

Pump for quick-drying, biodegradable oil

VBP-type

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



LUBE CORPORATION

Introduction

■ System application

The VBP pump for quick-drying, biodegradable oil is a pneumatically driven pump that supplies a small amount of this oil to each processing lubrication point.

Do not use this pump for any other purpose.

■ 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.

	Indicates a potentially hazardous situation which, if ignored, could result in death or serious injury.
	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:

■ Japan

LUBE Corporation Head Office

3-30-16(Horizon 1), Nishi Waseda, Shinjuku-ku, Tokyo,
169-0051 Japan

TEL:81-3-3204-8431 FAX:81-3-3204-8520

■ China

LUBE LUBRICATING SYSTEM(SHANG HAI)CO.,LTD
C, 3F, 88 Taigu Road, Waigaoqiao Free Trade Zone,
Shanghai

TEL: 021-5868-3818 FAX: 021-5868-3880

■ U.S.A

LUBE USA , Inc.

781 Congaree Road, Greenville, S.C.29607

TEL:800-326-3765 FAX:864-242-1652

■ 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.

Table of Contents

Introduction	1
Table of contents	3
1. Safety precautions	4
1-1 Basic safety precautions	4
1-2 Labels	4
1-2-1 Types of labels	5
1-2-2 Location of labels	5
2. Specification and outline	6
2-1 Specification	6
2-2 Name of each component	7
2-3 Product list	9
3. Installation	10
3-1 Environmental requirement	10
3-2 Mounting unit	10
3-3 Wiring	12
3-4 Tubing connection	12
4. How to control the pump	13
4-1 Discharge volume adjustment method	13
4-2 Pulse generator adjustment method	14
4-3 Pump operation	15
4-3-1 Normal operation	15
4-3-2 Bleeding air	16
4-3-3 Abnormal output (On at low level)	16
5. Example of laying out system	17
5-1 Oil shot method	17
5-2 Oil/air method	18
5-3 Oil mist method	19
6. Oil and refilling	20
6-1 Oil to be used	20
6-2 Refilling oil	20
7. Maintenance	21
7-1 Suction filter	21
7-2 Troubleshooting	22
Appendix. Oil contamination : Causes and measures	24

1. Safety precautions

1-1 Basic safety precautions



- 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.
- Only personnel with the knowledge and skills required to install and adjust pumps for quick-drying, biodegradable oil are allowed to handle this pump.
- Never modify or change this pump without prior permission of LUBE.

1-2 Labels

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.



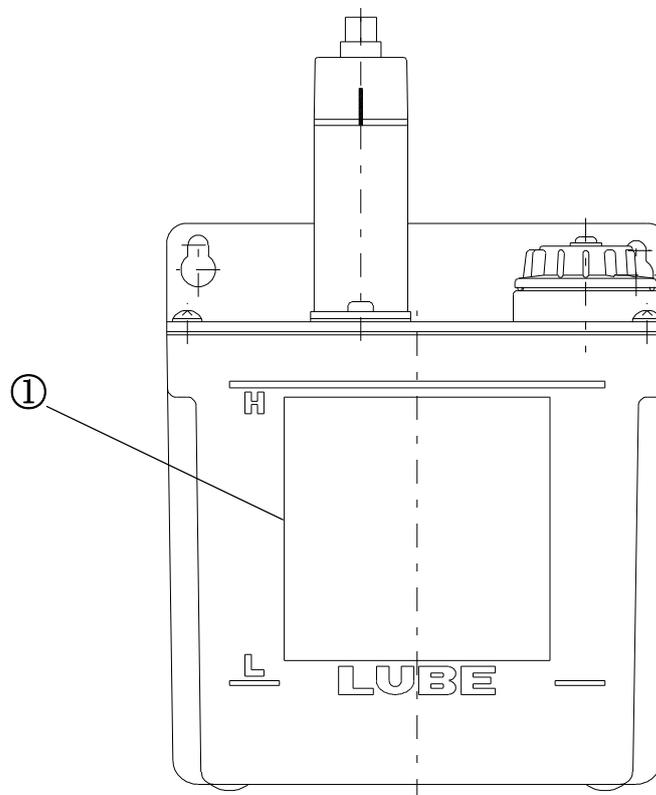
- Strictly observe the instructions on the labels affixed to the pump.

