

E-WHA

*Decreased Metering Pumps in Pulsation
Built-in Air Chamber & Back Pressure Valve*

OPERATION AND INSTALLATION MANUAL FOR JMBV (BUILT IN AIR CHAMBER & BACK PRESSURE VALVE)

JMBV SERIES



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1. Before Using the Pump

Thank you for using this EWHA CHEMICAL FEEDER Metering Pump.

The pump of this company is a plunger type metering pump, developed by our own domestic technical team, and produced and sold by strict quality management. This manual describes the handling and repairing and checking method of the metering pump displaying excellent performance in detail. In order to keep the perfect performance and make use of the pump without inconvenience, make sure to read through this manual prior to its use.

1-1. Description of Symbols

Warning

This symbol is telling you when using our product improperly without attention of manual that causes serious physical injury.

Caution

This symbol is telling you that causes damage to person or product when using improperly.

Importance

This symbol is telling you the methods of maintenance of product in best performance and durability.

Supplementary

This symbol is telling you sub-description.

Warning

- Do not operate pump without expert.
- To avoid electrical accident, cut the power off before repairing or checking.

Caution

- It causes electrical accident or damage of pump when using improperly.
- There's no responsibility for using pump that you remodel without any notice.
- Only electrician or qualified person in electricity can install the pump's power.
- Make sure that the earth terminal is earthed otherwise it causes electric shock to pump
- when it smokes or smells burning like unusual status, Stop running and Call our company or distributors. It causes fire, electric shock or serious problem to pump.
- Handling chemicals should have protective covering on any part of your skin that is likely to be exposed to these chemicals.
- Remove the chemicals in head part with clean water and pressure in the pipe before repairing.

1-2. Conditions of Using Pump



- Do not pump out any chemicals those are not planned. It causes break-down.
- Check your supplies like O-ring, V-packing regularly, exchange them in need.
- Do not operate any conditions except for this below
 - Field Temperature : 0~40 °C
 - Chemicals Temperature : STAINLESS STEEL 0~80 °C, PVC 0~40 °C
 - Chemicals Viscosity : Under 200 cps
 - Maximum Discharge Pressure : Refer to specifications for each model
- This pump is not suitable for pumping slurry. Consult with us about using slurry

1-3. Notice



- Do not operate pump without expert.
- To avoid electrical accident, cut the power off before repairing or checking.



- A main cause of accident or product damaged by falling or breakage, Stop running and Call our company or distributors to deal with the problem.
- Do not install where humid or a lot of dust. It causes electric shock or damage to pump.
- when it smokes or smells burning like unusual status, Stop running and Call our company or distributors. It causes fire, electrical shock or serious problem to pump.
- Do not put hands on its motor when running, it could burn your skin.
- To avoid electrical accident, cut the power off before repairing or checking.
Do not put on a power while repairing or checking.
- Handling chemicals should have protective covering on any part of your skin that is likely to be exposed to these chemicals.
- Remove the chemicals in head part with clean water and pressure in the pipe before repairing.
- Do not use any other connectors those are not standardized. It causes break-down.
- To prevent damage of discharge piping and physical injury with chemical leaking or spouting from pump, check the discharge valve or discharge piping opened.

 **Importance**

- Installation of relief valve that controls over-pressure automatically will help with problem like high pressure in piping.

2. Checking Points

JMBV SERIES are built in back pressure valve.

No additional installation is required for back pressure valve.

After purchasing the pump, check out the following matters by all means.

- Check if the model, discharging pressure, discharging amount, voltage of the purchased pump fit the ordered specifications.
- Check if any destroyed part has occurred by vibration and impact during transportation.
- Check if there is any loosened or released in the product.
- In storing the pump for a long time by the change of a plan, keep it in custody after opening the cover and checking it out.

List of Accessories

< JMBV TYPE >

PART NAME	HOSE TYPE	FLANGE TYPE	REMARK
OP & INS MANUAL	1 COPY	1 COPY	-
NUTS AND BOLTS	4 sets (M8 X 30)	4 sets (M8 X 30)	-
HOSE	2 m	-	ONLY APPLY TO HOSE TYPE
STRAINER	1 ea	-	ONLY APPLY TO HOSE TYPE

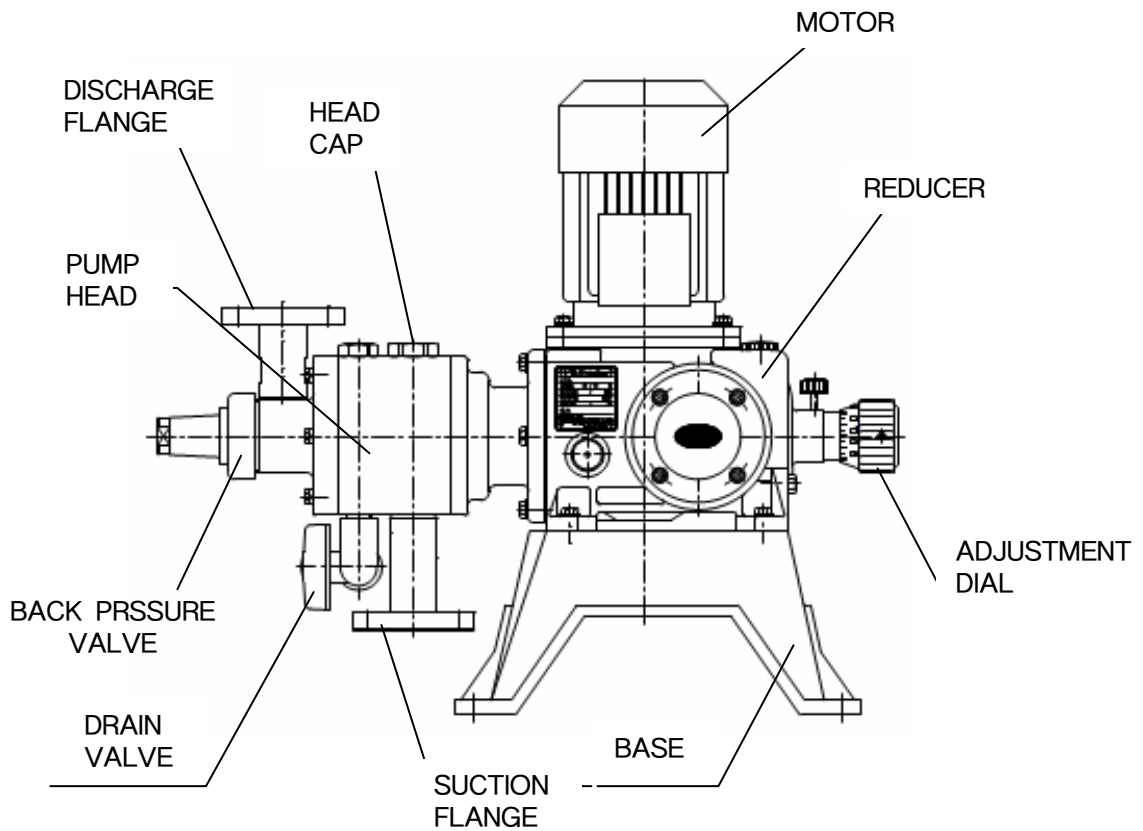
3. Outline

Our diaphragm type metering pumps, JMBV SERIES are classified according to as follows

TYPE	NO. OF HEAD	AIRCHAMBER	RELIEF VALVE	TYPE OF DRIVE	TYPE OF REDUCER	TYPE OF MOTOR ATTACHMENT	REMARK
JMBV	1	BUILT IN	BUILT IN	CAM & SPRING TYPE	WORM GEAR	VERTICAL	Exe II (eG3), Exd II (d2G4) POSSIBLE

