

# Motorized Gear Pump

## AMO – IIIDS

# INSTRUCTION MANUAL

- For your safety, read and understand this Manual thoroughly before handling the pump.
- Keep this Manual at a designated place for easy access at all times.

# Introduction



## ■ System Application

This Motorized Gear Pump “AMO-III DS-Type” is designed to lubricate each point on a machine by delivering relatively small amount of oil through a metering valve.




Do not use this system for any other purposes.

## ■ Marks used in Manual

In this Manual, safety precautions are provided using the marks below in order to prevent accidents which might cause injuries to human bodies. Be sure to carefully read these safety precautions to understand the contents thoroughly before handling the pump.

 <b>WARNING</b>	Indicates a potentially hazardous situation which, if ignored, could result in death or serious injury.
 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if ignored, may result in minor or moderate injury.

In addition to the above, the marks below will also appear in this manual. Please read the following explanation in order to handle the pump correctly.

	Indicates referential information or points to which special attention should be paid while handling the pump. If ignored, the pump and/or the machine could be damaged.
	Indicates referential information or points which are helpful for handling the pump.
	Indicates a reference clause.

## ■ Questions/Contacts

If any question or doubt arises concerning the contents of this Manual, contact following:

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## ■ Details of Contents

Details of all illustrations and specifications in this Manual are subject to change without prior notice for improvement and development of the pump.

## ■ Resale or Leasing

At the time of resale, leasing out or lending out the pump to the third party, make sure to include with the pump all the manuals and any other documents found supplied at the time of initial installation.

## ■ Disposal of Pump/Oil

Make sure to dispose pump or oil as designated by National laws and/or local regulations.

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# 1. Safety Precautions

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## 1-1 Basic Safety Precautions

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- Carefully read this Manual to understand the contents before handling the pump.
- Keep this Manual at a designated place for easy access at all times.
- This pump is handled by only personnel who have the knowledge and skill of its installation and adjustment.
- Never modify or change this pump without prior permission of LUBE.

## 1-2 Labels

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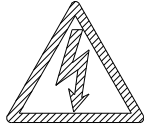
The following labels are affixed on the pump. If any label gets damaged or becomes illegible, contact LUBE immediately. A new one will be supplied at your own cost.



- Strictly observe the instructions on the labels affixed to the pump.
- Never remove from nor disfigure any labels on the pump.

## 1-2-1 Types of Labels

①



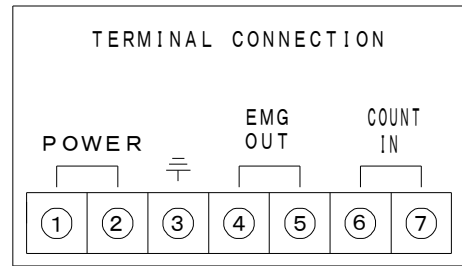
②

AMO-III DS		
FREQUENCY	50 Hz	60 Hz
VOLTAGE (1φ)	100 V	110 V
AMPERE	0,83 A	0,64 A
DIS. VOL (∕min)	150m	180m
DIS. PRESS	2MPa	

③



④



⑤

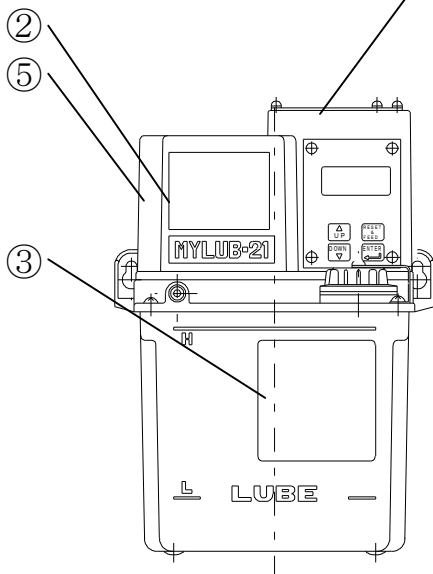
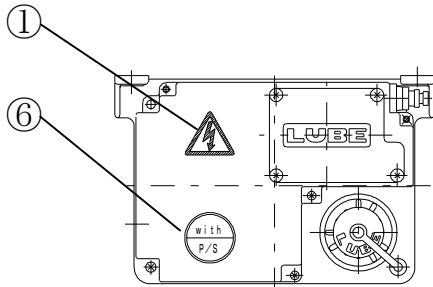
CODE NO.	SERIAL NO.
285301	606001

