



---

## OPERATION MANUAL

---

### MIST SPRAY

---

---

---

---

---

---

---

---

---

---

---

SMC CORPORATION

## 1. Purpose of Use

A mist spray unit is a device which atomizes and sprays lubricating fluid, cutting fluid, and so on, using compressed air, for the purpose of lubricating and cooling.

The oil mist which is sprayed from the nozzle becomes a cold mist due to adiabatic expansion. By using it to lubricate and cool the cutting face, it extends the life of the tool, and also the compressed air eliminates cutting chips and tool fragments, resulting in a better surface finish and more efficient cutting work. The oil mist can also be used for lubricating bearings of conveyors and general machinery, lubricating various press machinery, and oil-spraying onto press work material, etc.

The following benefits can be obtained by using this device.

- o Automated lubrication and central control is possible.
- o It is possible to always stably provide the minimum necessary amount of fresh oil, resulting in energy saving.
- o The use of compressed air permits simultaneous cooling and removal of cutting chips. As a result, the life of the cutting tool is extended and a better surface is obtained.
- o Improved work efficiency
- o A large number of points can be lubricated.

## 2. Features

This device has the following features:

- o Contains a special-purpose air blow circuit(LMU100) ..

This device contains an air blow circuit for removing cutting chips. The air blow pressure can be displayed on a pressure gauge.

- o Contains an airflow regulating needle valve .....

A needle valve is installed in the air passage of the mist generating mixing valve, hence it is possible to vary the size of the mist particles by regulating the flowrate.

- o Opeation is simple .....

The ON-OFF valve of the mxing circuit and air blow circuit can be easily operated from outside by means of a manual button.

- o Oil feed is easy .....

Oil feed can be performed by simply removing the oil feed plug, without stopping the air supply.

- o Oil tank has large capacity .....

The total tank capacity is  $3000 \text{ cm}^3$  and the effective capacity(capacity between oil level lines) is  $2500 \text{ cm}^3$ , which is large than the capacity of other makers' tanks.

- o It is possible to detect the higher and lower limit of liquid levels(LMU\*00-1 to 3) ...

A float switch in the tank enables the higher limit, lower limit, or both higher and lower limits, to be detected.

o Has good response .....

Because of mist generation, ON-OFF valves for both the air and oil pipes are installed at the secondary side of the oil tank. Consequently, no dribbling occurs when the spray is stopped, regardless of the residual pressure in the oil.

o Maintenance is easy .....

Because all the control devices are connected to a manifold, they can be easily replaced, thus facilitating maintenance.

### 3. Specifications

#### o Mist spray unit (LMU\*00-\*\*) )

Primary air pressure: 9.9 kgf/cm<sup>2</sup>{990 kPa}(max.)

Oil tank set pressure  
range: 0.5 - 2 kgf/cm<sup>2</sup>{50 - 200 kPa}

Oil tank capacity: Total 3000 cm<sup>3</sup>  
Effective 2500 cm<sup>3</sup>

Ambient temperature  
and operating fluid  
temperature: 5 - 50°C

Connection port: SUP side PT 1/4  
OUT side AIR T0604 (6-mm-OD tube)  
OIL T0425 (4-mm-OD tube)  
AIR BLOW T0806  
(8-mm-OD tube)

Voltage: AC100 V, 200 V(50/60 Hz)  
DC 24 V }standard

#### o Mixing valve (LMV\*\*0-\*)

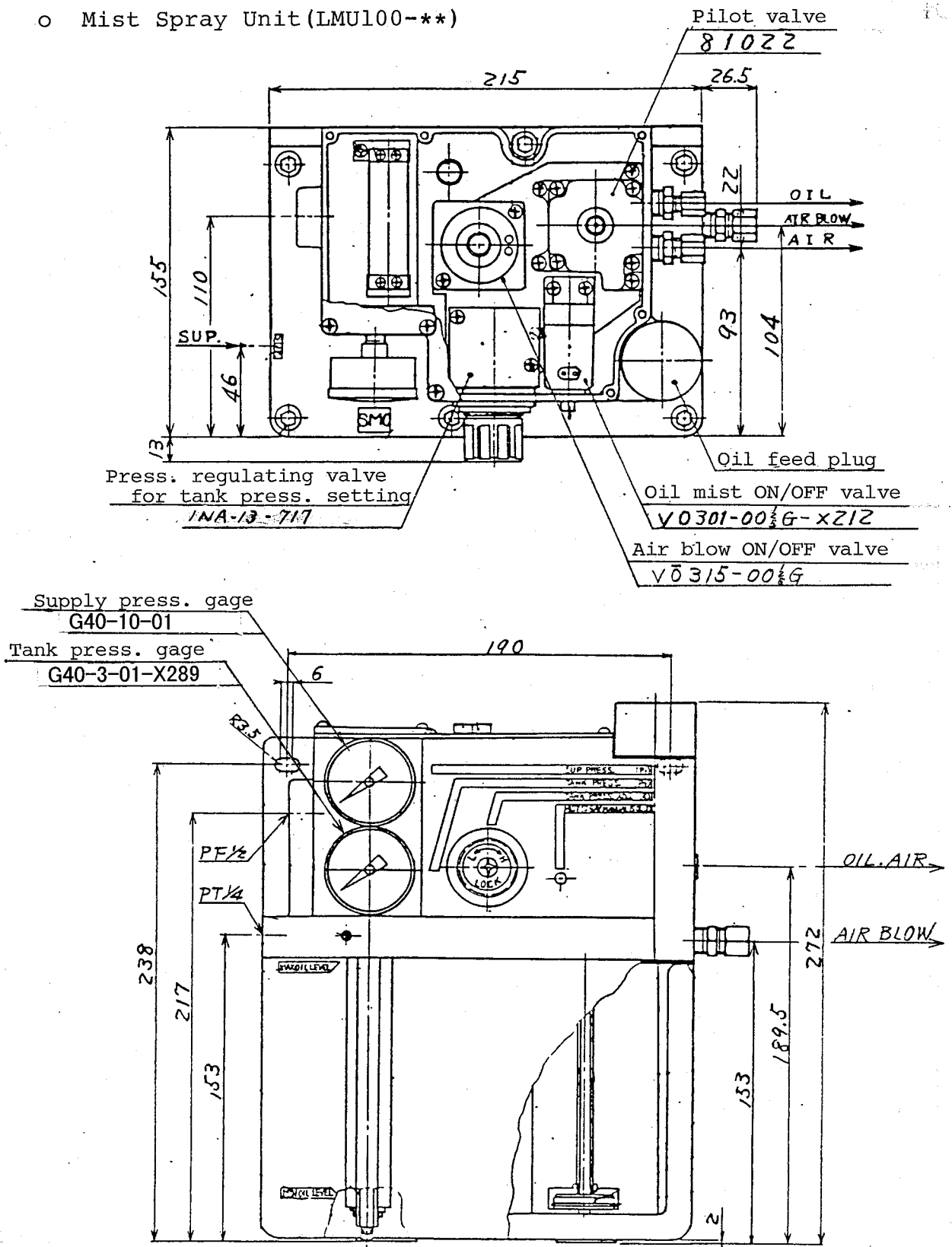
Primary air pressure: 3 kgf/cm<sup>2</sup>{300 kPa}(max.)

