KEMPION

CE SPEC KAB ISO 9001 Certified Company
KAB-QC-18

Diaphragm Metering Pumps

KD Series

Instruction Manual

전세산업 (주)

Instruction

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

Warranty

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. Any customer complaints will be reviewed by CHEONSEI. CHEONSEI will provide such technical advice and assistance as necessary to resolve customer complaints on a timely basis.

3. CHEONSEI's liability for any breach of this warranty shall be limited solely to replacement or repair at the sole option of CHEONSEI of any part or parts found to be defective during the warranty period, provided the product is properly installed and is being used as originally intended.
The customer must notify CHEONSEI of any breach of this warranty within the above mentioned warranty period.
Defective parts must be shipped by customer or Agency to CHEONSEI's point of manufacture, transportation charges prepaid.

We will make every efforts to minimize losses and damage resulting from defect. However, please bear in mine that we cannot guarantee against damage resulting from problems with consumable parts, unsuitable or incorrect operation, or natural disaster, etc.

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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 : 0~50℃ where head materials are PVC, PP, PVDF.
  0~80℃ where head materials are SS304, SS316.
  Piping Pressure : below maximum discharging pressure indicated on the specifications.

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.
- 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.
- 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 ?
5 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 Hose ..... 3 M (for only for hose connection type)
4 Strainer foot valve..... 1 set (for only hose connection type, but KD-13H, 23H are exceptions.)
5 Anti-siphon check valve ..... 1 set (for only hose connection type, but KD-13H, 23H are exceptions.)

3 General

This is diaphragm 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

K	D	V	-	□	-	3	3	H	-	P	T	C	-	F	W	S
❶		❷		❸		❹A	❹B	❺		❻A		❻B	❻C	❼	❽	❾

❶ Series Name : KD Diaphragm type

❷ Construction
- V : Vertical
- H : Horizontal

❸ Option
- No mark : No Option
- A : BLDC M/C UNIT
- E : Air relief Valve
- F : Relief Valve

❹ Nominal Capacity
(example)
$A \times 10^B \Rightarrow 3 \times 10^3 = 3000$(mL/min)

❺ Discharge Pressure Rank
- H : High
- M : Middle
- L : Low
- S : Special

❻ Liquid End material
- A : Head Material
  - P : PP(PVC) F : PVDF(PTFE)
  - S : SSC13A 6 : SSC14A
- B : Diaphragm Material
  - T : PTFE E : EPDM
- C : Check Ball Material
  - C : CERAMIC S : SS316 6 : SS316

❼ Connection Type
- F : Flange
- H : Hose(For only hose connection type, please consult with a CHEONSEI's representative)
- T : Thread
- X : Special

❽ Viscosity Limit
- W : Standard
- V : High viscosity

❾ Power Supply
- S : 3Ø 220/380V 60㎐
  3Ø 440V 60㎐
- X : Other

5 Specifications

Model	Max.capacity (mL/min)		Max.discharge pressure (bar)	Stroke number (SPM)		Diameter of diaphragm (mm)	Stroke length (mm)	Connection				Motor (kW)	Weight(kg) Verti. (Horiz)
								Hose		Flange	Thread		
	50Hz	60Hz		50Hz	60Hz			PVC	PTFE				
KD-21H	20	25	10	48	58	30	3	Ø6×Ø11	Ø10×Ø12	KS10K15A	-	0.2	14(17)
KD-61H	50	60	10	48	58	36	4						
KD-12H	100	120	10	96	116	36	4						
KD-22H	210	260	10	48	58	55	6	Ø12×Ø18			Rc3/8		15(18)
KD-52H	420	520	10	96	116	55	6						
KD-82H	700	840	10	96	116	68	5						
KD-13H	850	1020	10	48	58	100	6		Ø12×Ø14		Rc1/2		17(20)
KD-23H	1700	2040	8	96	116	100	6						
KD-33L	2900	3480	5	48	58	130	10	-		KS10K25A	Rc1		19(22)
KD-43L	3400	4100	5	96	116	130	6						
KD-73L	6200	7440	3	96	116	130	10						
KD-53L	4800	5800	5	96	116	130	8					0.4	20(22)
KD-63L	5450	6550	4	96	116	130	9						
KD-33H	2900	3480	10	48	58	130	10	-		KS10K25A		0.4	47(51)
KD-73H	6200	7440	7	96	116	130	10						
KD-43H	3600	4400	8	48	58	145	10	-		KS10K25A	Rc1	0.4	40(44)
KD-63H	5500	6600	7	48	58	145	15						
KD-93M	7500	9100	5	96	116	145	10						
KD-14N	9800	11800	4	96	116	145	12.5						
KD-14M	11500	13800	5	96	116	145	15					0.75	42(46)
KD-14H	9000	10800	7	48	58	177	17.5	-		KS10K40A	-	0.75	86
KD-14G	13300	16000	5	96	116	177	12.5						86
KD-24L	18400	22000	3	96	116	177	17.5						86
KD-24S	23300	28000	3	96	116	195	17.5						89
KD-24H	18400	22000	7	96	116	177	17.5	-		KS10K40A	-	1.5	88
KD-34H	26600	32000	5	96	116	195	20						92
KD-54L	45000	54000	3	96	116	250	20			KS10K50A			100

Note) 1. Max. capacity are tested under the condition as follows.
-Temperature : ambient - Liquid : Potable water -Discharge pressure : Max. discharge pressure.
2. The effective range of discharge volume adjustment is 20% upto 100% of max. capacity.
3. Self-priming capacity is 1m or less in full stroke operation.
4. The contents on this data may be revised for improvement without prior notice.
5. Thread connection is available only for P□□ liquid end materials.

6 Materials of Standard Liquid End

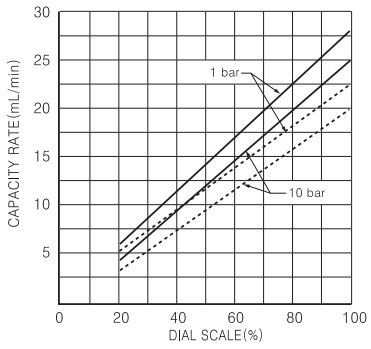
Materials(standard) / Parts Name	Nominal capacity	PTC(PES)		FTC		STS(6T6)		
		21H~82H	13H~54L	21H~14M	14H~54L	21H~82H	13H~14M	14H~54L
① Head		PP	PVC	PVDF	PVDF(PTFE)	SSC13A(SSC14A)		
② Diaphragm		PTFE(EPDM)		PTFE		PTFE		
③ Check Ball		CERAMIC(SS304)		CERAMIC		SS316		
④ Ball Guide		PP	PVC	PVDF		PVDF	SSC14A	
⑤ Ball Seat		FKM(EPDM)	PVC	PTFE(PVDF)		PTFE	SS316	
⑥ Joint		PP	PVC	PVDF		SSC13A(SSC14A)		
⑦ O-Ring,Packing		FKM(EPDM)		PTFE		PTFE		

Note) 1. Material other than standard can be used for special purpose pump.
Please contact us or distributor in your area.

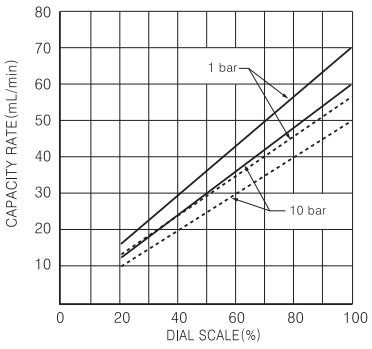
7 Performance Curves

Condition : Room temperature, Clean water, Suction head - 1m ——— 60Hz ------- 50Hz

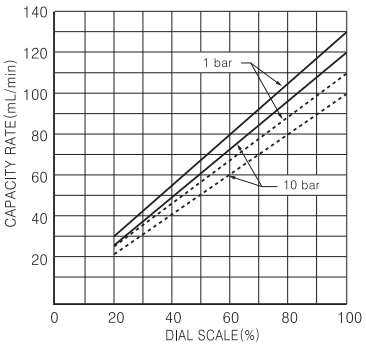
● KD-21H



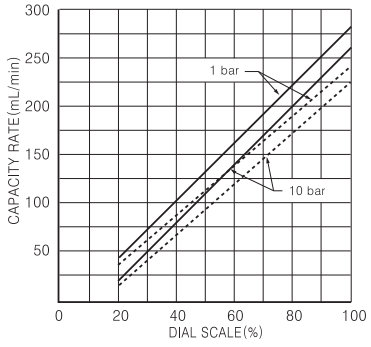
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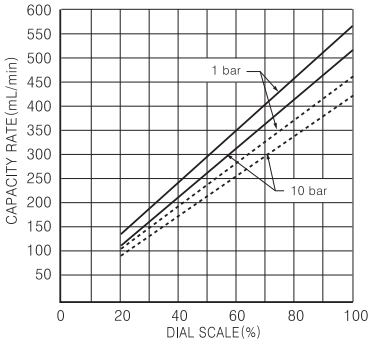
● KD-12H



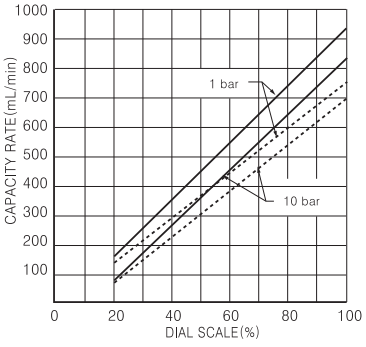
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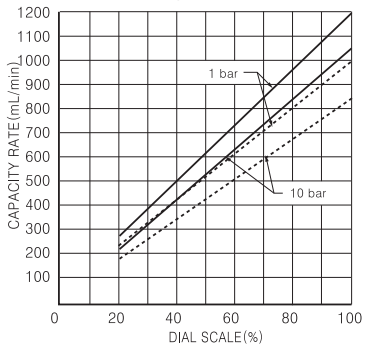
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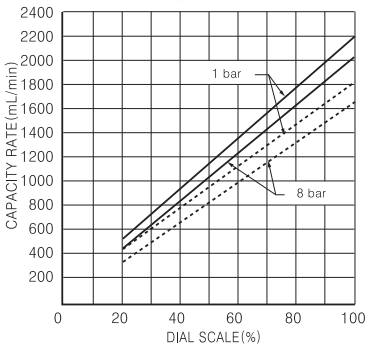
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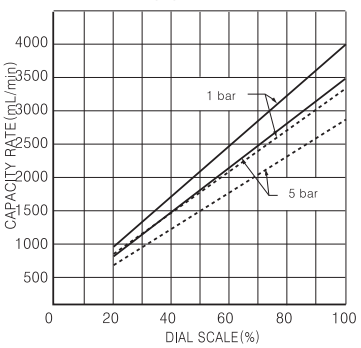
● KD-13H



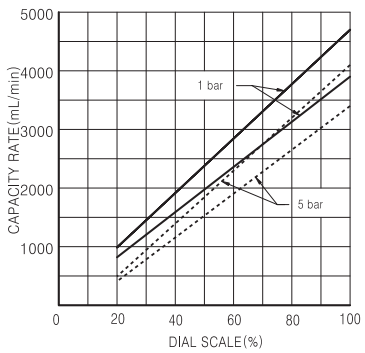
● KD-23H



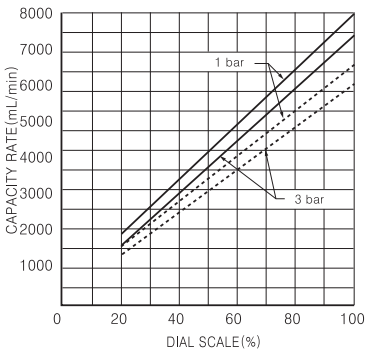
● KD-33L



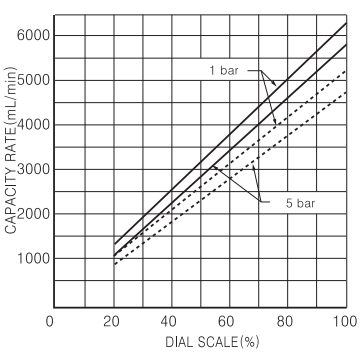
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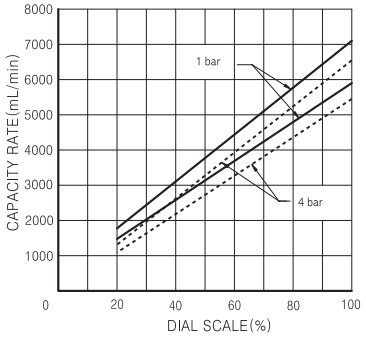
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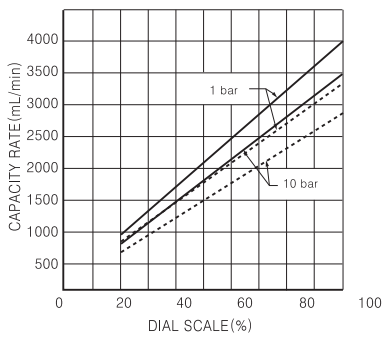
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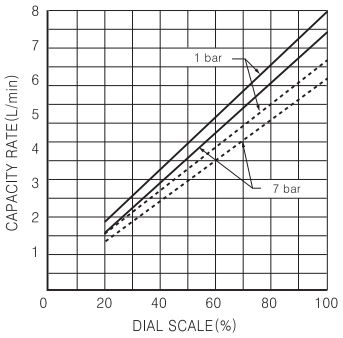
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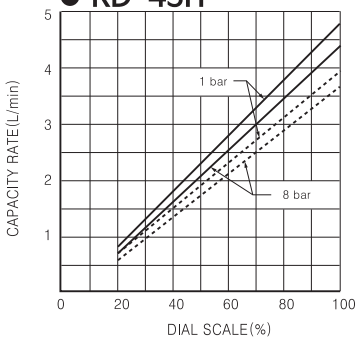
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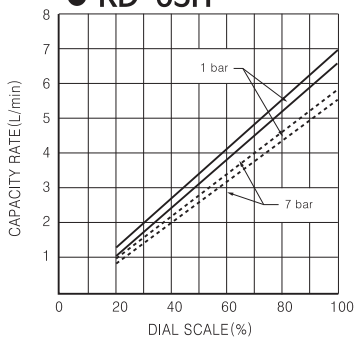
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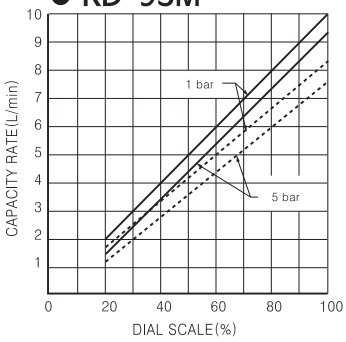
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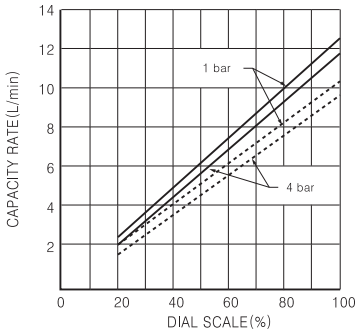
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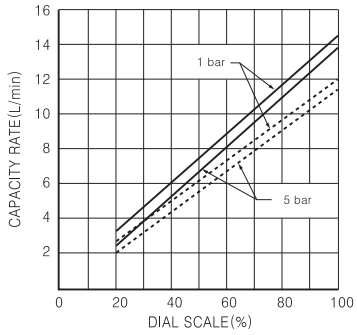
● KD-93M



