SMC

OPERATION MANUAL

IMPULSE-LUB

MODEL

ALIP1※00-01

ALIM1※00-2～10

SMC CORPORATION

INDEX

1.Summary.

Impulse-lub is a positive displacement piston pump, which is pneumatically actuated. This can provide a certain quantity of oil directly just before lubricating point and so is suitable for lubrication to pneumatic actuators or mechanical parts, which are difficult to feed oil by other means.

Special features

① Precise lubrication is promised by direct oil feeding just before lubricating spot.

② A certain quantity of oil feeding is made by pneumatic signal; this enables oil feeding even to less air consuming lines.

③ By arranging pneumatic signal,it also can feed oil independently from pneumatic circuit.

④ Oil discharge quantity is adjustable between range of 0.003 and 0.04cm3 per shot by manipulating handle.

⑤ From 2~3cst of low viscosity oil to less than 300 grease can be fed by this device.

⑥ Discharge oil quantity is kept away from influence of ex-ternal factors like variation of temperature.

⑦ Air entrapped in chamber of pump or in oil of pipings can be easily vented off.

2.Specification.

Model	ALIP1000-01	ALIP1100-01
*1 Pressure range of using oil.	0~0.4MPa {0~4.1kgf/cm²}	0.15~0.4MPa {1.5~4.1kgf/cm²}
*1 Viscosity of using oil. (40°C)	2~460cst	2~460cst, Less than 300 grease
Direction to install.	Facing OIL OUT upward.	Any directions.
Pipe connecting port size.Rc(PT)	1/8	
Proof pressure	1.03MPa {10.5kgf/cm²}	
Operating pressure range of signal pressure	0.25~0.7MPa {2.53~7.1kgf/cm²}	
Ambient temp. and temp. of using fluid	5~50°C	

(To be continued from previous page.)

*2 Discharge quanti-ty of oil per shot.	0~0.04cm³
Weight	0.22kgf

*1 With length of pipes and viscosity of oil, pressure of us-ing oil and dia. of required ports should be determined from items in <Selection of piping connections>.

*2 Adjustable oil feeding quantity range is 0.003~0.04cm³. It is set at 0.02cm³, when shipped from factory.

Specs of option.
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Name	Parts number	Specification				
		Operating pressure range	Volume of tank	Float switch	Max. working voltage	Max. contact rating
Oil tank	ALT10	0~0.4MPa {0~4.1kgf/cm²}	160 cm³	-	-	-
	ALT10-S1			L.limit ON	AC,DC 200 [V]	AC50[VA] DC50 [W]
	ALT10-S2			L.limit OFF		
Oil tank	ALT20	0~0.4MPa {0~4.1kgf/cm²}	1000 cm³	-	-	-
	ALT20-S1			L.limit ON	AC,DC 200 [V]	AC50[VA] DC50 [W]
	ALT20-S2			L.limit OFF		

3.Model indicating method.

● ALIP1000-01

- Pipe connecting port size
  01-Rc(PT)1/8
- Applicable oil • Pressure to discharge oil

Symbol	Applicable oil	Pressure to discharge oil
1000	Oil	Depressurized Pressurized
1100	Oil, Grease	Pressurized