4. Basic Structure

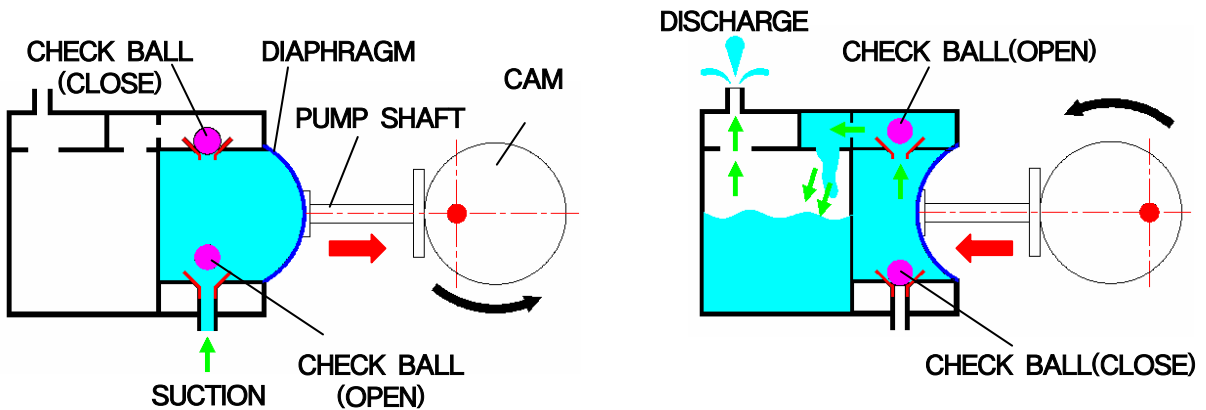
■ JMBV TYPE



- ※ THIS FEATURE IS FLANGE TYPE.
- ※ DRAIN VALVE IS OPTIONAL PART.

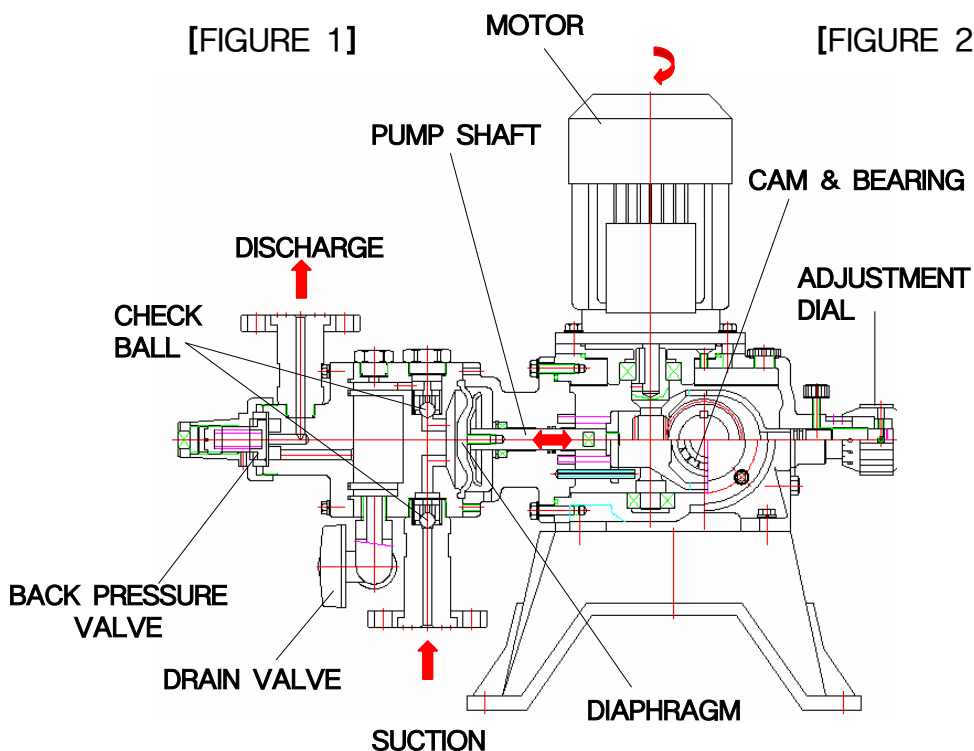
5. Principle of Operation

- 1) The rotary motion of a motor shifts to the reciprocating motion of a pump shaft.
- 2) If the diaphragm attached to the end of a pump shaft makes a rotary motion, then cubical change in the pump head generates, at the same time, the subsidiary and static pressure in the pump head alternately generate, and the suction and drain of chemical liquid is repeatedly done.
- 3) When the diaphragm moves back (Refer to the figure 1), subsidiary pressure generates in the pump head, when the check ball in outlet part shuts off the flowing path, and prevents the reverse flow of chemical liquid on the piping of outlet part.
- 4) On the contrary, the diaphragm moves forward (Refer to the figure 2), static pressure generates in the pump head, when the check ball in inlet part shuts off the flowing path, and the flowing path opens by the ascent of the check ball of outlet part, and chemical liquid becomes discharged.



[FIGURE 1]

[FIGURE 2]



6. Description of Model Codes

<u>JMBV</u>	<u>D</u>	<u>3000</u>	<u>P</u>	<u>C</u>	<u>F</u>	<u>D</u>
①	②	③	④	⑤	⑥	⑦
①	PUMP TYPE	DIAPHRAGM TYPE (BUILT IN BACK PRESSURE VALVE)				
②	FLOW RATE	NONE : SIMPLEX HEAD D : DUPLEX HEAD (EXCEPT FOR EWS TYPE)				
③	MATERIAL OF PUMP HEAD	3000=3000 cc/min.				
④	MATERIAL OF CHECK BALL	P : P.V.C S4 : SUS304 S6 : SUS316 T : PTFE K : PVDF				
⑤	PUMP TYPE	C : Ceramics S4 : SUS304 S6 : SUS316				
⑥	INLET/OUTLET CONNECTION TYPE	H : HOSE TYPE HF : HOSE-FLANGE TYPE F : FLANGE TYPE PF : PIPE FITTING TYPE				
⑦	DRAIN VALVE INSTALLED OR NOT	D : DRAIN VALVE INSTALLED NONE : DRAIN VALVE UNINSTALLED				
		※ DRAIN VALVE IS NOT APPLIED TO PTFE MAT'L				

7. Feature & Material of Liquid end part

HEAD MAT'L PART NAME	P.V.C	SUS304	SUS316	PVDF
DIAPHRAGM	PTFE + EPDM			
CHECK BALL	CERAMICS	SUS304	SUS316	CERAMICS
BALL SEAT	P.V.C	SUS304/PVC	SUS316/PVC	PVDF
BALL GUIDE	P.V.C	SUS304	SUS316	PVDF
O-RING, GASKET	VITON			PTFE

8. Specification

JMBV/JMBVD SERIES

MODEL		JMBV25	JMBV50	JMBV100	JMBV300	JMBV500	JMBV1000	JMBV2000
		JMBVD50	JMBVD100	JMBVD200	JMBVD600	JMBVD1000	JMBVD2000	JMBVD4000
MAX. FLOW RATE (cc/min.) (at max. kgf/cm ²) 60Hz(50Hz)		25 (20)	50 (40)	150 (125)	360 (300)	520 (430)	1,200 (1,000)	2,200 (1,800)
		50 (40)	100 (80)	300 (250)	720 (600)	1,040 (860)	2,400 (2,000)	4,400 (3,600)
MAX. DIS. PRESSURE (kgf/cm ²)		10				5		
STROKE RATE(spm)		57(48)	111(97)					
CONNECTION	HOSE	Φ 6					Φ 10	
	FLANGE	KS 10K 15A						
MOTOR (60Hz, 50Hz)		3 φ, AC 220/380V, 440V, 0.4kW, F CLASS						
		1 φ, AC 220V, 0.2kW, B CLASS						
		Exe II (eG3), Exd II (d2G4) 0.4kW						
MODEL		JMBV3000	JMBV4000	JMBV5000	JMBV6000	JMBV8000	JMBV10L	
		JMBVD6000	JMBVD8000	JMBVD10L	JMBVD12L	JMBVD16L	JMBVD20L	
MAX. FLOW RATE (cc/min.) (at max. kgf/cm ²) 60Hz(50Hz)		3,300 (2,700)	4,300 (3,500)	5,000 (4,100)	6,000 (5,000)	8,000 (6,600)	10,800 (9,000)	
		6,600 (5,400)	8,600 (7,000)	10,000 (8,200)	12,000 (10,000)	16,000 (13,200)	21,600 (18,000)	
MAX. DIS. PRESSURE (kgf/cm ²)		3						
STROKE RATE(spm)		111(97)						
CONNECTION	HOSE	Φ 10	Φ 16				Φ 19	
	FLANGE	KS 10K 20A					KS 10K 25A	
MOTOR (60Hz, 50Hz)		3 φ, AC 220/380V, 440V, 0.4kW, F CLASS					3 φ, AC 220/380V, 440V,0.75kW, B CLASS	
		1 φ, AC 220V 0.2kW B CLASS		1 φ, AC 220V, 0.4kW, B CLASS				
		Exe II (eG3), Exd II (d2G4) 0.4kW					0.75kW	

NOTE 1. All performance curves shown are for water @68°F/20°C and 1.0 S.G..