⑥



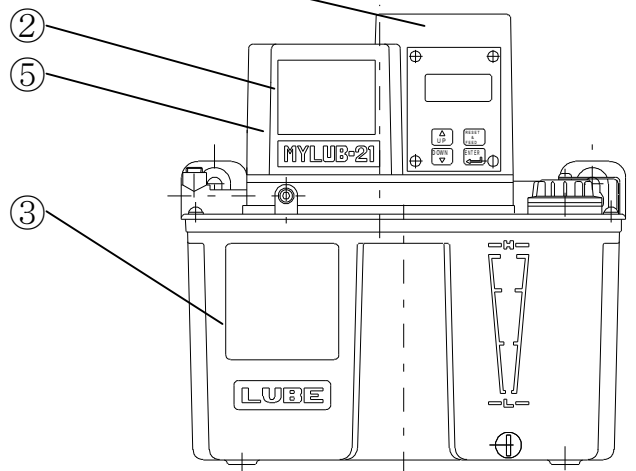
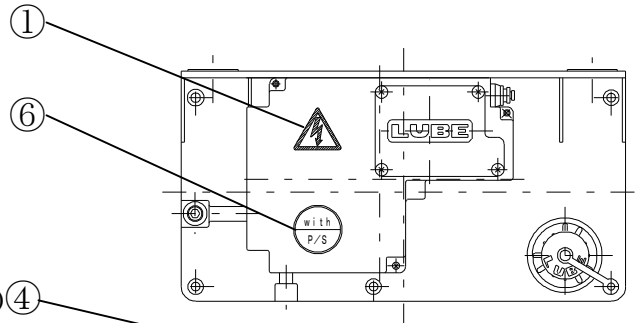
## 1-2-2 Location of Labels

### ■ AMO-III DS-1, 2



④ (A cover)

