

Instruction manual

■ AIRLESS EXTRUSION SYSTEM

FPP 655 series



This instruction manual contains **IMPORTANT WARNINGS, CAUTIONS** and instructions for safe operation. Before operation, be sure to read this instruction manual thoroughly and understand the equipment so that you can use it safely and effectively for a long time.

Keep this booklet in an appropriate place for immediate reference.

■ Contents

Important information-Safety precautions

1. Safety precautions	2
2 . Check the product	4
3 . Specifications	5
4 . Names of each section	6
5 . Installation	7
6 . Preparation for operation	8
7 . Painting job	13
8 . Interruption of job	15
9 . Daily inspection and maintenance	16
11 . Parts List	19
12. Safety systems	27

■ 1. Safety precautions

WARNING

Wear protective gear.

- Be sure to always wear protective gear such as proper glasses, mask and gloves. If not, paint or solvent can enter eyes or lungs.
- Wear earplugs during operation. Continuous operation for a long time can cause auditory damage.



Pay attention to ventilation.

- Be sure to use at a well-ventilated site. Use at badly ventilated or narrow site can cause organic solvent poisoning by sprayed mist and solvent. If you feel something wrong with your body during operation, immediately see a doctor.



Pay attention to high pressure of paint.

Never point toward a person or animal or pull trigger of gun when human body or fingers come near tip of gun.



Pay attention to sliding section of pump.

Do not touch sliding section (rod) during pump operation. If done, hand can be entangled.



Danger of wrong operation

- Before fitting or removing nozzle tip at tip of airless gun, be sure to stop pump, open drain valve, reduce fluid pressure down to “ 0” and apply safety lock.
- When paint leaks from airless gun, fluid hose and joint section, never try to stop leakage by hand. In such a case, immediately stop air supply and stop pump operation. If done, paint or solvent can enter human body through eyes, mouth and skin, which is very dangerous.



Limit of fluid to be used

- Do not use it for food products. As pump parts are not suitable for food products, foreign matter entering through parts can cause health problems.

Keep away from origins of explosions and fires.

- Never use near sparks or open fire. Especially the following will cause fire. Open flames such as cigarettes, pipes. Electric goods such as stoves, lamps, or heaters.



Connect groundings.

- Securely ground pump, airless spray gun, work pieces and containers containing paint or solvent.
- Especially be sure to use Anest Iwata's designated nylon air hose with built-in ground wire to have continuous grounding between pump and spray gun, or connect grounding separately.
- Insufficient grounding will cause explosion or fire if exposed to a spark of electricity.





WARNING

Be careful about explosion.

- Be sure to use airless unit at less than max. fluid operating pressure.
Usage at more than max. fluid operating pressure can cause explosion of pump resulting in great danger.
- Be sure to operate connected airless gun, fluid hose and each piece of equipment below its specified max. operating pressure.
Refer to the instruction manual of each piece of equipment.
- Never bend hose with a radius of less than 50 mm or put heavy things on it.
If done, hose can explode causing great danger. High pressure paint ejected through small hole caused by damage can penetrate even steel plate.
- Securely connect hose to avoid leakage and looseness.
If hose is disconnected during operation, hazardous hose movement and paint ejection can cause severe bodily injury.
- Never use the following hoses. They can explode during operation, causing great danger.
 - cracked
 - damaged
 - bent
 - crushed and distorted.



Others

If you find something wrong, immediately stop operation and study its reason. Do not use it again till the problem is solved.



CAUTION

When you do not use it, keep fluid pressure at “ 0 ” .
If not, paint can eject during disassembling or doing maintenance.

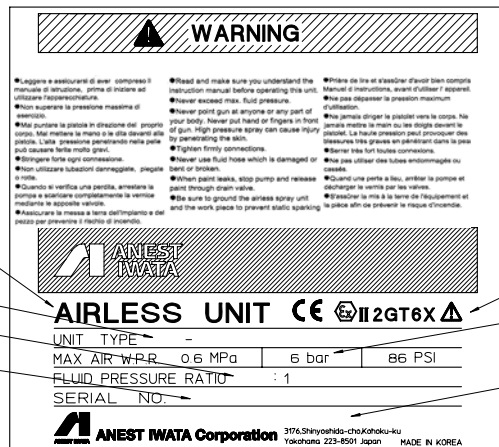
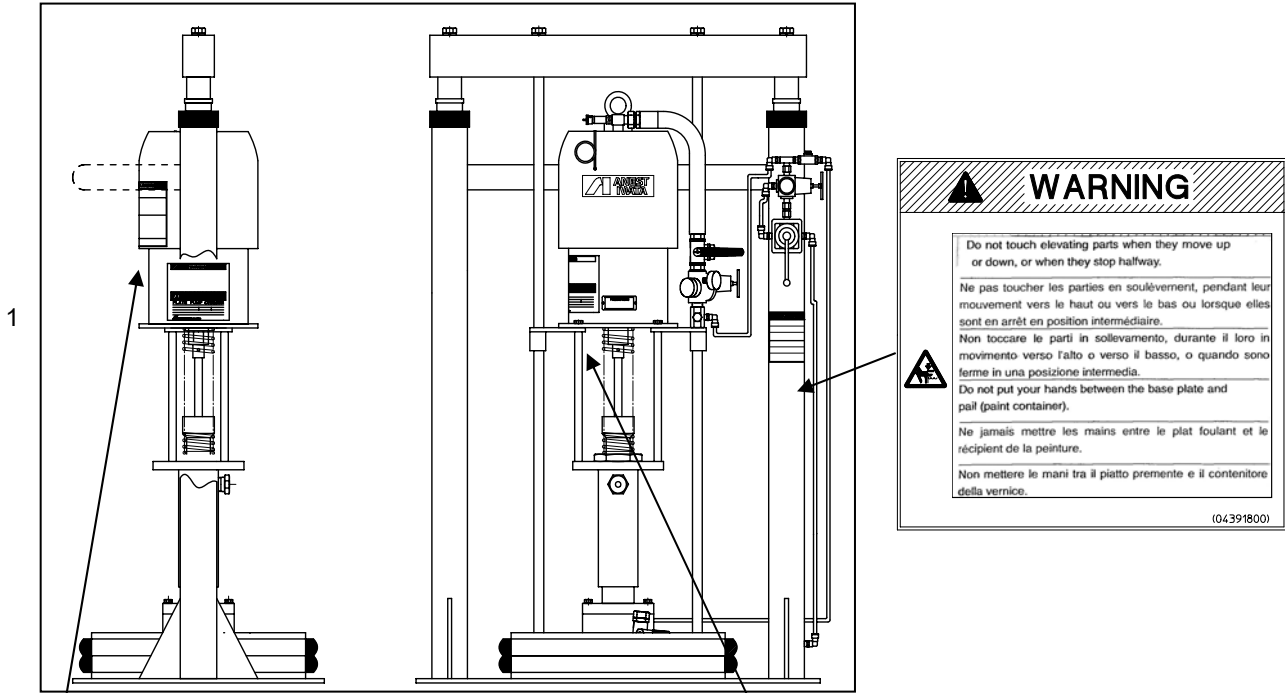
Never use the following halogenated hydrocarbon solvents:
methyl chloride, dichloromethane, 1,2 - dichloroethane, carbon tetrachloride,
trichloroethylene, 1,1,1 - trichloroethane, which can cause cracks or dissolution on gun body
(aluminum) by chemical reaction.
(Be sure that all fluids and solvents are compatible with gun parts. We are ready to supply
a material list used in the product.)

Important

- Supply clean air.
Use clean air filtered through dryer and filter (finer than 50 micron) .
If not, it can cause pump failure.
- Never alter equipment.
- When replacing parts, be sure to use our genuine parts.
If not, it can cause insufficient performance or failure.

2. Check the product

Check to make sure that the products are as ordered, and that they have not been distorted or damaged during transportation.



(※)CE-EX MARKING

- Equipment group:II
- Category: Gas2G
- Area:Gas
- Max . surface temperature :temperature class T6
- ENVIRONMENTAL LIMITS
(Environmental temperature
between -20°C and + 40°C)
- If there is some damage or something is lost during t ransportation, do not use the product, and contact the shop, which sold it to you.
- Check if all accessories are included.