The performances are subject to change without notice.

2. Pumping Temperature Limit : PVC 0~40°C, STAINLESS STEEL/PTFE/PVDF 0~80°C

3. Slurry Limit : 100μm(0.1mm), Slurry Concentration Limit 10wt(%)

4. Suction Lift : 2m

5. Standard Painting Color : PANTONE 334C(MUNSELL NO. 2.5BG 5/10)

9. Performance Curves



Importance

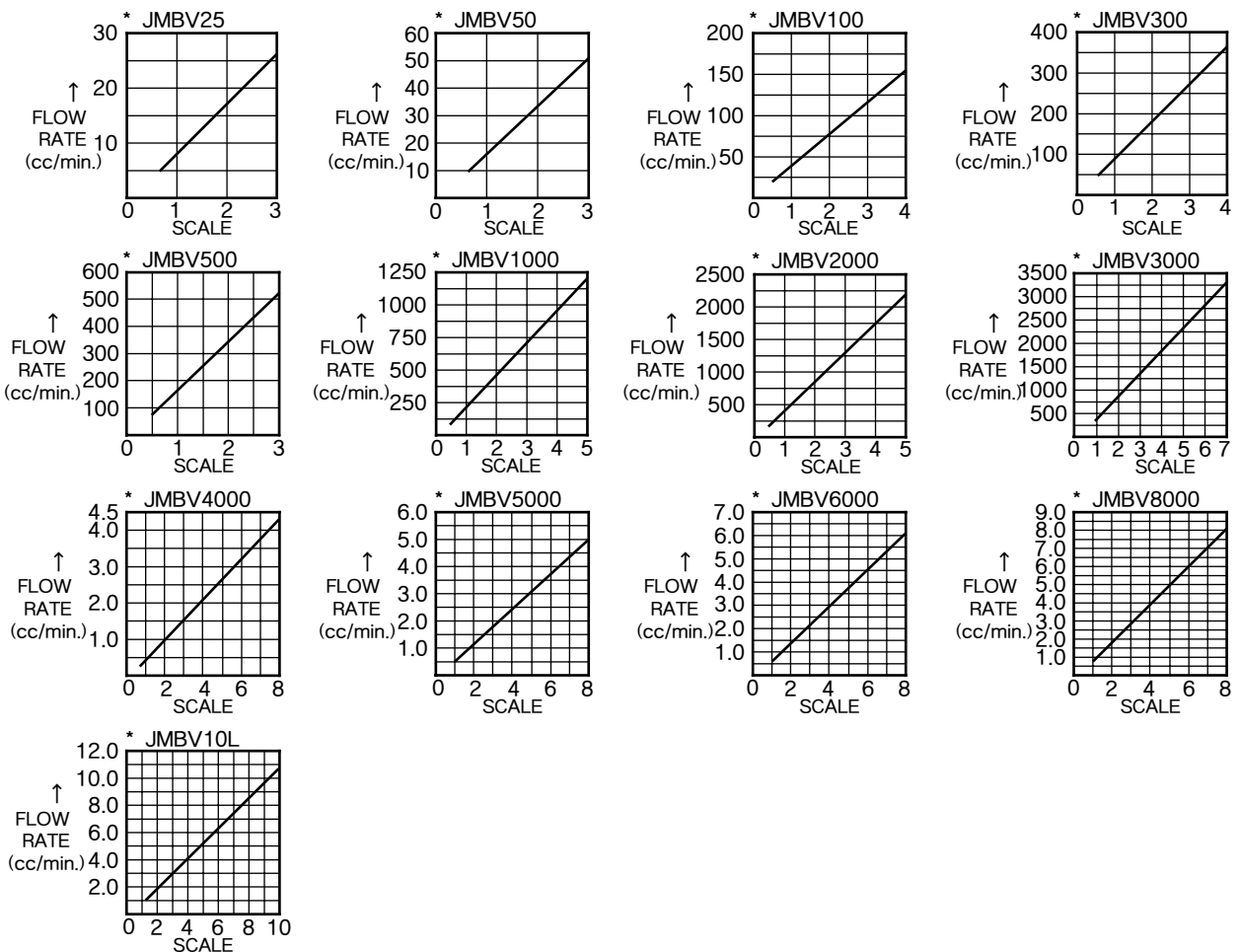
- Fix the dial knob after adjusting the flow rate that you want.



Supplementary

- All performance curves shown are for water @68°F/20°C and 1.0 S.G..
The performances are subject to change without notice.

1) JMBV SERIES



2) JMBVD SERIES

※JMBVD SERIES are the same scale as JMBV SERIES,
but the flow rate is twice more than JMBV SERIES.

10. Installation

10-1. Place of installation

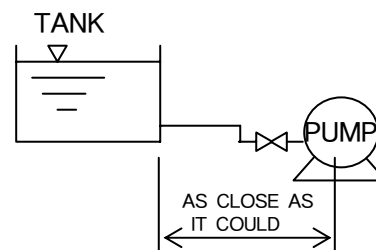
Consider the place to install our product with these matters as follows



- Do not operate pump without expert.
- To avoid electrical accident, cut the power off before repairing or checking.



- It could cause damage to pump when the chemicals are frozen therefore get ready the equipment which can prevent the problem in cold temperature.



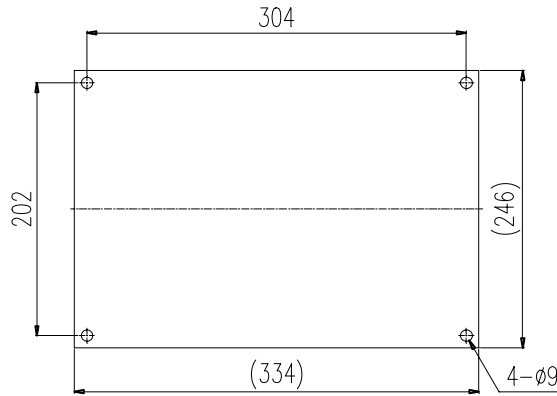
- The place of installation should protect from the direct rays of the sun, rainwater and dust penetrating. Even our product is produced for out-door, the direct rays of the sun make it lowered such as reaction between ultraviolet and metal or plastic. Rainwater and dust make it aged. So it's necessary to install with protective equipments.
- The place of installation should be well ventilated in summer and protective against chemicals frozen in winter.
A humid airtight place for pump is accelerating corrosion of pump's metal.
- Get a enough room for handling and repairing.
- The place of installation should be safe from danger of electricity while flooding.
- The place of installation should be even and have no influence of machinery's vibration.
- The floor has to be even otherwise the check balls are not seated properly so it doesn't generate vacuum that means it doesn't pump out.

