Hybrid Hydraulic System

ECORICH
EHU1404-40/EHU2504-40
EHU2507-40/EHU3007-40
SETUP MANUAL

DAIKIN INDUSTRIES, LTD.
Oil Hydraulic Division

General Precautions

- **Improper operation or handling of this product will cause accidents, reduced service life or performance deterioration of the equipment.**
- **The illustrations and photographs that appear in this manual may show the covers or safety guards removed in order to explain the details. When running this product, be sure to refit the covers and guards in their original positions as stipulated, and follow the instructions in this manual.**
- **The contents of this manual are subject to modification as appropriate in line with product specification changes or to improve the usability of the manual itself. For the latest version, and the manual for the product with the communications function (option code C), please check our Oil Hydraulics Division's internet service (http://www.daikinpmc.com/).**
- **Be sure to keep this manual and the accompanying documents, delivery specifications and so on so that they can be referred to at any time.**
- **The figures given in this manual may not be same as the actual product due to product improvement.**

Chapter 1. SAFETY INSTRUCTIONS

1.1 Indications of Safety Instructions in this Manual

Be sure to carefully read this manual and all accompanying documents before starting installation/running/maintenance inspections, and use the product correctly after having familiarized yourself with the information about the equipment, the safety information and all the cautions.

In this manual, safety instructions are classified into two categories: "⚠ DANGER" and "⚠ CAUTION".

⚠ DANGER: Improper handling without regard to this indication will cause an imminently hazardous condition that may result in death or serious injury.

⚠ CAUTION: Improper handling without regard to this indication will cause a potentially hazardous condition that may result in moderate or slight injury, or property damage.

1.2 General Precautions

⚠ DANGER

- **Ensure that transportation, installation, piping, wiring, running, operation, maintenance and inspection work are carried out by people with the required expertise.**
- **When working, wear the safety gear required for safe work (working clothes, safety belt, helmet, safety shoes, gloves, etc.).**
- **Do not use this product outside the specifications stated in this manual, the catalog, the delivery specifications and elsewhere.**

⚠ CAUTION

- **Be sure to carry out daily inspections (as described in this manual or the accompanying documents).**
- **Do not apply any external force to this product, for example by climbing on it or striking it. Otherwise, there is a risk of injury and breakage.**

1.3 Disclaimers

- Daikin shall not be responsible for any damage attributable to fire, earthquake, a third party's action or other accidents, or customers' intentional acts, misuse or use under abnormal conditions.

- Daikin shall not be responsible for any consequential damages (loss of business profits, business interruption) attributable to the use of this product, or the inability to use it.

- Daikin shall not be responsible for any accident or damage attributable to negligence in observing the instructions given in the instruction manual or delivery specifications.

- Daikin shall not be responsible for any damage attributable to malfunction, etc., resulting from the combination with connected equipment.

1.4 Restrictions on Applications

- This product is a hydraulic unit for driving industrial machines, installed indoors in a plant.

- This product has not been designed or manufactured for the purpose of use in equipment used in situations where human lives are at stake, for life-support equipment for example, or its associated systems, or for special applications including mobile structures that carry people, medical uses and nuclear power uses.

- This product has been manufactured under strict quality control, but when it is used with equipment where its failure, for example, can be anticipated to result in a serious accident or loss, install safety devices in the machinery.

Chapter 2. Precaution

(1) Regarding the hydraulic connections to this hydraulic unit, use hoses to prevent transmission of the vibration of the motor pump to the machine.

(2) This hydraulic unit is equipped with a fan to cool the hydraulic oil, controller and motor. To assure the air intake and exhaust for the fan, do not place any obstruction within 10 cm from the unit. In addition, install the unit at a location with good ventilation so that hot air does not remain.

(3) Turning the power ON/OFF frequently significantly shortens the life of the controller. Run and stop this hydraulic unit by using start/stop digital inputs. Leave an interval of at least 8 minutes between stopping and running of the unit by turning the power ON/OFF. When stopping and running of the unit with start/stop signals, leave an interval of at least 0.5 seconds between the stop command and restarting.

This hydraulic unit is equipped with a safety valve. Though the high-pressure safety valve is set at 1.5 MPa as factory default, the actual detected pressure of the safty valve may drop by repeated protracted operation of the machine or contamination in the hydraulic oil. If the unit is used continuously with the safety valve actuated under such conditon, an alarm may occur due to oil temperature rise for example. In this case, readjust the set pressure of the high-pressure safety valve according to your usage by following "Chapter 12 High-pressure Safety Valve Adjustment Instructions".

(4) Restrict continuous use at the maximum pressure to 5 L/min or less.

Chapter 3. PRODUCT SPECIFICATIONS AND CONDITIONS OF USE

3.1 Product Specifications

Product Model	EHU1404	EHU2504	EHU2507	EHU3007
Power rating (kW)	0.75	1.5	2.2	2.8
Maximum operating pressure (MPa)	4.0		7.0	
Operating pressure adjustment range (MPa)	1.5 - 4.0		1.5 - 7.0	
Maximum flow rate (∗1) (L/min) Maximum rotational speed (rpm)	15.2 3800	25.1 4400		28.5 5000
Operating flow rate adjustment range (∗1) (L/min)	2.5 - 15.2	3.5 - 25.1		3.5 - 28.5
Tank capacity (L) (∗2)	18			
Mass (kg)	26		29	
External dimensions (mm)	432 (w) × 328 (d) × 487 (h)			
Coating color	Black ∗ Purchased parts, etc.: standard color of the equipment manufacturer			
Discharge port size	Rc3/8 1 location			
Return port size	Rp1/2, 2 ports (in the oil)/1 port (above the oil level)			
Return port size (above the oil level)	Rp1, 1 port			
Digital input (3 channels)	Photo coupler insulation, DC +24 V (max. 27 V) 5 mA, positive or negative common			
Digital output (1 channel)	Photo coupler insulation, open collector output, DC+24 V (max. 27 V) 50 mA max., positive or negative common			
Alarm output (1 channel)	Relay output, contact capacity: DC30 V max. 1A, ALM NO: open when abnormal/ALM NC: closed when abnormal/COM: common			
Communications port (RS-485/RS-422)	Serial communications port ∗ Can be used only with communications option			
Communications port	(UART): Communications port for service ∗ For communications with a personal computer, a dedicated USB-UART communications converter is required.			

*1 The maximum flow rate is the theoretical value, not the guaranteed value.

*2 The tank capacity is 18 L. It will overflow if filled beyond the stipulated volume.

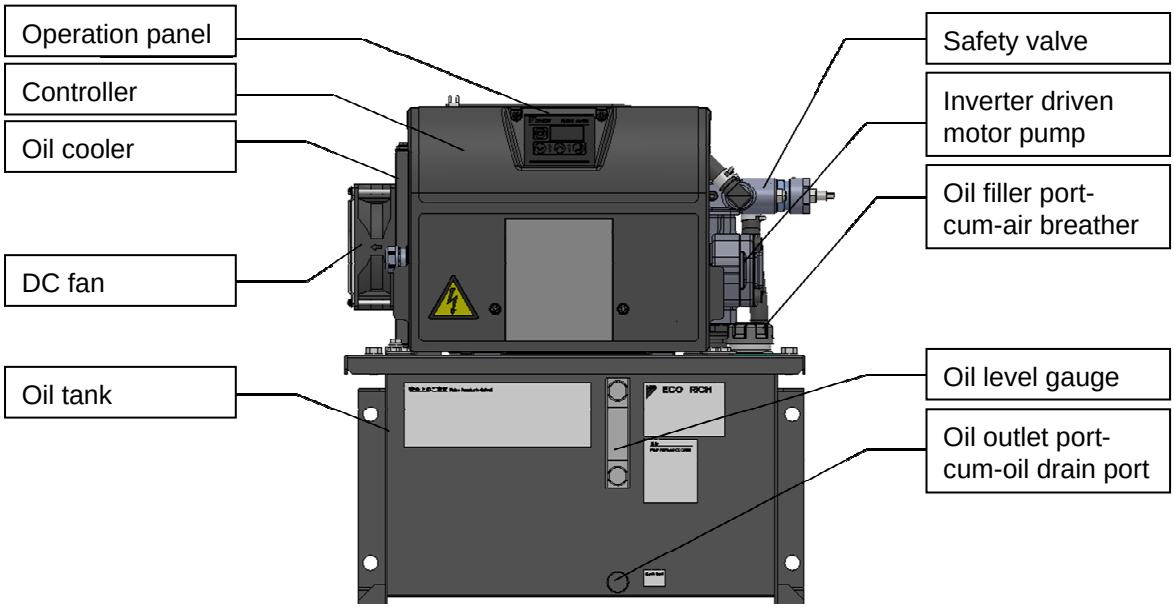
3.2 Conditions of Use

Useable oil (Note 1)	• Mineral-oil based hydraulic oil (For the recommended brand, see our "DAIKIN OIL HYDRAULIC EQUIPMENT Catalog (HK196)".) • Viscosity grade: ISO VG 32 to 68 • Dynamic viscosity range: 20 to 88 mm^2/s (recommended values), 15 to 400 mm^2/s (usable range) • Contamination: Within NAS class 10, water content 0.1%vol max. • Tank oil temperature range: 15 to 50°C (recommended values), 0 to 60°C (usable range) (Note 2)
Input power supply	• AC 3-phase, 200/200/220 V, 50/60/60 Hz (Permissible voltage fluctuation: ±10%)
Discharge port	Rubber hose connection
Operating ambient temperature	0 to 40 °C
Storage ambient temperature	–20 to 60 °C
Operating ambient humidity	Under 85% RH (no condensation)
Operating altitude	1,000 m maximum
Installation site	Indoors (Be sure to fix with bolts, etc.)
Other	• Be sure to install no-fuse breakers at all poles (3 poles or 2 poles) at the main circuit power supply side (primary side). • Wire electrical connections so as to satisfy JIS B 9960-1 (European standard EN60204-1). • Turning the power ON/OFF within a short time will significantly shorten the life of the controller. If operation is to be repeatedly started/stopped with an interval of shorter than 8 minutes, use start/stop signals. Note that an interval of at least 0.5 seconds should be provided between these signals. • Be sure to ground the earth terminals in accordance with the law in the country concerned. Make a direct connection without going through a circuit breaker.

