KEMPION KP Series

KP Series

Plunger Metering Pump

Instruction Manual

CHEONSEI IND. CO., LTD.
PUMPLAND DIVISION

Instruction

Thank you very much for purchasing CheonSei KP Series. Before beginning operation, please read this instruction manual carefully. We hope the pump will provide you with many year of trouble-free operation.

Contents

1 Notice for Safety

1-1 Introduction

- To use the products safely the signs will be showed on the manual .
- Please keep the manual certainly for important matters of safety.
- The signs and indications are as followings.

⚠ Warning Person death or serious injury will be occurred if warnings is not to kept by wrong handling.

⚠ Caution Person injury or property damage will be occurred if cautions is not to kept by wrong handling.

1-2 Cautions for Use Condition

⚠ Caution

- The pump should not be used by other purpose except for liquid injection, otherwise accident or damage may be occurred.
- The pump should never be used for kind of liquids which caused liquid end parts to be damaged.
- Please keep as followings or may be caused trouble.
  Ambient temperature : 0~40℃
  Temperature of handling liquid : 0~100℃
  Piping Pressure : below maximum discharging pressure indicated on the specifications.
- Must not use the slurry liquid: slurry liquid may cause the valve clogging and excessive leakage from gland packing.

1-3 Cautions for Handling Condition

⚠ Warning

- Install the pump at place not to touch by outsider or children except authorized person.
- Put off power and stop pump and other equipments when repair or disassembly pump. Electric shock may be caused if power is on during working.
- Do not operate when discharge valve is closed or do not close valve during operation. Pump and piping may be damaged with exaggerated pressure rising and liquid spout when operation under valve closing.
- Be careful not insert fingers or alien materials on rotation or going & returning equipments when pump operation. Hurt may be occurred when touch during operation.
- Bracket cover should be in place as it is during operation except when the bracket cover is needed to be dismantled for tightening of gland packing, or pump' s repairs and inspection purposes. Incident may occur if you operate without cover.
- Do not touch with wetted hand. Electric shock may be occurred.
- Use specified accessories certainly. Accident or trouble may be occurred.
- Absolutely do not modify pump arbitrarily, accident or trouble may be occurred .

⚠ Caution

- Do not install pump in place with heavy moisture and dust. Electric shock and trouble may be caused.
- Do not touch with bare hand on motor part when operation. A burn caused by high temperature may be occurred.
- In case of vague liquid for dangerous objects and character, wear safety equipments certainly as like gloves and goggles when repair and check of pump.
- Do not use other power except the power which is instructed on name plate of motor. Trouble and fire may be caused.
- Electric shock may be occurred unless earthing to earth line, connect to earth line certainly.
- Do work after releasing of pressure of discharge piping and eliminating liquid in liquid end prior to repair or maintenance of pump.
- Pump may be damaged when ambient temperature lows down below freezing point of liquid used. Do eliminate the liquid in pump and piping certainly after operation stop.
- Do proper protection under considering exposure of liquid, when pump and piping may be damaged.
- Installation of safety valve (relief valve) is required in order to prevent overpressure from discharge pipe.
- Dispose a disused pump in accordance with relation law.

2 Confirmation of Articles to be supplied

2-1 Check Point When Unpacking

1 Are the products the same as you ordered ?
2 Are all accessories included ?
3 Is there any visible damage caused by vibration or shock during transport ?
4 Are any of the screws loose or missing ?

We take great care to assure our products leave the factory in perfect condition. However, in the event that this pump is found to be defective, please report the details to CHEONSEI or your local representative. We will do our best to solve the problem as quickly as possible.

2-2 Standard Accessories

1 Manual ····· 1 copy
2 Bolt for pump installation(Hexagonal : M10x40L) ····· 4 sets
3 Gland nut setting tool····· 1 pc

3 General

This is plunger type metering pump of which discharge capacity is adjustable during operation.
It reduces motor rotation using the worm mechanism, gives reciprocating motion to the pump shaft by the eccentric cam, sucks a chemical liquid into the pump chamber diaphragm motion, and delivers the liquid by pressure.
The feeding volume can be accurately adjusted by simple dial-operation during either operation or stop.

4 Model Code

①	②	③		④		⑤	⑥	⑦		⑧	⑨		⑩
K	P	V	–		–	30	1	L	–	S	T	–	S

① Brand name	K:KEMPION
② Pump head type	P:Plunger type
③ Drive box type	V:Vertical (Motor direct joint) H:Horizontal (Motor indirect joint)
④ Option	No Mark:No option A:BLDC M/C UNIT B:SERVO UNIT
⑤ Plunger diameter	30:Plunger Dia. 30㎜
⑥ Stroke speed	1:58(48)SPM 2:116(96)SPM ※( ) is 50Hz
⑦ Drive box size	L:0.2kW Class M:0.4kW Class
⑧ Liquid end material	S:Standard X:Special
⑨ Connection	T:Thread F:Flange X:Special
⑩ Power supply	S:3 Phase 60Hz 220/380V A:3 Phase 60Hz 440V X:Special

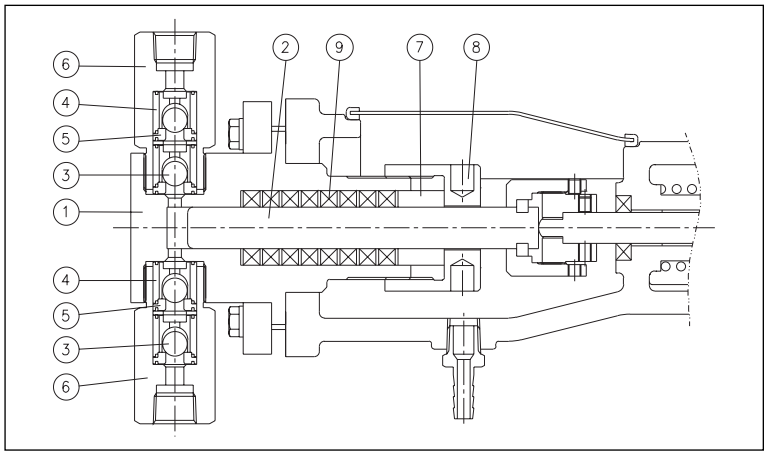
5 Specifications

Model	Max. capacity (mL/min)		Max. discharge pressure (bar)	Stroke speed (SPM)		Stroke Length (mm)	Plunger Diameter (mm)	Connection		Motor (kW)	Weight (kg) Vert./Hori.
	50Hz	60Hz		50Hz	60Hz			Thread	Flange		
KPV,H-061L	10.5	13	160	48	58	10	6	Rc1/4	63K15A	0.2	18/23
KPV,H-062L	21	26	160	96	116						
KPV,H-121L	45	55	160	48	58		12				18/23
KPV,H-122L	90	110	160	96	116						
KPV,H-161L	83	100	160	48	58		16	Rc3/8			19/24
KPV,H-162L	170	205	100	96	116						
KPV,H-221L	162	195	104	48	58		22		40K15A		19/24
KPV,H-222L	332	400	52	96	116						
KPV,H-301L	290	350	56	48	58		30	Rc1/2	20K15A		21/26
KPV,H-302L	614	740	28	96	116						

Model	Max. capacity (mL/min)		Max. discharge pressure (bar)	Stroke speed (SPM)		Stroke Length (mm)	Plunger Diameter (mm)	Connection		Motor (kW)	Weight (kg) Vert./Hori.
	50Hz	60Hz		50Hz	60Hz			Thread	Flange		
KPV,H-061M	16.5	20	200	48	58	15	6	Rc1/4	-	0.4	41/44
KPV,H-062M	33	40	200	96	116						
KPV,H-121M	70	85	225	48	58		12				41/44
KPV,H-122M	140	170	225	96	116						
KPV,H-161M	133	160	160	48	58		16	Rc3/8	63K15A		42/45
KPV,H-162M	266	320	160	96	116						
KPV,H-221M	253	305	160	48	58		22				42/45
KPV,H-222M	510	615	85	96	116						
KPV,H-301M	448	540	90	48	58		30	Rc1/2	40K15A		44/47
KPV,H-302M	930	1120	45	96	116						
KPV,H-401M	845	1020	50	48	58		40		20K15A		47/50
KPV,H-402M	1700	2050	25	96	116						
KPV,H-501M	1310	1575	32	48	58		50	Rc3/4	20K20A		48/51
KPV,H-502M	2710	3260	16	96	116						

Note) 1. Maximum capacity is the value when Maximum discharge pressure is applied(with pure water at room temperature).
2. The effective flow control range is 10~100 % stroke length. The metering accuracy is within ±1%FS. The linearity is within ±2%FS.
3. Explosion proof motor or other special requirement of the motor (except voltage, frequency) can only be met with horizontal type.
4. The standard joint flange indicates the discharge side. In case of the suction side is fixed KS20K flange.
5. The weight is based on the thread type including standard motor.
6. Self-priming capacity is 1m for Ø6 , 2m for Ø12~Ø22, 3m for Ø30~Ø50 of the plunger diameters.
7. The limit of viscosity is 500cP for Ø6~Ø12 and 1000cP for Ø16~Ø50 of the plunger diameters.
8. The Munsell No. of painting is 0.6PB 4.8/10.6 except motor. (The color of the motor is manufacturer standard.)
9. The specifications may be revised for improvement without prior notice.