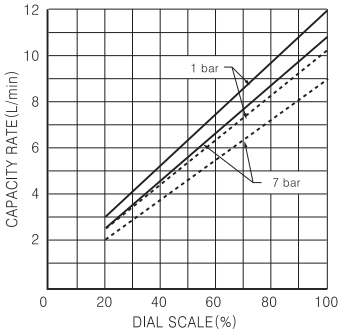
● KD-14N



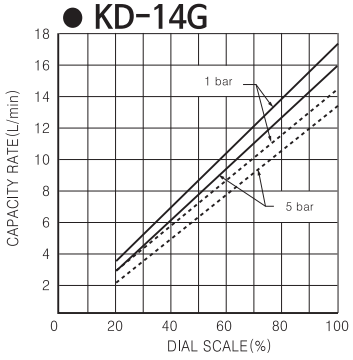
● KD-14M



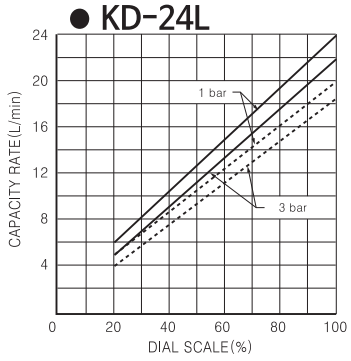
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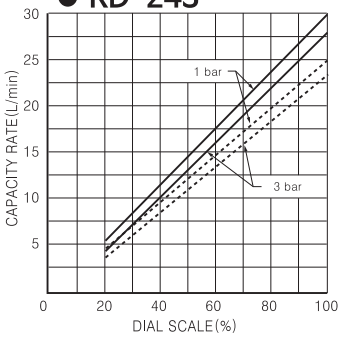
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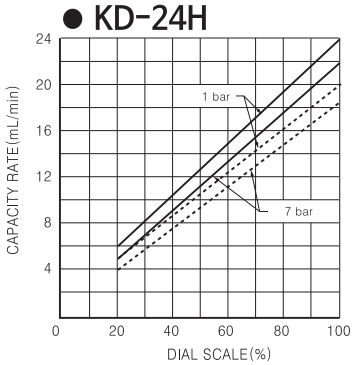
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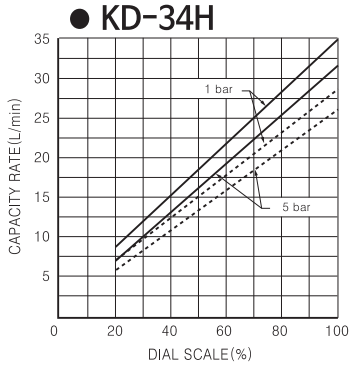
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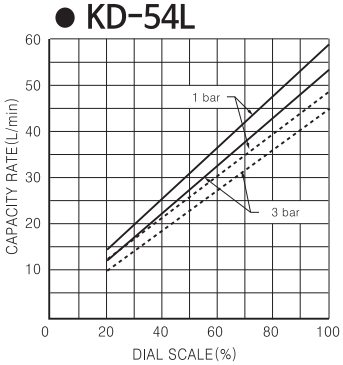
● KD-24H



● KD-34H



● KD-54L

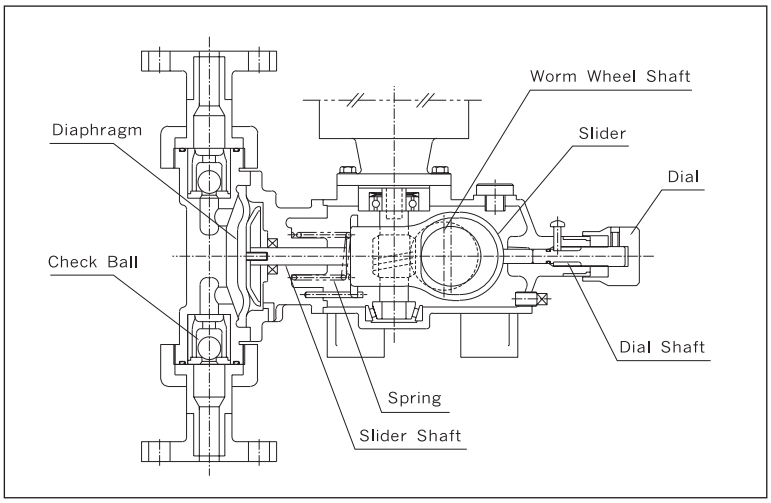


Note) The performance curves show examples at our testing facility under regular conditions. Performance curves can be somewhat different at each local site. Please measure the discharge capacity under the operation conditions, and adjust the stroke length dial on its performance curves.

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 diaphragm by the slider shaft which is connected to the diaphragm directly, hereby operating the pump owing to the change the volume of diaphragm 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.

9 Installation

9-1 Place of Installation

⚠ Caution

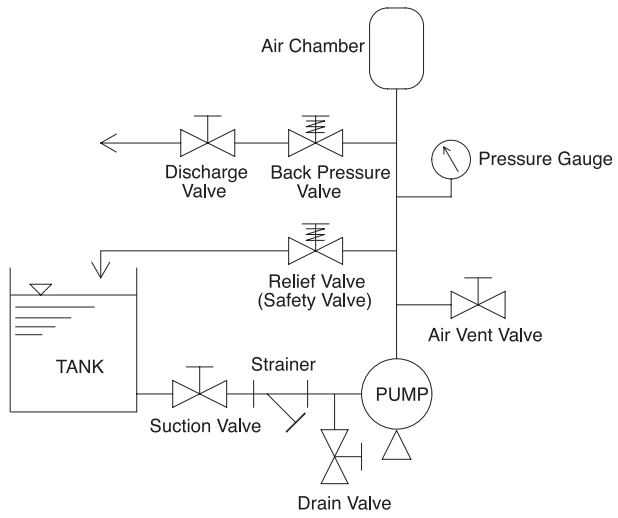
- Do not install the pump in place which ambient temperature is high (above 40℃) or lows down below freezing point, pump internal may be damaged.
- Do not install pump in place with heavy moisture and dust, or in place with rain, and wind, electric shock and trouble may be caused. (exception of outdoor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

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 sedimental slurry, do not make a U-shaped bend in the middle of the pipe distribution system.

Recommended piping plan



6 When feeding a viscous liquid, poisonous liquid or coagulative liquid, provide a washing pipe line for maintenance and inspection.
7 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.
8 When using the adhesive for PVC piping, please do not allow to soak the adhesive into the pump.
9 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.
10 The reciprocating pump should be provided with a safety valve. Be sure to fit a safety valve to the discharge pipe near the pump.
11 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.

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.

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.
- Connect power of motor to set rotation direction, reverse rotation of motor may be caused trouble.

1 Standard motor of pump is a combination 3 phase 220/380V and 440V.
2 Connect wiring for using power with reference to wiring diagram on name plate or terminal box cover attached on motor.
3 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.
4 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 ←

Note) For one phase motor and special motor, the wiring is different slightly. Separated discussion is requested for above.

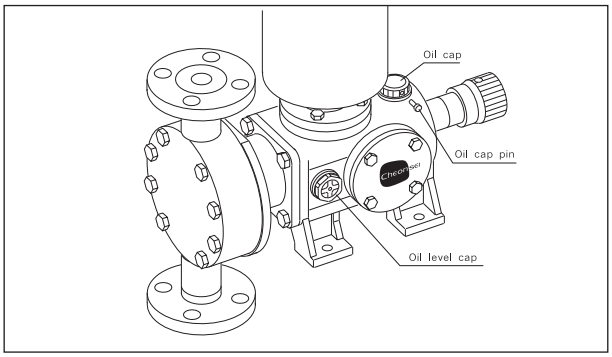
10 Operation

10-1 Preparation

⚠ Caution

- It is dangerous due to damage of piping with pressure rising and liquid spout when alien materials is inserted in valve on discharge piping of pump.
- In case of using of dangerous liquid, wear safety equipments(safety gloves, mask, safety glasses, resistant cloth for liquid) certainly.
- 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

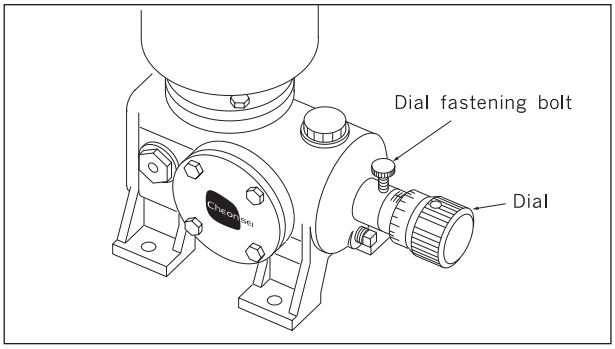
⚠ Caution

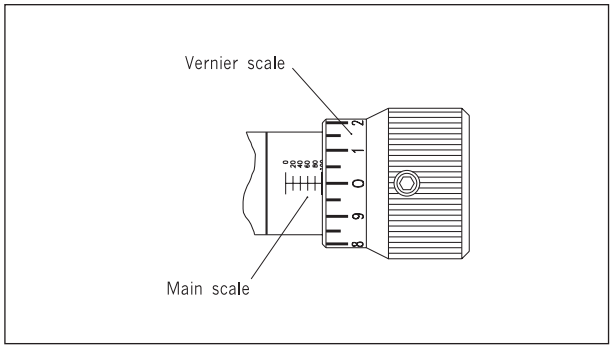
• Be careful not to turn dial gauge below 0% or above 100%.

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).

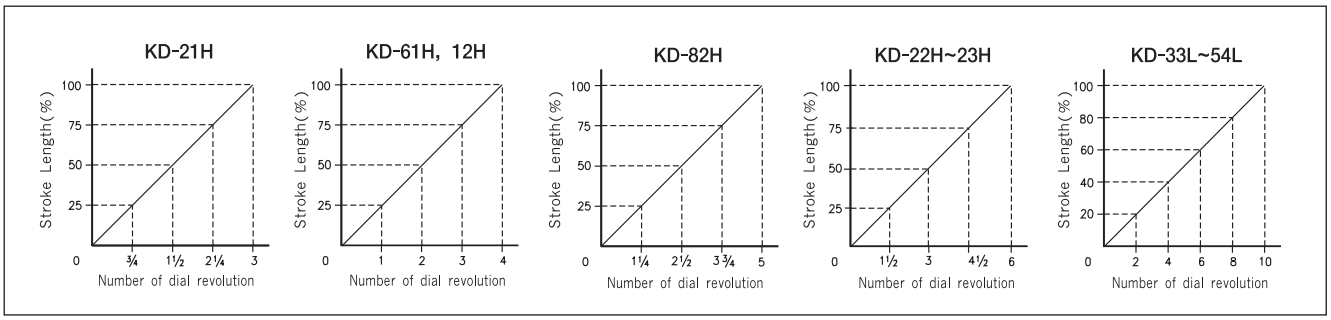
2 Loosen of dial shaft setting bolt.





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 operating amount of diaphragm, 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

⚠ Warning

• 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%.

4 Continue to run the pump for a warm-up period of 30 to 60 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.

5 Purge the internal air of the pump be supplying a liquid into the pump, opening the air vent valve of the discharge pipe or by gradually increasing the stroke length in such a manner that no pressure is applied to the discharge side.(Please refer to the recommended piping plan. Article 9-2)

6 Set the stroke length at 100% and run the pump for a warm-up period of 30 to 60 minutes.

7 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.

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 that the pump runs smoothly.
2 Check that the discharge volume and discharge pressure are not changed.
3 Check for no leakage in the liquid end.
4 Check the reduction gear and inside of gear box for oil shortage, leakage and dirt.
5 Check that the amperage of the motor is normal.
6 If spare pump is provided, run it from time to time. Also, keep up it well condition for running 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 Inspection of diaphragm
The diaphragm is an wearing part. It's service life varies according to the running condition of the pump. Inspect it every 1-2 months and if any deterioration is found at this time, replace it with a new one.

3 changing oil in the drive unit

① Oil change intervals
Change oil of the drive unit, every 12 months. However, when emulsification or deterioration of the oil is found, immediately change the oil.

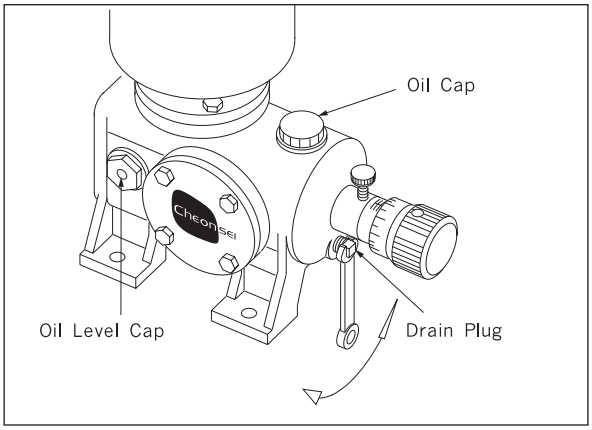
② Recommended oil quantity

MODEL	KD-21H~73L	KD-33H~14M	KD-14H~24S	KD-24H~54L
Oil Quantity	250 mL	1.2 L	2.7 L	3.5 L

③ How to change oil in the drive unit
First, remove the oil cap and drain plug, and drain the used oil. Next, clean the inside with flushing oil.
Then, supply new oil up to the specified level of the oil gauge.

④ Recommended oil
Omala oil(#220) of Shell company (※)
Mobilgear oil (#220) of Mobil company
Other ISO VG220, SAE90 density equivalent gear oil

Note) (※) is used oil by CHEONSEI.