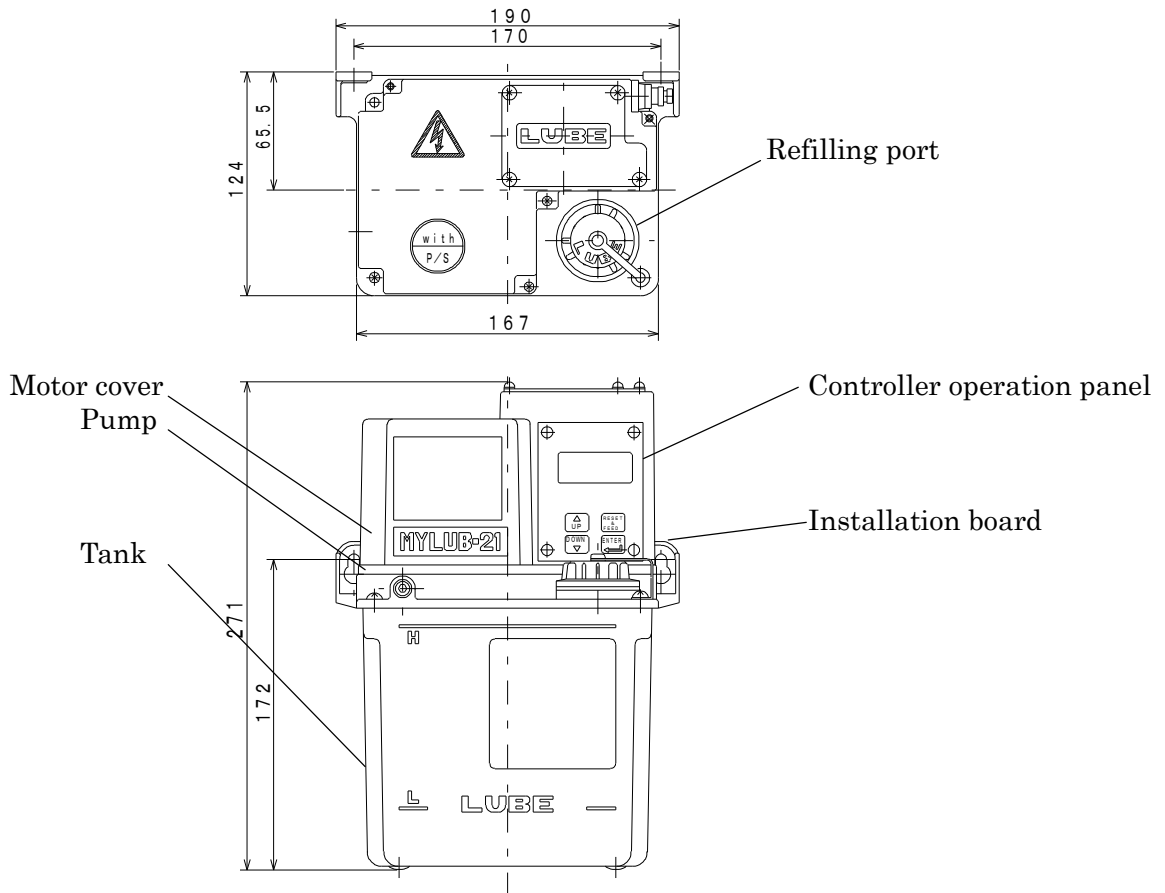
### ■ AMO-III DS-1-3, 2-3



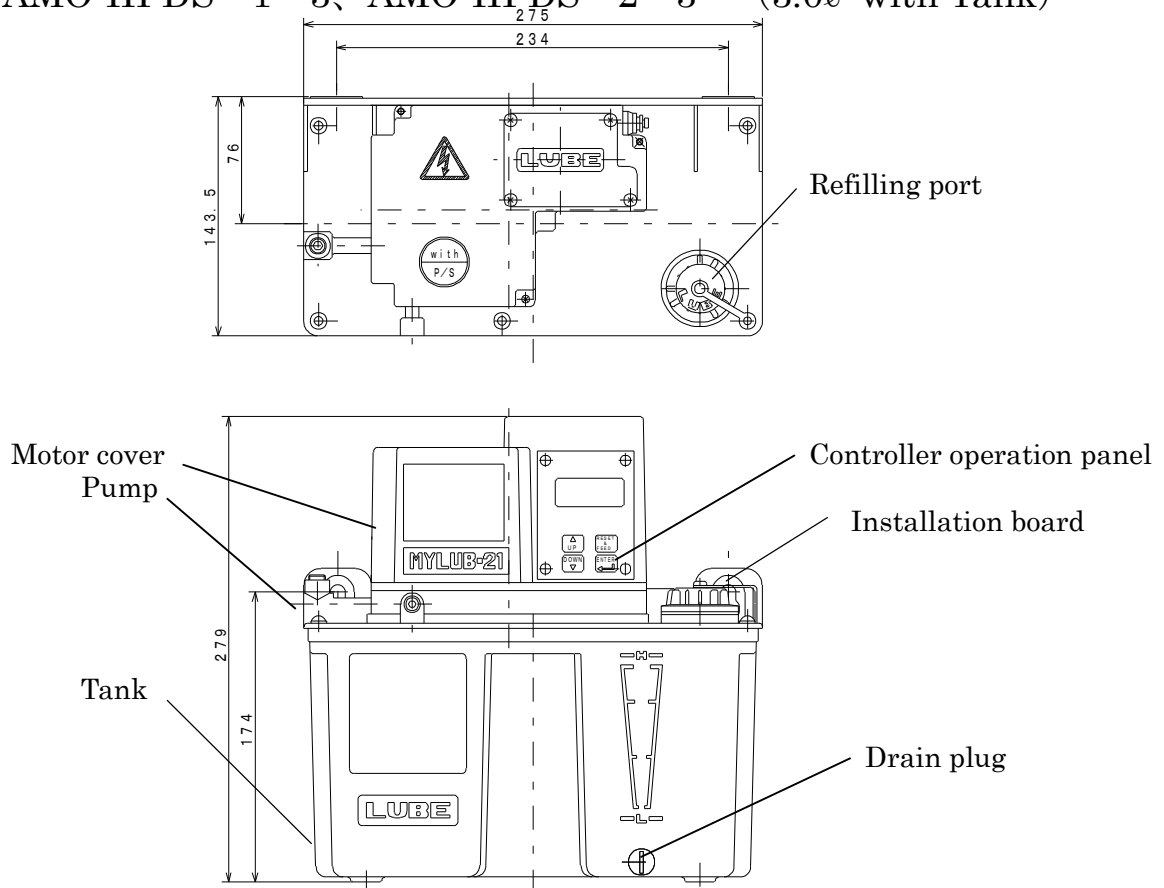


## 2-2 Name of Each Component

### ■ AMO-III DS-1、AMO-III DS-2 (1.8ℓ with Tank)



### ■ AMO-III DS-1-3、AMO-III DS-2-3 (3.0ℓ with Tank)





# 3. Installation

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## 3-1 Environmental Requirement

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Be sure to this pump in the following environment.