6 Materials of Standard Liquid End

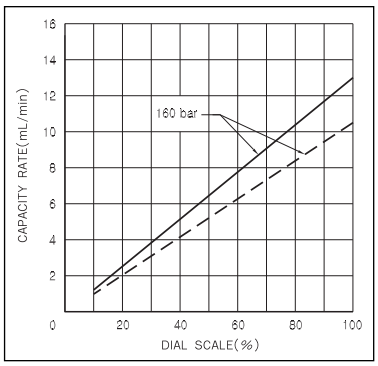


NO.	Parts Name	Material
①	Head	STS316
②	Plunger	STS316 + CQ
③	Check Ball	STS316
④	Ball Guide	STS316
⑤	Ball Seat	STS316
⑥	Joint	STS316
⑦	Gland Ring	STS316
⑧	Gland Nut	STS316
⑨	Gland Packing	PTFE + ARAMID

7 Performance Curves

Condition : Room temperature, Clean water, Suction head - 1m

● KP - 061L



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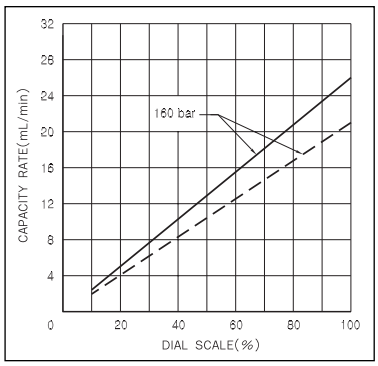

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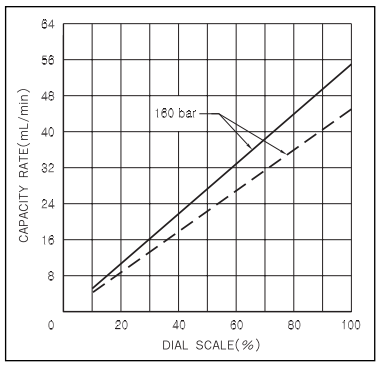

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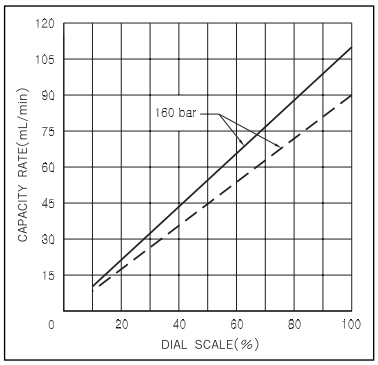

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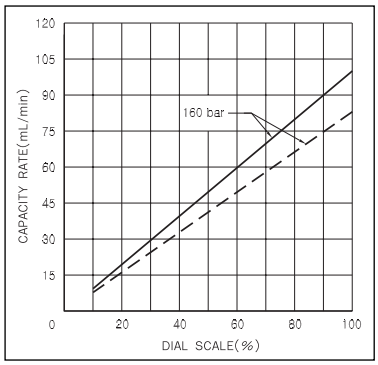

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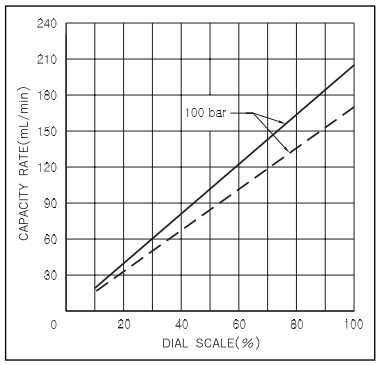

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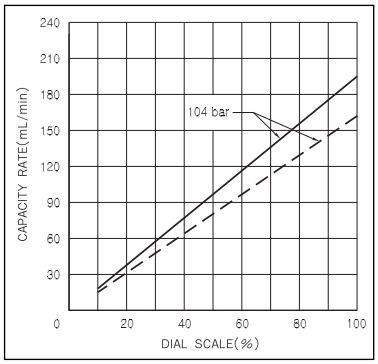

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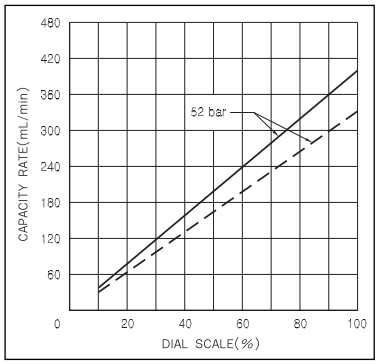

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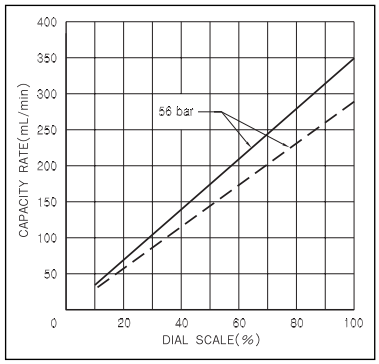

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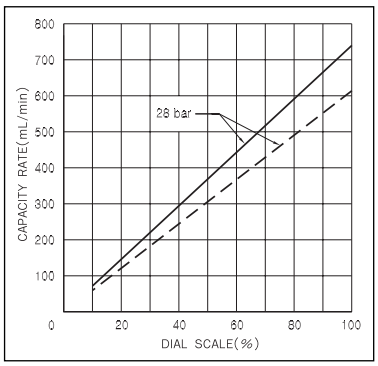

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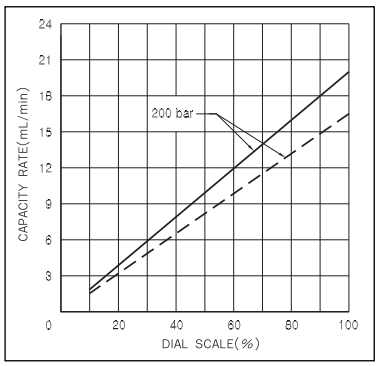

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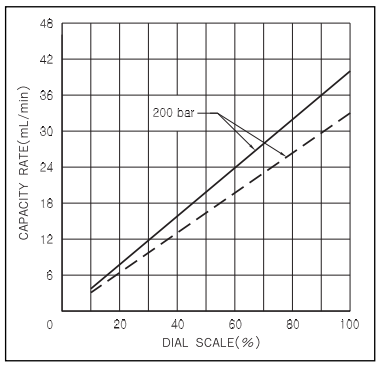

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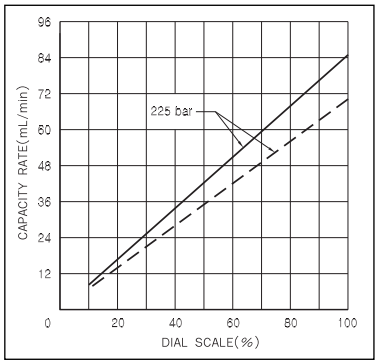

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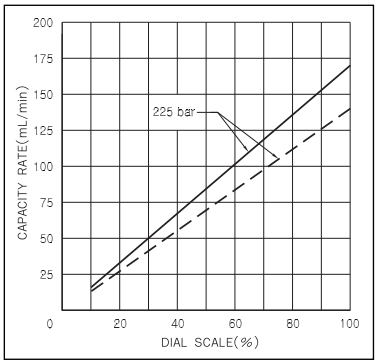

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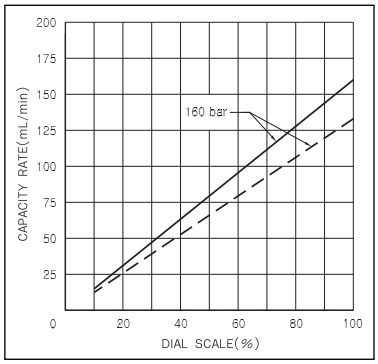

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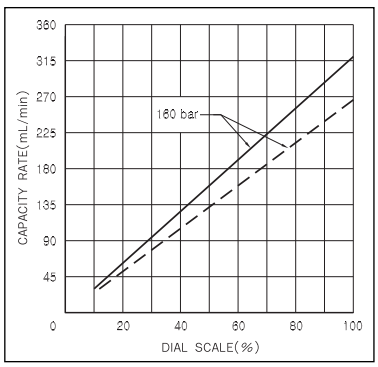

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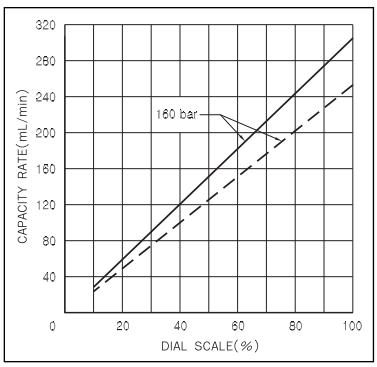

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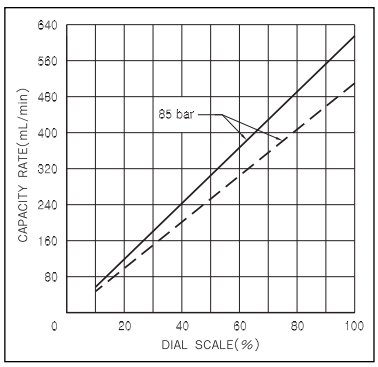

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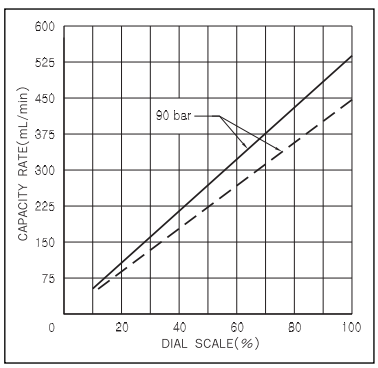

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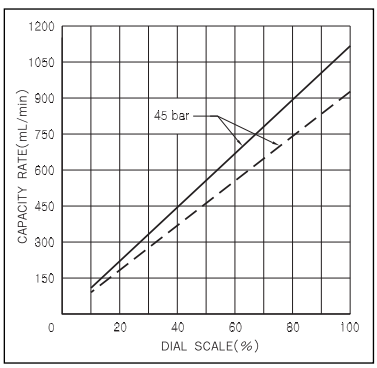

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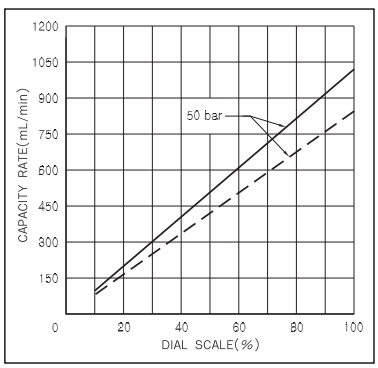

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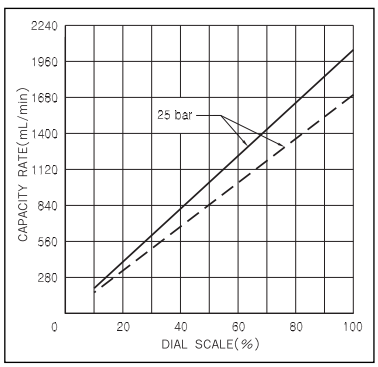

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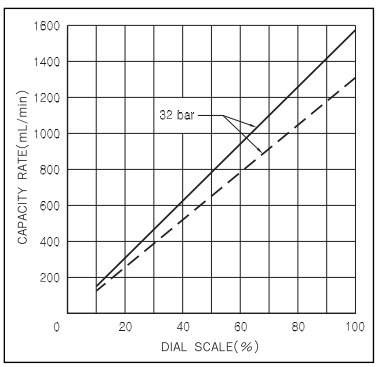

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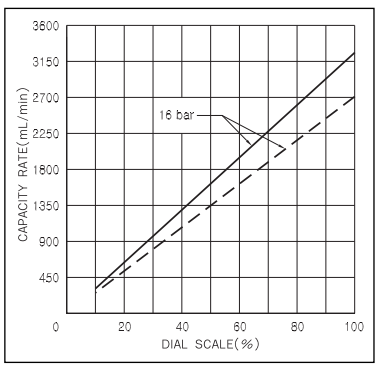


Note)

The performance curves show examples at our testing facility under regular conditions. Performance curves can be somewhat different at each local site. Please measure the discharge capacity under the operation conditions, and adjust the stroke length dial on its performance curves.