Note 1: Hydraulic oil must be the mineral-base oil type (e.g. water-glycol can't be used).

Note 2: When using the product outrange of the recommended operating temperature range, the pressure pulsations may become large and the discharge rate may decrease, but this conditon is not abnormal.

Chapter 4. COMPONENT PARTS AND PART NAMES



Front View of Unit

Chapter 5. PROCEDURE FOR STARTING UP

The procedure for starting up is as follows.

1. Check ..... Check the model on the product nameplate.

2. Transportation/installation ..... See “Chapter 6 TRANSPORTATION / INSTALLATION”.

3. Piping ..... See “Chapter 7 HYDRAULIC PIPING”.

4. Wiring ..... See “Chapter 8 ELECTRICAL WIRING”.

5. Powering on ..... See “Chapter 9 TRIAL RUNNING”.

   Be sure to check the following points before turning the power on.

   - Is the product installed correctly?
   - Has the piping been done correctly?
   - Has hydraulic oil been supplied?
   - Has the wiring been done correctly?
   - Is the power supply voltage correct?

6. Flushing operation ..... See “Chapter 9 TRIAL RUNNING”.

7. Replacement with new oil ..... See “Chapter 9 TRIAL RUNNING”.

8. Air bleeding ..... See “Chapter 9 TRIAL RUNNING”.

9. Operation check ..... Check the operation of the actuators.

   Referring to “10.3 Setting Mode”, change the pressure/flow rate settings as necessary.

Chapter 6. TRANSPORTATION / INSTALLATION

6.1 Transportation

6.1.1 Transportation in the packaged state

To transport the product in the packaged state, lift by using the handgrip openings in the cardboard, and transport it on a dolly, for example.

The weight in the packaged state is indicated on the label affixed to the side face.

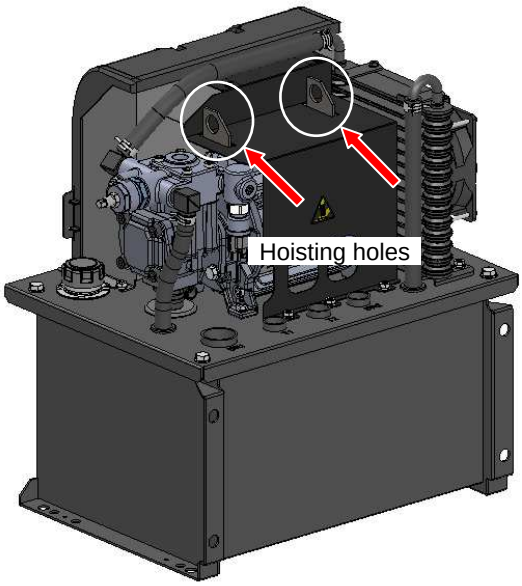
⚠ WARNING

- **Transport the product with material handling equipment appropriate for the packaged state. Otherwise, there is a danger of falling or toppling over.**
- **This is a heavy item and should therefore not be lifted by one person alone.**
- **Before lifting the product, check its weight and the position of its center of gravity. Otherwise, there is a danger of falling or toppling over.**

6.1.2 Transportation of the product

When transporting the product, hoist it by using the holes provided for hooks at two locations. Using other locations will lead to a risk of falling/toppling over.

Check the mass of the hydraulic unit, and make sure that the hoisting load is within the rated load of the hoisting equipment.



◆ Product Masses (Excluding Hydraulic Oil)

Product Model	Mass [kg]
EHU1404	26
EHU2504	
EHU2507	29
EHU3007	

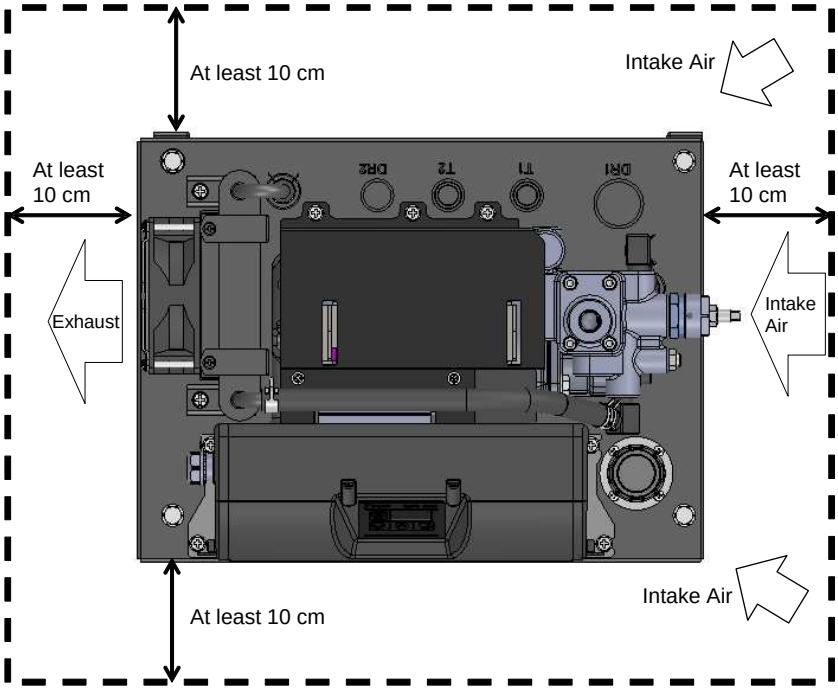
⚠ CAUTION

- **Do not hoist or move the product while there is oil in the tank. This could impair safety and/or performance due to the product falling or toppling, or oil leakage or inclusion of air.**
- **Check the mass of the hydraulic unit in the table above, and ensure that the hoisting load is within the rated load of the hoisting equipment.**

6.2 Installation

6.2.1 Secure the space for air intake/exhaust

Install the unit at a well ventilated location where heat will not build up, and secure a surrounding space of 10 cm from each of the four end faces of the unit. Also take care that the temperature of the intake air complies with the stipulated ambient temperature (40°C max.).



⚠ WARNING

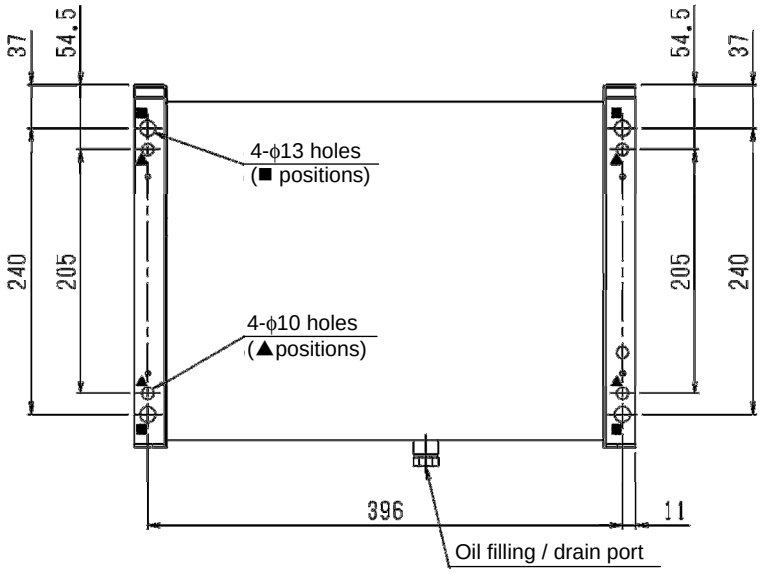
- **If the intake air/exhaust spaces described above are not secured, the heat exchange function of the oil cooler/DC fan will deteriorate, and the oil temperature and temperature of the hydraulic devices will become abnormally high, posing a risk of fire. Be sure to secure the space for air intake /exhaust.**

⚠ CAUTION

- **If the intake air/exhaust spaces described above are not secured, the motor and controller will reach high temperatures, temperature protection will be actuated and the product will stop running. It will also promote deterioration of the hydraulic oil. Be sure to secure intake air/exhaust spaces as specified on the drawing.**

6.2.2 Securing the hydraulic unit

Secure the hydraulic unit either on a level platform or level floor, that will not be affected by the vibration of the main machine (M10 bolts at 4 locations). For details on the mounting method and position, refer to the Delivery Specification (outside drawing).