10. Installation

10-2. Dimension of Base Fixing bolts Drilling Points of Each Type

■ JMBV SERIES

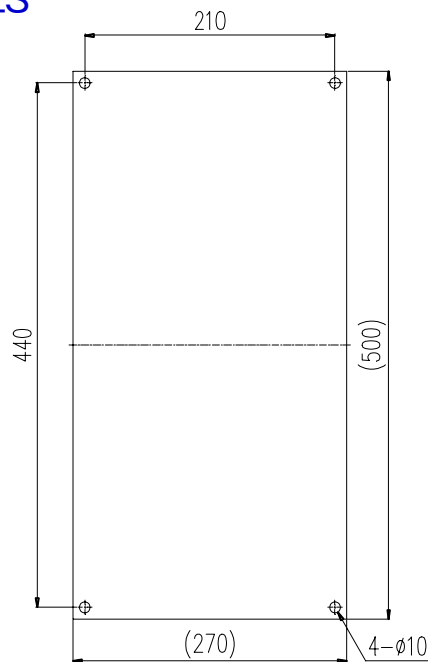

DIRECTION OF
PUMP HEAD



※ (334)×(246) IS
PUMP BASE SIZE

■ JMBVD SERIES


DIRECTION OF
PUMP HEAD



※ (270)×(500) IS
PUMP BASE SIZE

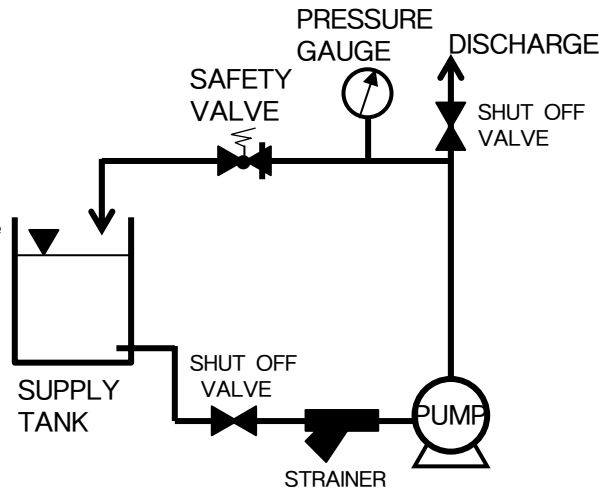
10. Installation

10-3. Piping



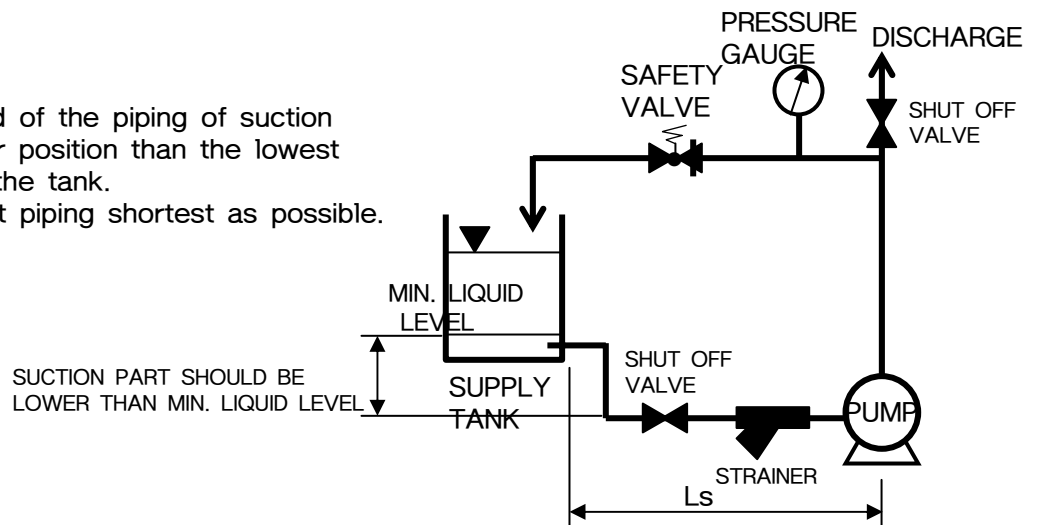
Warning

- There may be a case that the pump or the piping of the cubic pump including the reciprocating pump may be destroyed due to the inordinate rise of pressure, so install the Safety valve on the outlet part close to the pump to prevent this phenomenon. Also it's necessary to install a pressure gauge between pump and Safety valve.



Caution

- Install the end of the piping of suction part at the lower position than the lowest fluid surface of the tank. Also install outlet piping shortest as possible.



- Make the piping shortest or with curves least, in particular, air not filled.

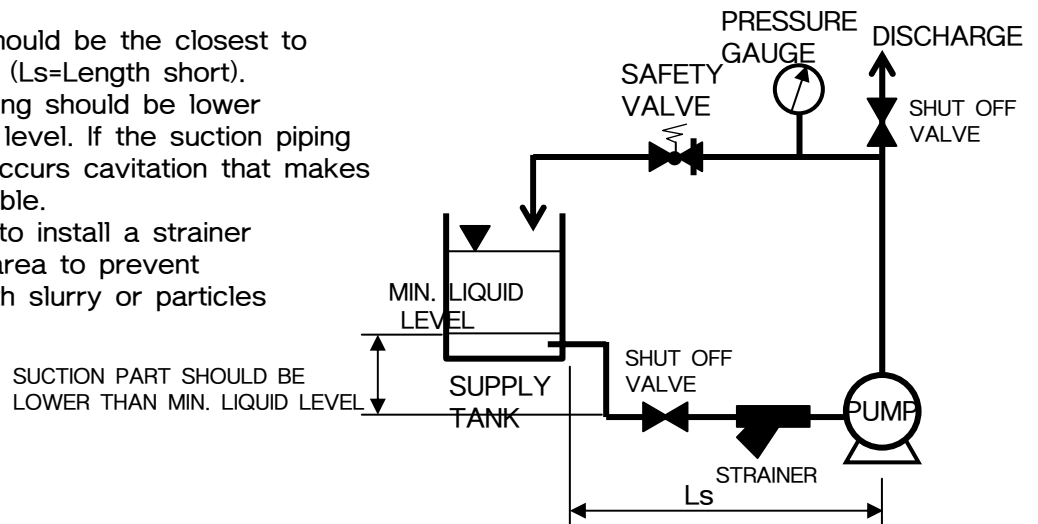
10. Installation

10-4. Inlet Piping



Warning

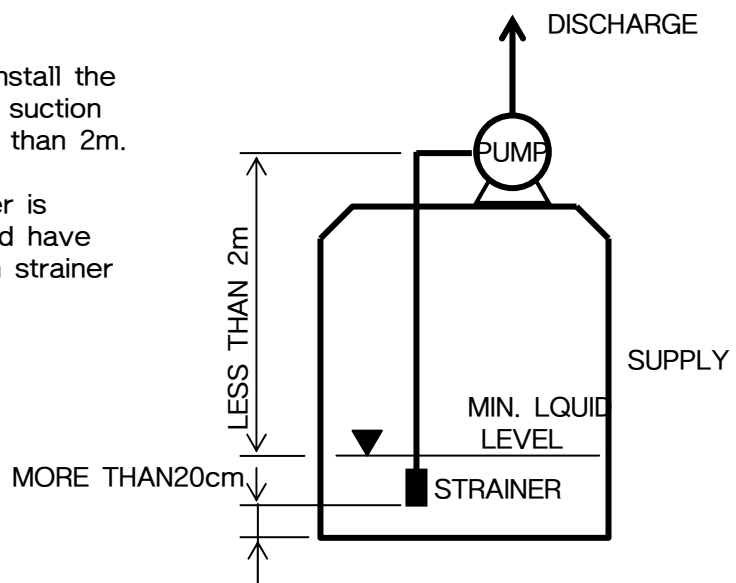
- The pump should be the closest to the supply tank (L_s =Length short). The suction piping should be lower than MIN. liquid level. If the suction piping is too long, it occurs cavitation that makes discharge unstable. Also you need to install a strainer at the suction area to prevent stuffy piping with slurry or particles



- Adjust the diameter of inlet piping (use pressure resistant piping) to the connection diameter of the standard specifications of this company.

- If you have the only way to install the pump on the supply tank, the suction piping or hose should be less than 2m.

And also installation of strainer is recommended, and that should have distance about 20cm between strainer and the bottom of tank.



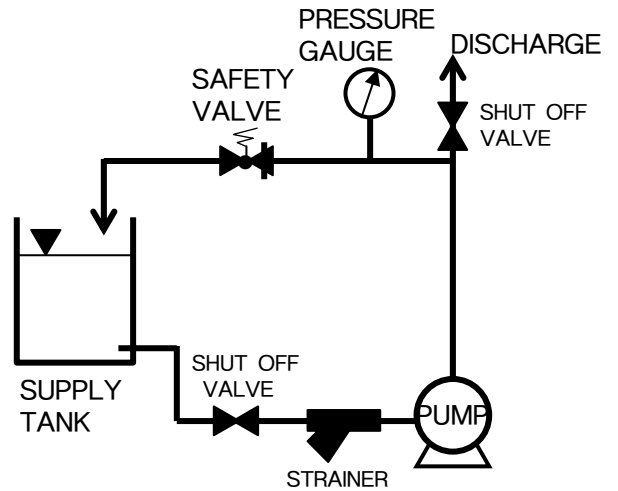
10. Installation

10-5. Outlet Piping

Warning

● There may be a case that the pump or the piping of the cubic pump including the reciprocating pump may be destroyed due to the inordinate rise of pressure, so install the Safety valve on the outlet part close to the pump to prevent this phenomenon. Also it's necessary to install a pressure gauge between pump and Safety valve.