- Impulse-lub

● ALIM1000-2

- Sequential numbers

2	2 series
4	4 series
6	6 series
8	8 series
10	10 series

- Model of Impulse-lub

1000	ALIP1000-01
1100	ALIP1100-01

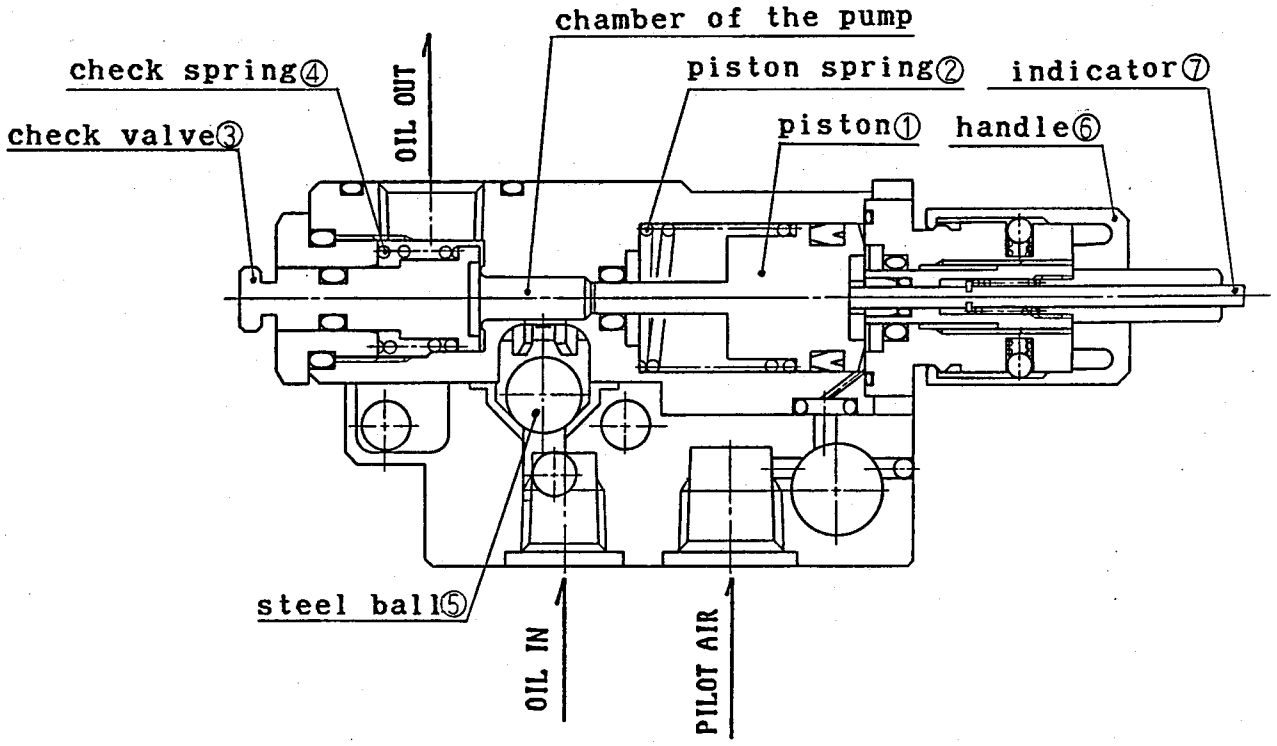
- Impulse-lub manifold

4.Operation principle.

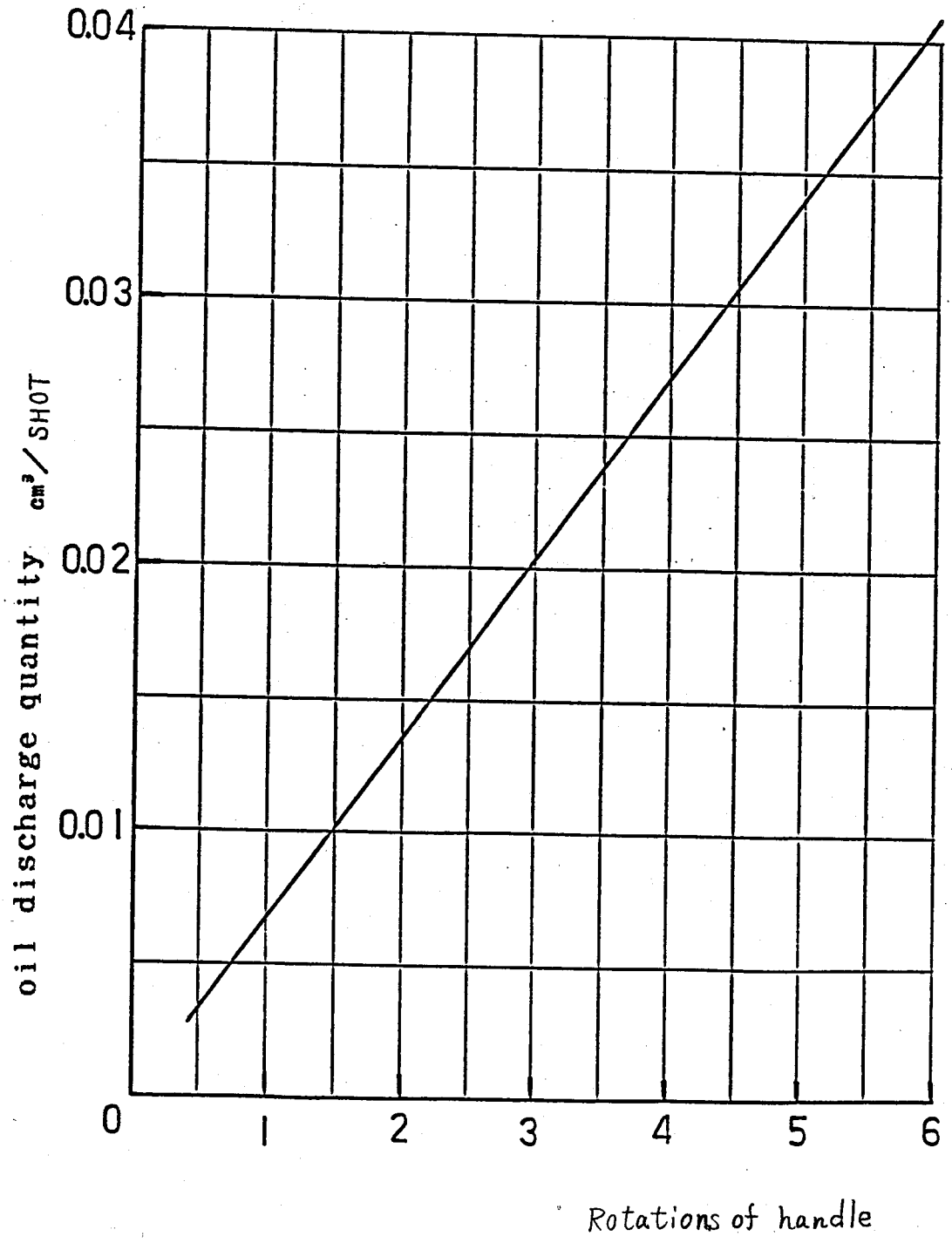
In diagram below, when pilot air is entered into primary side of piston ① , the piston ① overcomes force of piston spring ② to press the oil in chamber of the pump. At this moment, steel ball ⑤ is lowered to close inlet of oil. In the meantime, oil volume of [(cross sectional area of piston, which plunges into chamber of the pump) x (stroke of the piston)] flows out to oil outlet side through opened check valve ③ . Upon completing discharge of such amount of oil, check valve ③ closes outlet passage by force of check spring ④ .

Being pilot air discharged, piston ① is returned by force of piston spring ② and steel ball ⑤ is pushed upward to allow oil newly flow into chamber of the pump through inlet.

Adjustment of oil quantity to discharge is performed changing stroke of piston ① by rotating handle ⑥ . Rotating handle anti-clockwise to increase discharge quantity and clockwise to decrease. And movement of piston is visually monitored by indicat-or ⑦ .



5. oil discharge quantity



6.Selection of pipe connections.

