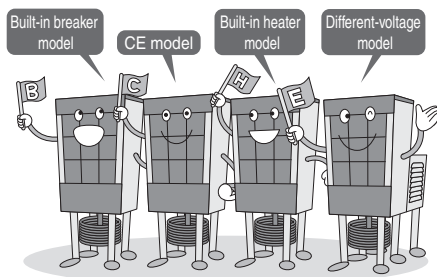


Instruction Manual

DAIKIN Oil Cooling Unit ("OILCON")

AKZJ8 Series Immersion type



Models

Menu Series	Standard model	Built-in breaker model (-B)	CE model (-C)	Built-in heater model (-H)	Different-voltage model (-E)
AKZJ188	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AKZJ358	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AKZJ458	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AKZJ568	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AKZJ908	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thank you for purchasing DAIKIN Oil Cooling Unit ("OILCON"). This instruction manual includes instructions for using the Oil Cooling Unit.

To ensure proper use of this product, be sure to read through this instruction manual before using it.

After reading this manual, keep it handy for your future reference.

Proper use results in power saving

If the air filter is clogged, the cooling performance deteriorates, causing excess power consumption.

Clean the air filter periodically to reduce power consumption.

CONTENTS

Safety Precautions	1
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Installation

Oil Cooling Unit and Accessories	4
Precautions for Installation	5
Electric Wiring	7

Handling

Model Identification and Specifications	12
Before Operation	14
Part Names and Functions	15
Names and Functions of the Control Panel Parts	16
Checking Initial Operating Conditions	18
Operation Setting	19

Holding constant tank liquid temperature	20
Tuning tank liquid temperature to room temperature (or machine temperature)	21
Cooling liquid in the tank at constant capacity (%)	22

Monitor Items	23
Timer Operation	24
Additional Setting Functions	25
Setting Additional Function	27
For Temperature Control Improvement	30
Alarm/Warning Output Logic	33
Alarm Settings for Optional Protection Devices (Installed by User)	33

Optional Parts

Machine temperature tuning control	34
Communication with main machine	35

Maintenance

Maintenance/Inspection	36
• Daily maintenance/inspection	
• Periodic maintenance/inspection	
• To leave the unit unused for a long period	

Troubleshooting	37
• When the unit operation seems abnormal although no alarm is activated	
• When an alarm is activated	

Installation
Procedure

Before
Operation

Operating
Procedure

Useful
Functions

Optional
Functions

Maintenance

Troubleshooting

Safety Precautions

Before using this product, read the following instructions carefully to ensure proper use.

- The instructions described below are intended to prevent injury or damage to you and other people. Possible conditions that may result from improper handling are classified as follows:



DANGER

This category indicates urgently **hazardous conditions that may result in death or serious injury.**



WARNING

This category indicates **potentially hazardous conditions that may result in death or serious injury.**



CAUTION

This category indicates **potentially hazardous conditions that may result in injury or property damage only.**

- All these instructions include important information on safety. Be sure to observe the instructions.
- After reading this manual, be sure to keep it in place so that users can read it whenever required.
- If this product is transferred to another person, be sure to attach this manual to the product.
- To use this product safely, be sure to observe the following instructions, and safety laws and regulations for the relevant standards listed below.

1. Industrial Safety and Health Law

2. Fire Service Law

3. JIS B8361 General Rules for Hydraulic Systems

Precautions for installation



DANGER

Only qualified technical experts can handle the unit.



Mandatory

Transportation, installation, piping, electric wiring, operation, maintenance and inspection must be conducted by qualified technical experts.

Check the power supply (voltage, frequency and current).

Check the weight, and hang the unit by the specified points.



Mandatory

Check the weight of the unit with the nameplate to make sure that it does not exceed the rated load capacity of the carrier. Hang the unit by the points specified in the outline drawing. Failure to observe this instruction may result in fall or overturn of the unit, causing injury or property damage.

Connect the power cable according to the procedure described in this instruction manual.



Forbidden

Connect the power cable according to the procedure described in "Electric Wiring" on page 7.

Ground the unit securely.



Ground cable connection

If the unit is not grounded, you may get an electric shock.



WARNING

Conduct electric wiring according to the ratings.



Mandatory

Conduct electric wiring according to "Regulation on Electrical Facilities" and "Internal Wiring Regulations". Improper wiring may result in burnout or fire.

For overseas use, conduct electric wiring according to the local wiring standard.

Fasten the unit during operation.



Forbidden

Check the fastening points with the outline drawing, and fasten the unit securely with bolts. Failure to observe this instruction may result in fall or overturn of the unit, if this unit is installed at an elevated position.

Keep away from the unit when it is being carried with slings.



Forbidden

Never get close to the unit when it is being carried with slings. Failure to observe this instruction may result in fall or overturn of the unit, causing injury or property damage.

CAUTION

Prepare a circuit breaker at user's site.



Mandatory

The Oil Cooling Unit is not equipped with a circuit breaker. A circuit breaker exclusively for the Oil Cooling Unit should be provided by user. To ensure safety, it is recommended to use an earth leakage breaker. To use an earth leakage breaker, select an inverter-compatible type. (Recommended: 15 mA or 20 mA)

Do not tilt the unit.



Mandatory

During transportation (including storage), do not tilt the Oil Cooling Unit more than 30°. If the unit is tilted more than 30°, the compressor may have a fault.

Precaution for using the CE model (optional)



Mandatory

The optional CE model (AKZJ**8-C) Oil Cooling Unit is classified as an auxiliary machine of the main machine (Overvoltage Category II). It has been self-declared under the following conditions. Be sure to follow the specifications of the main machine.

- (1) Provide a main power supply circuit breaker for the main machine according to the EN60204-1 requirement.
- (2) Connect the power supply via a transformer with basic insulation rating*.

* Basic insulation: Insulation provided for live parts to ensure fundamental protection against electric shock (under IEC Standard 60335-1)

Precautions for use

DANGER

Before handling this unit, turn OFF the power supply.



Mandatory

Before handling this unit, be sure to turn OFF the power supply. Handling this unit in live conditions may result in electric shock.

Do not use the unit beyond specified operating conditions.



Mandatory

Do not use this unit in any condition other than those specified in the catalog or delivery specifications. Failure to observe this instruction may result in a serious accident, such as damage to the main machine, injury, fire and electric shock.

Do not handle the unit for 5 minutes after power supply is turned OFF.



Forbidden

During this period, electric discharge from the internal high-voltage parts (capacitors) has not been completed. Failure to observe this instruction may result in electric shock.

Do not use the unit in explosive atmosphere.



Forbidden

Do not install this unit in a place where evolution, inflow, retention or leak of inflammable gas may be expected, or where airborne carbon fiber is present. Failure to observe this instruction causes fire.

Do not operate the unit with the covers opened.



Forbidden

Do not operate the Oil Cooling Unit with the unit casing or terminal covers of the motor or other electric parts removed. Failure to observe this instruction may result in electric shock.

Do not disassemble or repair the unit.



Do not disassemble

Do not modify this unit. Any person other than DAIKIN authorized service personnel must not disassemble or repair this unit. Failure to observe this instruction causes fire, electric shock or injury. If this unit is disassembled, repaired or modified by an unauthorized person, it shall not be beyond the scope of warranty.

Keep your hand or body away from the unit during operation.



Forbidden

During operation, the external panel may become extremely hot. Be careful that your hand or body does not directly touch it. Otherwise, you may get a burn.

Do not splash water.



Forbidden

Do not immerse this unit in water, or splash water on the unit. Failure to observe this instruction may result in short-circuit or electric shock.

⚠ WARNING

If refrigerant leaks, provide thorough ventilation.



Mandatory

If a large quantity of refrigerant is filled in the site, people in the site may be anesthetized or suffocated. With the CE model, MSDS (Material Safety Data Sheet) for the refrigerant is attached to the product. Take an action according to the MSDS.

If an abnormal condition occurs, stop operation immediately.



Mandatory

If an abnormal condition occurs, stop operation of the unit, and leave it unused until the cause of the trouble is securely removed. Failure to observe this instruction may result in damage to the unit, electric shock, fire or injury.

Do not put a finger or foreign object in an aperture of the unit.



Caution

To ensure safety, a cover or casing is mounted to rotary parts. Do not put a finger or foreign object in an aperture of the cover or casing. Failure to observe this instruction may result in injury.

Turn OFF the circuit breaker.



Mandatory

After stopping operation, be sure to turn OFF the circuit breaker.

Use a commercial power supply.



Mandatory

Be sure to use a commercial power supply. Using an inverter power supply may result in burnout.

When cleaning the unit, wear gloves.



Mandatory

Otherwise, you may cut your hand with the condenser fin edges. Furthermore, the internal compressor or motor frames and the refrigerant piping become extremely hot. If you touch these parts with bare hands, you may get a burn.

⚠ CAUTION

Do not use the unit in special atmosphere.



Forbidden

Do not use this unit in special atmosphere, including dust, oil mist, high temperature or high humidity.

Ensure safety of the main machine before trial run.



Mandatory

Before executing a trial run, make sure that the main machine is set in safe conditions (the main machine will not run, or no accident occurs even if the main machine runs.) Failure to observe this instruction may result in injury or damage to the machine.

Do not put an obstacle near the air intake/exhaust port.



Forbidden

Do not put an obstacle within 500 mm from the air intake/exhaust port. If air intake/exhaust flow is blocked, this unit may not provide the specified cooling capacity.

Clean the air filter periodically.



Mandatory

Clean the air filter at least every two weeks. If the air filter is clogged, the cooling capacity deteriorates, and power consumption increases.

Perform daily control of operating liquid pollution.



Mandatory

Pollution of the operating liquid causes the unit service life to be shortened. Use thorough caution about pollution of the operating liquid to maintain the pollution degree at NAS10 or lower level.

Cancel operation lock before running the main machine.



Mandatory

Before you start running the main machine, cancel the operation lock status with the Oil Cooling Unit operation panel. If you start the main machine in the operation lock status, the unit cannot control the operating liquid temperature, which may result in damage to the machine.

Do not step on the unit.



Forbidden

Do not sit or step on this unit. Failure to observe this instruction may result in fall or overturn of the unit, causing injury.

Check liquid level in the tank.



Forbidden

Before start of operation, make sure that the tank is filled with operating liquid to an appropriate level.

During transportation, fasten the unit securely.



Mandatory

Fasten this unit securely so that it will not be moved by vibration or external force during transportation. If storing vibration or external force is applied to the unit, the internal equipment may be damaged.

Check the unit before operation.



Check

Before start of operation, make sure that the electric wiring are properly conducted, and connecting parts are securely tightened.

Oil Cooling Unit and Accessories

Check the following items:

1 Oil Cooling Unit

Check the model name and serial No. (MFG. No.) on the nameplate attached to the right side of the Oil Cooling Unit.

2 Accessories

An accessory package*¹ is attached to the top plate of the Oil Cooling Unit. Make sure that the following items are included in the accessory package.

1. Instruction manual (This document): 1 volume

Keep this manual in place where users can read it whenever required.

2. Rubber bushing for electric wiring (Large size, with cross slit): 1 pc.

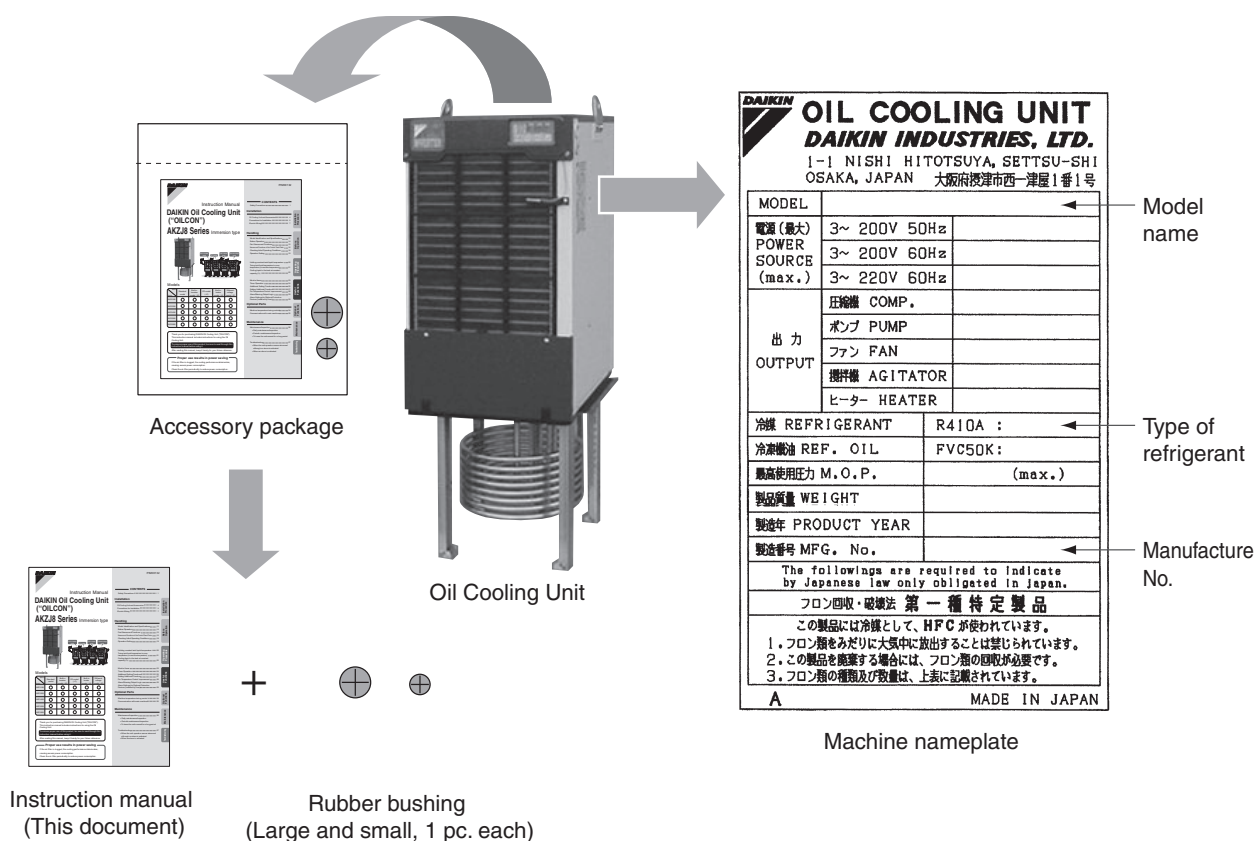
When connecting the power cable, remove the resin cable hole cap in the side plate of the unit, and attach the rubber bushing. It is only for provisional use.*²

3. Rubber bushing for electric wiring (Small size, with cross slit): 1 pc.

When connecting the signal cable, remove the resin cable hole cap in the side plate of the unit, and attach the rubber bushing. It is only for provisional use.*²

*1: Before operation, be sure to remove the accessory package. Otherwise, the package blocks exhaust air flow, resulting in cooling capacity deterioration.

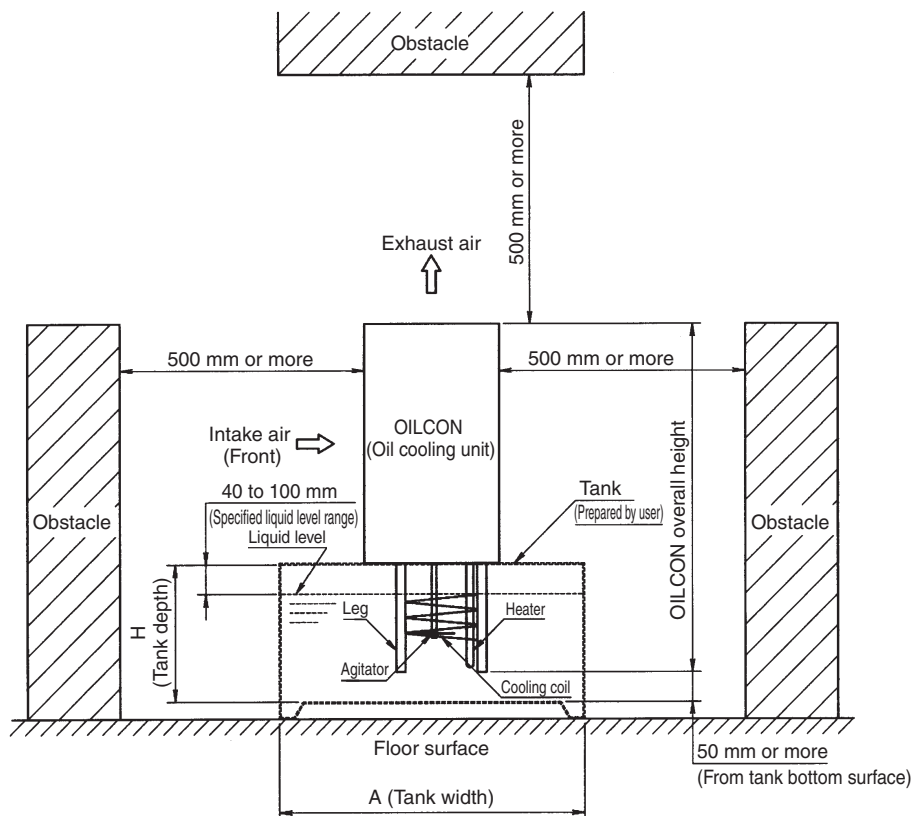
*2: **When connecting each cable finally, place the cable in a conduit.** If the rubber bushing is used, the dust-proof effect of the electrical equipment box deteriorates, causing a fault. For details, refer to "Wiring procedure" on page 8.