- Ambient temperature : 0 ~ +40°C
- Humidity : 35 ~ 85% RH

## 3-2 Mounting Unit

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Make sure to fix the pump firmly.  
Insufficient mounting of the pump could fall itself and cause injury.

Be sure to fix the pump against the vertical and flat surface, which can sustain its weight sufficiently.

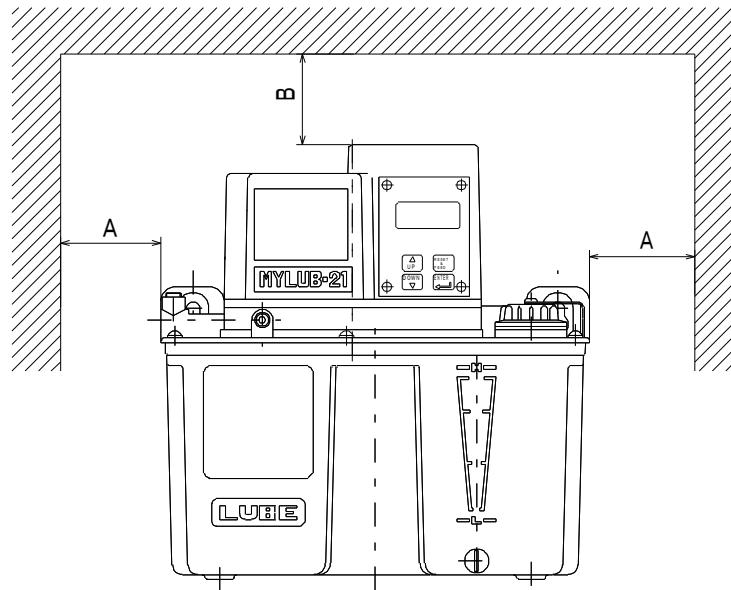
Mount and fix the pump firmly using two (2) M6 bolts (1.8ℓ with Tank) or M8 bolts (3.0ℓ with Tank).



LUBE recommends anti-vibration rubber to be applied when the pump is exposed to vibration.

Be sure to allow necessary space around the pump as shown on the next page for operation and maintenance.

■ Weight of the pump and required space




Pump model	Code number	Voltage (V)	Tank (ℓ)	Weight (kg) (see note below)	Required space (mm)
AMO-IIIDS-1 AMO-IIIDS-2	285301 285302	100 200	1.8	3.2	A: 150 B: 200
AMO-IIIDS-1-3 AMO-IIIDS-2-3	285303 285304	100 200	3.0	4.0	A: 150 B: 200



\* : Note: The weight of oil is not included.

# 3-3 Wiring



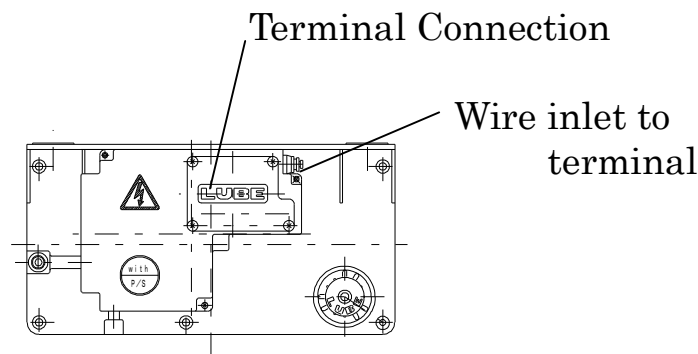
Only qualified personnel electrical work can connect wiring.

Rotatory direction of a motor is only constant direction. Wiring please refer to terminal connection.

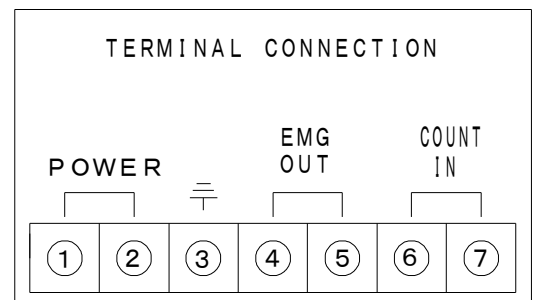
Make sure that you attach the terminal block to a good ground.

