



## INSTRUCTION MANUAL



### Product: LD-type Motor Driven Pump

#### Attention for Safety Use

Before operation, read carefully the instructions below for the safety use of LUBMAX lubrication system.

These safety-use instructions, composed of “ Warning” and “ Caution”, are designed to protect customers from any possible harm and damage caused by misusing this system.

Read and follow these instructions carefully to prevent misuse-driven this system troubles and protect yourself from danger.

- |  |   |
|--|---|
|  <b>Warning</b> | If ignoring instructions with this sign and operating wrong way, death or serious injury will happen.     |
|  <b>Caution</b> | If ignoring instructions with this sign and operating wrong way, injury and equipment damage will happen. |

#### **WARNING**

1. Turn off the control panel's power switch before installing, removing or maintaining the product; otherwise, electric shock will happen. Or the pump will operate automatically, eventually causing leakage or diffusion and tainting the surroundings.
2. Do not step on or pull the lubricator and pipe-related section as foothold or hand rail; you will slip and fall or it will damage the lubrication system.
3. Do not remodel or disassemble the equipment. If necessary, contact us beforehand. And if on-site maintenance job is needed, professional staff familiar with the mechanism must to work on it.
4. When using the equipment, put some protectors on, in response to a situation, to avoid a wound.

#### **CAUTION**

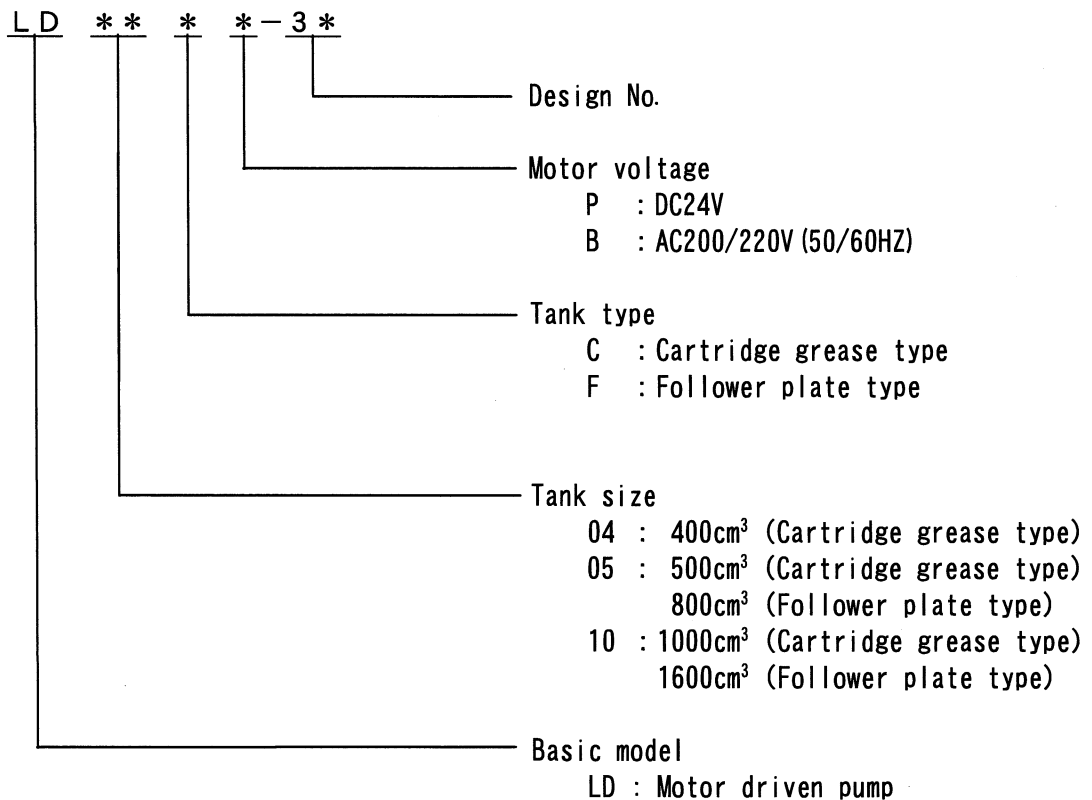
1. In case of air venting, protect the pump beforehand with vinyl case or other alternatives; otherwise, grease-contained air will diffuse and damage your eyes and other objects.
2. Use protectors whenever handling grease; otherwise eye damage or skin inflammation will happen when grease contacts your eyes or skin.
3. Do periodical inspection, such as checking grease amount and operation, to maintain the lubrication system. If do not, machine trouble driven by bearing injuring will happen.
4. Use the system within the rated capacity and under the adequate operational environment. If ignoring them and using it beyond the capacity or under the dangerous environment, including its installment nearby fire and explosives, the system will have mechanical problems or cause fire.