Impulse-lub, in its design structure, insufficient oil filling causes to aeration (segregation of bubble) at inside of pump chamber and thence this bubble may be discharged from oil OUTLET side. It is therefore, to maintain sufficient oil filling, connecting port size and oil filling pressure (tank pressure) should be determined according to the graph.

(Precautions to determine piping specs.)

1. Viscosity of oil to be used should be that of under minimum temperature value of ambient and using fluid.

2. When oil tank is used under depressurized exposing to atom-osphere, it should be installed at region of higher than the impulse-lub.

3. When oil tank is used under pressure, maximum pressure on tank should be less than 4kgf/cm². And when the oil tank is installed at lower region of the impulse-lub, pressure on tank should be gained to cover head height length to the impulse-lub (0.1kgf/cm² per 1 meter height above head)

4. I.D. of pipe should be more than Ø4 and length of it within 5 meters.

5. In cases, grease, of high viscosity, or other special fluid is used, please consult with us.

[Guidance for the graph.]

In a graph P.9, and an example is drawn to find I.D. of pipe and tank pressure, when 1.0×10^{-3} kg/cm³ of specific gravity, viscosity 6 st, and 3 meter of pipe lentfh are given.

[1] ALIP1000-01, I.D. of pipe and tank pressure per unit.

(1) At first, draw vertical extension from point of specific gravity of 1.0×10^{-3} kg/cm³ to find intersection (A) with viscosity curb of 6 st.

(2) From intersection (A), draw extension horizontally to find intersection (B) with pipe length graph of 3 meters.

(3) From intersection (B), draw extension vertically downward to find intersections (C) and (D) with I.D. of pipe Ø10 and Ø4 respectively.

(4)-1 In case of I.D. of pipe is Ø10, draw extension horizontally to right hand side from intersection (C), tank pressure 0.008kgf/cm² is obtained. In this case, the

tank can be used either under depressurized or pressurized.

④-2 In case of I.D. of pipe is Ø4, draw extension horizontally to right hand side from intersection Ⓓ, tank pressure 1 kgf/cm² is obtained. In this case, the tank should be used under pressure range between 1 ~4kgf/cm²

[2] I.D. of pipe and tank pressure of ALIP1000-01 n pcs. (or ALIM1000-n)

In case of using n pcs of ALIP1000-01, multiply tank pressure P kgf/cm² which found in ④-1 or ④-2 of item [1] with n to obtain tank pressure.

Here, tank pressure be Pn kgf/cm²,

$$Pn = P_1 \times n \text{ [kgf/cm}^2\text{]} \quad \text{---------- (1)}$$

Example 1) In a case of I.D. of the pipe Ø 10, n=10,
Pn=0.008×10=0.08kgf/cm²
and the tank can be used both under depressurized and pressurized.

Example 2) In a case of I.D. of the pipe Ø 4, n=6,
Pn= 1 x 6= 6 kgf/cm²
Tank pressure exceeds 4kgf/cm², it cannot be used under the condition of n more than 4.
When n=4, Pn= 4 kgf/cm² and so it can be used under pressurized condition 4kgf/cm².

[3] I.D. of pipe and tank pressure when 1 unit of ALIP1100-01 is used.

When 1 unit of ALIP1100-01 is used, add tank pressure:P_1 kgf/cm2 which found in ④-1 or ④-2 of item[1] to 1.5kgf/cm2.

Let tank pressure to obtain be P_1'

$$P_1' = P_1 + 1.5 \text{ [kgf/cm2]} \quad \text{---------- (2)}$$

Example 1)In a case of I.D. of pipe is Ø 4, P_1' = 1 +1.5=2.5 kgf/cm² from ④-2 and it can be used under tank pressure between 2.5~4kgf/cm².

[4] I.D. of pipe and tank pressure, when n pcs. of ALIP1100-01. (or ALIM1100-n)is used.

When n pcs of ALIP1100-01 are used, having press-

ure:P_1 in ④-1 or ④-2 of item [1], it is obtainable by the following calculation formula.