8 Principle of Operation & Structure

8-1 Principle of Operation

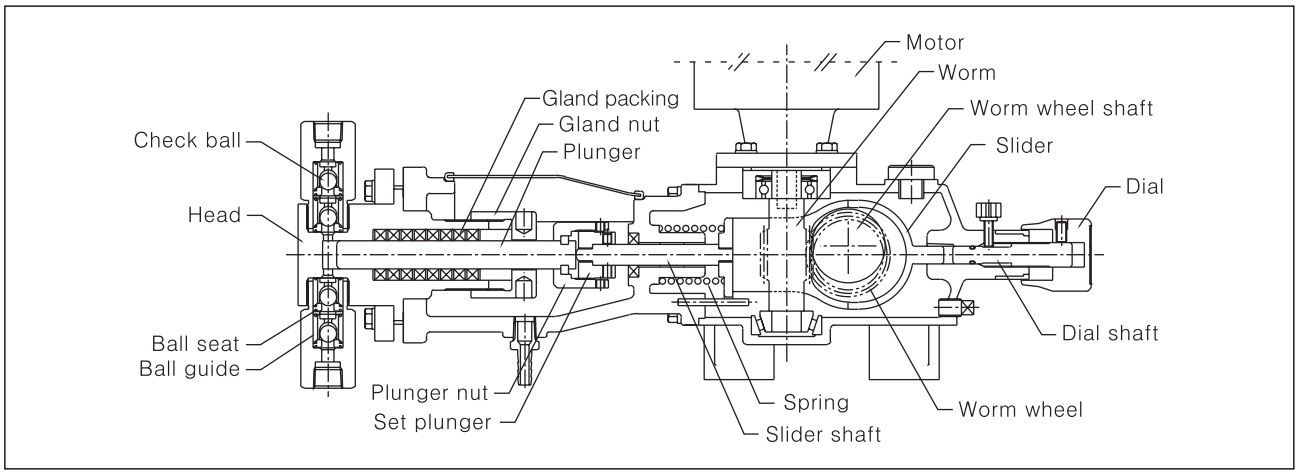
The rotation of the motor is reduced by worm and worm wheel and then changed to a reciprocation by an eccentric unit(worm wheel shaft, slider and spring etc.).
This reciprocation is transmitted to a plunger by the slider shaft which is connected to the plunger directly, hereby operating the pump owing to the change the volume of plunger chamber, and the movement of check ball in pump head.

8-2 Stroke Control Unit

The stroke length is adjusted by the control of eccentric amount of slider with the adjusting dial.

8-2 Self-aligning instrument

Plunger and plunger sets which drive the plunger are assembled with a very small opening. Because of this opening the plunger moves along the gland packing with a proper movement.



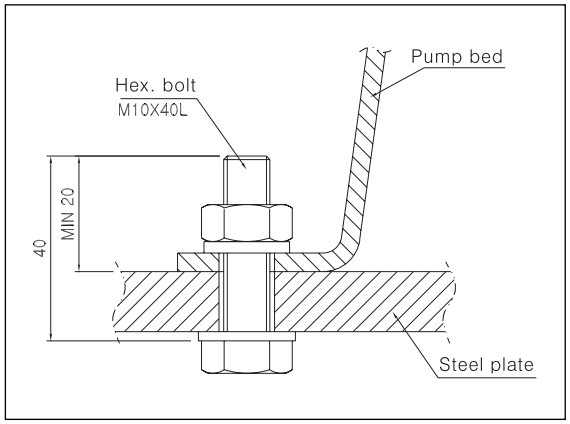
9 Installation

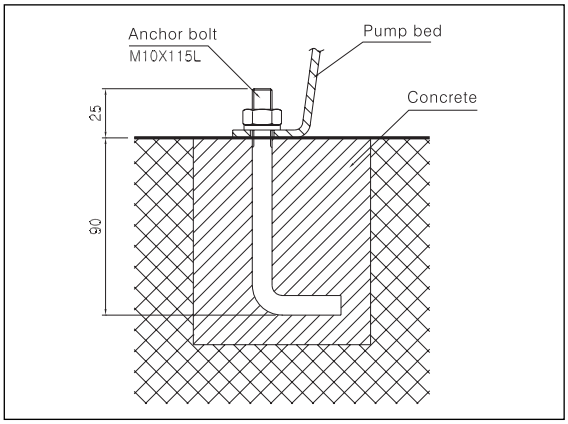
9-1 Place of Installation

⚠ Caution

- Do not install the pump in place which ambient temperature is high (above 40℃) or lows down below freezing point, pump internal may be damaged.
- Do not install pump in place with heavy moisture and dust, or in place with rain, and wind, electric shock and trouble may be caused. (exception of outdoor pump)

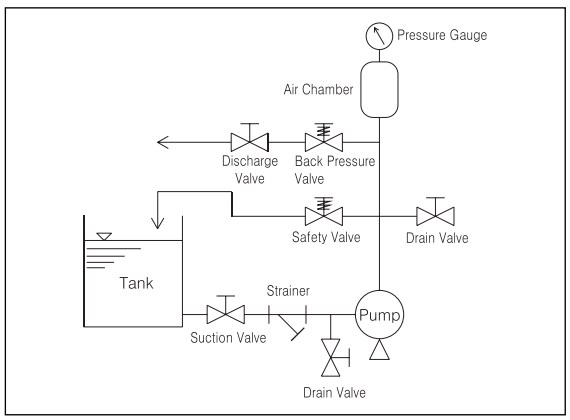
1 The pump should be installed as near to a suction tank as possible and should be easily accessible for inspection and maintenance. It is recommended that the pump be placed lower than the suction liquid level.
2 Take sufficient space around the pump so as to facilitate maintenance and check. In order to ensure safety during disasters such as floods, an emergency plan should be established for the motor and power distribution unit.
3 For foundation of pump, the surface should not be tilted.
4 Prepare a concrete foundation or a rigid base plate to support fully the weight of the pump.



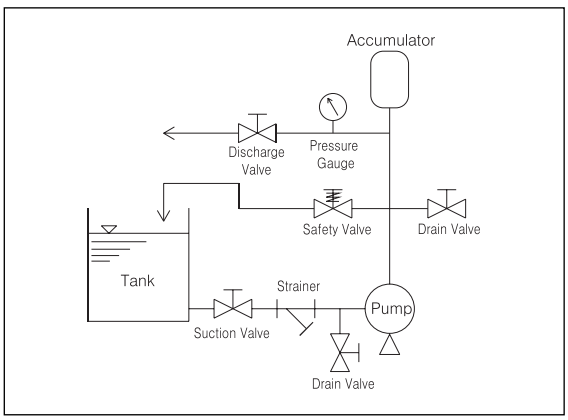


9-2 Piping

● Standard piping diagram for low pressure

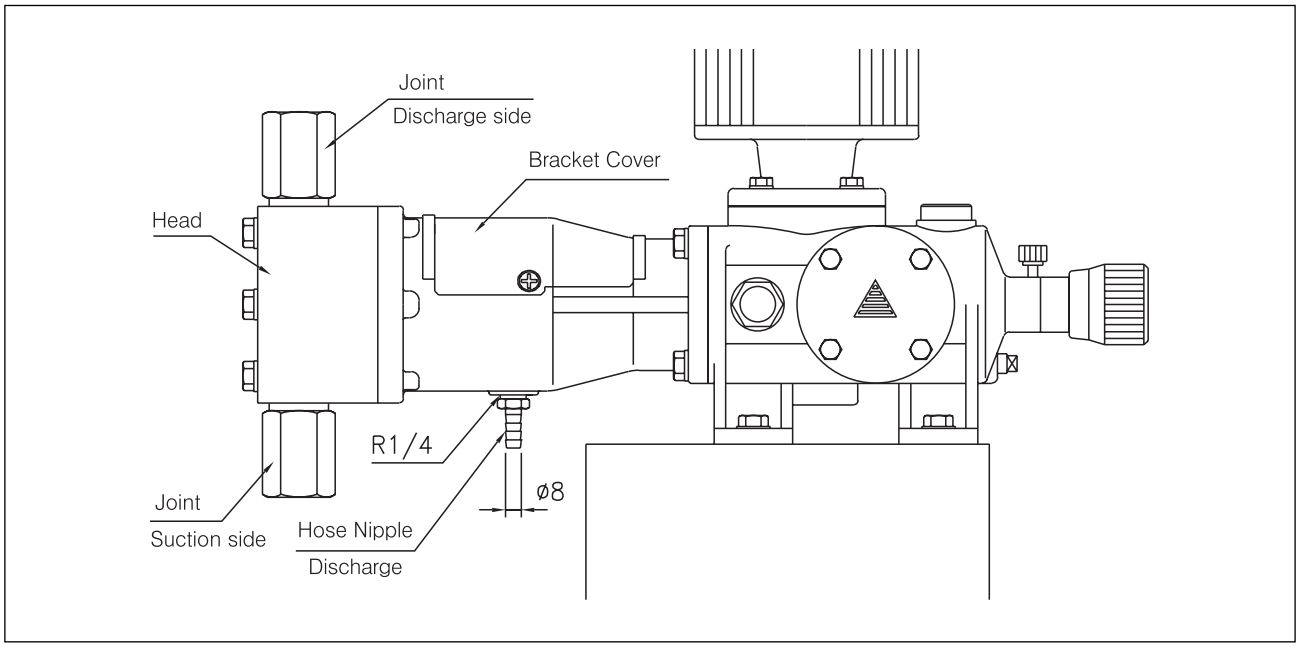


● Standard piping diagram for high pressure



1 The piping should be done under the best condition of the suction and discharge.
2 The best piping arrangement for minimum loss is based on straight runs with as few bends and fitting as possible. And do not make such a room in the pipe to collect air.
3 All piping should be supported independently so that unnecessary weight and vibration are not transmitted directly to the pump. Flexible piping is recommended to avoid damaging the plastic pump head especially.
4 When feeding a high or low temperature liquid, be care to prevent the pump from suffering thermal stress.
5 When feeding a viscous liquid, poisonous liquid or coagulable, please provide a washing pipe line for maintenance and inspection.
6 When selecting a piping material, check thoroughly its corrosion resistance to the liquid to be treated and the pressure to be applied to the pipe.
7 Before the pipe distribution, wash thoroughly the inside of the pipe and remove the protective cover fitted to the discharge port and suction port of pump.
8 The reciprocating pump should be provided with a safety valve. Be sure to fit a safety valve to the discharge pipe near the pump.

