

E-WHA

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

OPERATION AND INSTALLATION MANUAL FOR JMRV (BUILT IN AIR CHAMBER & RELIEF VALVE)

JMRV 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

JMRV SERIES are built in relief valve (safety valve).
No additional installation is required for safety 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

< JMRV 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

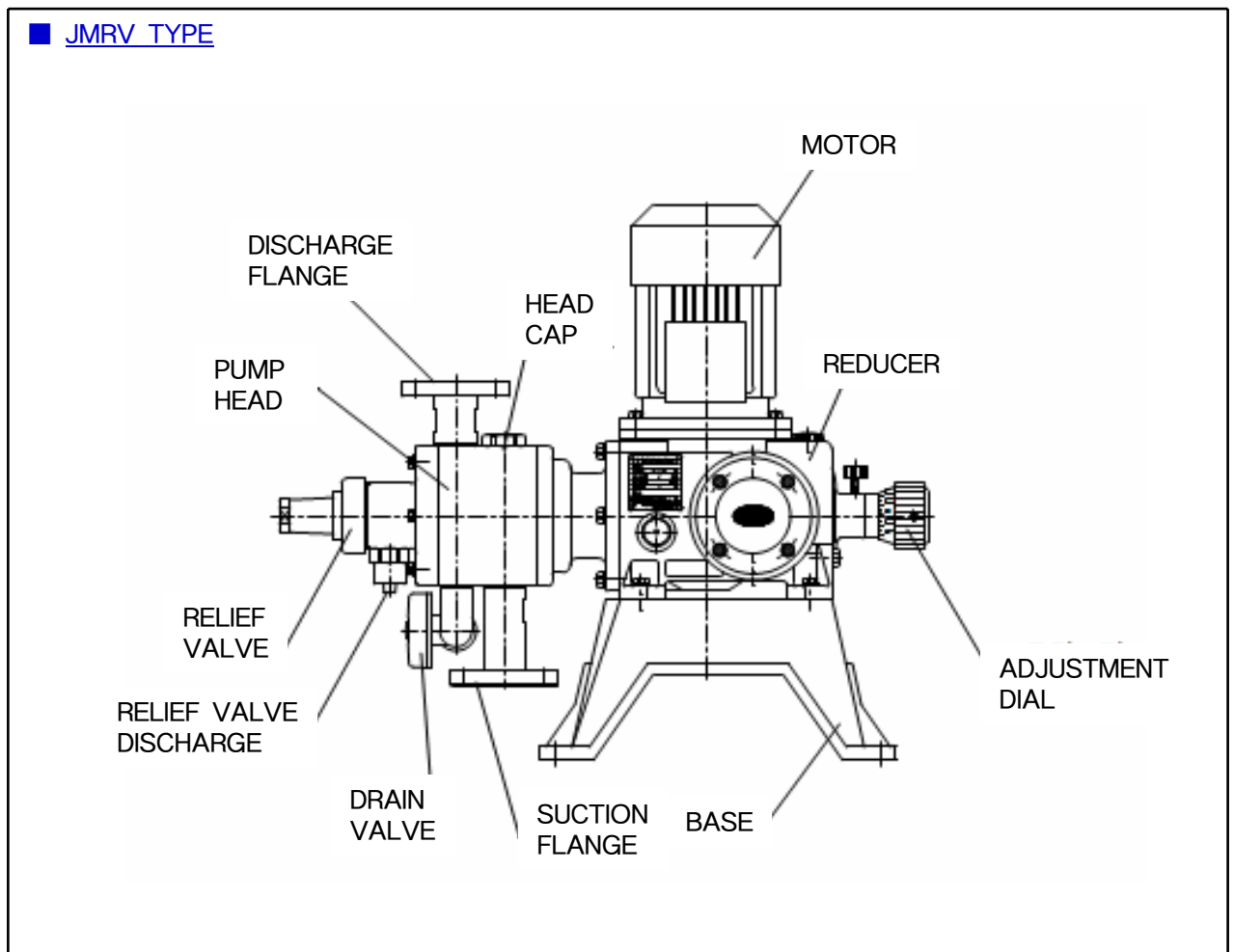
3. Outline

Our diaphragm type metering pumps, JMRV 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
JMRV	1	BUILT IN	BUILT IN	CAM & SPRING TYPE	WORM GEAR	VERTICAL	Exe II (eG3), Exd II (d2G4) POSSIBLE