Ambient temperature  
and operating fluid  
temperature: 5 - 60°C

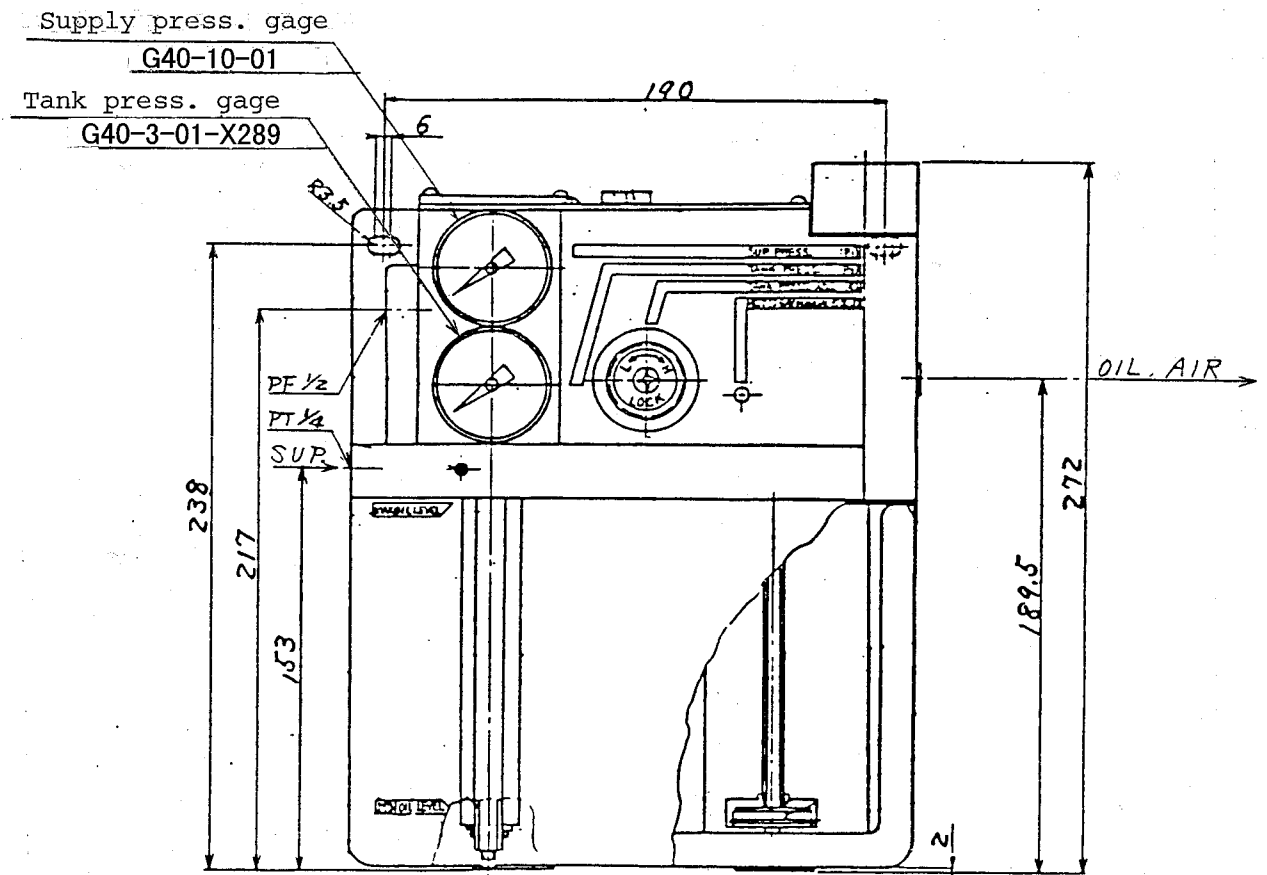
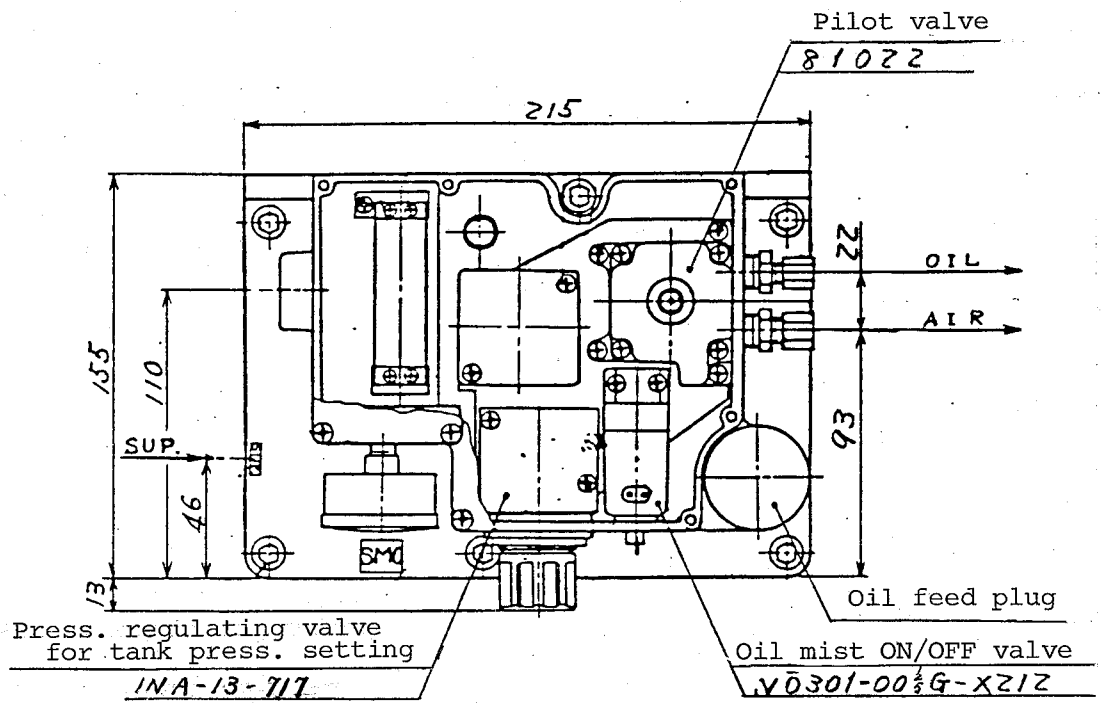
Connection port: AIR T0604 (6-mm-OD tube)  
OIL T0425 (4-mm-OD tube)  
AIR BLOW T0806 (8-mm-OD tube)