⚠ Caution

- Wear safety equipments not to touch skin and to enter into eye when oil handling.
- Keep oil in place which is to avoid flame or high temperature material and ventilate well.

12 Cause of Trouble and Troubleshooting

Causes / Troubles	Motor does not run.	Discharge quantity is short or excessive.	Discharge quantity is unstable.	Excessive amperage is applied to motor.	Liquid is not fed.	Discharge pressure does not rise.	Liquid leaks.	Excessive vibration and loud noise.	Oil leaks.	Reduction gear is excessively heated.	Liquid can not be sucked.	Remedies / Troubles
Coupling rubber is damaged.								○				Replace.
Defect of diaphragm.		○					○				○	Replace.
Defect of oil seal and O-ring.									○			Replace.
Lubricating oil of drive unit is not proper.				○				○		○		Check oil quantity and stain.
leak from safety valve.		○	○		○	○					○	Readjust pressure setting of safety valve.
Dust is clogging mouth of pressure gauge.						○						Clean.
Defect of pressure gauge.												Replace.
Liquid being treated is changed.		○	○		○							Reexamine pump specifications.
Air is sucked from suction line.		○	○		○	○					○	Inspect pipe and readjust.
Improper power supply specification.	○			○								Check.
Overload(Excessive discharge pressure)	○			○				○		○		Check discharge line.
Fluctuation in pump strokes.		○	○									Check power supply, motor and reduction gear.
Excessive feed due to shortage of minimum required differential pressure.		○	○									Examine minimum required differential .
Stroke length dial is shifted.		○										Readjust.
Suction discharge vavle, pipe or strainer is clogged.		○	○		○	○		○			○	Disassemble and clean.
Piping is clogged.		○	○		○						○	Disassemble and clean.
Ball seat is worn out.		○	○		○	○					○	Replace.
Insufficient NPSH(Cavitation)		○	○		○	○		○			○	Examine suction condition.
Voltage drop	○			○								Check for cause and take countermeasure.
Power fuse is burnt out	○											Check for cause and take countermeasure.
Disconnection or bad connection of wire	○			○								Connect or replace.
Defect of motor.	○			○				○				Replace.

13 Replacement of Parts

⚠ Caution

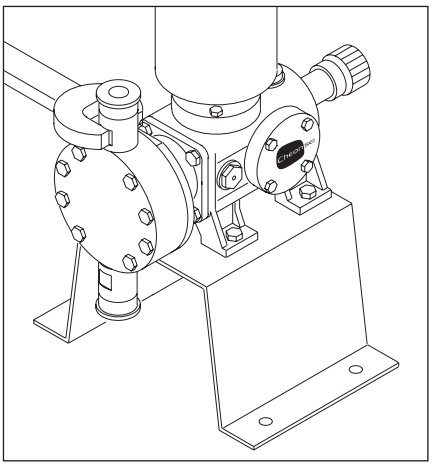
- Be carefully of handling for parts of heavy weight in case of large pump type.
- Wear safety equipments certainly, because the remained liquid in pump internal may be flowed when disassembly or assembly.

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

13-1 Replacement of Ball Seat, Ball Guide, Checkball

1 Disassembly
- ① Loosen suction and discharge piping.
- ② Take out valve(Ball Seat, Ball Guide, Checkball) after untightening of connection parts of suction and discharge piping.
- ③ Replace by new parts for checkball or ball seat etc., with abnormal scar or abrasion.

2 Assembly
- ① Assembly valve with reference to articles of 'structure and Name of Each Parts'.
- ② Assembly with tightening valve fully to tighten connection part of suction and discharge piping.
- ③ Be carefully to leak liquid even though tightening when damage parts of packing or o-ring.
- ④ Assembly piping of discharge and suction.

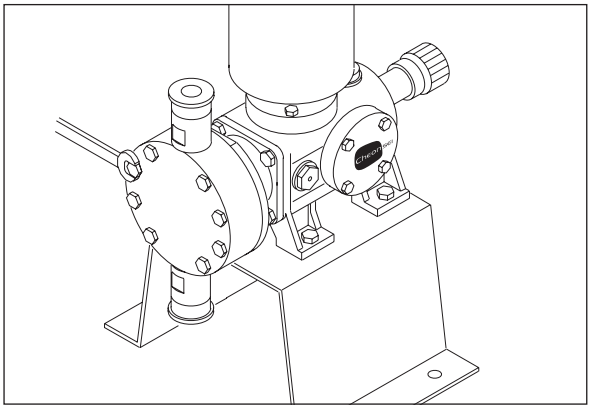


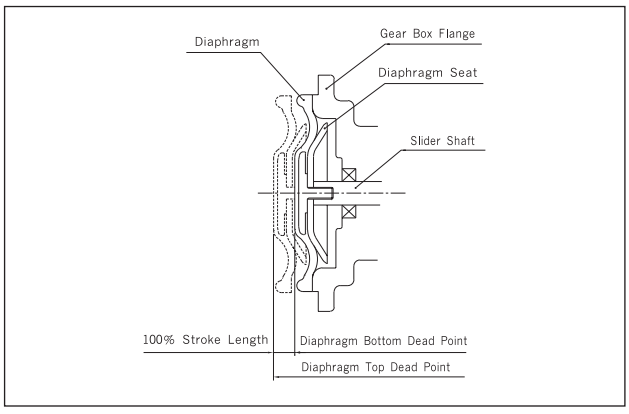
⚠ Caution

- 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.

13-2 Replacement of Diaphragm

1 Disassembly
- ① Remove the suction and discharge pipes.
- ② Loosen the pump head setting bolt.





③ Set stroke length to 0% and turn off when the diaphragm comes to the top dead point. And turn the diaphragm counterclockwise, then the diaphragm can be simply removed. Replace to a new diaphragm, if any worn or deformed part is founded.

2 Assembly

> ⚠ Caution
>
> • Liquid leakage may be occurred when fix pump head with head bolts, so tighten equally as reciprocal diagonal direction.

① Fix the new diaphragm firmly to the slider shaft by turning it clockwise.
② Set stroke length to 100% of bottom dead point, before reassembly the pump head. In this case, connect power supply and run the motor temporarily by on-off until the diaphragm will be located to the bottom dead point.
③ Tighten fix bolts of pump head till disappear of gap between flange face of Gearbox and pump head. Tighten bolts with reciprocal equal force(torque).

Model	KD-21H~12H	KD-22H~82H	KD-13H~14M	KD-14H~24H	KD-24S,34H,54L
Torque N·m(kgf·cm)	2.9(30)	3.9(40)	11.8(120)	19.6(200)	24.5(250)

④ Connect piping of discharge and suction to arrange connection parts of discharge and suction as reverse sequence of disassembly.

14 Consumable Parts and Spare Parts

14-1 Consumable Parts

Parts name	Q'ty for one pump head	Recommended replacement period
Check ball	2	1year
Ball guide	2	1year
Ball seat(Ball seat insert)	2	1year
O-ring	2	1year
Diaphragm	1	4000 hour
Oil seal	1	1year

※ The recommended replacement period is not guaranteed. The period is subject to condition of using.

14-2 Spare Parts

1 Spare parts for 3 years
- Bearing
- Worm gear(Worm, Worm Wheel)

2 Spare parts for over 3 years
- Motor

15 Warranty

⚠ Warning

• 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 using parts except of specified by CHEONSEI.
④ Trouble or damage due to repair or reconstruction by person except by CHEONSEI or designated by CHEONSEI.
⑤ 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.

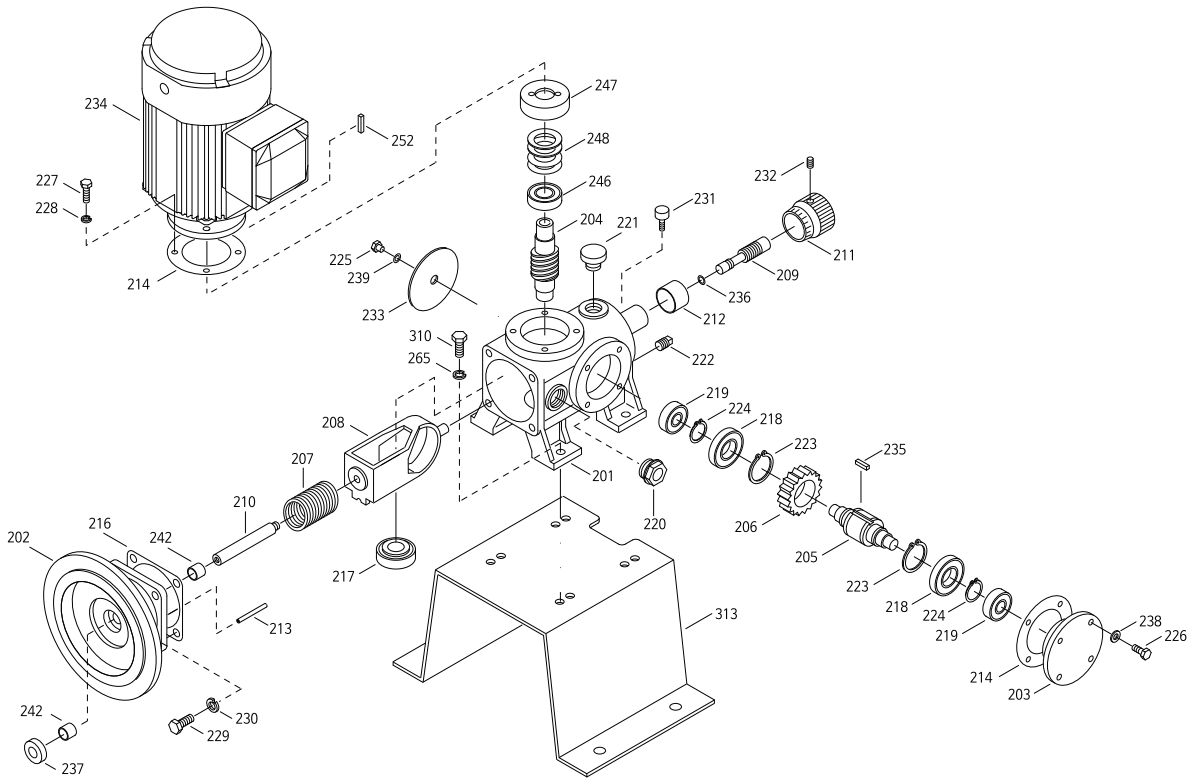
17 Accessory

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
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 Driving Parts(Vertical type)

1 Model : KDV-21H, 61H, 12H, 22H, 52H, 82H, 13H, 23H, 33L, 43L, 53L, 63L, 73L

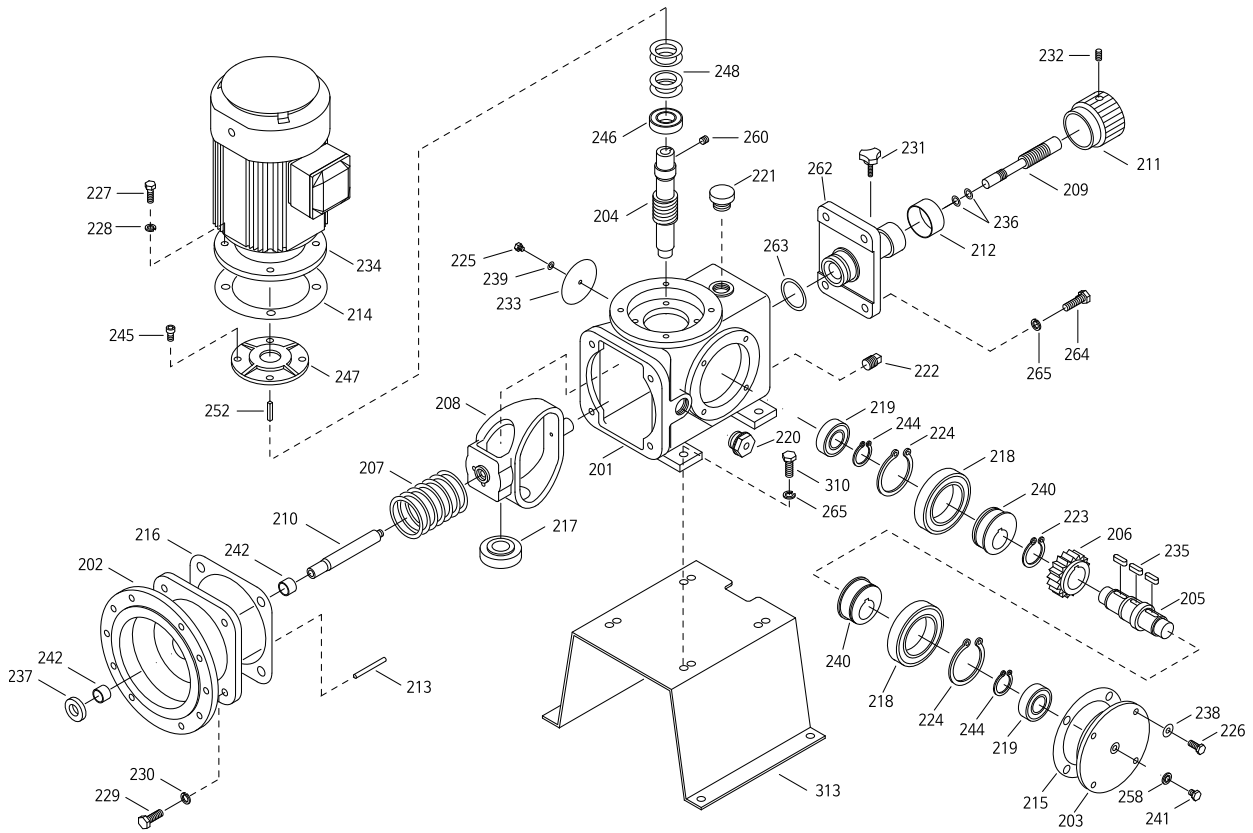


No.	Part Name	Q'ty
201	Gear box(Vertical)	1
202	Gear box flange	1
203	Gear cover	1
204	Worm	1
205	Worm wheel shaft	1
206	Worm wheel	1
207	Spring	1
208	Slider(Vertical)	1
209	Dial shaft	1
210	Slider shaft	1
211	Dial	1
212	Scale(Sticker)	1
213	Spring pin	1
214	Gasket "3"	2
216	Gasket "1"	1
217	Bearing(Taper)	1