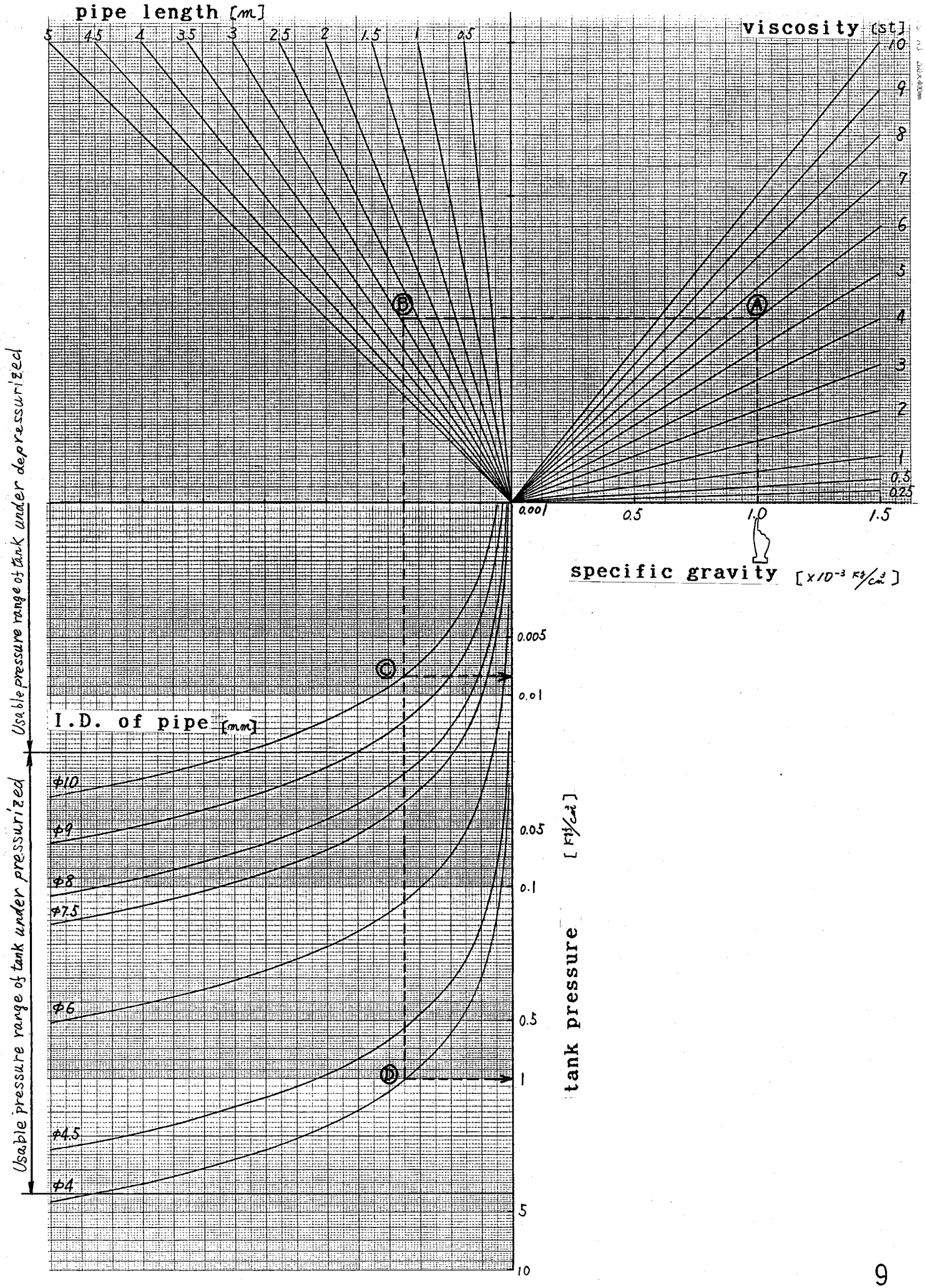
Let tank pressure to obtain be P'n kgf/cm²

$$P'n = P_1 \times n + 1.5 \text{ [kgf/cm}^2\text{]} \quad \text{---------- (3)}$$

Example 1) In a case of I.D. of pipe Ø 10, n=10,
P'n=0.008×10+1.5=1.58kgf/cm²
and it can be used under tank pressure between 1.58~4kgf/cm2.