Precautions for Installation

Installation place and oil piping

- To install this unit, select a place that meets the following conditions:
 1. Level, rigid floor (Inclination: 5° max.)
 2. A place where the unit is not exposed to direct sunlight or heat
 3. A place with proper ventilation and little humidity
 4. A place where exhaust air does not circulate (exhaust air will not be taken into the unit)
 5. A place that allows easy access to piping and wiring
 6. A place with little contaminant, waste, dust particles or oil mist
 7. A place free from explosive atmosphere (evolution, inflow, retention or leak of inflammable gas)
- Do not place an object that may block air flow within 500 mm from the air intake/exhaust port.



*For "A" and "H", see page 6.

Note) 1. About the specified liquid level range

- 1) During cooling operation with the liquid level lower than the specified range, the moisture of the atmosphere condenses on the exposed part of the cooling coil, causing the condensate to be mixed into the liquid. If the liquid level further decreases, it results in cooling capacity deterioration, and also causes a fault of the unit.
- 2) During heating operation the liquid level lower than the specified range, the heating element of the heater is exposed or discolored, or may emit burning smell. If the liquid level further decreases, the heater activates the overheat protection device. This condition hinders normal operation, and also causes a fault of the unit.
- 3) If the liquid level falls below the specified range due to liquid level fluctuations during operation, the liquid overflows from the tank. To prevent the above 1) to 3) problems, be sure to maintain the liquid level within the specified range.

*Mount a float switch to ensure that the liquid level in the tank is within the specified range.

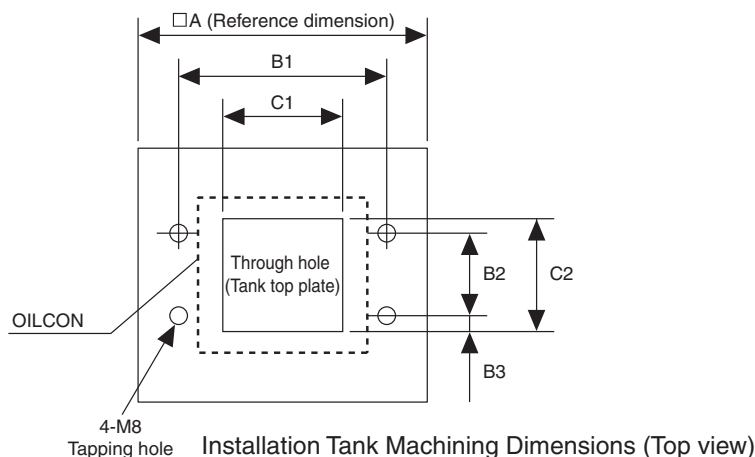
2. Give thorough consideration to the layout of the partitions and inlet/outlet piping for the installation tank, so that the low-temperature liquid that has been cooled with the OILCON unit can be uniformly mixed with the high-temperature liquid returned from the machine.

Installation tank (Prepared by user)

- Select the size and machining dimensions of the installation tank from the table below.

(Unit: mm)

	Size	Depth	Tapping hole pitch			Through hole	
	A	H	B1	B2	B3	C1	C2
AKZJ188,358,458	500 or more	400 or more	390	270	15	325	325
AKZJ568	690 or more	500 or more	500	380	45	440	440
AKZJ908	770 or more	500 or more	590	440	30	500	500



Return filter (Prepared by user)

- If cutting swarf or chips accumulate on the OILCON cooling coil surface, it results in cooling capacity deterioration, and also causes a fault of the unit.

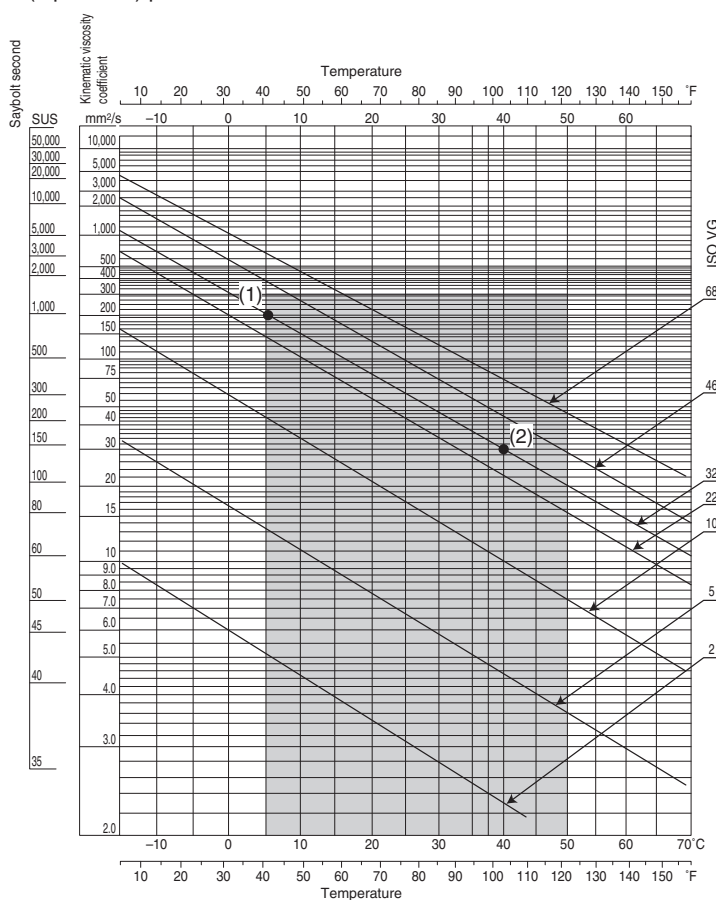
Be sure to attach a highly-efficient return filter at the return (liquid inlet) port.

Viscosity of operating liquid

- Make sure that the viscosity of the operating liquid is within the specified operating range (0.5 to 200 mm²/s).
- If the operating liquid is oil, note that the viscosity characteristic varies depending on the oil type (ISO VG**). (See the chart on the right.)

Example of viscosity (Kinematic viscosity coefficient)

- (1) In winter: 195 mm²/s (ISO VG32, Oil temperature: 5°C)
(2) In summer: 29 mm²/s (ISO VG32, Oil temperature: 40°C)



Electric Wiring

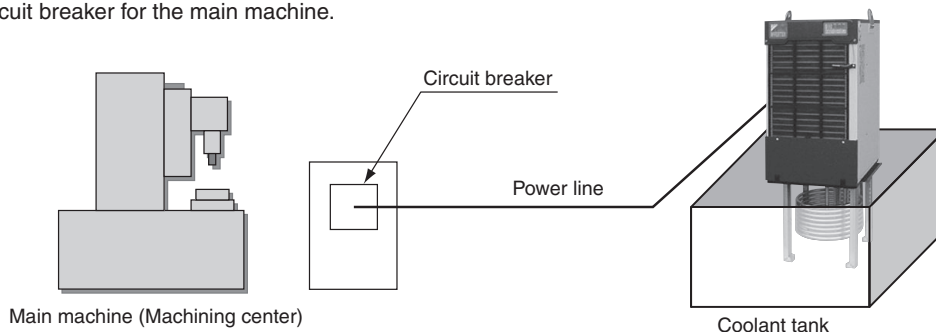
- Conduct electric wiring according to the local wiring standard.
- The Oil Cooling Unit (except for the “-B” model) is not equipped with a circuit breaker. A circuit breaker exclusively for the unit should be mounted to the main machine.
- For electric wiring, refer to the electric wiring diagram on the nameplate attached to the rear of the electrical equipment box cover.
- Do not change the wiring in the Oil Cooling Unit. Do not touch the protection devices.

Starting/stopping the Oil Cooling Unit

To turn ON the power supply for the Oil Cooling Unit, the following three methods are available:

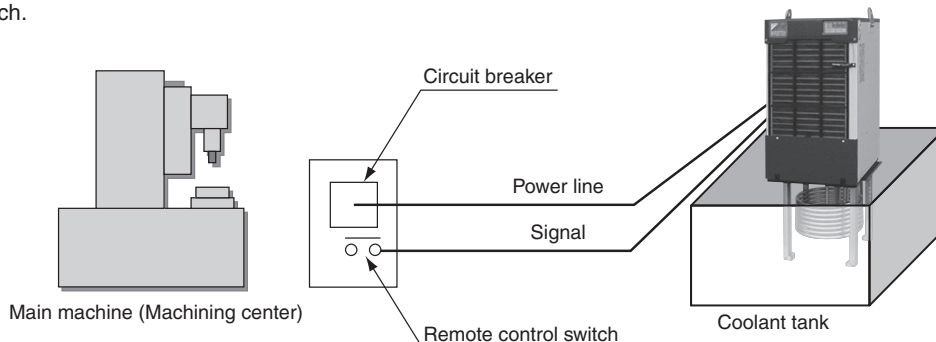
1 Directly starting/stopping the Oil Cooling Unit with the main machine power supply

When the circuit breaker for the main machine is turned ON, the Oil Cooling Unit starts operation. To stop the unit, turn OFF the circuit breaker for the main machine.







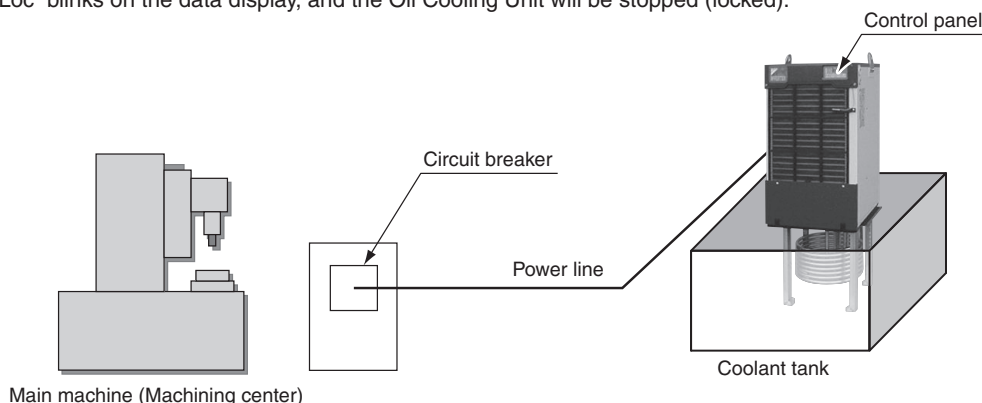
2 Starting/stopping the Oil Cooling Unit with the remote control contact (see page 9)

When the remote control switch is turned ON, the Oil Cooling Unit starts operation. To stop the unit, turn OFF the remote control switch.



3 Starting/stopping the Oil Cooling Unit with the control panel

If you keep pressing the  and  keys for at least 2 seconds in the “operation lock” mode, the Oil Cooling Unit starts operation according to preset conditions. If you keep pressing the  and  keys for at least 2 seconds during operation, “Loc” blinks on the data display, and the Oil Cooling Unit will be stopped (locked).



Mounting a circuit breaker

The Oil Cooling Unit is not equipped with a circuit breaker. Be sure to mount a 3-pole circuit breaker exclusively for the Oil Cooling Unit to the main machine. For the breaker capacity, refer to the specifications of each model (see page 12-13). To ensure safety, it is recommended to use an earth leakage breaker.

* Mount a circuit breaker exclusively for the Oil Cooling Unit.

⚠ CAUTION



To use an earth leakage breaker, select an inverter-compatible type. If the earth leakage breaker is not inverter-compatible, it may malfunction due to high-frequency noise of the inverter. (Recommended product: 15 mA or 20 mA)

Wiring procedure

1 Remove the top plate mounting screws, and remove the top plate.

2 1. Insert the power cable into the power cable insertion hole ($\phi 28$) in the side plate of the unit. When using the different-voltage model (-E), insert the power cable into the transformer box.
2. Insert the remote control signal cable and external output signal cable into the signal cable insertion hole ($\phi 22$) in the side plate of the unit.

* When inserting each cable from the left side of the unit (when viewed from the front of the unit), place the cable along the guide rail in the electrical equipment box. Then, fasten the cable to the cable anchor at the bottom of the electrical equipment box by using a tie band etc.

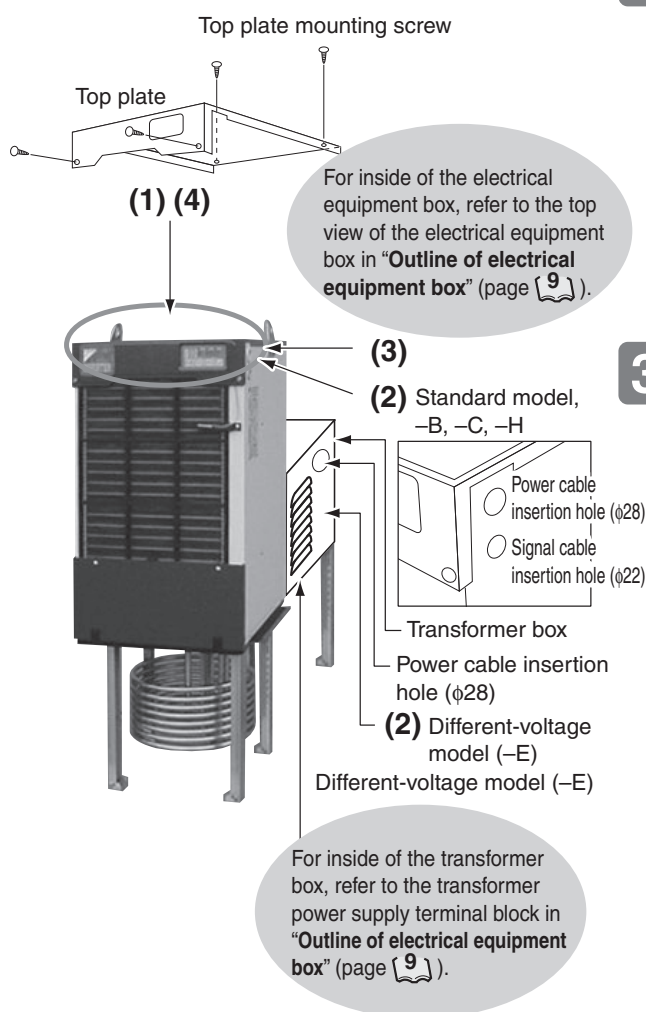
3 Connect the power cable to the power supply terminal block. Connect the ground cable to the PE (ground) terminal.

■ The cable size should conform to those listed below, or a larger size.

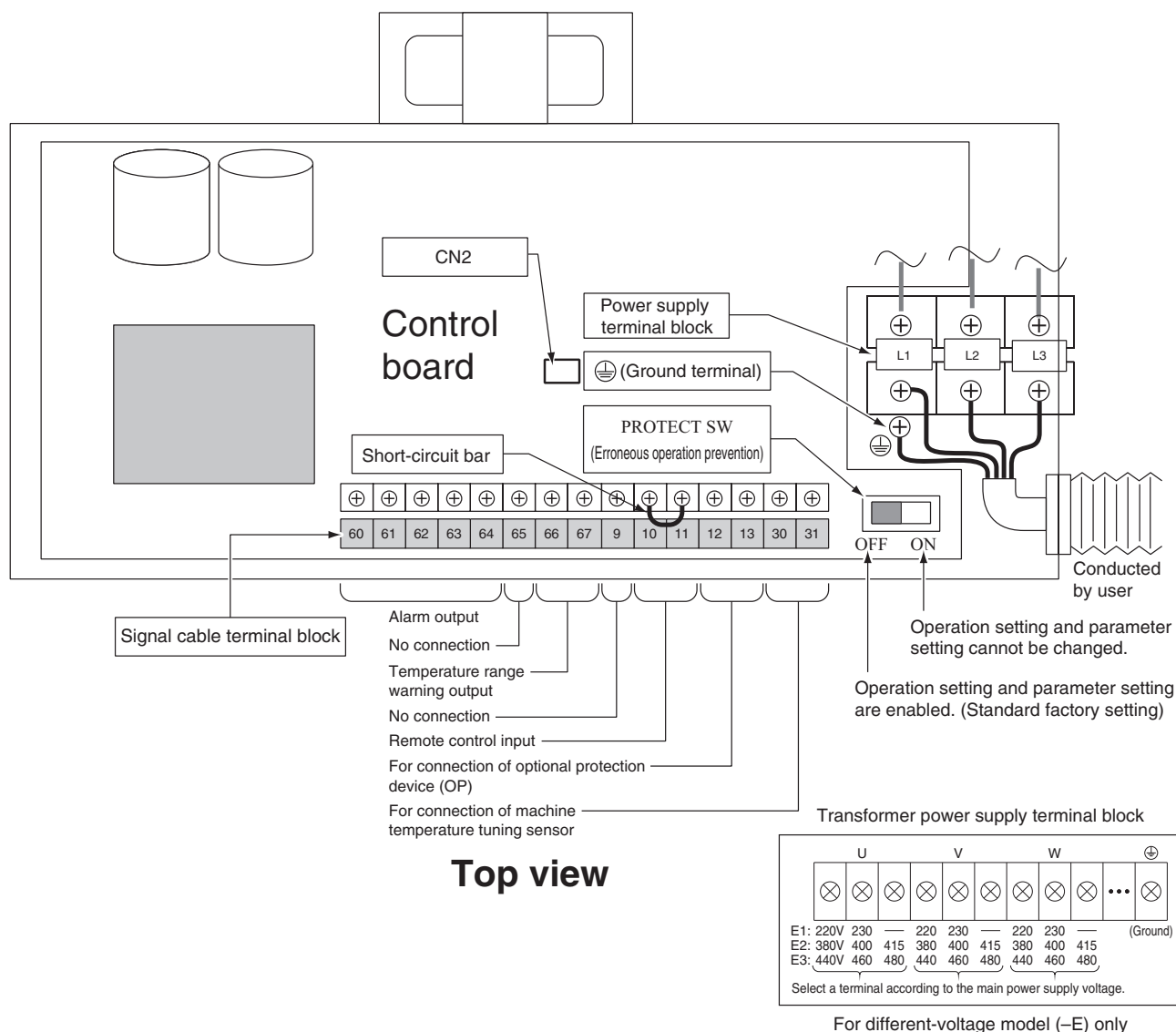
Cable type Model/Series name	AKZJ188,358,458,568 series	AKZJ908 series	AKZJ908-H
JIS	Heat-resistant vinyl, 2.0 mm ²	Heat-resistant vinyl, 3.5 mm ²	Heat-resistant vinyl, 5.5 mm ²
UL cable	UL1015 AWG#14 (equivalent to 2.0 mm ²)	UL1015 AWG#12 (equivalent to 3.3 mm ²)	UL1015 AWG#10 (equivalent to 5.5 mm ²)
IEC/CENELEC cable	2.5 mm ² (245 IEC53/H05RR-F)	4.0 mm ² (245 IEC53/H05RR-F)	6.0 mm ² (245 IEC53/H05RR-F)

- To connect each cable, use M4 (AKZJ908: M5) shielded round crimp terminal.
- Place the power cable in a conduit.
- For remote control input connecting procedure, refer to page 9.
- For external output contact connecting procedure, refer to page 10.

