

## Instruction manual

### ■ Diaphragm Pump

**DDP-90E**

**DDP-90EN**

**DDP-120B**

**DDP-120BN**

This instruction manual contains **IMPORTANT WARNINGS, CAUTIONS and INSTRUCTIONS**.  
Read and understand this instruction manual before use and retain for reference.



## ■ Important information - Safety precautions

- Equipment in this instruction manual is exclusively for coating purposes. Do not use for other purposes.
- Read and understand this instruction manual. The operator shall fully understand the requirements stated within the instruction manual including important warnings, cautions, operation and correct handling.
- Incorrect operation or mishandling can cause serious bodily, death, fire or explosion.




### ● Safety precautions

- The safety precautions in this instruction manual describe the minimum necessary information. Be sure to follow national and local regulations on fire prevention, electricity and safety as well as your own corporate regulations.
- Pay special attention to sections shown with the symbols below. The explanations of the symbols are as follows.

#### Warning and caution

 <b>WARNING</b>	This symbol indicates that a <b>potentially hazardous situation may result in serious injury or death if not followed.</b>
 <b>CAUTION</b>	This symbol indicates that a <b>potentially hazardous situation may result in Minor or moderate injury or death if not followed.</b>

#### Type of symbols

	This symbol indicates <b>you must use caution.</b> Explanation will be given near symbol.
	This symbol indicates <b>warning may cause physical harm.</b> Explanation will be given near symbol.
	This symbol indicates <b>recommendations or requirements.</b> Explanation will be given near symbol.

※We shall not be responsible for any injury or damage caused by disregard of warnings, cautions or instructions.

### ● Notes

<b>Important</b>	This symbol indicates important information needed to achieve full performance and function of the equipment.
<b>Hint !</b>	This symbol indicates useful knowledge and advice.

**Important information - safety precautions**

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# ■ 1. Safety Warnings

## WARNING

### Wear protective cover.

- During painting, be sure to wear protective cover such as glasses, mask or gloves to avoid serious injury caused by paints or solvents which might enter your eyes or you might inhale.



### Be careful about ventilation.

- Use it in well-ventilated place. Painting or cleaning in a narrow place with insufficient ventilation can cause organic solvent intoxication by sprayed mist of paint or volatile solvent.
- If you feel any abnormality during operation, consult a medical doctor immediately.



### Contact is forbidden.

- When paint leaks, never try to stop it by hand. In that case, close ball valve (for air) immediately, stop pump and open ball valve (for drain) and reduce paint pressure down to [0 MPa].



### Be careful about bodily injury.

- Never point gun toward a person or animal. Never pull trigger of gun when human body or fingers come near tip of air cap of gun. Paint can enter human body directly through eyes, mouth or skin. It is very dangerous. If you feel any abnormality or receive any injury, consult a medical doctor immediately.



### Limit of fluid to be used.

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

### Keep away from origins of explosions or fires.

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



### Be careful about ventilation.

- Use it in well-ventilated place. Painting or cleaning in a narrow place with insufficient ventilation can cause fire or explosion due to sprayed mist of paint or solvent which catches fire.

### Connect grounding.

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



## ■1. Safety Warnings

### **WARNING**

#### Be careful about explosion.

- Be sure to use paint pump at less than max. fluid operating pressure. Usage at more than max. fluid operating pressure can cause explosion of pump resulting in great danger.
- Never bend hose with a radius of less than 50mm. Never put heavy things on it (in order not to damage the hose). If done, hose can explode causing great danger.
- Securely connect hose to avoid leak and looseness. If hose is disconnected during operation, hazardous hose movement and paint ejection will cause severe bodily injury.
- Never use cracked, damaged, bent, crushed or distorted hose. Such a hose can cause great danger during operation.