9 When a diluted liquid is used, the liquid is frozen in the pump head and the pipe in winter, sometimes breaking the pump. So, please provide a drain valve at the suction /discharge pipe. And wash inside of pump with water for the interval operation.



10 In order to discharge the liquid released from gland packing, connect the hose to hose nipple safely avoiding any contaminants. In case of using a separate discharge piping, remove the hose nipple and use pipe components complied to standard screw types correctly.

9-3 Suction Piping Work

1 Be sure to fit the suction pipe according to the forced feed method.
The diameter of the suction pipe should be larger than or same with that of the pump suction diameter.

2 Carefully fit the joint of the suction pipe in such a manner that no air is sucked in it. If air flows into the suction pipe, the pumping capacity will not be stabilized.

9-4 Discharge Piping Work

1 Provide a safety valve near the discharge pipe of the pump. And do not install any other valves between the pump and the safety valve.

2 Use a discharge pipe whose withstanding pressure is higher than the pressure setting of the safety valve. Also, carefully fit the joint of the discharge pipe.

3 To avoid the pulsation and inertial resistance (accelerated head), installation of air chamber (accumulator) is recommended.

4 Pressure gauge should be installed for routine inspection purpose for discharge pressure.

9-5 Wiring

⚠ Caution

- Do not touch with wetted hand, electric shock may be occurred.

⚠ Caution

- Check voltage constant and frequency of motor prior to wiring, and connect to specificated power.
- Earth grounding wire with wiring to protect electric shock.
- Entrust to electrical technician for wiring.
- Install specified magnetic switch and thermal relay to control and maintenance, etc. of pump.
- Do use standardized goods for wiring and be carefully safety in accordance with technical standard and wiring regulations.

[1] Connect wiring for using power with reference to wiring diagram on name plate or terminal box cover attached on motor.

[2] Connect according to direction indicated by arrow of name plate for rotation direction of motor (clockwise from fan direction of motor).If rotation is reverse, change 2 among 3 wires.

[3] Method of motor wiring(when combination 220/380V)

220V wiring	380V wiring
①-⑥ ← ②-④ ← (△wiring) ③-⑤ ←	⑥ ① ← ④ ② ← (Ywiring) ⑤ ③ ←

10 Operation

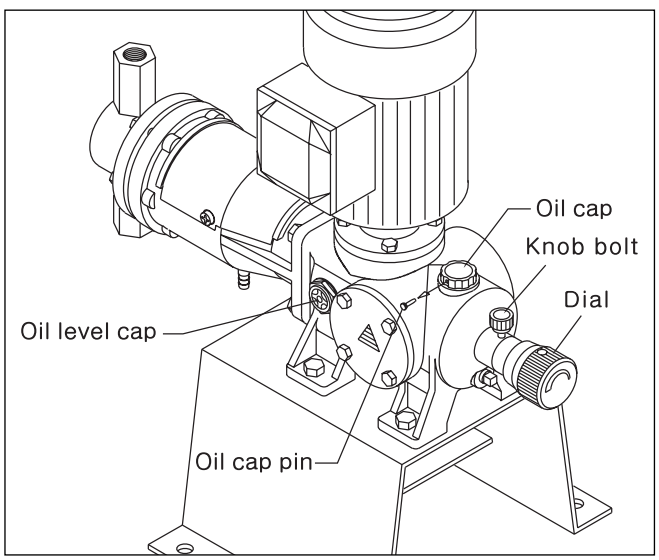
10-1 Preparation

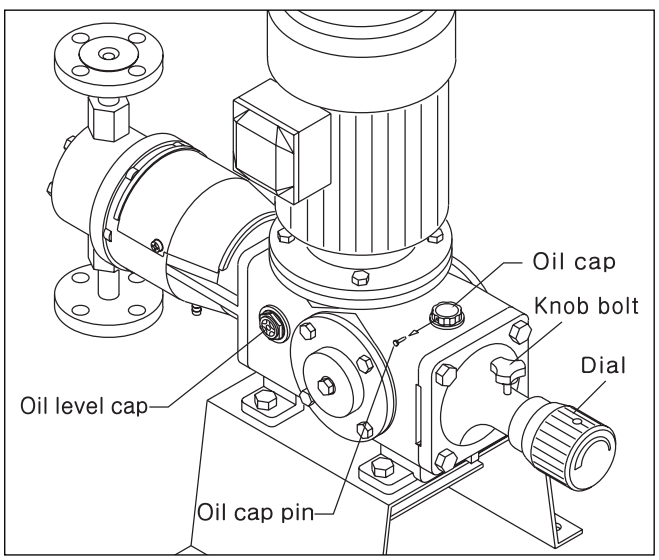
⚠ Caution

- Some water may be remained in pump head after final performance test. Remove the water in pump head and dry the pump necessarily, to avoid the problem that may be caused by abnormal phenomena of some liquid which may be occurred by a relation with water.

When pump operation is first after installation, please check as followings.

[1] Check every parts of the pump for defects, loosened bolts, oil leakage, etc.





2 Check the oil gauge to see if the drive unit is filled with the specified amount of oil and pull out the oil cap pin (black color).

3 Check the each parts for operating and transferring liquid and power condition, etc.

10-2 How to Adjust the Stroke Length

⚠ Caution

- Be careful not to turn dial gauge below 0% or above 100%.

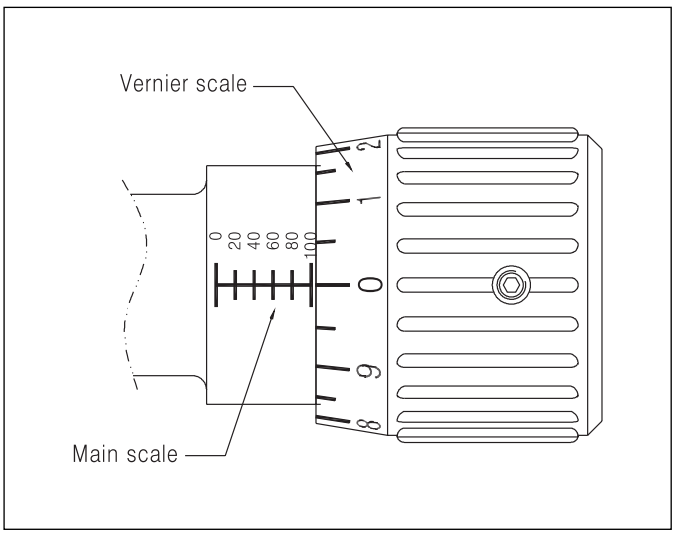
The stroke length is adjusted by control of eccentric amount of slider with the adjusted dial.
Please adjust the dial while the pump is running.

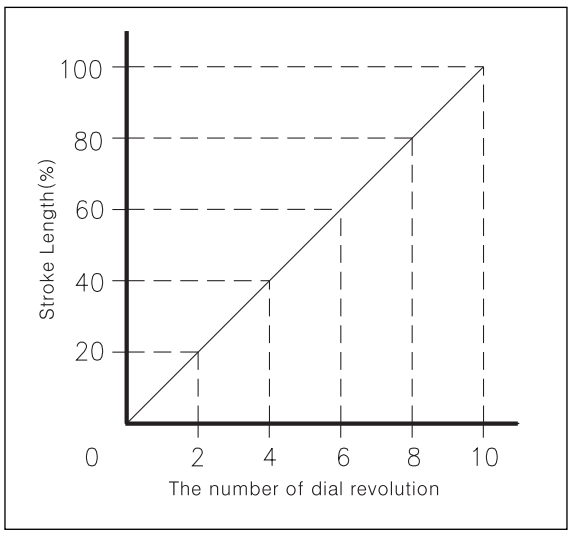
1 Select a proper stroke length in accordance with the test data of the pump.The stroke length dial is graduated in % (percentage).

2 Loosen of dial shaft setting knob bolt.

3 Set a proper stroke length

The proper stroke length is obtained by adding a value on the main scale to a value on the vernier.
And please refer to the below diagram on the number of dial revolution, corresponding to the stroke length from 0% to 100%.





4 After setting stroke length, fix dial shaft to turn fixed bolt as clockwise not to move dial when pump operates.

10-3 Operation

⚠ Waming

- Operate pump after opening certainly of valves on discharge piping and suction piping. Pump and piping may be damaged with exaggerated pressure rising and liquid spout if operation under valve closing.

When running the pump for the first time after installation, follow the procedures below.

1 Open the valve of the suction and discharge pipe. Do not operate the pump with the valves closed.

2 Turn on the power switch of the motor and the motor should be rotated clockwise when viewed from the motor fan cover side.

3 Set the stroke length at 0%.

Continue to run the pump for a warm-up period of 10 minutes with the stroke length set at 0%.

※ In a cold district, the pump may sometimes be overloaded (Amperage is over the rating) for a while just after starting running. This is because the temperature of oil in the pump is not enough high. In this case, continue no-load running until the oil temperature rises sufficiently.

4 Set the stroke length at 100% under no pressure to discharge side and run the pump for a warm-up period of 10 minutes.

5 If no abnormality is found during the warm-up running, gradually increase the pressure to the discharge side and set it at the required. In this case, check that the amperage of motor is within the rated value and no abnormality is found in each part.

10-4 Checking the Discharge Volume

If no abnormality is found in the pump, check the discharge volume under the actual running conditions, using a gauge such as measuring cylinder etc.

1 When no remarkable variation in the discharge volume is found as the result of repeated measurements and the discharge volume keeps diagrammatical linearity as against the stroke length, the pump is judged to be normally running.

2 Make a diagram of relationship between the discharge volume and stroke length under the actual running conditions and determine an optimum discharge volume in accordance with this diagram.

3 When the discharge volume is increased or decreased by changing the stroke length, measure the discharge volume after about a minute.

※ When the pump test data is requested by the orderer, we submit our in-plant test data.
The pump test data are the test results obtained by using clear water of normal temperature.
So, note that these are not obtained from an actual piping and actual liquid.

10-5 Re-starting to Run the Pump After it is Stopped

1 When starting to run the pump after it is stopped for a short period of time (Within a week), it can be started at a desired stroke length and a prescribed discharge pressure.

2 However, when starting to run again the pump after stopped for a long period of time (over a week), be sure to set the stroke length at 0% and continue no-load running for a few minutes until the pump drive unit is thoroughly lubricated.

3 As pump breakage may caused from frizzing condition during winter season, discharge any liquid remained in pipe and pump with idle operation after opening drain valve placed on suction piping regardless of shut-down duration of operation.