4 Re-mount the top plate, and fasten it with the screws.



Outline of electrical equipment box (Typical)



Connection of remote control input

To execute remote control, connect the cable according to the procedure below.

1 Local procurement items

Component	Single-pole, single-throw remote control switch, or "a" contact that enables operation command output (Note) Select a switch whose minimum allowable load is 12 VDC and 5 mA.
Wiring material	Single-core cable: $\phi 1.2$ (AWG16), or twisted cable: 1.25 mm^2 (AWG16), M3 crimp terminal

2 Remove the short-circuit bar (between terminals [10] and [11]) on the terminal block in the electrical equipment box.

3 Connect the cable specified in 1 above between terminals [10] and [11].

*12 VDC is applied across these terminals (Terminal [10]: negative polarity, [11]: positive polarity).

Connection of external output contact

To output the Oil Cooling Unit operation status signal to the main machine, connect the required signal cable to the signal terminal block according to the procedure below. For details of alarms, refer to “Alarm list” (page 38). To use an output contact, change the parameter setting, and make sure that the output contact normally operates. (For parameter setting changing procedure, refer to page 26.)

1. Screw terminal and cable size

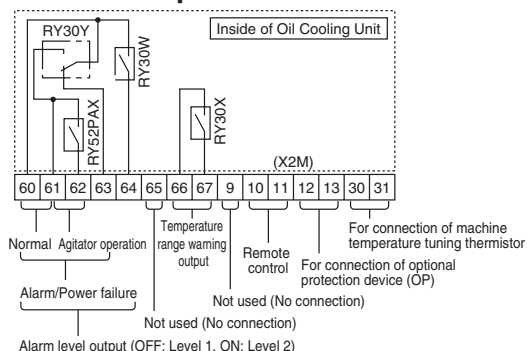
Screw terminal	Cable size		
	JIS cable	IEC cable	UL cable
M3	0.25 mm ² – 1.25 mm ²	0.3 mm ² – 1.5 mm ²	AWG#22 – #16

2. Connect each cable by using a round crimp terminal.

3. Use a twisted cable.

4. When a 2-core IEC cable is used, the cable size should be 0.5 to 1.5 mm².

1 External output circuit



(For alarm levels, refer to page 38.)

2 Alarm output logic

The alarm output logic can be changed depending on the parameter setting. (See page 33.)

3 When the power supply is turned ON, external output becomes unstable.

Set up the main machine sequence program so that the external output signal is ignored for one second after power-ON.

CAUTION

- The contact capacity is as follows:
Resistance load: 30 VDC, 2 A
- The minimum allowable load is as follows:
10 μ A, 10 mV
- To connect an inductive load, be sure to use a surge absorber.

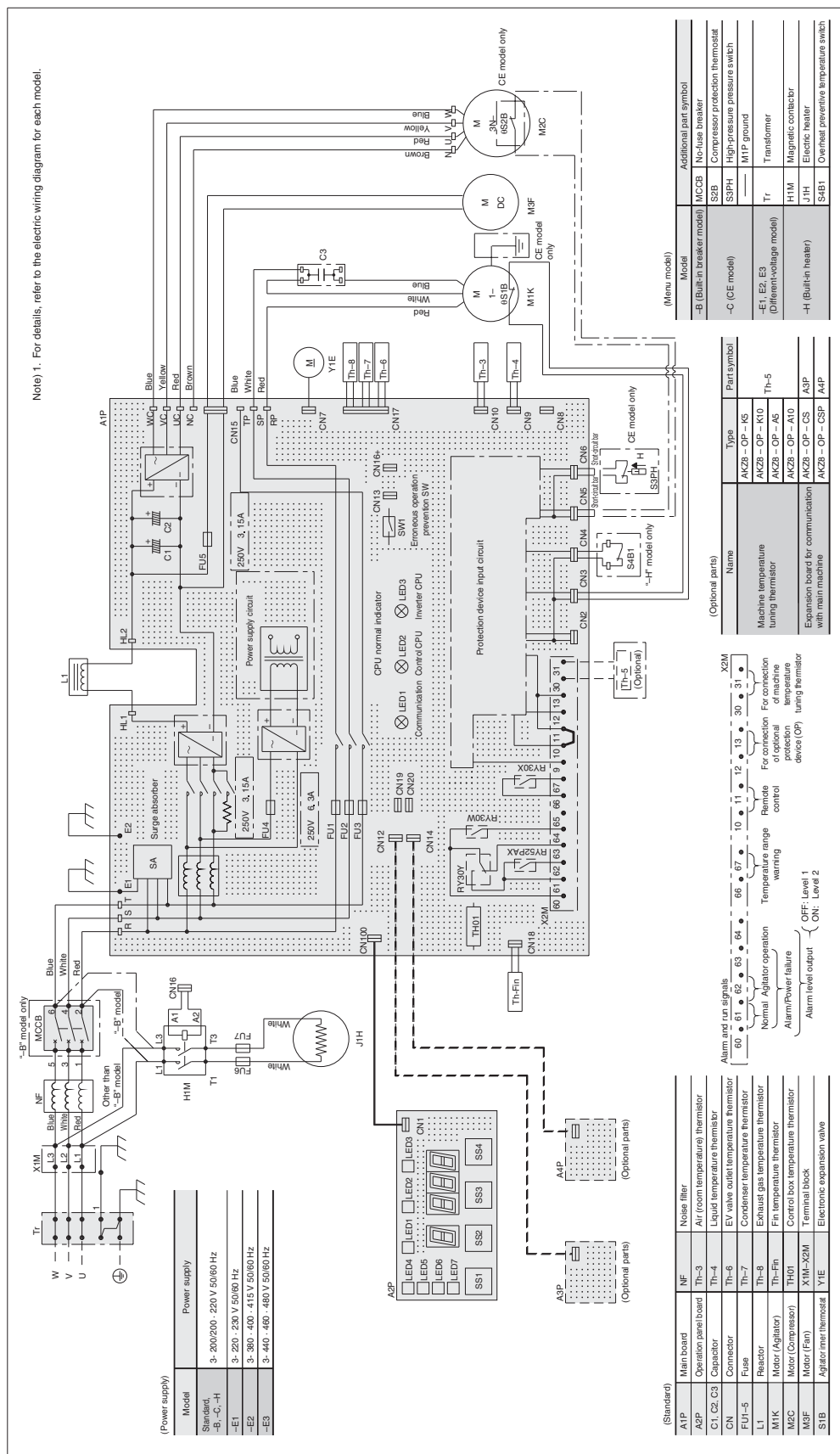
Value of the first digit in alarm output logic parameter (n01)

0 (Factory setting) [Positive action]	1 ["b" contact]
<p>Normal</p>	<p>Normal or power failure</p>
<p>Alarm or power failure</p>	<p>Alarm</p>

External output timing chart

Operation status			Power ON					
			Power OFF (including power failure)	Run	Alarm level 2	Run	Alarm level 1	Run
Preset condition	Power supply		OFF → ON	Reset	Reset			
	Remote control contact	Between terminals 10 and 11	ON → OFF	ON	OFF			
	Operation panel	[LOCK] key	ON	OFF	ON	ON		
Mode and terminal symbol of external output contact Output logic parameter setting: "0"	Normal ("a" contact)	Between terminals 60 and 61	OFF	ON				
	Alarm/Stop (Power OFF) ("b" contact)	Between terminals 60 and 63	ON	OFF				
	Agitator operation ("a" contact)	Between terminals 61 and 62	OFF	ON	OFF	ON		
	Alarm level	Between terminals 60 and 64	OFF		ON			
	Alarm ("a" contact)	Between terminals 60 and 61	OFF	ON	OFF	ON		
	Normal/Stop (Power OFF) ("b" contact)	Between terminals 60 and 63	ON	OFF	ON	OFF		
	Agitator operation ("a" contact)	Between terminals 61 and 62	OFF	ON	OFF	ON		
	Alarm level	Between terminals 60 and 64	OFF		ON			

Electric wiring diagram (Typical: AKZJ358)



Installation Procedure

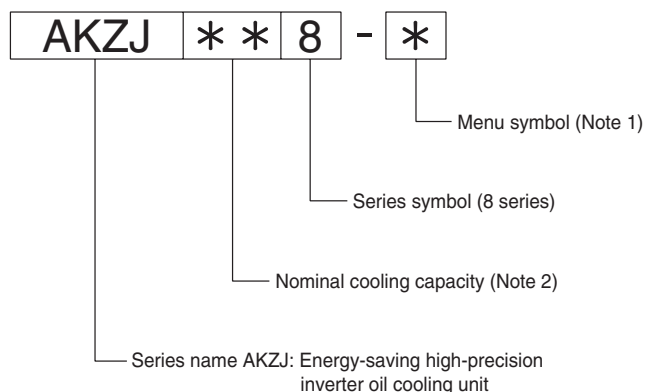
Installation

Model Identification and Specifications

Specifications (AKZJ188/358/458)

Oil Cooling Unit equivalent horsepower (HP)			0.5					1.2					1.5									
Model			AKZJ188					AKZJ358					AKZJ458									
			Standard	-B	-C	-H	-E ^{*3}	Standard	-B	-C	-H	-E ^{*3}	Standard	-B	-C	-H	-E ^{*3}					
Cooling capacity (50/60 Hz) ^{*1}			kW		1.6/1.8					3.2/3.5					4.2/4.5							
Heater			kW		1					1					1							
Power supply ^{*2}			3-phase 200/200 - 220 VAC 50/60 Hz					*3					3-phase 200/200 - 220 VAC 50/60 Hz					*3				
Circuit voltage			Main circuit		3-phase 200/200 - 220 VAC 50/60 Hz																	
			Operation circuit		12/24 VDC																	
Max. power consumption			200 V 50 Hz		1.07kVA/3.1A	1.35kVA/5.7A	Same as standard	1.76kVA/5.2A	1.76kVA/5.9A	Same as standard	1.94kVA/5.7A	1.94kVA/5.9A	Same as standard									
Max. current consumption			200 V 60 Hz		1.09kVA/3.2A	1.35kVA/5.6A	Same as standard	1.78kVA/5.2A	1.78kVA/5.8A	Same as standard	1.96kVA/5.7A	1.96kVA/5.8A	Same as standard									
			220 V 60 Hz		1.07kVA/2.8A	1.62kVA/6.1A	Same as standard	1.79kVA/4.9A	1.79kVA/6.3A	Same as standard	1.98kVA/5.3A	1.98kVA/6.3A	Same as standard									
Transformer capacity								2.2kVA					2.2kVA									
Exterior color			White																			
Outer dimensions (H × W × D)			mm		980×360×440		980×450×630		1120×360×440		1120×450×630		1320×360×440		1320×450×630							
Compressor (Fully-enclosed DC swing type)			Equivalent to 0.4 kW					Equivalent to 0.75 kW					Equivalent to 1.1 kW									
Evaporator			Open coil type																			
Condenser			Cross fin coil type																			
Propeller fan			Motor		φ300, 75 W																	
Agitator			Motor		1φ, 50 W, 4P																	
Temperature control (Selectable)			Tuning type		Reference		Room temperature or machine temperature ^{*4} (Factory setting: Room temperature: Mode 3)															
					Control target		Tank liquid temperature															
			Tuning range		K		Within ±9.9 relative to reference temperature (Factory setting: 0.0)															
			Fixed type		Control target		Tank liquid temperature															
					Range		°C		5-50													
Refrigerant control			Inverter compressor rotation speed + Electronic expansion valve opening																			
Refrigerant (New refrigerant: R410A) ^{*5} Loading weight			kg		0.58				0.81				0.99									
Protection device			Agitator inner thermostat, Reverse-phase protector, Restart prevention timer, Low room temperature protection thermostat, High oil temperature protection thermostat, Low oil temperature protection thermostat, Discharge pipe temperature thermostat, Condenser temperature thermostat, Refrigerant leak detector, Inverter protector, No-fuse breaker ("B" only), High-pressure pressure switch ("C" only), Compressor protection thermostat ("C" only), Overheat prevention temperature thermostat ("H" only), Fuse ("H" only)																			
Operating range			Room temperature		°C		5-45															
			Tank liquid temperature		°C		5-50															
			Oil viscosity		mm ² /s		0.5-200															
Applicable oil			Water-soluble cutting/grinding fluid, Cutting/grinding oil, Lubricating oil, Hydraulic oil, Water for industrial use (Note: Inapplicable to chemicals, foods and fuels)																			
Sound level (Measured at 1 m from front of unit, at 1 m height, in anechoic room)			dB (A)		62																	
Transportation vibration resistance			Vertical: 14.7 m/s ² (1.5 G) × 2.5 hr (10 to 100 Hz sweep/5 min)																			
Weight			kg		38		41		103		44		47		109		53		56		118	
Internal circuit breaker (Rated current)			A		—		10		—		—		10		—		—		10		—	
Local procurement item			Circuit breaker (Rated current)		A		10 (Required for the models other than "B")															
			Other than circuit breaker		Tank (Depth: 400 mm or more), supply pump, float switch, return filter																	

Model identification



(Note 1) Menu symbol

- B : Circuit breaker (with built-in breaker)
- C : CE-conformable
- H : Built-in heater
- E : Different voltage (Built-in transformer)

E1 : 220 VAC, 230 VAC 50/60 Hz
E2 : 380 VAC, 400 VAC, 415 VAC 50/60 Hz
E3 : 440 VAC, 460 VAC, 480 VAC 50/60 Hz

(Note 2) Nominal cooling capacity

Indicates cooling capacity at standard point with commercial power supply frequency of 60 Hz. (Inlet oil temperature and room temperature: 35°C, VG32-equivalent oil is used.)

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

Specifications (AKJZ568/908)

Oil Cooling Unit equivalent horsepower (HP)			2.0					3.0								
Model			AKZJ568					AKZJ908								
			Standard	—B	—C	—H	—E*3	Standard	—B	—C	—H	—E*3				
Cooling capacity (50/60 Hz)*1			kW				5.0/5.6				8.0/9.0					
Heater			kW				2				4					
Power supply*2			3-phase 200/200 · 220 VAC 50/60 Hz					*3			3-phase 200/200 · 220 VAC 50/60 Hz		*3			
Circuit voltage		Main circuit						3-phase 200/200 · 220 VAC 50/60 Hz								
		Operation circuit						DC12/24V								
Max. power consumption		200 V 50 Hz	3.3kVA/9.4A		4.0kVA/11.4A		Same as standard		3.9kVA/11.2A		7.5kVA/21.6A		Same as standard			
Max. current consumption		200 V 60 Hz	3.3kVA/9.4A		4.0kVA/11.4A		Same as standard		4.1kVA/11.7A		7.5kVA/21.6A		Same as standard			
		220 V 60 Hz	3.4kVA/9.0A		4.8kVA/12.5A		Same as standard		4.3kVA/11.2A		9.0kVA/23.7A		Same as standard			
Transformer capacity								5kVA							6kVA	
Exterior color								White								
Outer dimensions (H x W x D)			mm		1450x470x500		1450x560x710		1630x560x620			1630x655x830				
Compressor (Fully-enclosed DC swing type)								Equivalent to 1.5 kW							Equivalent to 2.2 kW	
Evaporator								Open coil type								
Condenser								Cross fin coil type								
Propeller fan		Motor						φ400, 90 Wx4P					φ450, 150 Wx4P			
Agitator		Motor						1φ, 50 W, 4P								
Temperature control (Selectable)	Tuning type	Reference	Room temperature or machine temperature*4 (Factory setting: Room temperature: Mode 3)													
		Control target	Tank liquid temperature													
		Tuning range K	Within ±9.9 relative to reference temperature (Factory setting: 0.0)													
	Fixed type	Control target	Tank liquid temperature													
		Range °C	5–50													
Refrigerant control													Inverter compressor rotation speed + Electronic expansion valve opening			
Refrigerant (New refrigerant: R410A)*5 Loading weight			kg		1.25				1.65							
Protection device			Agitator inner thermostat, Reverse-phase protector, Restart prevention timer, Low room temperature protection thermostat, High oil temperature protection thermostat, Low oil temperature protection thermostat, Discharge pipe temperature thermostat, Condenser temperature thermostat, Refrigerant leak detector, Inverter protector, No-fuse breaker ("—B" only), High-pressure pressure switch ("—C" only), Compressor protection thermostat ("—C" only), Overheat prevention temperature thermostat ("—H" only), Fuse ("—H" only)													
Operating range	Room temperature	°C						5–45								
	Tank liquid temperature	°C						5–50								
	Oil viscosity	mm ² /s						0.5–200								
Applicable oil			Water-soluble cutting/grinding fluid, Cutting/grinding oil, Lubricating oil, Hydraulic oil, Water for industrial use (Note: Inapplicable to chemicals, foods and fuels)													
Sound level (Measured at 1 m from front of unit, at 1 m height, in anechoic room)			dB (A)		65				68							
Transportation vibration resistance			Vertical: 14.7 m/s ² (1.5 G) x 2.5 hr (10 to 100 Hz sweep/5 min)													
Weight			kg		83		86		160		132		140		220	
Internal circuit breaker (Rated current)			A		—		15		—		—		20		—	
Local procurement item	Circuit breaker (Rated current)	A	15 (Required for the models other than "—B")					20 (Required for the models other than "—B")			30		20			
	Other than circuit breaker		Tank (Depth: 400 mm or more), supply pump, float switch, return filter													

Note) *1: Cooling capacity is the value at standard point (inlet oil temperature and room temperature: 35°C, ISO VG32 oil). The product tolerance is approx. ±5%.