4. Basic Structure

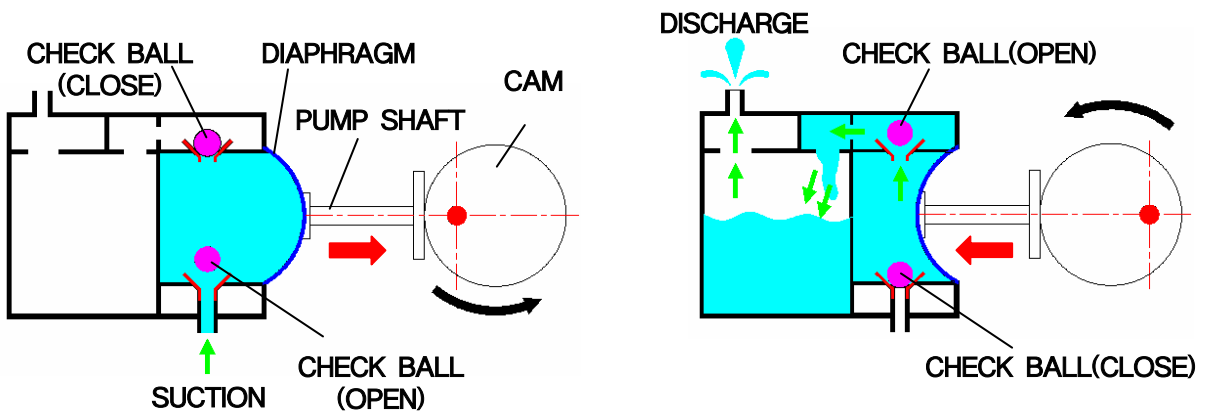
■ JMRV TYPE



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

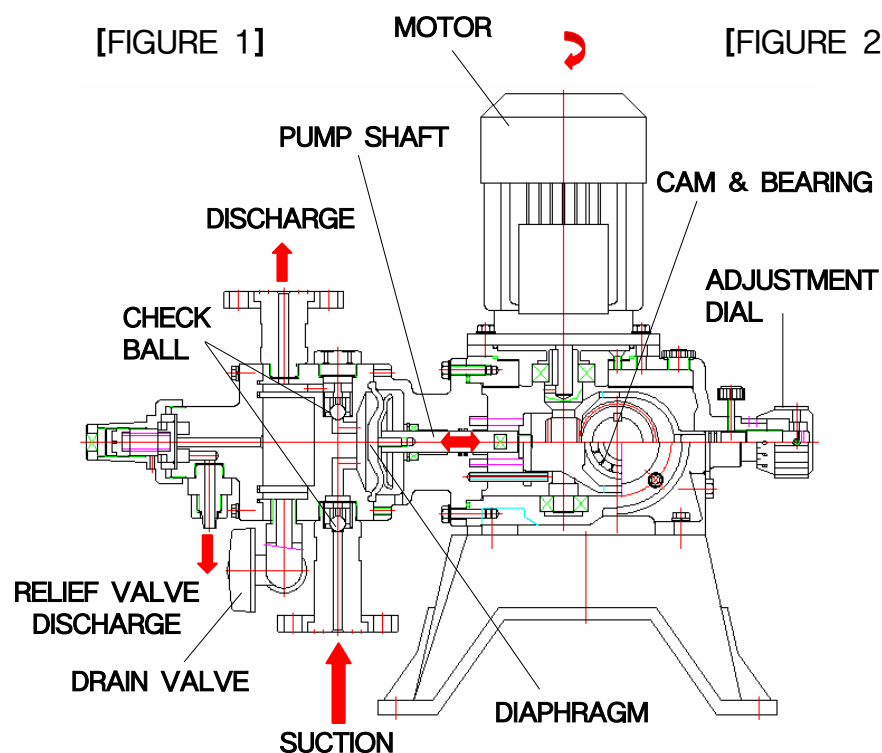
5. Principle of Operation

- 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>JMRV</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 RELIEF 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

JMRV/JMRVD SERIES

MODEL	JMRV25	JMRV50	JMRV100	JMRV300	JMRV500	JMRV1000	JMRV2000	
	JMRVD50	JMRVD100	JMRVD200	JMRVD600	JMRVD1000	JMRVD2000	JMRVD4000	
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)						
CONNECTI ON	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	JMRV3000	JMRV4000	JMRV5000	JMRV6000	JMRV8000	JMRV10L		
	JMRVD6000	JMRVD8000	JMRVD10L	JMRVD12L	JMRVD16L	JMRVD20L		
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)							
CONNECTI ON	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,		
	1 φ, AC 220V 0.2kW B CLASS			1 φ, AC 220V, 0.4kW, B CLASS			AC 220/380V, 440V,0.75kW, B CLASS	
	Exe II (eG3), Exd II (d2G4) 0.4kW					0.75kW		

NOTE

- All performance curves shown are for water @68°F/20°C and 1.0 S.G..
The performances are subject to change without notice.
- Pumping Temperature Limit : PVC 0~40°C, STAINLESS STEEL/PTFE/PVDF 0~80°C
- Slurry Limit : 100μm(0.1mm), Slurry Concentration Limit 10wt(%)
- Suction Lift : 2m
- Standard Painting Color : PANTONE 334C(MUNSELL NO. 2.5BG 5/10)

9. Performance Curves



Importance

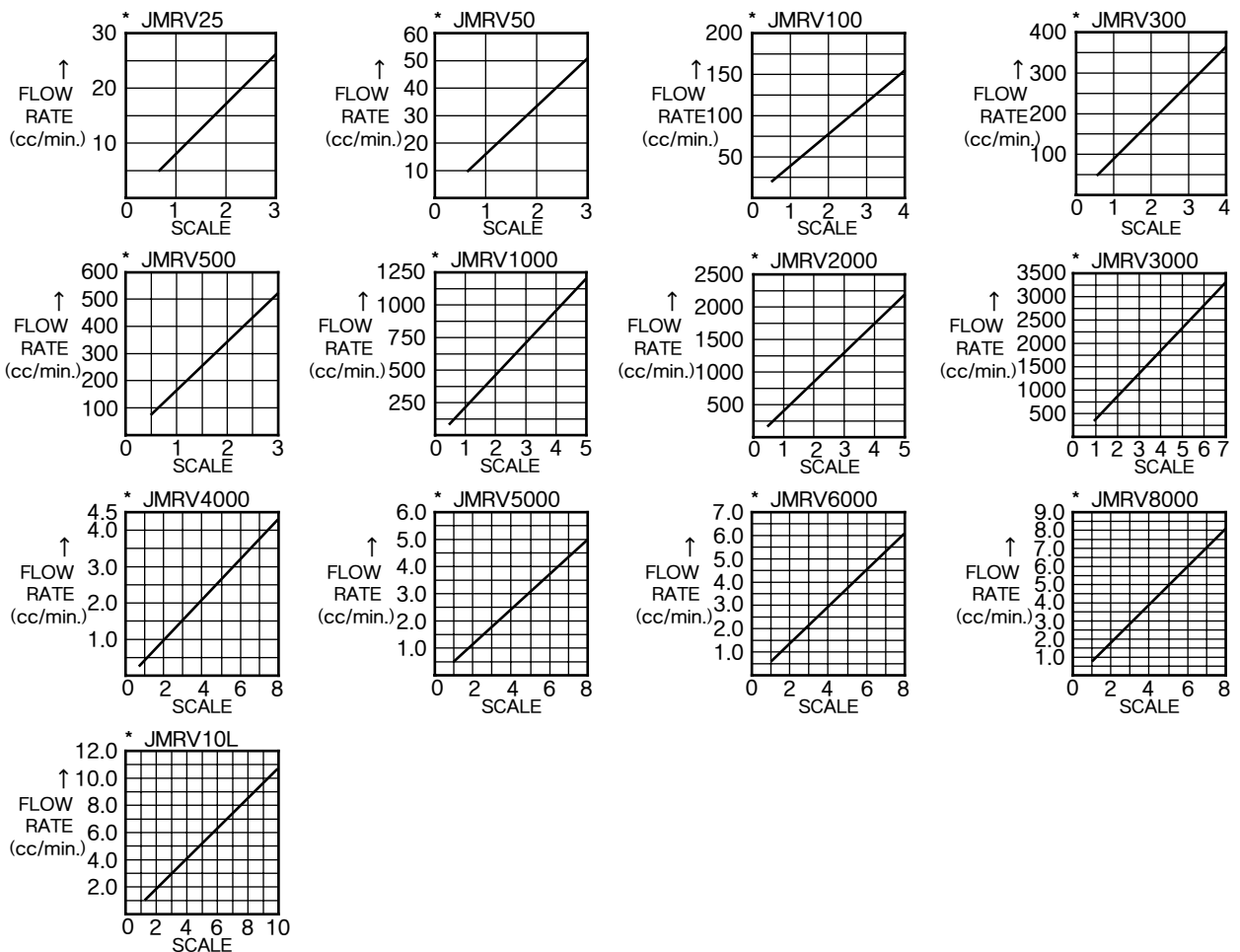
- Fix the dial knob after adjusting the flow rate that you want.



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) JMRV SERIES



2) JMRVD SERIES

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

10. Installation

10-1. Place of installation

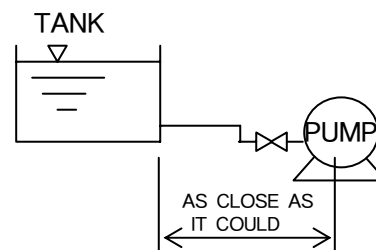
Consider the place to install our product with these matters as follows



- 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.