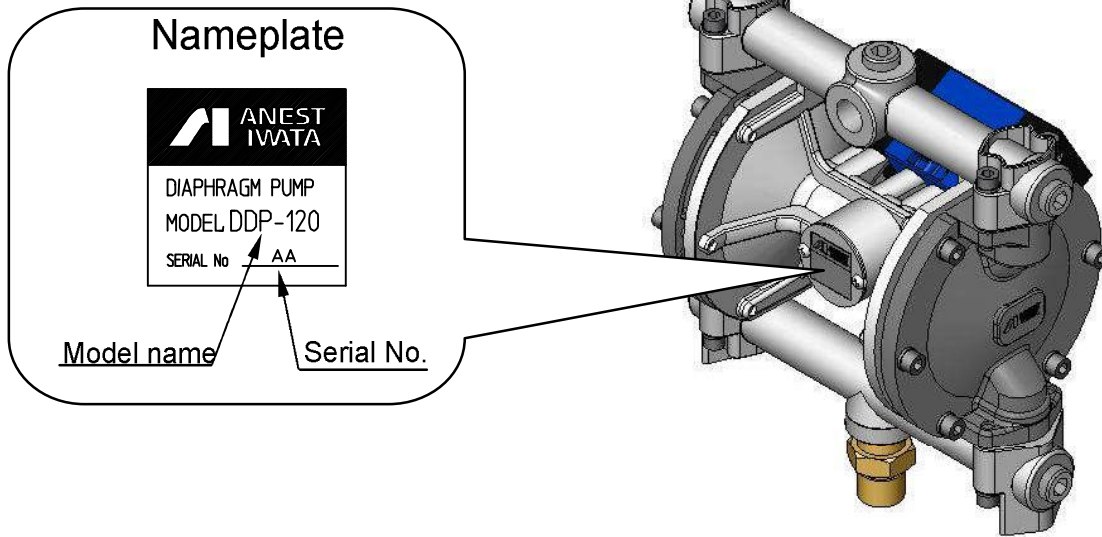


### **Important**

- Never alter the equipment.
- When you replace parts, be sure to use our genuine parts. If not done, it can cause insufficient performance or failure.
- Never use the following halogenated hydrocarbon solvents: methyl chloride, dichloromethane, 1,2 dichloroethane, carbon tetrachloride, trichloroethylene, 1,1,1-trichloroethane which can cause cracks or dissolution on gun body(aluminum) by chemical reactions. (Be sure that all fluids and solvents are compatible with gun parts. We are ready to supply a material list used in the gun on request.
- Please use stainless specification (DDP-90EN,DDP-120BN) for the liquid of the causticity (except PH6~8).
- Install or keep pump free of rain or splashes. If not done, it can cause pump failure.
- Install pump free of paint mist. Attached paint mist etc., can cause pump failure.
- Use clean air filtered through dryer and filter (less than 50 microns). If not done, it can cause pump failure.
- You can use pump without lubricating oil. If you lubricate oil by using a lubricator, use the following oil:  
kind of lubricating oil: turbine oil ISO VG32 or VG46  
Use of machine oil or spindle oil can cause pump failure.
- Do not use pump for oilless use which was once used with lubricating oil.  
If pump was once lubricated, the pump can cause failure unless it is lubricated again.

## ■2. Check the products

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



### List of accessories

Name of products	Q'ty	DDP-90E • DDP-90EN • DDP-120B • DDP-120BN
Dust proof cap	3	
Hex.Bar spanner (wrench flat 5mm)	1	
Instruction manual	1	(this instruction manual)
Assembly card	1	included
Caution card	1	included

- Check if accessories are included.
- If there is some damage or something is lost during transportation, do not use the product, and contact the shop which sold it to you.

