Service Manual

Thank you very much for purchasing our product.

This is a user's manual for your maintenance inspection staff or maker's service staff.
Be sure to read this manual thoroughly in order to obtain optimum result and keep the manual handy for future reference.

Models

CIPL Series

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1、 SAFETY PRECAUTIONS

This section defines rules to keep you and your property safe when you use this unit. Symbols in this text have the following meanings:

⚠ **DANGER**	This indication means, “there is imminent danger of death or serious injury.”
⚠ **WARNING**	This indication means, “there is a possibility of death or serious injury.”
⚠ **CAUTION**	This indication means, “there is a possibility of injury or property damage.

Rules are classified with the symbols below and explained

⊘	**Prohibition**	This mark denotes “Prohibition”. Items with this mark are prohibited.
❗	**Enforcement**	This mark denotes “Enforcement”. Items with this mark must be executed without fail.

1－1 Dangers

⚠ DANGER	
❗	**< During Transportation or Movement >** To move the unit using lifting hooks, attach hooks to the body to keep the unit level. To move the unit using a forklift, the forks must extend beyond the width of the unit. It is important to keep the unit level.
	< Wiring > The power input cord and signal line wiring should be connected by your maintenance/inspection staff or maker service staff with technical knowledge. Use the power input cord and signal line wiring specified for the voltage and current in the specifications. The power input cord must be connected to the protective ground lead. Make sure that the unit is not connected to a power source when wiring is being connected.
⊘	< **Operation and Maintenance/Inspection** > Do not pour or splash water into the main unit of the unit during cleaning. Do not place machine screws, fuses, tools, or any other small objects on top of the unit. Objects which may drop through the exhaust vent can damage the unit. Be sure to use fuses which are correctly rated for this unit. Disconnect the power cord to the unit before opening the control box cover for maintenance and inspection. After disconnecting the power cord, do not start maintenance or inspection for a few minutes until the energized high-voltage part has finished discharging.
❗	**ses not specified in the specifications are prohibited** > Uses not specified in the specifications are prohibited

1－2 Warnings

⚠ WARNING	
	< **During Transportation or Movement** > For the unit with reservoir tank, do not lift it when filled with fluid.
	< **Installation** > When installing this unit, secure it firmly with bolts.
 	< **Operation and Maintenance / Inspection** > Stop operation immediately if any trouble occurs. If the unit cover is to be removed for maintenance or inspection, it must be removed after operation is stopped. When the cover is removed, be careful not to touch the fan, refrigeration circuit piping surface, or refrigeration compressor surface with any part of the body. If refrigerant gas in the refrigeration circuit leaks, proper ventilation must be conducted in the plant because the leakage is harmful to the human body.

1－3 Cautions

⚠ CAUTION	
	< **During Transportation or Movement** > To move the unit using built-casters, check the condition of the surface along the route. Be careful not to let the unit fall over.
	< **Power Source** > Whenever the unit is not used for an extended period of time, disconnect the power

⚠ CAUTION	
	< **Installation Environment** > Do not use the unit in an environment which exceeds the temperature and humidity conditions specified in the specifications. Do not install the unit in a dusty environment or places exposed to mist or liquid.
	< **Operation and Maintenance / Inspection** > Do not obstruct the flow of air into the inlet opening or from the exhaust vent. Keep your face and other parts of the body away from the exhaust vent. Hot air escapes from this vent during operation. If liquid leakage occurs and splashes on the floor around the unit, be careful of the slippery liquid. Clean the air filter at regular intervals.

2、 GENERAL INSTRUCTIONS

2－1 Service Range

The unit contains an internal refrigeration system so the oil temperature setting range is limited. Use the unit within the operating range as illustrated in Figure 2-1.

2－2 Service Liquid

This device is the cooling system of Cutting Oil and Grinding oil. Can not be used of water, liquid food, etc.
Please use the liquid was filtered by the filter.
Viscosity
Select oil solutions within the range as shown in Figure 1