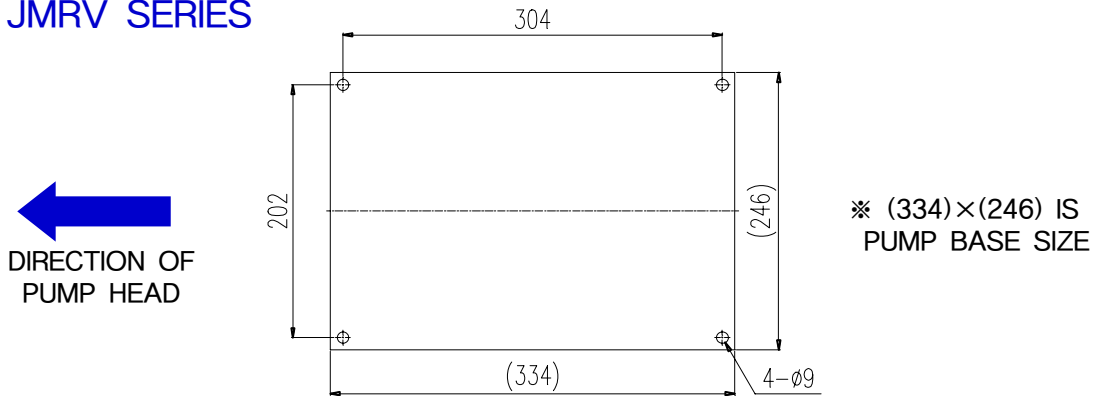


- The place of installation should protect from the direct rays of the sun, rainwater and dust penetrating. Even our product is produced for out-door, the direct rays of the sun make it lowered such as reaction between ultraviolet and metal or plastic. Rainwater and dust make it aged. So it's necessary 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.

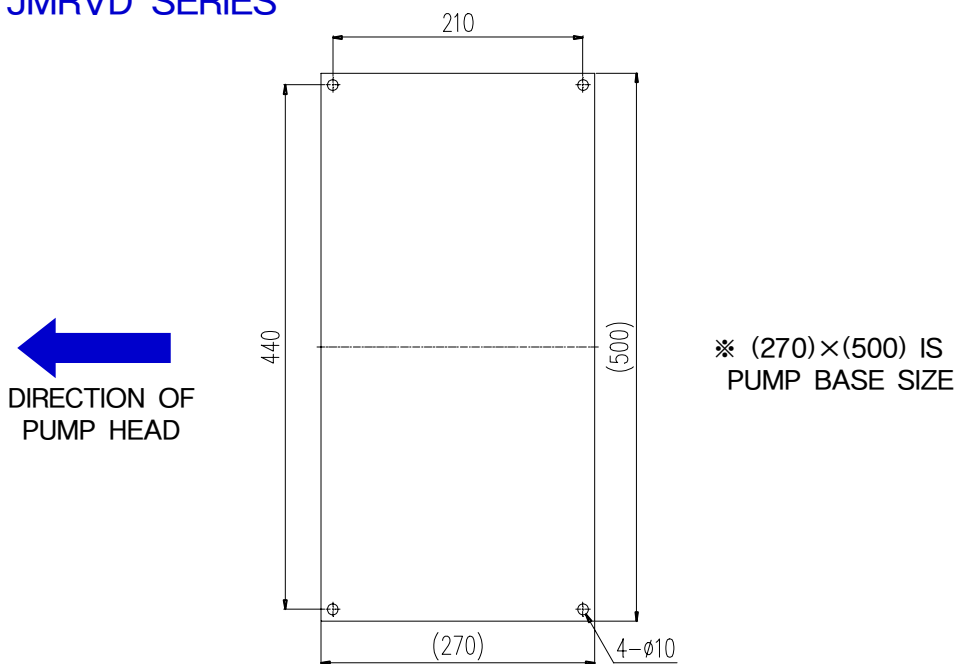
10. Installation

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

■ JMRV SERIES



■ JMRVD SERIES

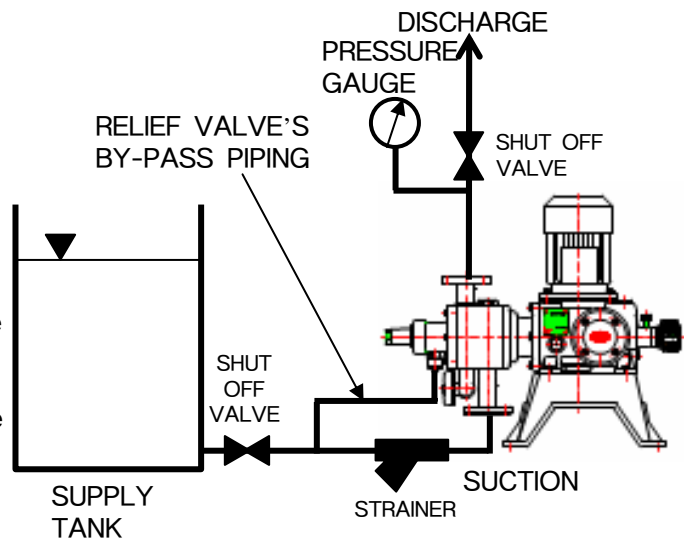


10. Installation

10-3. Piping

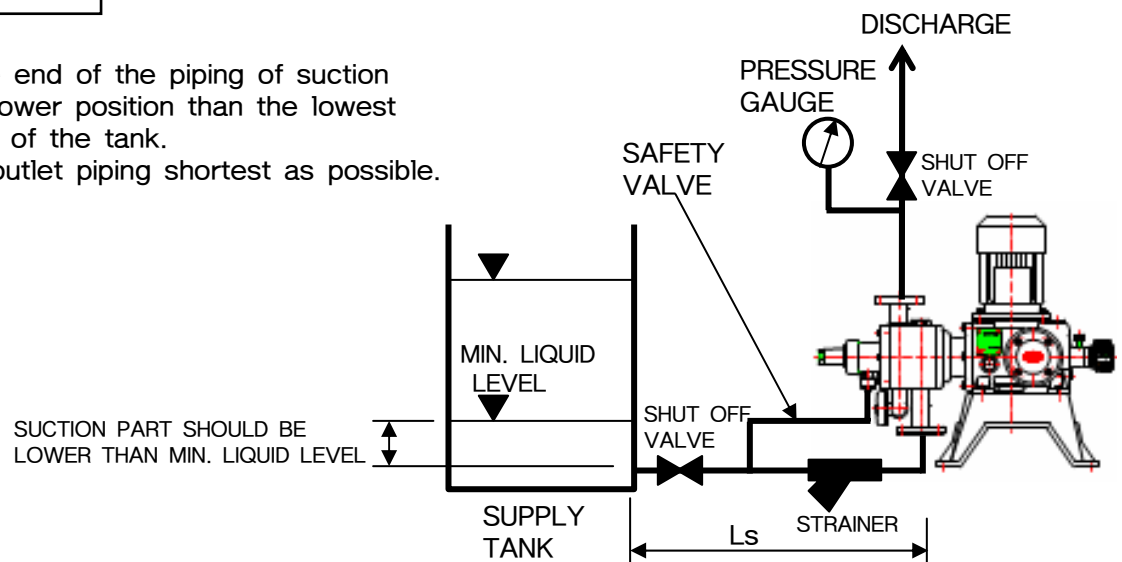
Warning

- 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 because of piping clogged or valve closed while running.
- This pump is installed a relief valve that prevents excessive overpressure. It is need of BY-PASS piping of relief valve for releasing the overpressure.
- Also do not change the setting pressure of relief valve that could be the problem such as having unstable discharge volume and fault releasing overpressure.
- it's necessary to install a pressure gauge to check the piping pressure