REF	DESCRIPTION
1	DENOMINATION
2	MODEL
3	COMPRESSION RATIO
4	SERIAL NUMBER
5	CE-EX MARKING (※)
6	MAX. AIR WORKING PRESSURE
7	MANUFACTURER IDENTIFICATION

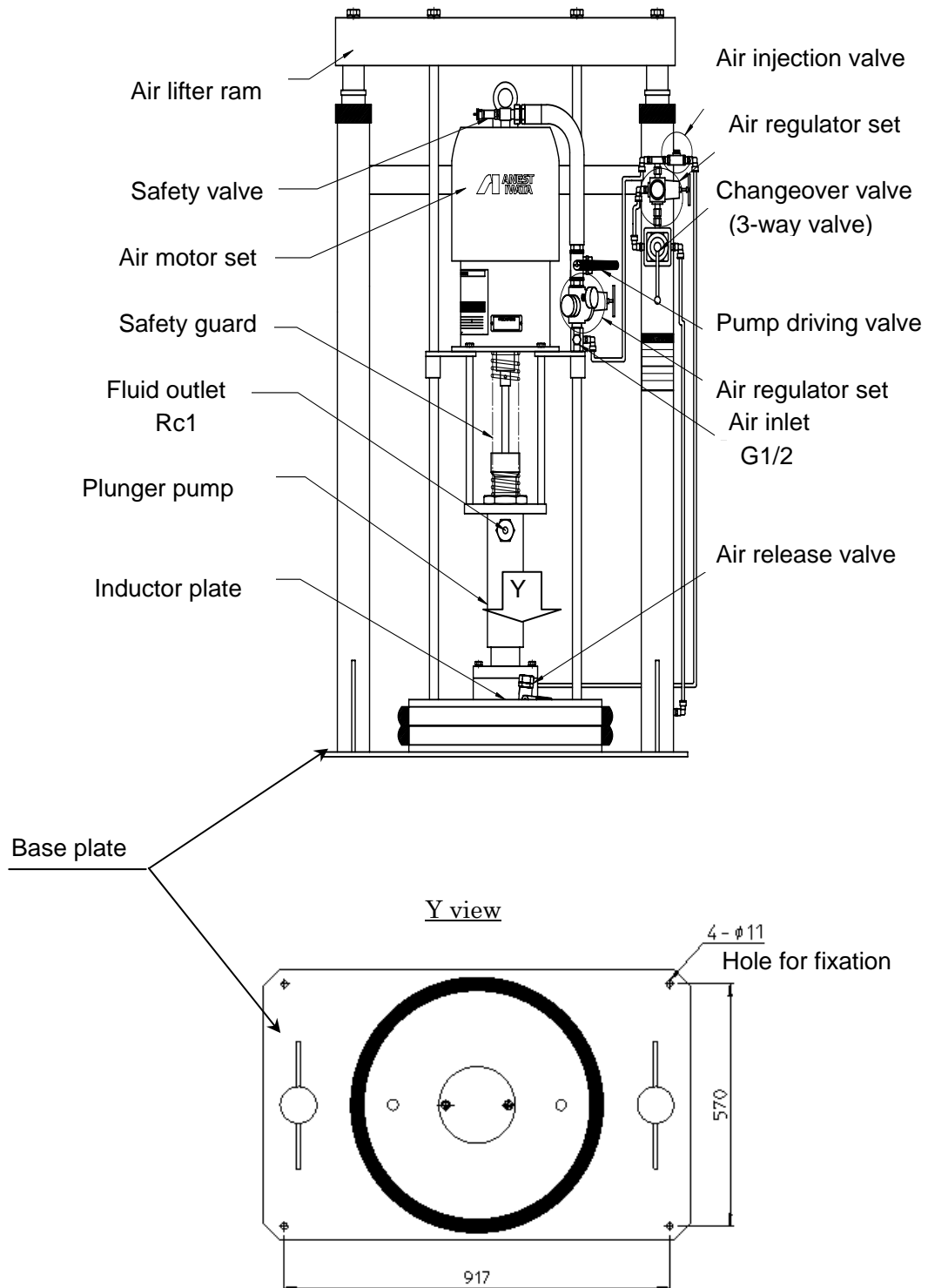
■ 3. Specifications

3-1 . Specifications

Items		Specifications
Product model		FPP-655
Max. working pressure (MPa / bar / PSI)		(33 / 330 / 4786)
Theoretical pressure ratio		55: 1
Max. operating air pressure (MPa / bar / PSI)		(0 . 6 / 6 / 86)
Max. fluid output l/min		10
Stroke length (mm)		120
Fluid output per cycle/ml		200
Max. No. of cycle cycles/min		50
Air consumption (L/min)		1080
Air inlet		G1/2
Fluid outlet		Rc1
Air release valve		Rc1/2
Air cylinder DIA(mm)		φ 254
Suction tube DIA(mm)		φ 49 . 2
L×W×H mm	Raised	1067×635×2576
	Lowered	1067×635×1575
Mass. (kg)		293
Permissible atmosphere temperature range °C		5 ~ 40
Permissible fluid temperature range °C		5 ~ 43
Noise level dB (A)		98

■ 4. Names of each section

As for details of each part, refer to ■ 10. Parts list



■ 5. Installation

WARNING

The pump unit should be fixed to the floor at four places with bolts. If not, it can fall.
 The pump unit should fix four places to the floor with the bolt. Otherwise, danger of collapse.
 Install to secure a space over the top of pump unit since it can reach ceiling when it moves up to the highest position.

The place set up secures the room of the part space on the pump unit. Because the ceiling might come in contact when the pump unit raised most.

Securely connect GROUND WIRE to the ground.
 If not, it can cause spark by static electricity, resulting in fire and explosion.

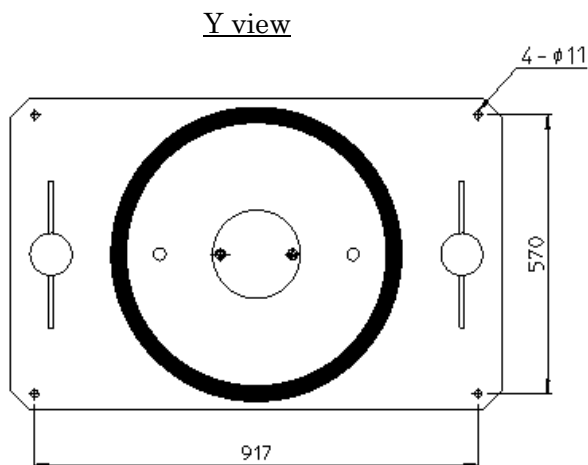
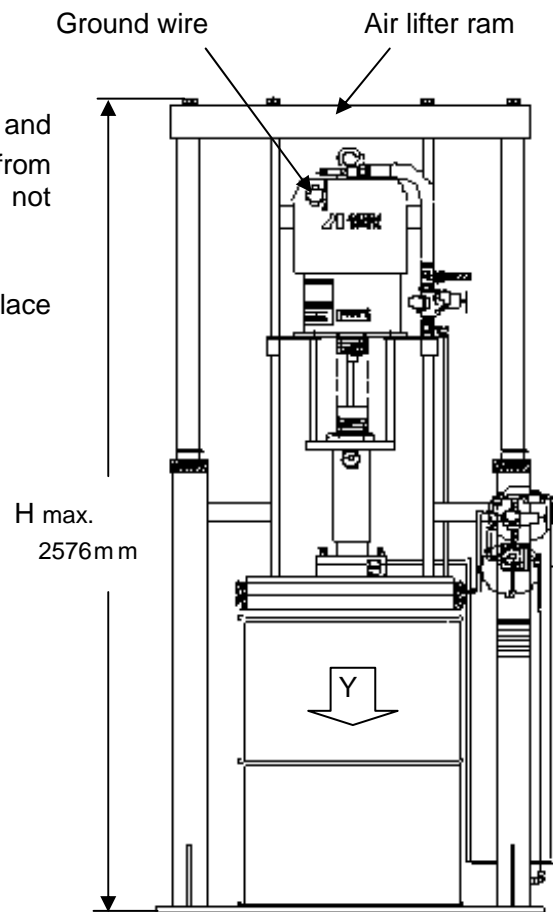


(1) When setting pump unit to drum can, lifter rises and top of air powered ram reaches height of 2576mm from floor. Decide installation place so that it does not contact ceiling of building or other things.

(2) Install where enough space is secured to replace drum can.

(3) When installation place is decided, fix it to the floor using the holes of 4-Φ 11 to fix base plate.

(4) Securely connect ground wire attached to pump to the ground.