*2: Be sure to use a commercial power supply. Using an inverter power supply may result in burnout. Voltage fluctuation range should be within ±10%.

If voltage fluctuation exceeds ±10%, consult DAIKIN.

*3: For the different-voltage model, three types (–E1, –E2 and –E3) are available depending on the power supply voltage. (see page 12.)

*4: The optional machine temperature tuning thermistor is required. (For details, see page 34.)

*5: The "–C" model is supplied with MSDS (Material Safety Data Sheet) for refrigerant R410A.

*6: This product is not equipped with a circuit breaker. The user must prepare a circuit breaker.

*7: Conventional "1 HP"-equivalent models (AKJ106/AKZJ287 class) have been integrated into AKZJ358 ("1.2 HP"-equivalent).

Handling

Before
Operation

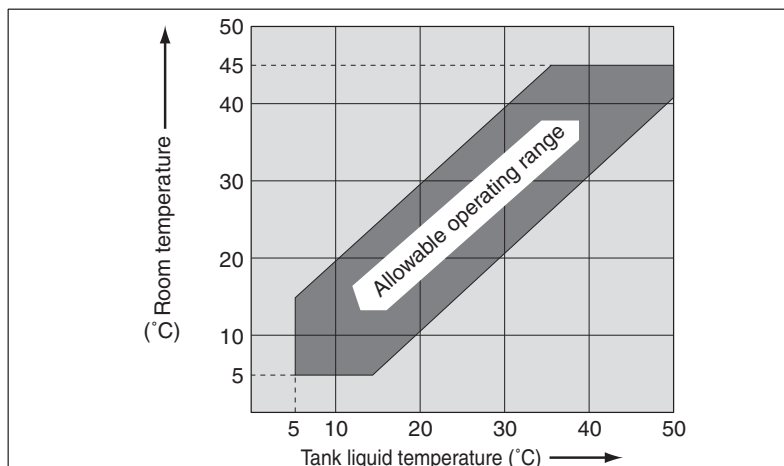
Before Operation

Before operating the Oil Cooling Unit, check the following items:

1 Operating environment

- Check the atmosphere for any factor (dust, oil mist, high temperature, high humidity, etc.) that may adversely affect the unit.
- Check if the unit is not installed in explosive atmosphere (that may cause evolution, inflow, retention or leak of inflammable gas).
- The operating range is limited. Make sure that the operating conditions are within the following range.

(Note: If this unit is operated out of the specified range, the protection devices may be activated, or the service life may be shortened.)



2 Electric wiring

- Check if the unit mounting parts are securely fastened to the tank top plate with bolts.
- Check for any obstacle that blocks air intake or exhaust flow.
(Do not put an obstacle within 500 mm from the air intake/exhaust port.)

3 Liquid level in the tank

- Be sure to maintain the liquid level in the tank within the specified range. (See page 5.)
(Operating the unit with a liquid level out of the specified range causes a fault of the unit.)


4 Delay timer

- The OILCON unit incorporates a delay timer. Therefore, when the compressor is stopped once and then restarted, the compressor may not start. This does not mean a fault of the unit. (See page 18.)

5 Applicable liquid

- The OILCON unit can be used for water-soluble cutting/grinding fluid, cutting/grinding oil, water for industrial use, lubricating oil, hydraulic oil (mineral oil). It cannot be applied to the following oils (liquids), and a liquid that may corrode the cooling coil (SUS304).

- | | |
|-----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1) Flame-resistant hydraulic oil | <ul style="list-style-type: none"> Phosphoric ester type Chlorinated hydrocarbon type Water + glycol type W/O, O/W emulsion type |
| 2) Chemicals and food liquids (drinking water etc.) | |
| 3) Fuels (kerosene, gasoline, etc.) | |
| 4) Water other than for industrial use | |


CAUTION

Before operating the Oil Cooling Unit, be sure to read through this instruction manual and understand the contents of this manual.

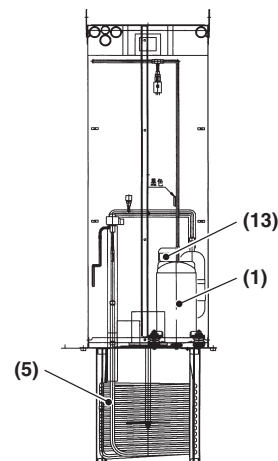
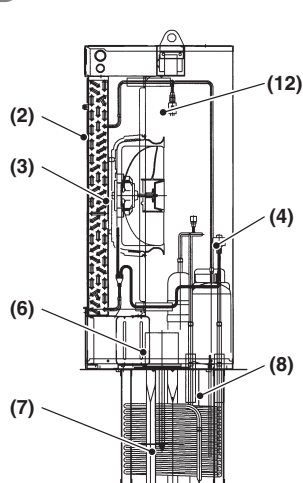
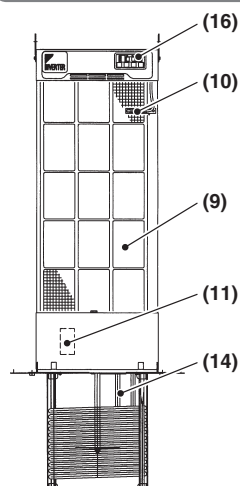
6 Electric wiring

- Check if the cable size is larger than the specified size. (Refer to "Wiring procedure" on page 8.)
- Check if the ground cable is securely connected.
- Be sure to use a commercial power supply. Using an inverter power supply may result in burnout.
- Check if the power supply voltage is within the following range:

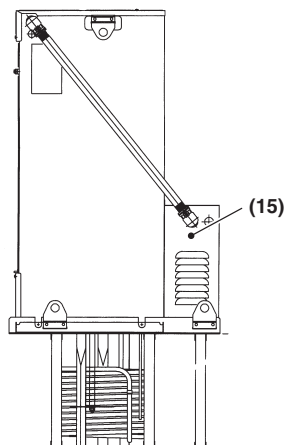
50 Hz200 V ±10%
60 Hz200/220 V ±10%
- Check if a circuit breaker is provided exclusively for each Oil Cooling Unit.

Part Names and Functions

Standard (-B, -C, -H)



-E

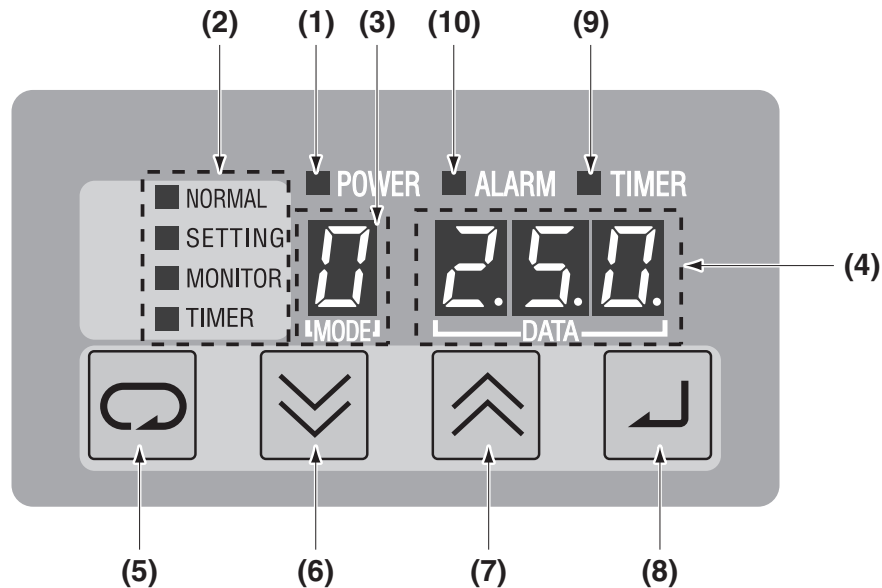


Before
Operation

No.	Name	Function	No.	Name	Function
(1)	Compressor	Sucks and compresses the low-temperature, low-pressure gas refrigerant produced in the evaporator, to produce high-temperature, high-pressure gas.	(9)	Air filter	Located at the front of the condenser. It is intended to prevent cooling capacity deterioration by eliminating dust adhering to the condenser from the air intake.
(2)	Condenser	Conducts heat exchange between the high-temperature, high-pressure gas refrigerant produced in the compressor and the air, to produce high-temperature, high-pressure liquid refrigerant.	(10)	Room temperature thermistor	Detects the inlet air temperature.
(3)	Fan (for condenser)	Forcefully blows air to accelerate heat exchange between the refrigerant in the condenser and the air.	(11)	Circuit breaker ("B" only)	Tripped when over-current flows through the circuit. It is intended to protect the internal electric wiring.
(4)	Electronic expansion valve	The valve mechanism reduces pressure of the high-temperature, high-pressure liquid refrigerant produced in the condenser, to produce low-temperature, low-pressure liquid/gas mixed refrigerant.	(12)	High-pressure pressure switch ("C" only)	Tripped when high-pressure alarm is activated. It is intended to protect the refrigerant system for the condenser etc.
(5)	Cooling coil	Evaporates the low-temperature, low-pressure liquid refrigerant produced in the electronic expansion valve through heat exchange between the refrigerant and oil, to produce low-temperature, low-pressure gas refrigerant.	(13)	Compressor protection thermostat ("C" only)	Tripped when compressor head high-temperature alarm is activated. It is intended to protect the compressor.
(6)	Agitator motor	Runs the agitator.	(14)	Heater ("H" only)	During warm-up in winter, the electric heater heats up the oil to a preset temperature.
(7)	Agitator	Improves the cooling efficiency by agitating the liquid in the tank.	(15)	Transformer ("E" only)	Intended for the different-voltage model.
(8)	Liquid temperature thermistor	Detects the controlled liquid temperature in the tank.	(16)	Control panel	OILCON operation panel (See page 16.)

Names and Functions of the Control Panel Parts

Outline of control panel



No.	Name	Description	Reference page
(1)	Power lamp (Green)	Lit while power supply is ON.	
(2)	Operation mode indicator	Indicates the control panel operation mode. NORMAL : Normal mode SETTING : Operation setting mode MONITOR : Monitor mode TIMER : Timer setting mode	page 17
(3)	Operation mode/data number display	Display the current operation mode (NORMAL/SETTING), or the data number currently displayed on the data display.	
(4)	Data display	Displays various data. The displayed data vary depending on the operation mode and data number.	
(5)	[SELECT] (selection) key	Used to select each mode.	
(6)	[DOWN] key	Decrements the number of operation mode or data number/value by one. If you keep pressing this key, the number is decremented by ten.	
(7)	[UP] key	Increments the number of operation mode or data number/value by one. If you keep pressing this key, the number is incremented by ten.	
(8)	[ENTER] (registration) key	Registers an operation mode, data number or data changed.	
(9)	Timer mode lamp (Red)	Blinks while the unit is halted in the timer mode.	page 24
(10)	Alarm lamp (Red)	When an alarm is activated: Blinks (Operation stops).....Alarm level 1 Lit (Only the compressor stops).....Alarm level 2	page 38

Operation mode

The control panel provides the following seven operation modes.
Among these seven modes, only four modes are available for normal operations.
In other modes, the Oil Cooling Unit may malfunction depending on operation.
Before using each mode, please understand the description on each mode.

	Mode	Description	Operation mode indicator	Reference page
	Operation lock mode	Disables operations of the Oil Cooling Unit regardless of preset conditions.		page 18
○*1	Normal mode	Displays the current operation mode and control target value.	"NORMAL" lamp is lit.	page 18
○*1	Operation setting mode	Specifies an operation mode and control target value.	"SETTING" lamp is lit.	page 18, 22
○*1	Monitor mode	Displays the current value of each thermistor etc.	"MONITOR" lamp is lit.	page 23
○*1	Timer setting mode	Used to set up time for the ON timer.	"TIMER" lamp is lit.	page 24
	Parameter setting mode	Used to set up basic parameters*2 of the Oil Cooling Unit.	"SETTING" lamp blinks.	page 25
	Auto-tuning mode	Used to set up the function for control response improvement.	"NORMAL" lamp blinks.	page 30


*1: The operation modes marked with a circle can be used for normal operation.

*2: "Parameter" means a constant to be defined for each setting.

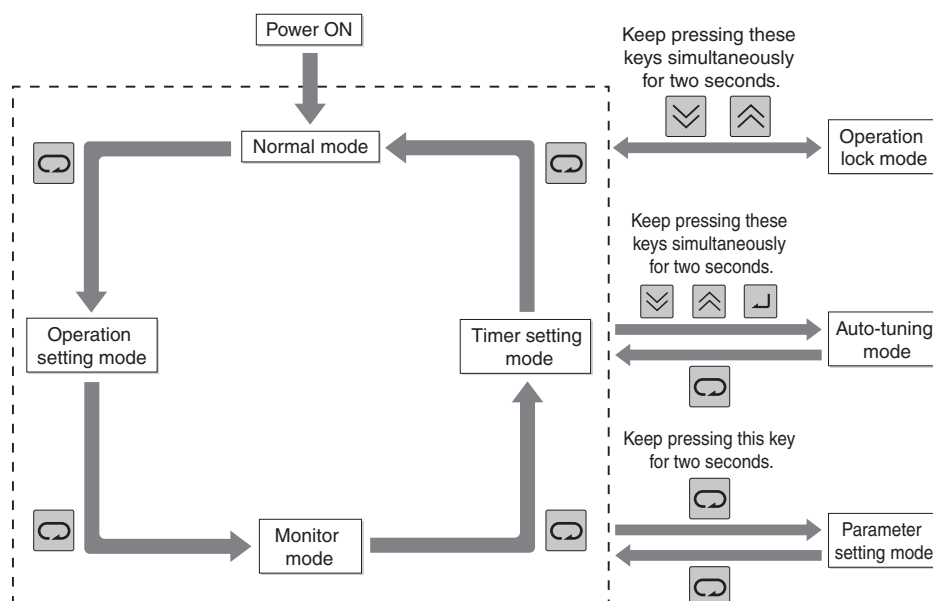
Handling

Before
Operation

Mode changing operation

Normally, the  key is used to shift between individual modes.

For special modes, you can change the mode by pressing several keys simultaneously for two seconds.

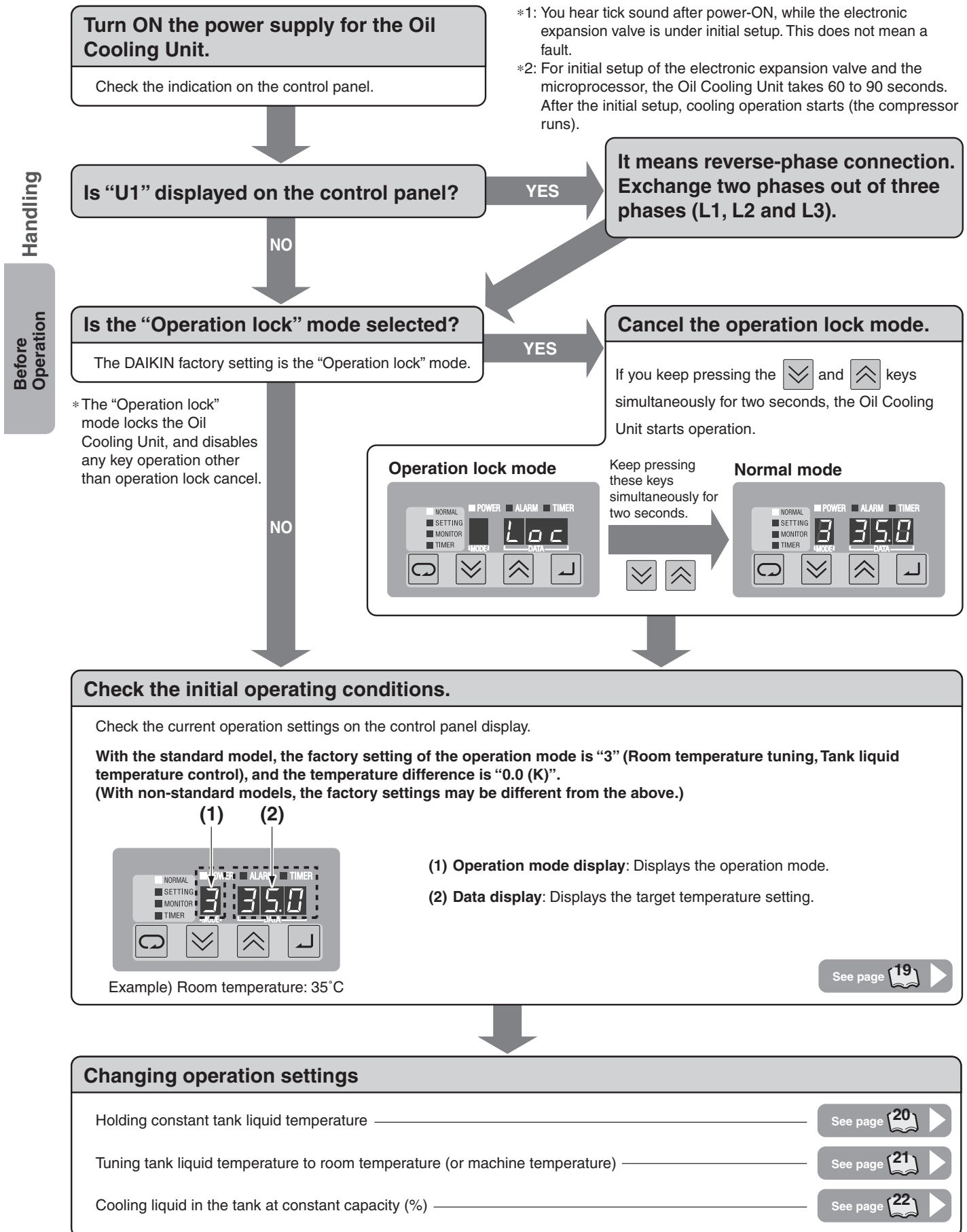


CAUTION



- The factory setting is the "Operation lock" mode.
To start operation, cancel the operation lock mode.
(See page 18.)
- With the standard model, the initial operating conditions are as follows:
Operation mode: 3 (Room temperature tuning, Tank liquid temperature control)
Temperature difference: 0.0 (K)

Checking Initial Operating Conditions



- *1: You hear tick sound after power-ON, while the electronic expansion valve is under initial setup. This does not mean a fault.
- *2: For initial setup of the electronic expansion valve and the microprocessor, the Oil Cooling Unit takes 60 to 90 seconds. After the initial setup, cooling operation starts (the compressor runs).