## LD-type Motor Driven Pump INSTRUCTION MANUAL

### 1. General Description

LD-type motor driven pump is used for single line lubricating system "LUBMAX", controlled by LC2M-type controller and it lubricates proper volume grease to bearing by combination using of LL-type distributing valve.

### 2. Key to Type Code



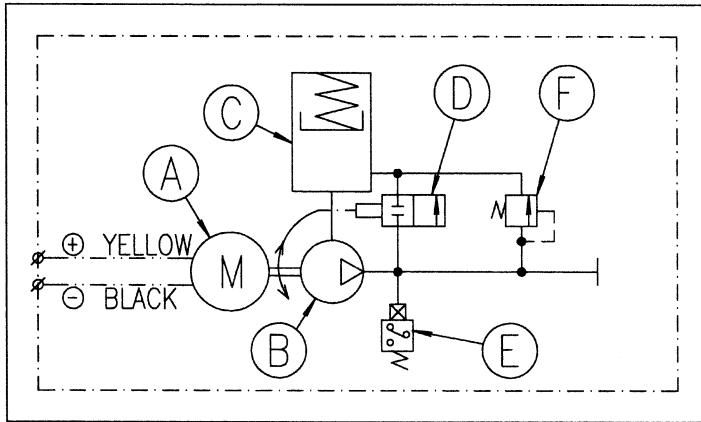
## 3. Specifications

Model		LD10CP	LD05CP	LD04CP	LD10FP	LD05FP
Max. working pressure MPa		24		21	24	
Discharge volume cm <sup>3</sup> /min		12				
Tank type cm <sup>3</sup>	Cartridge type	1,000	500	400	---	---
	Follower plate type	---	---	---	1,600	800
Working temperature range °C		-20 to +60		-5 to +50	-20 to +60	
Vibration resistance (Max.) G		8.9				
Consistency of applicable grease		No. 0 to No. 2 (Lithium group)				
Source voltage V		DC24				
Rated current A		3.5 (Max. : 6.5)				
Protection class		Drip-proof				

Model		LD10CB	LD05CB	LD04CB	LD10FB	LD05FB
Max. working pressure MPa		17				
Discharge volume cm <sup>3</sup> /min		8.3/10 (50/60Hz)				
Tank type cm <sup>3</sup>	Cartridge type	1,000	500	400	---	---
	Follower plate type	---	---	---	1,600	800
Working temperature range °C		5 to +50				
Vibration resistance (Max.) G		3				
Consistency of applicable grease		No. 0 to No. 2 (Lithium group)				
Source voltage V		AC200/220 (50/60Hz)				
Rated current A		0.30/0.26				
Protection class		Drip-proof				