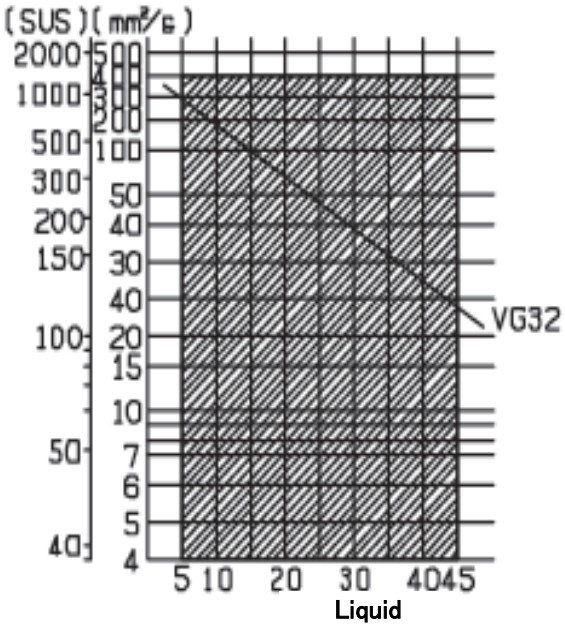


Figure 1

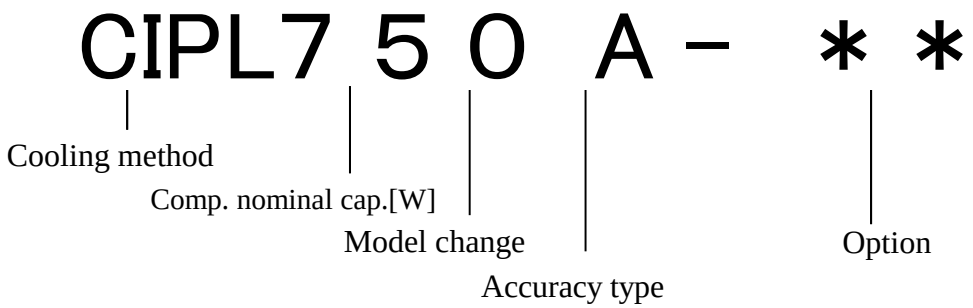
CAUTION	
!	If the proper oil solution is not used, it may result in a serious breakdown of the unit. Please use the proper oil solution.

（3）Relation of the unit to oil viscosity
Use low-viscosity oil as much as possible to obtain better heat exchange efficiency.
Use of higher viscosity oil may decrease the cooling capacity.

CAUTION	
!	The unit uses fluorocarbon (R407C, R410a) as a refrigerant in the refrigeration circuit. When disposing of the unit, ask a fluorocarbon collecting company or return the unit to us to collect fluorocarbons before disposal.

3、 MODELS AND SPECIFICATIONS

3-1 Model Code



3-2 Specification Table

Look up「SPECIFICATION」

3-3 Appearances

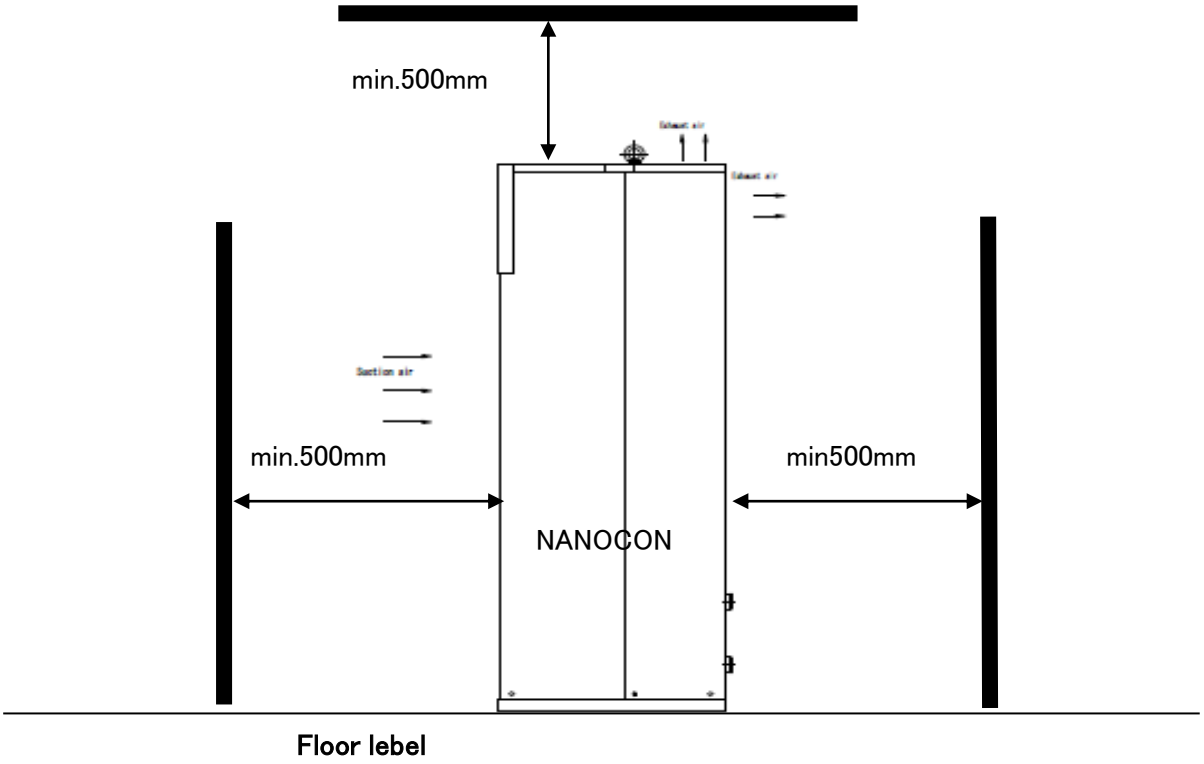
Look up「SPECIFICATION」

4、 INSTALLATION

4－1 Place of Installation

(1) The unit should be set on a flat spot, away from direct sunlight.

(2) Maintain a space of 100 mm or more for maintenance and inspection.



⚠ CAUTION	
!	Never tilt the unit more than 40° in any direction: forward, backward, right, or left. Extreme inclination will damage the refrigeration compressor. The unit should not be jolted. The damage incurred may cause the gas (refrigerant) to leak.