Operation Setting

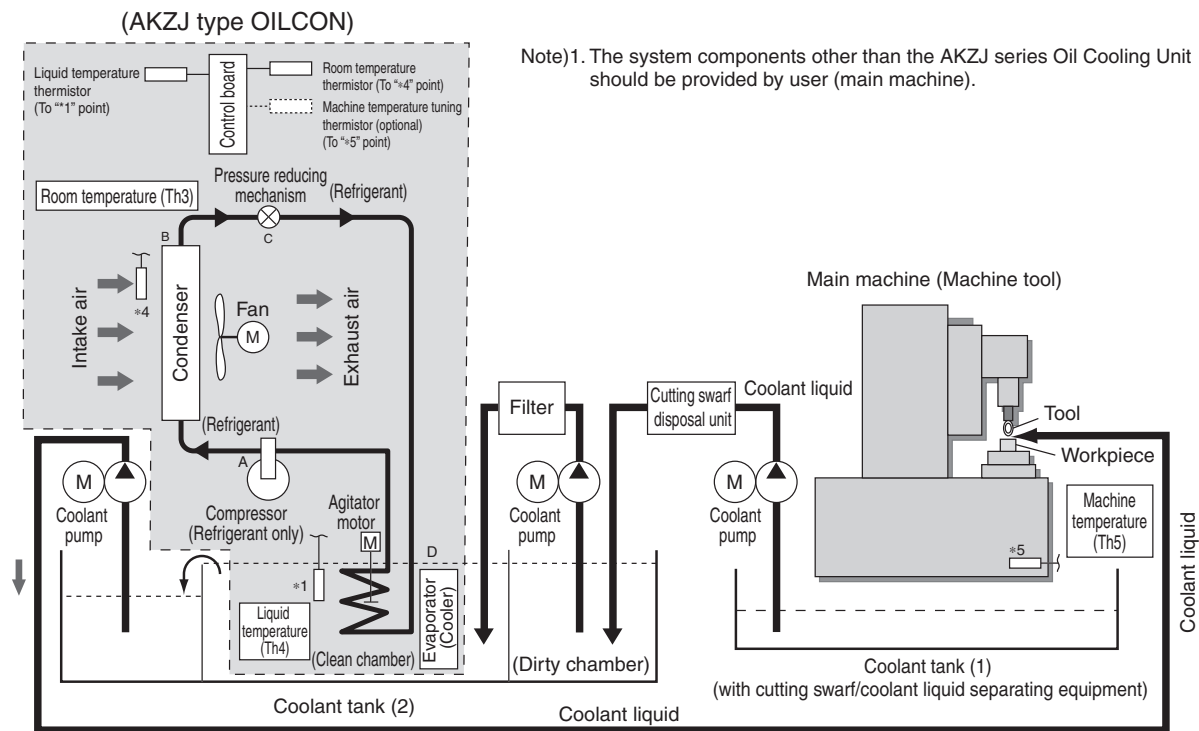
The Oil Cooling Unit operation setting provides the following modes.

	Control method	Reference temperature	Control target ^{*1}	Operation mode ^{*3} (Reference page)	Setting range
Holding constant tank liquid temperature (Keeping a control target at a constant temperature)	Fixed temperature control		Tank liquid temperature	0 (p. 20)	5.0–50.0 (°C)
Tuning tank liquid temperature to room temperature (or machine temperature) (Keeping a constant temperature difference between the control target and the reference temperature)	Tuning temperature control	Room temperature	Tank liquid temperature	3 (p. 21)	−9.9–9.9 (K) } ^{*4}
		Machine temperature ^{*2}	Tank liquid temperature	4 (p. 21)	
Cooling liquid in the tank at constant capacity (%) (Cooling operation is executed according to the capacity command, but tank liquid temperature control is disabled.)	Capacity direct designation (used for trial run etc.)	None	None	9 (p. 22)	0–100 (%)

- *1: For control target measuring points, see the figure below.
- *2: Optional function using optional parts
- *3: Operation modes 1, 2 and 5–8 cannot be used.
- *4: K (Kelvin) is a symbol of the SI unit system that indicates a temperature difference (°C).

System outline drawing

An example of a main machine coolant system using the Oil Cooling Unit is shown below.



Description on the refrigerating cycle

A: The compressor produces high-temperature, high-pressure compressed gas so that the refrigerant gas can be easily cooled and liquefied in the condenser.

B: The condenser cools and condenses the high-temperature, high-pressure gas produced in the compressor, to transform it to high-temperature, high-pressure liquid.

C: The pressure reducing mechanism throttles the high-temperature, high-pressure liquid to reduce pressure, and transform it to low-temperature, low-pressure liquid/gas mixture so that it can be easily evaporated in the evaporator.

D: The evaporator evaporates the low-temperature, low-pressure liquid/gas mixture produced in the pressure reducing mechanism by absorbing heat from the oil (by cooling the oil), and transforms it to low-temperature, low-pressure gas.

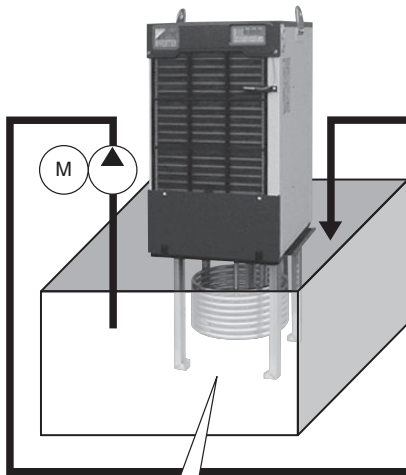
Handling

Before Operation

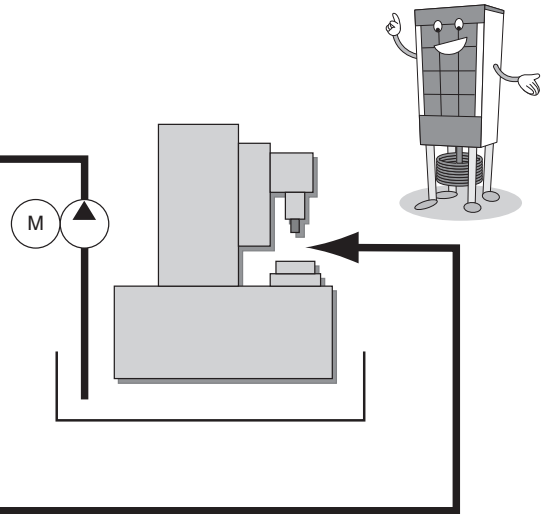
Holding constant tank liquid temperature

Controlling **tank liquid temperature** at constant temperature

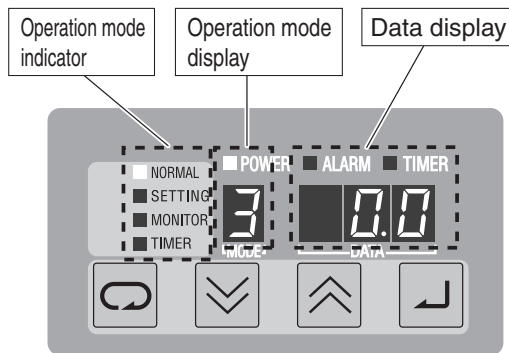
Operation mode: 0



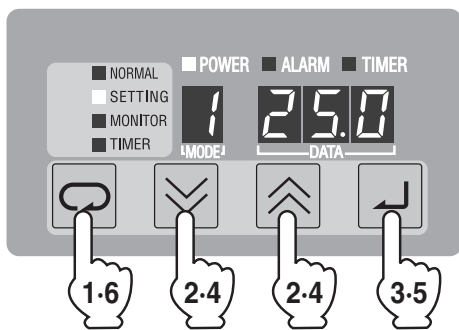
Tank liquid temperature control
Operation mode: 0



Setting procedure



Factory setting
(With non-standard models, the settings may be different from the above.)



Example) Outlet oil temperature,
Fixed temperature control
(Temperature setting: 25°C)

1. Select the operation setting mode.

- Go to the operation setting mode with the key.
See "Mode changing operation" on page 17.
- The "SETTING" lamp on the operation mode indicator lights.
* The number on the operation mode display blinks.

2. Change the operation mode.

When the number on the operation mode display is blinking, change the number to "0" with the or key.

3. After changing the number, press the key to register it.

After the number is registered, the number on the data display blinks.
* The number on the operation mode display remains lit.

4. Change the temperature setting.

When the number on the data display is blinking, change the set value to a desired oil temperature with the or key.

5. After changing the set value, press the key to register it.

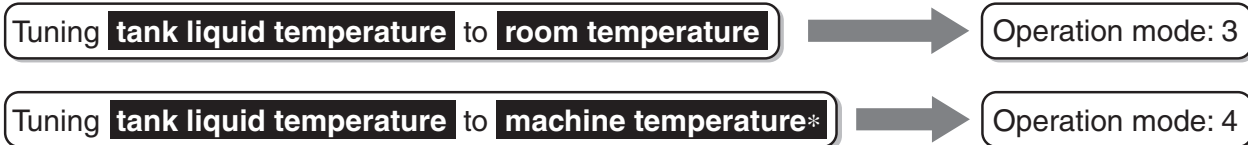
After the temperature setting is registered, the number on the operation mode display blinks.
* The number on the data display remains lit.

6. Return to the normal mode.

- Press the key three times, to return to the normal mode.
See "Mode changing operation" on page 17.
- The "NORMAL" lamp on the operation mode indicator lights.

Tuning tank liquid temperature to room temperature (or machine temperature)

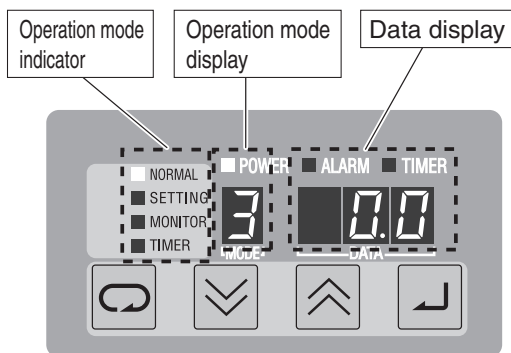
To tune tank liquid temperature to room temperature (or machine temperature), the following two types of operation settings are available.



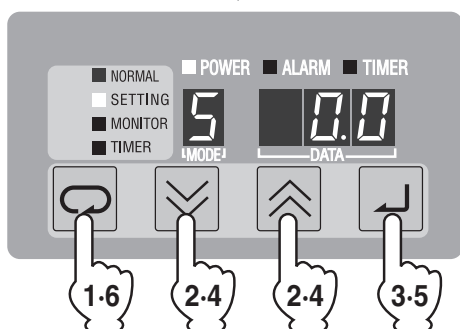
* Optional function using optional parts. See page 34.

With the above operation settings, the OILCON unit controls the tank liquid temperature so as to keep the **difference** between the room or machine temperature (reference temperature) and the tank liquid temperature (control target) at a constant value as the user specified, according to a change in the room or machine temperature. The temperature difference setting range is -9.9 to $+9.9$ (K).

Setting procedure



Factory setting
(With non-standard models, the settings may be different from the above.)



Example) Outlet oil temperature,
Room temperature tuning control
(Temperature difference setting: 0.0°C)

1. Select the operation setting mode.

- Go to the operation setting mode with the key.
See “Mode changing operation” on page 17.
- The “SETTING” lamp on the operation mode indicator lights.
* The number on the operation mode display blinks.

2. Change the operation mode.

When the number on the operation mode display is blinking, change the number to “3” or “4” with the or key.

3. After changing the number, press the key to register it.

After the number is registered, the number on the data display blinks.
* The number on the operation mode display remains lit.

4. Change the set value.

When the number on the data display is blinking, change the set value to a desired temperature difference relative to the room (machine) temperature with the or key.

5. After changing the set value, press the key to register it.

After the temperature setting is registered, the number on the operation mode display blinks.
* The number on the data display remains lit.

6. Return to the normal mode.

- Press the key three times, to return to the normal mode.
See “Mode changing operation” on page 17.
- The “NORMAL” lamp on the operation mode indicator lights.

Cooling liquid in the tank at constant capacity (%)

Cooling the liquid in the tank **at constant capacity (%)**

Operation mode: 9

With the above operation setting, the OILCON unit executes cooling operation according to the specified command value (%). Therefore, tank liquid temperature control is disabled.

The capacity setting range is 0 to 100%.

* The capacity (%) is an approximate index.

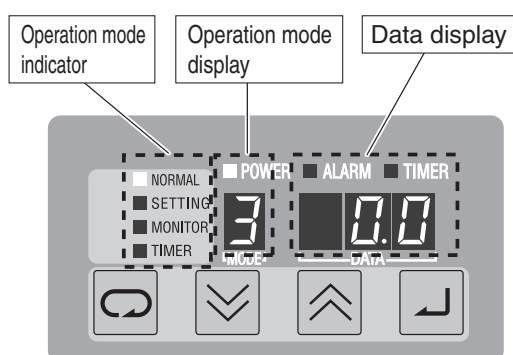
* When the capacity is set to "0"%, the compressor stops. (The pump and fan are running.)

* Even if the capacity command value is the same, the actual cooling capacity varies depending on the room temperature and the tank liquid temperature.

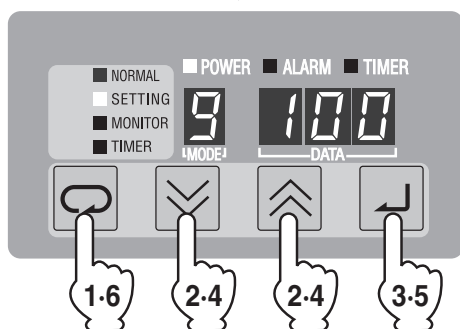
Setting procedure

Handling

Operating Procedure



Factory setting
(With non-standard models, the settings may be different from the above.)



Example) Capacity direct designation
(Capacity setting: 100%)

1. Select the operation setting mode.

- Go to the operation setting mode with the key.

See "Mode changing operation" on page 17.

- The "SETTING" lamp on the operation mode indicator lights.
* The number on the operation mode display blinks.

2. Change the operation mode.

When the number on the operation mode display is blinking, change the number to "9" with the or key.

3. After changing the number, press the key to register it.

After the number is registered, the number on the data display blinks.

* "9" on the operation mode display remains lit.

4. Change the set value.

When the number on the data display is blinking, change the set value to a desired capacity with the or key.

5. After changing the set value, press the key to register it.

After the temperature setting is registered, the number on the operation mode display blinks.

* The number on the data display remains lit.

6. Return to the normal mode.

- Press the key three times, to return to the normal mode.

See "Mode changing operation" on page 17.

- The "NORMAL" lamp on the operation mode indicator lights.

Monitor Items

When the “**Monitor mode**” is selected, the following items can be checked.

No.	Description	Note
0	Machine temperature [Th5]	*1
1	Not used	—
2	Room temperature [Th3]	*1
3	Tank liquid temperature [Th4]	*1
4	Not used	—
5	Not used	—
6	Capacity command value (%)	—
7	Compressor inverter rotation speed (rps)	—
8	Not used	*2
9	Status of expansion DIN (third digit)/DOUT (first digit)	*3

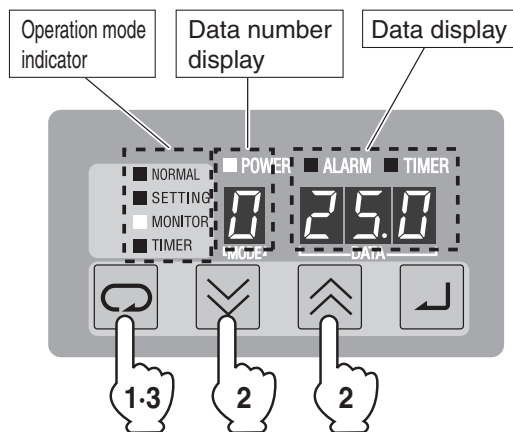
*1: Nos. 0, 2, and 3 indicate a temperature detected with each thermistor.