■ 6. Preparation for operation

6-1 . Connect air hose and fluid hose

WARNING

- Securely ground pump, airless gun, work pieces and containers containing paint or solvent.
- Use Anest Iwata's designated nylon hose with built-in ground wire to connect grounding between pump and spray gun.
- Insufficient grounding will cause explosion or fire if exposed to a spark of electricity.
- Securely connect hose to avoid leakage and looseness.
- If hose is disconnected during operation, hazardous hose movement and paint ejection can cause severe bodily injury.



Important

- Observe the following items regarding installation. If not, it can cause failure.
- Steer clear of direct sunshine, and install it in a well-ventilated and horizontal site.
- Install or keep pump free of rain or splashes.
- Install pump free of paint mist.
- Use clean air filtered through dryer and filter (finer than 5 0 microns) .
- If clean air is not used, it can cause pump failure.

Confirm that valves ① and ② are closed.

Job1

Connect air hose to air inlet. Supply air pressure (primary side) of over 0.5MPa.

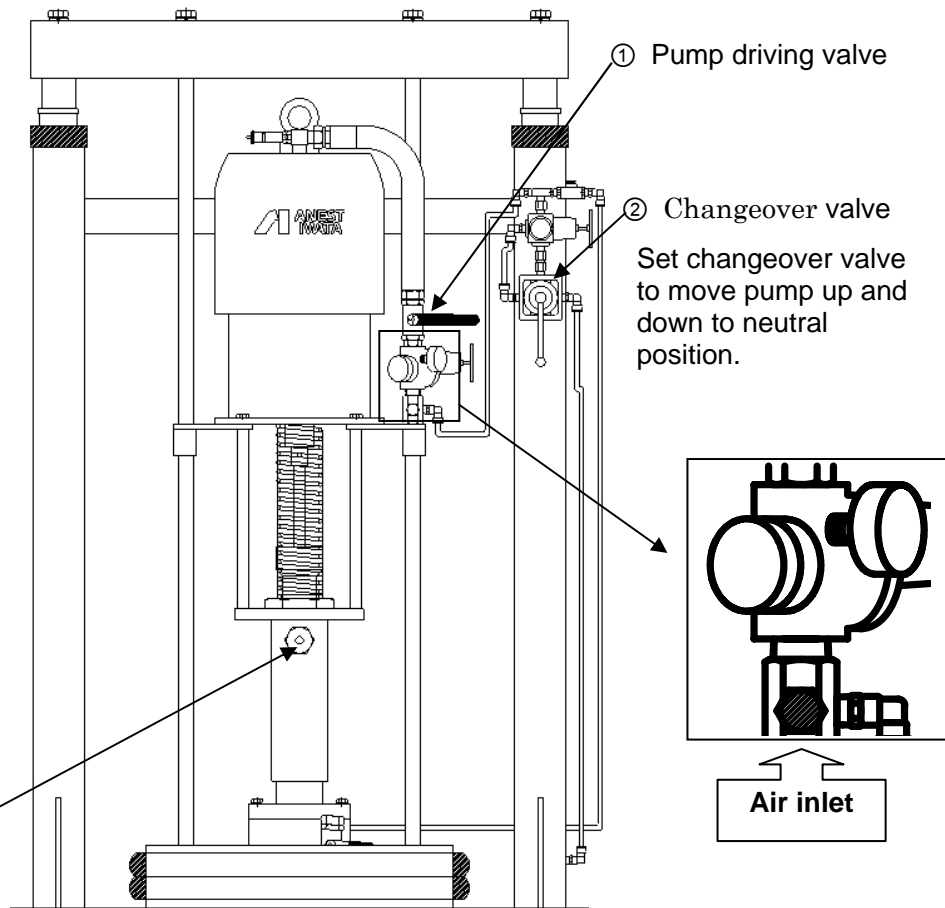
Job2

Connect fluid hose to fluid outlet.

Job3

Connect spray gun to fluid hose.

Fluid outlet



Important

- Before operation, be sure to pour the solvent matching the paint to be used entirely throughout the paint passages.
- Do not idle pump operation.

CAUTION

- When you use the product for the first time after purchasing it or have not used it for over one week even after cleaning, clean the inside fluid passages with cleaning liquid (2 ~ 3 liters).
- Use without cleaning can cause painting failure due to rust preventives or dust inside pump.
- When using drain valve, operate it fully closed or fully opened.
Half-opened operation can accelerate wear on seated section and cause paint leakage.
- When connecting drain valve to hose, firmly tighten it with hose band.
If hose comes off, high-pressure paint can shoot out which is very dangerous.

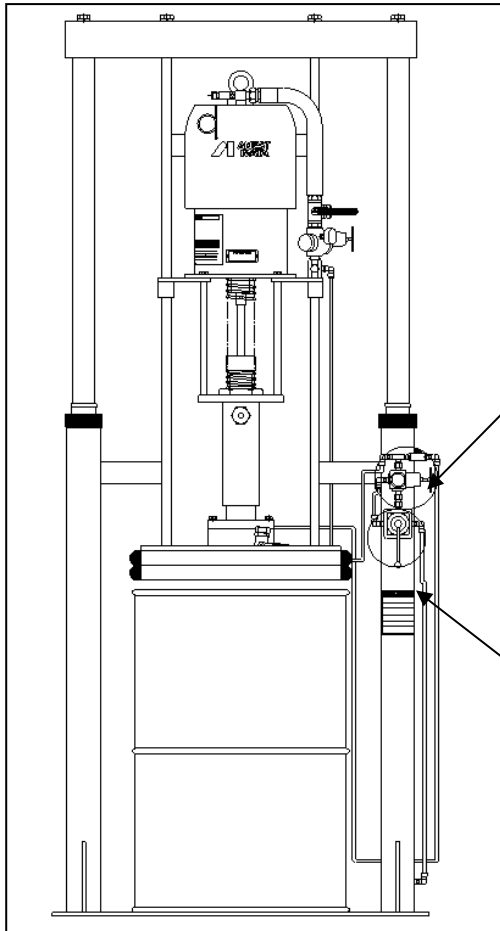
WARNING

- If you suddenly open drain valve under high pressure, paint can fly out from drain valve which is hazardous.
- So, slowly open drain valve.

6-2 . Install drum can

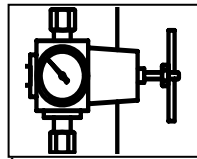
CAUTION

When move pump up , confirm that nothing is in the way before moving it up.
If not, paint can eject during disassembling or doing maintenance.



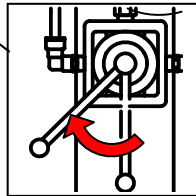
J o b
1

Set air regulator for lifter to move up and
down pump at 0.35 ~ 0.4MPa.



J o b 2

Move changeover valve counterclockwise
and move pump up.
(Confirm that nothing is in the way before
moving it up.)

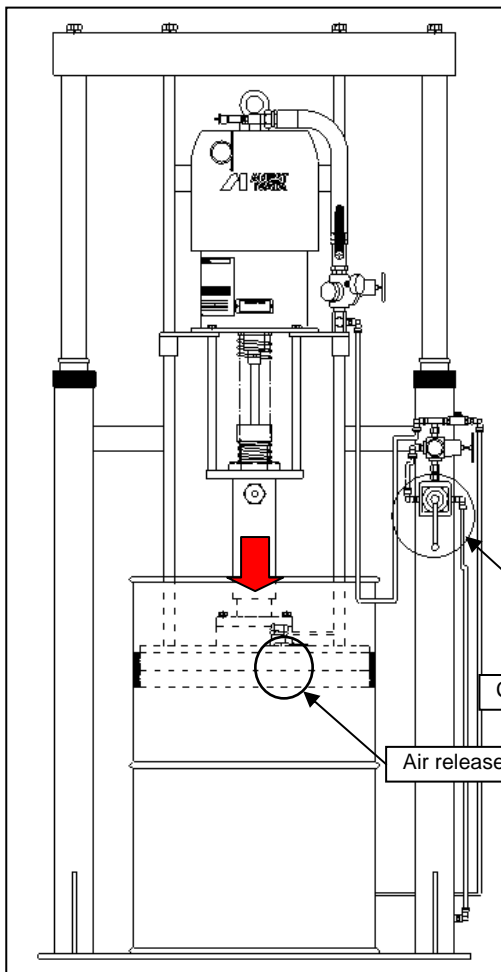


CAUTION

When move pump down , confirm that nothing is in the way before moving it down.
Never fully open it clockwise.
If done, sudden pump down-ward speed can pinch human body.