10-6 Precautions

1 Be sure to open both valves of discharge side pipe and suction side pipe before starting to run the pump.

2 Be sure to provide the pipe on discharge side with a safety valve.

11 Maintenance And Inspection

⚠ Warning

- Electric shock may be caused when work, put off power and stop pump and equipments.
- Be careful big accidents may be occurred when put fingers or cloth in rotator.

⚠ Caution

- Wear safety equipments certainly when work of disassembly or assembly.
- Do work after release discharge piping pressure, and remove the remained liquid in the pump head prior to repair or maintenance.

11-1 Daily Inspection

1 Check whether abnormal vibration or noise is generating from the pump to ensure smooth operation of pump.
2 Check whether discharge volume and discharge pressure are not changed, and current of motor is in normal action.
3 Check liquid release from connections.
4 Check the oil shortage and leakage condition from drive unit.
5 If any spare pump is provided, the pump should be operated and maintained for time to time in order to use it at any time.

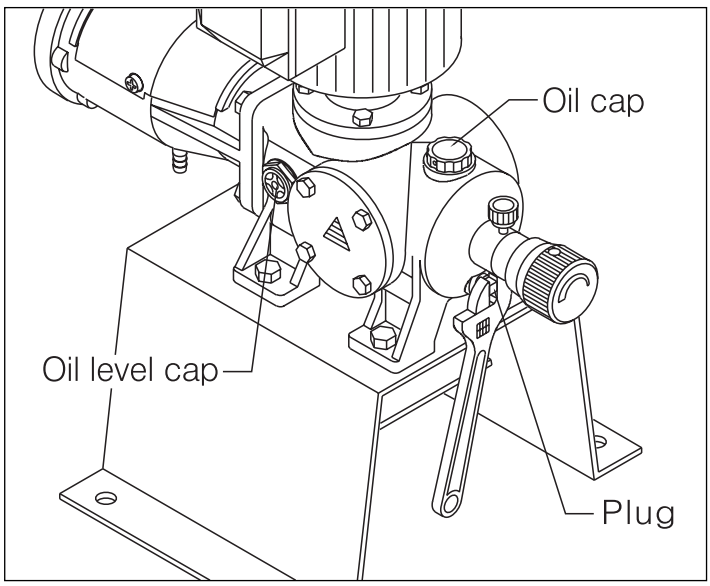
11-2 Regular Inspection

1 Inspection of discharge valve and suction valve Inspect them every 6 months. And if an abnormal flaw or wear is found at the time of inspection, replace the value with a new one.
2 Gland packing inspection
As a consumable component, life cycle of gland packing depends on liquid in use or working pressure.
① Additional tightening for gland packing
It is a normal usage that a few drops of liquid release per minute from gland packing unit. When release quantities increase due to the wear of gland packing, an additional tightening is required with gland nut. For tightening adjustment, the pump should be stopped without any discharge pressure in order to prevent breakage of screws. KP type of metering pump embedded with spring type driving unit needs special care during tightening procedure because over-tightening of gland packing may obstruct the plunger movement.
② Replacement interval
Replace the gland packing if large amount of liquid is released even after tightening the gland nut. For replacement sequence of gland packing refer to "component replacement" section.

3 changing oil in the drive unit
① Change interval: change oil after initial 500 hours of continuous operation and after that, change it every 4000 hours. Immediate change is required when lubricants degradation or emulsification occur.
② Oil change volume

MODEL	KPV,H-061L~302L	KPV,H-061M~502M
Oil Quantity	230 mL	1,200 mL

③ How to change oil in the drive unit
Loosen the plug (square) with spanner and drain the old oil to clean-up with flushing oil. Connect the plug and pour new oil with inlet (oil cap) into the pipe slowly by checking out the predetermined level (until red point) of oil cap.



④ Recommended oil
Omala oil(#220) of Shell company (※)
Gear oil (#630) of Mobile company
Super gear(#220) of ESSO company
Meropa(#220) of LG CALTEX company
Super gear(#220) of SK company
Dahuni gear rub(#220) of S-Oil company
Other ISO VG220, SAE90 density equivalent gear oil

Note) (※) is used oil by CheonSei.

12 Cause of Trouble and Troubleshooting

Item	Troubles	Troubleshooting number
A	Motor does not run.	1, 2, 3, 4, 12, 13
B	Discharge quantity is short.	5, 6, 7, 8, 9, 11, 14, 15, 18, 19, 20, 23, 24
C	Discharge quantity is excessive.	9, 10, 15
D	Discharge quantity is unstable.	5, 6, 7, 8, 10, 11, 24
E	Liquid is not discharged.	5, 6, 7, 8, 14, 15, 18, 24
F	Discharge pressure does not rise.	5, 6, 7, 8, 14, 16, 17, 18, 19, 24
G	Liquid is not sucked.	5, 6, 7, 8, 14, 19, 20, 23
H	Liquid leaks.	15, 19, 20, 23
I	Electric currency of motor is high.	1, 2, 4, 12, 22
J	Excessive vibration and loud noise.	1, 5, 8, 12, 22, 23, 25
K	Oil leaks.	21
L	Reduction gear is excessively heated.	12, 15, 22
M	Plunger movement is not smooth	24, 25

No.	Cause of Trouble	Troubleshooting
1	Defect of motor.	Replace.
2	Disconnection or bad connection of wire.	Connect or replace.
3	Power fuse is burnt out.	Check for cause and take countermeasure.
4	Voltage drop.	Check for cause and take countermeasure.
5	Insufficient NPSH (Cavitation).	Examine suction condition.
6	Check ball or ball seat is worn out.	Replace.
7	Valve(Check ball, ball seat, Ball guide) is clogged.	Disassemble and clean.
8	Suction discharge pipe or strainer is clogged.	Disassemble and clean.
9	Stroke length dial is shifted.	Readjust.
10	Shortage of minimum required differential pressure.	Install backpressure valve in the discharge pipe.
11	Fluctuation of pump stroke speed.	Check power supply, motor and reduction gear.
12	Overload (Excessive discharge pressure).	Check discharge line.
13	Improper power supply specification.	Check.
14	Air is sucked from suction line.	Inspect pipe and readjust.
15	Condition(Liquid, temperature, pressure, etc.) is changed.	Reexamine pump specifications.
16	Defect of pressure gauge.	Replace .
17	Dust is clogging mouth of pressure gauge.	Clean.
18	Leak from relief valve.	Readjust pressure setting of relief valve.
19	Defect of plunger and gland packing.	Check and replace.
20	Defect of gasket in Valve.	Replace.
21	Defect of oil seal and O-ring.	Replace.
22	Lubricating oil of dive unit is not proper.	Check oil quantity and stain.
23	Large clearance between gland packing	Tight the gland nut
24	Large clearance between plunger nut	Re-adjust the clearance between set plunger and plunger
25	Gland nut over-tightened	Re-adjust properly.

13 Replacement of Parts

⚠ Caution

- Wear safety equipments certainly, because the remained liquid in pump internal may be flowed when disassembly or assembly.

※ Refer to the name of the components in section 18 'Structure and Name of Each Parts' for disassembly and assembly.

13-1 Replacement of valve set

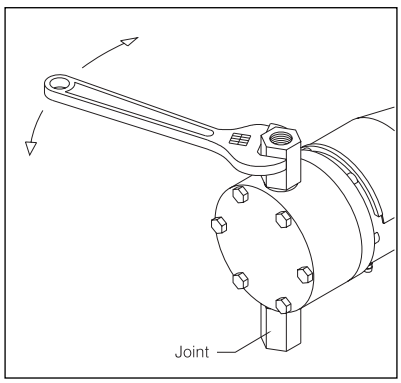
Valve set consists of ball guide, checkball, ball seat, gasket (valve), and double valve set composed in inlet & outlet respectively. Seam plate (valve) is placed between valve sets.

[1] Disassembly

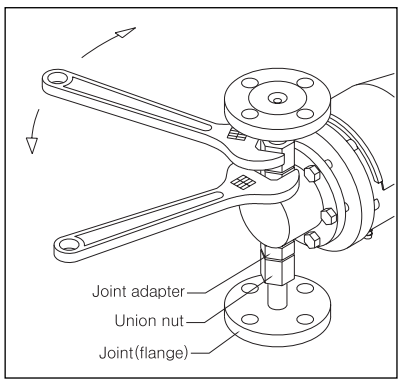
① Disconnect suction and discharge pipes.

② Loosen the joints (upper and lower threads) with spanner in case of threaded type.
Loosen the union nut of joints (flange) with spanner in case of flanged type. For KP-061□ ~ 222□ types, loosen the union nut by holding joint adapter.

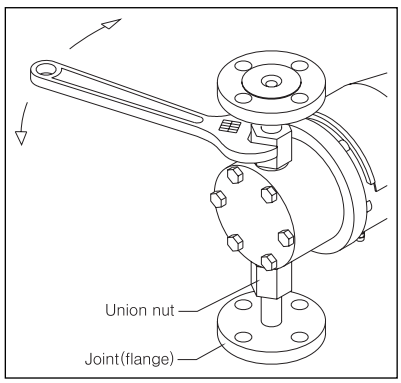
● Threaded joint type



● Flanged joint type(KP-061□~222□)



● Flanged joint type(KP-301□~502□)



③ Valve set should be removed from head carefully for avoiding any breakage or loss caused by dropping the parts from the valve set.

④ Replace any defected or worn parts with new ones.

[2] Assembly

⚠ Caution

- Assembly correctly according to sequence(top:ball guide, middle:checkball, bottom:ball seat). If the sequence is wrong, liquid flow backward and pump may be damaged.

① Assemble the valve set and seam plate (valve) to the head after referring to structure and name of each parts section

② Tighten the valve set combined with suction and discharge fittings.

③ If gasket (valve) parts are damaged, it could be lead to liquid leakage after tightening procedure.

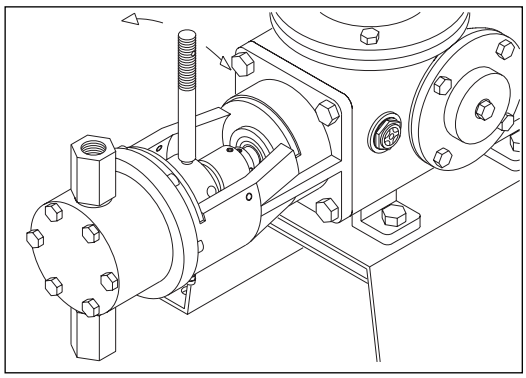
④ Connect suction and discharge pipes

13-2 Replacement of Plunger or Gland Packing

[1] Disassembly

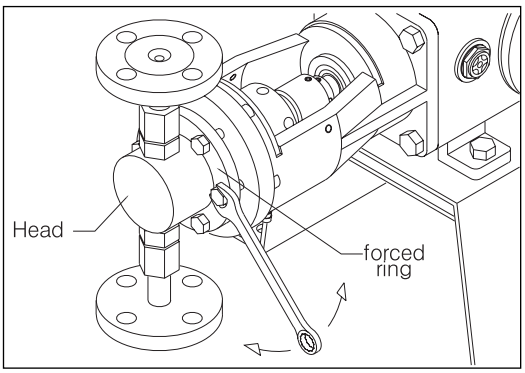
① Disconnect the suction and discharge pipes.