4. Circuit Diagram

DC MOTOR



Formation

A : DC motor or AC motor

B : Pump

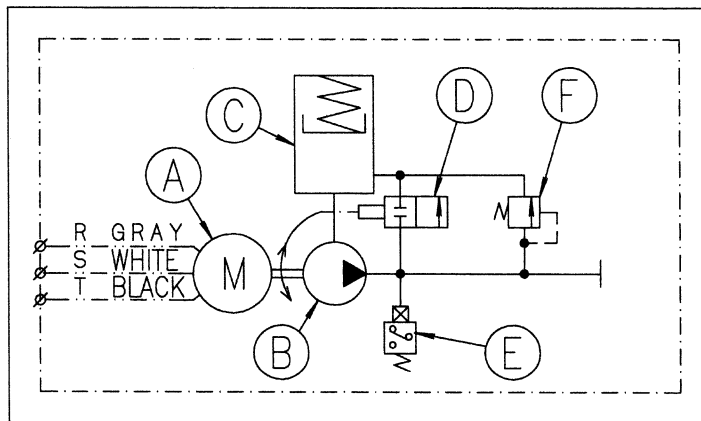
C : Tank

D : Pressure-releasing valve

E : Pressure switch

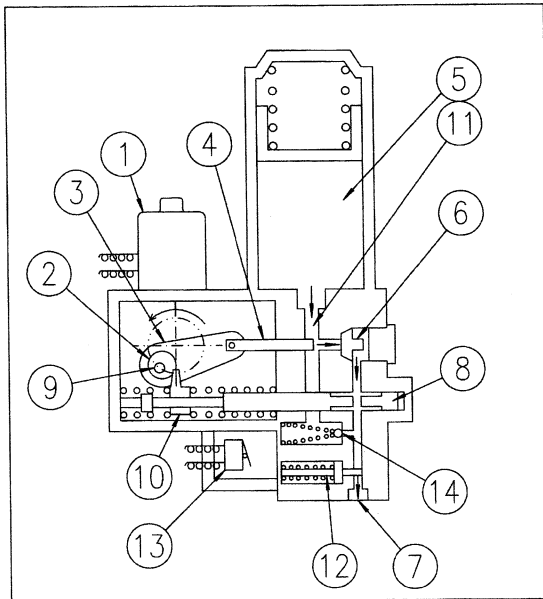
F : Relief valve

AC MOTOR



## 5. Principle of operation

### 1) Lubrication and pressurizing

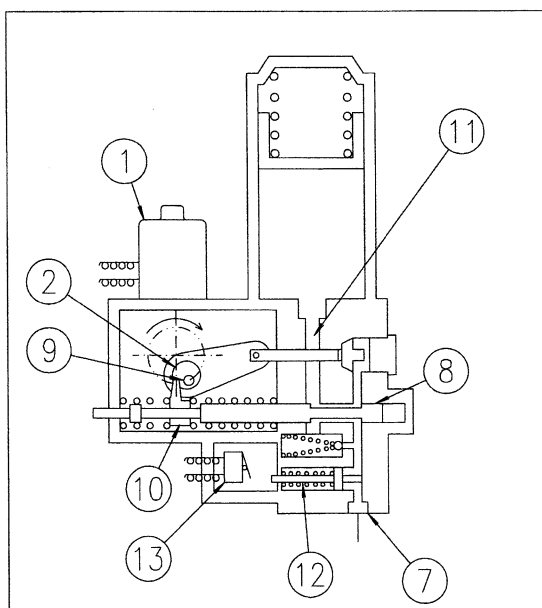


- When ① Motor starts on forward rotation, ② Eccentric wheel rotates counter-clockwise to put Pump piston in reciprocating motion through ③ Link plate. The pump piston will suck in grease contained in ⑤ Tank in its return stroke and push ⑥ Check valve to open it, so that grease is pushed out toward Discharge port path ⑦.
- ⑧ Pressure-releasing spool is allowed to move rightward by ⑨ Pin of eccentric wheel and ⑩ Pressure-releasing hook, so that Discharge port path ⑦ and Return path ⑪ are blocked to hold the pressurized condition.
- When pressure in main pipe increase upon completion of lubrication, ⑫ Indicator of pressure switch is pushed out to turn ON ⑬ Limit switch, so that ① Motor comes to a stop.

When the limit switch is turned OFF with the decrease of pressure, the ① Motor will restart to hold the pressurized condition.

- In case of abnormal pressure in the discharge port path, ⑭ Steel ball of relief valve will open to allow the pressure to escape into Return path ⑪ so that the given pressure will not be exceeded, thus protecting the circuit.

### 2) Pressure-releasing and on-standby



- When ① Motor starts on reverse rotation, ② Eccentric wheel will rotate clockwise. ⑧ Pressure-releasing spool is allowed to move leftward by ⑨ Pin of eccentric wheel and ⑩ Pressure-releasing hook to put Discharge port path ⑦ through to Return path ⑪, thus putting the circuit in pressure-released condition. Even if the pump piston makes reciprocating motion at this time, the volume of discharge will return to the return path to prevent pressure from rising.
- When the pressure in main pipe drops to pressure-released condition, ⑫ Indicator of pressure switch is pushed back to turn OFF ⑬ Limit switch, so that ① Motor comes to a stop. Unless the limit switch is turned OFF, the ① Motor is rotated in reverse by controller to release pressure from the discharge port path.

## 6. Selection of the Tank

## ① C-type Tank

- Grease replenishment of screw- in cartridge system is extremely easy without smearing the hand, permitting work to be carried out cleanly.  
As dust and air are hardly intermixed, troubles with the lubrication system can also be prevented. However, careful attention should be given to availability of the grease in the place where it is used due to the fact that suppliers of cartridge grease and kinds of grease are limited.