WARNING

When move pump down , confirm that pump and drum can are centered.
If done, when pump and drum can are not centered, damages drum can.



Job 3

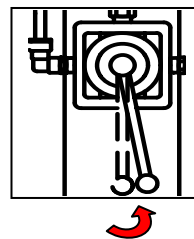
Install drum can so that both pump and drum can are centered.
(Do not operate changeover valve while installing drum can.)

Job 4

Open air release valve by one third.

Job 5

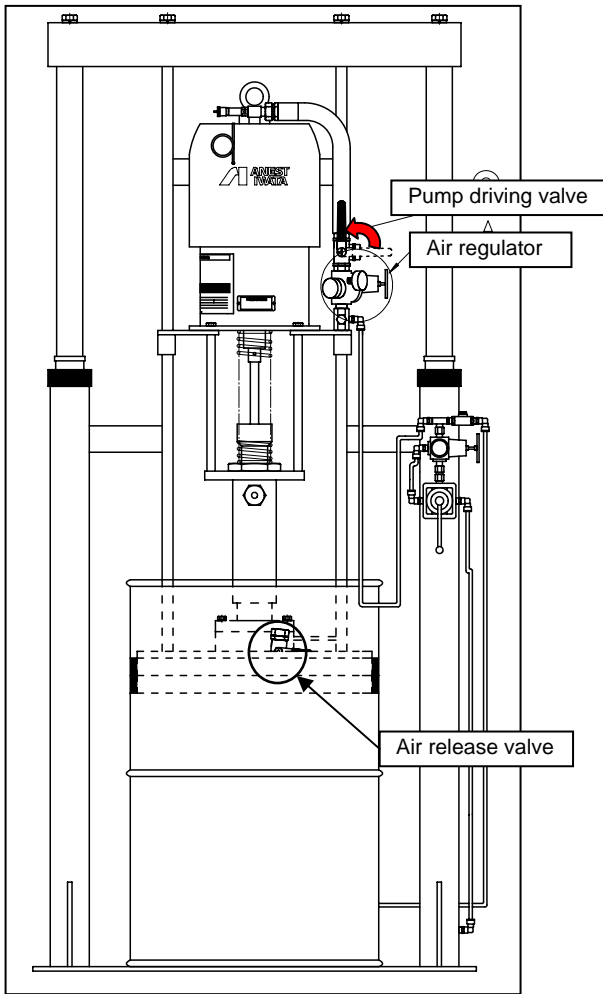
Move changeover valve for lifter a bit clockwise to move pump down a bit. Never fully open it clockwise. (If done, sudden pump down-ward speed can pinch human body and damage drum can)



Job 6

Close cock if fluid comes out from air release valve.

6-3 . Operate pump



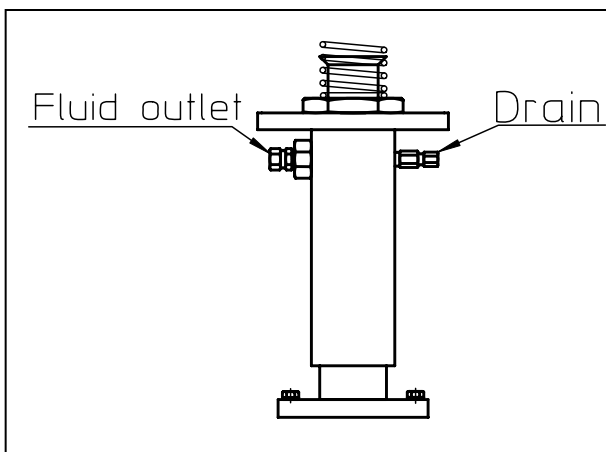
Job
1

Confirm that there is no looseness between pump and spray gun. Incomplete piping can disconnect piping and scatter fluid.

Job
2

Confirm that air regulator to operate pump is 0 Mpa, and fully open pump driving valve of three-way valve.

Gradually increase air pressure by air regulator to operate pump.



Job 3

Open drain valve of pump a bit to release air. Close it when fluid comes out.

■ 7. Painting job

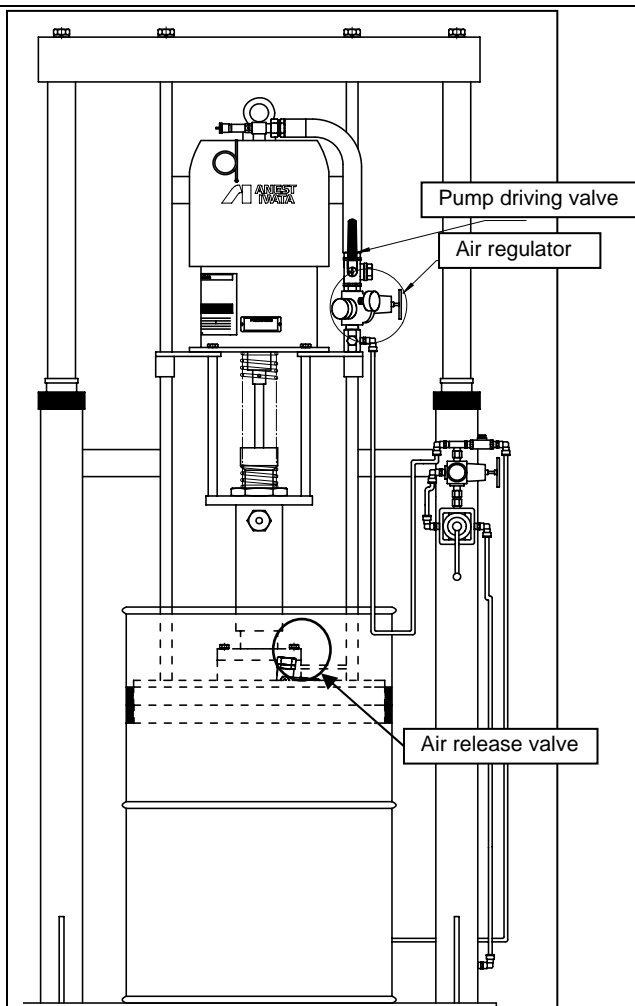
7-1 . Spraying job

Important

- Before job, fully tighten knob of air regulator.
- Operating pump at very high air pressure can promptly wear out sliding section and shorten pump life.
- Pour the same solvent as used with paint into packing nut up to half of its capacity.
It can smooth pump operation.
 - Do not idle pump.
If done, it can shorten pump life.

WARNING

- When paint leaks from airless gun, fluid hose and joints, never try to stop leakage by hand.
In such a case, immediately stop air supply and stop pump operation.
- Never point toward a person or animal or pull trigger of gun when human body or fingers come near tip of gun.
If done, high-pressure paint or solvent can enter human body through eyes, mouth or skin, which is very dangerous.
- Be sure to operate airless gun and fluid hose below max. operating pressure.



Job 1

Confirm that drain valve of pump is closed, and fully open pump driving valve. Then gradually increase air pressure by air regulator to operate pump, and adjust fluid pressure suitable for coating conditions.

Important

Keep air pressure of air regulator at less than 0.6 MPa.

Job 2

Point airless gun toward work and spray at a distance of 30 ~ 40cm.

7-2.For better painting

If you cannot get good painting conditions, refer to the following charts and adjust painting conditions.

(1) Tails appear on painting surface (streaks appear)

· Tailing problems come from material or properties of paints themselves. Refer to the following charts and solve problems.

No.	Problems	Remedies
①	Fluid pressure is not suitable for paint property.	Adjust fluid pressure so that fluid pressure does not cause tails (generally, the higher the fluid pressure, the less likely tailing will occur).
②	Fluid viscosity is high.	Dilute fluid and reduce fluid viscosity.

(1) Coating surface is rough (particles are large)

· It also comes from material or property of paint as in (1) above. Solve just the same as (1) above.

(2) Coating surface sags.

No.	Problems	Remedies
①	Fluid output is large.	Move gun faster to produce thin coating film. Reduce fluid pressure and fluid output.
②	Fluid viscosity is low.	Reduce fluid dilution and increase fluid viscosity.
③	Orifice of nozzle tip is large and fluid output is large.	Use nozzle tip with smaller orifice and reduce fluid output.

(3) Pulsation appears on coating surface.

No.	Problems	Remedies
①	Pressure fluctuation during pump changeover affects coating surface.	Use anti-vibration hose NHN-610 (nylon braided hose) .
②	Fluid hose is short.	Remedy as stated above.