When the relevant thermistor is not connected or has a wire break, “99.9” is displayed.

*2: “0” is displayed.

*3: With the factory setting, “J” is displayed. However, it is for indication only. Actual communication is enabled when the optional expansion communication board is mounted.

Operating procedure



1. Select the monitor mode.

- Go to the monitor mode with the key.
See “**Mode changing operation**” on page [17](#).
- The “MONITOR” lamp on the operation mode indicator lights.
* The value on the data number display blinks.

2. Monitor the current status.

Change the value on the data number display to a desired value with the or key.

When the data number is changed, the temperature currently detected with the thermistor and input/output values simultaneously appear on the data display.

3. Return to the normal mode.

- Press the key two times, to return to the normal mode.
See “**Mode changing operation**” on page [17](#).
- The “NORMAL” lamp on the operation mode indicator lights.

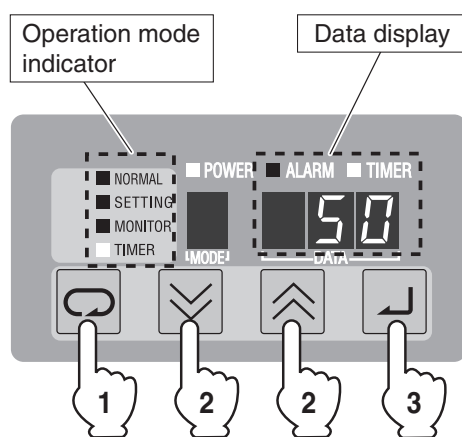
Timer Operation

With the "ON" timer, the Oil Cooling Unit can be started after elapse of a desired time.
This mode can be used to warm up the main machine.

The operation start time setting range is 0 to 99 hours (in one hour steps).

- * While the timer mode is selected, keep the main power supply ON.
The value indicated on the control panel will be decremented from a preset value at one-hour intervals.
- * To cancel the timer mode, set the timer at "0".
- * The timer setting is active only once. To use the timer again, you must set up the timer again.

Operating procedure



1. Select the timer mode.

- Go to the timer mode with the key.
See "Mode changing operation" on page 17.
- The "TIMER" lamp on the operation mode indicator lights.
* "0" blinks on the data display.

2. Specify an operation start time.

Change the value on the data display to a desired value with the

or key.

The unit of set value is "h" (hour).

3. Set up the timer.

- Press the key to register the timer setting.
- When the timer is activated, the Oil Cooling Unit is halted.
* The value on the data display blinks.
* The "TIMER" lamp (red LED) blinks.
Keep the main power supply ON.




Main machine warm-up

- With the built-in heater model (–H), the electric heater heats up liquid in the tank to a preset temperature during main machine warm-up in winter. Combining this function with timer operation enables more effective warm-up.
Heater ON: When tank liquid temperature is at least 2.1°C lower than preset temperature
Heater OFF: When tank liquid temperature is equal to, or higher than preset temperature
Regardless of the operation mode, the OILCON unit turns ON/OFF the heater by detecting the tank liquid temperature. (* Only when the compressor is not in operation)
- Note that the heater cannot perform high-precision tank liquid temperature control.

Additional Setting Functions

You can additionally set up the following functions by setting the parameters of the Oil Cooling Unit.

1 Additional setting functions

- ☐ Auto-tuning: Automatically sets up the parameters appropriately for the system.  page [30](#)
- ☐ Temperature range warning: Activates warning output when tank liquid temperature exceeds preset temperature range.  page [27](#)
- ☐ Alarm/warning output logic: Outputs signal from Oil Cooling Unit to main machine.  page [33](#)
- ☐ Communication with main machine: Enables communication with main machine when optional board is mounted (see page [35](#)). Refer to HM01568.

2 Parameter list

The parameters that must be specified for individual additional setting functions are listed below:

Additional setting function				No.	Item	Minimum value	Maximum value	Initial value (Factory setting)	Unit	Necessity of power supply reset	Remarks
Auto-tuning	Warning	Alarm output logic	Communication with main machine								
				n00	Not used	0	0	0	—		
		○		n01	Alarm output logic	0	11	0	—	○	See page 33 .
		○		n02	OP contact level	0	3	0	—		
		○		n03	OP2 contact level	0	2	0	—		
○				n04	Outlet oil temperature decrease (Auto-tuning end condition)	0.0	10.0	8.0	°C		For auto-tuning
○				n05	P/I gain calculation coefficient (Response coefficient)	0.1	10.0	7.0	—		See page 30 .
○				n06	Control gain P (for low deviation)	1	999	120	—		• The initial value varies depending on the model. (Automatically set up by auto-tuning)
○				n07	Control gain I (for low deviation)	1	999	120	—		
○				n08	Control gain P (for high deviation)	1	999	120	—		
○				n09	Control gain I (for high deviation)	1	999	120	—		
	○			n10	Warning setting 1	0	465	0	—		See page 27 .
	○			n11	Warning setting data 1	0.0	60.9	0.0	—		
	○			n12	Warning setting 2	0	465	0	—		
	○			n13	Warning setting data 2	0.0	60.9	0.0	—		
	○			n14	Warning setting 3	0	465	0	—		
	○			n15	Warning setting data 3	0.0	60.9	0.0	—		
	○			n16	Warning setting 4	0	465	0	—		
	○			n17	Warning setting data 4	0.0	60.9	0.0	—		
	○			n18	Warning setting 5	0	465	0	—		
	○			n19	Warning setting data 5	0.0	60.9	0.0	—		
			○	n20	Use of parallel communication	0	1	0	—	○	The optional board is required. See page 35 .
				n21 to n38		—	—	—	—		Never attempt to change these settings. Otherwise, the unit may malfunction.

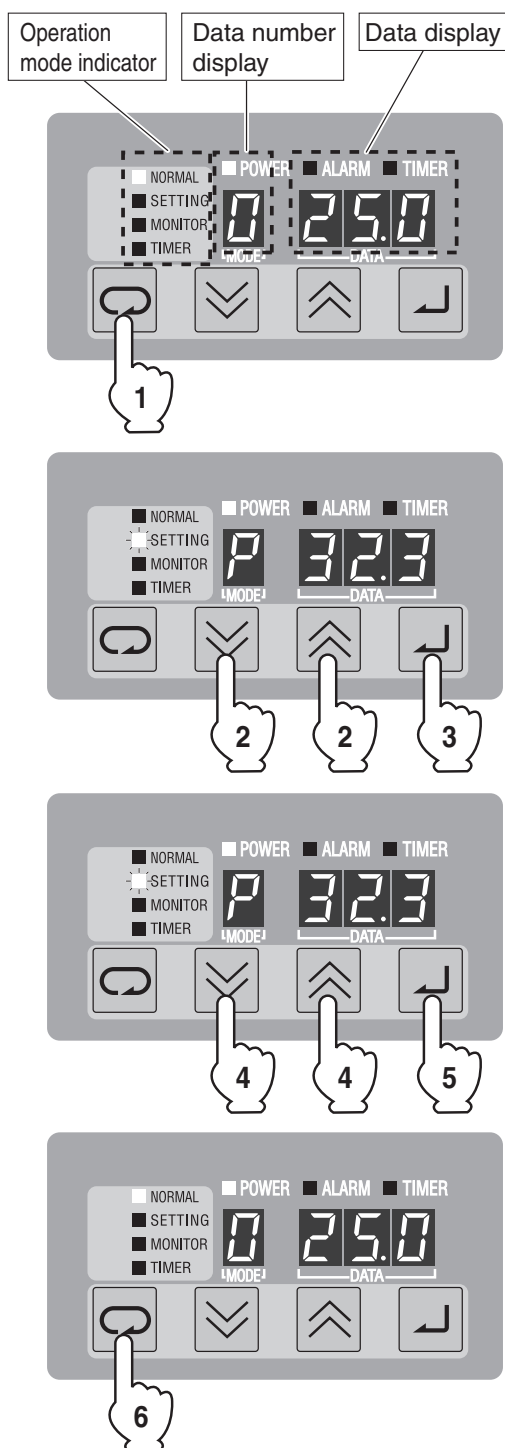
Handling

Useful Functions


3 Parameter setting procedure

You can set the parameter that enables the additional setting functions of the Oil Cooling Unit.
For description of the additional setting functions and parameter list, refer to page 25.



Setting procedure




1. Select the parameter setting mode.

- Go to the parameter setting mode by pressing the  key for two seconds.
- See “Mode changing operation” on page 17.
- The “SETTING” lamp on the operation mode indicator lights.
* “P” blinks on the data number display.



2. Select a parameter number.

- Change the parameter number to a desired number with the  or  key.
- After the selected parameter number is displayed for approx. 0.5 seconds on the data display, the set value appears.

3. Register the parameter number.

- Press the  key to register the parameter number.
- After the number is registered, the value on the data display blinks.
* “P” on the data number display remains lit.


4. Change the set value.

When the value on the data display is blinking, change the set value with the  or  key.

5. After changing the set value, press the key to register it.

- After the set value is registered, the value on the data display remains lit.
* “P” blinks on the data number display.

6. Return to the normal mode.

- Press the  key, to return to the normal mode.
- See “Mode changing operation” on page 17.
- The “NORMAL” lamp on the operation mode indicator lights.

Setting Additional Function—“Temperature range warning”

■ Outline of the function

- As an additional function of the Oil Cooling Unit, you can set up the “**Temperature range warning**” function. This function allows you to specify a desired temperature range within the Oil Cooling Unit operating range. When the control temperature exceeds the preset range, the unit informs you of the “Temperature range warning” condition.
- The “Temperature range warning” function provides the following settings:
 - External output (30X relay output: ON): Turns ON/OFF the contact (66, 67) of the signal terminal block.
(See the output logic on page 33.)
 - Compressor forced stop—Warning: Stops the compressor. (Indication: 1E to 5E)
Warning status will be automatically reset when preset warning reset temperature is reached.
 - Alarm stop—“FH” alarm: Stops the compressor. (Indication: FH)
(See “Alarm output logic” on page 10.)
The warning reset setting is inactive. (When the power supply is turned ON again, the compressor restarts operation.)

* The above 1), 2) and 3) can be combined.

■ Parameter setting

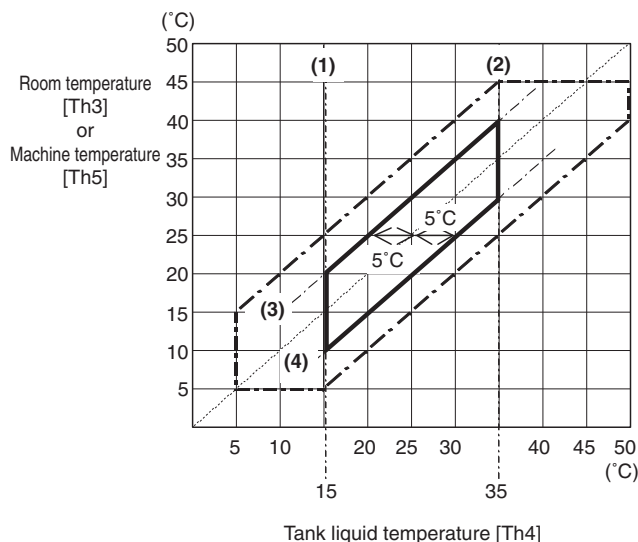
To enable this function, set the corresponding parameters. You can specify up to five warning conditions with the following five groups of parameters.

	Types of temperature range warning*	Parameter	
		Group A	Group B
(1)	Low liquid temperature (Fixed temperature)	n10	n11
(2)	High liquid temperature (Fixed temperature)	n12	n13
(3)	Low liquid temperature (Temperature difference)	n14	n15
(4)	High liquid temperature (Temperature difference)	n16	n17
(5)	Reserve	n18	n19

Group A: “Temperature range warning condition setting”
“Temperature range warning operation setting”
Group B: “Temperature range warning temperature setting”
“Temperature range warning reset temperature setting”

* For temperature range warning, the above (1) to (5) types are available. Actually, however, any combinations of these types are enabled. The above (1) to (5) types can be simultaneously used.

Application of temperature range warning



: Oil Cooling Unit operating range
 : Temperature range warning setting

- (1) When Tank liquid temperature [Th4] is 15°C or lower, the compressor stops. (Warning)
- (2) When Tank liquid temperature [Th4] is 35°C or higher, the compressor stops (FH alarm), and the 30X relay output turns ON.
- (3) When Tank liquid temperature [Th4] is at least 5°C lower than the room temperature [Th3] (or machine temperature [Th5]), the 30X relay output turns ON.
- (4) When Tank liquid temperature [Th4] is at least 5°C higher than the room temperature [Th3] (or machine temperature [Th5]), the 30X relay output turns ON.

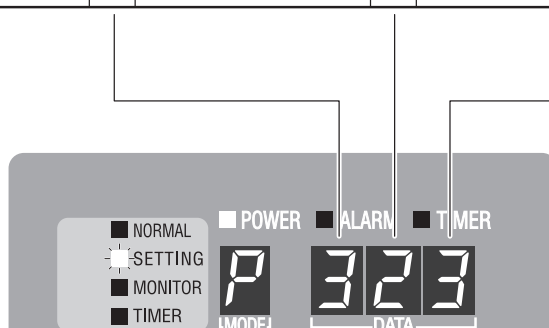
Description on parameter settings (Group A)

*Enter Group B (page 29) before Group A, so that the temperature range warning is not activated during setup.

In this section, set the following parameters by using three digits (first, second and third digits) of each parameter on the control panel data display.

- “Temperature range warning condition setting” (Use the second and third digits.)
- “Temperature range warning operation setting” (Use the first digit.)

		Temperature range warning condition setting				Temperature range warning operation setting	
		Third digit		Second digit		First digit	
(1)	n10	Tank liquid temperature [Th4]	4	≤ Fixed value	6	External output (“Rely 30” output: ON)	1
						Warning	2
						Warning + External output (“Rely 30” output: ON)	3
(2)	n12	Tank liquid temperature [Th4]	4	≥ Fixed value	5	External output (“Rely 30” output: ON)	1
						FH alarm	4
						FH alarm + External output (“Rely 30” output: ON)	5
(3)	n14	Room temperature [Th3]	3	Tank liquid temperature [Th4]	4	External output (“Rely 30” output: ON)	1
		Machine temperature [Th5]	1			Warning	2
						Warning + External output (“Rely 30” output: ON)	3
(4)	n16	Tank liquid temperature [Th4]	4	– Room temperature [Th3]	3	External output (“Rely 30” output: ON)	1
				– Machine temperature [Th5]	1	FH alarm	4
						FH alarm + External output (“Rely 30” output: ON)	5



Example of parameter settings (for temperature range warning: See page 27.)

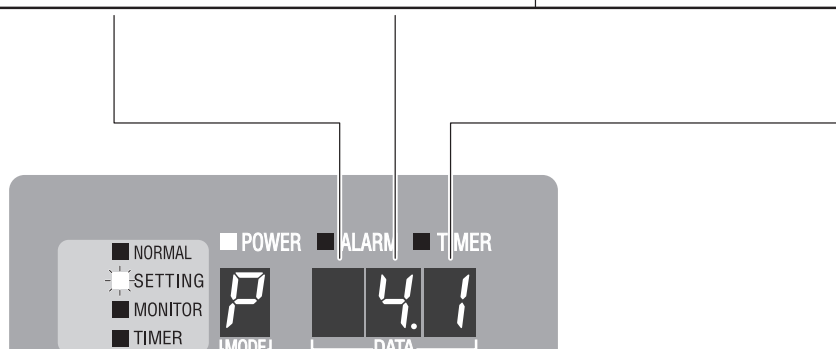
(1)	When Tank liquid temperature [Th4] is 15°C or lower, the compressor stops. (Warning)	n10	462
(2)	When Tank liquid temperature [Th4] is 35°C or higher, the compressor stops (FH alarm), and the 30X relay output turns ON.	n12	455
(3)	When Tank liquid temperature [Th4] is at least 5°C lower than the room temperature [Th3] (or machine temperature [Th5]), the 30X relay output turns ON.	n14	341 (141)
(4)	When Tank liquid temperature [Th4] is at least 5°C higher than the room temperature [Th3] (or machine temperature [Th5]), the 30X relay output turns ON.	n16	431 (411)

Description on parameter settings (Group B)

In this section, set the following parameters by using three digits (first and second digits, and first decimal place) of each parameter on the control panel data display.

- “Temperature range warning temperature setting” (Use the first and second digits.)
- “Temperature range warning reset temperature setting” (Use the first decimal place. Active only when “Warning” has been set.)

		Temperature range warning temperature		Temperature range warning reset temperature (Temperature difference for automatic reset)*1
		Second digit	First digit	First decimal place
(1)	n11	0 to 60 (°C)		1 to 9 (°C)
(2)	n13			
(3)	n15			
(4)	n17			



*1: When the first digit of the “temperature range warning operation setting” parameter of **Group A** is “4” or “5”, this parameter is inactive because the warning status will not be automatically reset. (Enter any number from 0 to 9.)

Example of parameter settings (for temperature range warning: See page 27.)