## • Type of Genuine Cartridge Grease

Type	GKL--100	GKL--050	G-KL1	GSL--100	GSL--050
Volume cm <sup>3</sup>	1000	500	400	1000	500
Name of grease	UNILIB DL			ALVANIA EP	
Grease oil	Kyodo Oil			Showa Shell Oil	
NLGI consistency No.	Grease No. 0 to No. 2 (*) (Lithium group)				

Note) Maker (\*) in Type Code represents consistency No.

## ② F-type Tank

- For grease replenishment, optional grease charge pump should be used. This tank should be selected in the local area where cartridge grease is unavailable or in the case where grease other than genuine one has to be used.

## 7. Procedure for Installation of the Pump

- 1) For installation, select such a place as is easy of inspection and grease replenishment, free from exposure to direct sunlight, and excellent in environmental conditions pertaining to sand and soil, dust, heat, vibration, etc. It is ideal to keep it with cover.
- 2) For the tightening torque to the pump discharge port piping Rc 3/8, apply 3000 to 3400 N · cm.
- 3) For wiring to DC motor and limit switch, use cables equivalent in size to those which are appended to the pump and connect them securely with solderless terminals or connectors. Refrain from using ornamental terminals as they may cause contact failure.
- 4) Where the pump is to be painted, carry out the painting work after masking resin parts such as tank cover, pressure switch cover, connectors, etc. to protect against deposition of paint.

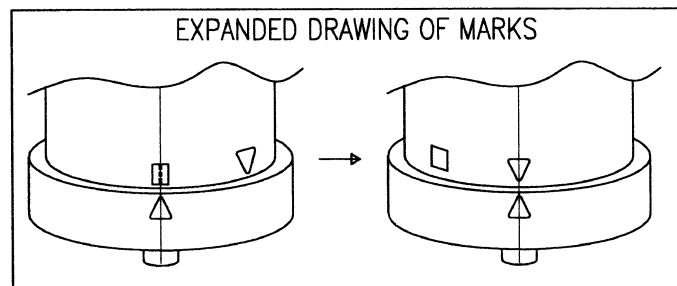
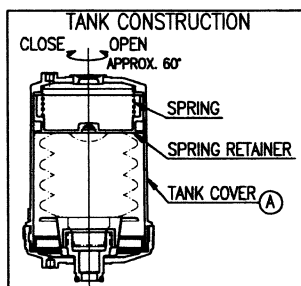
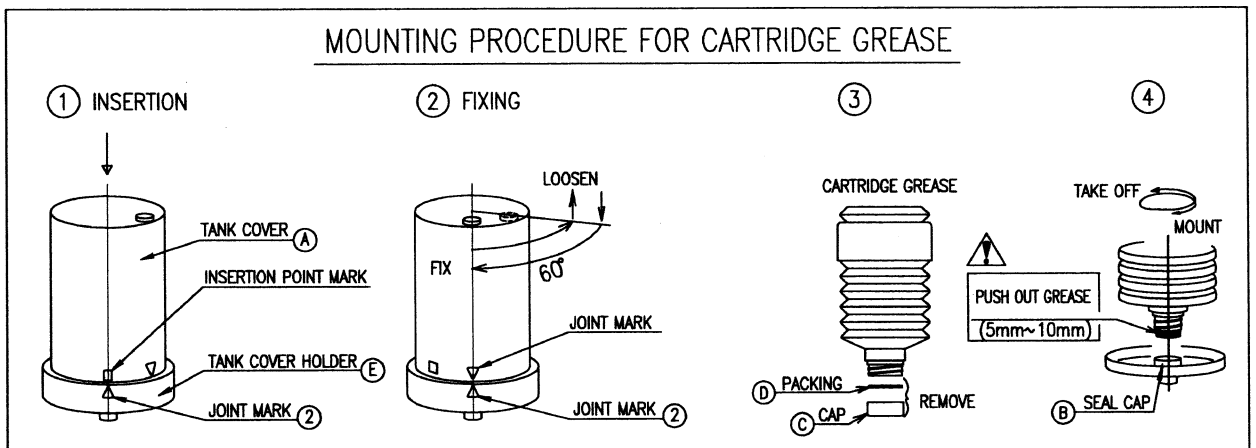
## 8. Mounting procedure for cartridge grease

### ① Mounting procedure for cartridge grease of C-type Tank

Carry out replacement of cartridge grease in according with the following procedure.