#### 4. External Dimensional Drawings

##### o Mist Spray Unit (LMU100-\*\*)



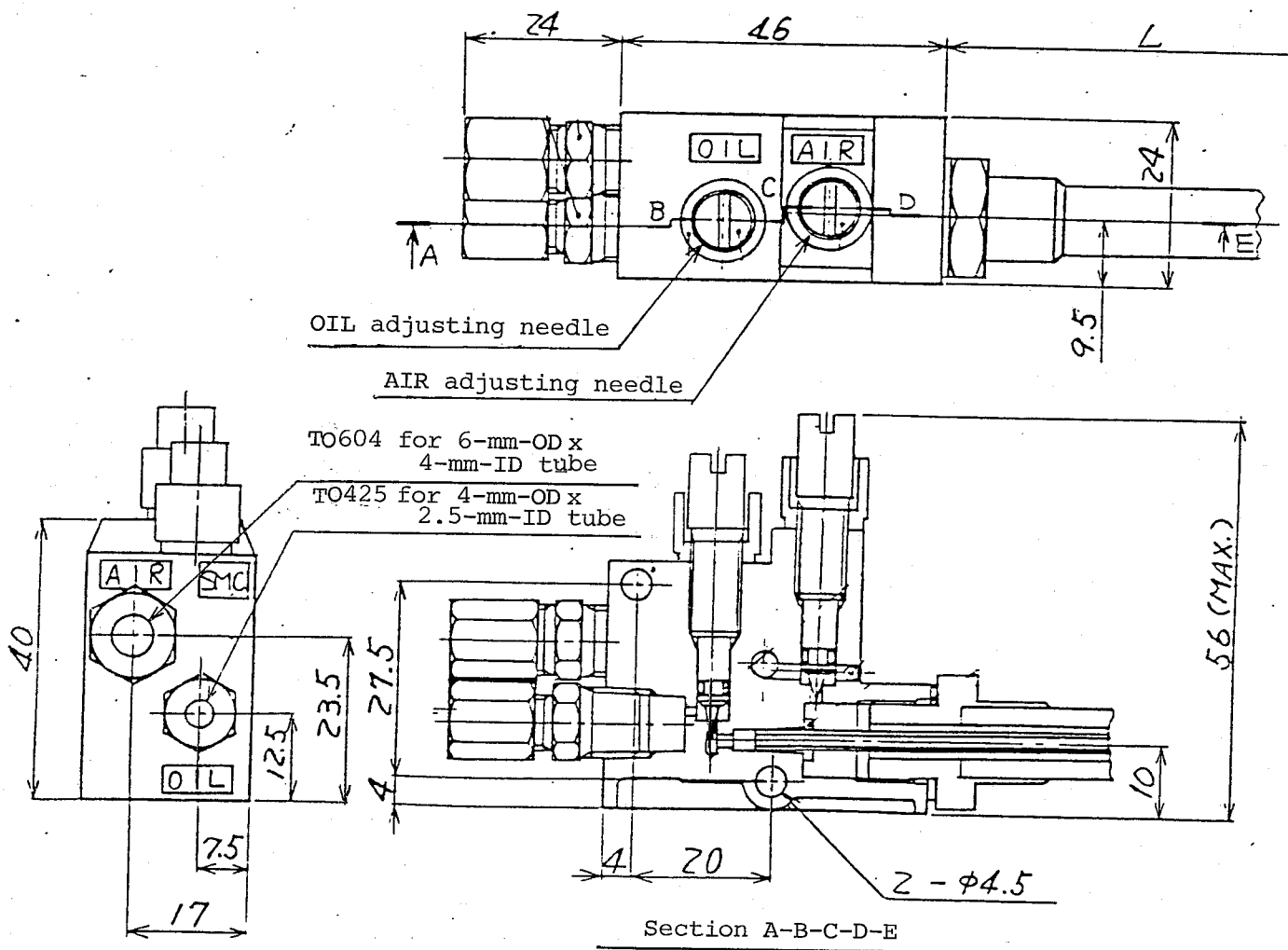
o Mist Spray Unit(LMU200-\*\*)



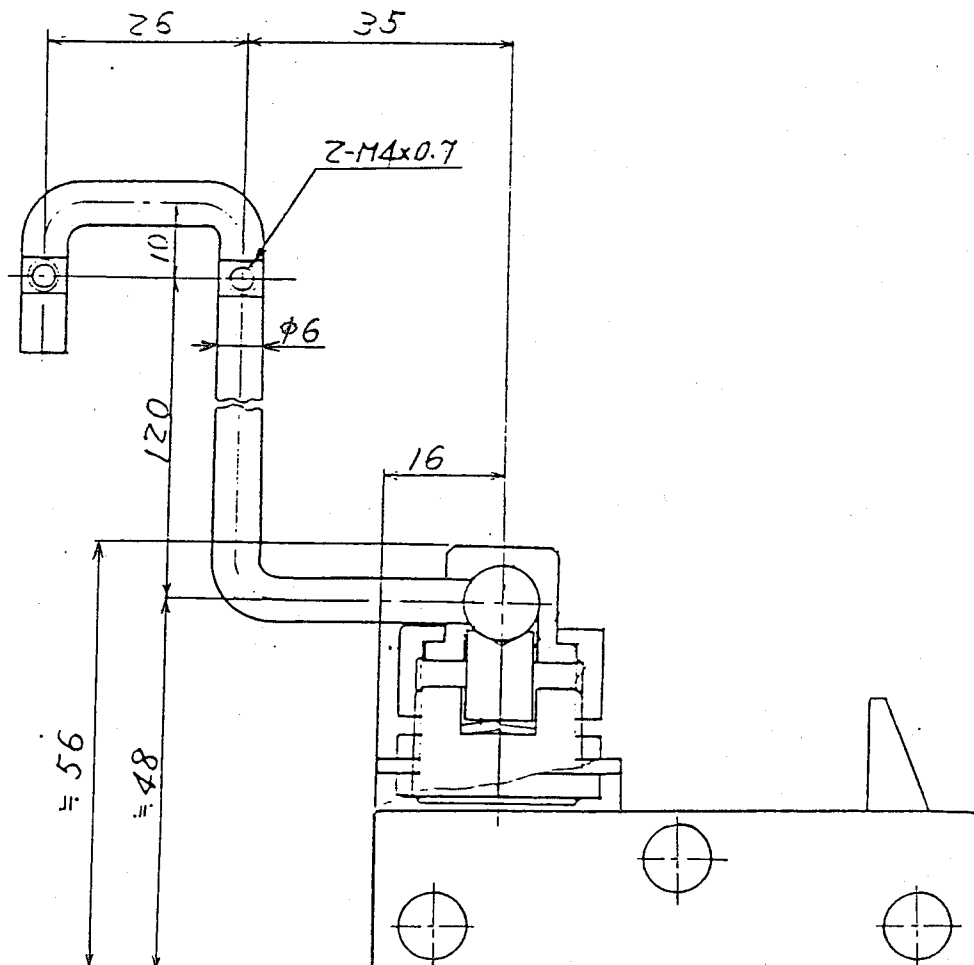
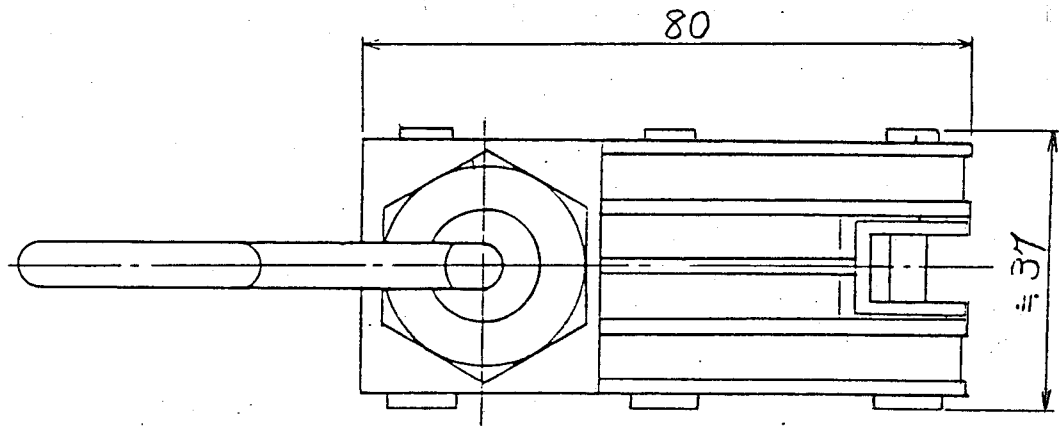