No.	Part Name	Q'ty
218	Bearing(Ball)	2
219	Bearing(Ball)	2
220	Oil level cap	1
221	Oil cap	1
222	Bolt(Squ. head)	1
223	Snap ring	2
224	Snap ring	2
225	Bolt(Hex. head)	1
226	Bolt(Hex. head)	4
227	Bolt(Hex. head)	4
228	Washer(Spring)	4
229	Bolt(Hex. head)	4
230	Washer(Spring)	4
231	Bolt(Knob)	1
232	Set screw	1
233	Name plate	1

No.	Part Name	Q'ty
234	Motor	1
235	Key	1
236	O-ring	1
237	Oil seal	1
238	Washer(Flat)	4
239	Washer(Seal)	1
242	Bearing(D.U.)	2
246	Bearing(Ball)	1
247	Attachment	1
248	Spring(Belleville)	4
252	Key	1
265	Washer(Spring)	4
310	Bolt(Hex. head)	4
313	Bed(Vertical)	1

2 Model : KDV-33H, 73H

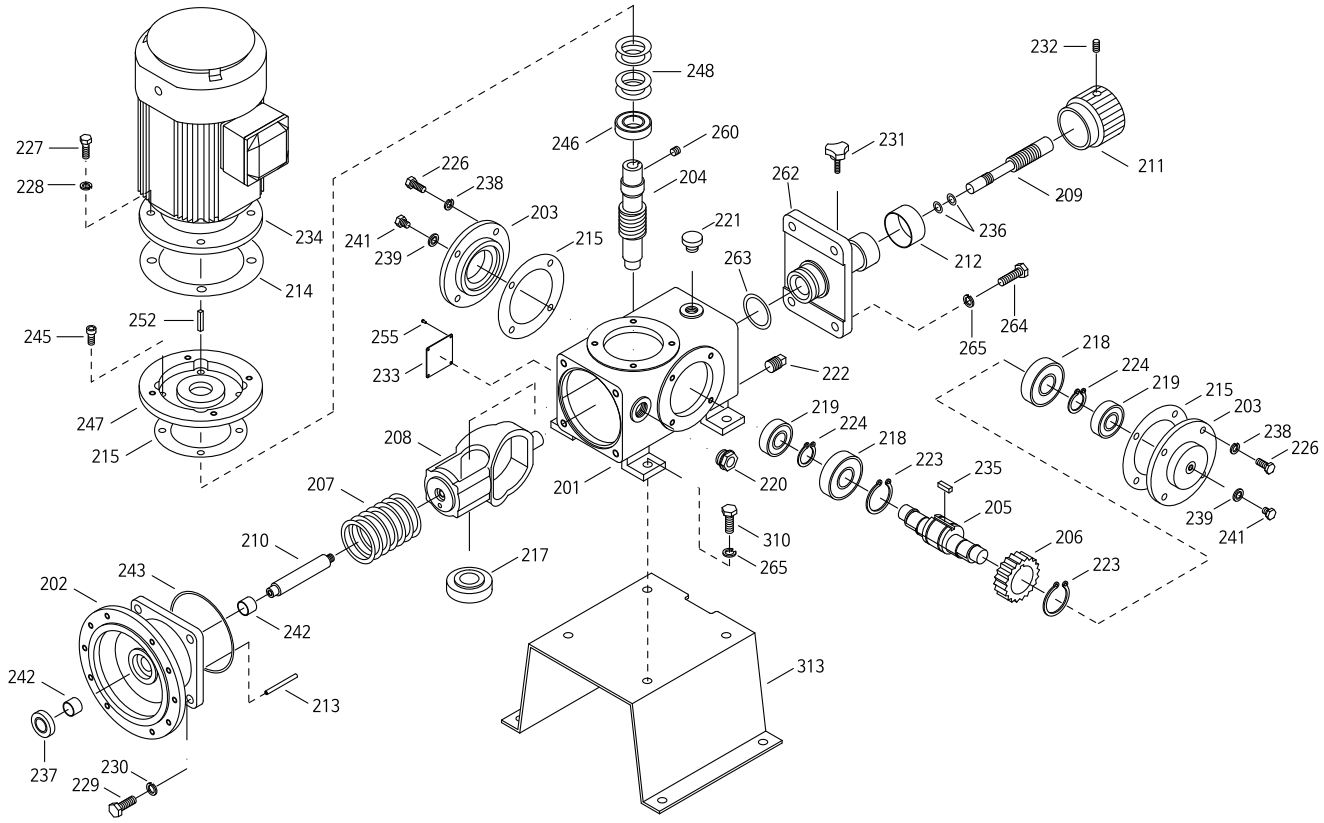


No.	Part Name	Q'ty
201	Gear box(Vertical)	1
202	Gear box flange	1
203	Gear cover	1
204	Worm	1
205	Worm wheel shaft	1
206	Worm wheel	1
207	Spring	1
208	Slider	1
209	Dial shaft	1
210	Slider shaft	1
211	Dial	1
212	Scale(Sticker)	1
213	Spring pin	1
214	Gasket"3"	1
215	Gasket"2"	1
216	Gasket"1"	1
217	Bearing(Taper)	1
218	Bearing(Ball)	2
219	Bearing(Ball)	2
220	Oil level cap	1

No.	Part Name	Q'ty
221	Oil cap	1
222	Bolt(Squ. head)	1
223	Snap ring	1
224	Snap ring	2
225	Bolt(Hex. head)	1
226	Bolt(Hex. head)	4
227	Bolt(Hex. head)	4
228	Washer(Spring)	4
229	Bolt(Hex. head)	4
230	Washer(Spring)	4
231	Bolt(Knob)	1
232	Set screw	2
233	Name plate	1
234	Motor	1
235	Key	3
236	O-ring	2
237	Oil seal	1
238	Washer(Flat)	4
239	Washer(Seal)	1
240	Eccentric cam	2

No.	Part Name	Q'ty
241	Bolt(Hex. head)	1
242	Bearing(D.U.)	2
244	Snap ring	2
245	Bolt(Wrench)	4
246	Bearing(Ball)	1
247	Attachment	1
248	Spring(Belleville)	4
252	Key	1
258	Washer(Seal)	1
260	Set Screw	1
262	Box plate	1
263	O-ring	1
264	Bolt(Hex.head)	4
265	Washer(Spring)	8
310	Bolt(Hex. head)	4
313	Bed(Vertical)	1

3 Model : KDV-43H, 63H, 93M, 14N, 14M

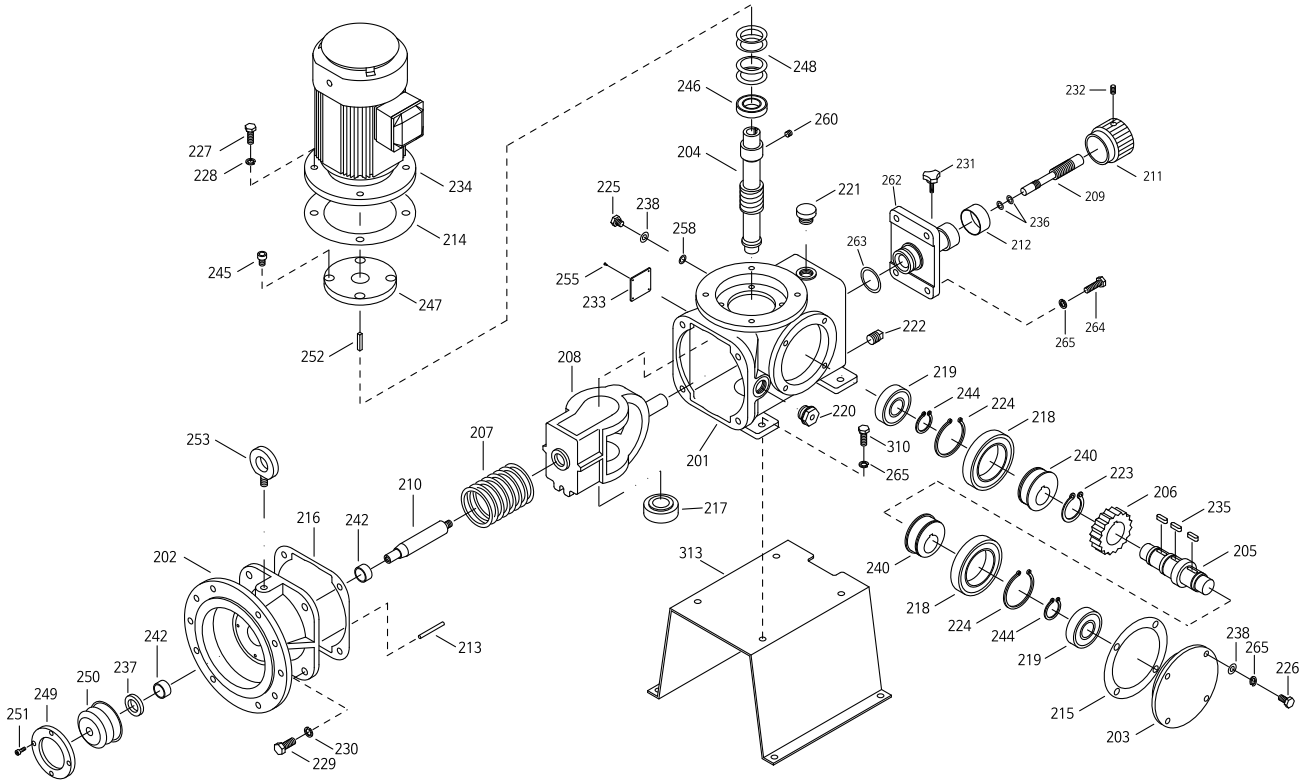


No.	Part Name	Q'ty
201	Gear box	1
202	Gear box flange	1
203	Gear cover	2
204	Worm	1
205	Worm wheel shaft	1
206	Worm wheel	1
207	Spring	1
208	Slider(Vertical)	1
209	Dial shaft	1
210	Slider shaft	1
211	Dial	1
212	Scale(Sticker)	1
213	Spring pin	1
214	Gasket "3"	1
215	Gasket "2"	3
217	Bearing(Taper)	1
218	Bearing(Ball)	2
219	Bearing(Ball)	2

No.	Part Name	Q'ty
220	Oil level cap	1
221	Oil cap	1
222	Bolt(Squ. head)	1
223	Snap ring	2
224	Snap ring	2
226	Bolt(Hex. head)	8
227	Bolt(Hex. head)	4
228	Washer(Spring)	4
229	Bolt(Hex. head))	4
230	Washer(Spring)	4
231	Bolt(Knob)	1
232	Set screw	2
233	Name plate	1
234	Motor	1
235	Key	1
236	O-ring	2
237	Oil seal	1
238	Washer(Spring)	8

No.	Part Name	Q'ty
239	Washer(Seal)	2
241	Bolt(Hex. head)	2
242	Bearing(D.U.)	2
243	O-ring	1
245	Bolt(Wrench)	4
246	Bearing(Ball)	1
247	Attachment	1
248	Spring(Belleville)	4
252	Key	1
255	Rivet	4
260	Set Screw	1
262	Box plate	1
263	O-ring	1
264	Bolt(Hex. head)	4
265	Washer(Spring)	8
310	Bolt(Hex. head)	4
313	Bed(Vertical)	1

4 Model : KDV-14H, 14G, 24L, 24S

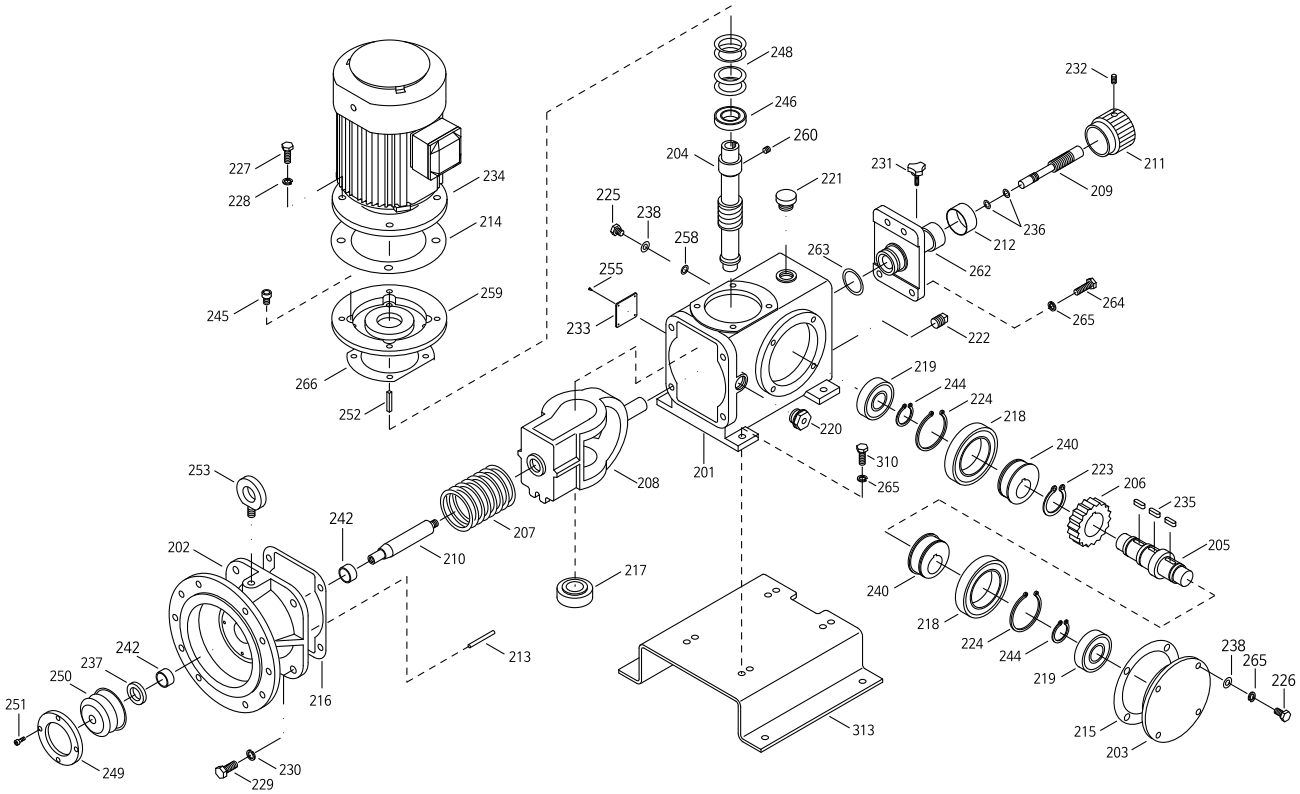


No.	Part Name	Q'ty
201	Gear box	1
202	Gear box flange	1
203	Gear cover	1
204	Worm	1
205	Worm Wheel shaft	1
206	Worm Wheel	1
207	Spring	1
208	Slider	1
209	Dial shaft	1
210	Slider shaft	1
211	Dial	1
212	Scale(Sticker)	1
213	Spring pin	1
214	Gasket"3"	1
215	Gasket"2"	1
216	Gasket"1"	1
217	Bearing(Taper)	1
218	Bearing(Ball)	2
219	Bearing(Ball)	2
220	Oil level cap	1
221	Oil cap	1