② Disassemble bolts connected to bracket cover side by using driver and remove the bracket cover.
③ Unfasten the gland nut by rotating it clockwise from the front of pump with using gland nut setting tool.

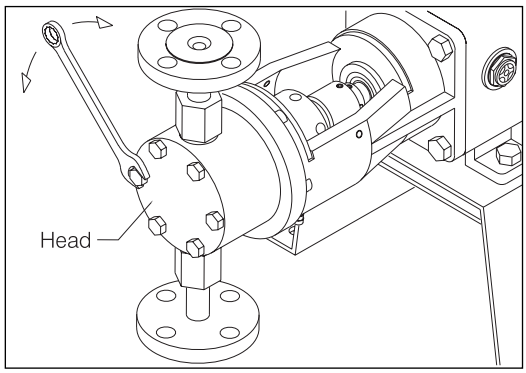


④ Unfasten the bolt firmly connected to pump head by using spanner and remove it. In such case, the bolt is pulled out smoothly by turning the head from right to left direction repetitively.

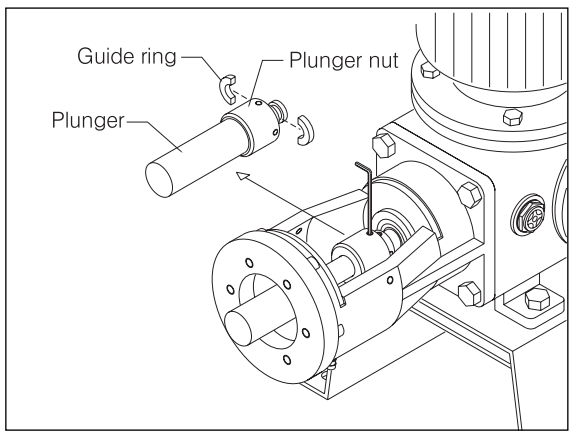
● KP-061□~222□



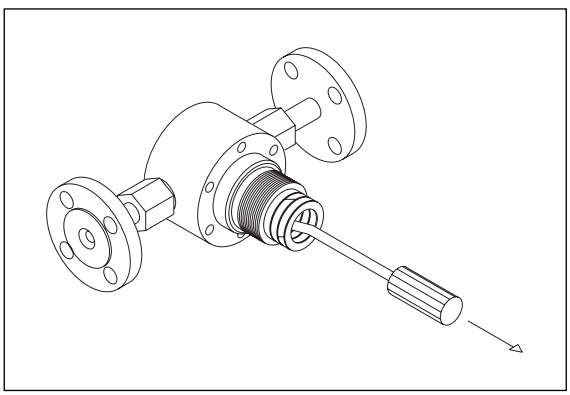
● KP-301□~502□

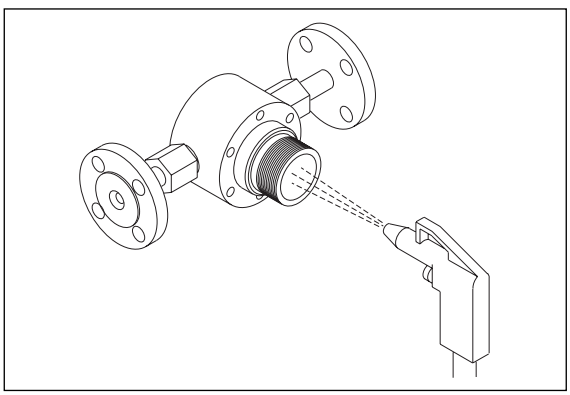


⑤ Loosen the set screw, which fix in plunger nut by using hexagonal rod wrench, and then remove the set plunger by rotating the plunger nut to counter-clockwise from the front view of the pump.
⑥ Remove plunger and guide ring from the plunger nut. As guide ring is fixed to plunger groove, it should be removed carefully without dropping it on the floor.
⑦ Inspect the surface condition of plunger. If plunger is defected, replace it when new one or if plunger condition is fine, clean it.
⑧ Unfasten the gland nut completely from the pump head and remove gland ring out.



⑨ Pull out the gland packing and spacer (packing), which have been used for pump head, then,take care of any damage to the internal side of the head.



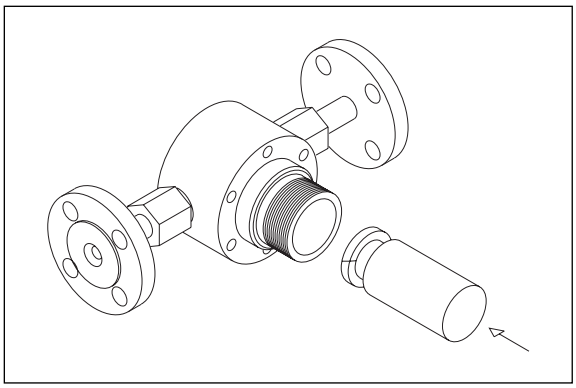


⑩ After removing all gland packing, cleans inside of the pump head. If any worn gland packing is adhering to the inside of pump head, remove it complately with the fine sandpaper over #400 .

⑪ Clean-up the spacer (packing) for reusing.

2 Assembling

① Insert new spacer (packing) and gland packing into pump head. In this case, insert in order of spacer and packing by one piece using plastic rod of external diameter smaller than gland packing. Cut section of gland packing should be inserted intersection each other of 90° .



Note) During insert procedure of gland packing, do not put the gland packing compulsorily with sharp point of driver & etc.

② Place the gland ring in pump head and tight with gland nut.

③ For plunger, install the set plunger fixing the guide ring into the groove of plunger after inserting the plunger nut.

④ Install the pump head to bracket. For smooth inserting, rotate the head from right to left.

⑤ After inserting the pump head into the bracket ends, adjust the inlet and outlet position with vertical, and tight the fixing bolt of the head. Bolts should be tightened in order of diagonal with balanced force (torque).

Model	KPV,H-061□~122□	KP-16□□	KP-221□~502□
Torque N·m(kgf·cm)	7.4(75)	9.8(100)	14.7(150)

⑥ Fixation of plunger nut and set plunger refer to self-aligning instrument section.

⑦ First, tight the gland nut firmly by the tool for fixing gland nut and gland packing should be placed in pump head rightly, and then loosen the gland nut and tight them again properly by hand.

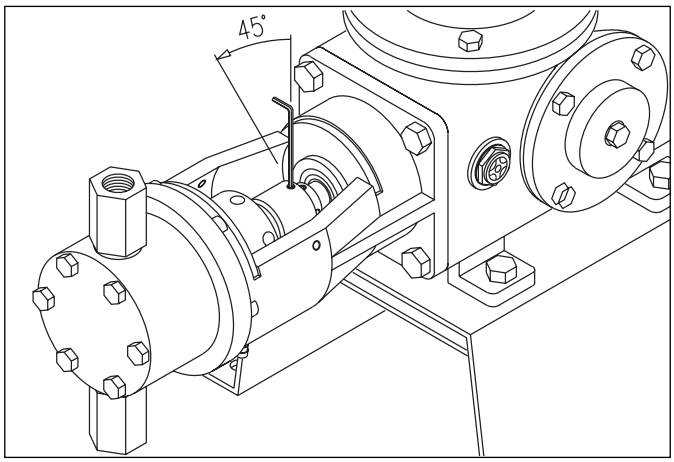
⑧ Install the suction and discharge pipes. When a number of gland packing is greater than an appropriate quantity or gland nut have not been tightened yet then gland nut end and plunger nut end can be met each other(in some cases, parts can be damaged) during pump operation. Therefore, prior to pump operation, return the dial to stroke distance of 0% and then check whether parts are met each other or not.

13-3 Self-aligning adjustment

1 Fix the plunger nut until it reaches to set plunger completely by rotating clockwise.

2 From this position, unfasten the plunger nut to counter-clockwise direction by 1/8(45°) circles. Reduction of life cycle of gland packing and decreasing discharge volume may result from no unfastened plunger nut, or excessively unfastened plunger nut

3 From this point, fix the plunger nut either thread hole with set screw by using hexagonal rod wrench.



14 Consumable Parts

14-1 Consumable Parts

Parts No.	Parts Name	Q' ty for one pump head	Replacement Period
2	Check Ball	4	1 year
3	Ball Guide	4	2 year
4	Ball Seat	4	1 year
10	Gasket(Valve)	12	1 year
87	Gland Packing	1 set	6 month
89	Plunger	1	1 year
237	Oil Seal	1	2 year

※ Replacement period is forecast, not guarantee. The period is subject to condition of using.

14-2 The proper quantity of Galnd packing · Spacer(packing)

Quantity / Model	Gland Packing	Spacer(Packing)
KPV,H-06□□	10	11
KPV,H-12□□	8	9
KPV,H-16□□	8	9
KPV,H-22□□	8	9
KPV,H-30□□	7	8
KPV,H-40□□	6	7
KPV,H-50□□	5	6

15 Warranty

⚠ Waming

- CheonSei will not warrant if the pump is reconstructed arbitrarily or used by other parts except specified parts. And be cautious not to be compensated for a various expense happened by a accident and trouble.

1 CheonSei will warrant all products to be free of defects in material or workmanship for a period of eighteen(18) months from date of shipment or one(1) year from the date of installation, whichever occurs first.

2 During guarantee period repair or change of pump is free of charge, if trouble or damage of pump due to design or manufacturing of CheonSei.

※ Consumable parts are excluded.

3 Repair or change for pump having a trouble or damage caused by the following reasons should be charged regardless of the guaranteed period.

① Trouble or damage of pump expired guarantee period
② Trouble of using by careless handling
③ Trouble or damage due to repair or reconstruction by person except by CheonSei or designated by CheonSei.
④ Trouble by inevitability of fire or natural calamity

16 Repair Service

⚠ Caution

- Prior to sending the pump for repair, wash the pump head's internal clearly.
- Do not return the pump if the pump has been used with harmful and fatal liquids to health.

1 Contact to A/S Department of CheonSei or Local Distributor as shown on back of the manual when occurred abnormal of pump or has inquiry.