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

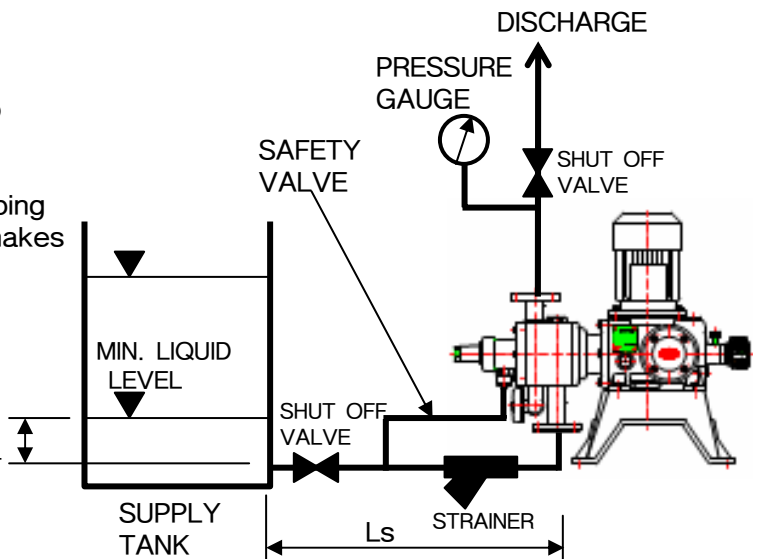
10-4. Inlet Piping



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

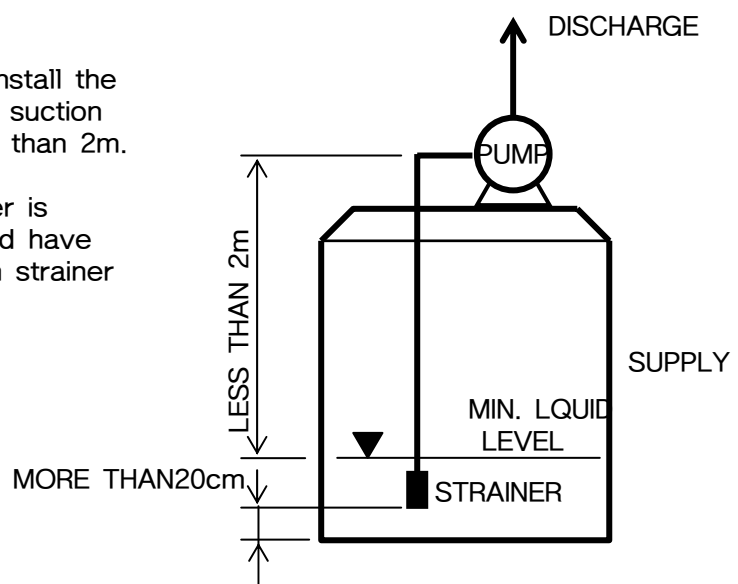
SUCTION PART SHOULD BE LOWER THAN MIN. LIQUID LEVEL



- 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.

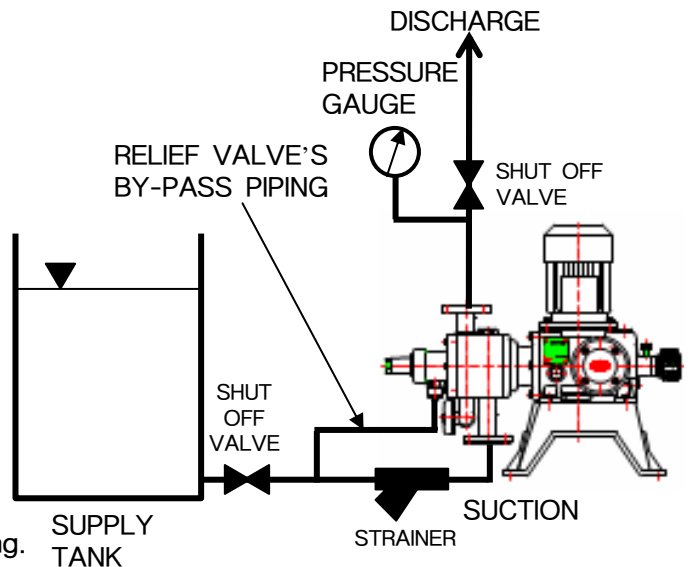


10. Installation

10-5. Outlet Piping

- 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.

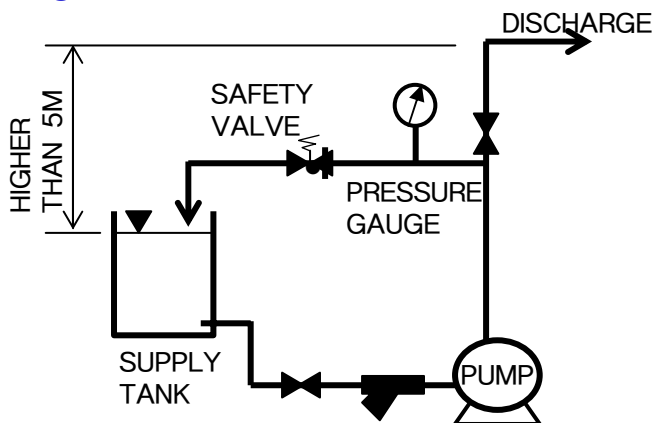


Caution

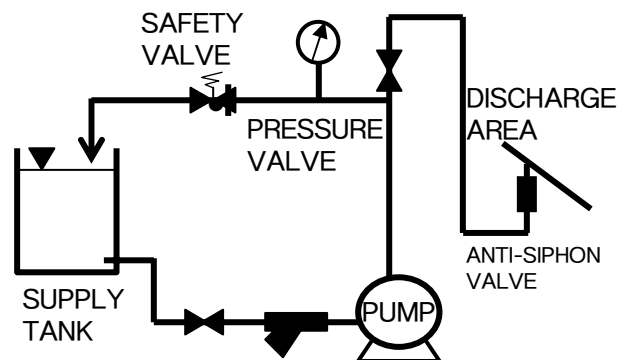
- Discharge piping pressure is higher than suction, so make sure that its piping is fixed with a certain.
- To prevent the phenomena of over-feeding or siphon of chemical liquid, install the level of chemical liquid on inlet part lower that of outlet part.