No.	Part Name	Q'ty
222	Bolt(Squ. head)	1
223	Snap ring	1
224	Snap ring	2
225	Bolt(Hex. head)	1
226	Bolt(Hex. head)	4
227	Bolt(Hex. head)	4
228	Washer(Spring)	4
229	Bolt(Hex. head)	4
230	Washer(Spring)	4
231	Bolt(Knob)	1
232	Set screw	2
233	Name plate	1
234	Motor	1
235	Key	3
236	O-ring	2
237	Oil seal	1
238	Washer(Flat)	5
240	Eccentric cam	2
242	Bearing(D.U.)	2
244	Snap ring	2
245	Bolt(Wrench)	4

No.	Part Name	Q'ty
246	Bearing(Ball)	1
247	Attachment	1
248	Spring(Belleville)	4
249	Bellows guide	1
250	Bellows	1
251	Bolt(Wrench)	4
252	key	1
253	Bolt(Eye)	1
255	Rivet	4
258	O-ring	1
260	Set Screw	1
262	Box plate	1
263	O-ring	1
264	Bolt(Hex. head)	4
265	Washer(Spring)	12
310	Bolt(Hex. head)	4
313	Bed	1

5 Model : KDV-24H, 34H, 54L



No.	Part Name	Q'ty
201	Gear box	1
202	Gear box flange	1
203	Gear cover	1
204	worm	1
205	Worm wheel shaft	1
206	Worm wheel	1
207	Spring	1
208	Slider	1
209	Dial shaft	1
210	Slider shaft	1
211	Dial	1
212	Scale(Sticker)	1
213	Spring pin	1
214	Gasket"3"	1
215	Gasket"2"	1
216	Gasket"1"	1
217	Bearing(Taper)	1
218	Bearing(Ball)	2
219	Bearing(Ball)	2
220	Oil level cap	1
221	Oil cap	1

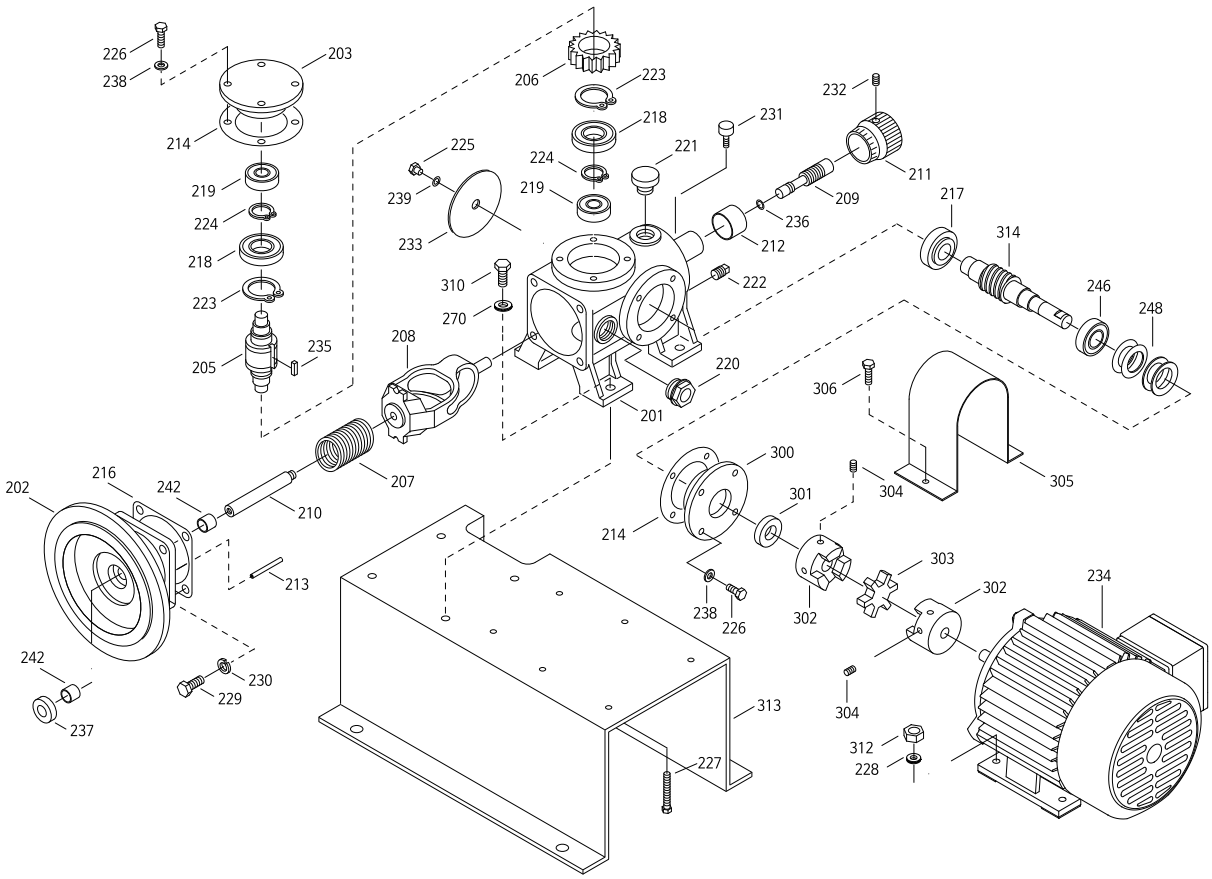
No.	Part Name	Q'ty
222	Bolt(Squ. head)	1
223	Snap ring	1
224	Snap ring	2
225	Bolt(Hex. head)	1
226	Bolt(Hex. head)	4
227	Bolt(Hex. head)	4
228	Washer(Spring)	4
229	Bolt(Hex. head)	4
230	Washer(Spring)	4
231	Bolt(Knob)	1
232	Set screw	2
233	Name plate	1
234	Motor	1
235	Key	3
236	O-ring	2
237	Oil seal	1
238	Washer(Flat)	5
240	Eccentric cam	2
242(1)	Bear(D.U.)	2
244	Snap ring	2
245	Bolt(Wrench)	4

No.	Part Name	Q'ty
246	Bearing(Ball)	1
248	Spring(Belleville)	4
249	Bellows guide	1
250	Bellows	1
251	Bolt(Wrench)	4
252	Key	1
253	Bolt(Eye)	1
255	Rivet	4
258	O-ring	1
259	Attachement	1
260	Set Screw	1
262	Box plate	1
263	O-ring	1
264	Bolt(Hex. head)	4
265	Washer(Spring)	12
266	Gasket"4"	1
310	Bolt(Hex. head)	4
313	Bed	1

Notice) (1) For only 24H Model

18-2 Driving Parts(Horizontal type)

1 Model : KDH-21H, 61H, 12H, 22H, 52H, 82H, 13H, 23H, 33L, 43L, 53L, 63L, 73L

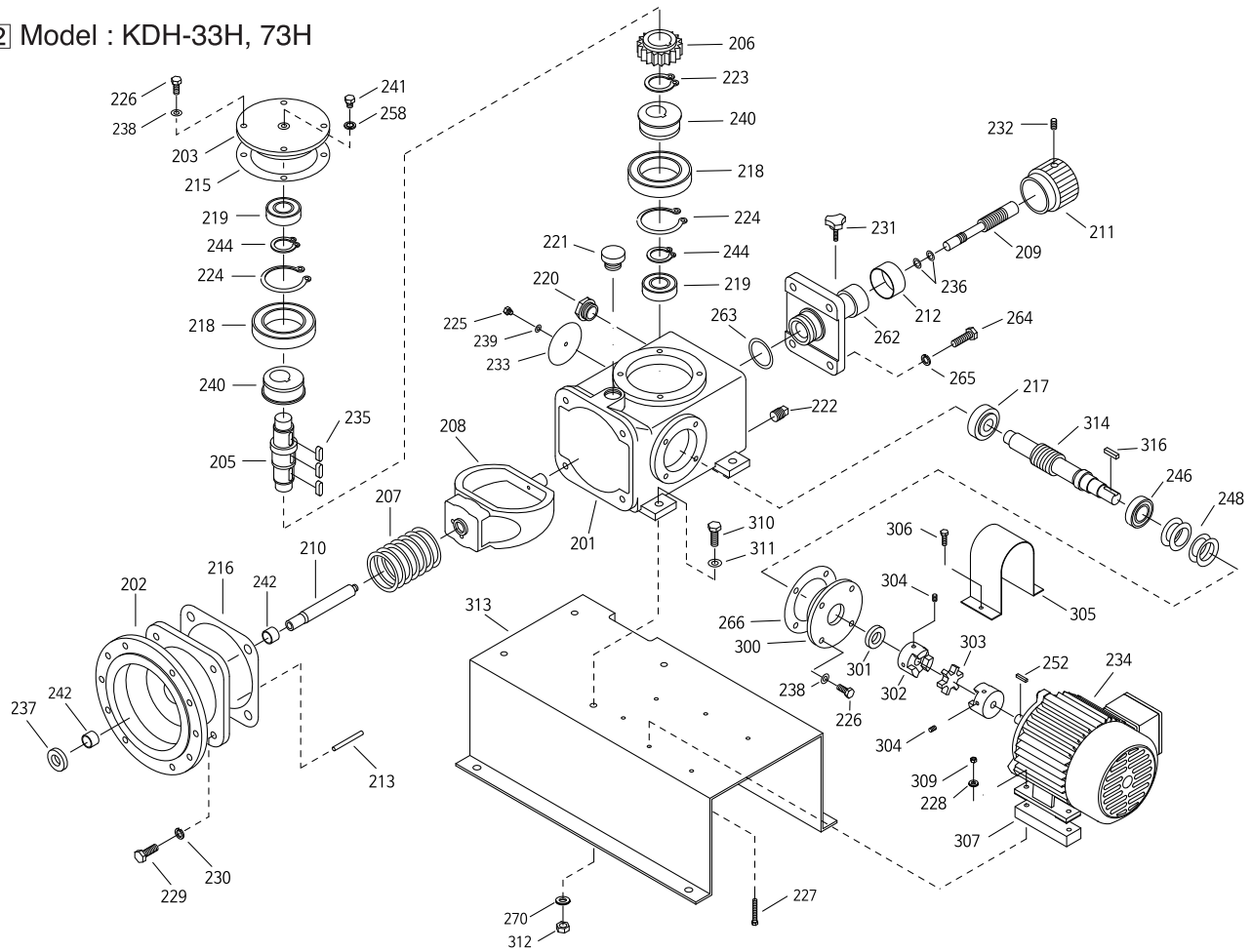


No.	Part Name	Q'ty
201	Gear box(Horizontal)	1
202	Gear box flange	1
203	Gear cover	1
205	Worm wheel shaft	1
206	Worm wheel	1
207	Spring	1
208	Slider(Horizontal)	1
209	Dial shaft	1
210	Slider shaft	1
211	Dial	1
212	Scale(Sticker)	1
213	Spring pin	1
214	Gasket"3"	2
216	Gasket"1"	1
217	Bearing(Taper)	1
218	Bearing(Ball)	2
219	Bearing(Ball)	2
220	Oil level cap	1

No.	Part Name	Q'ty
221	Oil cap	1
222	Bolt(Squ. head)	1
223	Snap ring	2
224	Snap ring	2
225	Bolt(Hex. head)	1
226	Bolt(Hex. head)	8
227	Bolt(Hex. head)	4
228	Washer(Lock)	4
229	Bolt(Hex. head)	4
230	Washer(Spring)	4
231	Bolt(Knob)	1
232	Set screw	1
233	Name plate	1
234	Motor	1
235	Key	1
236	O-ring	1
237	Oil seal	1
238	Washer(Flat)	8

No.	Part Name	Q'ty
239	Washer(Seal)	1
242	Bearing(D.U.)	2
246	Bearing(Ball)	1
248	Spring(Belleville)	4
265	Washer(Lock)	4
300	Gear cover(Horizontal)	1
301	Oil seal	1
302	Coupling	1
303	Coupling rubber	1
304	Set screw	4
305	Coupling cover	1
306	Bolt(Pan. head)	2
310	Bolt(Hex. head)	4
312	Nut(Hex. head)	4
313	Bed(Horizontal)	1
314	Worm shaft	1