1-2-1 Types of labels

①



1-2-2 Location of labels



2. Specifications and outline

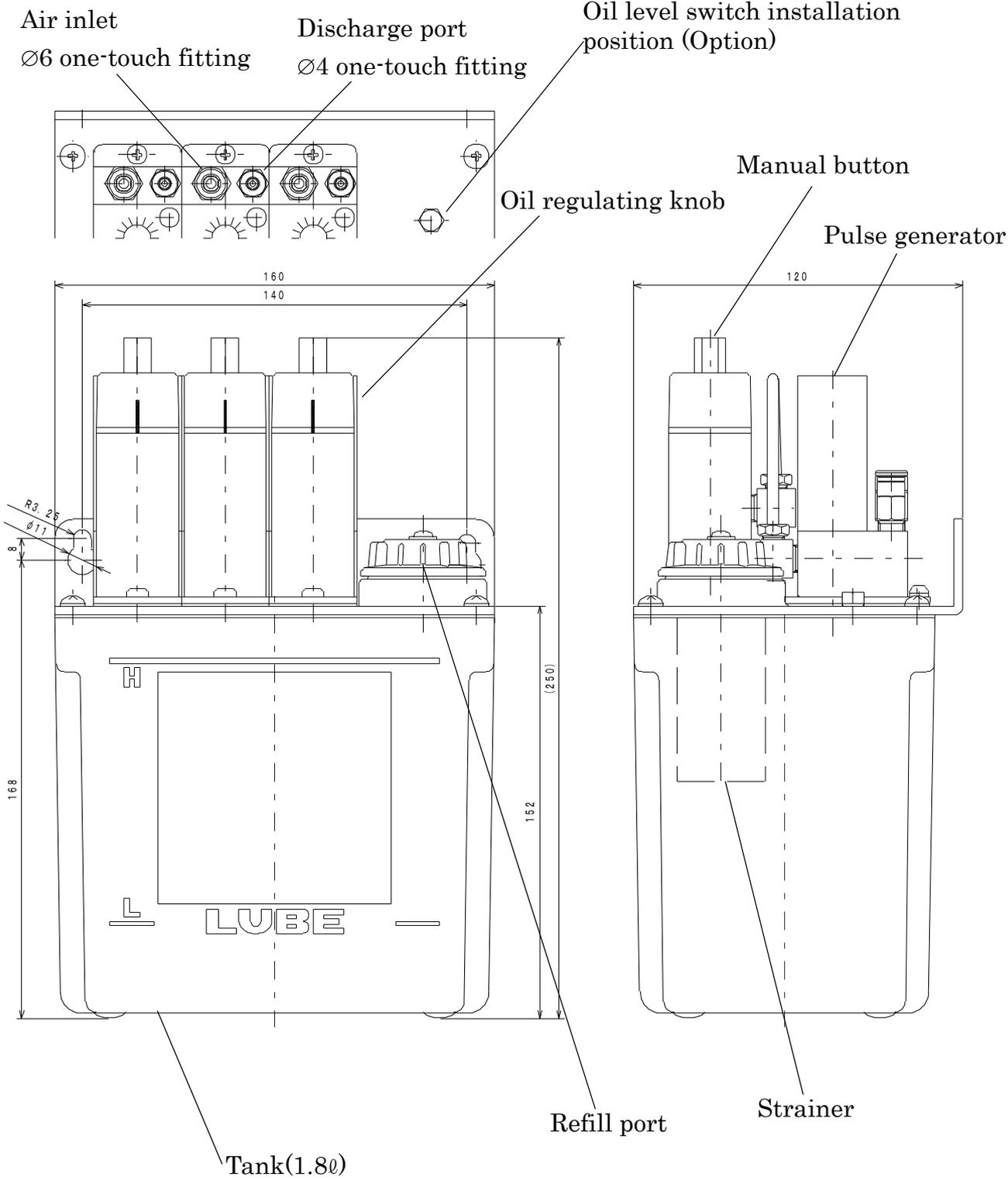
2-1 Specification

		Specification
Pump	Driving source	Compression air
	Range of use air pressure	0.3~0.7MPa (Without pulse generator) 0.4~0.7MPa (With pulse generator)
	Range of discharge volume	0~0.07 ml /shot
	Discharge cycle	2(Max) shot/sec
	Number of circuits	1.8ℓ : three circuits(Max) 3.0ℓ : five circuits(Max)
Tank	Effective capacity	1.8ℓ 3.0ℓ