Important

· If you cannot get appropriate painting conditions even if you refer to the above charts, please study the following matters and inform the shop which sold it to you:

(1) Names of paint manufacturer and paint

(2) Paint viscosity (how much did you dilute it ?) and fluid pressure when spraying

(3) No. of nozzle tip used

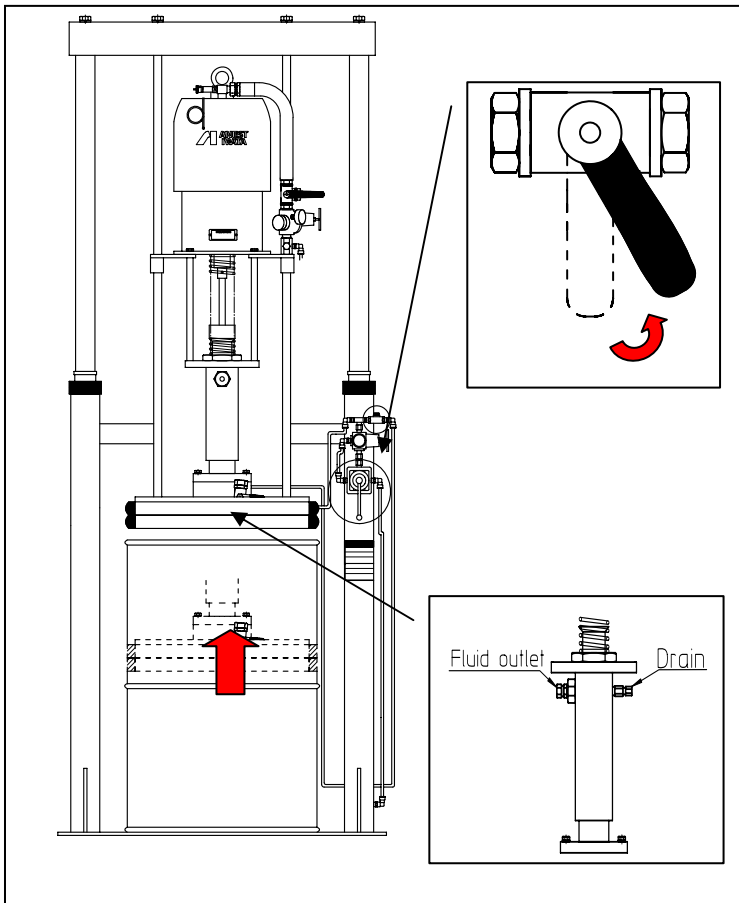
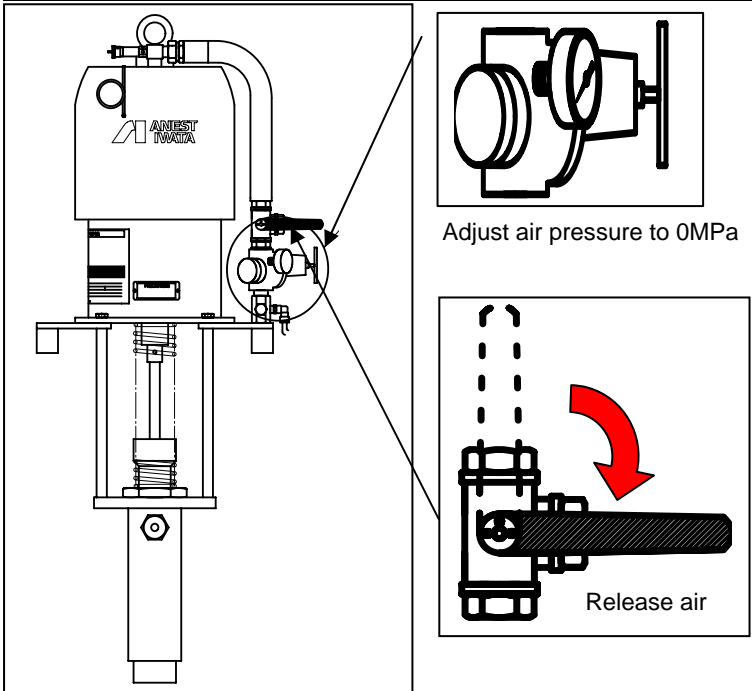
(4) Situations of painting conditions

(Please explain in detail such as "fluid output is small", "there are streaks in spray pattern", etc.)

■ 8. Interruption of job

WARNING

- If you suddenly open drain valve under high pressure, paint can fly out from drain valve which is hazardous.
So, slowly open drain valve.



Important

- Keep paint surface in paint container above paint intake section, or fully clean pump.
If paint intake section with paint is exposed to air without cleaning, ball in suction tube can stick to seat section of pump and pump cannot draw paint during next operation.
- Fully clean during color changing or periodic cleaning.
If not, it can fail next job.
Especially clean intake filter.
- If you do not use for over one day, fully clean fluid passages with cleaning liquid.
Circulate till clean liquid comes out.
- Be sure to disassemble and clean intermediate filter set after job is finished.

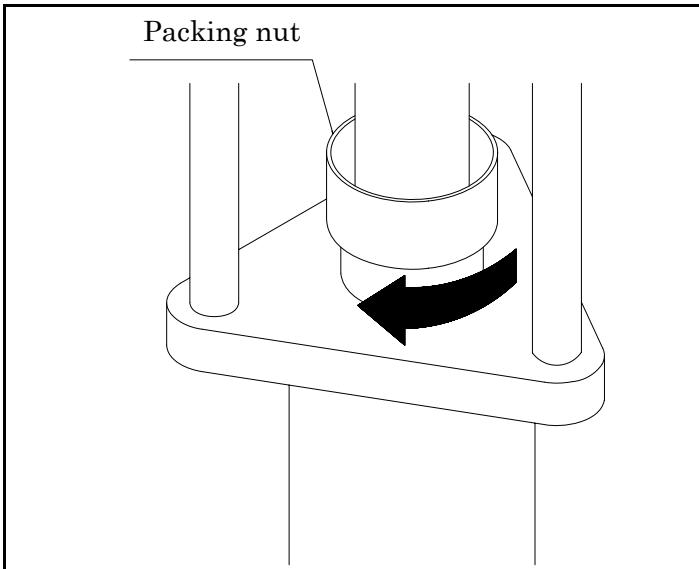
■ 9. Daily inspection and maintenance

9-1 Inspection time and items

Refer to the chart below and do the maintenance and inspection.

1.After daily job ends	(1) Clean nozzle tip. (2) Clean gun filter. (3) Loosen air regulator to allow pressure to fall to 0 MPa by exhausting paint from gun. When you do not clean pump, always keep paint surface in paint container above paint intake set.
2.Every 50 hours	(1) Clean paint passages (especially when paint has lots of pigments or deposits easily)
3.Every 100 hours	(1) Clean paint passages with cleaning liquid.
4.Every 300 hours	(1) Tighten packing of lower pump set.
5.Every 500 hours	(1) Apply grease to each sliding section of lower pump set and air motor set. (Use grease, equivalent to Esso Beacon No.2)
6.Every 1000 hours	(1) Overhaul the whole unit. (2) Replace worn parts.

9-2. Tighten packing of lower pump set



Important

When doing maintenance every 300 hours and paint leaks from upper packing, tighten packing nut. Before doing the above, be sure to reduce fluid pressure down to “ 0” .