Note. Insufficient screwing up may lead to inclusion air so that pump work would be blocked.

- 1) Rotate (A) Tank cover counterclockwise by approx. 60° to take it Off.
- 2) Remove the used-up cartridge grease by counterclockwise rotation.  
At this time, do not remove (B) Seal cap. Next remove (C) Cap and (D) Packing of brand-new cartridge grease firmly screwing-up the Cartridges grease.
- 3) When mounting, slightly press down the cartridge grease (Approx. 5 to 10 mm) to allow grease emerge from the open end and screw up the cartridge into the section port, so that no inclusion of air is caused.
- 4) Joining "Insertion point mark" of (A) Tank cover on to (E) Tank cover holder, insert and rotate clockwise to tighten up it firmly until it has become fixed as it was. At this time, rotate it until a point of sound "clack".  
Insufficient tightening may cause (A) Tank cover to be loosened by the vibration of main machine.

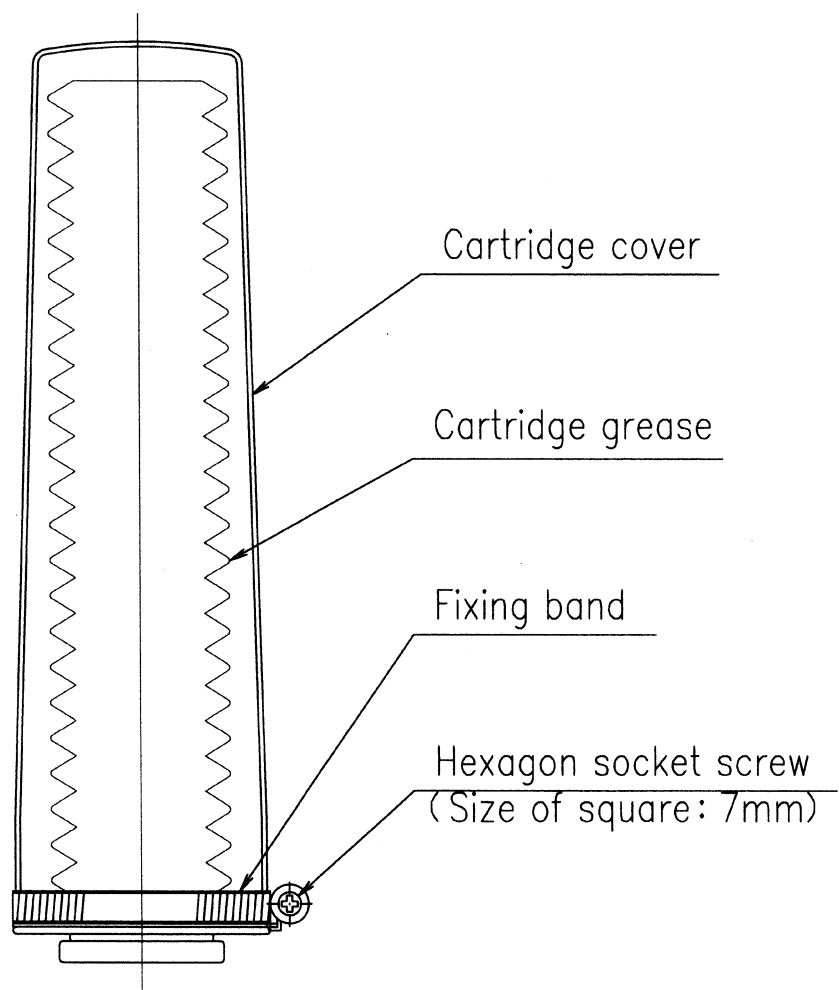


## 5) Case of LD04C\*-33

Install general goods in the market for cartridge grease 400cm<sup>3</sup>.

Install following method.

- Loosen hexagon socket screw (size of square is 7mm) of fixing band. (Using a spanner or a screwdriver)
- Remove cartridge cover of the pump pull up (to be felled down) by hand.
- Screw the top of cartridge on the part of center screw of the pump body.
- When put the cartridge cover as it was, and tighten the screw of fixing band, installation is completed.