(1)	When Tank liquid temperature [Th4] is 15°C or lower, the compressor stops. (Warning) [When Tank liquid temperature [Th4] becomes 17°C, the warning status will be automatically reset.]	n11	15.2*2
(2)	When Tank liquid temperature [Th4] is 35°C or higher, the compressor stops (FH alarm), and the 30X relay output turns ON.	n13	35.0
(3)	When Tank liquid temperature [Th4] is at least 5°C lower than the room temperature [Th3] (or machine temperature [Th5]), the 30X relay output turns ON. [When the difference between room temperature [Th3] and Tank liquid temperature [Th4] becomes 4°C or less, the warning status will be automatically reset.]	n15	5.1*3
(4)	When Tank liquid temperature [Th4] is at least 5°C higher than the room temperature [Th3] (or machine temperature [Th5]), the 30X relay output turns ON. [When the difference between room temperature [Th3] and Tank liquid temperature [Th4] becomes 3°C or less, the warning status will be automatically reset.]	n17	5.2*4

*2: 17 (Temperature range warning reset temperature) – 15 (Temperature range warning temperature) = 2

*3: 5 (Temperature range warning temperature) – 4 (Temperature range warning reset temperature) = 1

*4: 5 (Temperature range warning temperature) – 3 (Temperature range warning reset temperature) = 2

For Temperature Control Improvement—“Auto-tuning mode”

* To use the Oil Cooling Unit in normal conditions, this function is not required.

■ Outline of the function

Depending on the system of the main machine, problems of “**unstable temperature control**” or “**slow response in temperature control**” may be raised. In such cases, it is possible that the temperature control gain* P or I setting is not suitable for the system.

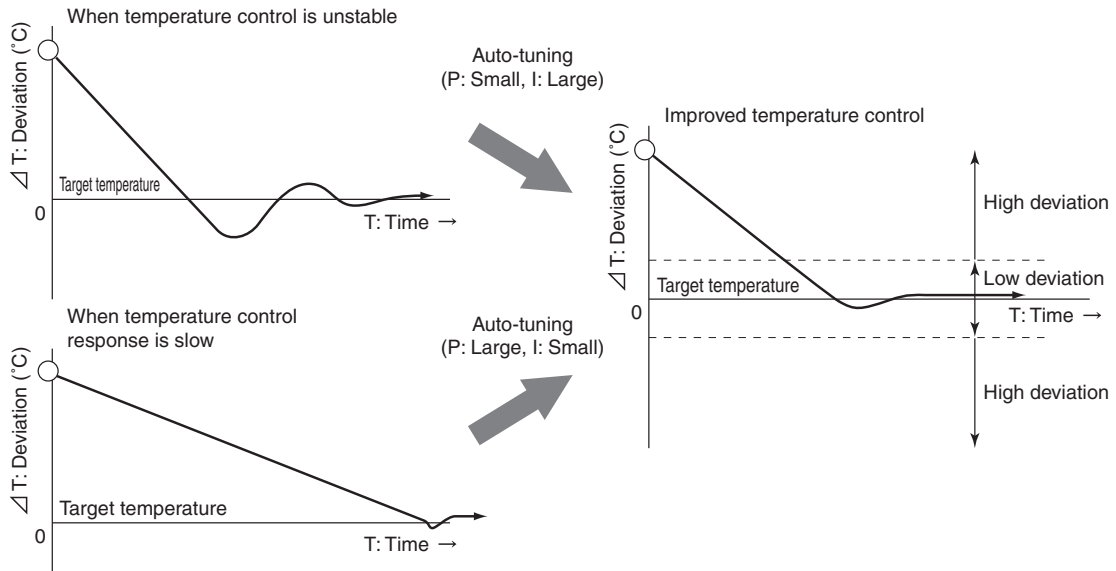
* Temperature control gain: Coefficient to determine a control value according to deviation (temperature difference)

P: Proportional gain

I: Integral gain

In such cases, you can improve the temperature control performance by using the “Auto-tuning mode” that provides more suitable gain settings.

Auto-tuning (Conceptual drawing)



Parameter No.	Item
n05	P/I gain calculation coefficient (Response coefficient)
n06	Temperature control gain P (for low deviation)
n07	Temperature control gain I (for low deviation)
n08	Temperature control gain P (for high deviation)
n09	Temperature control gain I (for high deviation)

The auto-tuning mode automatically writes calculated values of temperature control gain (P and I) into specified parameters.

Initial value: 7.0

Calculated temperature control gain P

Calculated temperature control gain I

■ Factory settings of the standard model
P: 120
I: 120

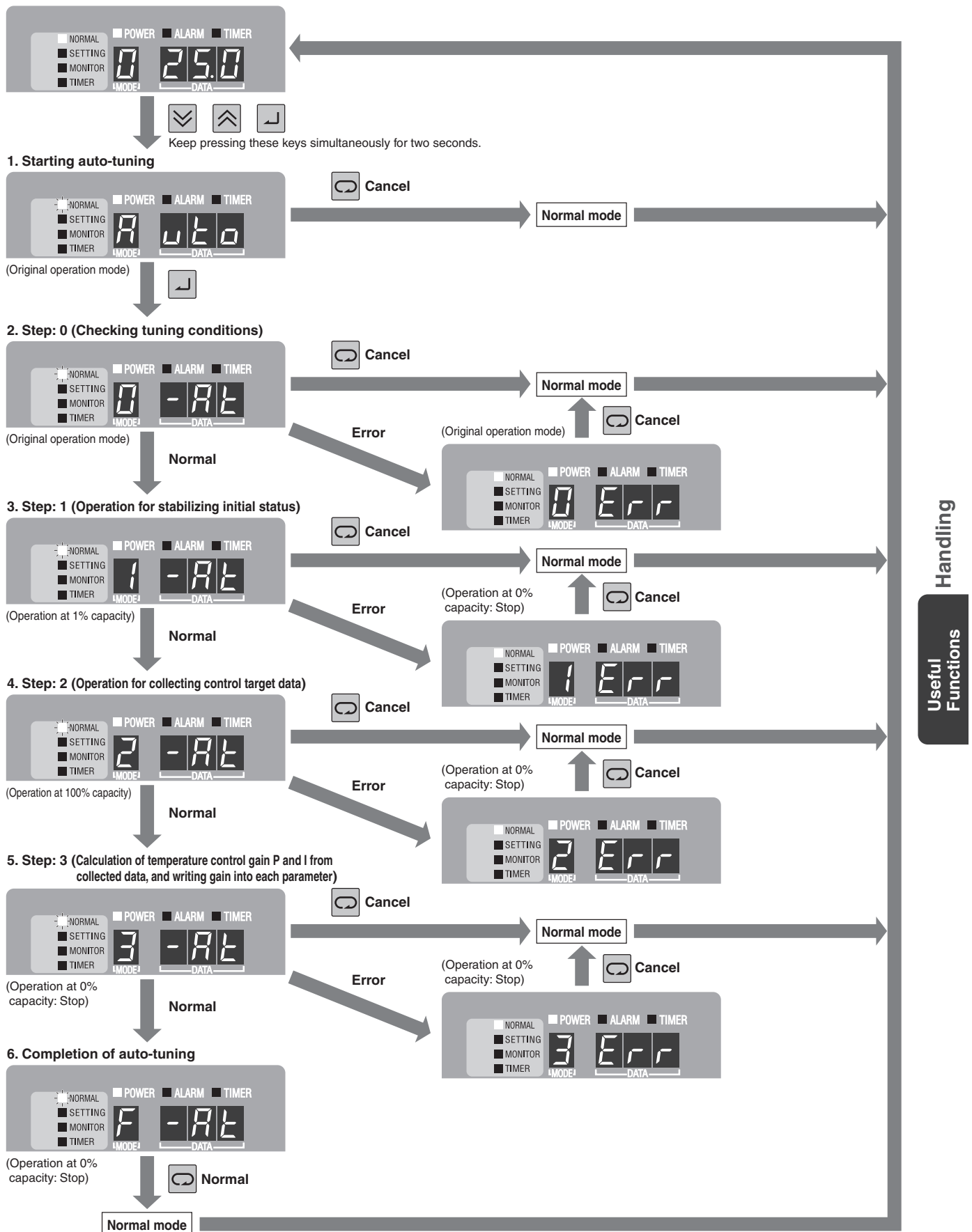
■ Outline of operation

The auto-tuning mode executes the following steps.


Check the Oil Cooling Unit status in each step.

Step	Operation	Unit status	Remarks
Before start	—	Operation status (Operation mode: Other than 9)	Select a desired operation mode. *[Note] 1., 3.
Step 0	Checking tuning conditions	Operation status (Operation mode: Other than 9: Same as before start)	
Step 1	Operation for stabilizing initial status	Operation status (Automatic operation for 2 minutes at 1% capacity)	
Step 2	Operation for collecting control target data	Operation status (Automatic operation for 10 minutes at 100% capacity)	*[Note] 4.
Step 3	Calculation of temperature control gain P and I from collected data, and writing gain into each parameter	Stop	*[Note] 5.
After completion	—	Stop	*[Note] 6.

Operation flow



[Note]

1. When starting auto-tuning, make sure that **the oil temperature is nearly equal to the room temperature (in stable condition)**. Leave the main machine under no load (stopped).
2. If **the remote signal turns OFF** or **an alarm is activated** during execution of auto-tuning, an error occurs (auto-tuning cannot be executed), and the corresponding error message appears.
To cancel the error, press the  key. (The unit returns to the normal mode.)
Check the remote signal, or examine the cause of the alarm. After taking a corrective action, execute auto-tuning again.
3. Before starting auto-tuning, select an operation mode to determine the control target thermistor. (Select any operation mode other than "9".)
Operation mode 0, 3 or 4 \Rightarrow Tank liquid temperature thermistor
Then, set Parameter [n04] by referring to [Note] 4. below.

4. In Step 2, the machine may be over-cooled. To suppress machine over-cooling, specify an auto-tuning end condition in Parameter [n04].

Parameter [n04] Outlet oil temperature decrease (Auto-tuning end condition)

Setting range: 0.0 to 10.0°C, Initial value: 8.0°C

When the tank liquid temperature has decreased by the temperature specified with this parameter, auto-tuning (data collection) ends.

If the specified temperature range is too small, temperature control gain may not be correctly calculated. You should set this parameter to the maximum value in the range where it does not cause damage to the machine.

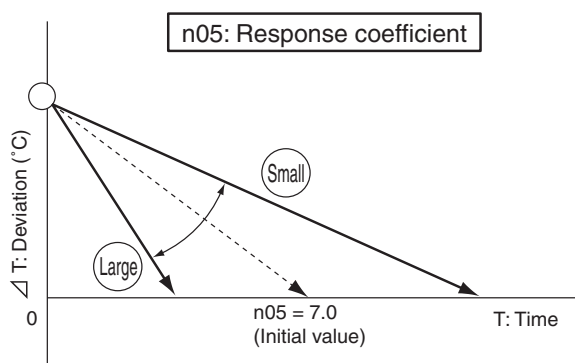
5. To calculate more suitable temperature control gain based on the data collected in Step 3, you must specify a response coefficient in Parameter [n05]. (Through response coefficient adjustment, you can select whether to place importance on stability or response speed.)

Parameter [n05] P and I gain calculation coefficient (Response coefficient)

Setting range: 0.1 to 10.0, Initial value: 7.0

Setting a smaller value improves stability. Setting a larger value improves response speed.

If the set value is extremely large or small, the unit may not normally perform temperature control. First, you should execute auto-tuning with the initial value of 7.0.



6. Depending on the condition of the control target (machine), the unit may not calculate suitable temperature control gain in a single auto-tuning operation. You should **execute auto-tuning two or three times to average the calculated values, or use the value that most frequently appears (except for an extreme value)**.
To calculate a more suitable temperature control gain, you may change Parameter [n05] (see [Note] 5. above).
7. In the following cases, temperature control is not stabilized because the compressor turns ON/OFF without being subjected to inverter control.
 - (1) Operation under small load (Cooling capacity: 30% or less)
 - (2) Rapid load change (Transition period)

Alarm/Warning Output Logic

The Oil Cooling Unit can output an operation status signal to the main machine through wiring to the signal terminal block and parameter setup.

1. Connect the required signal cable to the signal terminal block.
(For the connecting method, refer to "Connection of external output contact" on page 10.)
2. Set Parameter [n01].
n01: Alarm/warning output logic (First digit).

Setting		0			1 (2 to 9: Same operation as with 1)		
	Contact	Normal	Power failure	Alarm	Normal	Power failure	Alarm
Alarm output	60–61	ON	OFF	OFF	OFF	OFF	ON
	60–63	OFF	ON	ON	ON	ON	OFF
Temperature range warning output	66–67	ON	OFF	OFF	OFF	OFF	ON

First digit: Specifies alarm output logic (60, 61, 63) and warning output logic (66, 67) of the signal terminal block.

Second digit: Specifies DOUT signal output logic. (Optional communication expansion board is required.)

For details, refer to "Communication Expansion Board Instruction Manual" (HM01568).

Alarm Settings for Optional Protection Devices (Installed by User)

The Oil Cooling Unit can activate an alarm by receiving an output signal from optional protection devices (e.g. flow switch).

When using OP terminals [12] and [13]:

1. Connect the signal cable of the optional protection device to terminals [12] and [13] on the Oil Cooling Unit signal terminal block.
(See "Outline of electrical equipment box" on page 9.)
2. Set Parameter [n02].
"0": OP terminal is not used. (Factory setting)
"1": When OP contact turns OFF, Alarm Level 1 is activated.
"2": When OP contact turns OFF, Alarm Level 2 is activated.
"3": When OP contact is not ON after 30 seconds from agitator operation start, Alarm Level 1 is activated.

[CAUTION] The protection function cannot be activated simply by connecting the protection device to the OP terminals.
Be sure to set this parameter.

When using OP 2 terminal [CN2]:

1. Connect the signal cable of the optional protection device to [CN2] on the Oil Cooling Unit control board.
(See "Outline of electrical equipment box" on page 9.)
2. Set Parameter [n03].
"0": OP2 terminal is not used. (Factory setting)
"1": When OP2 contact turns OFF, Alarm Level 1 is activated.
"2": When OP2 contact turns OFF, Alarm Level 2 is activated.

[CAUTION] The protection function cannot be activated simply by connecting the protection device to the OP terminals.
Be sure to set this parameter.

Optional Parts

Machine temperature tuning control

See page 19.

When the following optional parts are mounted to the main machine, the Oil Cooling Unit can perform control by detecting the machine temperature.

Optional Parts

Name	Type	Lead wire length L (m)	Dimensions	Application (Installed by user)	Compatible model
Machine temperature tuning thermistor	AKZ8-OP-K5	(5 m)	<p>DB619-121 or equivalent</p> <p>27.5</p> <p>R1/8</p> <p>(5)</p> <p>(4.5)</p> <p>Lead wire</p> <p>L</p> <p>80</p> <p>Round terminal 1 - 25-3</p>	For machine temperature tuning control (embedded in machine body)	AKZ8 series AKZJ8 series
	AKZ8-OP-K10	(10 m)			
	AKZ8-OP-A5	(5 m)	<p>DB619-122 or equivalent</p> <p>25</p> <p>(6)</p> <p>(4.5)</p> <p>Lead wire</p> <p>L</p> <p>80</p> <p>Round terminal 1 - 25-3</p>	For machine temperature tuning control (attached to machine body surface)	
	AKZ8-OP-A10	(10 m)			

Characteristics of thermistor: Resistance R25 (resistance at 25°C) = 20 kΩ, Tolerance: ±2%

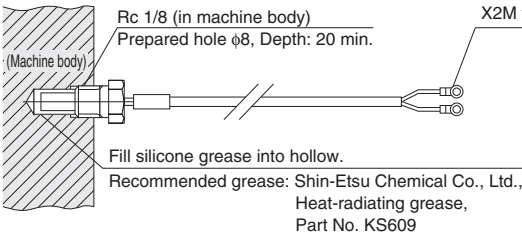
Mounting procedure

Oil Cooling Unit

Connect the round terminal (1.25–3) of the above part to terminals [30] and [31] of the X2M terminal block in the electrical equipment box. (No polarity)
(See “Outline of electrical equipment box” on page 9.)

Main machine

For AKZ8-OP-K

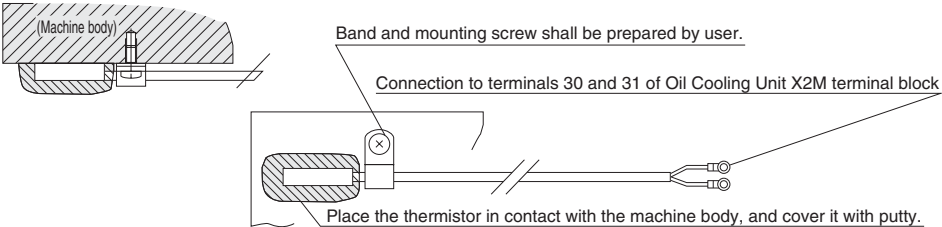


Connection to terminals 30 and 31 of Oil Cooling Unit X2M terminal block

CAUTION

- If the sensor is directly exposed to wind, detected temperature may fluctuate. Be sure to take heat-insulation measures by applying putty.
- When using a sensor of screw-mounting type, screw the sensor all the way into the body of the detection target.

For AKZ8-OP-A



Band and mounting screw shall be prepared by user.

Connection to terminals 30 and 31 of Oil Cooling Unit X2M terminal block

Place the thermistor in contact with the machine body, and cover it with putty.