## ■ 3. Specifications

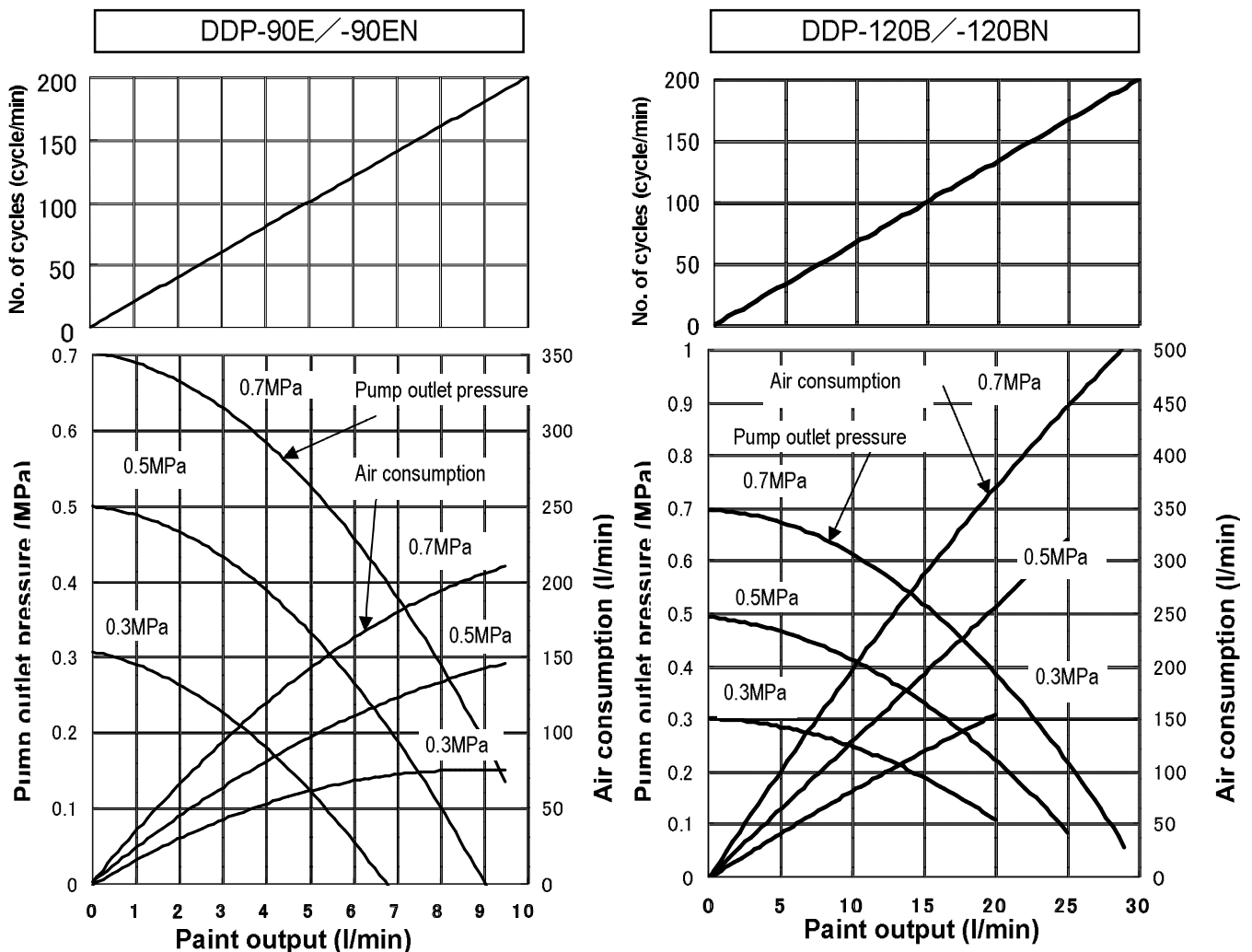
### 3-1 Specifications

Model		DDP-90E	DDP-90EN	DDP-120B	DDP-120BN
Type		General purpose	SUS	General purpose	SUS
Dimensions (L x W x H)	mm	186 x 213 x 220		223 x 207 x 274	
Mass	kg	3.1	5.0	4.0	7.2
Air Inlet		G1/4B			
Fluid Outlet		Rp 3/8			
Fluid Inlet		G1/2B			
Operating air pressure		0.15~0.7MPa (1.5~7bar)			
Max. Fluid Working Pressure		0.7MPa (7bar)			
Paint output/cycle	mL/cycle	50		150	
Max. paint output	L/min	※10		※30	
Max. cycles	cycle/min	200			
Fluid Temperature	°C	5~40			