2 Model : KDH-33H, 73H

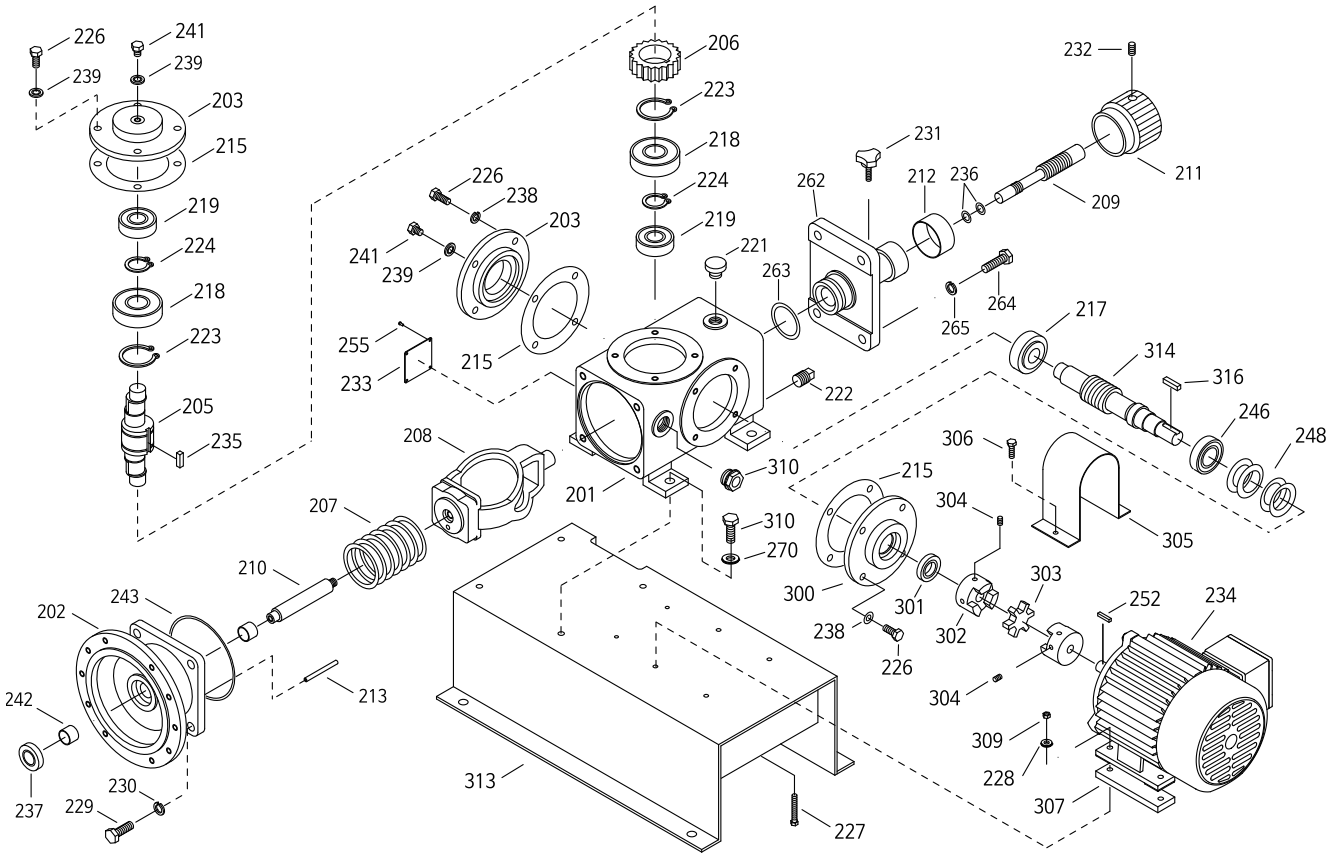


No.	Part Name	Q'ty
201	Gear box(Horizontal)	1
202	Gear box flange	1
203	Gear cover	1
205	Worm wheel shaft	1
206	Worm wheel	1
207	Spring	1
208	Slider	1
209	Dial shaft	1
210	Slider shaft	1
211	Dial	1
212	Scale(Sticker)	1
213	Spring pin	1
215	Gasket"2"	1
216	Gasket"1"	1
217	Bearing(Taper)	1
218	Bearing(Ball)	2
219	Bearing(Ball)	2
220	Oil level cap	1
221	Oil cap	1
222	Bolt(Squ.head)	1
223	Snap ring	1
224	Snap ring	2
225	Bolt(Hex. head)	1

No.	Part Name	Q'ty
226	Bolt(Hex. head)	8
227	Bolt(Hex. head)	4
228	Washer(Lock)	4
229	Bolt(Hex. head)	4
230	Washer(Spring)	4
231	Bolt(Knob)	1
232	Set screw	2
233	Name plate	1
234	Motor	1
235	Key	3
236	O-ring	2
237	Oil seal	1
238	Washer(Flat)	8
239	Washer(Seal)	1
240	Eccentric cam	2
241	Bolt(Hex. head)	1
242	Bearing(D.U.)	2
244	Snap ring	2
246	Bearing(Ball)	1
248	spring(Belleville)	4
252	Key	1
258	Washer(Seal)	1
262	Box plate	1

No.	Part Name	Q'ty
263	O-ring	1
264	Bolt(Hex. head)	4
265	Washer(Spring)	4
266	Gasket"4"	1
270	Washer(Lock)	4
300	Gear cover(Horizontal)	1
301	Oil seal	1
302	Coupling	1
303	Coupling rubber	1
304	Set screw	4
305	Coupling cover	1
306	Bolt(Pan. head)	2
307	Spacer bar	2
309	Nut(Hex.)	4
310	Bolt(Hex. head)	4
311	Washer(Flat)	4
312	Nut(Hex.)	4
313	Bed(Horizontal)	1
314	Worm shaft	1
316	Key	1

3 Model : KDH-43H, 63H, 93M, 14N, 14M



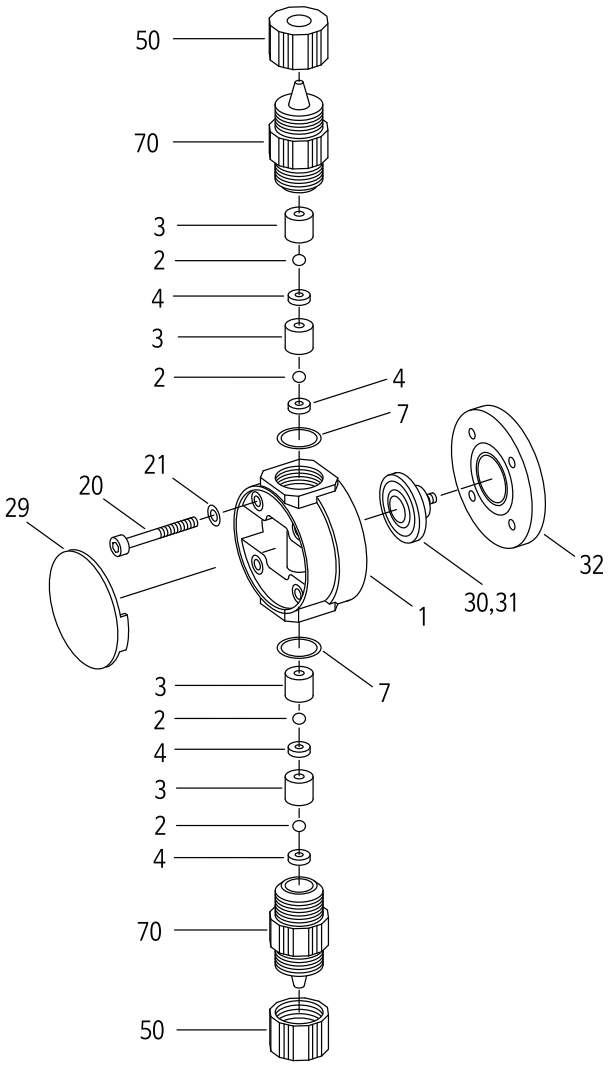
No.	Part Name	Q'ty
201	Gear box	1
202	Gear box flange	1
203	Gear cover	2
205	Worm wheel shaft	1
206	Worm wheel	1
207	Spring	1
208	Slider(Horizontal)	1
209	Dial shaft	1
210	Slider shaft	1
211	Dial	1
212	Scale(Sticker)	1
213	Spring pin	1
215	Gasket "2"	3
217	Bearing(Taper)	1
218	Bearing(Ball)	2
219	Bearing(Ball)	2
220	Oil level cap	1
221	Oil cap	1
222	Bolt(Squ.head)	1
223	Snap ring	2

No.	Part Name	Q'ty
224	Snap ring	2
226	Bolt(Hex. head)	12
227	Bolt(Hex. head)	4
228	Washer(Lock)	4
229	Bolt(Hex. head)	4
230	Washer(Spring)	4
231	Bolt(Knob)	1
232	Set screw	2
233	Name plate	1
234	Motor	1
235	Key	1
236	O-ring	2
237	Oil seal	1
238	Washer(Spring)	8
239	Washer(Seal)	6
241	Bolt(Hex. head)	2
242	Bearing(D.U.)	2
243	O-ring	1
246	Bearing(Ball)	1
248	Spring(Belleville)	4

No.	Part Name	Q'ty
252	Key	1
255	Rivet	4
262	Box plate	1
263	O-ring	1
264	Bolt(Hex. head)	4
265	Washer(Spring)	4
270	Washer(Lock)	4
300	Gear cover(Horizontal)	1
301	Oil seal	1
302	Coupling	1
303	Coupling rubber	1
304	Set screw	4
305	Coupling cover	1
306	Bolt(Pan. head)	2
307	Spacer bar	2
309	Nut(Hex.)	4
310	Bolt(Hex. head)	4
313	Bed(Horizontal)	1
314	Worm shaft	1
316	Key	1

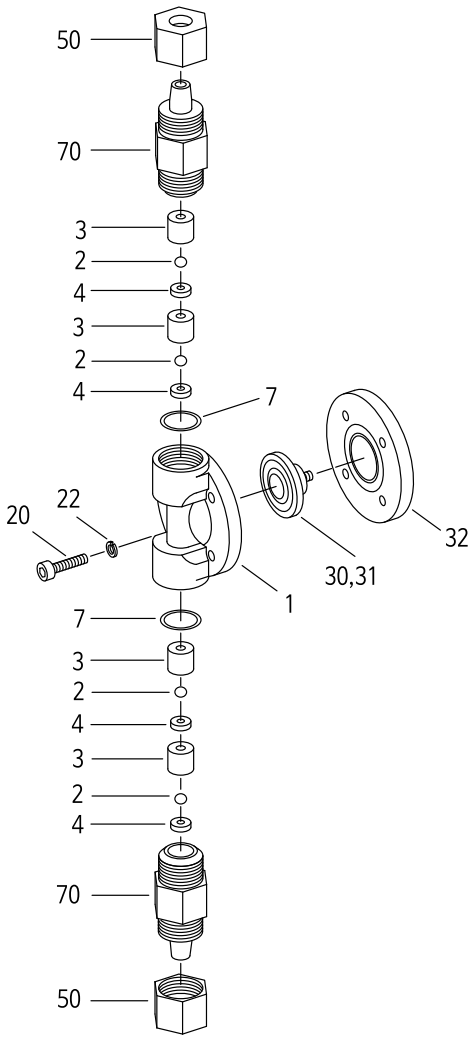
18-3 Liquid End Parts(Flexible hose type)

1 Model : KD-21H, 61H, 12H-P□□, F□□



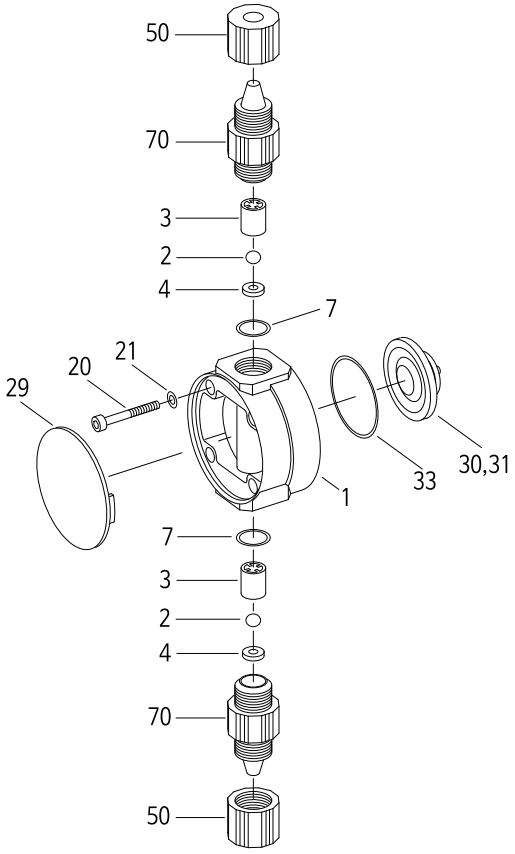
No.	Part Name	Q'ty
1	Head	1
2	Check ball	4
3	Ball guide	4
4	Ball seat	4
7	O-ring	2
20	Bolt(Wrench)	4
21	Washer(Flat)	4
29	Head cover	1
(30)	Diaphragm	1
(31)	Diaphragm seat	1
32	Support ring	1
50	Hose nut	2
70	Hose joint	2
30,31	Diaphragm Set	1

2 Model : KD-21H, 61H, 12H-S□□, 6□□



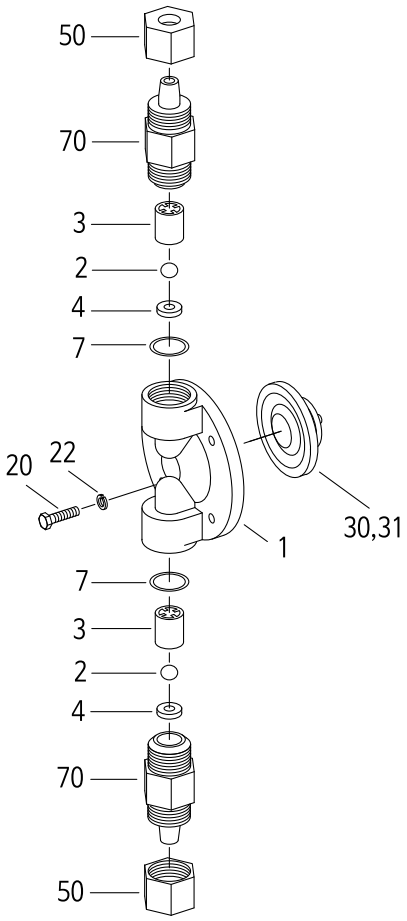
No.	Part Name	Q'ty
1	Head	1
2	Check ball	4
3	Ball guide	4
4	Ball seat	4
7	O-ring	2
20	Bolt(Wrench)	4
22	Washer(Spring)	4
(30)	Diaphragm	1
(31)	Diaphragm seat	1
32	Support ring	1
50	Hose nut	2
70	Hose joint	2
30,31	Diaphragm Set	1

3 Model : KD-22H, 52H, 82H-P□□, F□□



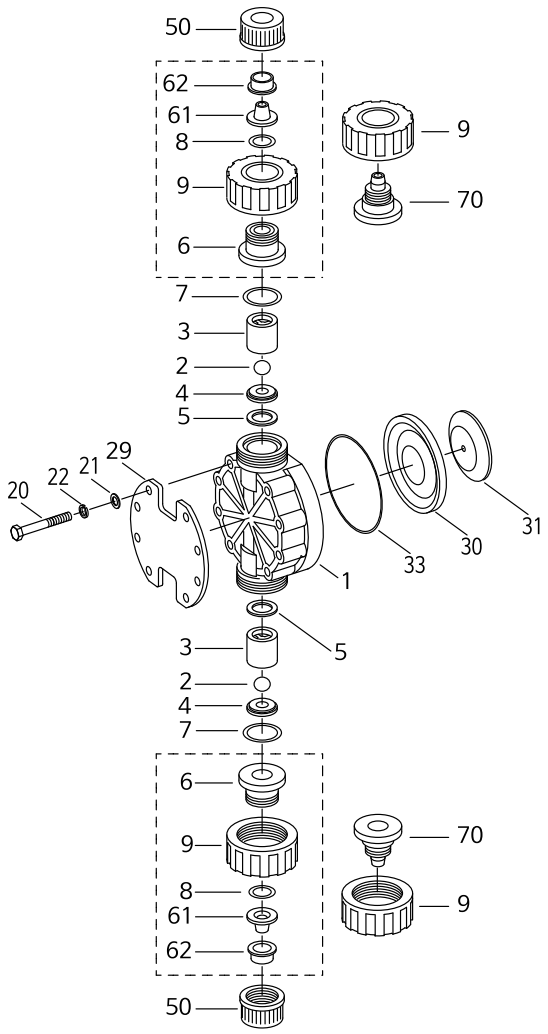
No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
7	O-ring	2
20	Bolt(Wrench)	4
21	Washer(Flat)	4
29	Head cover	1
(30)	Diaphragm	1
(31)	Diaphragm seat	1
33	O-ring	1
50	Hose nut	2
70	Hose joint	2
30,31	Diaphragm Set	1