If the outgoing cord touches the outside surface of the equipment or other objects or if it comes in contact with the hand of the operator, use an insulated cord.

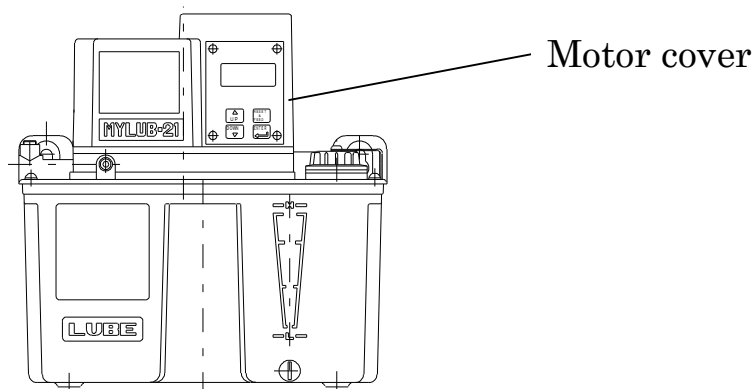
## ● Controller terminal



## ● Terminal Connection



※It is stuck on the inside of a terminal cover



## 3-4 Tubing connection

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Connect tubing to the machine to the discharge Port (Rc1/8).



Use tubing good for the pressure 3.0 MPa or higher.

Fix the joint with hands and then tighten it 2/3 turns with a spanner.



Clamping torque please refer to “Tightening Level for Connecting Section”

After connection, make sure there is no grease leakage from the joint. Make sure to bleed air from the tubing and the pump after connection.

# 4. How to Control the Pump

## 4-1 Method of setting the timer

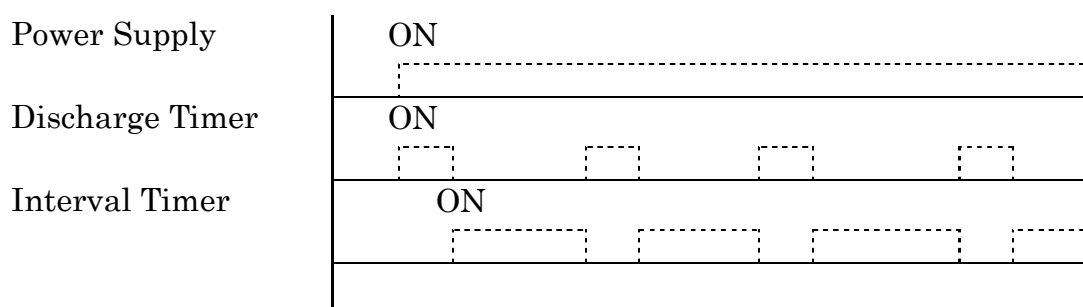
Install timer(s) on the machine and set the Discharge Timer and Interval cycle as defined below.



When set the continuous “ON”, discharge from the valve is made only one time and oil does not get to the lubrication points after that.

- ① Power supply from the machine controller for the pump “ON”.
- ② Discharge timer “ON”. (‘DIS’ by liquid crystal)
- ③ Interval timer “ON”. (‘INT’ by liquid crystal)
- ④ Repeat from ② to ③.

\* The step may be started from ③ with the memory backup function.



## 4-2 Method of operating the controller

The AMO-IIIDS pump, equipped with a twin-timer, pauses or starts the discharge operation in approximately three seconds after powering on. From then on, fueling is automatically executed intermittently.

### 4-2-1 Basic operations

When powered on, the pump shifts to the pause status or the discharge operation (from the previous status at the time of power shut-off).

The status of pause or discharge is indicated as INT or DIS on the LCD on the front of the pump.

The remaining time for the pause is indicated in “minutes” (or the number of counts) and the remaining time for the discharge is indicated in “seconds” on the LCD.

The timer is initially set to 20 seconds for a discharge and 3 minutes (or 3 counts) for a pause. Change the setting according to the use condition.



To change the initial setting of the timer, refer to “4-2-3 Method of changing the timer setting”.

When the oil level is lowered and discharge pressure is insufficient (1.7 MPa), the failure detection is output on the LCD, stopping the pump operation.