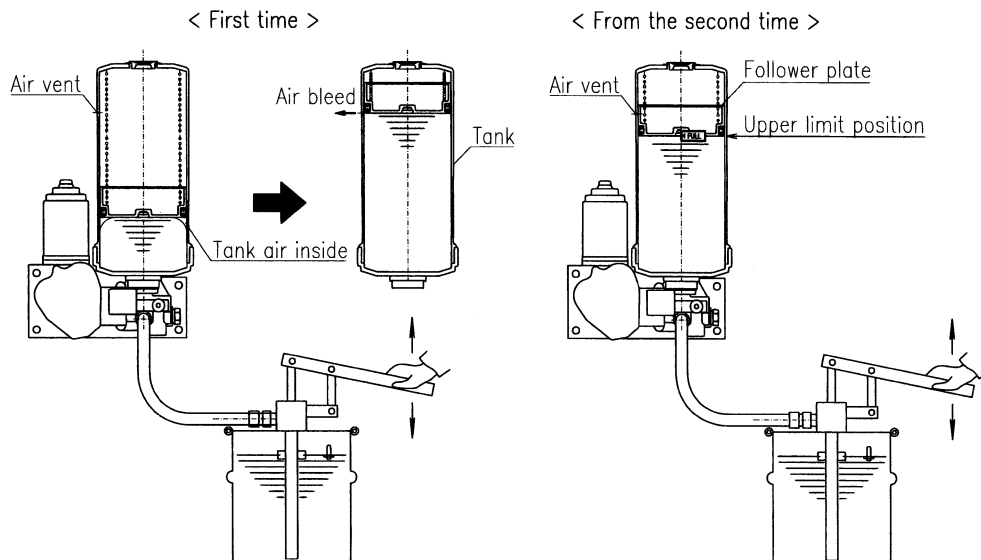


## ② Grease filling procedure for F-type tank

For grease replenishment, be sure to use Model FM3 grease filling pump and carry out replenishment work so as not to allow air and dust to be intermixed in accordance with the following procedure.

In addition, carry out the replenishment work at environment over 10°C.

- (1) Make preparation for brand-new 18-kg pail-can grease and remove the cover. First press the follower plate of grease filling pump against the surface, then insert the pump and set the exclusive cover to the pail-can.  
Next operate the pump handle and make sure that fresh grease comes out from the leading of hose.
- (2) After removing the cap of pump discharge port, screw up the hose fitting into the port and operate the filling pump.
- (3) Greasing replenishment. (see the figure below)  
<First time>  
Replenish grease to the air vent.  
※For bleeding work at the bottom of the follower plate.  
  
<After the second time>  
Grease up to **FULL** (upper limit position) in the tank.  
※If it exceeds the upper limit position, there is possibility of grease leakage and do not exceed.
- (4) Upon completion of grease replenishment, disconnect the hose fitting and be sure to fit the cap to the pump feed port.
- (5) When the grease in pail-can becomes empty, do not gather and put the grease remains in the bottom or side into next pail-can, because it may cause the mixture of dust or air.  
And once the air is mixed into the filling pump, put the filling hose out of lubricating pump. After the clean grease begins to be delivered continually, connect the hose and replenish the grease again.

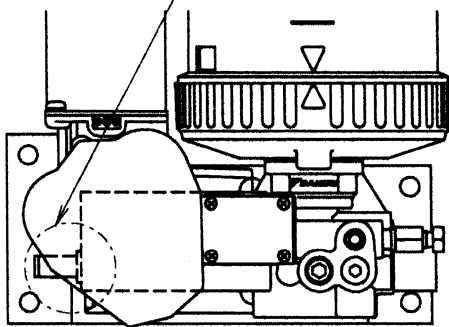


9. Procedure for air venting of the pump

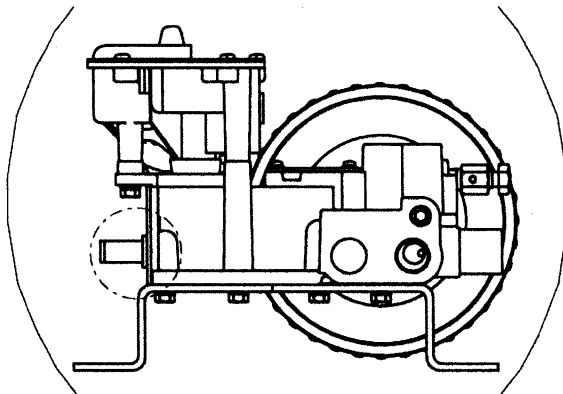
Before starting operation, confirm that the power source to lubricating system is turned off, the electric power source is completely stopped and the pressure in lubricating circuit is released. Note 1)