● For the resisting pressure of outlet piping, use that over the pressure set at the safety valve. Make sure the joint of the piping.



Caution

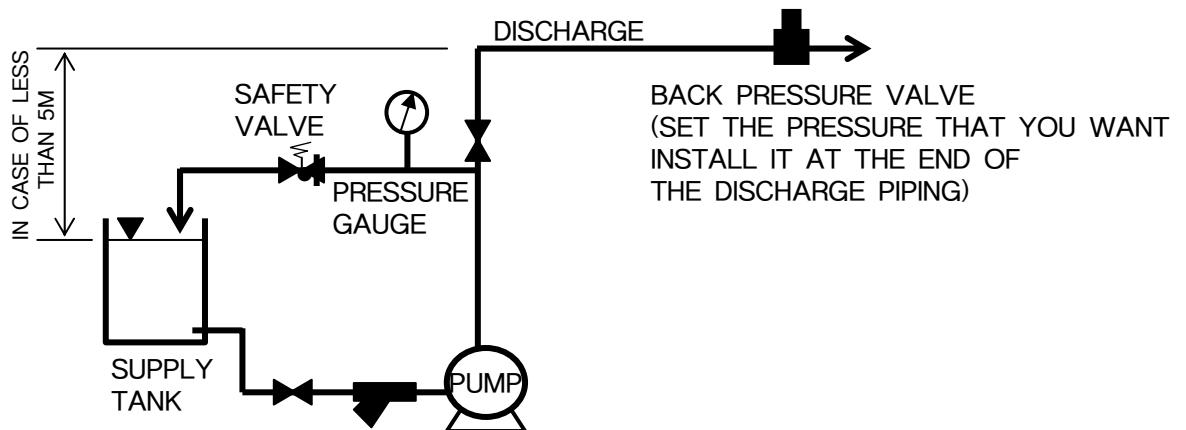
● Discharge piping pressure is higher than suction, so make sure that its piping is fixed with a certain.

● To prevent the phenomena of over-feeding or siphon of chemical liquid, install the level of chemical liquid on inlet part lower that of outlet part.

10. Installation

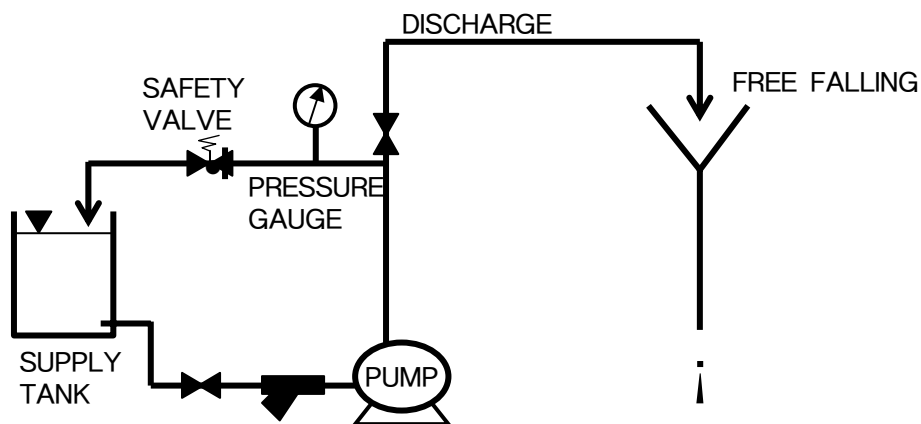
③ BACK PRESSURE VALVE Installed

- If it is difficult to build the discharge piping higher than 5m from the MAX. liquid level of supply tank or in case of need of pressure higher than 0.5kgf/cm^2 in piping, Install a BACK PRESSURE VALVE.



④ THE WAY OF USING GRAVITY(FREE FALL)

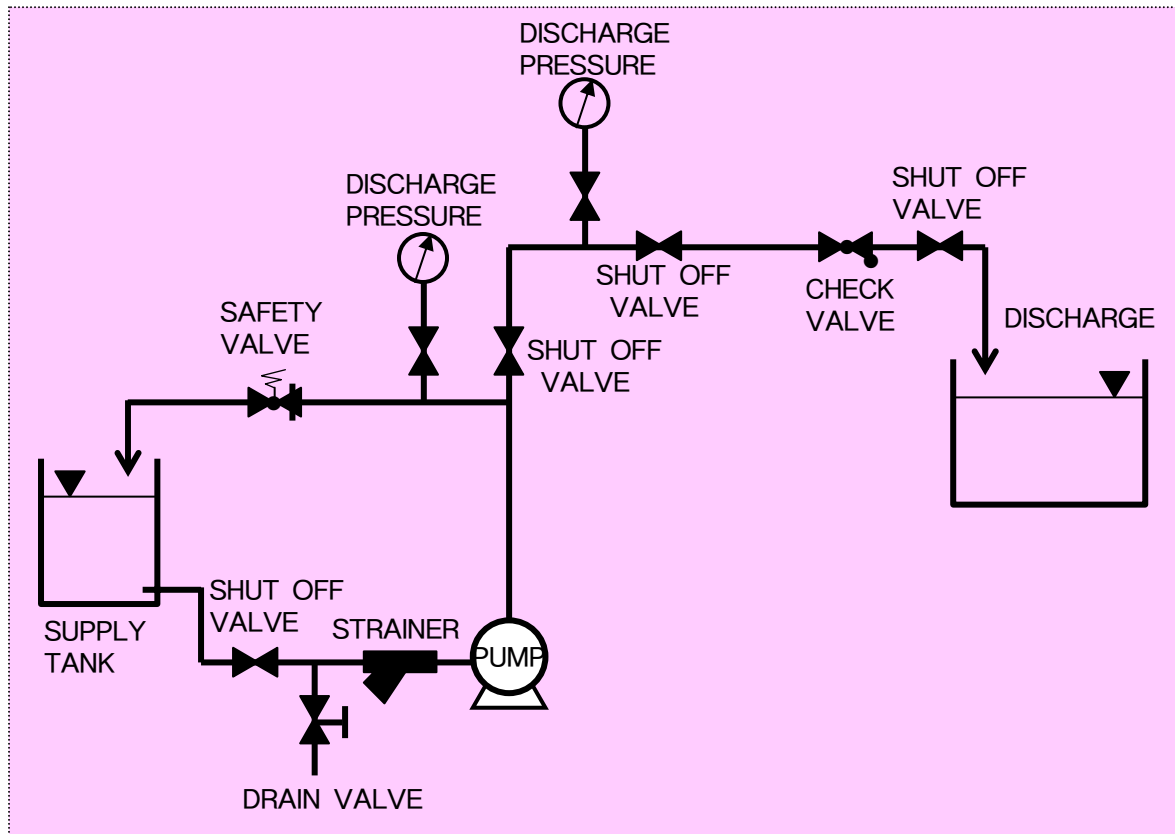
- In case of siphon phenomenon when the chemical pouring spot is lower than chemical supply tank



10. Installation

10-6. Ideal Piping for Metering Pump

- ※ This picture illustrates a ideal piping diagram for JMBV TYPE.
Refer to this picture when piping. It is dependent on each field's conditions.



10. Installation

10-7. Electric Installation



Warning

- Do not touch when your hands are wet.



Caution

- Only electrician or qualified person in electricity can install the pump's power.
- It well, ground it by all means.
- Referring to the wiring drawing attached to the motor plate or terminal box cover, connect the line according to the used voltage.