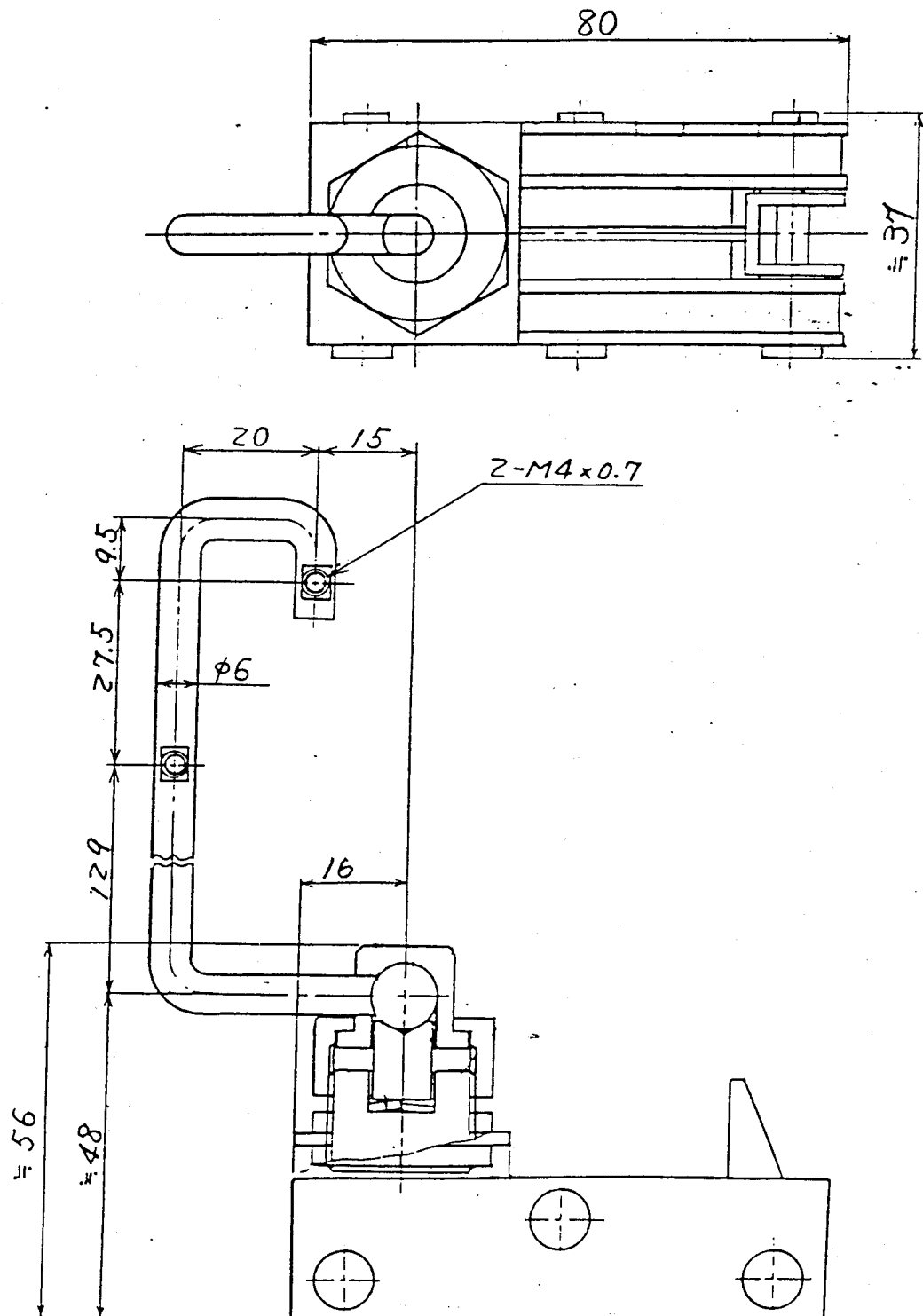
o Mixing Valve (LMV2\*0-\*)