For example, pumping out to underground from ground It occurs over-feeding or siphon. So get a distributive pressure valve at the end of discharge piping for prevention of this phenomena.

① BUILD HIGHER DISCHARGE PIPING



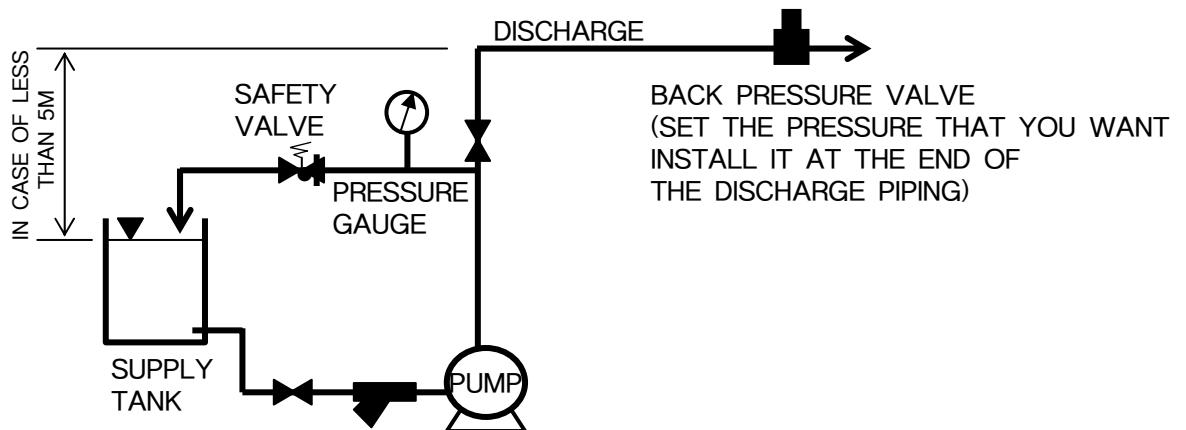
② ANTI-SIPHON VALVE INSTALLED



10. Installation

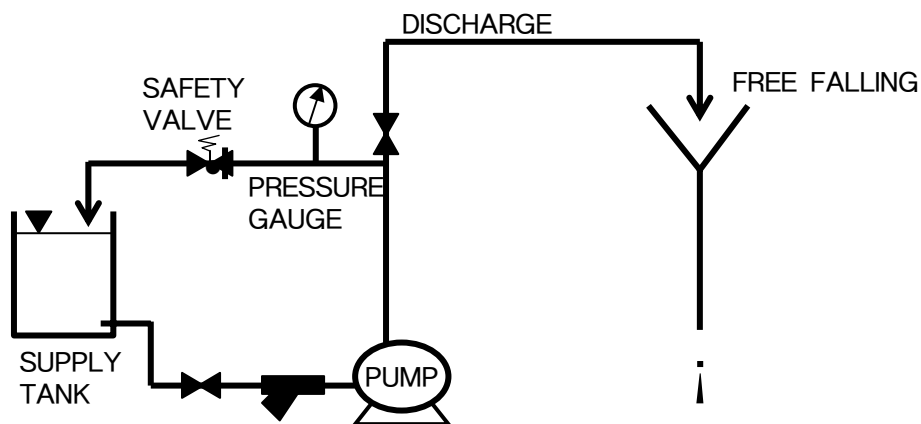
③ BACK PRESSURE VALVE Installed

- 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

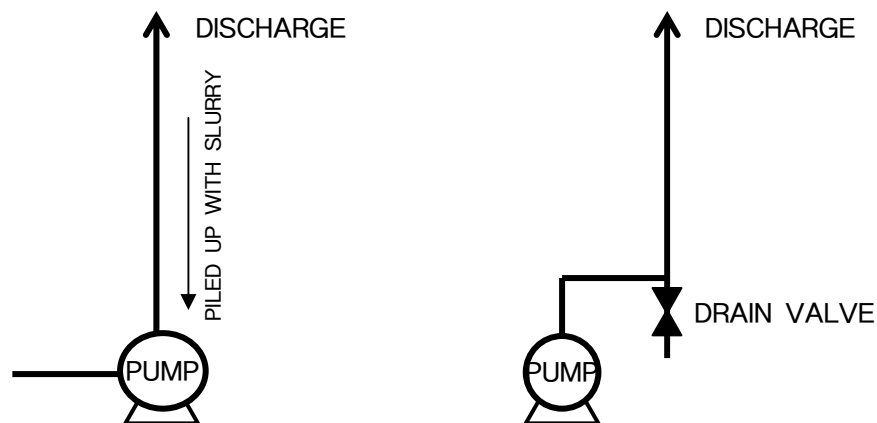


10. Installation

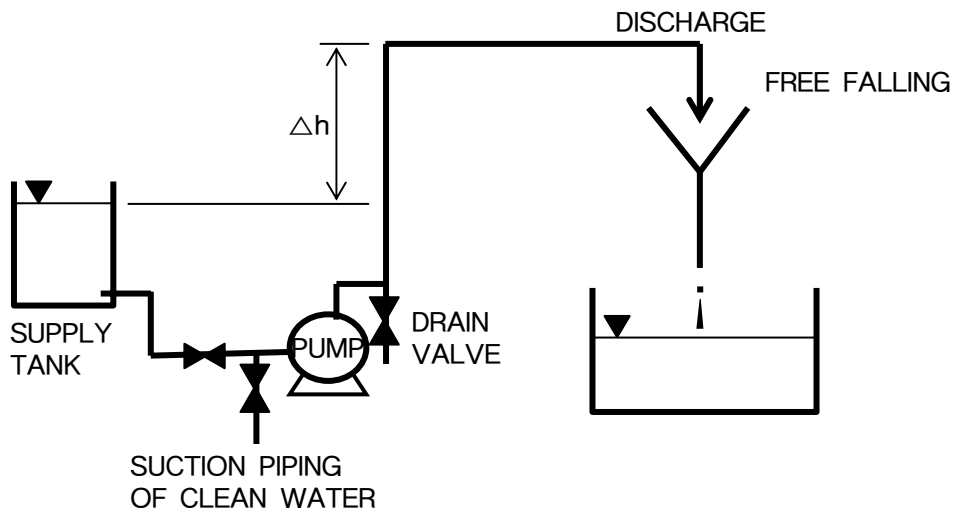
10-6. In Case of Using Sedimentary Slurry

This pump is not suitable for slurry contained chemical pumping but in case of unavoidably using the chemical, refer to this page for piping.