4－2 Piping Connections

（1）Liquid

Connection port of This unit is

CIPL750 Seris PT3 / 4 "to both inlet and outlet

CIPL1500 Seris PT 1 " to both inlet and outlet

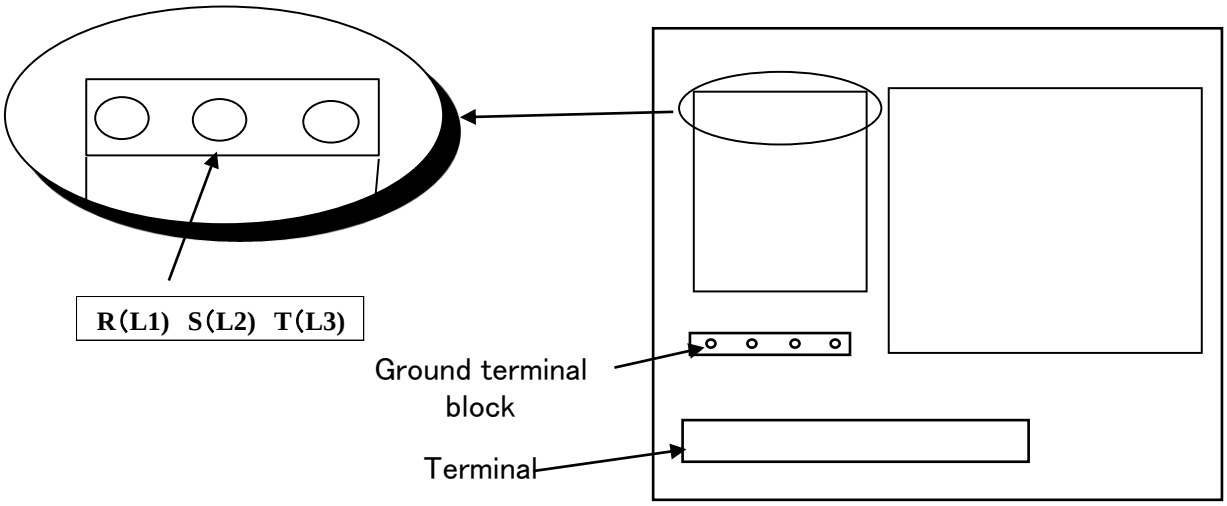
Note: This unit, circulation pump does not have a built in, please be fitted by your company.

Inlet pressure：0.5Mp or less, Addict pressure：0.35Mp less,

Circulation flo CIPL750 Seris 30L/min

CIPL1500 Seris 50L/min

4－3 Wiring Connections



(1) Electrical connections

①Remove the cover of the unit control box and confirm the place for power cord connection.

②Determine the capacity of power referring to the specifications.

③Connect the ground lead to the connection port for grounding through the power cord inlet.

④Connect R (L1), S (L2), and T (L3) phases of power cord to R (L1), S (L2), and T (L3) phases of the breaker, respectively.

＊ If nothing is displayed on the operation panel when power is ON, change any of R (L1), S (L2), or T（L

（2）Starting with an external start signal

Connect the start signal to the external start terminal block. When short-circuiting between terminals, the unit will start operation.

（3）Connecting to alarm output contact

for details.

（4）Installing a base temperature sensor（option）

The sensor has an R 1/8 thread. Screw it into the machine side.

Connect to the terminal block through the port on the left side surface of the unit.

Refer to the Electrical Circuit Diagram for the line number of the terminal block.

＊A base temperature sensor is not installed in the standard type unit.

4－4 Alarm Time Chart

Outputs signal about 1 sec after power ON.

NANOCON Alarm (Common parameter list Set as per C on Display column on page 30/30.)

Operation state	Set value	Alarm signal	Power OFF	Power ON	Operation starts	Operation stops	Abnormal	Reset
"Closed" when normal	00	ON / OFF						
"Opened" when normal	01	ON / OFF						
"Closed" when operating	10	ON / OFF						
"Opened" when operating	11	ON / OFF						

CAUTION

Before loading the alarm signals into your machine, set the

Outputs signal about 1 sec after power ON.

Alarm 1, 2 (Alarm setting → page 12)