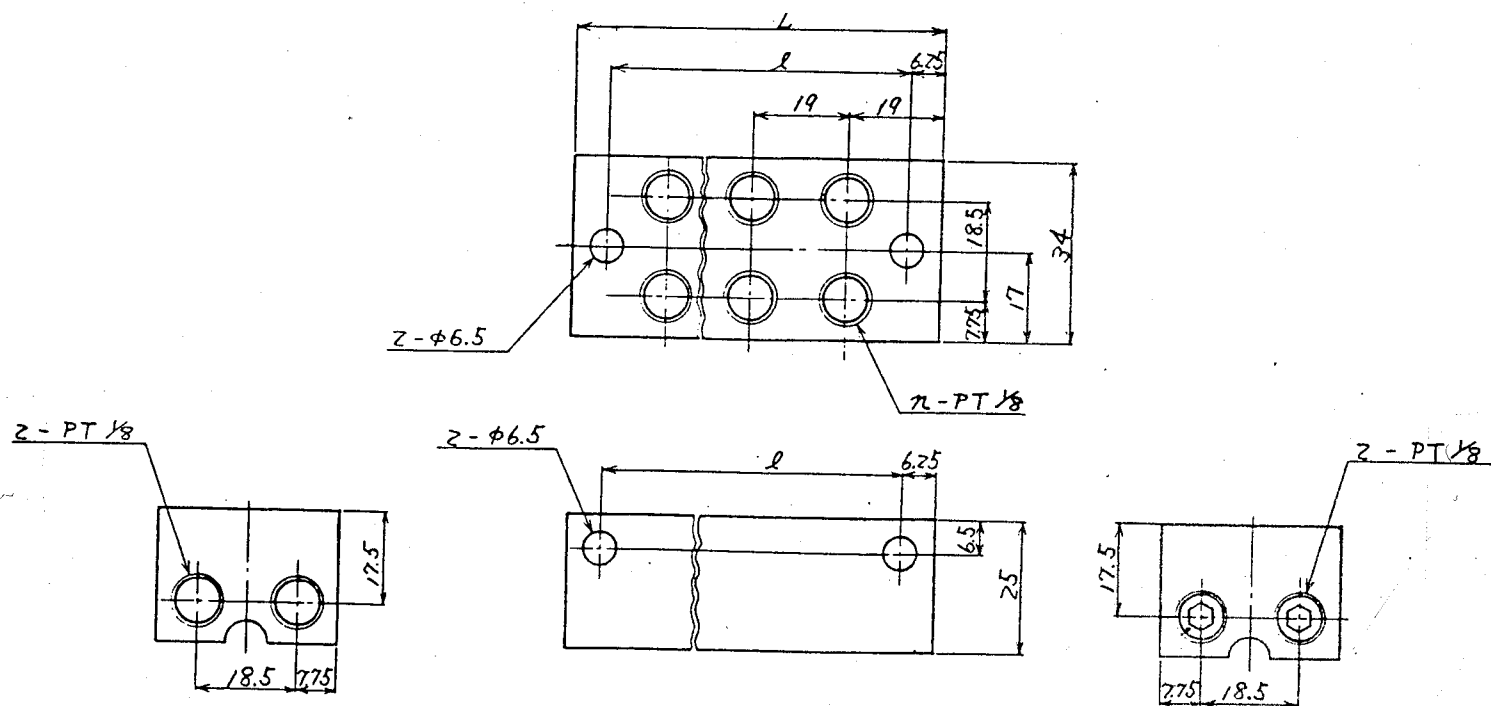
o Magnet Holder (LMH10)



o Magnet Holder (LMH20)



- o Branch Pipe (LMD2-1 - -6)



Part No.	n	L	l
LMDZ-1	2	38	25.5
LMDZ-2	4	57	44.5
LMDZ-3	6	76	63.5
LMDZ-4	8	95	82.5
LMDZ-5	10	114	101.5
LMDZ-6	12	133	120.5

## 5. Drawings Showing Structure and Principle of Operation

A description of the principle of operation of the mist spray unit will now be given, making reference to the drawings on pages 16 and 17. Part of the air from the air source goes to pressure regulating valve ① which sets the tank pressure, and the remainder is taken to oil mist ON-OFF valve ④ which operates pilot valve ③ of the mixing circuit and air blow ON-OFF valve ② of the air blow circuit. The compressed air which is set to the specified tank pressure by pressure regulating valve ① passes through orifice ⑤ and gradually fills the oil tank to pressurize the oil in the tank. As a result, the oil in the tank passes through strainer ⑦ into pilot valve ③. Here, when oil mist ON-OFF valve ④ operates, control signal pressure is sent to pilot valve ③, causing diaphragm ⑧ to be pushed down. Consequently, the compressed air and oil valves in pilot valve ③ open, causing air and oil to flow through the respective passages into mixing valve ⑨.

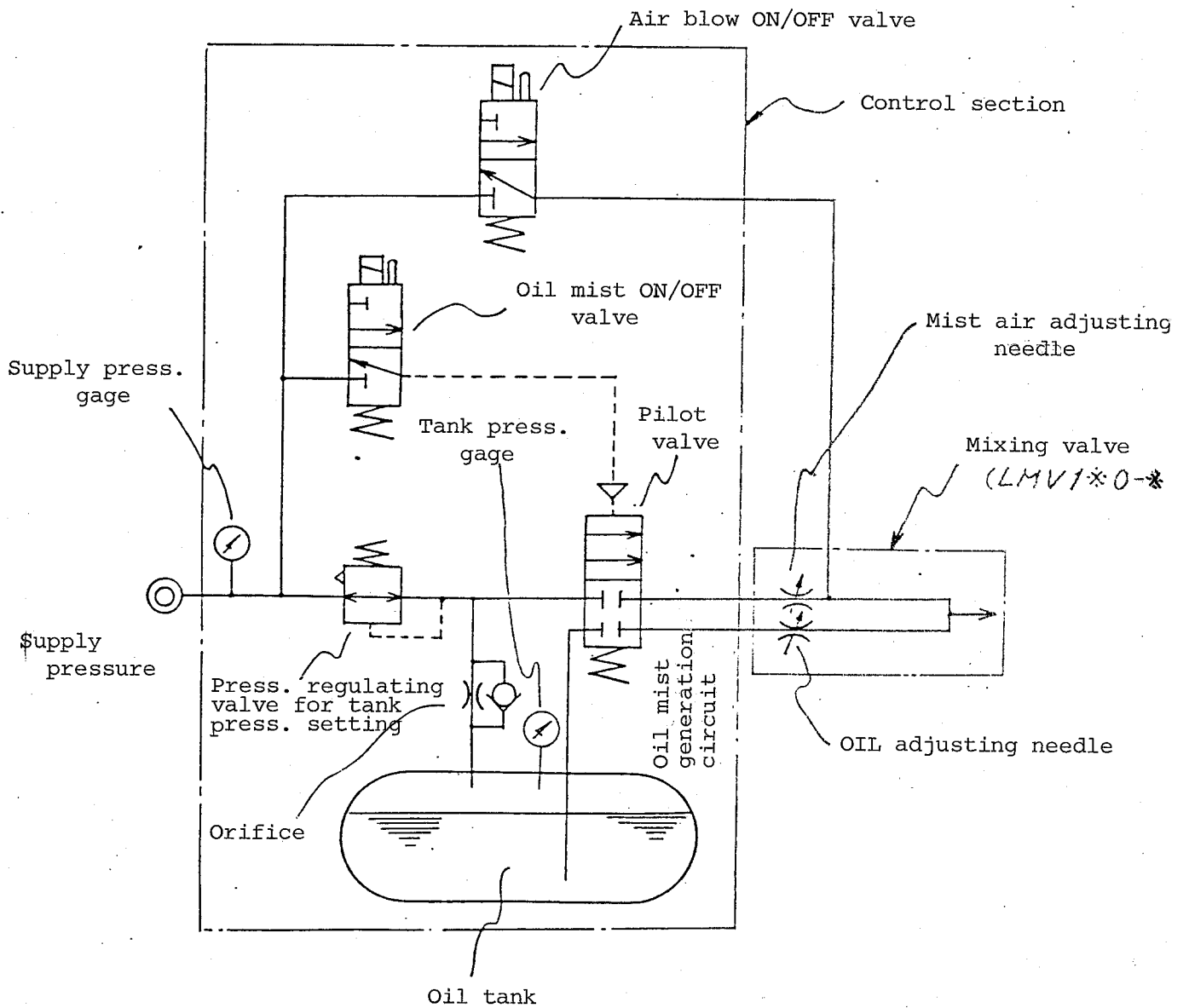
The air and oil are regulated to the necessary amounts by means of mist air and oil adjusting needles ⑩ and ⑪ on mixing valve ⑨. Between mixing valve ⑨ and double tubular nozzle ⑫, the compressed air passes through the outer passage, and the oil through the inner passage, of the double tube. At the end of double tubular nozzle ⑫, the oil is broken up into a fine mist by the

discharged air, and sprayed out.