- 1) The particle of chemical (slurry) is supposed to be smaller than $100\mu\text{m}$ (0.1mm).
- 2) Concentration of slurry (gravity of slurry) is supposed to be lower than 10wt%
- 3) Do not install piping too much higher vertically it obstructs remarkably when piled up sedimentation of slurry. Also drain valve installation on the bottom of outlet piping is recommended and drain slurry regularly



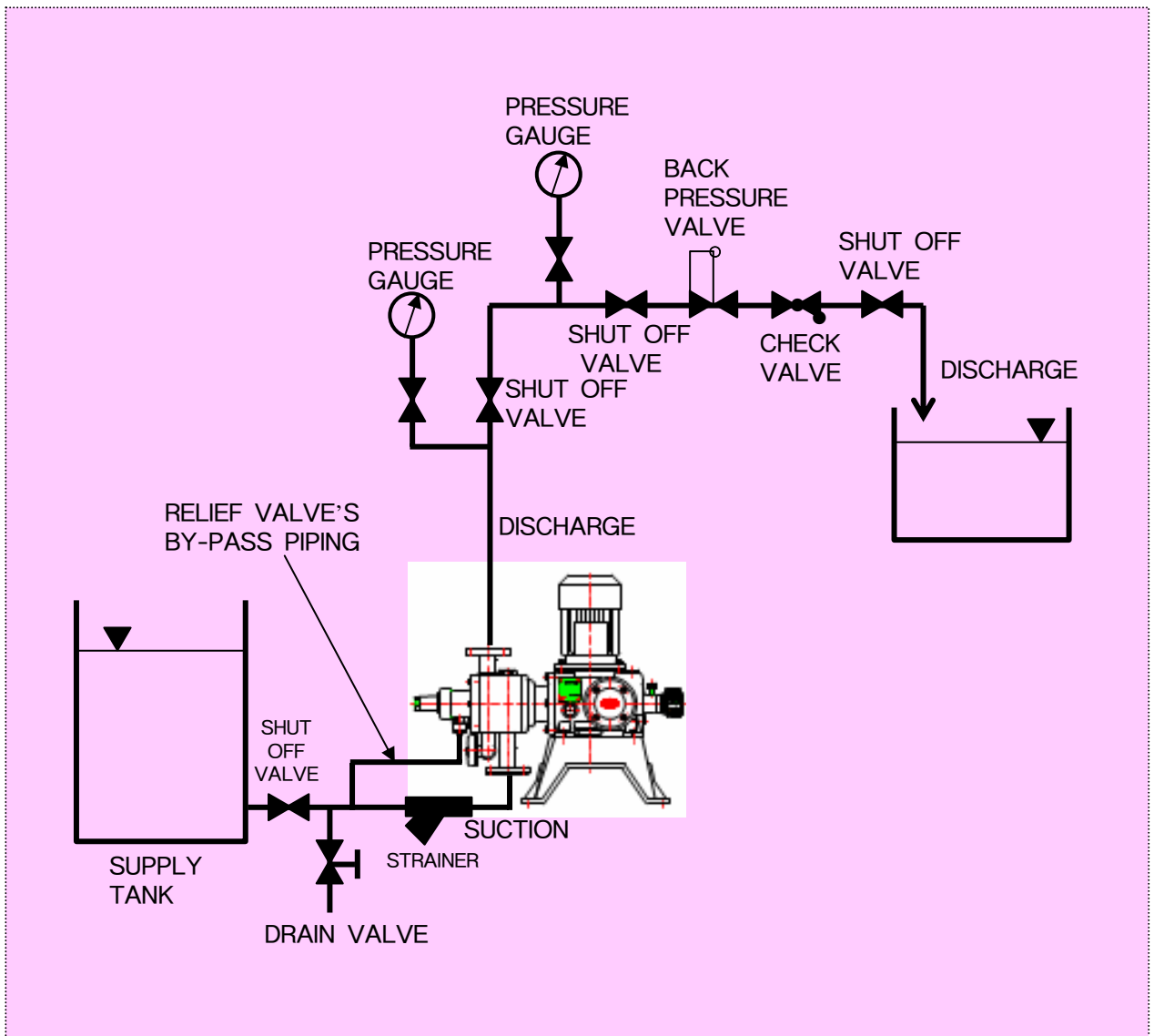
- 4) To increase flow velocity is one of the way of slurry sedimentation. So if pressure-loss is unlimited, use smaller diameter of piping as much as possible than usual
- 5) To prevent slurry sedimentation, install another piping for cleaning. Flush piping before stop
- 6) It's not a good way to install a preventive siphon valve or a distributive pressure valve. because it occurs lack of discharge volume by sticking slurry on the valve path.



10. Installation

10-7. Ideal Piping for Metering Pump

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



10. Installation

10-8. 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

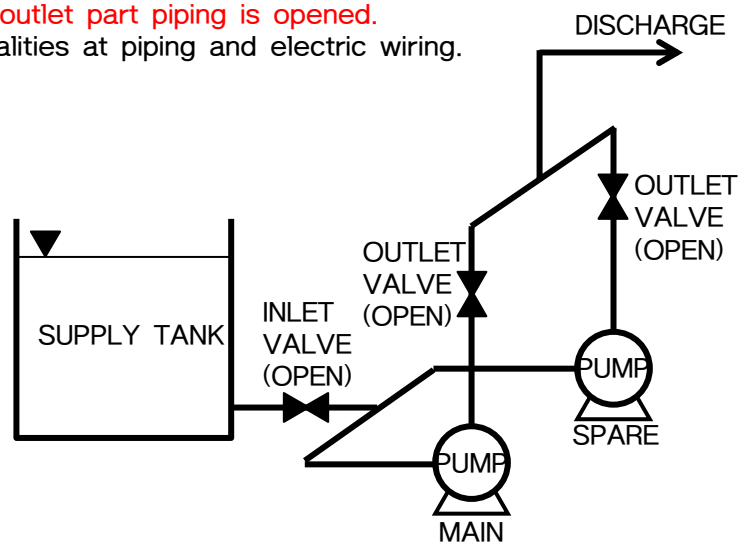
Maximum Discharge Pressure : Refer to specifications for each model

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 ▶ Measure with a mass cylinder. ▶ If you want to change flow rate, refer to performance curves.	▶ 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.