< DIAGRAM >

■ SIEMENS MOTOR TYPE ■				
0.4kW ~ 1.5kW MOTOR				
MOTOR TYPE 1LA77073-4AB91		MOTOR TYPE 1LA77073-4AB11		
60Hz 3PHASE 220/380V		50Hz 3PHASE 230/400V		60Hz
3PHASE 220V	3PHASE 380V	3PHASE 230V	3PHASE 440V	3PHASE 460V ONLY
<p>DELTA(Δ)</p>	<p>STAR(Y)</p>	<p>DELTA(Δ)</p>	<p>STAR(Y)</p>	<p>STAR(Y)</p>
■ OTIS, HYUNDAI, HYO SUNG MOTOR TYPE ■				
0.2kW ~ 1.5kW MOTOR				
3PHASE 220V	3PHASE 220/380V		3PHASE 440V ONLY	
	3PHASE 220V	3PHASE 380V		

- Connect the rotation of the motor to the directing direction of an arrow shape plate (clockwise looking at it from the direction of the fan of the motor). Reverse rotation will be the cause of malfunction.
- Install a magnetic switch and a thermo-relay provided for adjustment and preservation.
- Use standardized articles for wiring, and take caution of safety according to the technical standards and indoor wiring regulations of electric installations.

11. Operation

11-1. The Direction of Operation



Caution

- Do not pump out any chemicals those are not planned. It causes break-down.
- Do not operate any conditions except for this below

Field Temperature : 0~40 °C

Chemicals Temperature : STAINLESS STEEL 0~80 °C, PVC 0~40 °C

Chemicals Viscosity : Under 200 cps

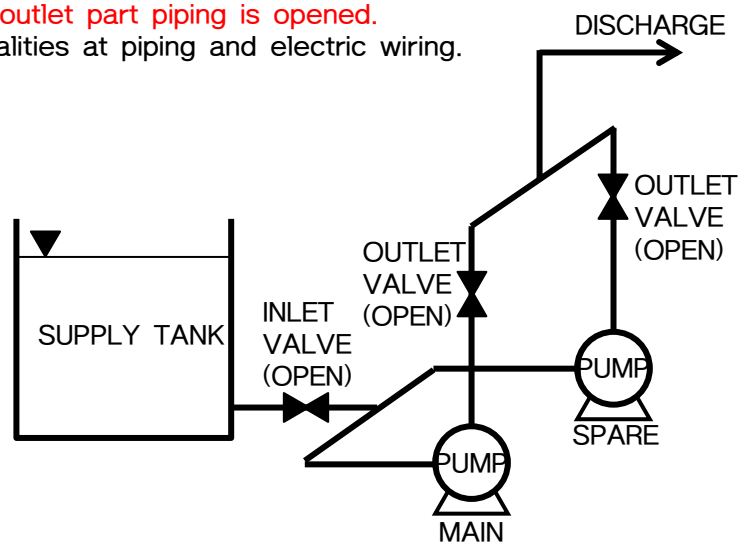
Maximum Discharge Pressure : Refer to specifications for each model

11-2. Check Prior to Operation



Caution

- Check if each part is destroyed or connection part is loosened of the pump before test operation after installation.
- Check a fixed amount of gear oil is filled in the pump driving part.
- Check if the flux of chemical liquid tank is sufficiently filled.
- **Check the valve of inlet and outlet part piping is opened.**
- Check if there is any abnormalities at piping and electric wiring.



11. Operation

11-3. Operation Preparation



- Handling chemicals should have protective covering on any part of your skin that is likely to be exposed to these chemicals.
- NaOCl is supposed to be diluted with tap water. If using groundwater, it is extracted Mn, Fe or it generates GAS-LOCK (It deteriorates discharging cause of forming gas drop in pump head)
- Remove water in pump head clearly and dry. It could react to chemicals that generate gas or solidification.



- Less Na contained NaOCl is recommended.

11. Operation

11-4. Start-up

Unless there is any problem in the above checking points, operate the machine according to the following order.

NO	OPERATION ORDER	REMARK
1	Open up valves of inlet and outlet completely	If outlet valve is closed, it makes overpressure in the piping and pump head.
2	Adjust the dial to 0 point of scale plate.	Refer to 11-5
3	Supply power to the motor.	check the rotating direction of the motor
4	Check the pump while running about 5 minutes.	Check if there is any abnormal sound at the pump and oil leakage from gear case. (At this time, there is no motion of diaphragm, so discharge is not generated.)
5	Perform a preliminary operation for about 30 minutes by adjusting the dial to the maximum point of scale plate (stroke length : 100%).	Double check the pump.
6	Check Discharge's Flow Rate <ul style="list-style-type: none">▶ Measure with a mass cylinder.▶ If you want to change flow rate, refer to performance curves.	<ul style="list-style-type: none">▶ Change stroke length, and in adjusting discharge volume, measure discharge amount after over one minute passes▶ It's normal when the measurement deviate is in 15%

When Pump Doesn't Discharge Itself

Especially, there is some piece of materials that came from when installing in pump head and piping that causes check balls unseated on ball seats.

Then stop running, disassemble the head part and clean up the check ball's ASS'Y with clean water. Reassemble it and try again.

-Remember the direction of the ball guides. Always the ball seats are downside, the ball guides are upside. It wouldn't work when assembled wrongly.
Also do remember the gaskets.

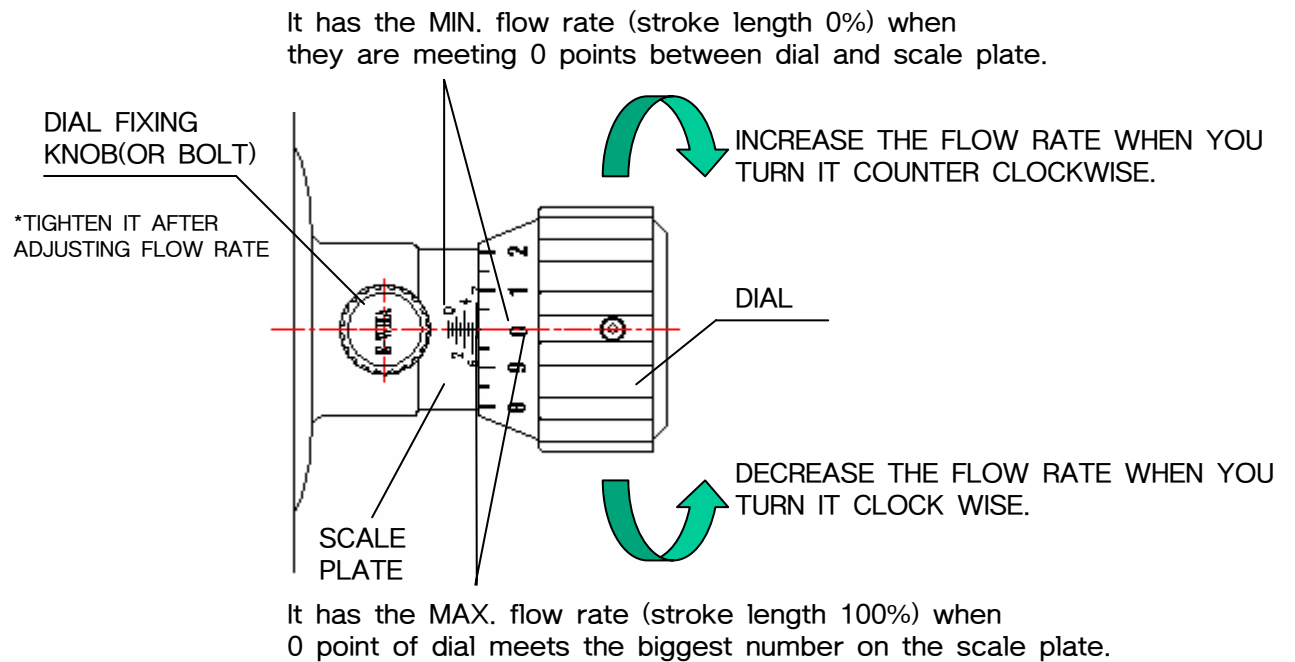
Refer to chapter 13

11. Operation

11-5. Adjust

Adjustment of discharge flow rate is changed by loosening (higher) or tightening (lower) that changes pump shaft's running distance (stroke length). Adjust it while running.

-Tighten the knob after adjusting flow rate.