Installation mounting hole dimensions (seen from the bottom)

⚠ WARNING

- **If the hydraulic unit is not secured, it may topple over or move as a result of reactions to the hydraulic pressure in the piping and so on, imposing a hazard. Be sure to secure it with bolts, etc.**

⚠ CAUTION

- **Installing the product on a sloping surface may cause oil leakage and inclusion of air in the oil, leading to abnormal noises and shortening of equipment life. Be sure to install it on a level surface.**

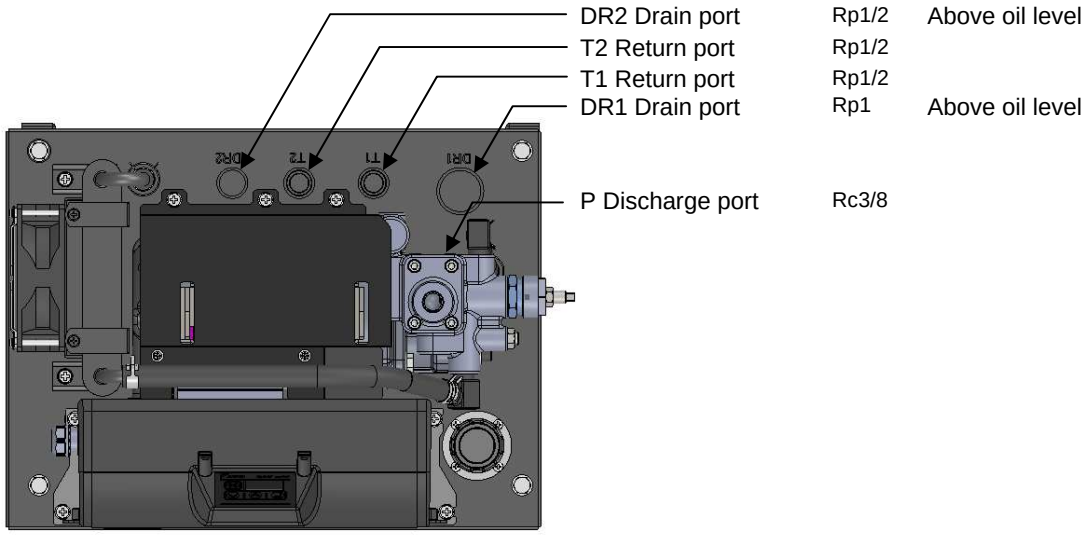
Chapter 7. HYDRAULIC PIPING

7.1 Piping

Be sure to connect piping at the following ports. Details on the piping positions can be found in the outside view drawing. Use hoses for the piping work, and fasten them with sealing tape.

<Piping Specifications>

Piping port	Piping size	Recommended hose withstand pressure	At shipment
P	Rc 3/8	10.5 MPa	Plastic plug
DR1	Rp 1	1.5 MPa	
DR2	Rp 1/2	1.5 MPa	
T1	Rp 1/2		
T2	Rp 1/2		

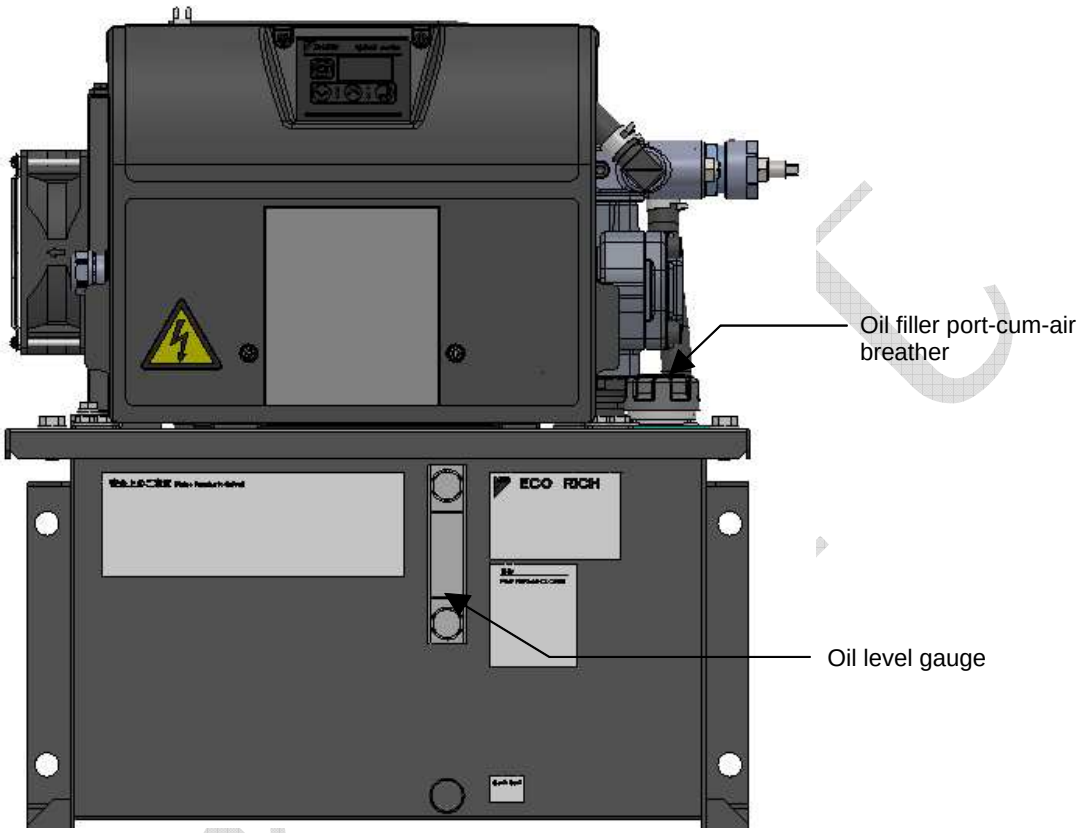


⚠ CAUTION

- **Use hoses for the piping to this product.**
- **Connect hoses without exceeding their specified bending radius, and without any twisting.**

7.2 Filling with Hydraulic Oil

- Remove the cap of the filler port cum air breather by turning it to the left, then pour clean hydraulic oil (NAS class 10 or better) into the tank. The volume of oil should be that sufficient to bring the float to between the red line and yellow line.
- Use a hydraulic oil that conforms to the specifications.



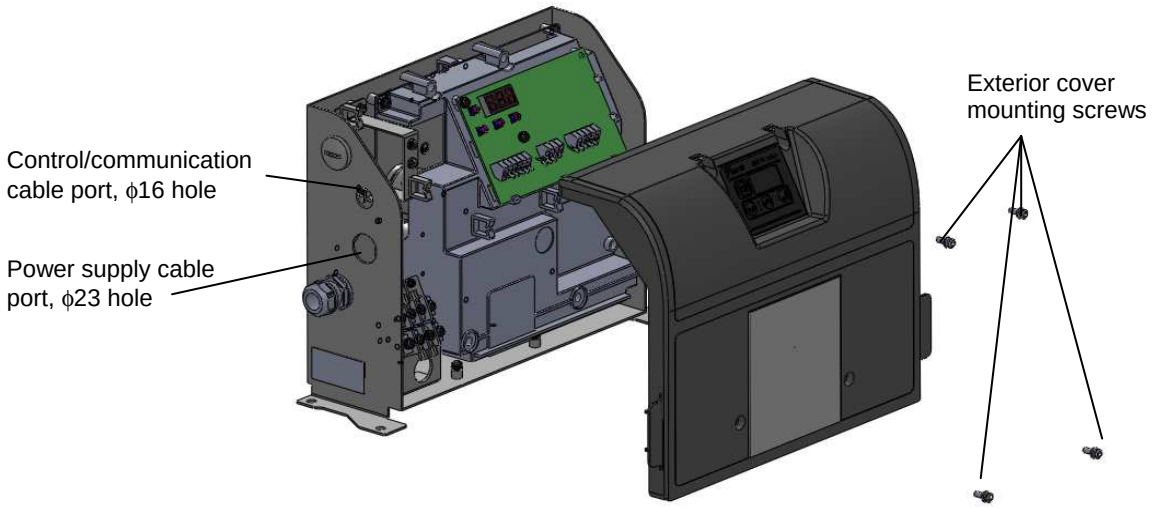
⚠ CAUTION

- **Running the product while the tank is not full of oil will cause burning and/or wear of the pump, leading to breakage.**
- **During the initial operation of the machine, oil is supplied to the hydraulic circuits at the machine side and the oil in the tank may decrease. Add oil to bring the height of the oil level to within the stipulated range.**
- **Depending on the hydraulic circuits at the machine side, the fluctuations in oil level in the tank may become large, and oil may overflow from the tank or the oil level may drop. Adjust while watching the oil level gauge to achieve the optimum oil level.**

Chapter 8. ELECTRICAL WIRING

In order to run this product, the main power supply has to be connected. Also connect input/output signal cables as necessary.

- Connect the main power supply and input/output signal cables after removing the exterior cover. To remove this cover, unscrew the four M4 cross recessed screws. After completing the wiring work, mount the exterior cover before use. The recommended tightening torque is 1.0 N·m.
- When wiring the main power supply and input/output signal cables, pass the cables through the specified cable ports.
- Fit a no-fuse breaker conforming to European standard EN60947-2 to the source power supply of the hydraulic unit in order to protect the electrical circuits against short circuits, overcurrents, etc., and to prevent electric shock.
- Use a power supply connection device that has a switch specification where the distance between contacts is at least 3 mm for all three poles when the switch is OFF.



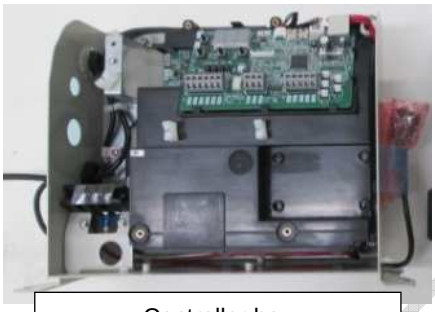
⚠ DANGER

- **Turn the breaker at the source power supply side OFF and wait at least 5 minutes before starting the wiring work. Otherwise, there is a risk of electric shock.**
- **Do not apply any excessive power supply voltage, beyond the power supply specifications of this product. This will damage the controller.**
- **Perform the wiring so as not to cause short circuit or ground faults between terminals and electric wires. Otherwise, there is a risk of electric shock and fire.**
- **When stripping electric wires, take care not to damage the conductors.**
- **For wiring, use multi-conductor cables and cable clamps, and do the work so as to satisfy protection class IP54 or better.**

8.1 Procedure for Mounting Exterior Covers

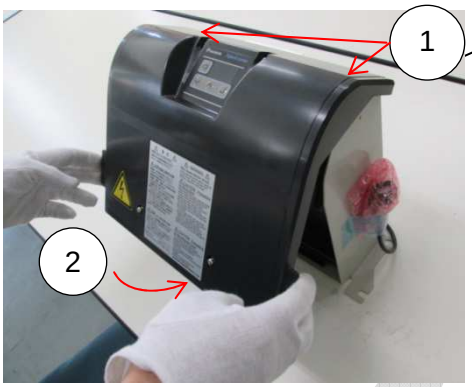
After connecting the main power supply and input/output signal cables, the exterior cover needs to be mounted. Mount it by following the procedure below.