When the oil level is lowered, “OILLEVEL ERR” is noted on the LCD, and the pump operation is stopped. After refilling oil, press the RESET & FEED key to reset the alarm. At the same time that the alarm is reset, the operation starts from the pump operation.

When discharge pressure is insufficient, “PRESSURE ERR” is noted on the LCD, and the pump operation stops.

After checking the failure and taking the necessary steps, press the RESET & FEED key to reset the alarm. At the same time that the alarm is reset, the operation starts from the pump operation.



To check and take necessary steps for the failure of insufficient discharge pressure, refer to “6-2 Troubleshooting”.

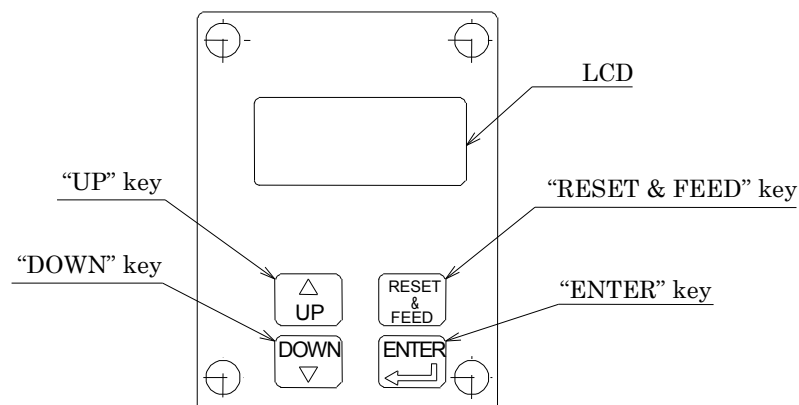
After taking necessary steps for the failure, make sure to check for correct operation.



The AMO-III DS pump is equipped with a backup function that uses no battery.

When a power failure occurs, the status of the data immediately before the power failure is kept. The next operation after power-on starts with the status of the data immediately before power failure. However, if powering on and off are intentionally repeated frequently, because the condition differs from that during an ordinary power failure, data is not written correctly, which fails to keep the data and leads to a function outage. Turn off the power again, and after 10 seconds, power on to check for correct operation.

#### 4-2-2 Exterior features of the controller



### Operation panel of the controller

### 4-2-3 Method of changing the timer setting

- ① Press the UP key and the DOWN key at the same time for 1 second or more.
- ② The upper section of the LCD shows “DIS TIME” and the lower section “0\* S”.
- ③ The cursor is shown under the indication of “0\* S” 0 in the lower section of the LCD. After setting the ten’s place using the UP key or the DOWN key, press the ENTER to confirm the entry.
- ④ As in the setting method above, after setting the one’s place, press the ENTER key to confirm the entry.
- ⑤ After setting the operation time, press the ENTER key again to confirm the entry.
- ⑥ The upper section of the LCD shows “INT” and the lower section “0\*\*\* M”.
- ⑦ The cursor is shown under “0\*\*\* M” 0 in the lower section of the LCD. After setting the thousand’s place using the UP key or the DOWN key, press the ENTER key to confirm the entry.
- ⑧ As in the setting method above, after setting the hundred’s, ten’s, and one’s places, press the ENTER key to confirm the entry.
- ⑨ After setting the pause time, press the ENTER key again to confirm the entry.
- ⑩ After the setting has been changed, the operation starts from the discharge operation and repeats the operations.
- ⑪ To reset a failure alarm or to start the operation midway, press the RESET & FEED key for 1 second or less.  
If the button is pressed for 2 seconds or longer, the FEED function works, operating up to 99 seconds. To reset the FEED function, press the RESET & FEED key again.



## 4-3 Pump protector

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The pump is equipped with a circuit protector to protect the pump.

When the circuit protector trips, after removing the cause, press the recovery button.

When the circuit protector is operated, always make sure to operate the pump with the RESET & FEED key to check for correct operation.

# 5. Lubricating oil and refilling

## 5-1 Lubricating oil to be used

Use industrial lubricating oil in the range from 68 to 1800 mm<sup>2</sup>/s of ISO viscosity.



Do not use any lubricating oil other than that which has been recommended.

Use lubricating oil of the same grade made by the same manufacturer.