※AVAILABLE MAX. SCALE OF EACH MODEL

MODEL	JMBV25	JMBV50	JMBV100	JMBV300	
	JMBVD50	JMBVD100	JMBVD200	JMBVD600	
MAX. SCALE	3		4		
MODEL	JMBV500	JMBV1000	JMBV2000	JM3000	
	JMBVD1000	JMBVD2000	JMBVD3000	JMD6000	
MAX. SCALE	4	5		7	
MODEL	JMBV4000	JMBV5000	JMBV6000	JMBV8000	JMBV10L
	JMBVD8000	JMBVD10L	JMBVD12L	JMBVD16L	JMBVD20L
MAX. SCALE	8				10

11. Operation

11-6. In case of Stopping Operation for a Long Time

- Cut power off.
- Inflow fresh water to the pump and discharge it from it for about 10 minutes and wash out the inside of the pump head.
- Lay a cover to protect the pump from dust and corrosive environment. Leave the stroke backward most not to transform the diaphragm.
- When there is a possibility of being frozen to rupture in winter, open the drain valve of the pump head or loosen the fixing bolt of the pump head and remove the chemical inside.

11-7. Cautions in Starting Operation After Stop

- In resuming operation after stop for a short time (within about one week), operating with a voluntary stroke length and fixed pressure does not cause any hindrance.
- In resuming operation after stop for a long time (after about one week), operate in non-load state for minutes to prevent the over-load of the motor by adjusting the dial scale to "0" and stroke length to "0", then perform main operation.

When Pump Doesn't Discharge Itself

In resuming operation after stop for a long time, the check balls could be stuck in the ball seats.

Then disassemble the head part and clean up the check ball's ASS'Y with clean water. Reassemble it and try again.

※ Refer to chapter 13.

12. Repairs & Checking



Warning

- Do not touch when your hands are wet.



Caution

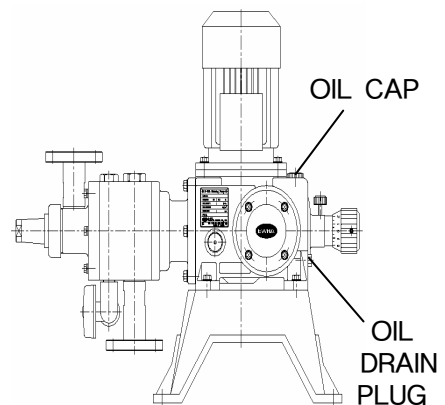
- Turn off power by all means, interrupt the valves of inlet and outlet piping.
- Close the valves of inlet and outlet.
- In checking the liquid end part of the pump, take special care like washing out the piping or the inside of the pump with fresh water.
- The metering pump is for transporting harmful chemical liquid such as toxic chemicals, so in repairing and checking the pump, grasp the characteristics of chemical liquid, wear a mask and gloves, then safely repair and check it according to the handling points of toxic chemicals.
- To prevent damage of discharge piping and physical injury with chemical leaking or spouting from pump, check the discharge valve or discharge piping opened.

12-1. Routine Checking

- Check if the volume of chemical liquid is full in the chemical tank?
- If the pump is smoothly operated?
- If there is any leaked fluid at the liquid end part and piping?
- If the current of the motor is normal?
- If there is any change in discharge volume and pressure?
- If discharge is generated without pulsation?
- If the oil of driving part is lacking or leaked?
- When a preliminary pump is installed, check the operation state from time to time.

12-2. Exchange of Oil

MODEL	OPTIMUM INJECTION AMOUNT	RECOMMENDED GEAR OIL	PERIOD OF EXCHANGE
JMBV	0.40 LITER	INDUSTRIAL GEAR OIL 2TYPE KS M 2127, DIN5157 Part 3. VISCOSITY: ISO VG 220, SAE 90	ONCE A 4000HRS RUNNING
JMBVD	0.40 LITER X2		



*Exchange of Oil for Driver Part.

- Turn off power by all means, close the valves of inlet and outlet piping.
- Loosen the drain plug at the bottom of cam box and remove it fully and inject oil through the oil injection port.

13. Exchange of parts



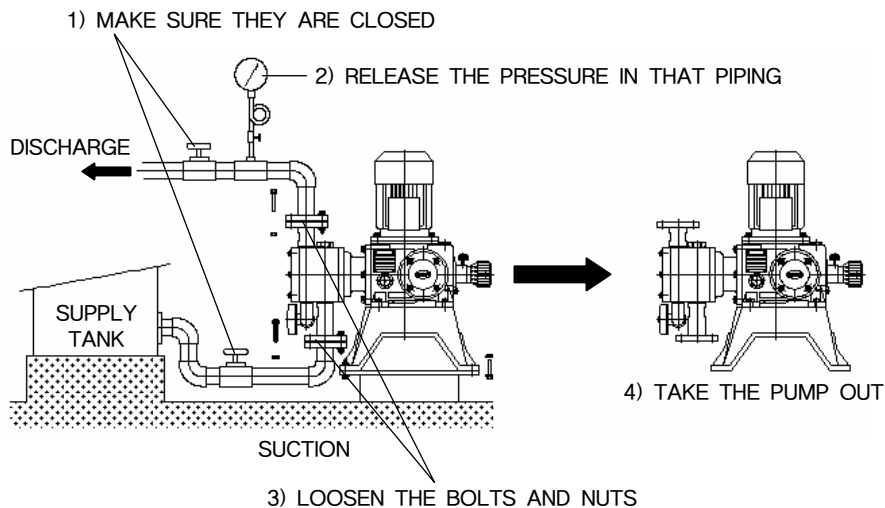
Caution

If necessary for assembling and disassembling the pump in repairing and checking the pump, refer to the pertinent assembling and disassembling drawing of liquid end part, then the pump is divided to driving and liquid end part.

For the assembling and disassembling the driving part, follow the assembling and disassembling order mentioned at this manual. In disassembling any part of liquid end part, clean it by having fresh water pass through the liquid end part before disassembling, and turn off the valve of inlet and outlet part.

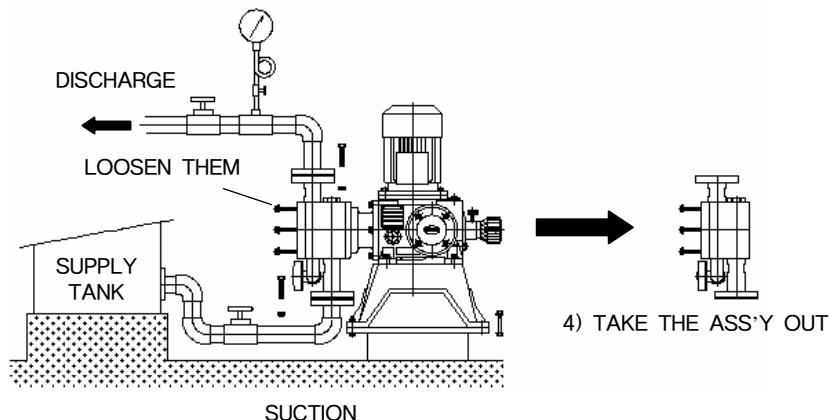
13-1. Taking pump off from piping

- 1) Make sure that the ball valves are closed in discharge and suction part.
- 2) Release the pressure of discharge and suction part.
- 3) Loosen the flange's bolts and nuts of discharge and suction. (Remove the hoses of discharge and suction with loosening the union nuts if your pump is hose type.)
- 4) Loosen fixing bolt of base, take the pump out of its piping line.



13-2. Taking pump head ASS'Y off from piping

- 1) It is the same order from 1)~3) of 13-1,
- 4) Take the ASS'Y off from pump flange after loosening fixing bolts of pump head.