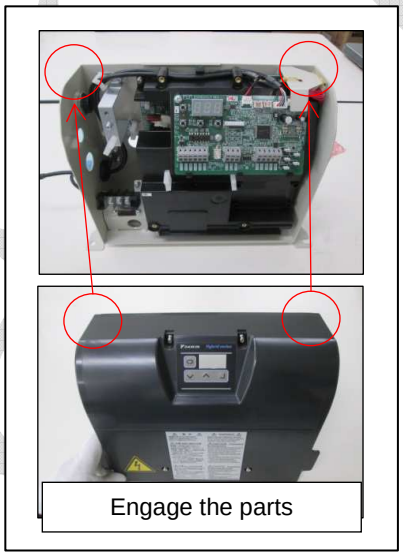
Exterior cover



Controller box

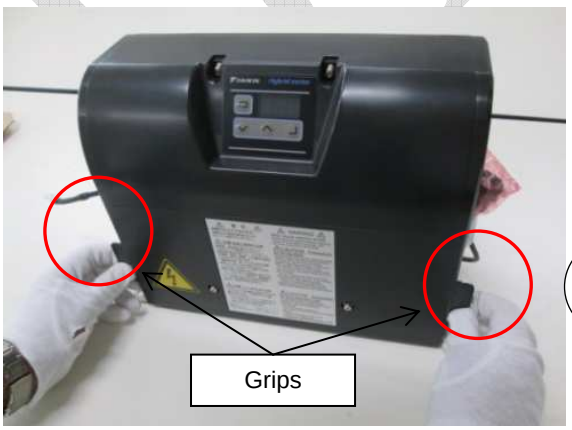
① Engage the corners of the controller and corners of the cover together and ② close the cover.





Engage the parts

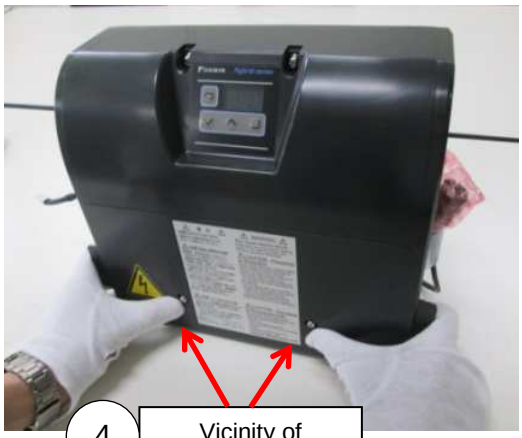
③ Holding the grips at the left and right of the cover, engage the cover with the bottom of the controller.

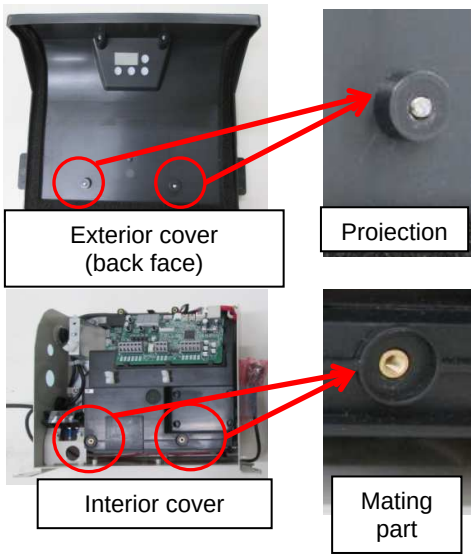


Grips

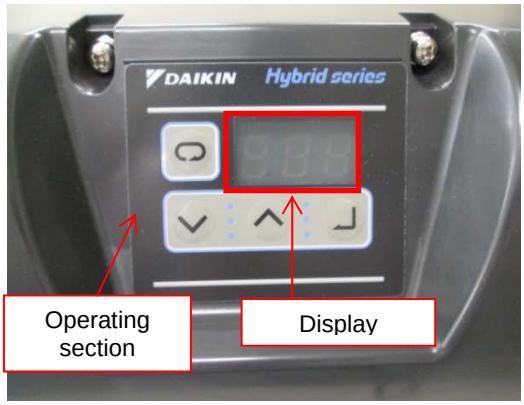
④ Press in the vicinity of the two screws at the bottom of the exterior cover to position it.

∗ When pressing the vicinity of the screws, confirm that a clicking sound is heard as the projections on the exterior cover go into the mating parts on the interior cover.





Position check with the display window

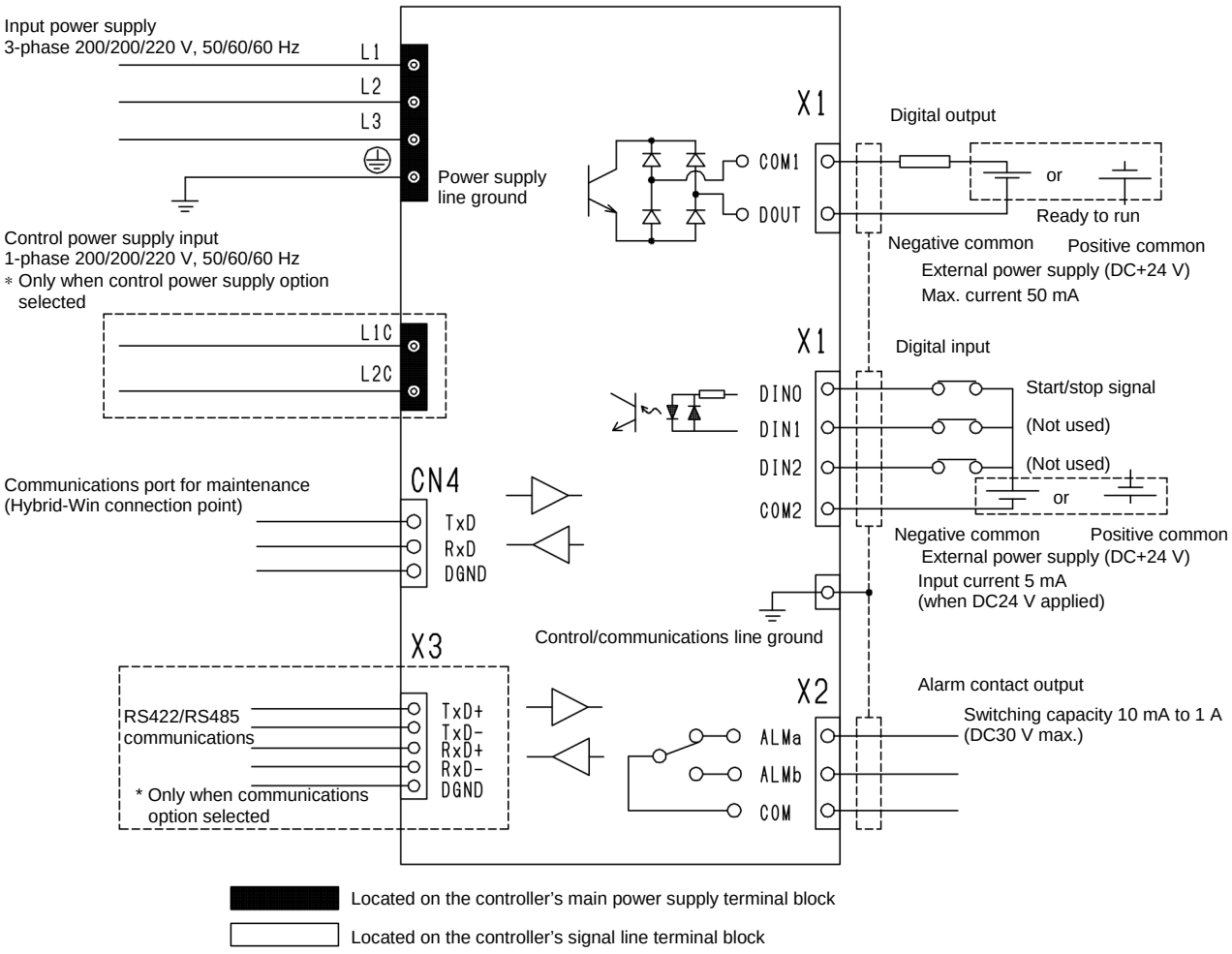


∗ Check that the 7-segment display is located in the center of the display window in the operating section.

∗ The product is shipped with a protective film over the operating section. Peel it off before use.
Bubbles may sometimes be found between the sheet and the protective film. They are generated in the sheet manufacturing process and it is not abnormal.

⑤ Tighten the two screws in the lower part of the cover, then tighten the two screws at the top.

8.2 Overall Wiring Diagram



8.3 Installation of the Breaker

In order to prevent power-supply-related accidents, be sure to use a no-fuse breaker conforming to EN60947-2 in the power supply connection line. The rated capacity of the breaker should be as indicated in the table below. There are no inrush currents with ECORICH.