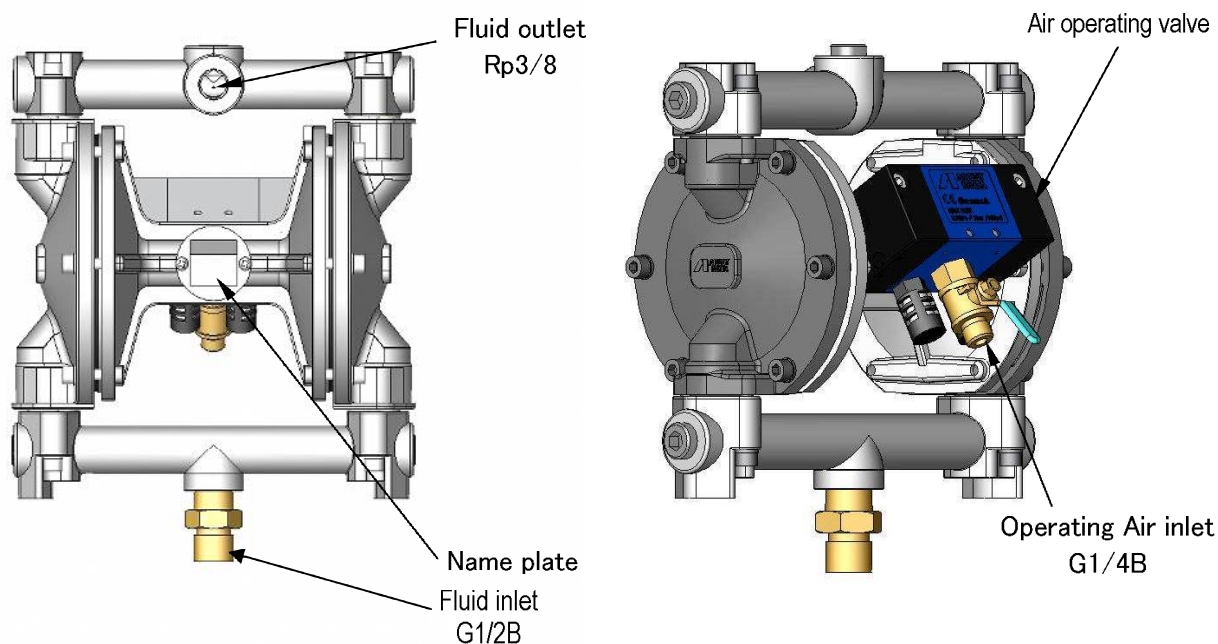
※Air pressure 0.7MPa, Fluid outlet opening

### 3-2 Performance curve

0.3 / 0.5 / 0.7MPa in graph shows



## ■4. Name of each section



## ■5. Before operation

### 5-1. Installation, connection and inspection

#### **WARNING**

- Securely connect hose to avoid leaks and looseness. If hose is disconnected during operation, hazardous hose movement and paint ejection will cause severe bodily injury.
- Securely ground pump, spray gun, workpiece and containers containing paint or solvent. Insufficient grounding will cause explosion or fire by spark of static electricity.



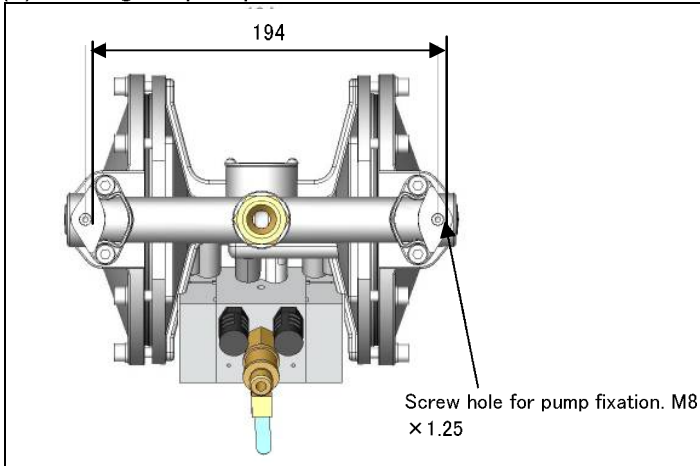
#### **Important**

- Install or keep pump free of rain or splashes. If not done, it can cause pump failure.
- Install pump free of paint mist. Attached paint mist etc., can cause pump failure.
- Use clean air filtered through dryer and filter (less than 50 microns). If not done, it can cause pump failure.
- Install pump free of paint mist. Attached paint mist etc., can cause pump failure.