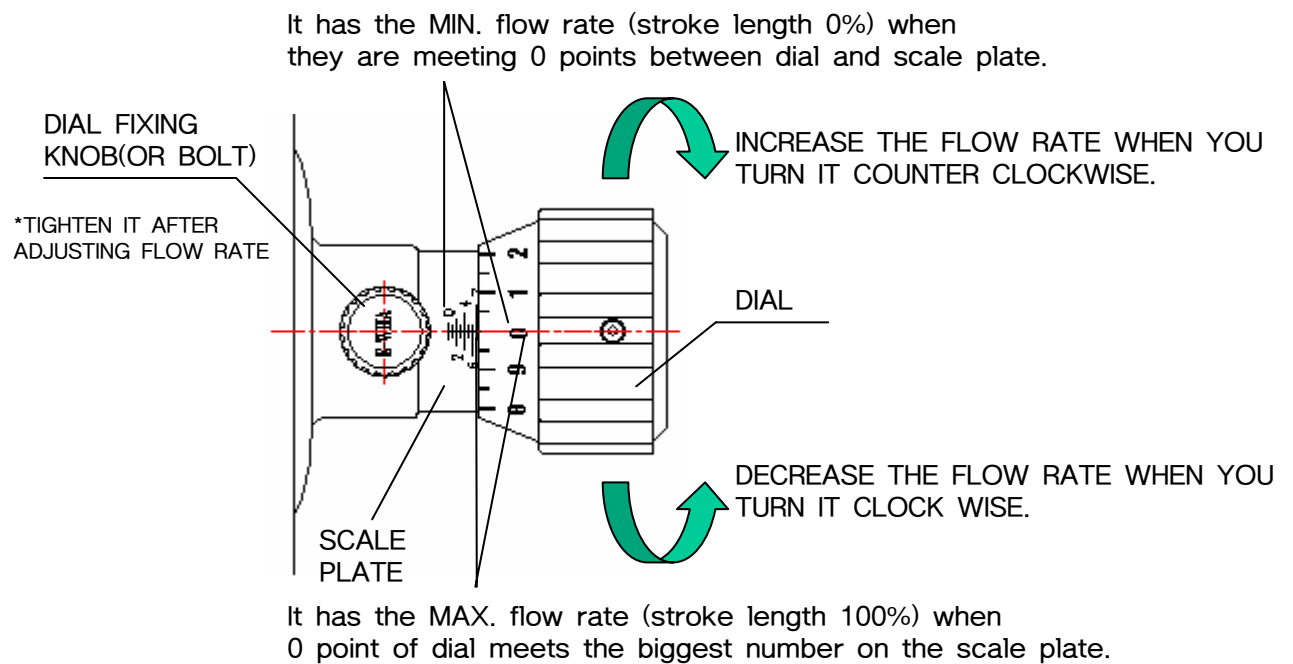
Refer to chapter 13

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	JMRV25	JMRV50	JMRV100	JMRV300	
	JMRVD50	JMRVD100	JMRVD200	JMRVD600	
MAX. SCALE	3		4		
MODEL	JMRV500	JMRV1000	JMRV2000	JM3000	
	JMRVD1000	JMRVD2000	JMRVD3000	JMD6000	
MAX. SCALE	4	5		7	
MODEL	JMRV4000	JMRV5000	JMRV6000	JMRV8000	JMRV10L
	JMRVD8000	JMRVD10L	JMRVD12L	JMRVD16L	JMRVD20L
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

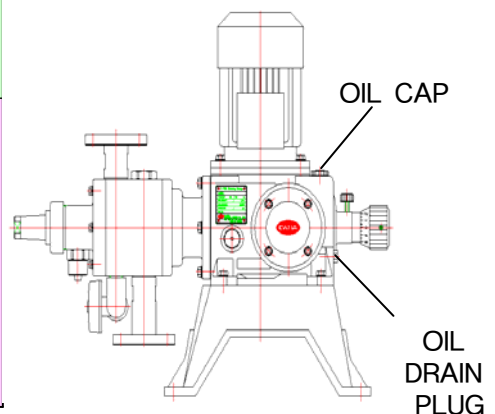
- Turn off power by all means, interrupt the valves of inlet and outlet piping.
- Close the valves of inlet and outlet.
- In checking the liquid end part of the pump, take special care like washing out the piping or the inside of the pump with fresh water.
- The metering pump is for transporting harmful 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
JMRV	0.40 LITER	INDUSTRIAL GEAR OIL 2TYPE KS M 2127, DIN5157 Part 3. VISCOSITY: ISO VG 220, SAE 90	ONCE A 4000HRS RUNNING
JMRVD	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.

12. Repairs & Checking

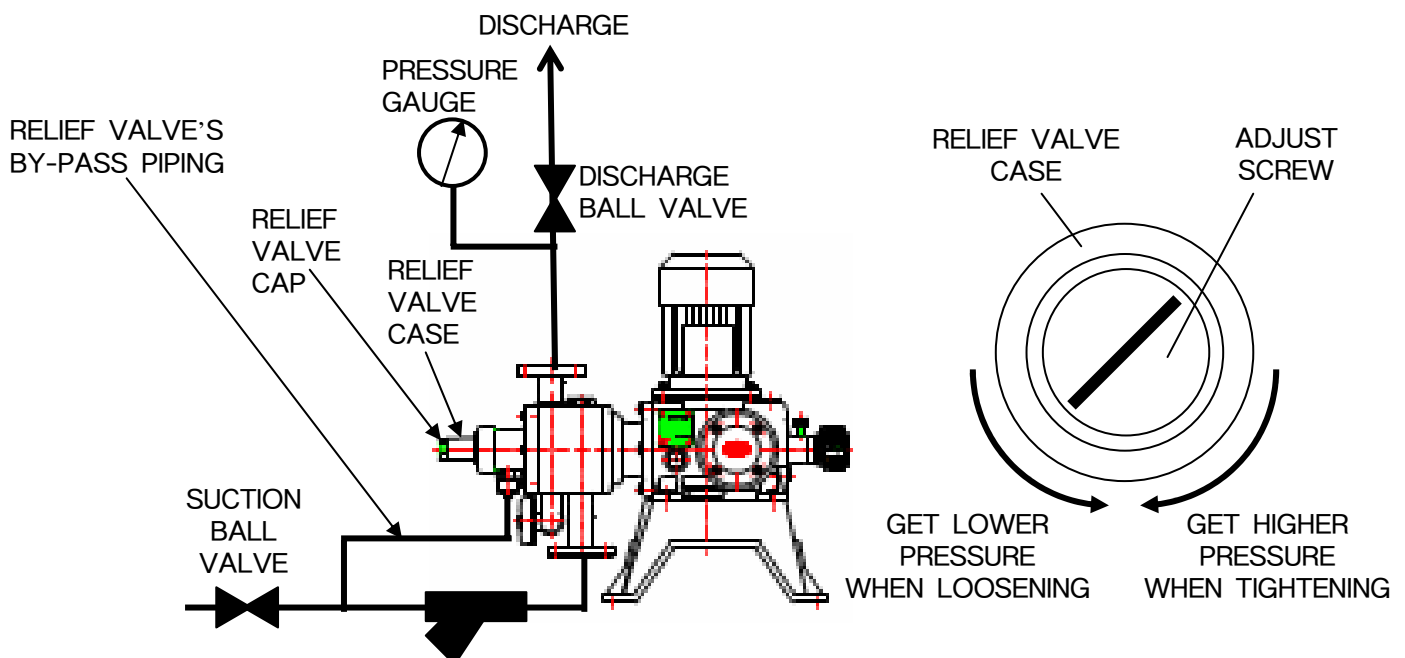
12-3. Change of relief valve's setting pressure

- When it is delivered, it is set up 120% of releasing overload pressure for MAX limitation of pump's discharge pressure.

If you want to change the setting pressure as using it at the condition of your field, Please follow this order below.

DO NOT EXCEED 120% OF MAX. DISCHARGE PRESSURE WHEN YOU SET IT UP AGAIN.