4 Model : KD-22H, 52H, 82H-S□□, 6□□



No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
7	O-ring	2
20	Bolt(Hex. head)	4
22	Washer(Spring)	4
(30)	Diaphragm	1
(31)	Diaphragm seat	1
50	Hose nut	2
70	Hose joint	2
30,31	Diaphragm Set	1

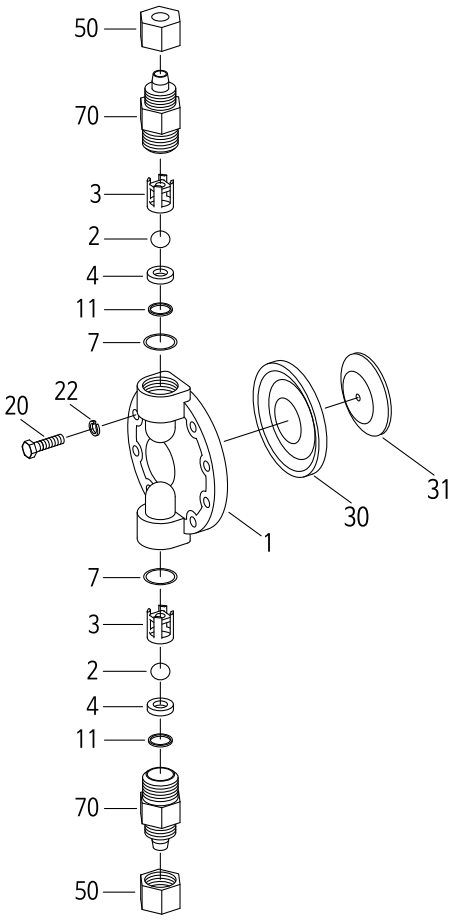
5 Model : KD-13H, 23H-P□□, F□□



No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
5	Packing	2
6(1)	Joint adapter	2
7	O-ring	2
8(1)	O-ring	2
9	Union nut	2
20	Bolt(Hex. head)	8
21	Washer(Flat)	8
22	Washer(Spring)	8
29	Head Fixing plate	1
30	Diaphragm	1
31	Diaphragm seat	1
33	O-ring	1
50	Union nut"2"(1)/Hose nut(2)	2
61(1)	Hose adapter	2
62(1)	Hose guide	2
70(2)	Hose joint	2

Notice) (1) For only P□□ Type
(2) For only F□□ Type

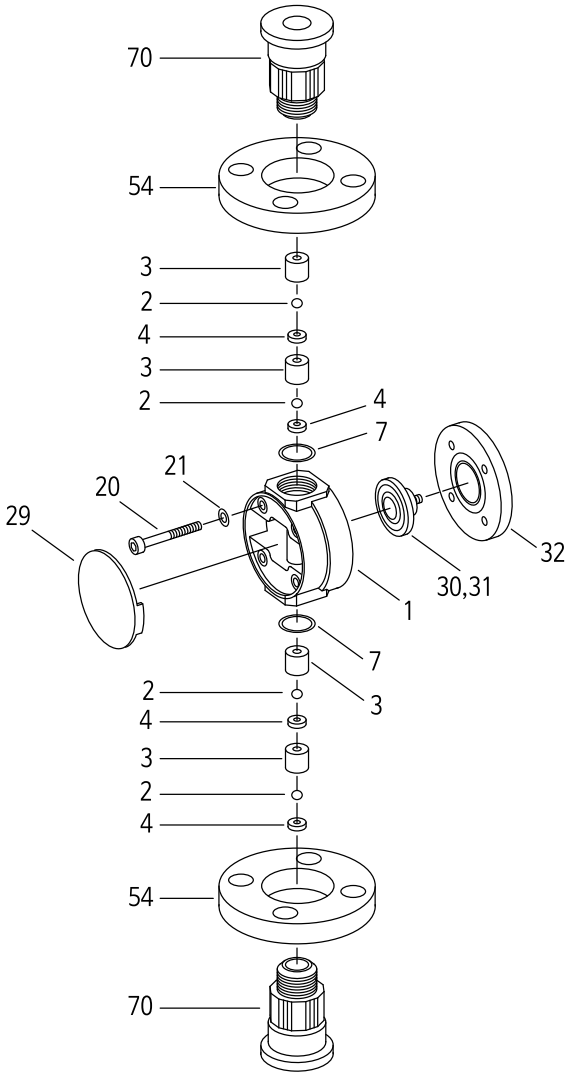
6 Model : KD-13H, 23H-S□□, 6□□



No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
7	O-ring	2
11	Gasket	2
20	Bolt(Hex. head)	8
22	Washer(Spring)	8
30	Diaphragm	1
31	Diaphragm seat	1
50	Hose nut	2
70	Hose joint	2

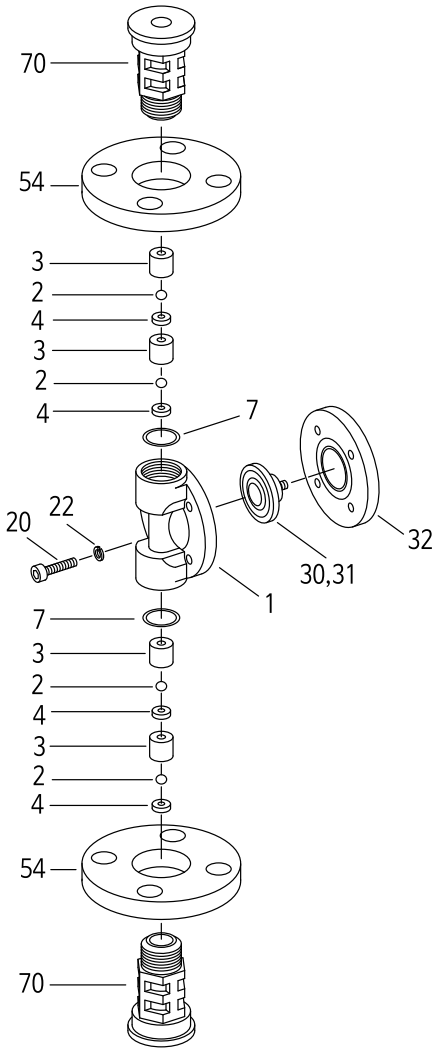
18-4 Liquid End Parts(Flange type)

1 Model : KD-21H, 61H, 12H-P□□, F□□



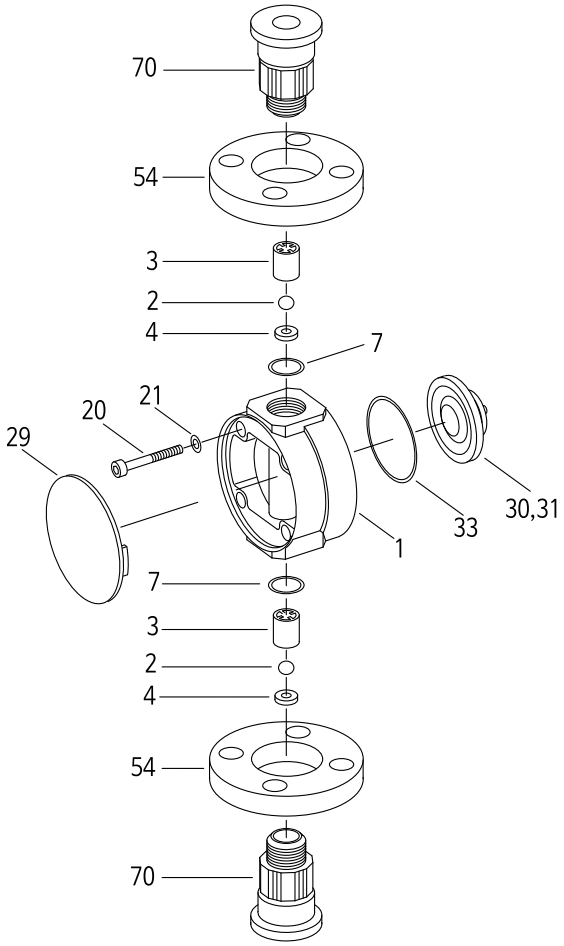
No.	Part Name	Q'ty
1	Head	1
2	Check ball	4
3	Ball guide	4
4	Ball seat	4
7	O-ring	2
20	Bolt(Wrench)	4
21	Washer(Flat)	4
29	Head cover	1
(30)	Diaphragm	1
(31)	Diaphragm seat	1
32	Support ring	1
54	Flange	2
70	Joint	2
30,31	Diaphragm Set	1

2 Model : KD-21H, 61H, 12H-S□□, 6□□



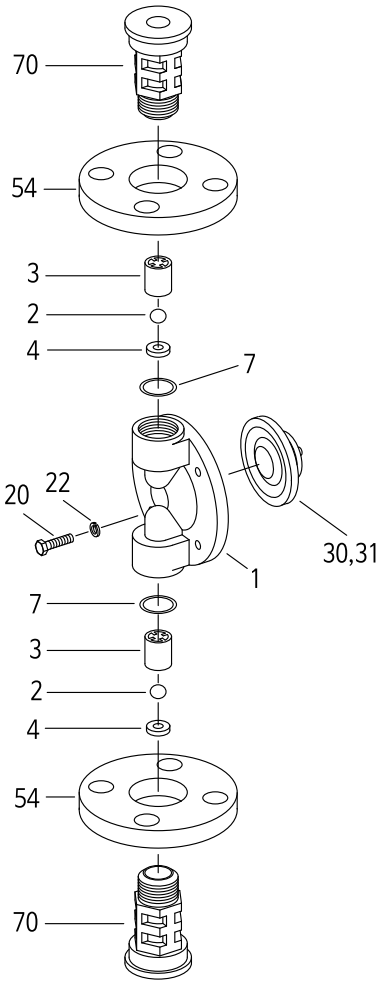
No.	Part Name	Q'ty
1	Head	1
2	Check ball	4
3	Ball guide	4
4	Ball seat	4
7	O-ring	2
20	Bolt(Wrench)	4
22	Washer(Spring)	4
(30)	Diaphragm	1
(31)	Diaphragm seat	1
32	Support ring	1
54	Flange	2
70	Joint	2
30,31	Diaphragm Set	1

3 Model : KD-22H, 52H, 82H-P□□ , F□□



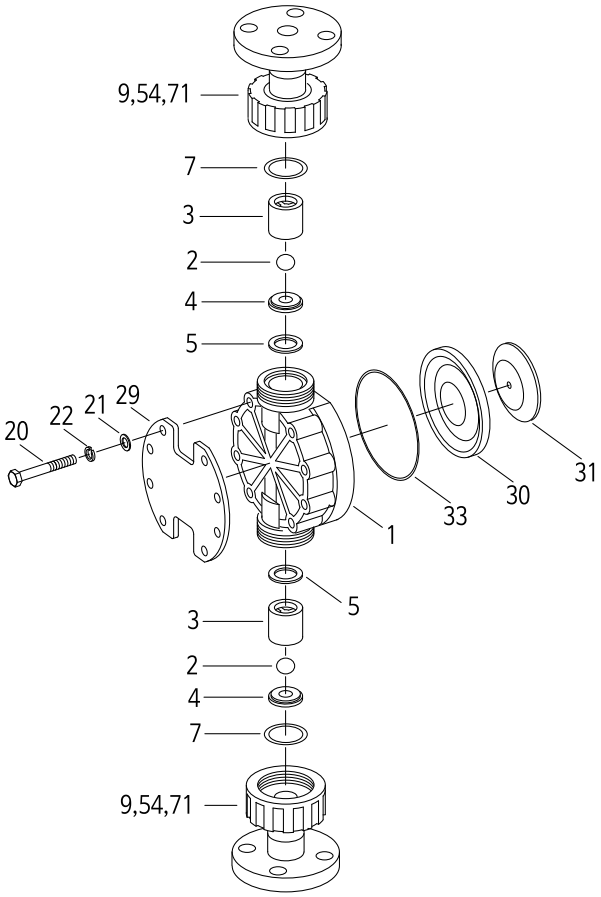
No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
7	O-ring	2
20	Bolt(Wrench)	4
21	Washer(Flat)	4
29	Head cover	1
(30)	Diaphragm	1
(31)	Diaphragm seat	1
33	O-ring	1
54	Flange	2
70	Joint	2
30,31	Diaphragm Set	1

4 Model : KD-22H, 52H, 82H-S□□ , 6□□



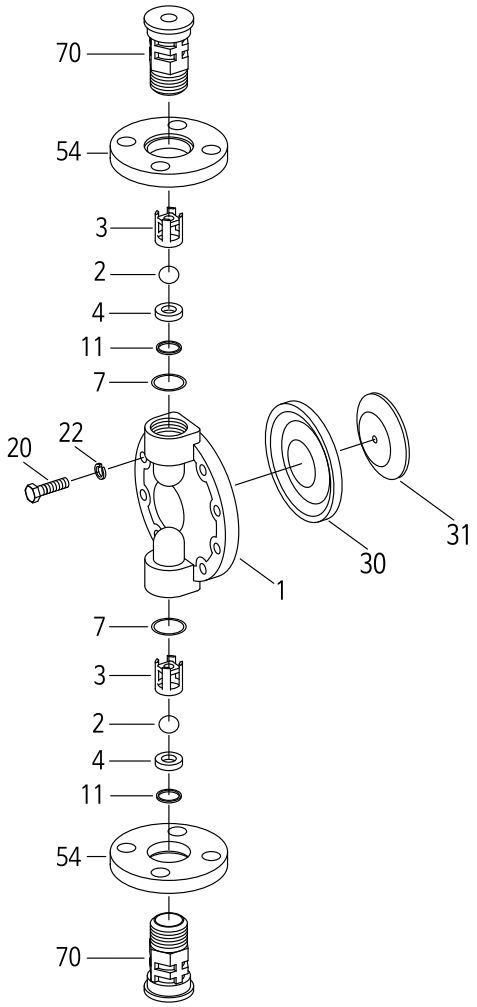
No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
7	O-ring	2
20	Bolt(Hex. head)	4
22	Washer(Spring)	4
(30)	Diaphragm	1
(31)	Diaphragm seat	1
54	Flange	2
70	Joint	2
30,31	Diaphragm Set	1