## 5. Before operation

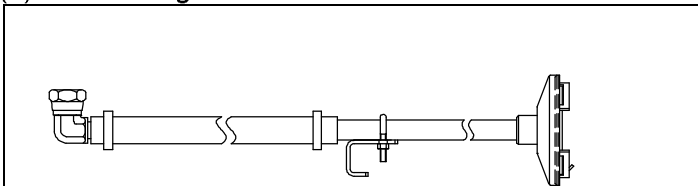
### (1) Setting for pump



**Job 1** Please confirm two holes (M8) are created in the lower adaptor of pump.

**Job 2** Please lock two bolts (M8) certainly.

### (2) Connecting suction tube

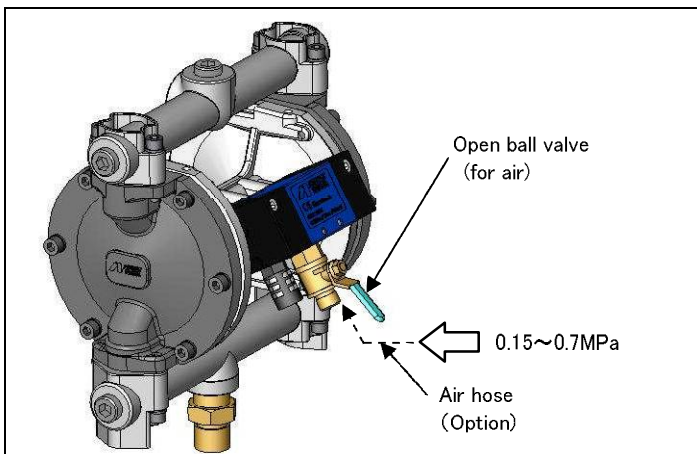


Connect suction tube on the fluid inlet on the diaphragm pump.  
Ensure attaching suction filter on the suction tube.

### 5-2 Checking operation

#### Important

- Do not idle pump operation. Idle operation can cause pump failure.
- Flush fluid passages of this unit completely with cleaning fluid (3~4 l). When first use or not-use for a long period.



Please open the ball valve (for air) to operate pump.

#### Hint!

- Do not use the following paints which can cause pump failure.
  - contains big solid matter,
  - contains solid matter of sharp shape,
  - has corrosiveness (except for PH6~8).

## ■6. Inspection and maintenance

### Important

Regarding ③ in the below chart, consult our distributor or the shop which sold it to you.  
If it is not done properly, it can cause poor performance.

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

No	Time	Inspection and maintenance
①	After every job ends	Inspect and clean filter.
②	Every 50~100 hours	Clean pump. ※When paint has lots of pigments or deposits easily, clean pump every 50 hours.
③	Every 1000 hours (about one year)	Overhaul the whole pump. ※Inspect and replace consumable parts.