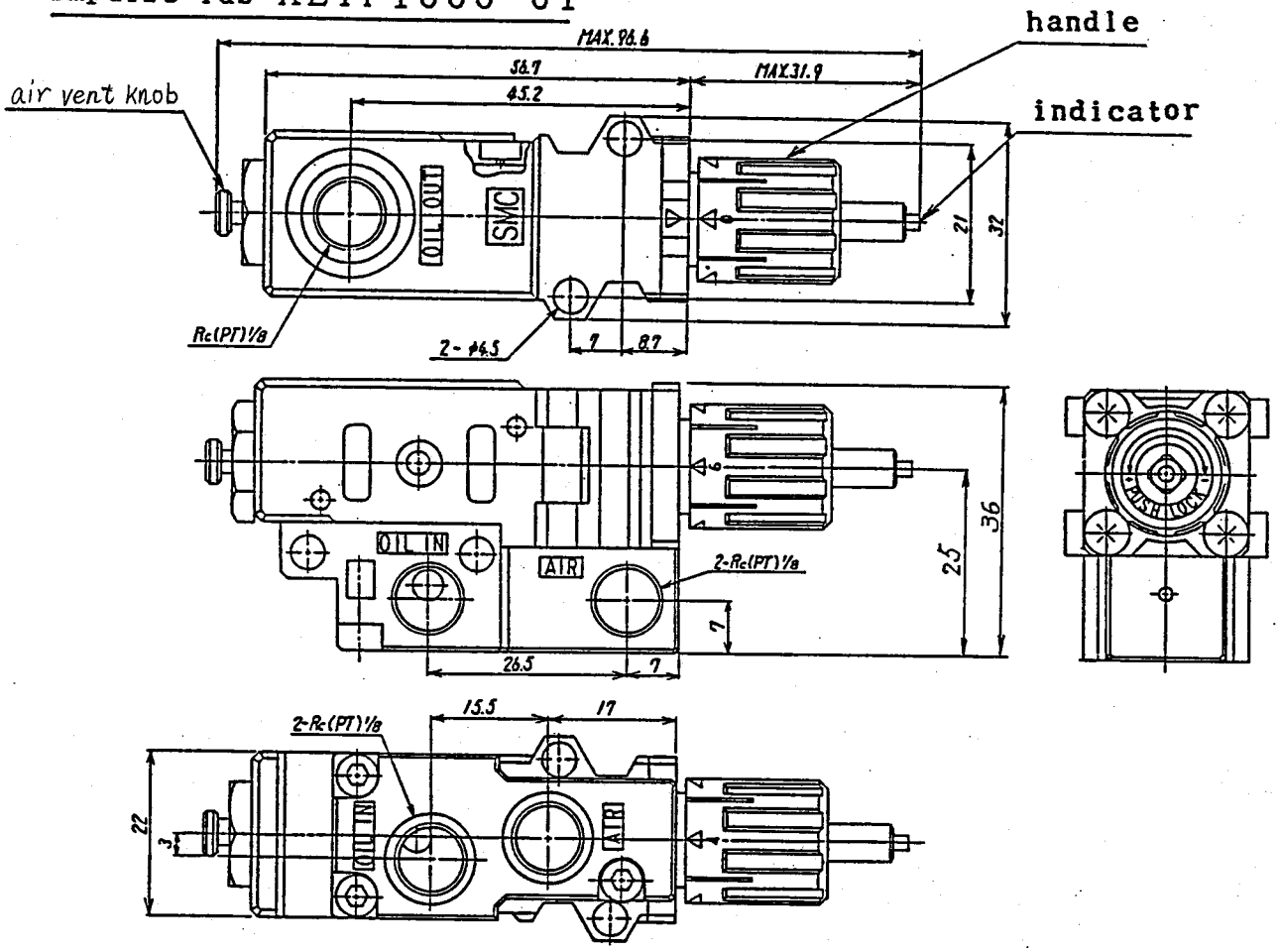
Example 2) In a case of I.D. of pipe Ø 4, n=4,
P'n= 1 ×4+1.5=5.5 kgf/cm² and tank pressure exceeds 4kgf/cm². It can be used only under n is less than 2. When n=2, P'n=3.5kgf/cm², so it can be used under tank pressure between 3.5~4kgf/cm².