2 Inform following items when request repair of pump.

① Model Name and Production No. as shown on name plate of pump

② Used period and using condition, status, transfer liquid

3 Inquire to Local Distributor whether charge or not for repair when expired guarantee period of pump.

4 Minimum retain period of performance parts for repair of CheonSei is 5 years from the date of production.

17 Accessory

1 Back Pressure Valve

In case that overfeed or siphon phenomena is occurred, according to piping condition, a discharge liquid flows with a excessive quantity during operation, or liquids flows continuously despite stoppage of pumping.

2 Safety Valve(Relief Valve)

This is the valve to be opened automatically when the pressure in the piping is occurred excessively. Usually, the excessive pressure could be occurred , in case that alien material is entered into inside of discharge piping or valve is closed on discharge piping.

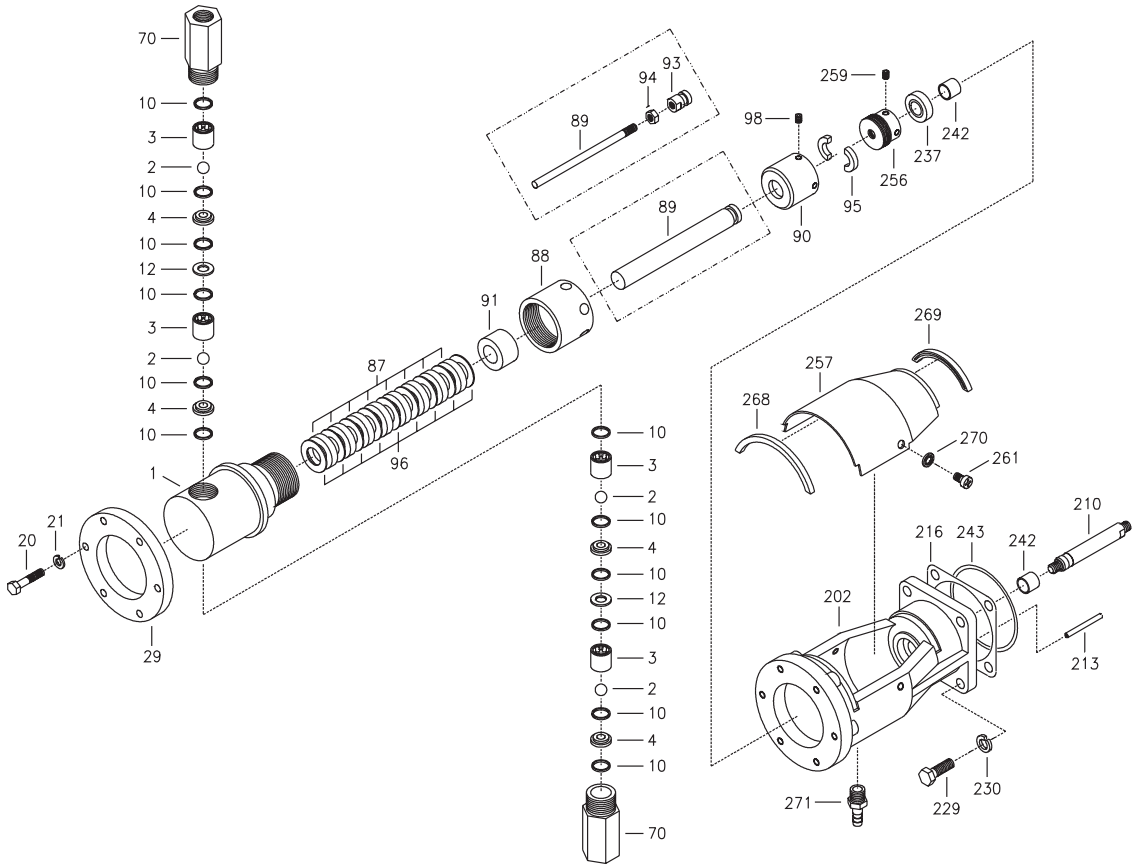
3 Air Chamber(Accumulator)

Usually, a reciprocating pump has a peculiar pulsation which results in vibration of piping and overfeed phenomena. Air Chamber will be used to solve such a problem caused by pulsation.

18 Structure and Name of Each Parts

18-1 Thread tpye

□ Model : KPV,H-061□~222□



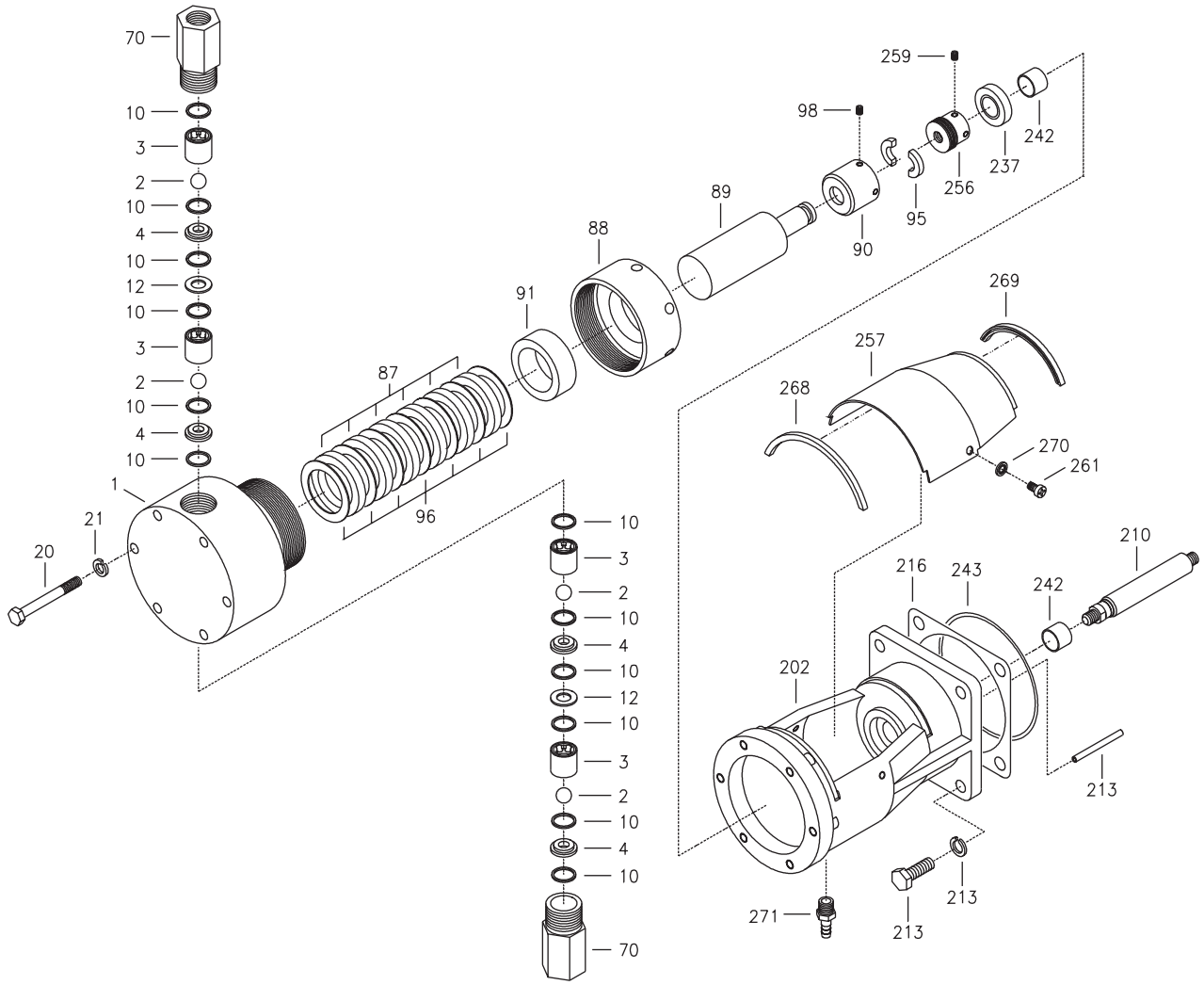
NO.	Parts Name	Q' ty
1	Head	1
2	Check ball	4
3	Ball guide	4
4	Ball seat	4
10	Gasket(Valve)	12
12	Shim plate(Valve)	2
20	Bolt(Hex.)	6
21	Washer(Spring)	6
29	Force ring	1
70	Joint	1
87	Gland packing	1set
88	Gland nut	1

NO.	Parts Name	Q' ty
89	Plunger	1
90	Plunger nut	1
93(1)	Plunger adapter	1
94(1)	Nut(Hex.)	1
95	Guide ring	2
96	Spacer(packing)	1set
98	Set screw	1
202	Bracket	1
210	Slider shaft	1
213	Spring pin	1
216(2)	Gasket"1"	1
229	Bolt(Hex.)	4

NO.	Parts Name	Q' ty
230	Washer(spring)	4
237	Oil Seal	1
242	Bearing(Dry)	2
243(2)	O-ring	1
256	Set plunger	1
257	Bracket cover	1
259	Set screw	1
261	Bolt(Pan head+)	2
268	Gasket(cover)"A"	1
269	Gasket(cover)"B"	1
270	Washer(Seal)	2
271	Hose nipple	1

Note) 1. Applicable only for KPV,H-061 □ ,062 □ .
2. #216 is applied to 0.2kW driving unit and #243 to 0.4kW driving unit respectively.