## ■7. Problems and remedies

### Important

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

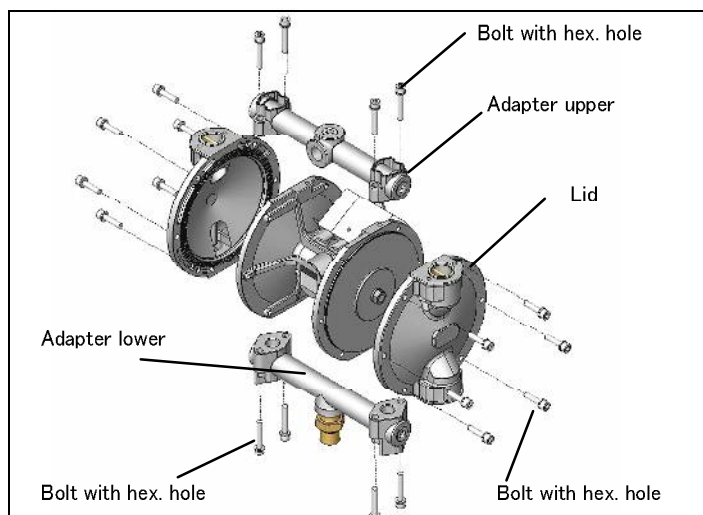
No	Problems	Causes	Remedies
①	Pump does not operate.	① Exhaust hole air operating valve is clogged. (refer to page 27).	① Inspect and clean exhaust hole of air operating valve.
		② Air pressure is insufficient.	② Increase air pressure.
		③ Ball valve is closing (air)	③ Open the ball valve (air)
		④ Diaphragm is damaged.	④ Disassemble, inspect, replace. ☆
		⑤ Ball of intake valve or exhaust valve is stuck.	⑤ Disassemble, inspect, clean. ☆
②	Pump operation is unstable. Output is small.	① Air pressure is insufficient.	① Increase air pressure.
		② Filter of intake hose set are clogged.	② Clean filter.
		③ Air is stored in pump.	③ Open drain ball valve and release air.
		③ Exhaust hole air operating valve is clogged. (refer to page 27).	④ Inspect and clean exhaust hole of air operating valve.
		⑤ Pump freezes.	⑤ Supply air dehumidified by dryer.
		⑥ Intake and exhaust valves are not properly seated.	⑥ Disassemble, inspect, replace. ☆
		⑦ Damage and wear of packings of rod and oilless bearing.	⑦ Disassemble, inspect, replace. ☆
		⑧ Damage on diaphragm.	⑧ Disassemble, inspect, or replace. ☆
		⑨ Inside of pump is clogged.	⑨ Disassemble, inspect, replace. ☆
③	Paint contains air.	① Intake hose set is loose.	① Tighten and secure connection.
		② Hole in intake hose.	② Replace hose.
		③ Lower adaptor is loose.	③ Tighten.
		④ Nut to hold diaphragm is loose or O ring is daaged.	④ Disassemble, inspect, tighten or replace. ☆
		⑤ Diaphragm is damaged.	④ Disassemble, inspect, replace. Disassemble, inspect, tighten or replace. ☆
		⑥ Seat packing is distorted or damaged.	⑥ Disassemble, inspect, replace. ☆
④	Paint leaks	① Connection is loose.	① Assemble again. ☆
		② Seat packing is distorted or damaged.	② Disassemble, inspect, replace. ☆
⑤	Air leaks	① Air operating valve are not fitted properly.	① Tighten and fit correctly.
		② Lid is not fitted properly.	② Assemble again. ☆
		③ Diaphragm is not fitted well.	③ Assemble again. ☆
⑥	Pump operates but paint does not come out.	① Filter of Intake hose set are clogged.	① Clean filter.
		② Inside of intake hose set are clogged.	② Disassemble, inspect, clean or replace. ☆

## ■8. Disassembly and Assembly

### 8-1. Pump

#### Important

- When fitting parts, tighten bolts with hex.hole evenly and diagonally by turns.  
Tightening torque    Adapter    90E series : 7.5N · m    120B series : 9N · m  
   Lid        90E series : 10N · m    120B series : 12N · m
- Pay attention to up-down direction of main body and fitting direction of adaptor (upper and lower sets).



**Job 1** Remove 4 bolts from upper section of pump and remove adaptor upper set.

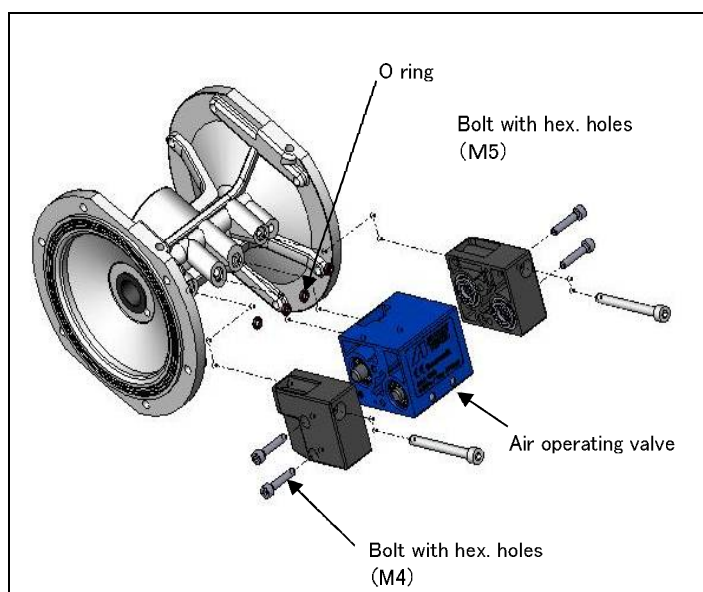
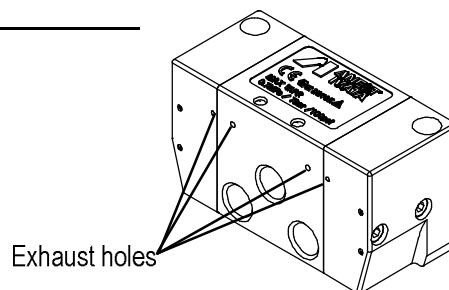
**Job 2** Remove 4 bolts from lower section of pump and remove lower adaptor.