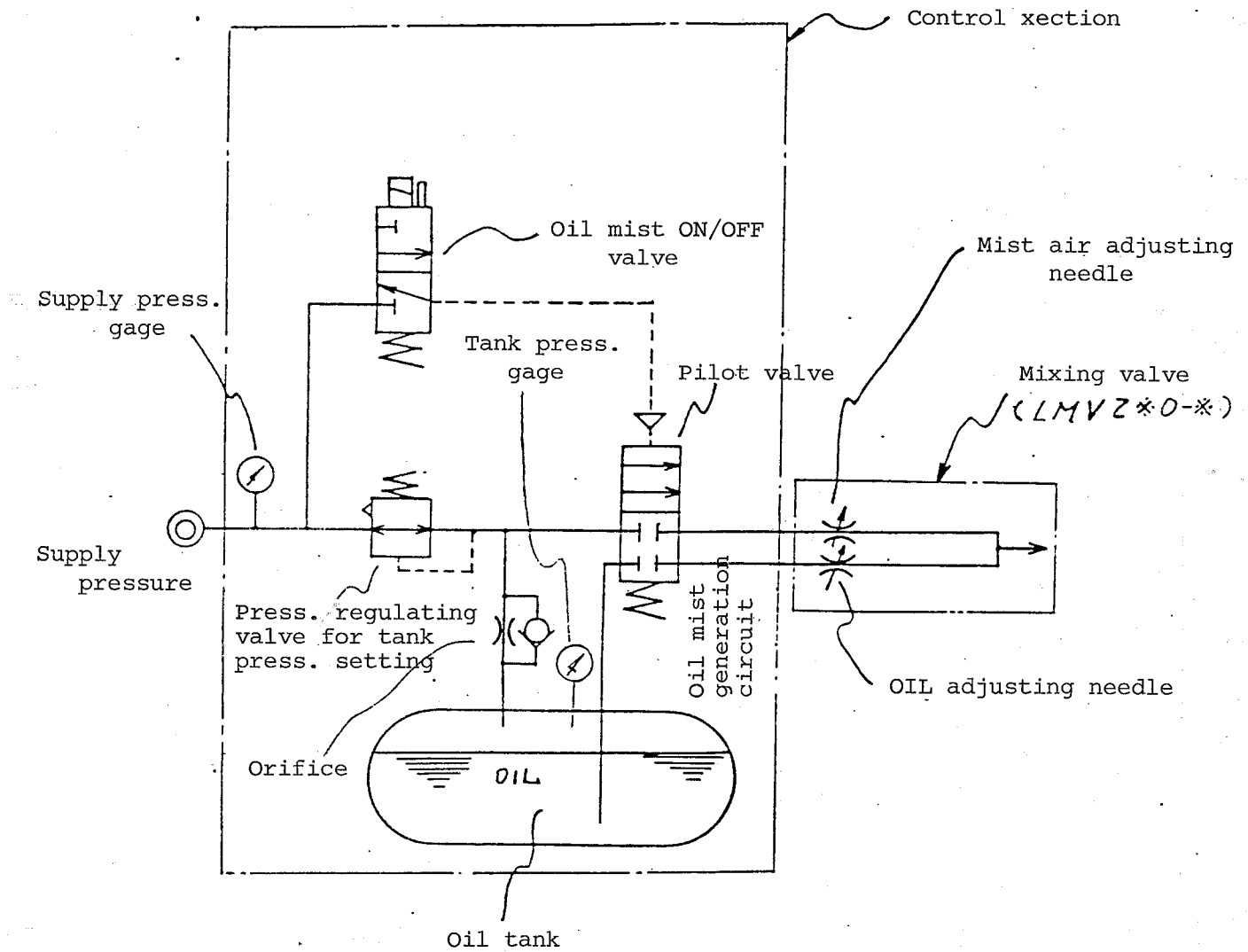
If air blow ON-OFF valve (13) is operated when expelling cutting chips, the compressed air will be taken directly to mixing valve (9) from where it passes through the outer passage of double tubular nozzle (12) , to be discharged as air blow.

Also, if oil feed plug (14) is loosened, the compressed air in the tank will be discharged from the side hole in the oil feed plug, and in addition the oil will be gradually fed to the tank via orifice 5 , enabling the oil to be easily fed from the oil feed port.

Control Circuit Diagram(LMU100-\*\*)