■ 10. Problems and remedies

Important

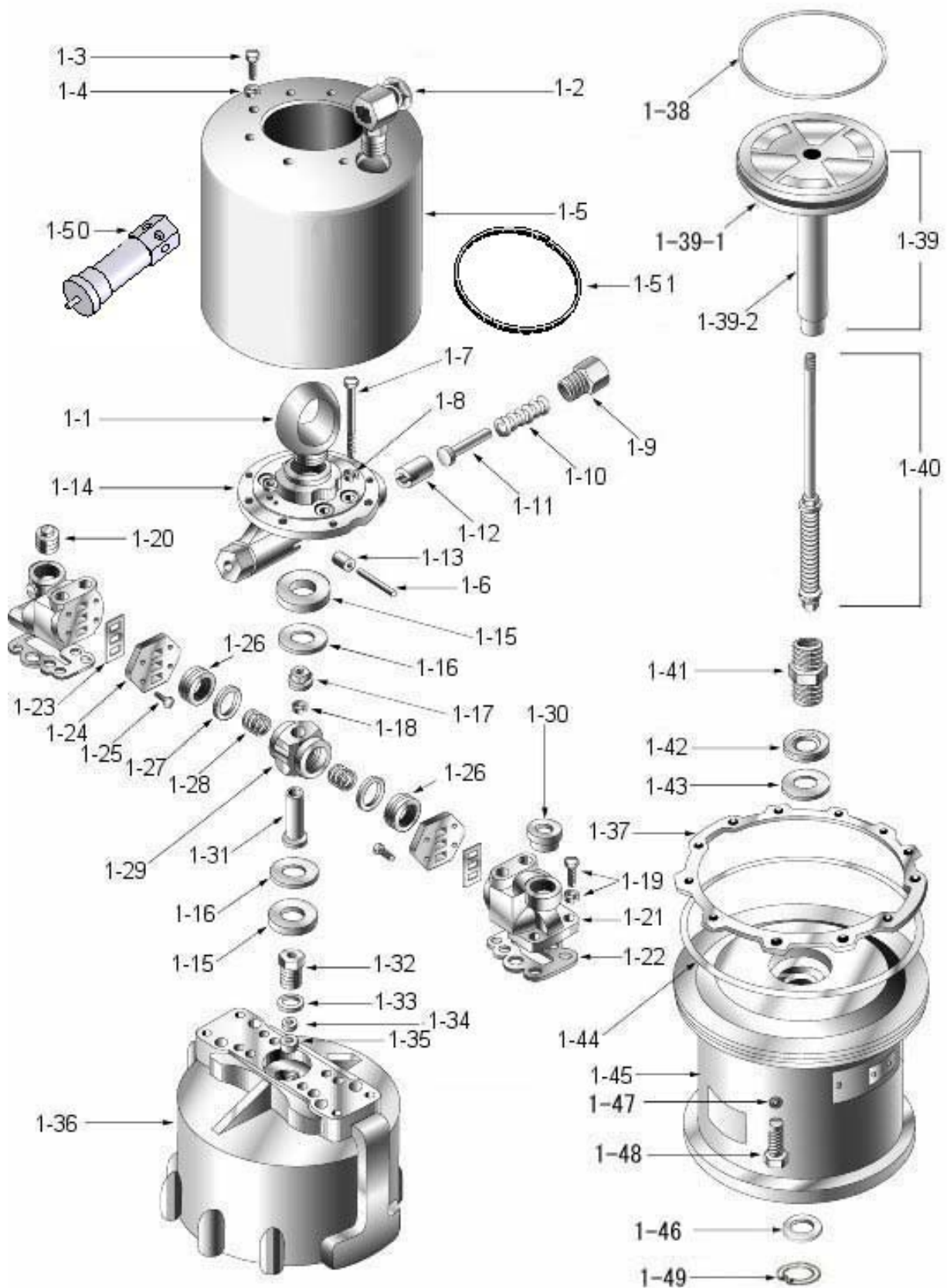
- Ask the dealer or the shop which sold it to you about ☆ marked items.
- If they are not solved properly, it can cause poor performance.

No.	Problems	Causes	Remedies
1	Air pressure does not rise.	<ol style="list-style-type: none"> 1. Air source valve is not opened. 2. Air regulator is not closed. 3. Insufficient air pressure of air source. 	<ol style="list-style-type: none"> 1. Fully open it. 2. Tighten its knob. 3. Replace air compressor.
2	Plunger pump does not operate.	<ol style="list-style-type: none"> 1. Air source valve is not opened. 2. Air regulator knob is not closed. 3. Plunger pump fails. 	<ol style="list-style-type: none"> 1. Fully open it. 2. Tighten its knob. <p>Remove each clog. Disassemble air motor.☆</p>
3	Plunger pump stops and fluid pressure does not rise (air pressure rises)	<ol style="list-style-type: none"> 1. Upper packings are tightened too much. 	<ol style="list-style-type: none"> 1. Loosen it. (refer to ■ 10. Inspection and maintenance) .
4	Although pump operates, fluid pressure does not rise.	<ol style="list-style-type: none"> 1. B a l l in suction tube sticks. 	<ol style="list-style-type: none"> 1. R e m o v e intake hose set and push ball up by bar from connection.

No.	Problems	Causes	Remedies
5	Plunger pump does not stop operation.	<ol style="list-style-type: none"> 1. Drain valve is not closed. 2. Paint is insufficient. 3. Air is drawn. 4. Air remains in paint passages. 5. Paint leaks from thinner cup. 6. Ball in suction tube sticks to seat. 7. Leakage from fluid passages. 8. Scratch or dust on ball or seat. 	<ol style="list-style-type: none"> 1. Close drain valve. 2. Replenish paint. 3. Securely connect intake hose set. 4. Loosen drain valve and release air. 5. Tighten upper packing or replace. ☆ 6. Remove intake hose set and push ball up with bar from connection. 7. Tighten. 8. Disassemble, clean or replace. ☆
6	Vibration appears (spray pattern becomes large or small).	<ol style="list-style-type: none"> 1. Nozzle tip is worn out. 2. Lower packing is worn out. 3. Intake joint is loosened. 4. Scratch or dust on ball and seat. 5. Seated surface of valve shaft or packing on exhaust side is worn out. 	<ol style="list-style-type: none"> 1. Replace. 2. Tighten or replace ☆ 3. Tighten. 4. Disassemble, clean or replace. 5. Replace parts. ☆
7	Air pressure cannot be adjusted by air regulator.	<ol style="list-style-type: none"> 1. Rubber valve of air regulator is damaged. 	<ol style="list-style-type: none"> 1. Replace. ☆

■ 11. Parts list

11-1. Air Motor Set



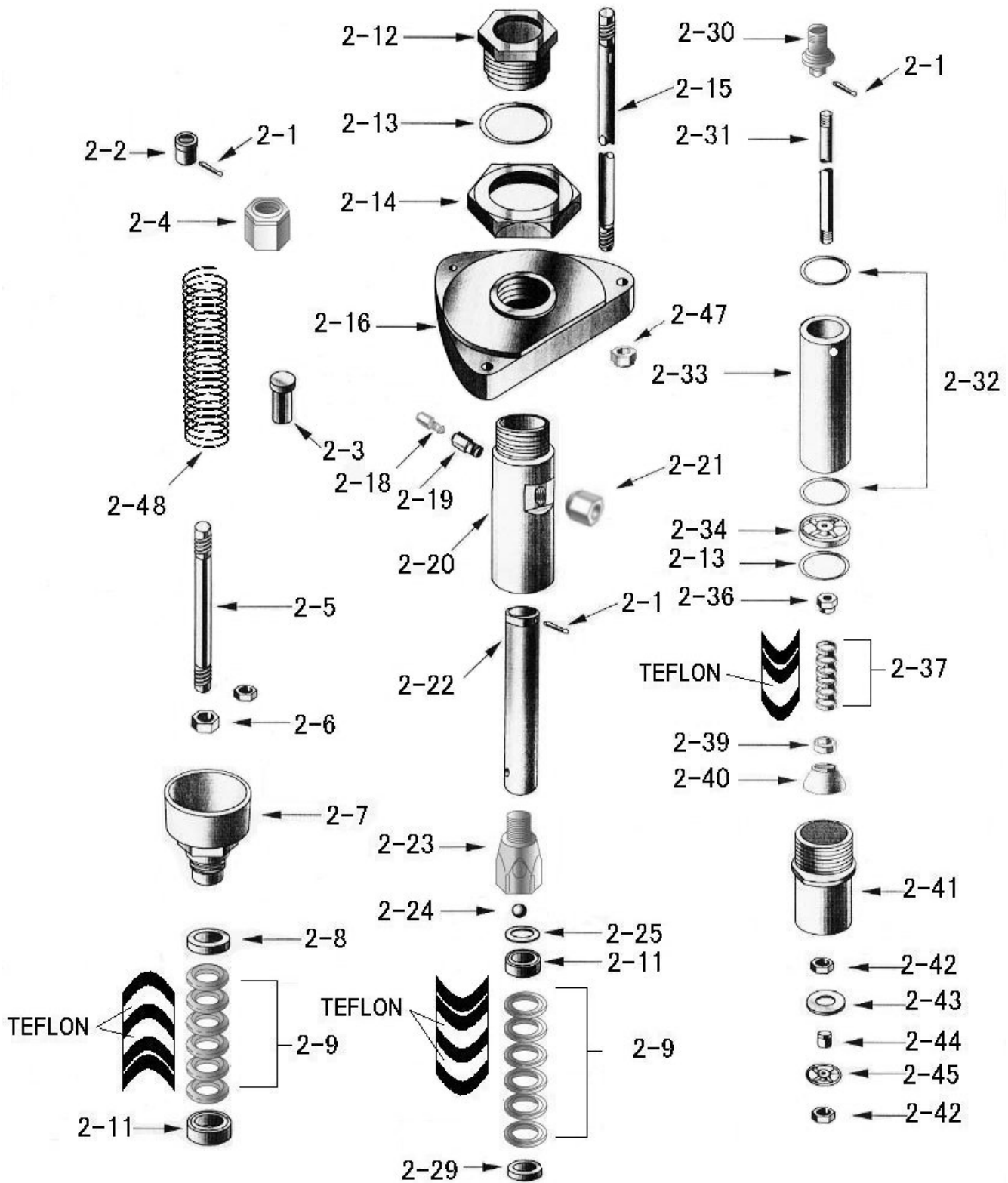
Refer to drawing on page 19.