Product Model	Power Supply Voltage and Frequency			Breaker Setting
	3-phase 200 V 50 Hz	3-phase 200 V 60 Hz	3-phase 220 V 60 Hz	
EHU1404-40	6.0 A	5.9 A	5.5 A	15 A
EHU2504-40	7.0 A	7.0 A	6.7 A	15 A
EHU2507-40	4.7 A	4.5 A	4.3 A	15 A
EHU3007-40	10.3 A	10.3 A	9.7 A	15 A

8.4 Connection of the Main Power Supply

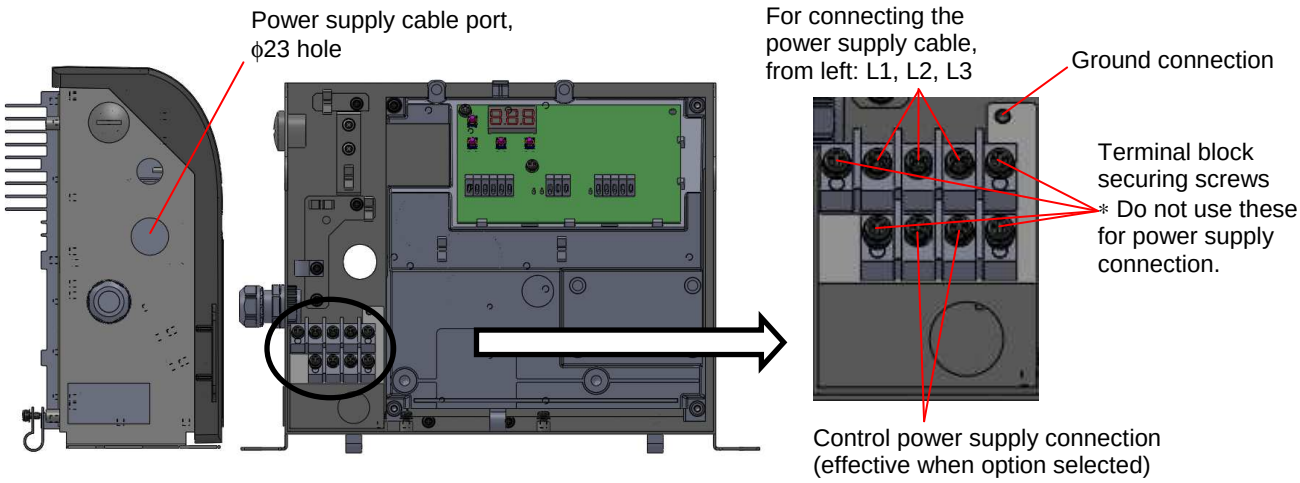
1) Prepare the power supply cable, crimp terminals (ring-type crimp terminals with insulating cladding), and cable clamps. Crimp a ring-type crimp terminal with insulating cladding onto the end of the cable using a dedicated tool.

<<Recommended Items>>

Models	Cable Specifications	Cable Size	Recommended Cable	Recommended Crimp Terminal	Recommended Cable Clamp
EHU1404 EHU2504 EHU2507 EHU3007	CE	1.5 mm^2 or larger	CE362 1.5 $mm^2 \times 4$ conductors (KURAMO ELECTRIC)	RBV2-4	OA-W1611 (OHM ELECTRIC) Applicable cable outer diameter: ϕ9 to ϕ11
	VCT	2 mm^2 or larger	VCT362 2 $mm^2 \times 4$ conductors (KURAMO ELECTRIC)		OA-W1613 (OHM ELECTRIC) Applicable cable outer diameter: ϕ11 to ϕ13

2) Pass the cables through the controller's wiring port to accomplish the wiring work. At the wiring port, use a cable clamp appropriate to ensure the port satisfies protection class IP54 or better.

3) Connect the power cable to the terminal block. The screws for connecting the power supply ground are different from those for the power supply cable connection terminals, so take care not to confuse them. The recommended tightening torque is 1.0 N·m.



⚠ DANGER

- **Use an AC power supply matching this product's power supply specifications.**
- **Use a cable appropriate for the power supply capacity.**
- **Connect the end of the cable by using a crimp terminal. Use a tool suited to crimp terminals. Crimping faults may result in the cable coming loose during use, short-circuiting accidents, and burnout due to abnormal heat generation.**
- **Be sure to ground the earth terminals in accordance with the law in the country concerned. Make a direct connection without going through a circuit breaker.**
- **Do not connect the power supply cable to the input/output signal terminals or ground terminal. This could cause an electric shock or equipment damage.**

⚠ CAUTION

- **This product incorporates an overcurrent protection function internally, so no thermal relay for overcurrent protection is necessary.**

8.5 Connection of Input/Output Signal Cables

1) Prepare cables and cable clamps. For the cables, use shielded cabtyre cables, and be sure to complete terminal processing of the shielding wire.

<<Recommended Items>>

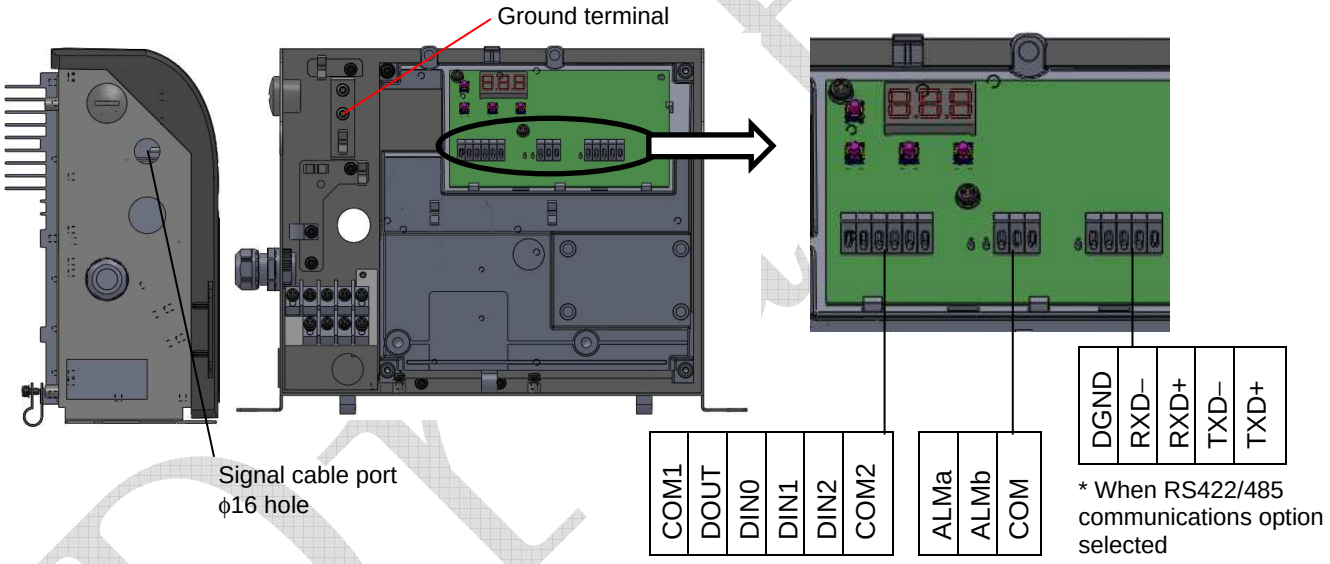
Cable Size	Recommended Cable	Recommended Cable Clamp
0.3 - 0.5 mm^2 (AWG20 - 22)	KVC-36SB 0.3 – 0.5 mm^2 (KURAMO ELECTRIC)	OA-W15-07 (OHM ELECTRIC) Applicable cable outer diameter: ϕ5 – ϕ7

If you are not using I/O signals, fit a blanking cap to satisfy the ingress protection requirement.

<<Recommended item>> : PRBG16 by SANKEI MANUFACTURING CO., LTD.

2) Connect the cables through the controller's cable port. At the cable port, use a cable clamp appropriate to ensure the port satisfies protection class IP54 or better.

3) Check the specifications of each signal cable, and connect them to the I/O signal terminal block. If measures against loose strands or corrosion at the end of the cable are required, use rod-type crimp terminals with insulating cladding. (Recommended crimp terminal: 216 – 322 (0.3 mm^2), 216 – 221 (0.5 mm^2), WAGO)

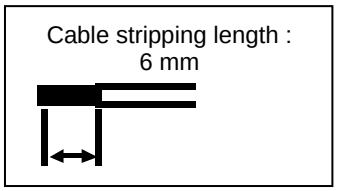


Terminal code	Signal name	Remarks
COM1	Digital output common	See 8.5.2 Digital outputs.
DOUT	Digital outputs	
DIN0	Digital input 0	See 8.5.1 Digital inputs.
DIN1	Digital input 1	
DIN2	Digital input 2	
COM2	Digital input common	

Terminal code	Signal name	Remarks
ALMa	Alarm output, NO contact	See 8.5.3 Contact outputs.
ALMb	Alarm output, NC contact	
COM	Alarm output common	

<<Method for Connecting to the Terminal Block>>

1) Push on the spring with e.g. a screwdriver.
2) Pushing the screwdriver up will open up the opening for insertion.
3) Check the stripped length of the wire, and insert it fully home without making any loose strands.
4) Remove the screwdriver or other tool from the lever.
5) Lightly pull the wire to check that it is securely connected.



⚠ CAUTION

- **Check the specifications of each signal before making the connections.**
- **Be sure to terminate shielded cables, and connect them to the shielded cable grounding terminal.**
- **If noise is not eliminated even when connected to the shielded cable grounding terminal, make a single-point grounding connection on your own equipment (disconnect the grounding at the unit).**

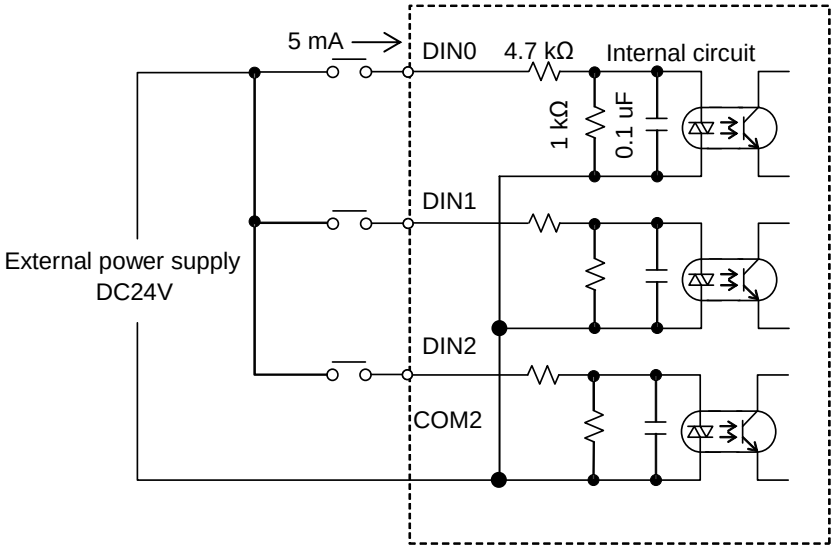
8.5.1 Digital inputs

These are sequence input signals that control the operations of this unit from an external device. Connect them as necessary by following the information below.