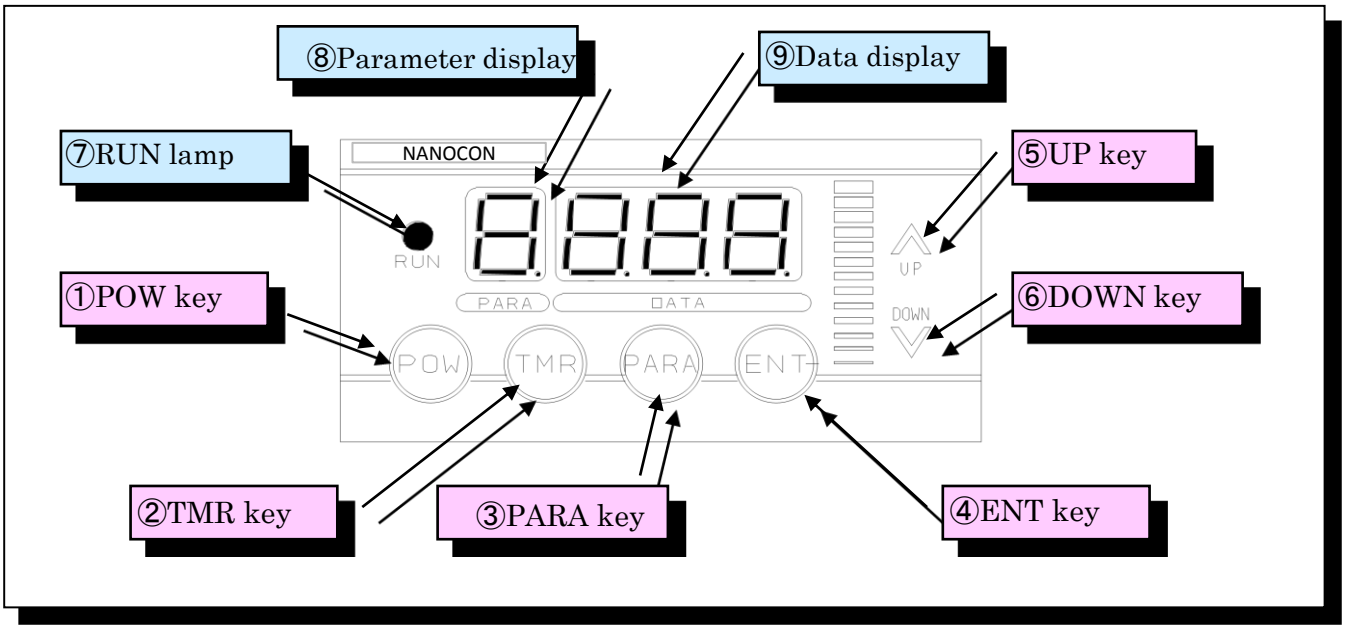
Operation state	Set value	Alarm signal	Power OFF	Alarm 1 and 2: Normal			Alarm 1 and 2: Error		
				Power ON	Operation starts	Operation stops	Power ON	Operation starts	Operation stops
Upper limit alarm ON at set value or higher	001	ON / OFF							
Lower limit alarm ON at set value or lower	010	ON / OFF							
Up/low limit alarm ON when out of setting range	011	ON / OFF							
FIL cleaning alarm ON at set time.	100	ON / OFF							
Upper limit alarm OFF at set value or higher	101	ON / OFF							
Lower limit alarm OFF at set value or lower	110	ON / OFF							
Up/low limit alarm OFF when out of setting range	111	ON / OFF							

Outputs signal about 2 sec after power ON.

５、 OPERATION OF CONTROLLER

Operation panel, parameter setting, start, stop

５－１ Description of Operation Panel



①POW key

Turns ON/OFF (start/stop) the power to the unit.

②TMR key

Starting timer setting key

③PARA key

Parameter setting key　Each press renews a displayed item.

④ENT key

Current temperature display　Data renewing (press for at least 2 sec)

⑤UP key

Data setting key　Press to increment the set data.

⑥DOWN key

Data setting key　Press to decrement the set data.

⑦RUN lamp

Lights ON during operation.　Lights Off during alarm and stop.

⑧Parameter display

Indicates data number at parameter display.

⑨Data display

Indicates data of current oil temperature, etc.

5-2 Parameter Setting

(1) Current liquid temperature display

When power is supplied to the unit, the panel displays the current liquid temperature.

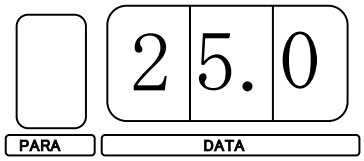
(2) Constant or follow-up mode selecting panel

Press ENT key for 2 sec.
When the right-most segment blinks, press UP and DOWN to change the value.
Press ENT key for 2 sec to return to liquid temperature display to complete the setting.

(3) Room temperature follow-up mode or machine body temperature follow-up mo selecting

Stop operation of the unit. Change the sennsor connected to the terminal block on control board operation.
This will switch room temperature follow-up mode or machine body temperature follow-up mode

(4) User parameter setting



Press PARA key or TMR key on the current liquid temperature display panel to change the panel to the user parameter change panel.
PARA key: To the next item
TMR key: To the previous item



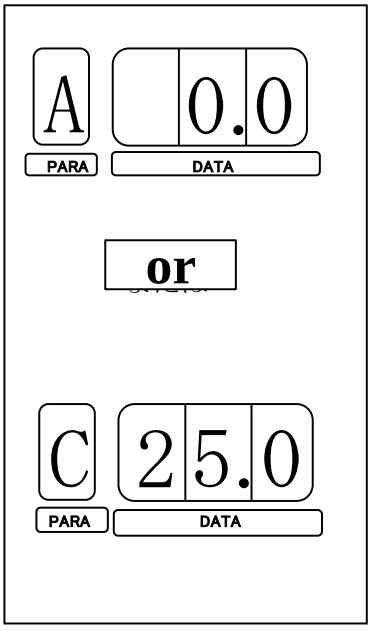
① Temperature Setting

A: Temperature follow-up mode

A" is displayed on PARA display area and the right-most LED is blinking.
Press UP and DOWN keys to adjust and set the set value, or press ENT key to make the blinking LED shift to upper digits. When it comes to the target digit, set the set value using UP and DOWN keys.