Parts circled by ○ mark are consumable parts.

No.	Part Name	Q'ty
1-1	eyebolt	1
1-2	elbow union	1
1-3	hex. bolt	8
1-4	spring washer	8
1-5	air motor cover	1
○ 1-6	spindle	2
1-7	hex. bolt	4
1-8	spring washer	4
1-9	retainer	2
○ 1-10	spring	2
○ 1-11	spring guide	2
○ 1-12	plunger	2
○ 1-13	roller	2
1-14	housing	1
1-15	damper	2
1-16	washer	2
1-17	nut	1
1-18	spring washer	1
1-19	bolt with washer	4
1-20	plug with hex. hole	1
1-21	manifold	2
○ 1-22	gasket	2
○ 1-23	seal valve plate	2
○ 1-24	valve plate	2
1-25	screw	8

No.	Part Name	Q'ty
○ 1-26	valve	2
○ 1-27	O ring	2
○ 1-28	spring	2
1-29	valve housing	1
1-30	grommet	1
1-31	hub	1
○ 1-32	bearing	1
○ 1-33	gasket	1
○ 1-34	leather packing	1
○ 1-35	packing	1
1-36	air cylinder	1
○ 1-37	cylinder gasket	1
○ 1-38	O ring	1
1-39-1	piston	1
1-39-2	piston rod	1
○ 1-40	changeover rod set	1
1-41	piston tube	1
○ 1-42	U packing	1
1-43	washer	1
1-44	O ring	1
1-45	base	1
○ 1-46	seal	1
1-47	spring washer	12
1-48	hex. bolt	12
1-49	snap ring	1
○ 1-50	safety valve	1
○ 1-51	ground wire	1

11-2 . Lower pump set



Refer to drawing on page 21.

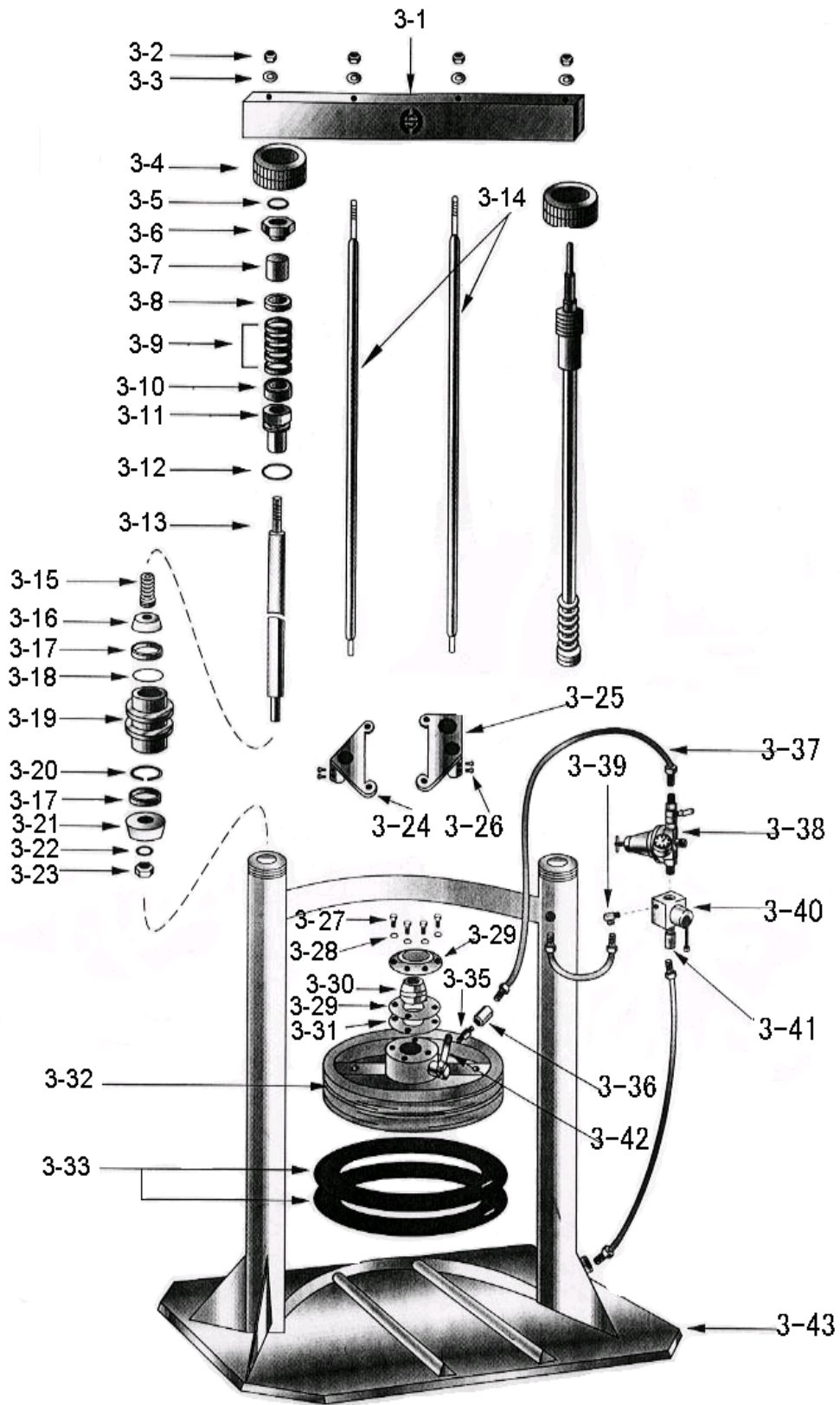
Refer to drawing on page 21.

Parts circled by ○ mark are consumable parts.

No.	Part Name	Q'ty
2-1	pin	3
2-2	coupling	1
2-3	coupling nut	1
2-4	nut	1
○ 2-5	rod	1
2-6	nut	1
2-7	packing nut	1
○ 2-8	gland (F)	1
○ 2-9	V packing set	2
○ 2-11	gland (M)	2
2-12	nut	1
○ 2-13	O ring	2
2-14	nut	1
2-15	connecting rod	3
2-16	flange	1
2-18	plug	1
2-19	socket	1
2-20	pump housing	1
2-21	nipple	1

No.	Part Name	Q'ty
2-22	rod	1
2-23	housing	1
○ 2-24	ball	1
2-25	washer	1
○ 2-29	gland (F)	1
○ 2-30	piston	1
2-31	rod	1
○ 2-32	O ring	2
2-33	cylinder	1
○ 2-34	guide	1
2-36	nut	1
○ 2-37	V packing set	1
○ 2-39	gland (F)	1
2-40	valve	1
2-41	intake housing	1
2-42	nut	2
○ 2-43	intake plate	1
○ 2-44	guide	1
○ 2-45	piston	1
2-47	nut	3
2-48	safety guard	1