Terminal Name	Signal name	Remarks
COM2	Digital input common	Can be either positive or negative
DIN0	Digital input 0	Start/stop signal
DIN1	Digital input 1	(Reserved) (Do not connect.)
DIN2	Digital input 2	(Reserved) (Do not connect.)

Note: When a stop command has been input via digital input 0, “STP” is displayed on the panel.

Note: Secure a time of at least 0.5 seconds between stopping and starting the unit.



⚠ CAUTION

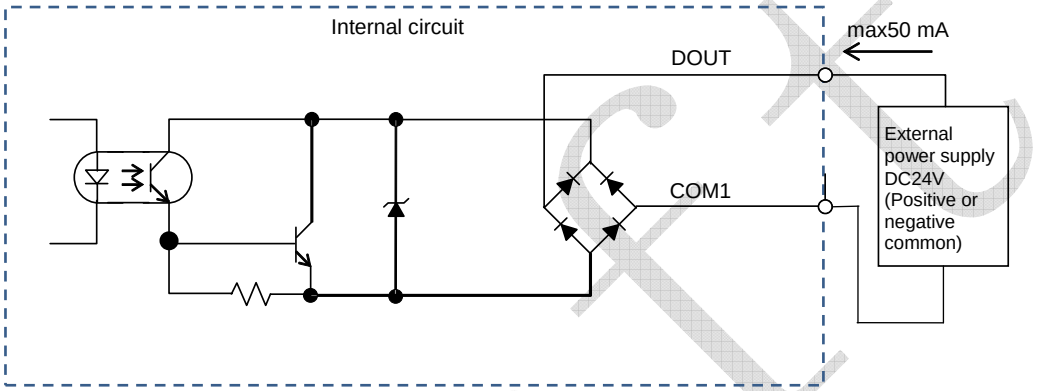
- **Prepare an external power supply that is DC24 V ±DC1 V/0.5 A minimum.**
- **It is not possible to supply power from this controller to external destinations.**
- **The current flowing to each input circuit is 5 mA (typ.). If a circuit is configured with contacts, etc., pay attention to the minimum current for those contacts, etc.**

8.5.2 Digital outputs

These are the digital output signals that output the alarm statuses of this unit. Connect them as necessary by following the information below.

For the change to the output details, refer to manual PIM00504.

Terminal Name	Signal name	Output Content: factory default setting
DOUT	Digital output 1	Function disabled (comes ON when ready to run)
COM1	Digital output common	Can be either positive or negative



⚠ CAUTION

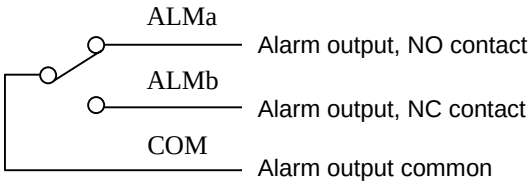
- **Prepare a DC24 V ±DC1 V/0.5 A power supply externally. It is not possible to supply power from this controller to external destinations.**
- **The maximum output current of the output circuit is 50 mA (resistance load). Note that driving a load exceeding the permissible current may damage the circuit.**
- **When driving inductive loads, implement surge protection measures.**

8.5.3 Contact outputs

These are the contact output signals that output the alarm statuses of this unit. Connect them as necessary by following the information below.

For the change to the output details, refer to the manual PIM00504.

Terminal Name	Signal name	Output Content: factory default setting
ALMa	Alarm output, NO contact	Has continuity to the common terminal when the pressure switch is not actuated and the status is normal.
ALMb	Alarm output, NC contact	Has continuity to the common terminal when the pressure switch is actuated or an alarm has occurred.
COM	Alarm output common	Can be either positive or negative



Power ON : Normal status

⚠ CAUTION

- **The switching capacity of the contact outputs is DC24 V/1 A (at resistance load). Note that driving a load exceeding the permissible current may damage the contacts or other components.**
- **The minimum applicable load for the contact outputs is DC24 V/10 mA (at resistance load), but this is only a guide to the lower limit where switching is possible with a minute load. The value varies depending on the switching frequency, environmental conditions, etc., so it is advisable to check the actual value.**
- **When driving inductive loads, implement surge protection measures.**

Chapter 9. TRIAL RUNNING

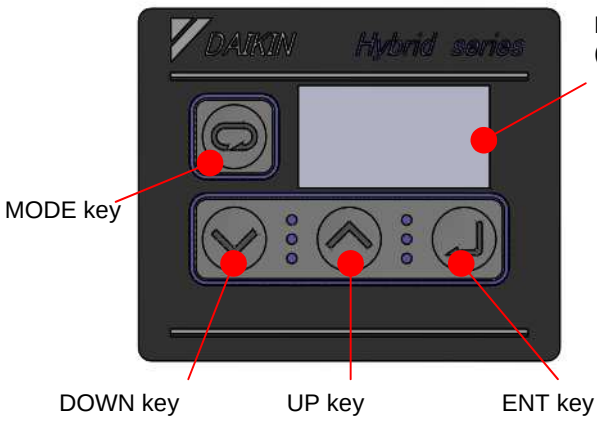
⚠ CAUTION
● **Ensure that the power can be shut off immediately in response to unforeseen events. Either incorporate an emergency stop switch or similar device, or configure a sequence circuit for the main machine for that purpose.** ● **In the event of unanticipated operation, stop the unit and check safety before restarting the operation.**

Check that all the preparations for running have been completed by referring to “Chapter 5 PROCEDURE FOR STARTING UP”.

(1) Powering on	Turn the switch on the control panel at the machine to “ON” to supply power to the hydraulic product. This unit starts in about 3 seconds after powering up. Check the following points: A. That the display on the controller’s operation panel lights up B. That the DC fan for the oil cooler is running C. That the pressure indicated on the controller’s operation panel display rises after the sound of the pump running
(2) Flushing operation	When the starting check is completed, connect all the piping except for the actuators in a loop, then flush for about two hours by passing hydraulic oil through the return filter.
(3) Changing the hydraulic oil	Turn the power off, drain all of the hydraulic oil in the tank out through the tank’s oil drainage port, then pour in the stipulated volume of new hydraulic oil through the oil filler port cum air breather. Check the return filter’s indicator, and if it is clogged, change the filter element.
(4) Air bleeding	Thoroughly bleed air from inside the hydraulic circuit. If the air is not completely bled out, cylinders and other actuators may operate abnormally, and there may be abnormal noise from the pump, valves and so on.

Chapter 10. PANEL OPERATIONS

10.1 Names and Main Functions of Each Part of the Operation Panel



The controller’s operation panel features the 3-digit data display and four key-switches indicated in the figure to the left. The LED display normally shows the current actual pressure (MPa).

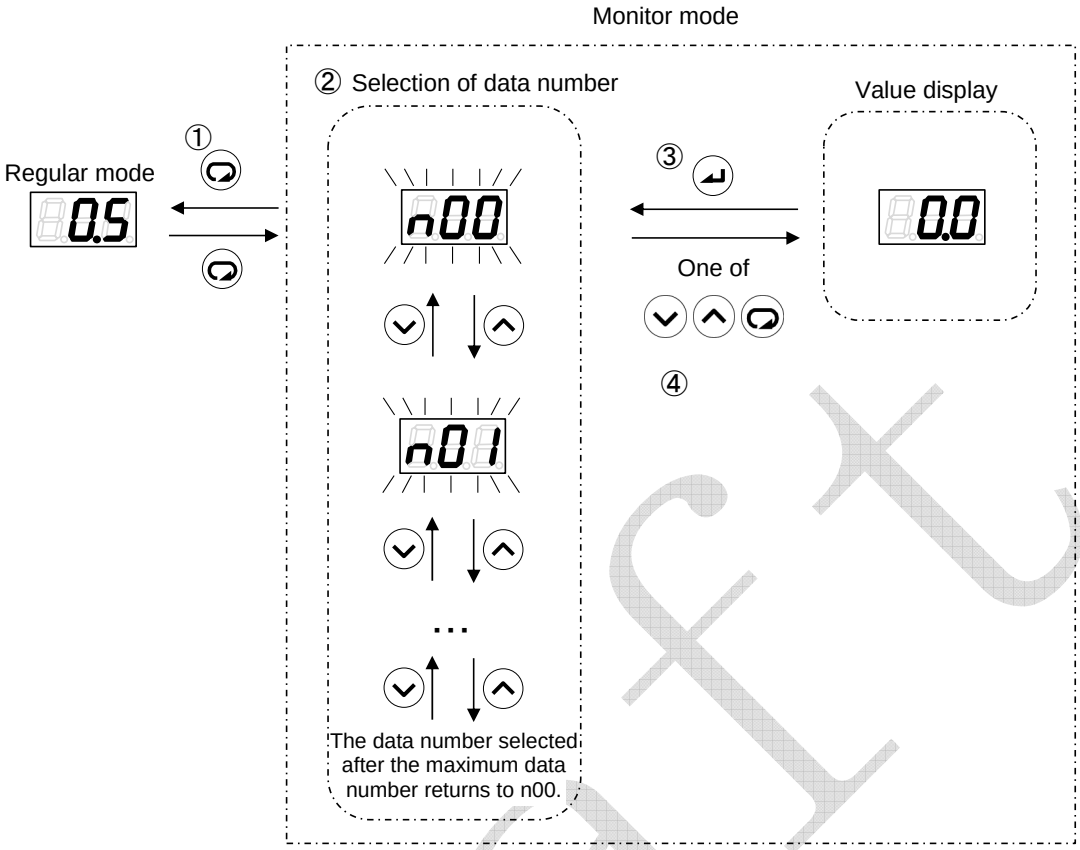
10.2 Monitor Mode

10.2.1 List of display items in the monitor mode

The monitor mode enables monitoring of the items listed in the table below by operation from the panel.