13. Exchange of Parts

13-3. Ball Seat, Guide, Check ball, O-ring

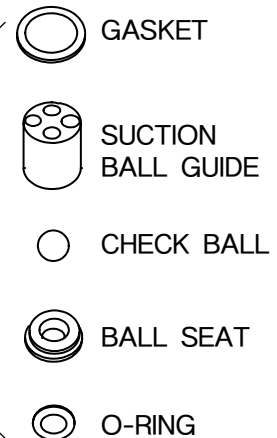
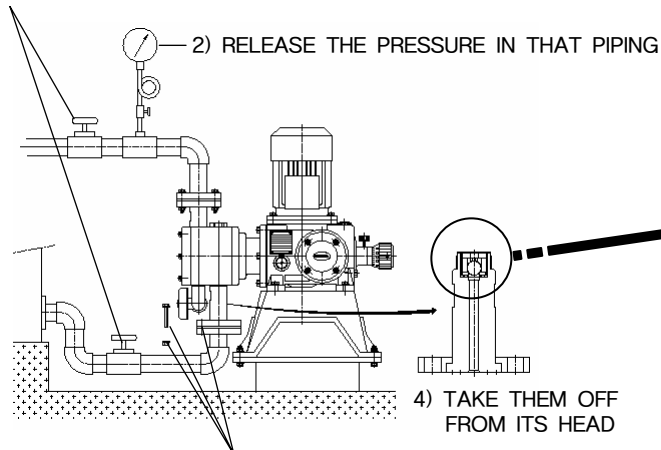


Importance

- Do not lose any parts when disassembling or assembling

- 1) Make sure that the ball valves are closed in discharge and suction part.
- 2) Release the pressure of discharge and suction part.
- 3) **SUCTION** : ① Loosen the flange's bolts and nuts of discharge and suction. (Remove the hoses of discharge and suction with loosening the union nuts if your pump is hose type)
② Loosen the suction connector and take it off from its head. (THERE ARE BALL SEAT, CHECK BALL AND BALL GUIDE INSIDE OF DISCHARGE CONNECTOR, AND O-RING FOR SEALING.)

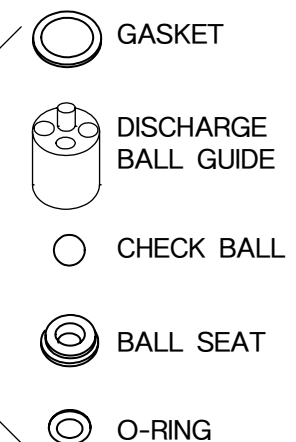
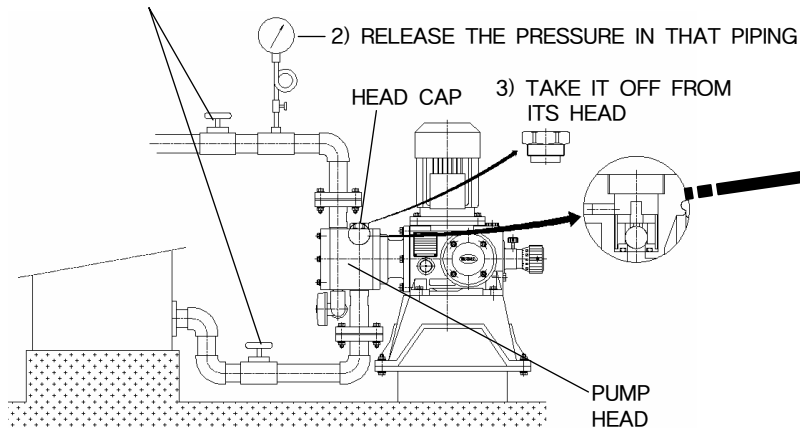
1) MAKE SURE THEY ARE CLOSED



3) LOOSEN THE BOLTS AND NUTS

- 4) **DISCHARGE** : ① Loosen the head cap and take it off.
② There are a discharge ball guide, check ball, ball seat, gasket and an O-ring in side of its head

1) MAKE SURE THEY ARE CLOSED



14. Cause & Remedy

14-1. Cause & Remedy

Cause		Phenomena	Remedies
Phenomena			
Inferiority of motor	●	Motor does not run	Exchange
Short circuit or connection inferiority	●	Motor does not run	Connecting lines or exchange
Short circuit of power fuse	●	Motor does not run	Take measures after examining the cause
Voltage drop	●	Motor does not run	Take measures after examining the cause
Lack of NPSH	●	lack of discharge volume	Checking suction condition
Wear of valve seat	●	lack of discharge volume	Exchange
Blockage of valve part	●	lack of discharge volume	Disassemble and wash it out
Blockage of suction valve strainer	●	lack of discharge volume	Disassemble and wash it out
Adjustment inferiority of dial scale	●	lack of discharge volume	Adjust it to the "0" point again
Excessive supply of lack of necessary min. differential pressure	●	Over-excess of discharge volume	Review necessary min. differential pressure
Change of pump stroke number	●	Over-excess of discharge volume	Check power, motor and reducer
Excess of overloaded outlet pressure Inappropriateness of power specifications	●	Over-excess of discharge volume	Examine and modify discharging piping
Air inhalation of inlet piping	●	Instability of discharge volume	To put after examination
Change of handling fluid	●	Instability of discharge volume	Check and modify piping
Failure of pressure gauge	●	Instability of discharge volume	Review pump specification
Blockage of flowing path in a pressure gauge	●	Instability of discharge volume	Exchange
Leaked fluid at safety valve	●	Instability of discharge volume	Clean
Damage of diaphragm	●	Instability of discharge volume	reset and repair set pressure
Inferiority of O-ring gasket of valve seat	●	Leakage of fluid	Exchange
Leakage of hose connection of pipe flange	●	Leakage of fluid	Exchange
	●	High vibration and noise	Re-assemble
	●	Excess of current of motor	
	●	No discharging of fluid	
	●	Inferiority of rise of discharge pressure	
	●	Impossibility of suction	

14. Cause & Remedy

14-2. Frequent problems and solutions in use of metering pump

PHENOMENON	CAUSE	REMEDY
● SUCTION FAULTY	<ul style="list-style-type: none"> - SOME PIECES OF MATERIAL INDRAFT IN THE BALL GUIDES OF DISCHARGE OR SUCTION PART. - SUCTION PIPING OR HOSE CLOGGED/ BROKEN - STRAINER CLOGGED - FAULT BALL SEAT, O-RING, GASKET 	<p>TAKE APART THE PUMP HEAD ASS'Y, REASSEMBLE AFTER CLEANING THEM WITH PURE WATER. (REFER TO 13-5)</p>
● DISCHARGE UNSTABLE	<ul style="list-style-type: none"> - AIR INDRAFT IN THE SUCTION PART PIPING - PIPING, VALVE AND FLANGE, ETC LEAKED 	<p>CHECK THE CONNECTION PARTS, FIX ALL OF LEAKAGES</p>
	<ul style="list-style-type: none"> - DIAPHRAGM DAMAGED 	<p>EXCHANGE DIAPHRAGM (REFER TO 13-3)</p>

15. Guarantee

● Term of Guarantee and Service Policy

1. Term of Guarantee

- 1) Term of guarantee is 1 year from purchase day or 6 months after installation, Either condition will be applied the preferential expiration of the term.
- 2) In term of guarantee, we provide free of charge for all matters of faulty product that is used in conditions of using pump.
- 3) This policy is applied to using in general term in Korea.
- 4) It occurs expenses to users when product damaged by the reason as below.
 - ① When term of guarantee is expired.
 - ② When damaged by Maintenance with carelessness or use of pump improperly.
 - ③ When damaged by no use of genuine parts of EWHA CHEMICAL FEEDER.
 - ④ When damaged by repairing and remodeling pump incorrectly.

2. Service Policy

- 1) About the factors of disorder, users should discuss with the engineer of EWHA CHEMICAL FEEDER to figure out.
- 2) It occurs expenses when sending EWHA's staff to the field to repair.
- 3) There is no responsible for any property loss or accident with our product that is functionally disordered

16. List of Spare Part

SPARE PART IS NOT INCLUDED IN GENERAL PART.

No.	PART NAME	USAGE	Q'TY/ UNIT	REMARK
1	CHECK BALL		2	
2	SUCTION BALL GUIDE		1	
3	DISCHARGE BALL GUIDE		1	
4	BALL SEAT		2	
5	O-RING	FOR BALL SEAT	2	
6	GASKET	FOR SUCTION CONNECTOR	1	
7	GASKET	FOR DIS.CONNECTOR	1	
8	GASKET	FOR HEAD CHAMBER	1	ONLY APPLY TO STAINLESS HEAD
9	GASKET	FOR HEAD CAP	1	
10	O-RING	FOR HEAD COVER	2	ONLY APPLY TO PVC, PTFE HEAD
11	DIAPHRAGM		1	



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