2 Model : KPV,H-301□~502□



NO.	Parts Name	Q' ty
1	Head	1
2	Check Ball	4
3	Ball Guide	4
4	Ball Seat	4
10	Gasket(Valve)	12
12	Shim plate(Valve)	2
20	Bolt(Hex.)	6
21	Washer(Spring)	6
70	Joint	1
87	Gland packing	1set
88	Gland nut	1

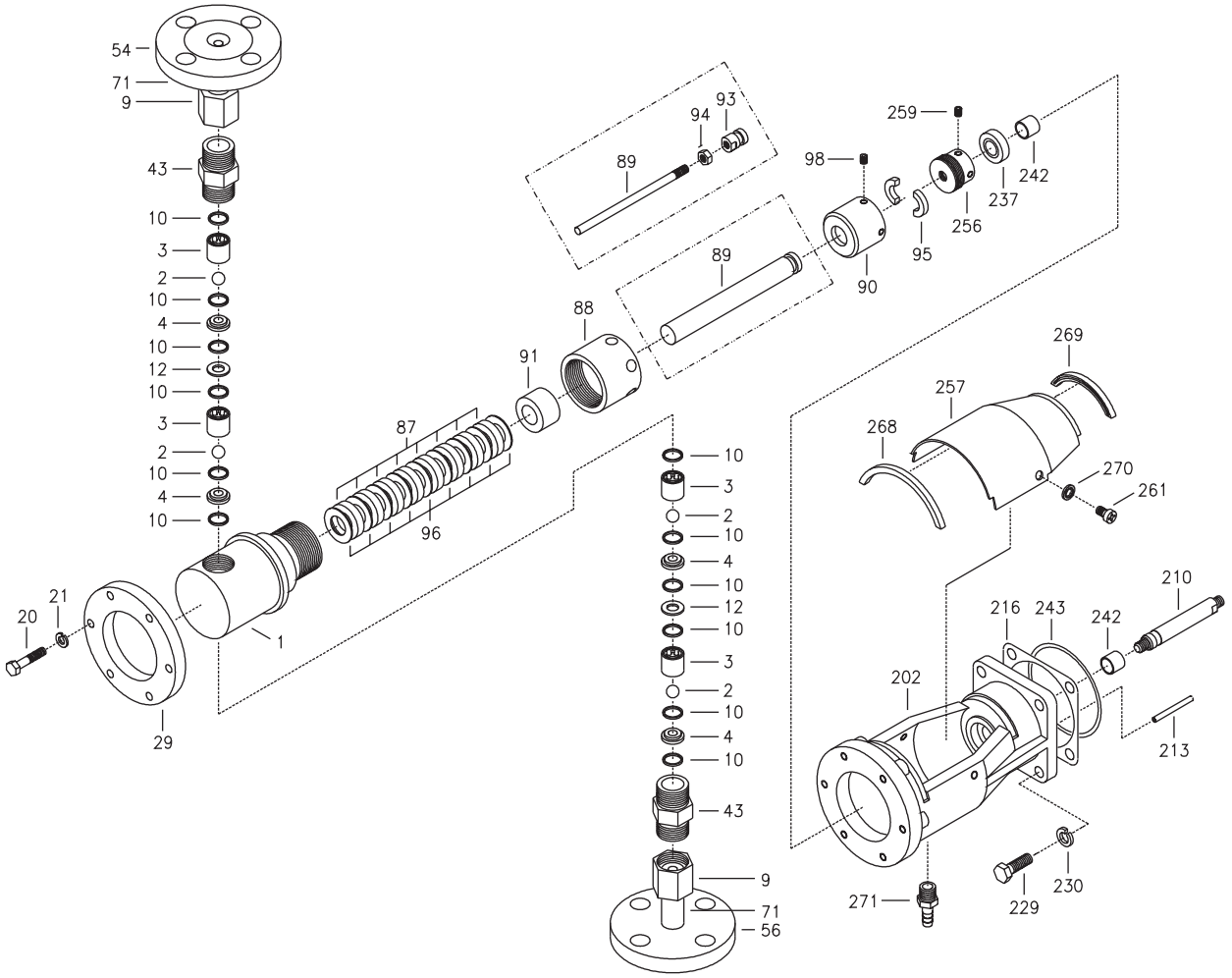
NO.	Parts Name	Q' ty
89	Plunger	1
90	Plunger nut	1
95	Guide ring	2
96	Spacer(packing)	1set
98	Set screw	1
202	Bracket	1
210	Slider shaft	1
213	Spring pin	1
216(1)	Gasket"1"	1
229	Bolt(Hex.)	4
230	Washer(Spring)	4

NO.	Parts Name	Q' ty
237	Oil seal	1
242	Bearing(Dry)	2
243(1)	O-ring	1
256	Set plunger	1
257	Bracket cover	1
259	Set screw	1
261	Bolt(Pan head+)	2
268	Gasket(cover)"A"	1
269	Gasket(cover)"B"	1
270	Washer(seal)	2
271	Hose nipple	1

notice) #216 is applied to 0.2kW driving unit and #243 to 0.4kW driving unit respectively.

18-2 Flange type

[ ] Model: KPV,H-061□~222□



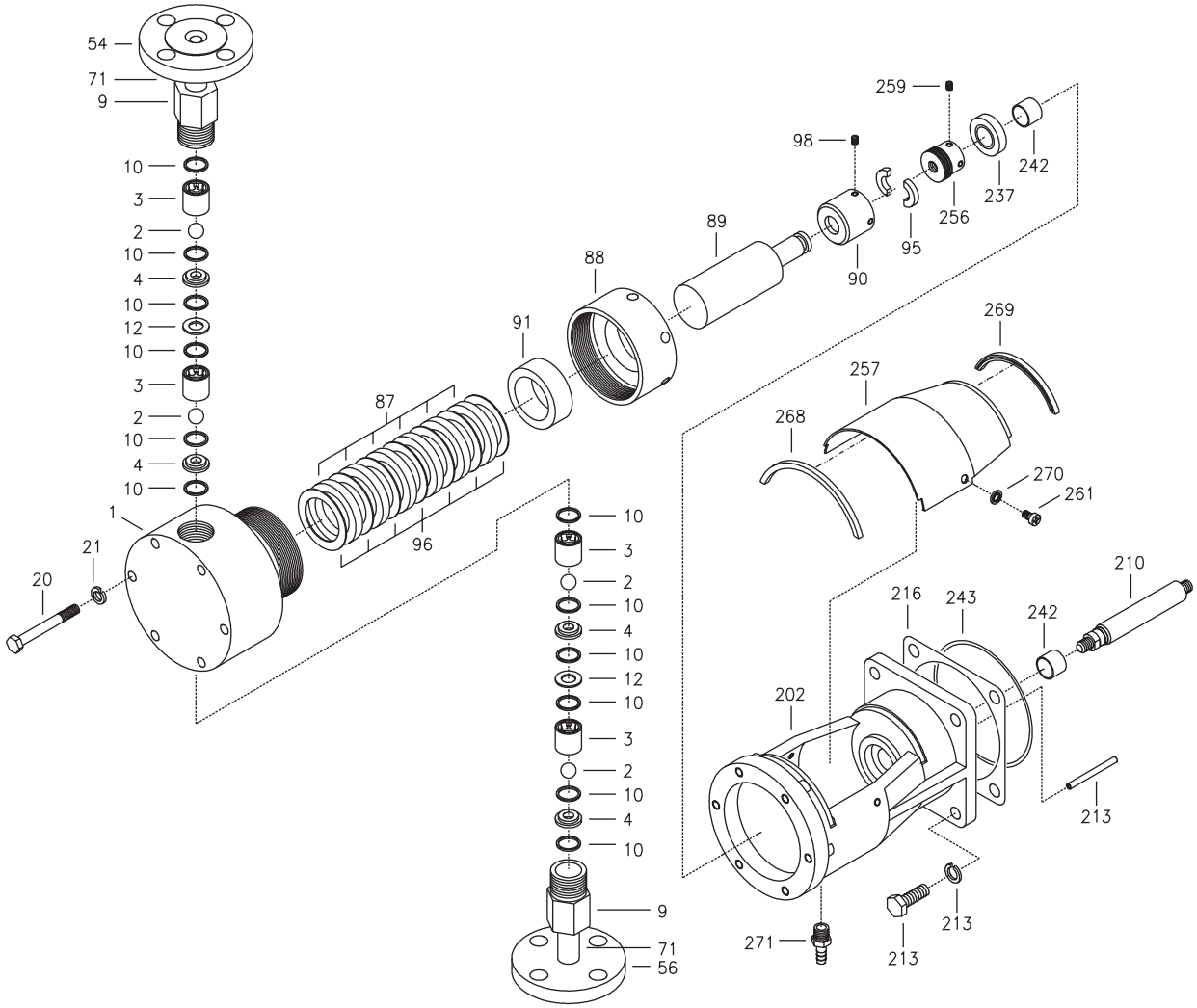
NO.	Parts Name	Q'ty
1	Head	1
2	Ceck ball	4
3	Ball guide	4
4	Ball seat	4
(9)	Union nut	(2)
10	Gasket(valve)	12
12	Shim plate(valve)	2
20	Bolt(Hex)	6
21	Washer(Spring)	6
29	Forced ring	1
43	Joint adapter	2
(54)	Flange	(1)
(56)	Flange	(1)
(71)	Joint pipe	(2)

NO.	Parts Name	Q'ty
9,54,71	Joint(Flange)	1set
9,56,71	Joint(Flange)	1set
87	Gland packing	1set
88	Gland nut	1
89	Plunger	1
90	Plunger nut	1
93(1)	Plunger adapter	1
94(1)	Nut(Hex.)	1
95	Guide ring	2
96	Spacer(packing)	1set
98	Set screw	1
202	Bracket	1
210	Slider shaft	1
213	Spring pin	1

NO.	Parts Name	Q'ty
216(2)	Gasket"1"	1
229	Bolt(Hex.)	4
230	Washer(Spring)	4
237	Oil seal	1
242	Bearing(Dry)	2
243(2)	O-ring	1
256	Set plunger	1
257	Bracket cover	1
259	Set screw	1
261	Bolt(Pan head+)	2
268	Gasket(cover)"A"	1
269	Gasket(cover)"B"	1
270	Washer(seal)	2
271	Hose nipple	1

Note) 1. Applicable only for KPV,H-061□,062□.
2. #216 is applied to 0.2kW driving unit and #243 to 0.4kW driving unit respectively.

2 Model : KPV,H-301□~502□



NO.	Parts Name	Q' ty
1	Head	1
2	Check ball	4
3	Ball guide	4
4	Ball seat	4
(9)	Union nut	(2)
10	Gasket(valve)	12
12	Shim plate(valve)	2
20	Bolt(Hex.)	6
21	Washer(Spring)	6
(54)	Flange	(1)
(56)	Flange	(1)
(71)	Joint pipe	(2)
9,54,71	Joint(Flange)	1set

NO.	Parts Name	Q' ty
9,56,71	Joint(Flange)	1set
87	Gland packing	1set
88	Gland nut	1
89	Plunger	1
90	Plunger nut	1
95	Guide ring	2
96	Spacer(packing)	1set
98	Set screw	1
202	Bracket	1
210	Slider shaft	1
213	Spring pin	1
216(1)	Gasket"1"	1
229	Bolt(Hex.)	4

NO.	Parts Name	Q' ty
230	Washer(Spring)	4
237	Oil seal	1
242	Bearing(Dry)	2
243(1)	O-ring	1
256	Set plunger	1
257	Bracket cover	1
259	Set screw	1
261	Bolt(Pan head+)	2
268	Gasket(cover)"A"	1
269	Gasket(cover)"B"	1
270	Washer(seal)	2
271	Hose nipple	1

notice) #216 is applied to 0.2kW driving unit and #243 to 0.4kW driving unit respectively.

2007. 7. 30.

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