11-3 . Air Powered Ram



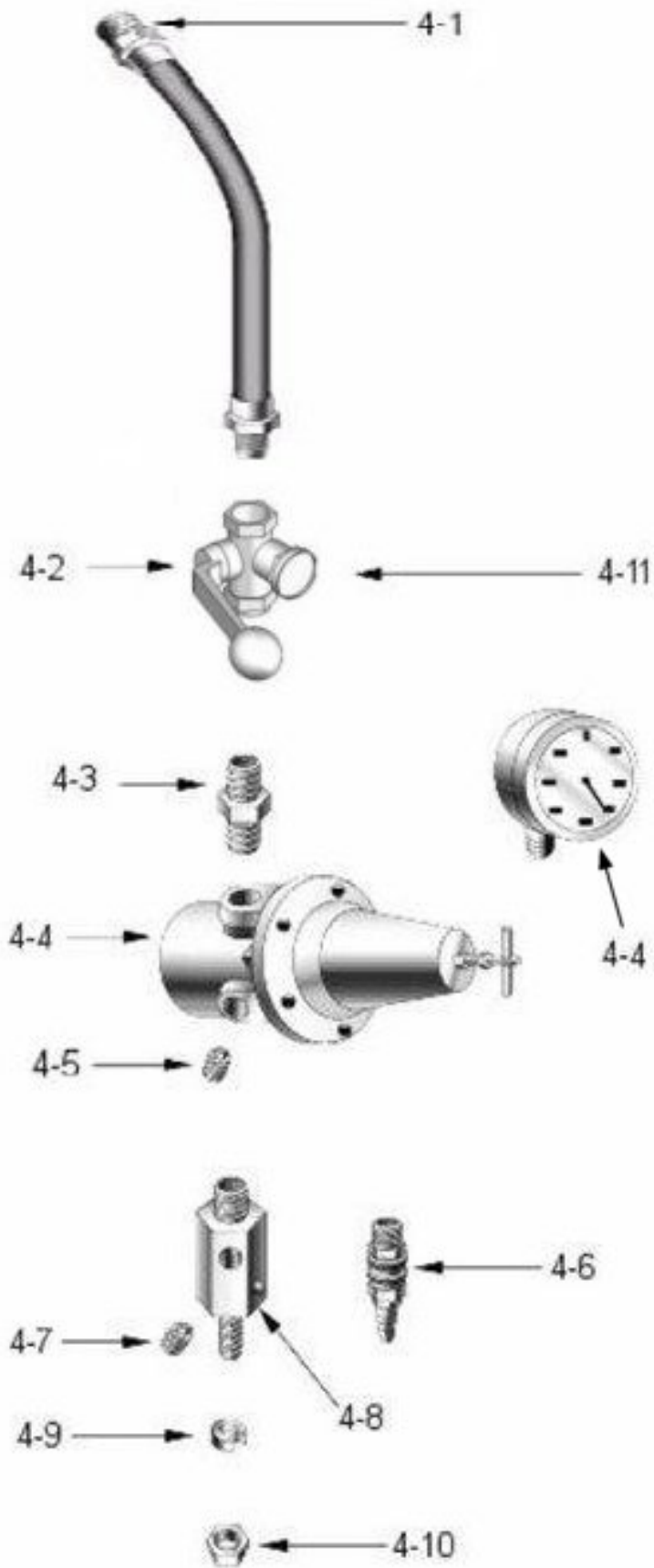
Refer to drawing on page 23.

Parts circled by ○ mark are consumable parts.

No.	Part Name	Q'ty
3-1	beam	1
3-2	nut	4
3-3	washer	4
3-4	cap	2
○ 3-5	seal	2
3-6	nut	2
○ 3-7	bearing	2
○ 3-8	gland (F)	2
○ 3-9	V packing set	2
○ 3-10	gland (M)	2
3-11	housing	2
○ 3-12	O ring	2
○ 3-13	piston rod	2
3-14	connecting rod	2
3-15	spring	2
3-16	spacer	2
○ 3-17	U-packing	4
○ 3-18	O ring	2
○ 3-19	piston	2
3-20	wear ring	2
3-21	spacer	2

No.	Part Name	Q'ty
3-22	washer	2
3-23	nut	2
3-24	bracket (F)	1
3-25	bracket (M)	1
3-26	bolt	4
3-27	bolt	4
3-28	washer	4
3-29	seal retainer	2
3-30	seal	1
○ 3-31	gasket	1
○ 3-32	inductor plate	1
3-33	wiper	2
○ 3-35	nipple	1
3-36	holder	1
3-37	air hose	3
3-38	air regulator	1
3-39	one touch nipple	6
3-40	hand valve	1
3-41	silence	1
3-42	ball valve	1
3-43	double post	1

11-4 . Air Regulator set



Refer to drawing on page 25.

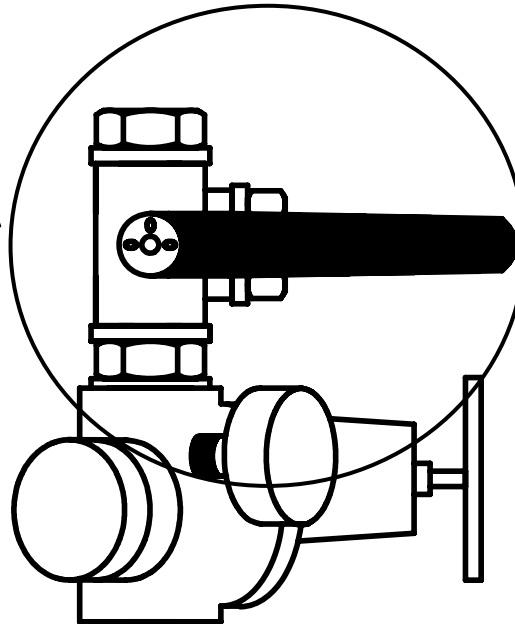
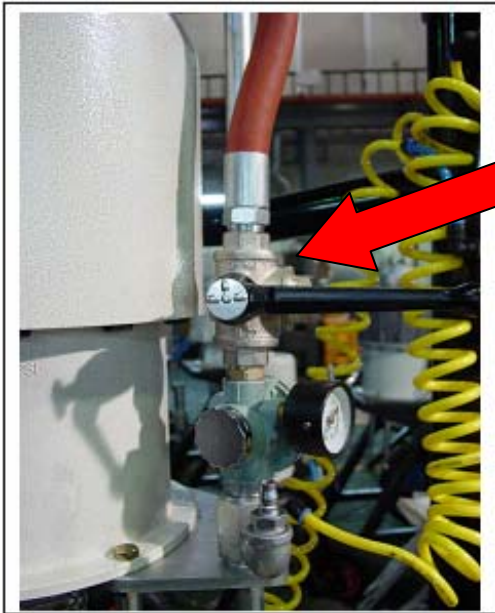
Parts circled by ○ mark are consumable parts

No.	Part Name	Q'ty
4-1	air hose	1
4-2	3 way valve 3/4"FF	1
4-3	nipple	1
4-4	air regulator	1
4-5	plug	1
4-6	coupling set	1
4-7	plug	1
4-8	manifold	1
4-9	spring washer	1
4-10	hex. nut	1
○ 4-11	Air muffler 3/4"	1

■ 12. Safety systems

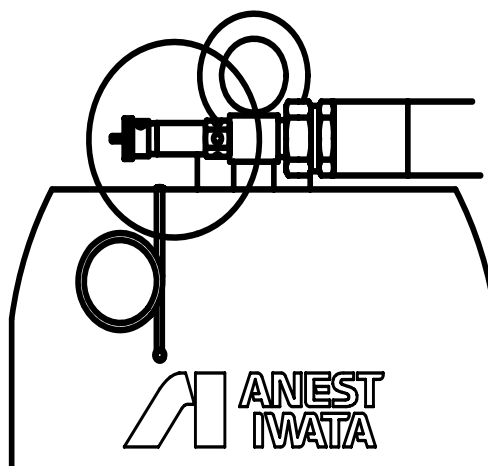
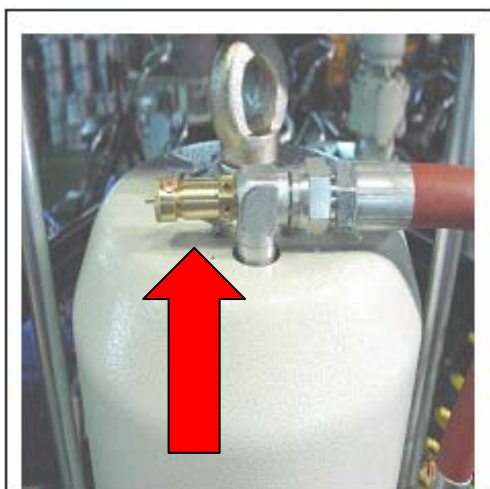
Three-Way Valve

In case of anomalies during operation, turn the three-way valve lever 90° clockwise. In this way, the air supply will be interrupted and the residual pressure inside the pump will be released.



Safety Valve

A 8 bar calibrated safety valve is installed to ensure the pump working pressure does not exceed the limits inside the feeding circuit. If the calibration pressure is exceeded, the valve opens by releasing the excess of air.



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