**Job 3** Remove 12 bolts from lids on both sides and remove lids.

### 8-2. Air operating valve

#### Important

- As small holes on back of air operating valve are exhaust holes, do not allow paint or solvent to adhere. If it done, it can cause failure of pump.
- Do not clog  $\phi 9$  exhaust hole inside of blocks on both sides of air operating valve, if it done it can cause failure of pump

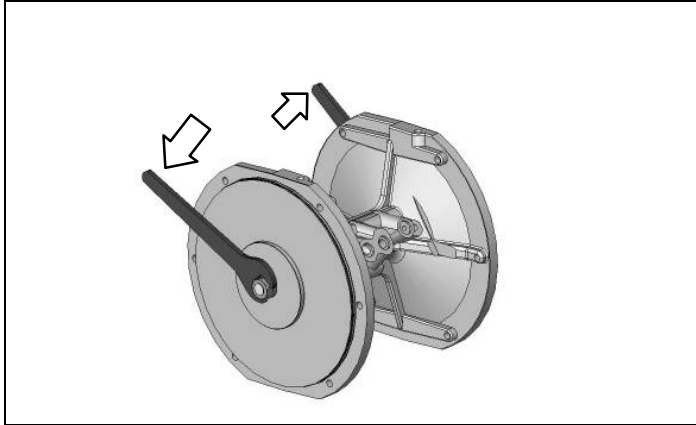


**Job 1** Remove 2 bolts with hex.hole(M5) and then air operating valve and o ring.

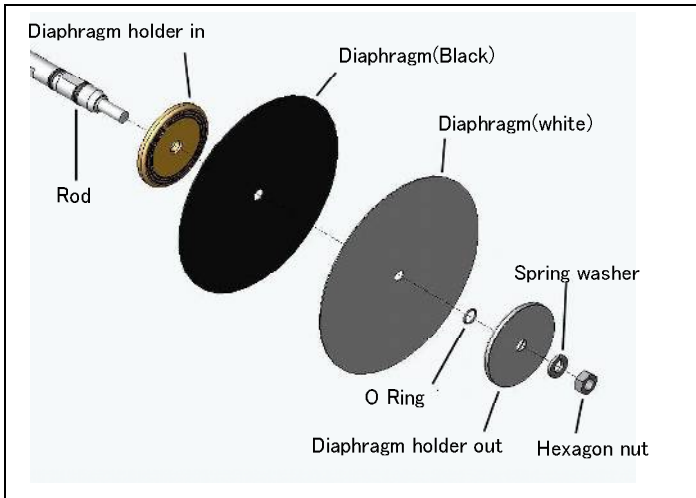
**Job 2** Remove 4 bolts with hex.hole(M4) on side of air operating valve and remove blocks on both sides.