No.	Name	Unit	Details
n00	Pressure switch set value	MPa ×10 PSI	Displays the value set with the pressure switch.
n01	Pressure set value	MPa ×10 PSI	Displays the current set value for pressure.
n02	Flow rate set value	L/min	Displays the current set value for flow rate.
n03	Flow rate	L/min	Displays the current flow rate.
n04	Latest alarm code	-	Displays the alarm code for the alarm that occurred immediately previously. By pressing the ↵ key, the current power-up count can also be checked.
n05	Motor rotation speed	×10 min^{-1}	Displays the current rotational speed of the motor.
n06	Running status display	-	Displays the running status of the pump. While the pump is running, the segment dots repeatedly cycle from left to right. Example: L-0 PQ selection No. 0
n10	Motor temperature	°C	Displays the motor temperature.
n11	Radiating fin temperature	°C	Displays the temperature of the radiating fins.
n12	Main circuit DC voltage	V	Displays the direct current voltage of the controller's main circuit. The voltage value is the supply power voltage multiplied by the square root of 2, and it varies depending on the running status.
n20	Power-on count (lower digits)	Times	Displays the number of times the unit has been powered on after shipment from the factory. (On exceeding a count of 9,999, the value is cleared to 0.)
n21	Power-on count (upper digits)	×1,000 times	
n22	Total operation time (minutes)	min	Displays the total operation time after shipment from the factory (time the motor is energized).
n23	Total operation time (hours)	h	
n24	Total operation time (thousands of hours)	×1,000 h	
n25	Power consumption	kW	Displays the current approximate power consumption.
n26	I/F board temperature	°C	Displays the current approximate temperature in the controller.

10.2.2 Monitor mode operations



① Press the key in the regular mode. The mode will switch to the monitor mode.

② Select the data number to be displayed by using the key or key. During data number selection, the display will flash.

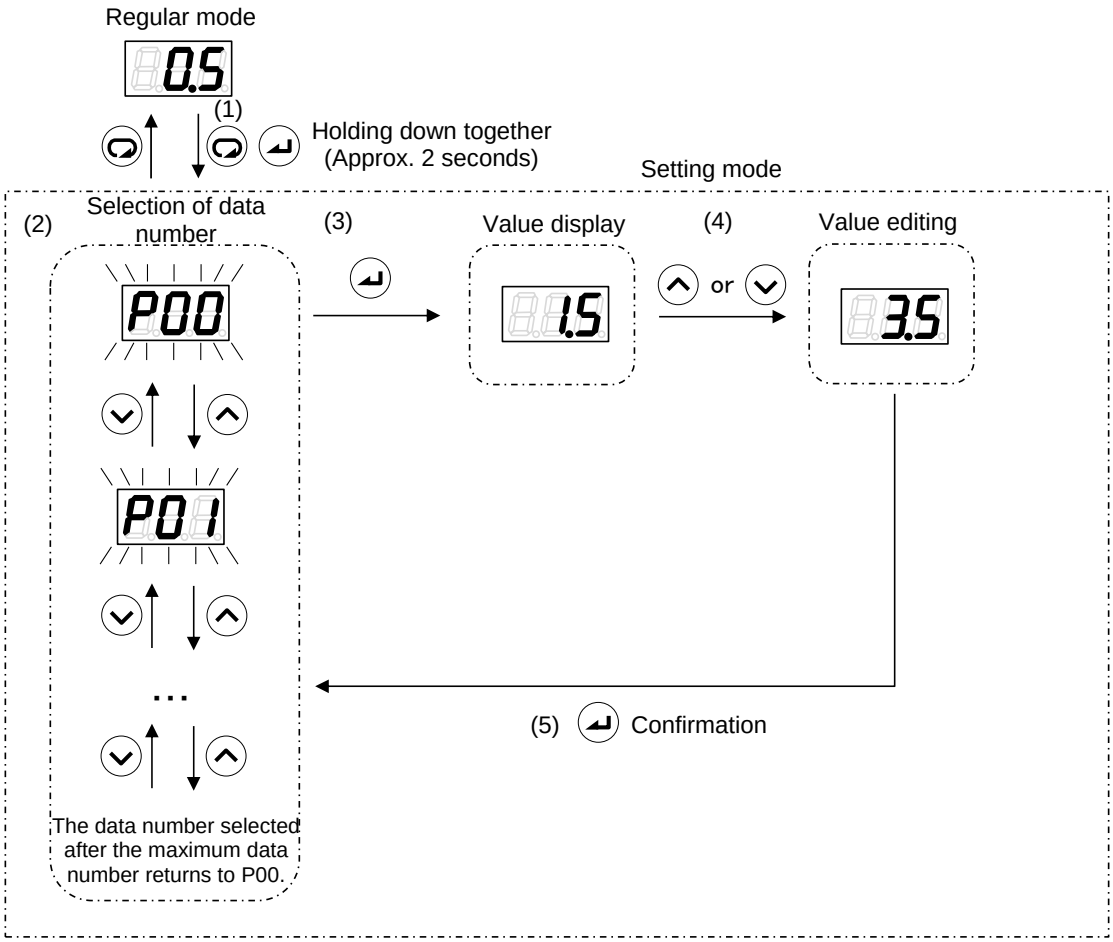
③ Confirm the data number by pressing the key. The value for the selected data number will be displayed.

④ Return to data number selection with , or .

10.3 Setting Mode

10.3.1 Setting mode operations

For details of setting mode parameters relating to pressure and flow rate, refer to “ADJUSTING PARAMETERS”. For items other than pressure and flow rate, refer to manual PIM00403.



(1) Hold down the and keys together in the regular mode. After about 2 seconds, the mode will switch to the setting mode.

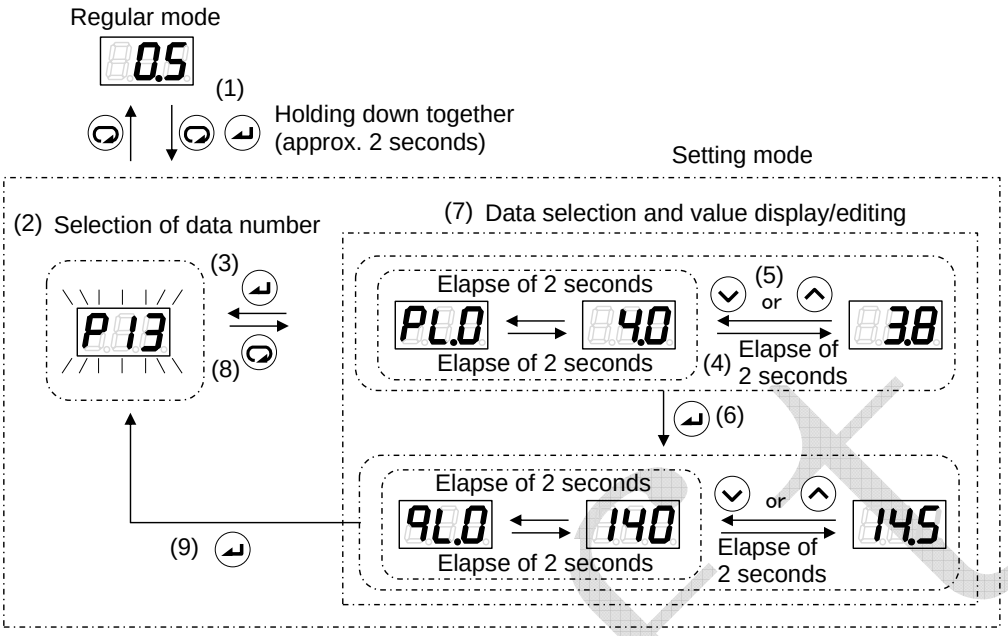
(2) Select the data number to be displayed by using the key or key. During data number selection, the display will flash.

(3) Confirm the data number by pressing the key. The value for the selected data number will be displayed.

(4) Change the set value by incrementing or decrementing it with the and keys.

(5) Confirm the set value and return to data number selection by pressing the key.

■ **PQ setting**



(1) Hold down the ↺ and ↵ keys together in the regular mode. After about 2 seconds, the mode will switch to the setting mode.

(2) Select P13 with the ∨ or ∧ key. During data number selection, the display will flash.

(3) Confirm the data number by pressing the ↵ key. The value for the selected data number will be displayed.

(4) The set values for pressure and flow rate in the PQ selection parameters will be displayed alternately at approximately 2-second intervals.

(5) Change the set values by incrementing or decrementing them with the ∨ and ∧ keys. The data code will be displayed approximately 2 seconds after a set value has been changed.

(6) Confirm the set value with the ↵ key. The next data code will be displayed.

(7) Repeat steps (4), (5) and (6).

(8) Pressing the ↺ key will switch the display to the data number selection screen. Parameters whose values have been changed up until that time will retain the changed values.

(9) Setting the flow rate setting “qL.0” will switch the display to the data number selection screen.