Selection of pipe connections.

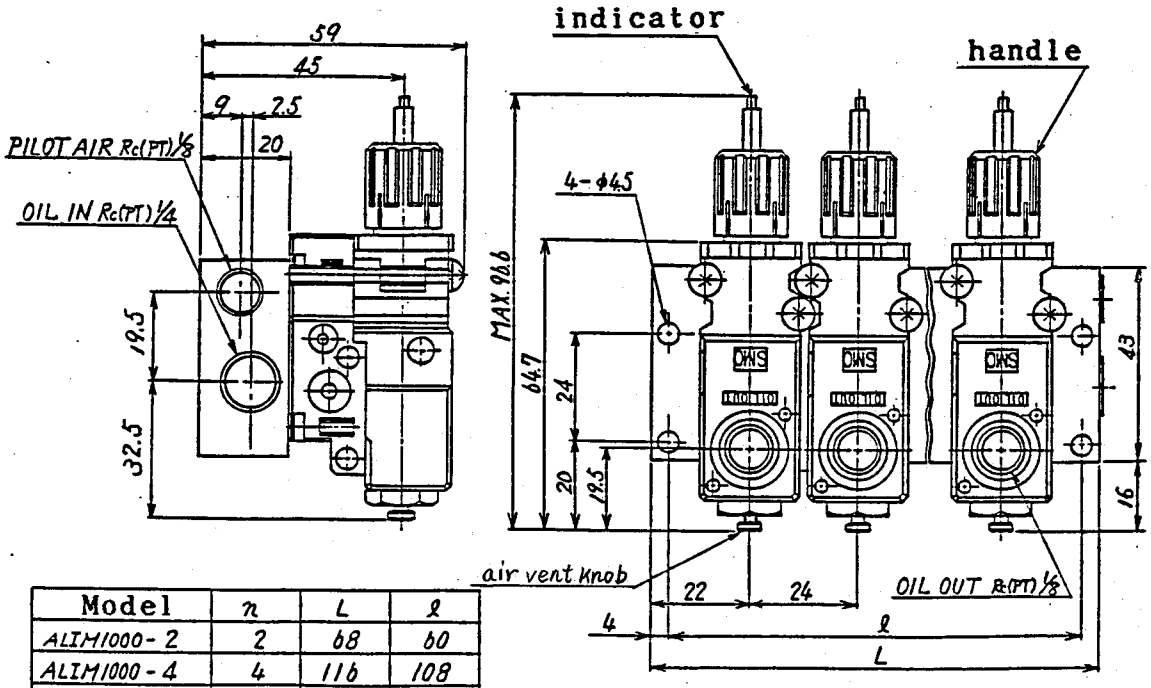


7. External dimensions

Impulse-lub ALIP1000-01



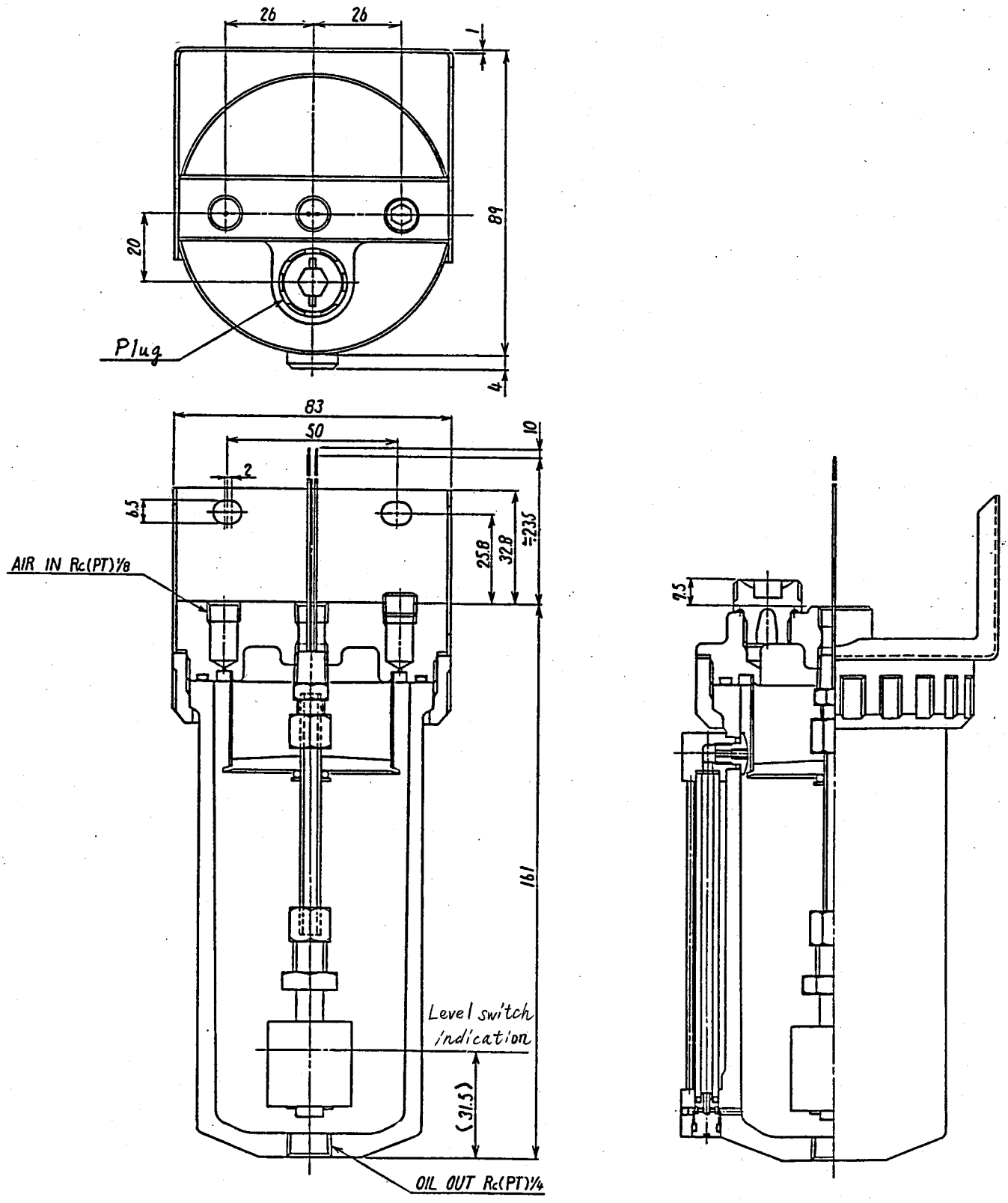
Impulse-lub manifold ALIM1000-2~10



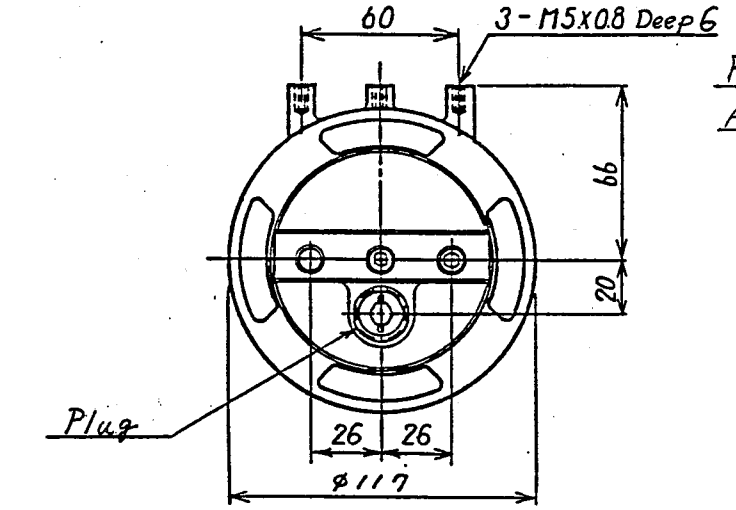
Model	n	L	ℓ
ALIM1000-2	2	68	60
ALIM1000-4	4	116	108
ALIM1000-6	6	164	156
ALIM1000-8	8	212	204
ALIM1000-10	10	260	252