2sec



The setting range is from -9.9 to +9.9℃ in 0.1℃ increments.
Press ENT key for 2 sec to return to liquid

B: Temperature constant mode

C" is displayed on PARA display area.
As with the follow-up mode, use UP and DOWN keys or digit shift key to adjust and set the target temperature.
The setting range is from 5.0 to 45.0℃ in 0.1℃ increments.Press ENT key for 2 sec to return to liquid temperature. The

② Prior to setting of alarms 1 and 2

Prior to the setting of alarms 1 and 2, it is necessary to select the alarm type using common parameters.
Alarm types are described in the following table.
Refer to "Change of common parameter" for the details of setting method.

Alarm type	Set value	Alarm type	Set value
None	000	FIL cleaning alarm (ON at set time)	100
Upper limit alarm(ON at set value or higher)	001	Upper limit alarm(OFF at set value or higher)	101
Lower limit alarm(ON at set value or lower)	010	Lower limit alarm(OFF at set value or lower)	110
Upper/lower limit alarm(ON when out of setting range)	011	Upper/lower limit alarm (OFF when out of setting range)	111

1) Setting of alarm 1

1" is displayed on PARA display area and the right-most LED is blinking.
Press UP and DOWN keys to adjust and set the set value, or press ENT key to make the blinking LED shift to upper digits. When it comes to the target digit, set the set value using UP and DOWN keys.
The setting range varies depending on the alarm type. Refer to the following table.
Press ENT key for 2 sec to return to liquid temperature. The renewed data will be set.
(Canceling operation of FIL cleaning alarm is the same.)

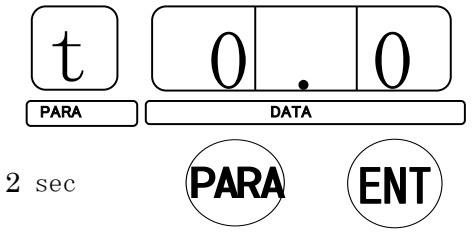
2) Setting of alarm 2

As with the setting of alarm 1, use UP and DOWN keys or digit shift key to adjust and set the target temperature.
The setting range varies depending on the alarm type. Refer to the above table.
Press ENT key for 2 sec to return to liquid temperature. The renewed data will be set.
(Canceling operation of FIL cleaning alarm is the same.)

Alarm type	Setting range
Upper limit alarm	0. 1～15. 0
Lower limit alarm	－0. 1～－15. 0
Upper/lower limit alarm	0. 1～15. 0
FIL cleaning alarm	Display only (Elapsed time since cleaning)

③ Setting of timer

Press PARA key until "t" is displayed on PARA display
area.Press UP or DOWN key or digit shift key to set the
timer to start.
The setting range is from 0 to 99.9 hours in 6-min increments.
Press ENT key for 2 sec to return to liquid temperature. The renewed data will be set.



④ Data display

Setting of data display

After setting the timer, press PARA key to display the following eight items.

The data cannot be changed, so press ENT key to return to the current liquid temperature display.

PARA disp.	Contents	Description
3	Liquid temp.	Displays slave liquid temperature.
4	Target temp.	Displays target temperature of slave liquid temperature.
5	Base temp.	Displays base temperature only for follow-up mode.
6		
7	Pulse valve opening	Displays bypass pulse valve opening. (Operating amount will be displayed by pressing UP key.)
8	Operating amount	Displays operating amount.

(5) Change of control mode

Press ENT key for 2 sec to change the panel to control mode change panel.

Press ENT for 2 sec after setting is completed.

Display	Control mode
10	PID constant mode(CIPL750Series)
11	PID follow-up mode(CIPL750Series)
50	PID constant mode(CIPL1500Series)
51	PID follow-up mode(CIPL1500Series)

(6) Change of common parameters

Press UP key for 2 sec to change the panel to common parameter change panel.

Press ENT for 2 sec after setting is completed.

Refer to the Parameter List for details.

(7) Change of specific parameters

Press DOWN key for 2 sec to change the panel to the specific parameter change panel.

Press ENT for 2 sec after setting is completed.

Since the specific parameters are exclusive to each control mode, the indicated item varies depending on the control mode.

Refer to the Parameter List for details.

(8) Invalid key operation

Other key operation is not possible to simultaneously press the【UP】、【DOWN】key

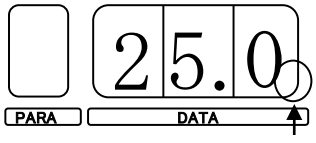
At this time, LED lamp is lighting



Lighting

All keys can be operated simultaneously press the key again【UP】、【DOWN】

LED lamp is turned off



Turned off the light

5－3 Switching inlet and outlet liquid temperature control

Stop operation and turn off the power.
The controlled system is a sensor always connected with the CN2 connector.