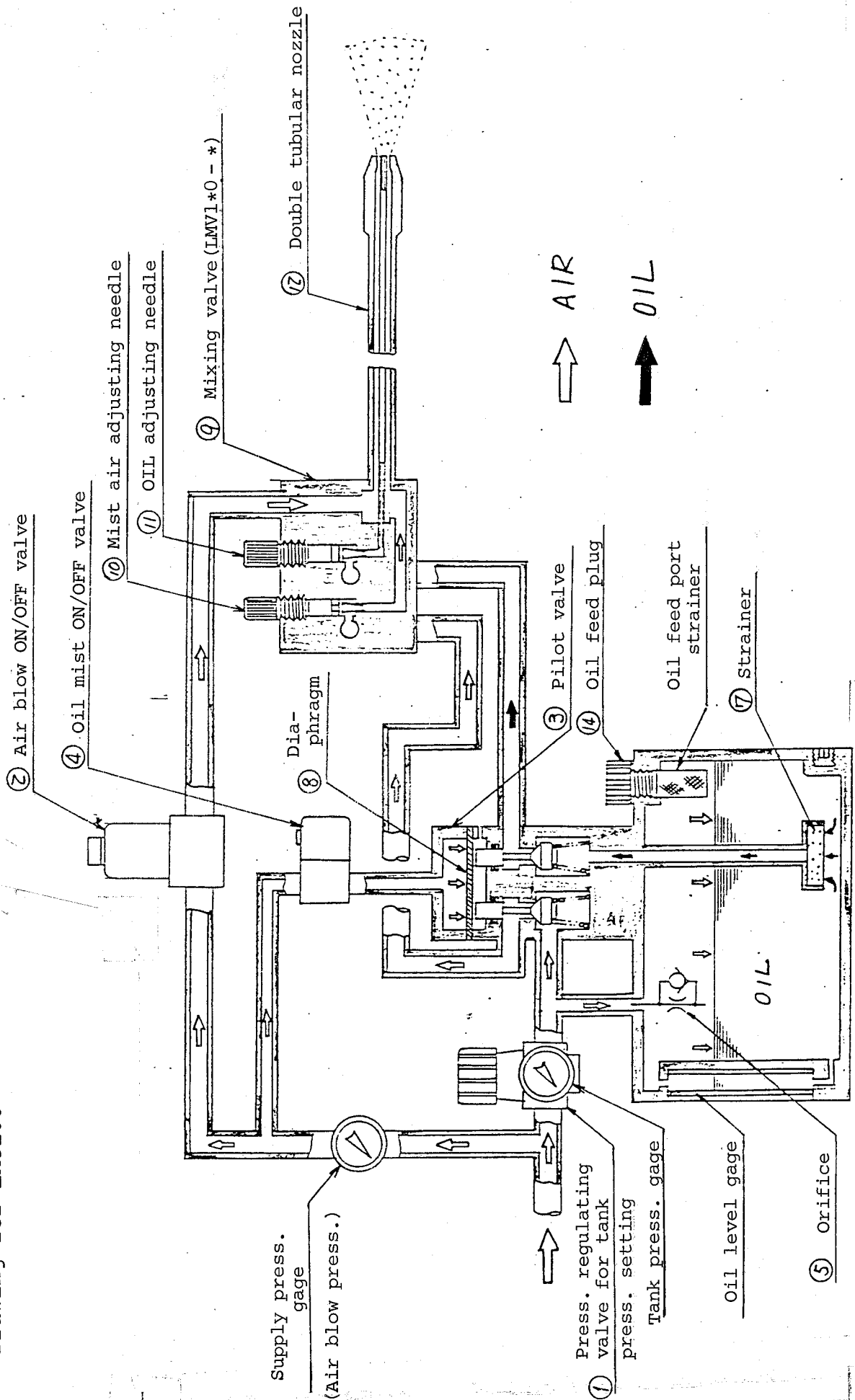


# Control Circuit Diagram(LMU200-\*\*)

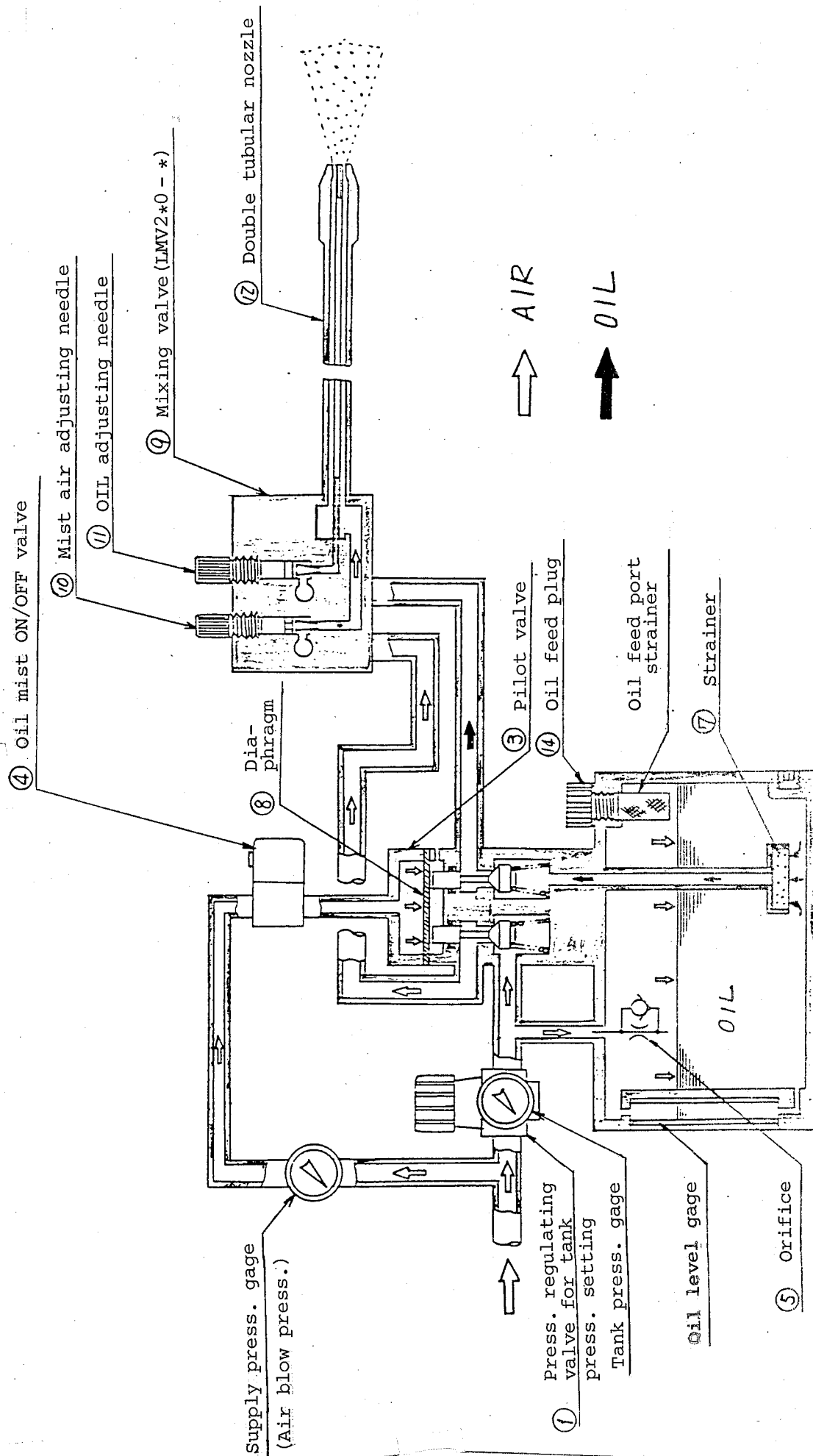




Construction and Operating Principle  
Drawing for LMU100-\*\*



Construction and Operating Principle  
Drawing for LMU200-\*\*



## 6. Recommended Equipment

It is recommended that the mixing valve, magnet holder and branch pipe shown below be used on each type of mist spray unit.