5 Model : KD-13H~73H-P□□, F□□



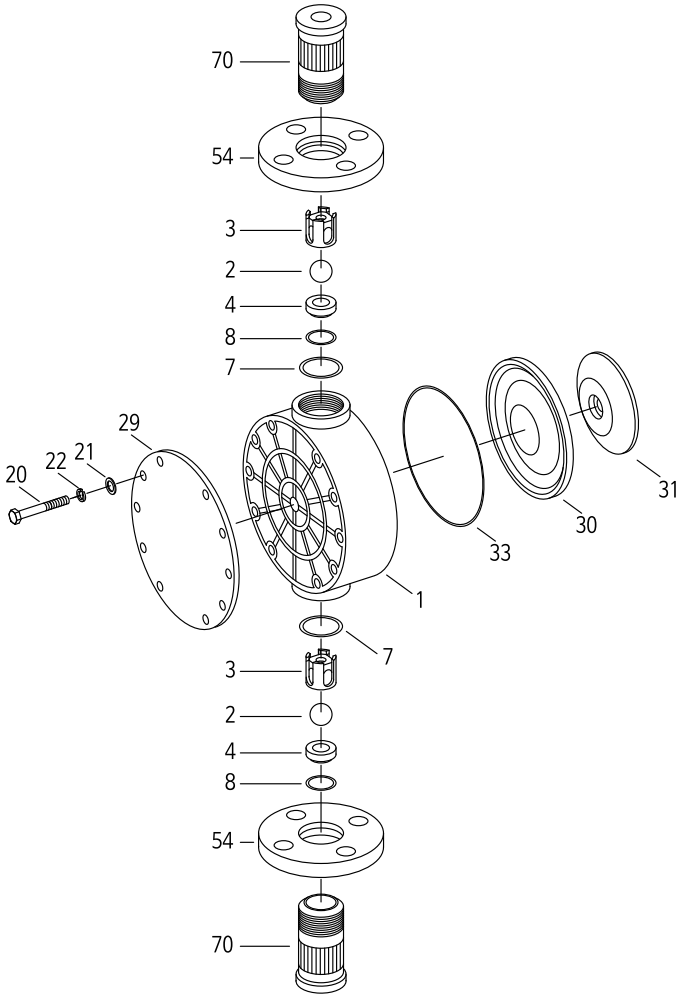
No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
5	Packing	2
7	O-ring	2
(9)	Union nut	2
20	Bolt(Hex. head)	8
21	Washer(Flat)	8
22	Washer(Spring)	8
29	Head Fixing plate	1
30	Diaphragm	1
31	Diaphragm seat	1
33	O-ring	1
(54)	Flange	2
(71)	Joint pipe	2
9,54,71	Joint(Flange)	2 SET

6 Model : KD-13H~73H-S□□, 6□□



No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
7	O-ring	2
11	Gasket	2
20	Bolt(Hex. head)	8
22	Washer(Spring)	8
30	Diaphragm	1
31	Diaphragm seat	1
54	Flange	2
70	Joint	2

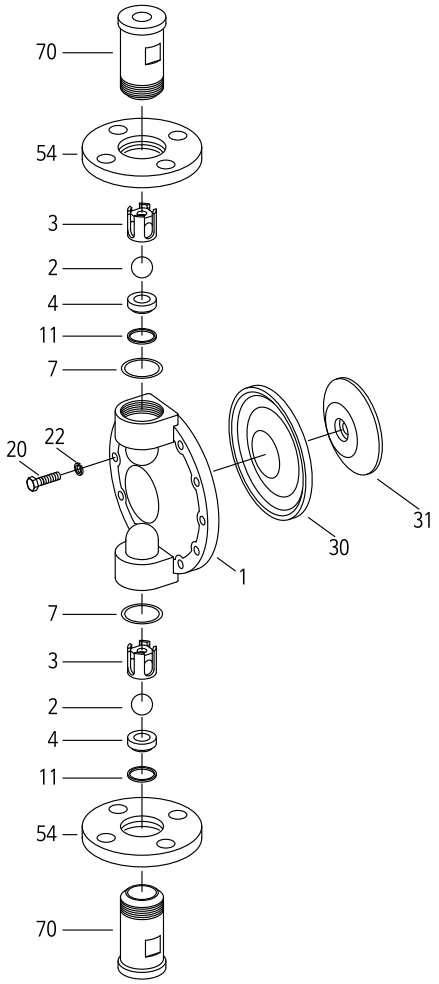
7 Model : KD-43H~14M-P□□, F□□



No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
7	O-ring	2
8(1)	O-ring	2
20	Bolt(Hex. head)	10
21	Washer(Flat)	10
22	Washer(Spring)	10
29	Head Fixing plate	1
30	Diaphragm	1
31	Diaphragm seat	1
33	O-ring	1
(54)	Flange	2
(70)	Joint	2

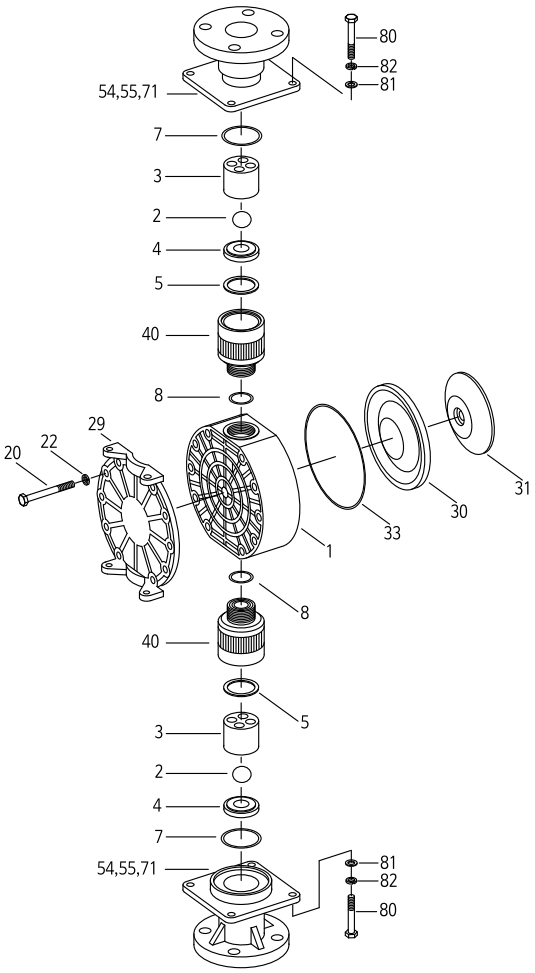
Notice) (1) For only P□□ Type

8 Model : KD-43H~14M-S□□, 6□□



No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
5	Packing(Head)	2
11	Gasket	2
20	Bolt(Hex. head)	10
22	Washer(Spring)	10
30	Diaphragm	1
31	Diaphragm seat	1
54	Flange	2
70	Joint	2

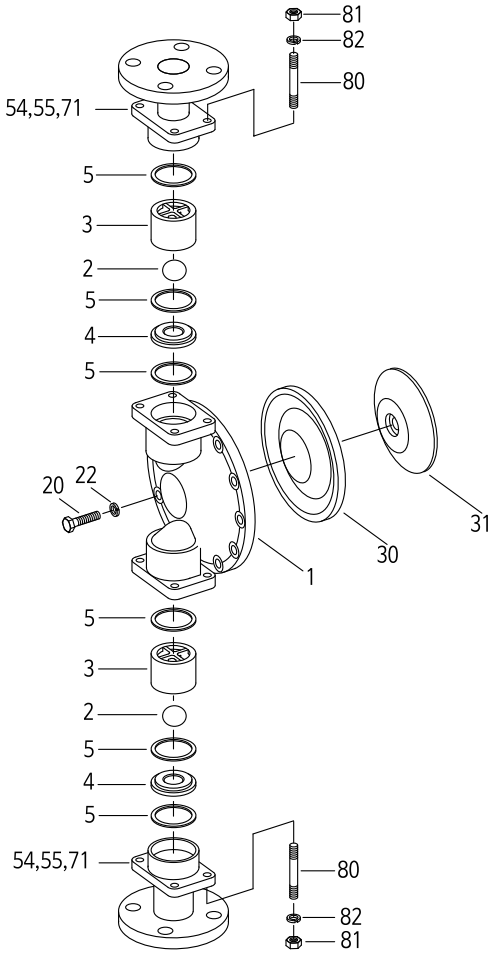
⑨ Model : KD-14H,14G,24L,24H-P□□, F□□



No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
5(1)	Packing	2
7	O-Ring(1)/Packing(2)	2
8	O-Ring(1)/Packing(2)	2
20	Bolt(Hex. head)	10
22	Washer(Spring)	10
29	Head Fixing plate	1
30	Diaphragm	1
31	Diaphragm seat	1
33	O-ring	1
40	Joint	2
(54)	Flange	2
(55)	Joint Fixing plate	2
(71)	Joint pipe	2
54,55,71	Joint(Flange)	2SET
80	Bolt(Hex. head)	8
81	Washer(Flat)	8
82	Washer(Spring)	8

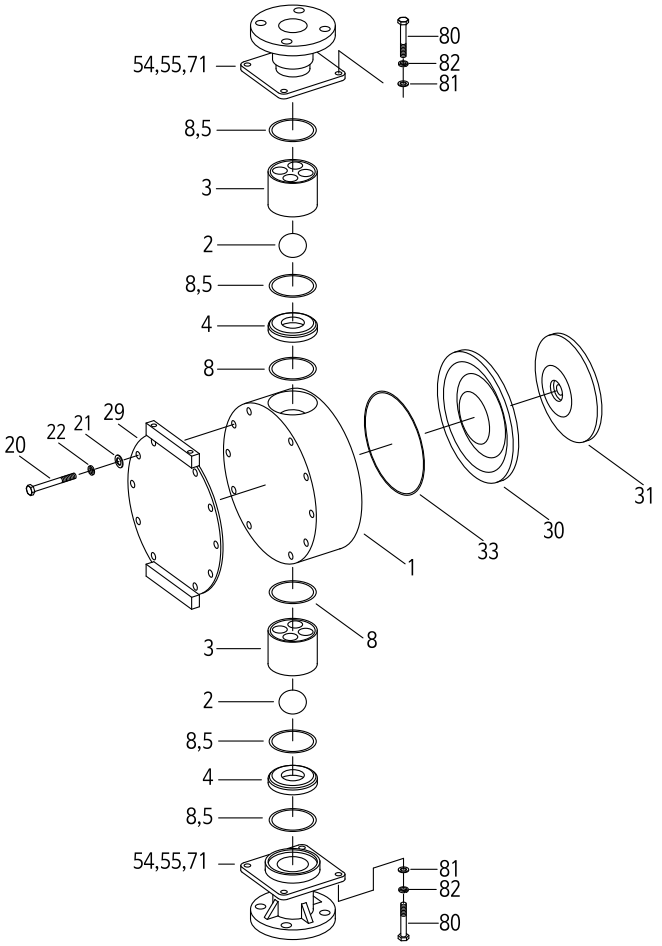
Notice) (1) For only P□□ Type
(2) For only F□□ Type

⑩ Model : KD-14H,14G,24L,24H-S□□, 6□□



No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
5	Packing	6
20	Bolt(Hex. head)	10
22	Washer(Spring)	10
30	Diaphragm	1
31	Diaphragm seat	1
(54)	Flange	2
(55)	Joint Fixing plate	2
(71)	Joint pipe	2
54,55,71	Joint(Flange)	2SET
80	Bolt(Stud bolt)	8
81	Nut(Hex.)	8
82	Washer(Spring)	8

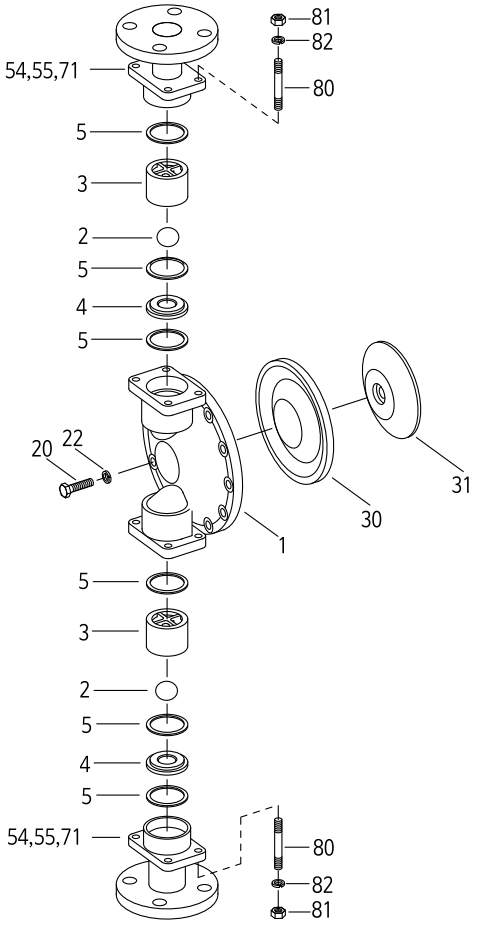
⓫ Model : KD-24S,34H,54L-P□□, F□□



No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
5(2)	Packing	4
8(1)	O-ring	6
20	Bolt(Hex. head)	10
21	Washer(Flat)	10
22	Washer(Spring)	10
29	Head Fixing plate	1
30	Diaphragm	1
31	Diaphragm seat	1
33	O-ring	1
(54)	Flange	2
(55)	Joint Fixing plate	2
(71)	Joint pipe	2
54,55,71	Joint(Flange)	2SET
80	Bolt(Hex. head)	8
81	Washer(Flat)	8
82	Washer(Spring)	8

Notice) (1) For only P□□ Type
(2) For only F□□ Type

⓬ Model : KD-24S,34H,54L-S□□, 6□□



No.	Part Name	Q'ty
1	Head	1
2	Check ball	2
3	Ball guide	2
4	Ball seat	2
5	Packing	6
20	Bolt(Hex. head)	10
22	Washer(Spring)	10
30	Diaphragm	1
31	Diaphragm seat	1
(54)	Flange	2
(55)	Joint Fixing plate	2
(71)	Joint pipe	2
54,55,71	Joint(Flange)	2SET
80	Bolt(Stud bolt)	8
81	Nut(Hex.)	8
82	Washer(Spring)	8

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