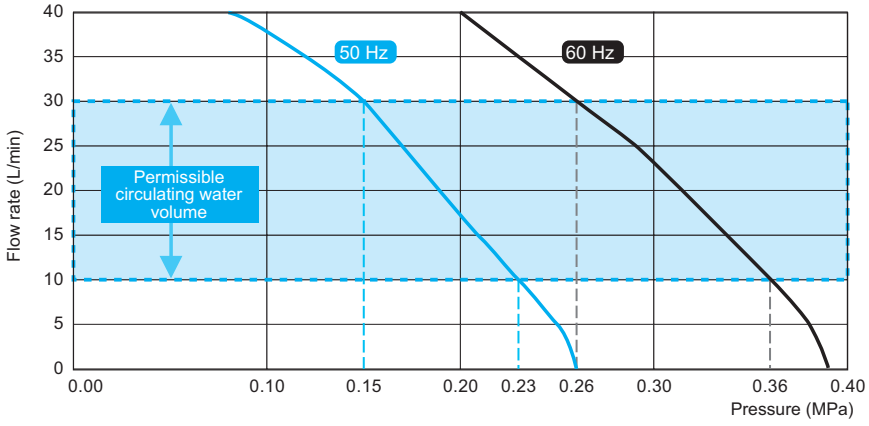
AKW149



AKW329



AKW439



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