■ **Relationship between data display and parameters**

Display Order	Display	Parameter Name
1	PL.0	Pressure setting
2	qL.0	Flow rate setting

■ **Pressure settings on shipment from the factory**

Product Model	P13			
	Pressure: PL (MPa)		Flow rate: QL (L/min)	
	Default value	Scope of Use	Default value	Scope of Use
EHU1404-40	1.5	1.5 - 4.0	15.2	2.5 - 15.2
EHU2504-40			25.1	3.5 - 25.1
EHU2507-40		1.5 - 7.0		
EHU3007-40			28.5	3.5 - 28.5

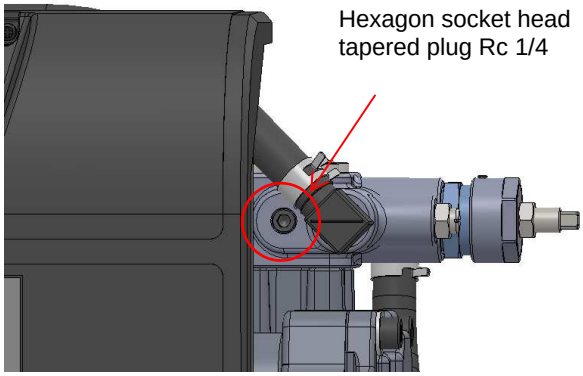
Chapter 11.Fixed Throttle (ϕ0.8) Mounting Instructions

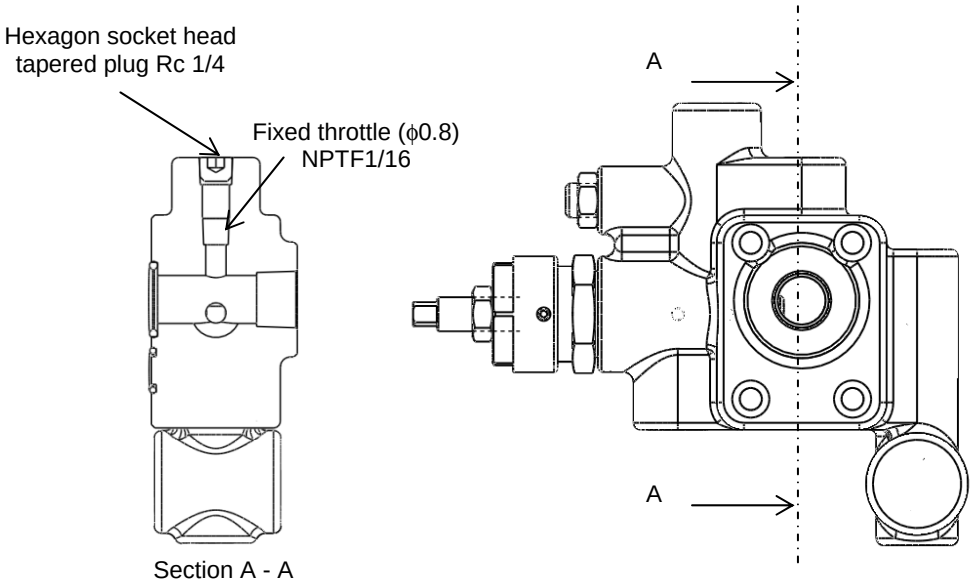
When using the unit with a set pressure at 6 MPa or higher, if the pressure becomes unstable due to the effects of contaminants, etc., install the fixed throttle (ϕ0.8) provided as an accessory. Check that there is no residual pressure before installing it.

1) Remove the hexagon socket head T plug (Rc 1/4).

2) Install the fixed throttle (NPTF1/16 × ϕ0.8).

3) Wrap sealing tape around the hexagon socket head T plug (Rc 1/4) and fit it as it was.





11.1 Minimum Rotational Speed Adjustment Instructions

In case the fixed throttle is instoalled, rotational speed in the pressure holding status would be changed. Adjust to the appropriate speed (380 min^{-1}).

1) Press the mode key on the panel to switch the display mode to the monitor mode.

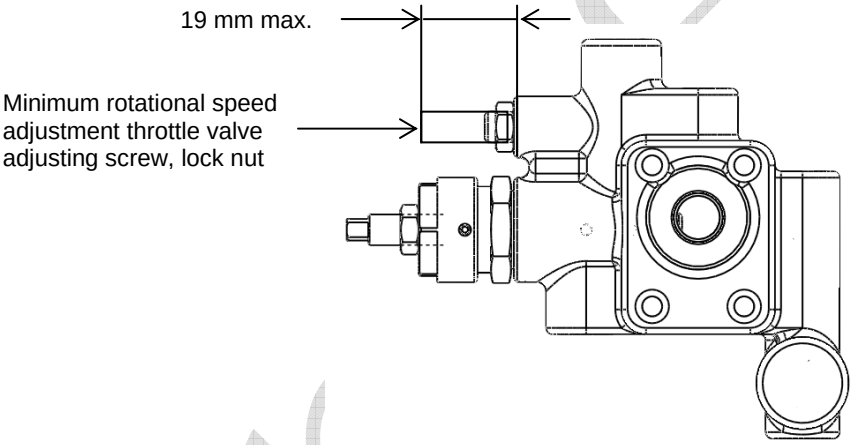
2) Press the setting keys with the “n00” displayed to select [n05] (motor speed indication) to display the current motor speed.

3) Loosen the lock nut of the throttle valve for minimum rotational speed adjustment.

4) Adjust the throttle valve while monitoring the actual motor rotation speed displayed. (The motor rotation speed decreases during clockwise rotation, and increases during counterclockwise rotation.)

5) Tighten the lock nut to complete the adjustment.

6) Press the mode key to switch to actual pressure indication.



⚠ CAUTION

- **If the adjusting screw of minimum rotational speed adjustment throttle valve is loosened too much, it will come out and oil will spout out.**
  Ensure that the adjusting screw does not project beyond 19 mm from its mount.

Chapter 12.High-pressure Safety Valve Adjustment Instructions

If any of the three conditions below is applicable, readjust the safety valve by referring to the [Safety Valve Adjustment Instructions].

(1) Although the setting is such that even when used at the maximum pressure setting, the safety valve will not actuate under normal pressure control (there is an exception during transition to the main machine’s hydraulic circuit blockage due to a stop of a hydraulic actuator, for example), the set pressure of the safety valve drops and it actuates even in the normal status due to repeated operation over a protracted period or contaminants in the hydraulic oil.

[Judgment method]

- When the oil temperature rise has become faster in comparison with how it was previously.
- When, in the pressure holding state with the motor speed displayed, turning the safety valve adjusting screw in the tightening direction lowers the motor speed.

(2) When, for reasons such as the restricted withstand pressure of the hoses used, it is desired to as far as possible suppress surge pressures that greatly exceed the set value.

(3) When the pressure setting has been changed after shipment from Daikin. For the purpose of suppressing surge pressure in order to protect the main machine's actuator and peripheral devices such as pressure gauges, it is advisable to set the safety valve setting to "unit set pressure + 0.5 MPa".

[Safety Valve Adjustment Instructions]

1) Referring to the enlarged view of the safety valve on the next page, loosen the lock nut. (Lock nut: M10, width across flats of 14 mm)

2) In accordance with the guidance diagram for the length of the pressure adjusting screw, bring the screw to about the length corresponding to the desired control pressure. (The tip of the adjusting screw has four faces, with width across flats of 7 mm.)

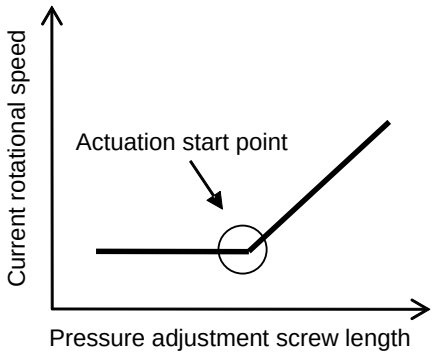
3) Turn on the power to the hydraulic unit, establish the setting mode by panel key operation, and adjust the pressure setting to the desired pressure.

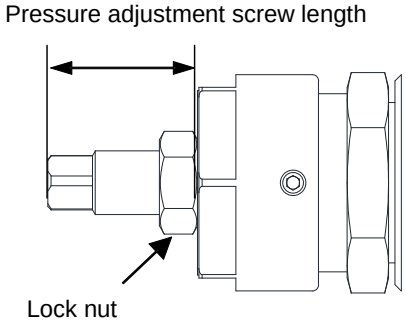
4) Select [n05] (motor rotation speed indication) in the monitor mode by panel key operation to display the current motor rotation speed.

5) Adjust the pressure adjusting screw length of safety Valve and find the actuation start point shown in the figure below.

6) Turn the pressure adjusting screw clockwise three fourths from the actuation start point.

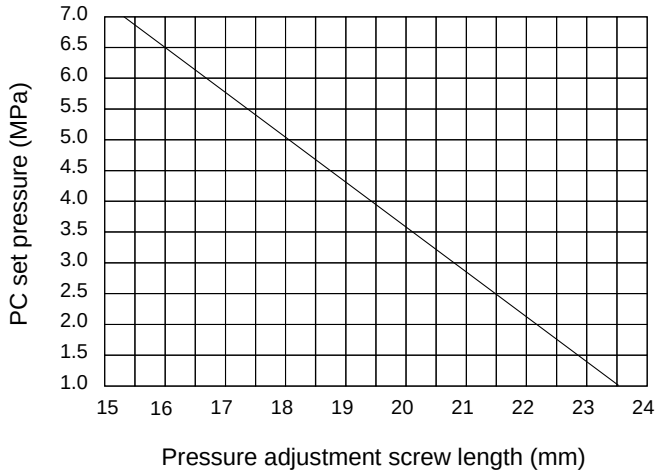
7) Tighten the lock nut to complete the adjustment. (When tightening the lock nut, take care that the adjusting screw does not turn.)





<Detail of Safety Valve>

Guidance diagram



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