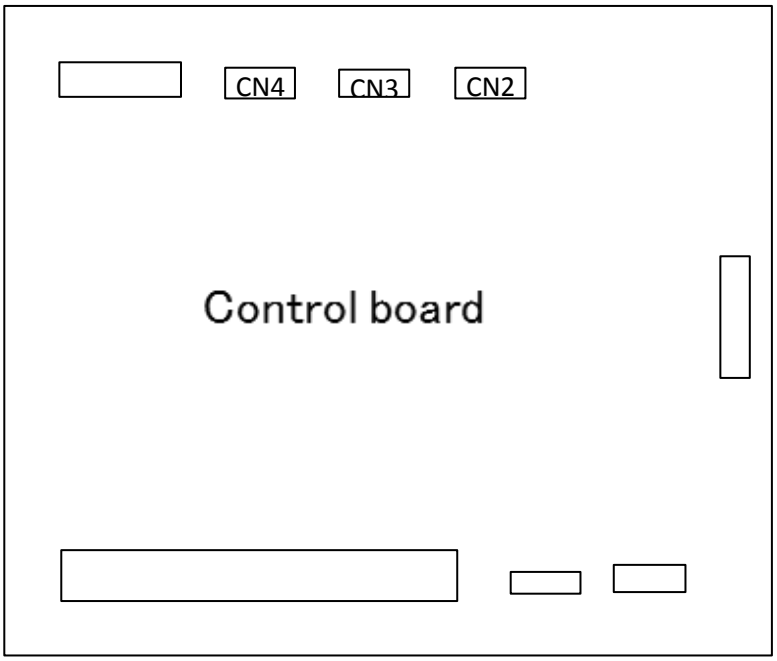
At the outlet liquid temperature control :

outlet liquid temperature sensor R13(A8) (A9) in CN2 is connected
inlet liquid temperature sensor R 1 (A4) (A5) in CN4 is connected

At the inlet liquid temperature control :

outlet liquid temperature sensor R 1(A4) (A5) in CN2 is connected
inlet liquid temperature sensor R13 (A8) (A9) in CN4 is connected

The setting when shipping it is a outlet oil temperature control.



Note: Place the connector on the control board, may also be changed for improvement.

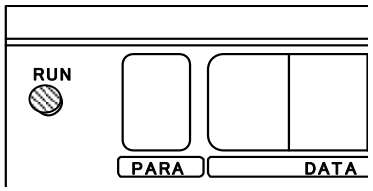
6、 OPERATION METHOD

Operation, confirmation, stop

6－1 Operation

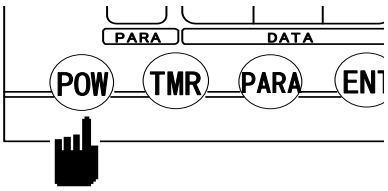
（1） Starting with an external signal

Short-circuit the signal line connected as specified in 4-4 (2) to turn on the RUN lamp of the controller, and the unit will start operation.



（2） Starting with the POW switch

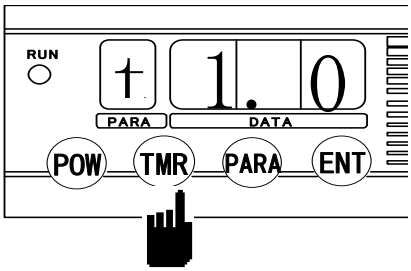
Press the POW key on the operation panel to turn on the RUN lamp of the controller, and the unit will start operation.



（3） Starting with the timer

Press TMR key to start the timer and the set time is displayed. After the set time has passed, the unit will start operation. Press the POW key during timer count to cancel the timer and start operation. Timer can be set in 0.1 h (6 min)-increments.

●Refer to “Setting of timer” for the setting

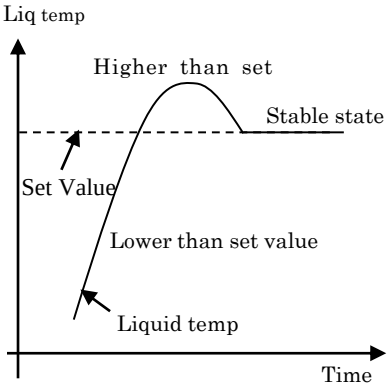


6－2 Confirmation

（1） Ement at operation

When the unit is started, the oil feed pump works and oil circulates.

If the liquid temp. is lower than the set temp. by 0.5℃ or more, the compressor will not operate. For a model with a heater, the heater activates and heats the unit until “the set temp. - parameter value (normal value - 2.0)” is reached. When the liquid temp. rises above the set temp. - 0.5℃ either because of machine heat or when heated by the heater, the compressor starts operation and controls the bypass pulse valve for high-precision temp.control so that the set liquid temp. can be reached.

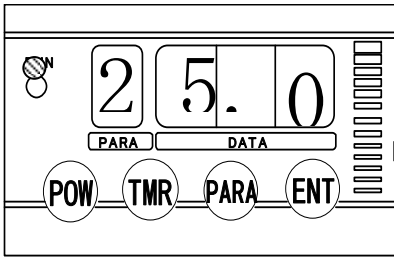


（2） Irmation of operation via the operation panel monitor

When operation starts, the current liquid temperature is displayed on the operation panel.