- ☞ EX : MAX. DISCHARGE PRESSURE OF YOUR PUMP IS 5kg/cm²
RELIEF VALVE'S STANDARD SETTING PRESSURE 6kg/cm²
→ ACTUAL USING PRESSURE OF YOUR PUMP IS 3kg/cm²
 $3 \times 120\% = 3.6\text{kg/cm}^2$



- 1) Get the pressure gauge indicated 3.6kg/cm² by adjusting discharge ball valve.
- 2) Open the relief valve cap (loosen it with counterclockwise)
- 3) You can set it up with the adjust screw shaped “-”,
Screw in (getting higher pressure) and out (getting lower pressure)
- 4) The pressure of relief valve's standard is 6kg/cm² so you have to loosen it to have 3.6kg/cm². Watch the gauge as loosening it.
Suddenly you can see the indicator is getting lower than 3.6kg/cm², at that moment, stop adjusting it. (the point is working time of relief valve)
- 5) Rechecking of 3.6kg/cm² setting pressure : Open the discharge ball valve completely then close it slowly as watching the indicator of pressure gauge, and that's going up to 3.6kg/cm². It is right when the indicator is going down from 3.6kg/cm².
(If the indicator is going up to 4.5kg/cm² then going down, you set it 4.5kg/cm².
Loosen it a little bit more as checking the indicator going down)

13. Exchange of parts



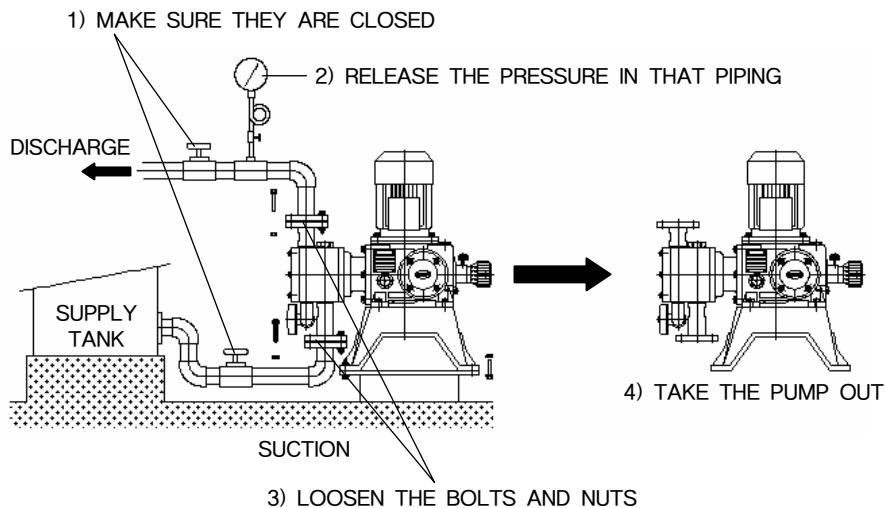
Caution

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.

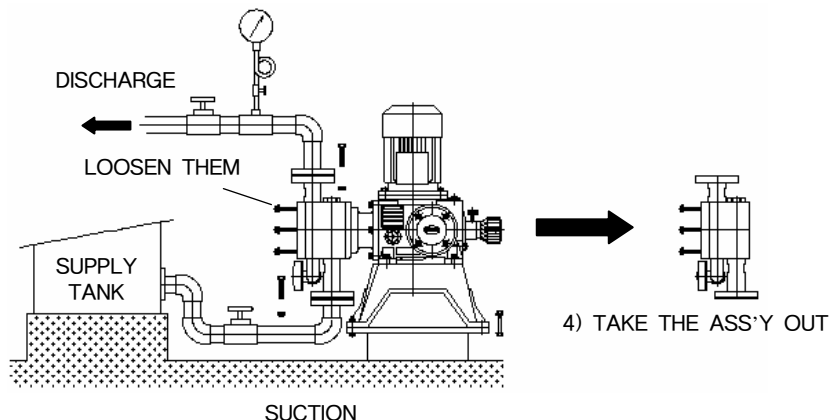
13-1. Taking pump off from piping

- 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

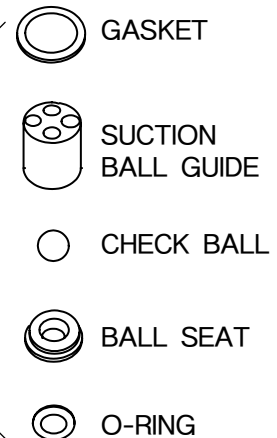
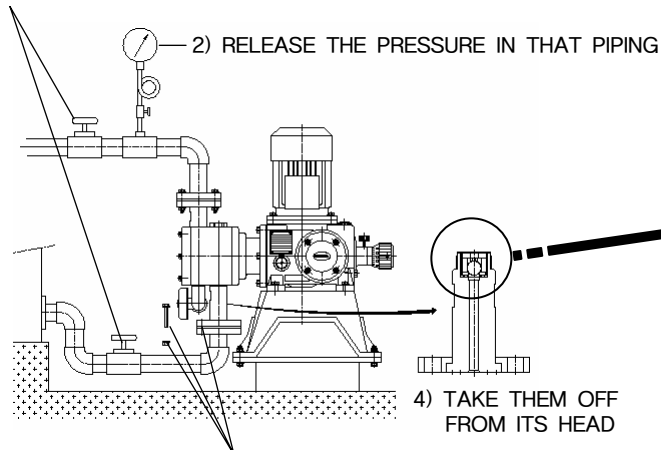


Importance

- 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

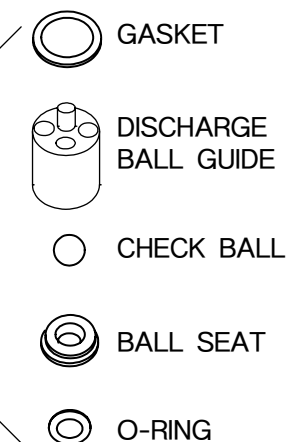
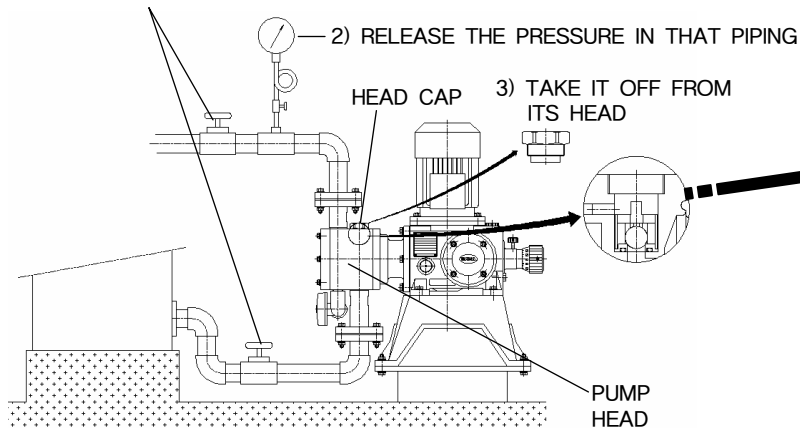


4) TAKE THEM OFF FROM ITS HEAD

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



PUMP HEAD

14. Cause & Remedy

14-1. Cause & Remedy

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

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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