Optional Parts

Communication with main machine

When this optional board is mounted to the Oil Cooling Unit to connect this unit to the main machine:

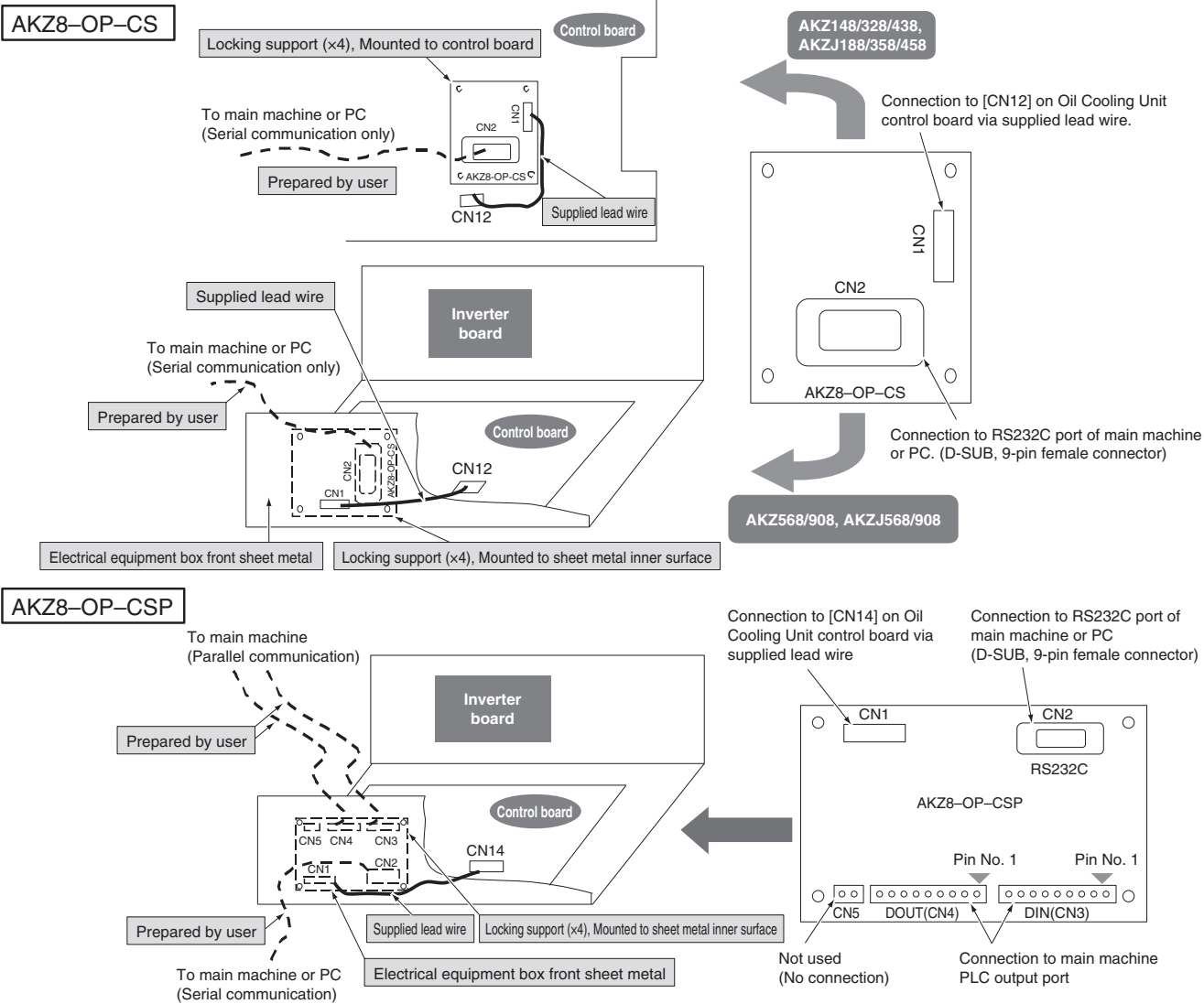
- 1. You can change the operation mode and operation setting from the main machine.
- 2. You can read the Oil Cooling Unit alarm code and temperature data (machine temperature, room temperature, inlet oil temperature, outlet oil temperature, temperature difference between inlet and outlet, and inverter frequency data) from the main machine.

* To execute parallel communication, you must set the corresponding parameter. (See page 25.) The Oil Cooling Unit cannot communicate with the main machine simply by mounting this optional board. For serial communication, parameter setting is not required.

Optional parts

Communication method	Type	Mounting position	Compatible model	Specification No.
Serial communication only	AKZ8-OP-CS	Upper surface of Oil Cooling Unit control board	AKZ148, AKZ328, AKZ438, AKZJ188, AKZJ358, AKZJ458	SS08303
		Back of Oil Cooling Unit electrical equipment box front sheet metal	AKZ568, AKZ908, AKZJ568, AKZJ908	
Serial or parallel communication	AKZ8-OP-CSP	Back of Oil Cooling Unit electrical equipment box front sheet metal	AKZ568, AKZ908, AKZJ568, AKZJ908	SS08370

Mounting procedure



Maintenance/Inspection

Daily maintenance/inspection

- Use thorough caution about operating liquid pollution control to maintain the pollution degree at NAS10 or lower level.
- Maintain the liquid level in the oil tank within the specified range. (See page 5.) Be sure not to allow liquid leak due to overflow. Never attempt to operate the unit without oil.
- Clean inside of the oil tank periodically to eliminate accumulated objects (cutting swarf etc.).
- Make sure that the power supply voltage is within the following range:
50 Hz.....200 V $\pm 10\%$
60 Hz.....200/220 V $\pm 10\%$
- Check if the compressor, fan or agitator does not abnormally sound during operation.
- Make sure that the Oil Cooling Unit does not abnormally shake during operation.

Periodic maintenance/inspection

Return filter (See page 6.)

- Clean the return filter at the tank return (liquid inlet) port periodically to prevent decrease in liquid level in the tank due to dust clogging.

Air filter (See page 15.)

- Be sure to wash the air filter with water at 40°C or lower temperature every two weeks.
If the air filter is clogged with dust, the wind volume reduces, resulting in capacity deterioration. Also, the compressor's protection device is activated, hindering smooth operation. Furthermore, it causes power consumption increase.
- Operating the unit without the air filter causes a fault.
- To remove the air filter, hold the bottom of the filter with both hands, and push it up while warping it forward.

If the air filter is clogged, the cooling capacity deteriorates, resulting in excess power consumption. Clean the air filter periodically to save power consumption.

Condenser (See page 15.)

- If the condenser becomes extremely dirty, clean it with a brush, air blower, etc.
(When cleaning the condenser fins, wear gloves. Otherwise, you may be injured by the sharp edges.)

Exterior

- Wipe the exterior surface with a dry cloth.
Never splash water over it.
- To clean the exterior, do not use a brush, polish powder, acid, solvent (benzine etc.) or hot water. Using such substances causes the paint to peel off.

Cooling coil

- If cutting swarf or chips accumulate on the OILCON cooling coil surface, it results in cooling capacity deterioration, and also causes a fault of the unit. Check and clean the cooling coil periodically.
- Remove the OILCON unit from the tank, and clean the unit with a soft non-metal brush.
- During cleaning, be careful not to apply strong impact or force to the cooling coil.

To leave the unit unused for a long period

- Mount a cover to the Oil Cooling Unit to prevent dust or water from entering inside of the unit.
- Be sure to turn OFF the main power supply.
- Be careful to keep oily dust off the condenser surface of the Oil Cooling Unit.

Troubleshooting

1 When the Oil Cooling Unit does not work well, first check the following points.

2 If the problem persists, contact DAIKIN Contact Center with information on the following 1), 2) and 3) items.
(For phone/fax number and address of DAIKIN Contact Center, see the back cover.)

- 1) Machine name (Full Model No.)
 - 2) Manufacture No. (MFG. No.)
 - 3) Condition of the Oil Cooling Unit (as closely as possible)
- } See page 4.

When the unit operation seems abnormal although no alarm is activated

Item	Condition	Cause	Corrective action
1	The unit does not run at all. (The POWER lamp on the control panel is unlit.)	1) The main power supply is OFF, or the power cable (L1, L2) is disconnected.	Check if the power cable is connected to the power supply terminal.
2	The agitator does not run.	1) The remote control input ([10]–[11]) is OFF. 2) The unit has been set to the operation lock mode. (With the factory setting, the operation lock mode is selected.)	Check the connection of the remote control input. Cancel the LOCK mode on the control panel. (See page 17.)
3	The agitator is running, but the compressor does not run.	1) The compressor is stopped under temperature control. 2) The compressor restart prevention timer has been activated (for 30 seconds). 3) The low oil temperature protection device has been activated. (Inlet oil temperature is 2°C or lower.) 4) The low ambient temperature protection device has been activated. (Room temperature is –2°C or lower.) 5) The capacity setting is 0% (Mode 9).	--- Check if the compressor starts after elapse of the timer preset time. Check if the compressor normally operates at 5°C or higher tank liquid temperature. Check if the compressor normally operates at 0°C or higher room temperature. Change the operation mode to an appropriate setting.
4	Both the agitator and compressor are running, but the operating liquid cannot be cooled.	1) There is an obstacle near the air intake/exhaust port. 2) The air filter is clogged. 3) The unit is running under capacity suppressing control, because the room temperature is high. 4) Heat load is large. 5) The temperature setting is high. 6) If the exhaust air temperature is almost equal to the room temperature although the compressor is in operation, the refrigerant gas is running short.	Remove the obstacle. Clean the air filter. Check the capacity in the operating temperature range with the catalog, and select a model with appropriate capacity. Change the temperature setting to an appropriate temperature. Re-fill refrigerant.
5	Operation setting cannot be performed.	1) If “---” appears on the data display, the temperature sensor corresponding to the selected operation mode is not connected. 2) If “---” instantaneously appears when the [ENT] key (at the right end of the control panel) is pressed, the erroneous operation prevention switch is set to ON.	Connect the corresponding temperature sensor. Turn OFF the erroneous operation prevention switch (SW1) on the control board.
6	Alarm output operation ([64] or [65]) is different from that of conventional signal output.	1) The alarm output signal connection has been partially changed.	The [60] to [63] outputs are compatible with conventional models (AKJ6 series). With the 8 series, however, signal operations and connections of the [64] and [65] outputs have been changed.

When an alarm is activated (To cancel the alarm, turn OFF the power supply, and then turn it ON again.)

Alarm list

Alarm code	Alarm* level	Description	Cause	Corrective action
AA	2	Heater overheat (S4B1:CN4) (For built-in heater model only)	1) AKZJ type: Insufficient oil level in tank	Refill the operating liquid.
A6	2	DC fan motor lock error	1) Fault of the DC fan motor	Replace the DC fan motor.
			2) Fan motor-control board communication error	Check the connector insertion and wire break. Replace the control board.
E1	1	System error	1) Internal parameter setting is invalid.	Replace the control board.
E3	2	High pressure error (High-pressure pressure switch (S3PH:CN6), Activated at 4.1 MPa)	1) The tank liquid temperature or room temperature is higher than the specified range.	Use the unit within the specified operating range.
			2) There is an obstacle near the air intake/exhaust port.	Do not place any object that blocks ventilation at 500 mm or shorter distance from the air intake/exhaust port.
			3) The filter is clogged, or the condenser is dirty.	Clean the air filter. (See "Maintenance/Inspection" on page 36.)
			4) Any factor other than the above	Contact DAIKIN Contact Center.
E5	2	Compressor high temperature error (Discharge pipe thermostat Th6, Activated at approx. 120°C) (Compressor head thermostat (S2B:CN5), Activated at 115°C)	1) The tank liquid temperature or room temperature is higher than the specified range.	Use the unit within the specified operating range.
			2) There is an obstacle near the air intake/exhaust port.	Do not place any object that blocks ventilation at 500 mm or shorter distance from the air intake/exhaust port.
			3) The filter is clogged, or the condenser is dirty.	Clean the air filter. (See "Maintenance/Inspection" on page 36.)
E6	2	Compressor (M2C) lock	1) Fault of the compressor (Replace the compressor.)	Replace the compressor.
EH	1	Agitator motor inner thermostat (S1B:CN3) is activated at 135°C.	1) Because high-viscosity oil is used, the motor is overloaded.	Use a coolant liquid that provides 0.5 to 200 mm ² /s viscosity at an oil temperature within the specified operating range.
			2) Because the agitator runs with foreign objects (cutting swarf etc.) accumulated in the tank, the motor is overloaded.	Clean inside of the tank by referring to "Maintenance/Inspection" on page 36.
			3) Because the power supply voltage falls below the operating range, the current value for the agitator motor has increased.	Check if the power supply voltage is not lower than the specified operating range. Check for an instantaneous power supply voltage drop at startup of peripheral equipment.
			4) The agitator motor wiring has a break. (Open-phase)	Replace the agitator motor.
			5) Fault of the agitator motor.	Replace the agitator motor.
EJ	1 or 2	Optional protection device is activated. (OP.)	1) The optionally-connected protection device (or factory-connected device, if it is incorporated in the unit) has been activated.	Check the condition detected with the relevant protection device.
H1	2	Air temperature thermistor error (Th5: Machine temperature tuning thermistor) (Th3: Room temperature thermistor)	1) The air temperature thermistor required for control is disconnected or short-circuited.	Identify the thermistor that indicates the error in the monitor mode on the operation panel ("99.9" is displayed), and check the thermistor wiring.
FH	2	The tank liquid temperature is higher than 60°C.	1) The heating value of the main machine has exceeded the cooling capacity of the Oil Cooling Unit. (Improper model selection)	If the unit is properly installed and the compressor runs at 100% capacity (capacity setting can be checked in the monitor mode), select a model that provides larger cooling capacity.
			2) There is an obstacle near the air intake/exhaust port, resulting in cooling capacity deterioration.	Do not place any object that blocks ventilation at 500 mm or shorter distance from the air intake/exhaust port.
			3) The unit is running under capacity suppressing control, because the standard temperature (room temperature: 35°C, tank liquid temperature: 35°C) has been exceeded.	If the standard temperature is exceeded, the cooling capacity becomes smaller than the nominal capacity, because the unit runs under capacity suppressing control. Make sure that the cooling capacity of the Oil Cooling Unit is larger than the main machine heating value throughout the operating temperature range.
			4) Temperature control is disabled because the unit is operated in Mode 9 (capacity direct designation mode).	Select an appropriate operation mode. (The capacity direct designation mode does not execute temperature feedback control.)
			5) The refrigerant gas has leaked.	If the exhaust air temperature is almost equal to the room temperature regardless of the compressor operation, it is possible that the refrigerant gas has leaked. Contact DAIKIN Contact Center.

* Alarm level 1: Compressor, agitator and fan stop.
Alarm level 2: Only compressor stops.

Alarm code	Alarm level	Description	Cause	Corrective action
JH	2	Liquid temperature thermistor error (TH4: Tank liquid temperature thermistor)	1) The tank liquid temperature thermistor required for control is disconnected or short-circuited.	Identify the thermistor that indicates the error in the monitor display mode on the operation panel ("99.9" is displayed), and check the wiring of the thermistor.
J3	2	Discharge pipe temperature thermistor error	1) The discharge pipe temperature thermistor is disconnected or short-circuited.	Check the wiring of the relevant thermistor.
J5	2	EV valve outlet temperature thermistor error	1) The EV valve outlet temperature thermistor is disconnected or short-circuited.	Check the wiring of the relevant thermistor.
J6	2	Condenser temperature thermistor error	1) The condenser temperature thermistor is disconnected or short-circuited.	Check the wiring of the relevant thermistor.
L0	2	Inverter/compressor error	1) The compressor or inverter has a fault.	Replace the control board or compressor.
LC	2	INV-temperature control CPU communication error	1) Communication failure between the temperature control microprocessor and the inverter microprocessor.	Replace the control board, or improve the power supply environment. (Take noise suppressing measures.)
P3	2	Electrical equipment box temperature thermistor error	1) The electrical equipment box temperature thermistor is disconnected or shortcircuited.	Check the wiring of the relevant thermistor.
P4	2	Radiator fin temperature thermistor error	1) The radiator fin temperature thermistor is disconnected or short-circuited.	Check the wiring of the relevant thermistor.
U0	2	Gas shortage	1) The refrigerant piping is damaged by excess vibration during transportation, resulting in refrigerant gas leak.	Repair the refrigerant pipe, and refill refrigerant.
U1	1	Power supply reverse-phase connection	1) The power supply is connected in reverse phase.	Exchange any phase of the power supply wiring.
			2) The L3 phase is open.	Make sure that the L3 phase is properly connected to the power supply terminal block.
			3) The fuse in the control board has blown.	Contact DAIKIN Contact Center.
U2	2	Momentary power failure or voltage drop	1) The power supply voltage is lower than approx. 170 V.	Make sure that the power supply voltage conforms to the rating. Check for instantaneous voltage drop at startup of peripheral equipment.
U9	2	Other system communication error (Slave communication error)	1) An error occurred in communication with a slave.	Make sure that the slave communication line is properly connected. (This error occurs only when the slave does not make response in master-slave communication.)
UH	2	System failure (EEPROM error)	1) The parameter stored in the control board is invalid.	Replace the control board.
UJ	1 or 2	Optional protection device is activated. (OP2)	1) The optionally-connected protection device (or factory-connected device, if it is incorporated in the unit) has been activated.	Check the condition detected with the relevant protection device.
1E	—	Temperature range warning 1	1) The monitor temperature has exceeded the preset temperature. (It does not mean a fault of the Oil Cooling Unit.)	Check the preset warning condition.
2E	—	Temperature range warning 2		
3E	—	Temperature range warning 3		
4E	—	Temperature range warning 4		
5E	—	Temperature range warning 5		

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