In a stable state, confirm that the liquid temperature is at the set temperature (machine body temperature or room temperature in the case of follow-up mode).

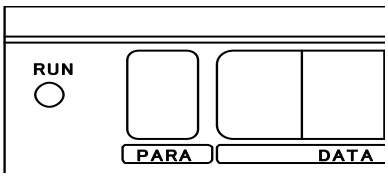
In addition, confirm that alarms or temperature warnings have not occurred.



6－3 Stop

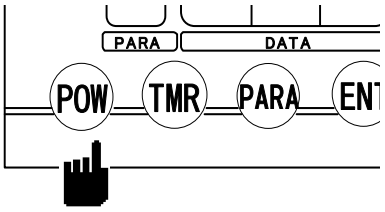
（1） Stopping operation with external signal

Turn OFF the signal line to turn off the RUN lamp and stop the operation.



（2） Stopping operation with POW switch

Press POW switch on the operation panel to turn off the RUN lamp of the controller and stop the operation.



6－4 Low temperature protection thermostat

To protect freezing the cooler, this device has installed the low temperature protection thermostat in the cooler entrance.

The supplied liquid temperature stops and carrying oil from 5℃ or less or the pump decreases or when it stops,.

and the cooler becomes 5℃ or less,the refrigeration compressor stops driving.

7、 MAINTENANCE AND INSPECTION

Precautions, cleaning of parts, long term operation

7－1 Precautions for Maintenance and Inspection

（1） Disconnect the power cord before opening the control box cover for maintenance and inspection.

（2） Do not attempt to inspect the unit when it is operating.

7－2 Cleaning Parts

（1）(1) Cleaning air filter

The function of the air filter is to remove foreign particles and dust in the air drawn through the ventilation vent. If foreign particles, dust, or mist accumulate on the air filter, cooling capacity decreases, making normal operation impossible.
Inspect the air filter at the start of operation everyday, and clean it when FIL cleaning is displayed.
After cleaning, press ENT key for 2 sec to reset.
Once-a-week cleaning is recommended for long-term use.

（2）Cleaning condenser

gun, brush, etc. Handle the condenser fins with special care so as not to bend or otherwise damage them.
Do not use a metallic brush or any pointed tool which might damage the fins.

（3）Internal cleaning of cooler

Cooling capacity is reduced and deposited in the cooler and chips inside,
please go to clean once a year inspection. The cleaning has a structure that can be cooler.

[How to Clean]

1） Remove the liquid piping Inlet ·Outlet, please remove the liquid from the Drain.

2） Remove the rear cover

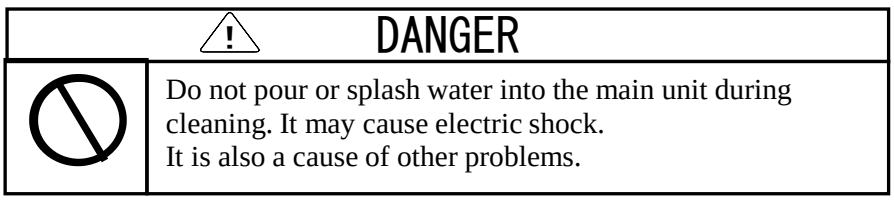
3） Remove the lid mounting bolts at the top of the cooler and open the lid cooler.

4） To pull out on the tank during cleaning, so as not to scratch the cooling coils.
It may cause refrigerant gas leakage and will damage the coil.

5） When you have finished cleaning, please wipe off the dirt with the surface of the rubber packing.

6） Please attach to its original position in the tank and lid.
* The tightening torque of the bolt is 2N ·m.

7） At the time of re-operation, to check if there is any leakage.



7－3 Precautions for Long-Term Operation Stoppages

（1）Be sure to disconnect the main power.

（2）Keep the inside of the unit free of foreign particles, dust, water, etc.

（3）Make sure to drain oil from the unit.

8、 TROUBLESHOOTING

When alarms sound, malfunctions without alarms

8－1 Alarms

Abnormality (Cut off the power after the unit stops, remove the cause of the alarm to restart operation.)

Abnormality of refrigeration circuit and the related (press POW key to reset)

Operation of lamp		Description	Cause	Countermeasure/Action
RUN	Display			
●	AL2	②Refrigeration circuit pressure switch S50 (GPS) is actuated.	Abnormal refrigerant pressure caused by poor condensing capacity and overload of refrigeration circuit.	･Improve airflow condition of inletport/exhaust vent ･Lowre the suction air temperature of condenser. ･Remove foreign particles from air filter of condenser ･Check whether fan is rotating

Abnormality of heater and the related (press POW key to reset)

Operation of lamp		Description	Cause	Countermeasure/Action
RUN	Display			
●	AL4	Heater protective temperature switches S70 are actuated. (Models with heater only)	Heater body surface temperature is too high.	･ Check whether liquid in cooler is filled. ･ Check whether liquid circulating volume is extremely low. ･ Check whether carbonized component of liquid adheres to the surface of the heater body.