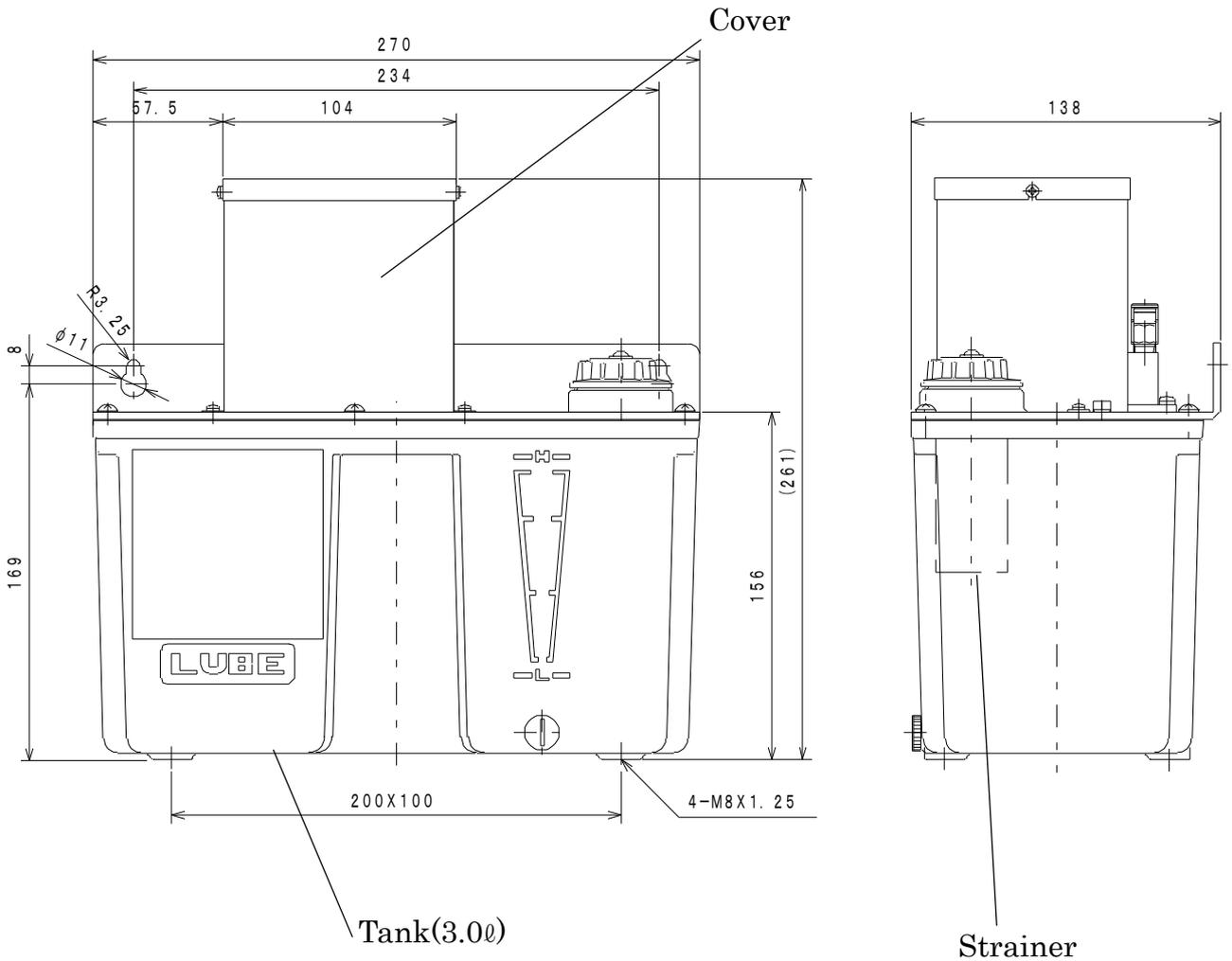
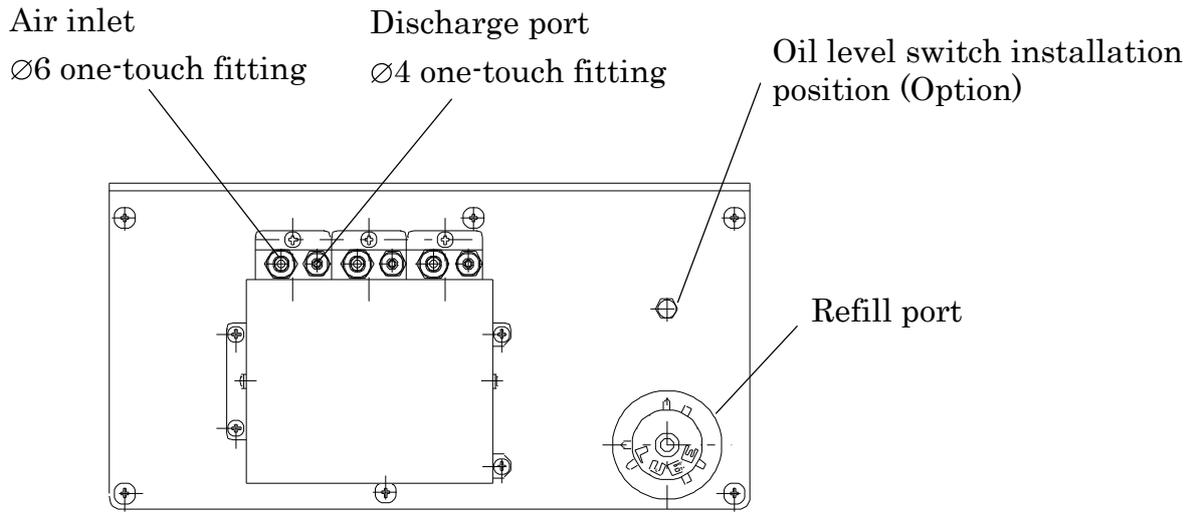
		Rated load
Oil level switch ※1	Contact type	
	A contact (on at low level)	AC,DC200V,0.5A,30W whichever is smaller
B contact (off at low level)		