Model No. of mist spray unit	Model No. of mixing valve	Model No. of magnet holder	Model No. of branch pipe
LMU100-**	LMV110-** LMV120-** LMV130	LMH10	LMH1-*
LMU200-**	LMV210-** LMV220-** LMV230	LMH20	LMH2-*

## 7. Method of Installing Mist Spray Unit

### 1) Preparation before use

- a) Be sure to install an air filter of 5  $\mu\text{m}$  (equivalent to our AF200 filter) on the SUP. side of the mist spray unit.
- b) Loosen the tank pressure setting handle (counter-clockwise), and let in air from the air source.
- c) Using the tank pressure setting handle, set the pressure within the range 0.5 to 2  $\text{kgf/cm}^2$ , then turn ON each control valve (manually or electrically), and carefully check to see if any connecting joints are loose. During this operation, set the air/oil adjusting needles of the mixing valve to the fully closed position (turn to right).
- d) Completely remove the air in the oil pipe. If even a small amount of air gets into the oil pipe, dribbling may occur. The air can be removed by either fully opening the oil adjusting needle of the mixing valve and turning ON the oil mist generating ON-OFF valve, or continually depressing the manual button. If air stagnates in the oil pipe as a result of using a branch pipe, etc., bleed off the air by installing an air bleed unit at the highest

point in the pipe. Be sure to perform an air bleed off when filling the tank after all the oil has been used up.

2) Method of adding oil

- a) Oil can be added, leaving the pressure setting of the tank pressure setting handle unchanged. During this operation, unscrew the oil feed plug(turn it to the left) by 1 to 2 turns to bleed off the air in the tank.

Subsequently, fully open and remove the plug and fill the tank with oil.

- b) Do not pour in oil past the "MAX. OIL LEVEL".
- c) After filling the tank with oil, properly tighten up the oil feed plug.

3) Regulating method

- a) Regulating tank pressure

Turn the tank pressure setting handle to the right and set the tank pressure within the range 0.5 to 2 kgf/cm<sup>2</sup>.

Even when the pressure is set, it will gradually rise. Accordingly, be careful not to set it too high.

b) Adjusting mixing valve

- . Turn ON the ON-OFF valve in the mixing circuit and regulate the air and oil.
- . To regulate the air flow, turn the air adjusting needle. Turning the needle to the left will cause the flowrate to increase.
- . To regulate the oil flow, turn the oil adjusting needle. Turning the needle to the left will cause the oil flowrate to increase.

## 8. Troubleshooting

Refer to Section 5. Drawing Showing Structure and Principle of Operation.

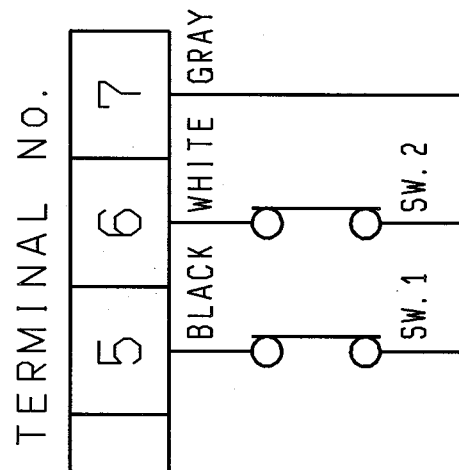
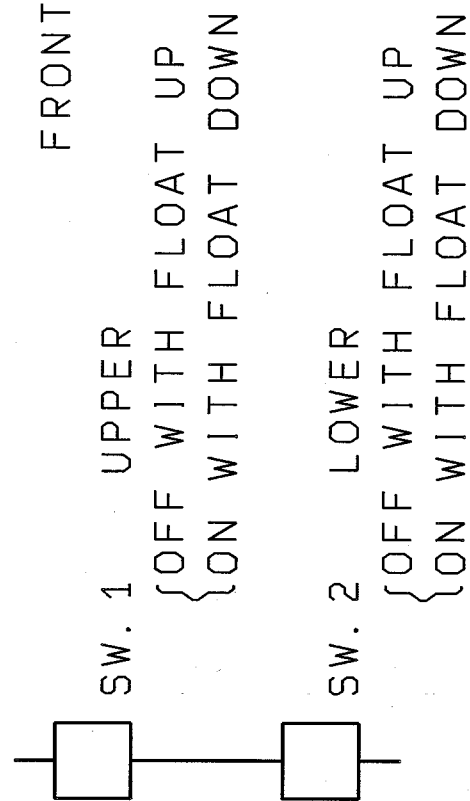
Phenomenon	Main cause	Remedy
Pressure in oil tank does not rise.	<ol style="list-style-type: none"><li>1) Pressue regulating spring of pressure regulating valve is broken.</li><li>2) Pressure gauge failure</li><li>3) Orifice clogged</li><li>4) Leakage from packing and seal of oil tank, oil feed plug, etc.</li></ol>	<ol style="list-style-type: none"><li>1) Disassemble valve and replace adjusting spring.</li><li>2) Replace.</li><li>3) Disassemble, then clean or replace.</li><li>4) Disassemble, then clean. If packing is damaged, replace it to prevent leakage, and re-assemble.</li></ol>
Pressure in oil tank cannot be regulated.	<ol style="list-style-type: none"><li>1) Foreign matter is lodged in seat of pressure regulating valve.</li><li>2) Diaphragm of pressure regulating valve is damaged.</li><li>3) Rubber lining of body of pressure regulating valve is damaged.</li><li>4) Pressure gauge failure</li></ol>	<ol style="list-style-type: none"><li>1) Disassemble and clean.</li><li>2), 3) Disassemble and replace damaged parts.</li><li>4) Replace.</li></ol>
Oil mist does not come from nozzle.	<ol style="list-style-type: none"><li>1) Failure of oil mist ON-OFF valve</li><li>2) Diaphragm of pilot valve damaged</li><li>3) Clogged element</li></ol>	<ol style="list-style-type: none"><li>1) Replace.</li><li>2) Disassemble and replace diaphragm ass'y.</li><li>3) Disassemble and wash.</li></ol>

Phenomenon	Main cause	Remedy
Air/oil from nozzle does not stop.	1) Failure of oil mist ON-OFF nozzle 2) Foreign matter lodged in seat of pilot valve. 3) Rubber lining of pilot valve is damaged.	1) Replace 2) Disassemble then clean or replace. 3) Disassemble and replace damaged parts.
Oil dribbling occurs.	1) Air is in oil pipe. 2) Defective seat in check valve.	1) Install an air bleed unit at a high point to bleed off the air in the oil pipe. 2) Disassemble and clean or replace.
Air does not come out of nozzle (for air blow)	1) Failure of air blow ON-OFF valve 2) Air blow ON-OFF valve is not installed correctly.	1) Replace. 2) Install valve correctly.
Air from nozzle does not stop (for air blow)	1) Failure of air blow ON-OFF valve. 2) Air blow ON-OFF valve is not installed correctly.	1) Replace. 2) Install valve correctly.



## FLOAT SWITCH SPECIFICATIONS

### •ELECTORICAL CIRCUIT



### •ELECTORICAL SPECIFICATIONS

VOLTAGE 200V (AC, DC)  
 BREAKING CAPACITY AC50VA, DC50W

CONTACT ADDRESS: SMC CORPORATION

AKIHABARAUDX 15F, 4-14-1, SOTOKANDA, CHIYODA-KU, TOKYO  
101-0021, JAPAN  
TEL: 03-5207-8271