Oil tank ALT10

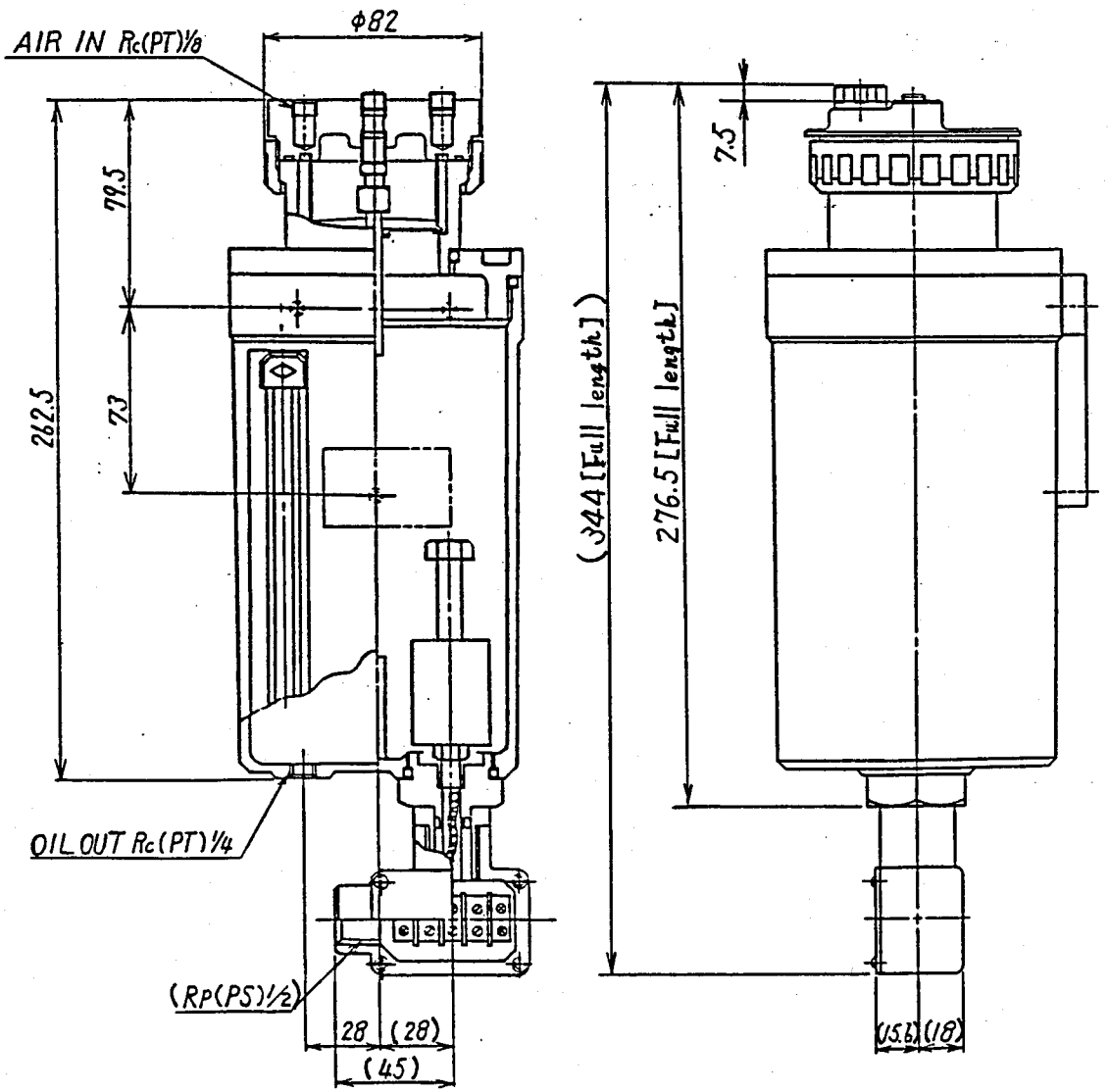
Parenthesized dimension stand for ALT10-S½.



Oil tank ALT20



Parenthesized dimension stand for ALT20-S½.



8. How to use.

(1)Installation

① Thorough air-flashing should be carried out to pipes prior to connect.

② Ports IN for AIR and OIL are two points respectively Depending on installation method(refer to external dimension diagram), close unnecessary ports with hexagon socket head cap plug, sized R(PT)1/8.

③ ALIP1000-01 and ALIM1000-2~10 should be installed, their OIL OUT sides to face upward.

④ Appropriate spacing should be kept at upper of air-relief knob to release air.

⑤ When oil tank is used opened exposing to atomosphere, it should be located at region higher than impulse-lub and determine I.D. of oil pipe from items of [selections of pipe connections].

⑥ Air filter should be fitted at primary side of PILOT AIR and PILOT AIR should be exhausted prior to re-operate by using three directional control valve for ON-OFF control of impulse-lub.

⑦ Pipings of Impulse-lub at OIL OUT side should use of hard pipe material (harder than nylon) and make as short as possible. Pipings done long distance by hard tube or presenting bank or throttle at OIL OUT side may cause to time-lag of oil discharge.

(2)Adjustment of oil discharge quantity.

① When Impulse-lub is shipped from factory, oil discharge quantity is set at 0.02cm³. When adjustment of this discharge quantity is needed, pull handle to unlock and rotate it.

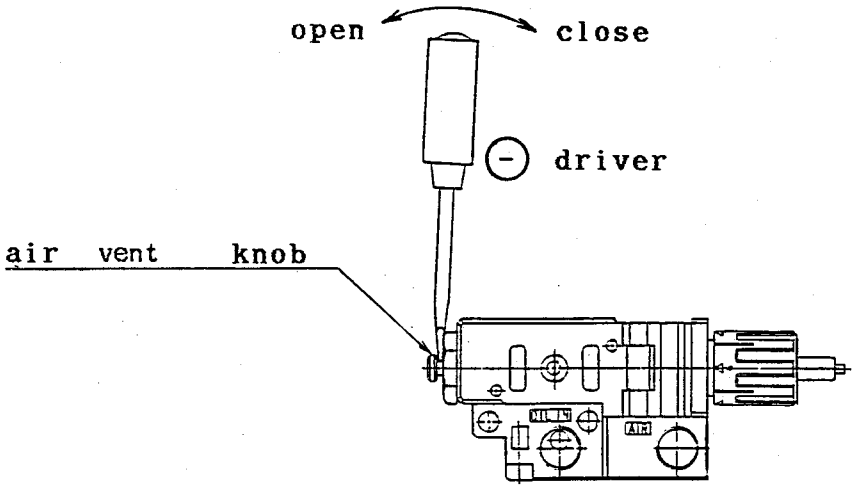
② Rotating handle clockwise to reduce discharge quantity and anti-clockwise to increase. Rotating the handle a turn to either direction,oil discharge quantity is adjusted by approx. 0.007 cm³. Upon completing adjustment, press the handle to lock.

③ Blank cap screw should not alsolutely be fitted to OIL OUT side.

(3)Air vent of main body and of pipe at OIL OUT side.