※1:Optional parts

2-2 Name of each component



VBP-3-G-18LP



VBP-3-G-C-30LP

2-3 Product list

Pump model	Code number	Effective capacity	Number of circuits	Pulse generator	Cover presence
VBP-1-18LP	112740	1.8ℓ	1	×	×
VBP-2-18LP	112741		2		
VBP-3-18LP	112742		3		
VBP-1-C-18LP	112743		1	×	○
VBP-2-C-18LP	112744		2		
VBP-3-C-18LP	112745		3		
VBP-1-G-18LP	112746		1	○	×
VBP-2-G-18LP	112747		2		
VBP-3-G-18LP	112748		3		
VBP-1-G-C-18LP	112749		1	○	○
VBP-2-G-C-18LP	112750		2		
VBP-3-G-C-18LP	112751		3		
VBP-1-30LP	112752	3.0ℓ	1	×	×
VBP-2-30LP	112753		2		
VBP-3-30LP	112754		3		
VBP-4-30LP	112755		4		
VBP-5-30LP	112756		5		
VBP-1-C-30LP	112757		1	×	○
VBP-2-C-30LP	112758		2		
VBP-3-C-30LP	112759		3		
VBP-1-G-30LP	112762		1	○	×
VBP-2-G-30LP	112763		2		
VBP-3-G-30LP	112764		3		
VBP-4-G-30LP	112765		4		
VBP-5-G-30LP	112766		5		
VBP-1-G-C-30LP	112767		1	○	○
VBP-2-G-C-30LP	112768		2		
VBP-3-G-C-30LP	112769		3		
VBP-4-G-C-30LP	112770	4			

3. Installation

3-1 Environmental requirement

Be sure to this pump in the following environment.

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

3-2 Mounting unit



Make sure to fix the pump firmly.

Insufficient mounting of the pump could fall itself and cause injury.



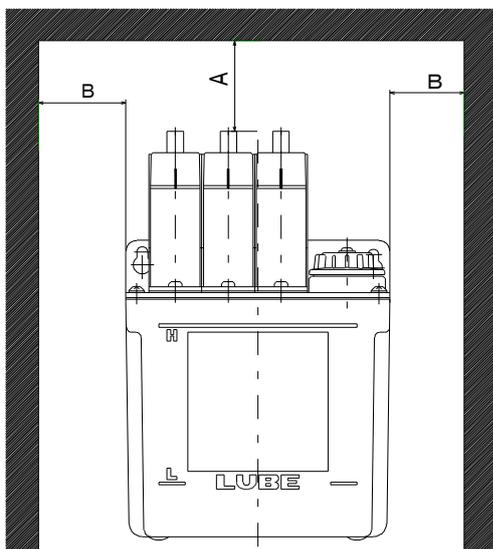
Mount and fix the pump firmly using two (2) M6 bolts (1.8ℓ with Tank)



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	Weight (kg) (see note below)	Required space (mm)
VBP-1-18LP	112740	1.6	A:150 B:200
VBP-2-18LP	112741	2.4	
VBP-3-18LP	112742	3.2	
VBP-1-C-18LP	112743	2.0	
VBP-2-C-18LP	112744	2.8	
VBP-3-C-18LP	112745	3.6	
VBP-1-G-18LP	112746	2.0	
VBP-2-G-18LP	112747	3.1	
VBP-3-G-18LP	112748	4.2	
VBP-1-G-C-18LP	112749	2.4	
VBP-2-G-C-18LP	112750	3.5	
VBP-3-G-C-18LP	112751	4.6	
VBP-1-30LP	112752	2.5	
VBP-2-30LP	112753	3.3	
VBP-3-30LP	112754	4.1	
VBP-4-30LP	112755	4.9	
VBP-5-30LP	112756	6.7	
VBP-1-C-30LP	112757	2.9	
VBP-2-C-30LP	112758	3.7	
VBP-3-C-30LP	112759	4.5	
VBP-1-G-30LP	112762	2.8	
VBP-2-G-30LP	112763	3.9	
VBP-3-G-30LP	112764	5.0	
VBP-4-G-30LP	112765	6.1	
VBP-5-G-30LP	112766	7.2	
VBP-1-G-C-30LP	112767	3.2	
VBP-2-G-C-30LP	112768	4.3	
VBP-3-G-C-30LP	112769	5.4	
VBP-4-G-C-30LP	112770	6.6	



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

3-3 Wiring



Only qualified personnel electrical work can connect wiring.

This pump has no electric wiring.

In installing electric wiring for the air supply controller, follow the instructions given in its operation manual.

3-4 How to connect pipes

The discharge port is equipped with a one-touch fitting that makes it easy to connect a pipe to it. Insert the tube as far as it will go to avoid leakage.

After fitting the pipe, make sure that there is no oil leaking from the fitting.

4. Controlling the pump

4-1 Discharge volume adjustment method

Adjust the discharge volume according to the following procedure.

- (1) Pull up the oil regulating knob to unlock it (see Fig. 1).
- (2) As shown in Fig. 1, turn the oil regulating knob toward the “-” sign (counterclockwise) until it stops.

* The knob is now at the zero discharge point.

- (3) As shown in Fig. 1, turn the oil regulating knob toward the “+” sign (clockwise) until the necessary amount of oil is discharged.