Note 1) Way of confirmation of pressure condition in Lubricating circuit

Point to confirm



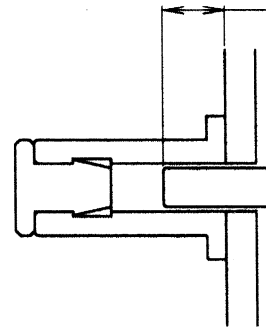
Position from bottom view



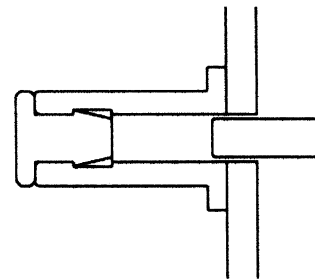
Pressure-releasing condition  
Lubricating circuit is connected to tank line.

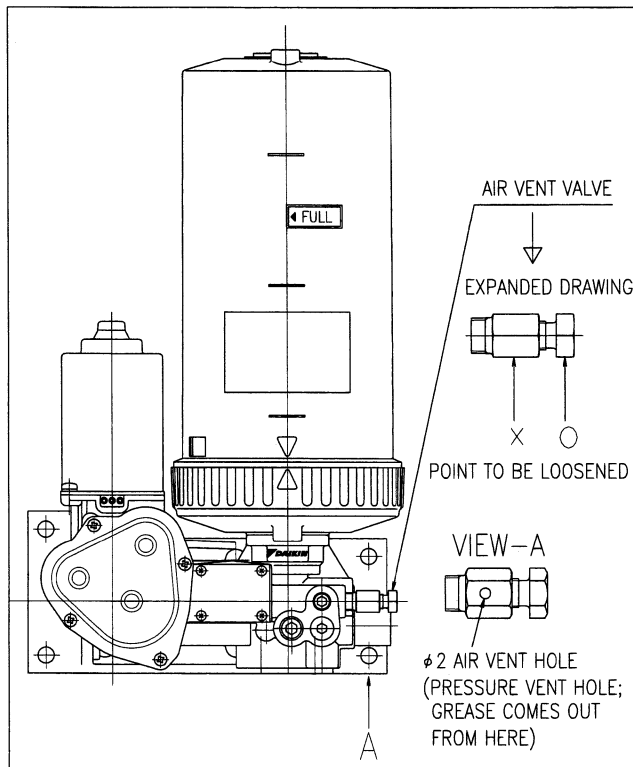
Sectional view

Approx. 5mm



Pressure-feeding condition  
Lubricating circuit is connected to pressure feeding line.





After loosening air vent valve of the pump side with spanner of hexagon 12, turn on the power and push the start key to operate the pump.

At the same time, from air vent hole grease include bubble push out entirely and fresh grease comes out continuously, then turn off the power to stop the pump. At this time, be careful of direction of air vent hole (that looks down) and be careful to avoid the grease comes into your eyes.

After that, tighten air vent valve. Tighten by hand first, when it becomes tight, tighten again by wrench at angle of approx. 30° .

## 10. Procedure for Maintenance of the Pump

### 1) Routine checks

- In the initial stage, check for the extent of the fall of tank grease level in proportion to the operating time of main machine. Thereafter, proper consumption of oil can be checked by watching the fall of grease level. It is also convenient to check and record the number of days taken until empty tank after full tank.
- Check the periphery of tank for leaks of grease. If there are any leaks of grease around the tank, wipe off and find the cause of leakage to repair. As the cartridge type may be insufficiently or obliquely screw up the cartridge perpendicularly and firmly in position.

### 2) Periodic inspection

- Put the pump into operation with the optional operation button of controller and check if it performs lubrication normally. If pump pressure increases in normal operation, the indicator located on the front-face pressure switch section will operate to turn ON the switch, so that the motor comes to a stop.

## 11. Others

- 1) As the pump casing is internally sealed up with molybdenum-group No. 2 grease, seal it up internally with the same grease by 30 g when it has been disassembled for repairs.
- 2) Since pressure switch and safety valve are preset by pressure, do not disassemble and decompose them.