Abnormality of sensor and the related (press POW key to reset)

Operation of lamp		Description	Cause	Countermeasure/Action
RUN	Display			
●	AL61	Abnormality of master liquid temp. sensor	Disconnection of master liquid temp. Sensor	･ Check for disconnection of sensor. ･ Check for contact failure of connector. ･ Replace with a new sensor.
	AL62	Abnormality of slave liquid temp. Sensor	Disconnection of slave liquid temp. Sensor	
	AL63	Abnormality of base temp. Sensor	Disconnection of base temp. sensorDisconnection of base temp. Sensor	

Alarm (Check and resolve the cause)

Operation of lamp		Description	Cause	Countermeasure/Action
RUN	Display			
○	H” and current liquid temp. Blinking	Temperature alarm	The control liquid temp. is higher than the sum of the set temp. and the upper limit alarm temp.	・Confirm high temperature alarm ・Check for leakage of refrigerant (gas).
○	45” blinking		Control liquid temp. becomes 45℃ or more.	Check for leakage of refrigerant (gas).
○	L” and current liquid temp. blinking		The control liquid temp. is lower than the set temp. minus the lower limit	Confirm low temperature alarm.
○	5” blinking		Control liquid temp. becomes 5℃ or lower.	・Too-much cooling capacity ・Check whether control board and sensor is normal.

●: Lights OFF ○: Lights ON.

8－2 Malfunction without Alarms

Depending on trouble or malfunction, cut off the power to this unit and remove the cause of the alarm to restart operation.

Status of trouble/malfunction	Cause	Countermeasure/Action
Does not operate at all.	① Normal voltage is not supplied.	Check the voltage between terminals R, S, and T in the control box using a tester.
	② Control circuit fuse is blown.	Check the fuse in the control box, replace if necessary.
	③ Circuit protector is turned off.	Check circuit protector in the control box and turn on if it is turned off.
	④ Connection failure or broken wiring connection.	Check for connection failure and breakage at all wiring connections.
	⑤ Thermal protector S40 (THP) actuated and reset automatically.	Turn off the breaker once.
Oil temp. control is not normal.	Breakdown of temperature controller or temperature sensor.	・Replace with a new part. ・Adjust parameters.
Cooling capacity is insufficient	① Heat load is too large	Re-select NANOCON
	② Oil circulation quantity drops.	If circulation quantity drops, heat exchanging capacity with the part to be cooled decreases, which may cause incapability of cooling.
	③ Shortage or leakage of refrigerant.	Due to a shortage of refrigerant, cooling capacity may drop though not to a degree that causes protective devices to operate.
	④Malfunction of pulse solenoid valve,	Because a bypass valve or the pulse valve of the expansion valve works by mistake, please change a part
Refrigeration compressor stops and it doesn't cool.	・Protection equipment F2(OL2) or thermal protector S40(THP) for the compressor operates. ・ Temperature rises of refrigeration compressor dome by overload etc. and temperature rises of motor coil	・Heat load is too large and the oil temperature high. ・Shortage of refrigerant. ・Exchange of refrigeration compressors

Supplemental 1: Parameter List

Common parameter to all control schemese

	Initial value
Display	CIPL All models
0	Control mode display（PID constant/follow-up）
1	－2．0（Differential between main and sub、℃）
2	－0．2（Hysteresis of main、℃）
3	－0．2（Hysteresis of sub、℃）
4	0（Expansion valve opening）
5	———
6	0 (Pressure sw[AL5] for oil circuit setting 0:invalidate, 1:B point, 2: 30)
7	0 (Reversed phase protecter setting 0: invalidate, 1: effective)
8	5．0（Lower limit temp.）
9	600（Time for filter cleaning）
A	———（Pulse valve combination）
b	1（Parameter display ”ON”）
C	00（NANOCON Alarm、“Closed” when normal）
d	111（Alarm 1、Up/low limit alarm OFF when out of setting range）
E	100（Alarm2、FILalarm 、FIL cleaning alarm ON at set time）
F	500（Stop timer for compressor、second）
H	1（Compressor” stop “selected）
J	0（Operating amount for compressor stop、%）
L	1（Gradient of operating amount、non-linear）
o	1(REMOTE setting 0: external signal, POW: switch is effective, 1:POW switch is invalid)

Press ENT key for 2 sec aftre sets

Supplemental 2: Parameter List

Specific parameter for PID control mode

	Initial value	
Display	CIPL 750 series	CIPL 1500 series
0	Control mode display(PID constant/follow-up)	
1	0. 2（Sampling period、second）	
2	———	Main valve 550 (Pulse range)
3	———	Main valve 0 （ Minimum pulse)
4	———	Main valve 420 (The maximum pulse)
5	Bypass vaive 10（Lower limit pulse）	
6	Bypass vaive 500（Upper limit pulse）	
7	Bypass vaive 0（Lower limit of operating amount、%）	
8	100（Upper limit of operating amount、%）	
P	8. 0	10. 0
i	200	180
d	50	50
A	———	
9	———	
P	0	
i	0. 0	
d	0. 0	
s		20
t		200
U		50