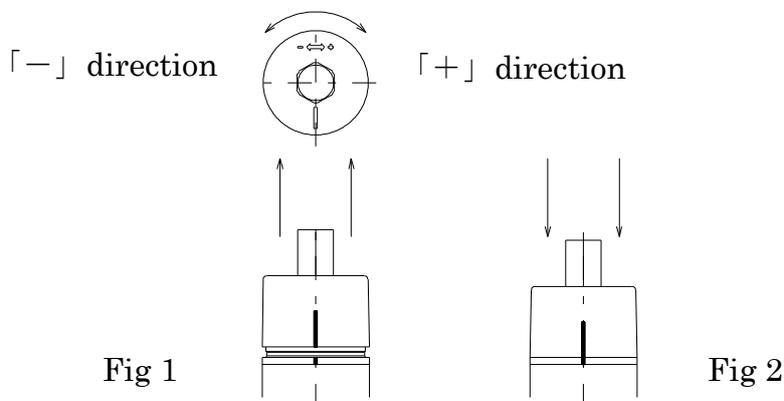
* One full turn of the knob results in an increase in the discharge volume of 0.005 ml.

* The relationship between the number of turns of the oil regulating knob and the discharge volume is shown in Table 1.

- (4) Push down the oil regulating knob to lock it (see Fig. 2).



Be sure to lock the oil regulating knob after making discharge volume adjustments. Failure to do so may result in an unwanted change in the discharge volume during operation.



Starting from the zero discharge point, the maximum number of turns that can be made to increase the discharge volume is 14. Do not exceed this limit.

Table 1 Relationship between the number of turns of the oil regulating knob and the discharge volume

Number of turns of the knob	0	1	2	4	6	8	10	12	14
Discharge volume per shot	0	0.005	0.01	0.02	0.03	0.04	0.05	0.06	0.07

[ml/shot]



The discharge volume is unstable if the knob is not rotated at least one full turn. Be sure to rotate the knob one full turn or more.

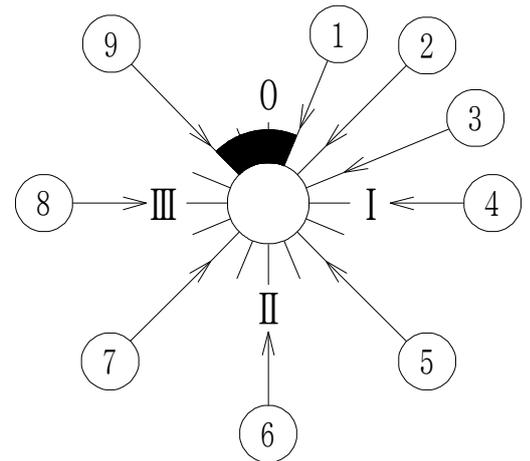
4-2 Pulse generator adjustment method

Adjust the pulse generator using a flat-blade screwdriver while referring to Table 2. The values provided in this table are only reference values. They vary by about 30%, depending on the pulse generator. Make fine adjustments to the pulse generator, using these values only as a reference.

Table 2 Relationship between the pulse generator setting and the number of discharges

Position	Scale	Compressed air pressure [MPa]	
		0.4	0.5
①	*	136	123
②	*	85	79
③	*	50	45
④	I	30	27
⑤	*	15	14
⑥	II	9	8
⑦	*	5	5
⑧	III	4	4
⑨	*	1	1

[cycle /min]





As shown in the table above, the number of discharges supplied by the pulse generator varies according to the compressed air pressure. Be sure to set the pressure level using a pressure reducing valve.



Do not use the pulse generator if the compressed air pressure is set to between ⑨ and ① (the ■ area).

4-3 Pump operation

4-3-1 Normal operation



Be sure to bleed air from the pump before the initial operation.



Refer to 4-3-2 Bleed air.

a. When using an electromagnetic valve:

- (1) Adjust the compressed air pressure within the set range and pressurize the air with the electromagnetic valve.
- (2) Turn the electromagnetic valve ON to supply air to the pump (pressurization).
→ The pump discharges air (1 shot).
- (3) Turn the electromagnetic valve OFF to release air from the pump.
→ The pump is depressurized and is ready for the next discharge.
- (4) Repeat steps (2) and (3) above.



Use a 3-port electromagnetic valve for this procedure.

b. When using a pulse generator:

(1) Referring to Table 2 in section 4-2, adjust the compressed air pressure and the setting for the pulse generator.

(2) Supply air to the pulse generator.

→ The pump discharges air.



Control the air supplied to the pulse generator by using a valve (cock) or an electromagnetic valve. When using an electromagnetic valve, make sure that you use a 2-port one for this procedure.

4-3-2 Bleed air

Air must be bled from the pump before it is used for the first time. To bleed air from the pump, operate the pump at its maximum discharge volume (14 full turns of the oil regulating knob) or by pressing the manual button.



See “4-1 Discharge volume adjustment method” for instructions on this procedure.

4-3-3 Abnormal output (below the low oil level)

* Abnormal output occurs only when the optional oil level switch is used.

When the oil level in the tank is low, the oil level switch is activated to remove oil from the tank. After it is empty, refill the tank with oil.