## 5-2 Refilling lubricating oil

When the oil level is lowered, “OILLEVEL ERR” is noted on the LCD, and the pump operation is stopped. After refilling oil, press the RESET & FEED key to reset the alarm. At the same time that the alarm is reset, the operation starts from the pump operation.

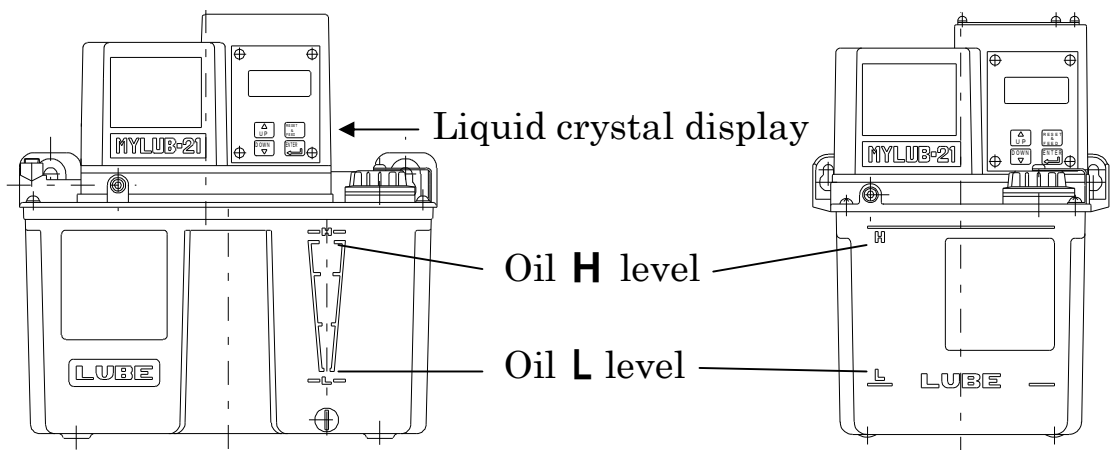


Use new lubricating oil. If lubricating oil contains any foreign substances, clogging may occur, causing the pump to stop discharging oil.

Refill it through the refill port that you find above the pump flange.



If lubricating oil overflows or leaks, wipe off the overflowing or leaking oil.



# 6. Maintenance

## 6-1 Suction filter

Replace or clean filter once a year.



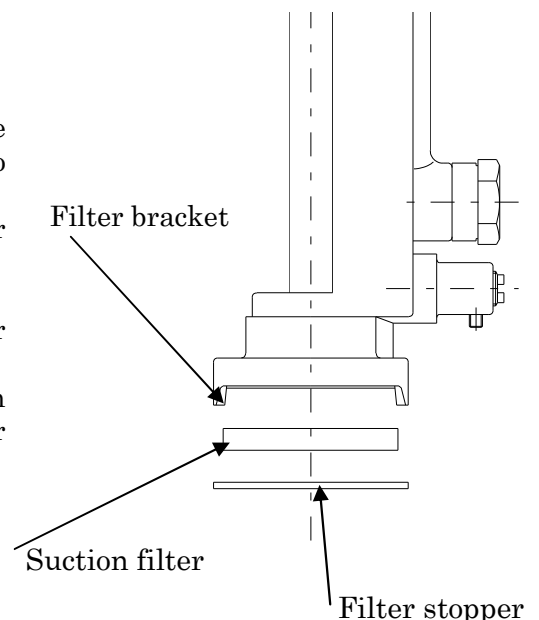
Before conducting maintenance on the pump, turn off the power and make sure that the pump is not operating. Conducting maintenance with the power turned on will increase the risk of the operator getting an electric shock or the fingers being pinched in moving parts of the pump drive unit. Also make sure that the supply of air is cut at the air supply source.



Proper lubrication cannot be expected if the suction filter is clogged or become dirty because oil may not sucked well Clogged or dirty suction filter may cause over load, too.

### Replacement of suction filter





- 1) Tank off pump from tank
- 2) Hold the filter stopper located under the filter bracket using your fingers to remove it from the filter bracket.
- 3) Remove the suction filter located filter bracket in the filter bracket.
- 4) Replace or clean filter.
- 5) Insert the suction filter into the filter bracket.
- 6) Set the filter stopper by inserting both its ends into the holes of the filter bracket firmly.
- 7) Set pump on the tank.






## 6-2 Troubleshooting

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When troubles occur, take the measures as defined in the chart below.