① After filling oil into tank, insert ⊖ driver to air release knob of Impulse-lub and pull check val-

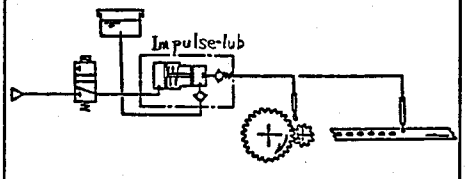
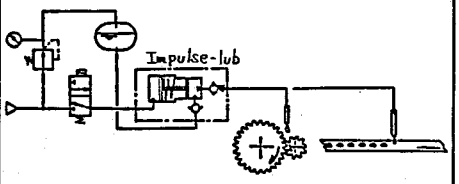
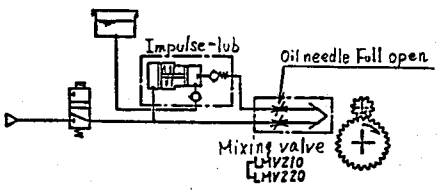
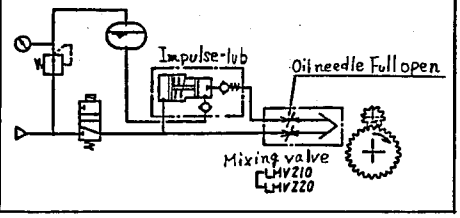
ve to open it. In a case of oil tank of opened exposed to atomosphere type, repeat open-close action of check valve to confirm the oil discharge from end of pipe at OIL OUT side. In a case, the Impulse-lub is mounted on manifold, this procedure should be carried out to all Impulse-lubs. Upon completing air vent , operate the Impulse-lub to confirm the oil is properly discharged from end of pipe at OIL OUT side.

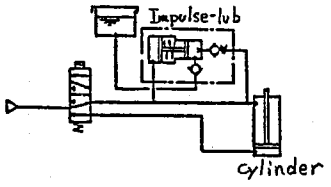
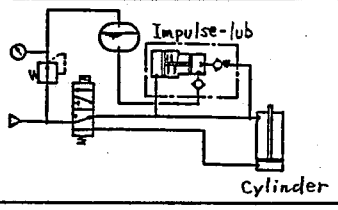


② Air entrapped in chamber of the Impulse-lub result in difficulty to let the oil discharge, it is advised to detect lower level of the tank by float switch or something else to watch the tank not to become empty. If air is entrapped, vent it.

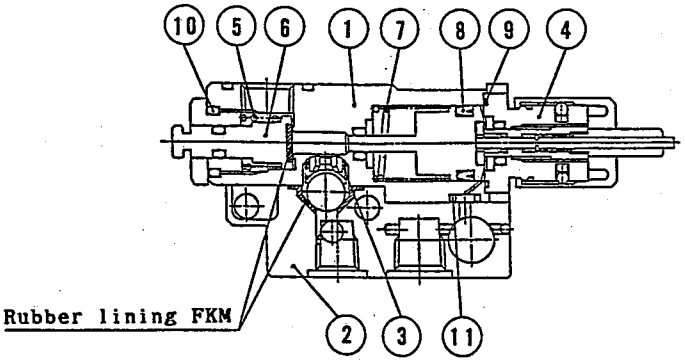
③ After filling oil into oil tank, plenty of air bubble is entrapped in the oil, and so provide sufficient time to let the air bubble go or apply vacuum to extract air bubble.

9. Piping examples.

	Depressurized tank	Pressurized tank
Intermittent lubrication to machine frictional part or dropping of fized quantity of oil.		
One-shot spray to machine frictional part.		

Lubricant to pneumatic devices like air-cylinder.		

10. Parts List



Chief parts

No.	Parts name	Material	Reference
①	Body	Zinc diecast	Platinum silver painted
②	Base B	Zinc diecast	Platinum silver painted

Parts list/Spare parts

No.	Parts name	Material	Parts number	
			ALIP1000-01	ALIP1100-01
③	Check spring	stainless steel	-	881128
④	Bonnet assembly	-	88117-1A	88117-3A
⑤	Check spring	stainless steel	881118-1	
⑥	Check valve assem-bly	-	881115-2A	
⑦	Piston spring	stainless steel	881117	
⑧	DY packing	NBR	DYP14	
⑨	"O" ring	NBR	Ø16.9xØ14.9x1W	
⑩	"O" ring	NBR	JIS B2401 P10	
⑪	"O" ring	NBR	JIS B2401 P3	

11. Trouble and remedy.

Trouble	Cause	Remedy
Piston cannot be operated.	1.PILOT AIR is not supplied. 2.Oil discharge is totally closed. 3.PILOT AIR is not exhausted.	1.Set PILOT AIR higher than 0.25MPa {2.53kgf/cm²}. 2.Adjust oil discharge quantity by rotating handle anti-clockwise. 3.By installing 3 Port directional control valve or other means to exhaust PILOT AIR after operation.
Piston can be operated but oil cannot be discharged.	1.Air is entrapped into pump chamber. 2.Oil tank is empty. 3.In a case of ALIP1000 (ALIM1000), installed direction is wrong. 4.In a case of ALIP1100 (ALIM1100), tank is opened exposed to atomosphere.	1.Vent the air off. 2.After oil filling, vent air off. 3.Re-install, OIL OUT port to face upward. 4.Pressurize oil tank at pressure of between 0.15~0.4MPa {1.5~4.1kgf/cm²}.
Air is entrapped in discharged oil.	1.In a case of oil tank opened exposed to atomosphere type, I.D. of pipe at OIL IN side is too small. 2.In a case of pressurized type oil tank, tank pressure is too low. 3.Plenty of air bubble is entrapped in the oil of tank.	1.Re-pipe larger size referring to [selection of pipe connection]. 2.Increase tank pressure Max.0.4MPa{4.1kgf/cm²}. 3.In a case plenty of air bubble is presnting in tank, provide enough time to let it go.
Oil is discharged with time lag.	1.Pipe at OIL OUT side is too long and relatively soft tube is used. 2.Airstagnantis present in tube pipe at OIL OUT side.	1.When long piping is needed, use hard tube. 2.Replace pipe which makes no air stagnant.