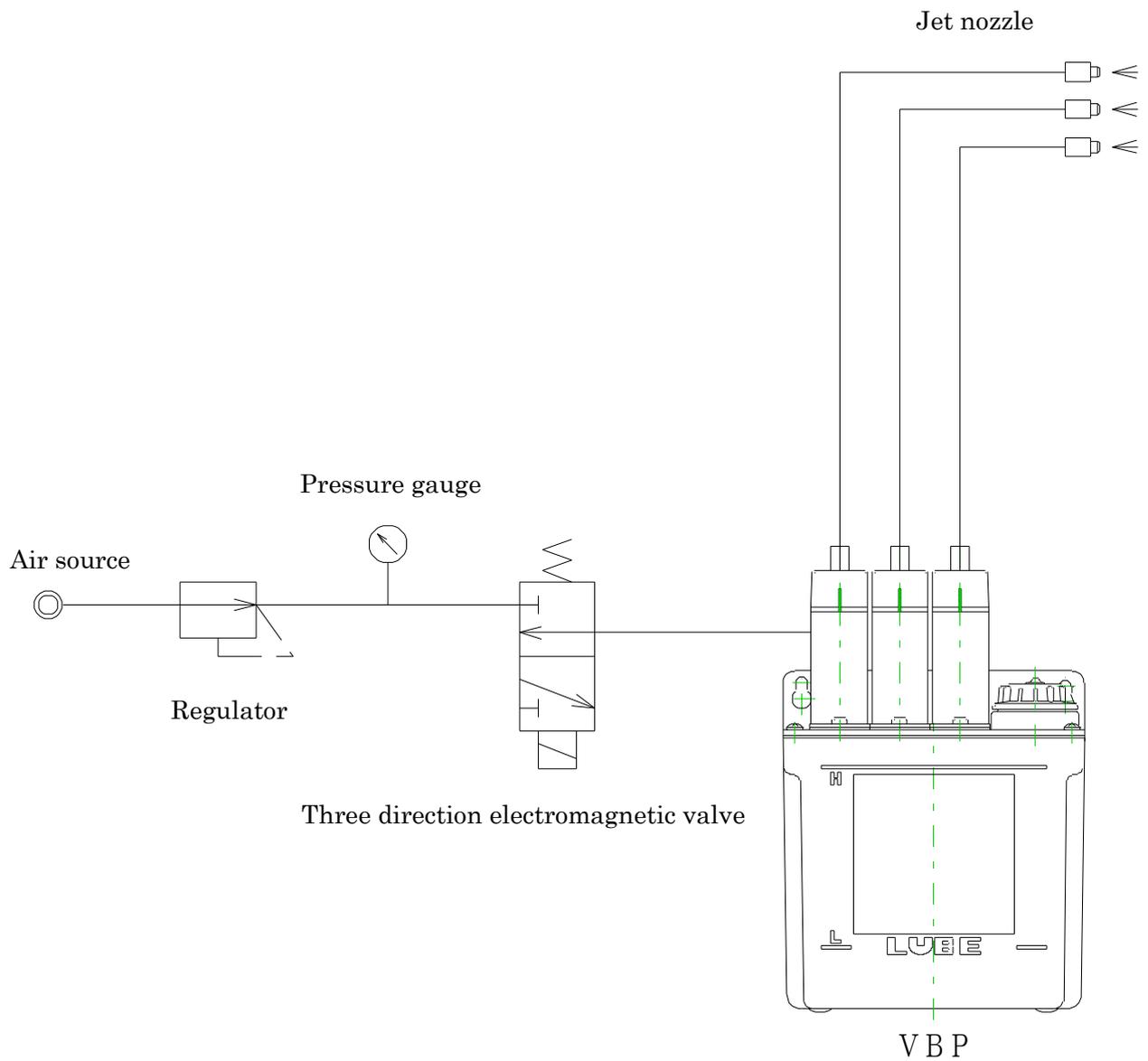


See “6-2 Refilling oil” for instructions on this procedure.