Trouble	Cause	Measures to take
No oil discharged from pump	Low oil level	Refill the same oil in use  Refer to “5. Lubricating oil and refilling”
	Clogged suction filter	Clean or replace filter, or change oil to new oil  Refer to “6-1 Suction filter”
	Damage in the tubing inside the pump (Twisted, crashed, or disconnected)	Tighten or replace the connecting parts
	Viscosity is too high, so that oil can not be sucked	Recheck oil in use and replace it to proper oil  Refer to “5. Lubricating oil and refilling”
Pressure in main tubing is not built up	No oil discharged from pump due to any of above causes	Refer to above measures
	Air in the tubing	Take off closure plug(s) at the end and operate pump and bleed air in tubing
	Foreign particle(s) at the ball seating section of relief valve	Contact LUBE
	Pump discharge low pressure due to relief valve wrong pressure setting	Contact LUBE  The relief valve pressure has been set before shipment

Trouble	Cause	Measures to take
Pressure in main tubing is not built up	Oil leaking from pump discharge port or pipe connection parts on machine (Due to looseness or excessive tightness)	Tighten them with proper torque or re-pipe them  For proper torque refer to “Tightening Level for Connecting Sections” of the next page
	Damaged tubing	Replace damaged tubing
Air in the system	Air in the system due to above reasons	Refer to above measures for “Air in the pump” and “Air in the tubing”
	Due to low level of oil in tank, air is introduced into pump	Refill tank with same or equivalent oil and then bleed air
No oil discharged from valve(S)	Pressure does not increase	Refer to above measures for “Pressure in main tubing is not built up”
	Viscosity is too high, so the reaming pressure are not relieved completely	Check oil and change oil to proper oil  Refer to “5. Lubricating oil and refilling”
DIS is indicated, but the pump does not operate.	Wire connection error in the motor	Check the connection of the wire connected from the motor.
Nothing displayed on LCD	The circuit protector is set to OFF.	Press the red button for the circuit protector to recover the operation.
Failure indication of PRESSURE ERR	Because a short operation time is set, the pressure switch does not operate.  Same cause explained in “Pressure in main tubing is not built up”	Check the time set for the pump operation.  Take the steps explained in “Pressure in main tubing is not built up”.

Trouble	Cause	Measures to take
Failure indication of OILLEVEL ERR	Oil level low	Refill the oil, using the same brand and grade as currently used.  Refer to “5. Lubricating oil and refilling”.
Failure indication does not disappear.	The RESET & FEED key is not pressed.	Press the RESET & FEED key to recover the operation.
Failure is indicated, but the failure is not output.	Wire connection error in the external signal	Check the wire connection for the external signal.
	Contact capacity exceeded	Check the set capacity.

## ■ Tightening Level for Connecting Section

	Tightening level	Reference torque (N·m)
OD 4mm nylon pipe (Valve discharge port)	Turn compression bushing with hands until it stops and then tighten it 2/3 turn with a spanner ,etc	3. 5
OD 4mm copper tubing & steel tubing (Valve discharge port)	Turn compression bushing with hands until it stops and then tighten it 2/3 turn with a spanner ,etc	4. 1
OD 6mm copper tubing & steel tubing (Undercut joint)	Turn the nut part with hands until it stops and then tighten it 2/3 turn with a spanner ,etc	3. 5
OD 6mm copper tubing & steel tubing (Undercut joint)	Turn the nut part with hands until it stops and then tighten it 2/3 turn with a spanner ,etc	4. 1
Taper screw for tubing Rc1/8 (Pump discharge port & junction)	Turn the undercut joint with hands until it stops and then tighten it two and a half to three turns with a spanner , etc	7. 1

# Appendix. Oil Contamination

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## Causes and Measures

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### ■ Causes

Causes for contamination can be divided into two categories.

- Before the completion of installation  
Foreign particles in the tubing or pump tank.  
( Manufacturing defects of the assembly parts or connecting parts and unconformity during construction.)
  
- During operation  
Foreign particles from outside or generated inside of the system.  
(Condensation of the moisture in the air due to change in temperature or sludge by oxidation of lubrication oil itself.)

### ■ Measures

1. Clean the tank and remove the foreign particles.
  
2. Keep the oil for refilling in the proper place.  
If the system is installed and/or oil is stored outdoors, proper care must be taken since introduction of dust or rain into the oil would lead to system malfunction.