5. Example of out system

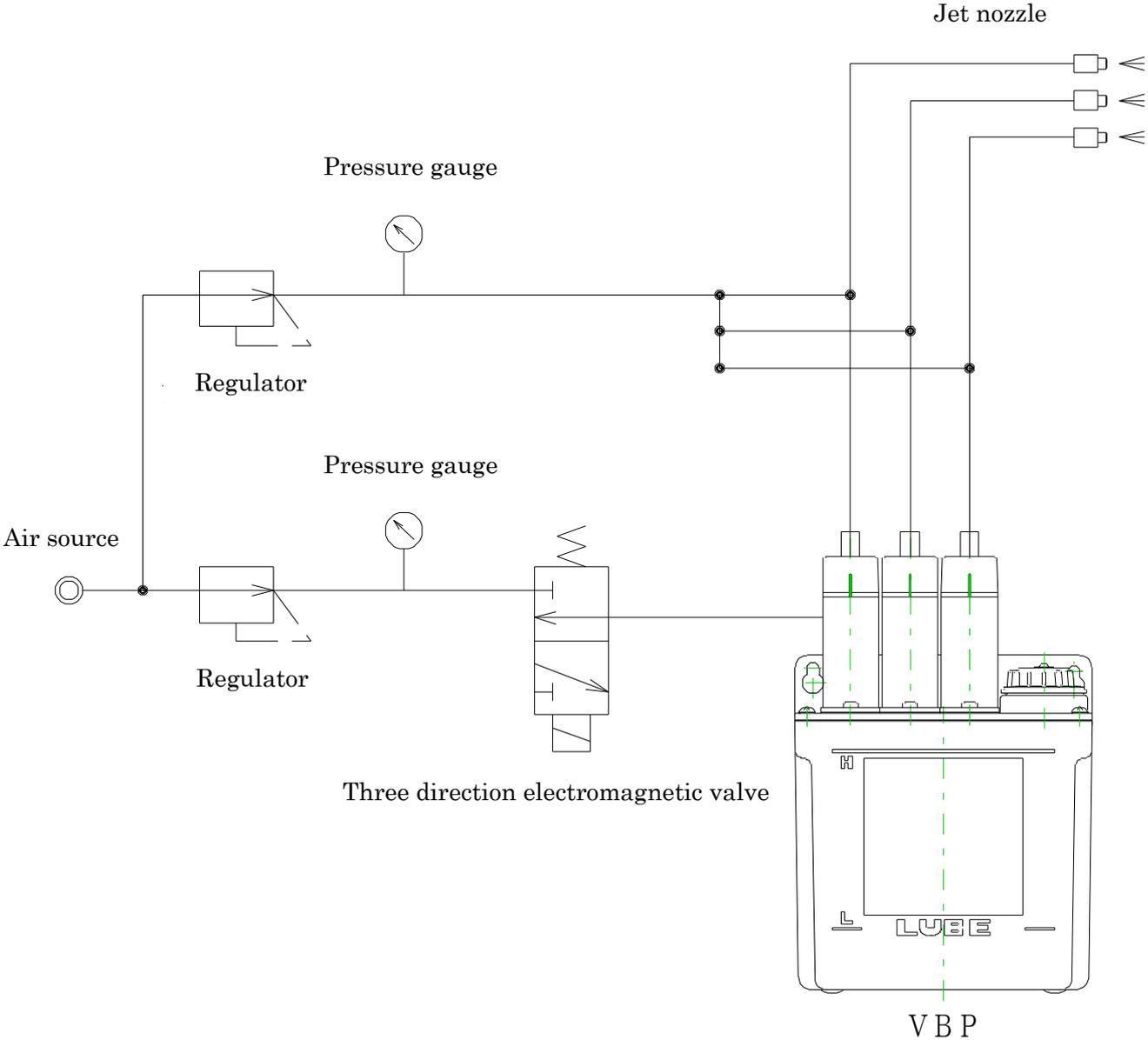
5-1 Oil shot method

This system is used only to supply oil that is to be discharged from a pump.



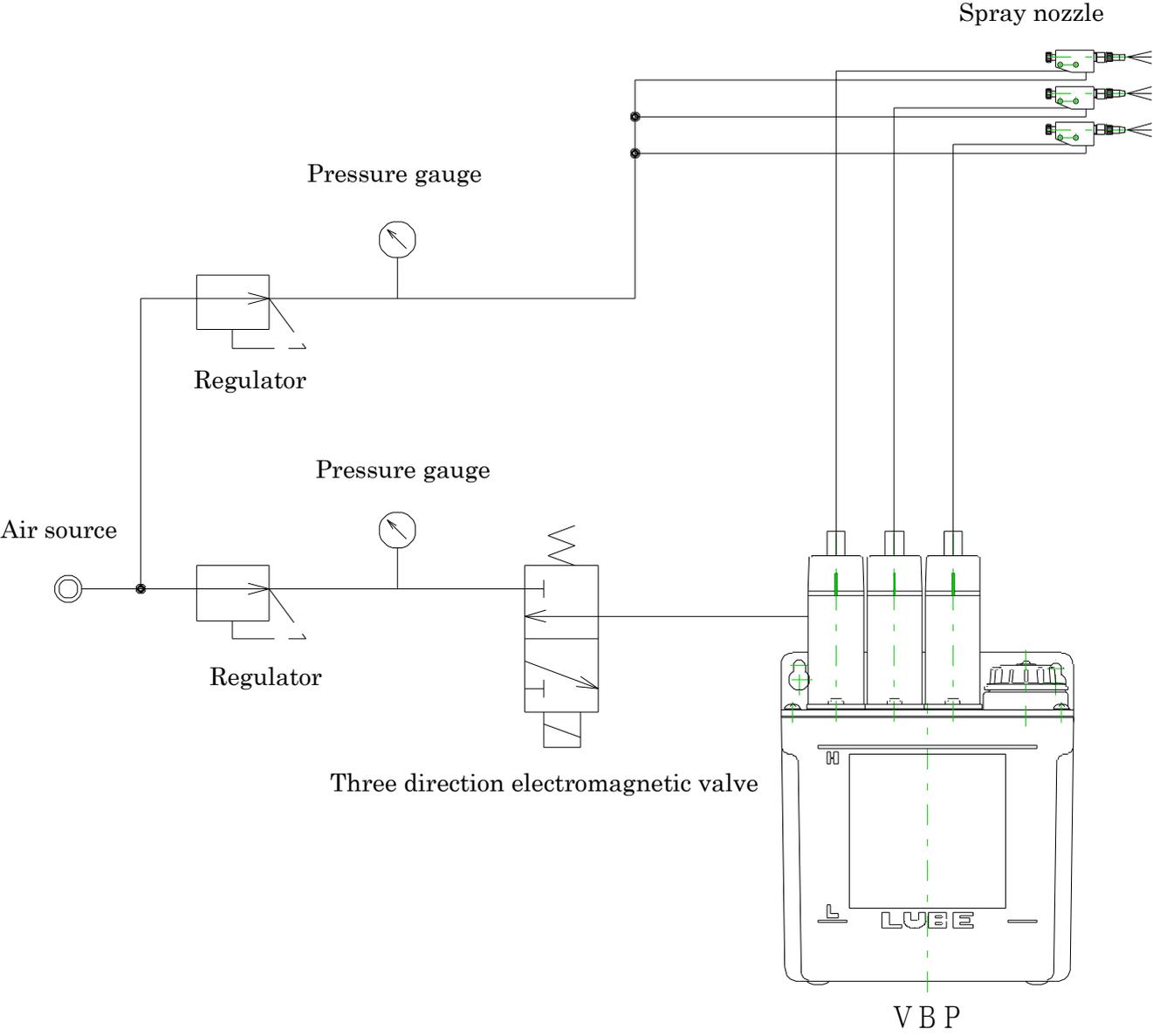
5-2 Oil/air method

This system is used to supply oil that is to be mixed with air before being discharged from a pump.



5-3 Oil mist method

This system is designed to use air to mist oil to be discharged from a pump.



6. Lubricating oil and refilling

6-1 Oil to be used

LUBE recommends the use of “Lubefit.”



For other oil products (ISO viscosity grade: 2 to 100 mm²/s), contact LUBE for information.

6-2 Refilling lubricating oil

Refill lubricating oil when the level gauge on the tank shows “L.”

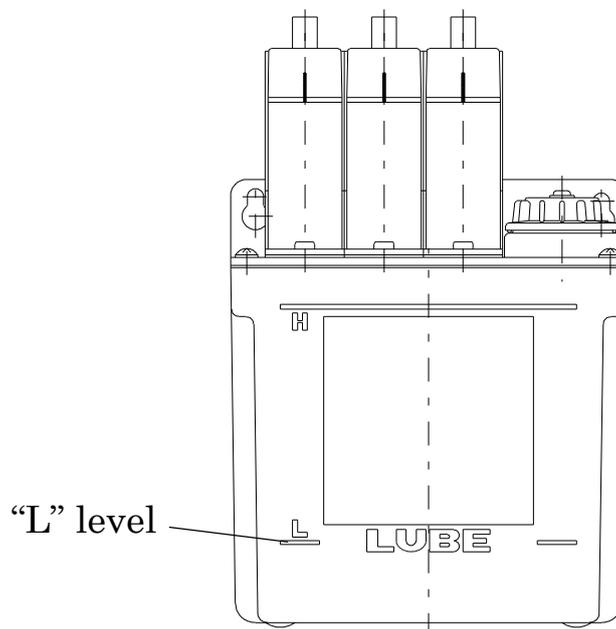
Refill it through the refill port that you find above the pump flange.



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



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



7. Maintenance

7-1 Suction filter

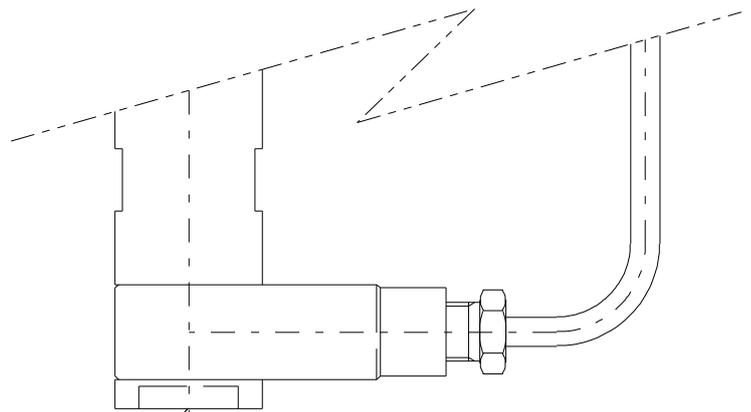
Replace the suction filter once a year or clean it periodically.



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.



If the suction filter is clogged or contaminated, the oil suction performance will deteriorate and lubricating oil will not be able to reach points of lubrication.



Suction filter

7-2 Troubleshooting

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 “6. Lubricating oil and refilling”
	Clogged suction filter	Clean or replace filter, or change oil to new oil  Refer to “7-1 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 “6. Lubricating oil and refilling”
	Air is not being supplied.	Check the compressed air pressure and then supply air. Ensure the air pipes are properly connected. If they are not, reconnect them.
	Air supply method (ON/OFF) is not working correctly.	Check if the air pipes are connected properly. If they are not, reconnect them. Check if the air control supply devices are wired correctly. If they are not, rewire them.
	Air pressure has not been adjusted.	Adjust air pressure.

Trouble	Cause	Measures to take
Air in the system	Damage in the tubing inside the pump(Twisted, crashed, or disconnected)	Tighten or replace the connecting parts
	Due to low level of oil in tank, air is introduced into pump	Refill tank with same or equivalent oil and then bleed air

■ 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	Turn compression bushing 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 1/4 turn with a spanner, etc	21
Taper screw for tubing Rc1/8 (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

Causes and measures

■ 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 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.