## 8. Disassembly and Assembly

### 8-3. Diaphragm section

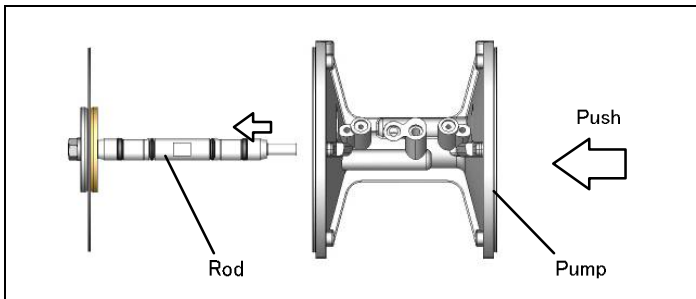


**Job 1** Loosen hex. nuts which are on both sides of diaphragm. You can remove either one of them.

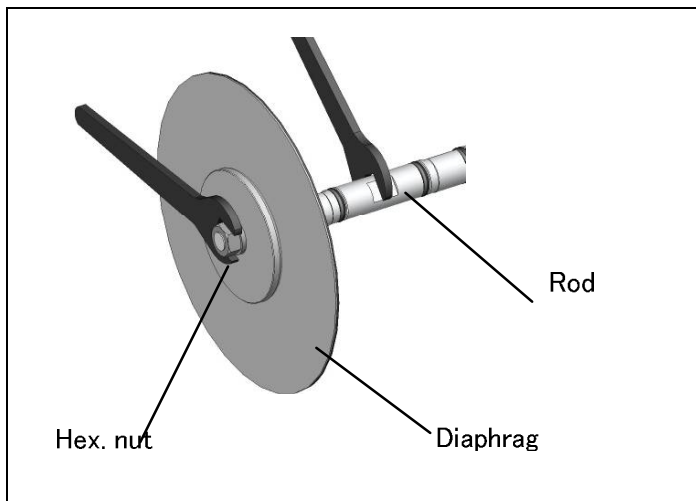


**Job 2** Remove the following parts beginning with the rod from the side where hex. nut is removed:

- ① Spring washer ×1 pc
- ② Diaphragm holder-out ×1 pc
- ③ O ring ×1 pc
- ④ Diaphragm set ×1 pc  
Diaphragm (White)  
Diaphragm (Black)
- ⑤ Diaphragm holder-in ×1 pc



**Job 3** While pushing the rod from the side where hex.nut is removed, hold diaphragm where hex. nut is not removed and pull rod from main body.



**Job 4** Hold center of rod, remove hex.nut and remove following parts beginning with the rod.

- ① Spring washer ×1 pc
- ② Diaphragm holder-out ×1 pc
- ③ O ring ×1 pc
- ④ Diaphragm set ×1 pc  
Diaphragm (White)  
Diaphragm (Black)
- ⑤ Diaphragm holder-in ×1 pc

During assembly, please observe the following tightening torque

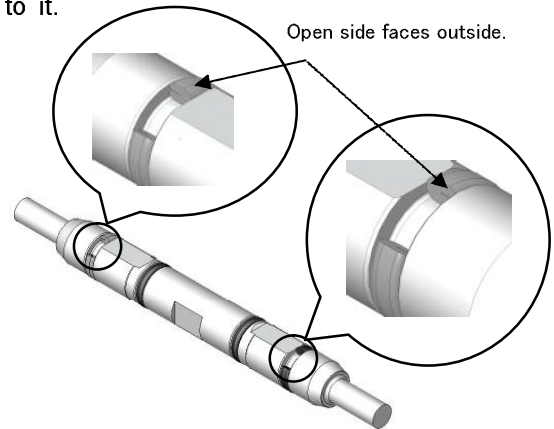
90E series : 20N•m

120B series : 20N•m

8-4 Rod section

**Important**

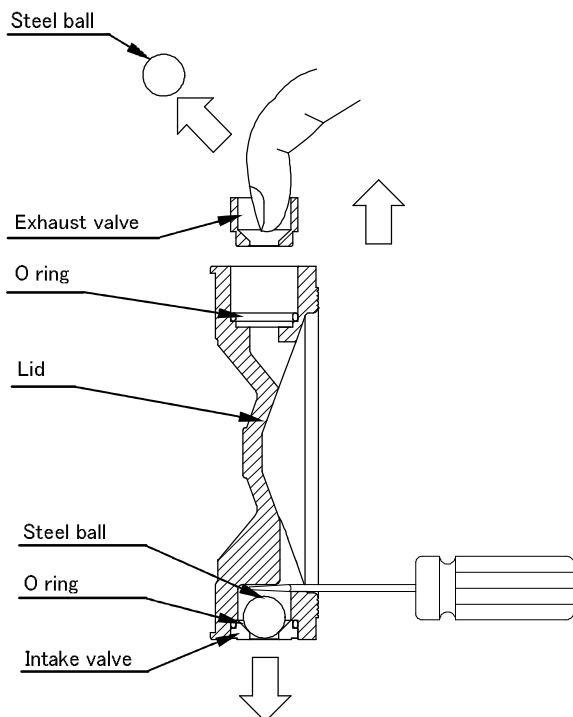
- Do not damage, bend rod, or attach dirt or foreign matter to it. If done, it can damage the rod.
- When fitting Y packing or O ring to rod, be sure to grease and careful about fitting direction. Do not damage Y packing or O ring. Wrong fitting can fail pump.
- Placing Y packing on the rod, make sure that open side of the packing faces outside.



8-5 Intake valve, exhaust valve

**Important**

- Be sure to fit O ring when fitting intake valve and exhaust valve. Wrong fitting of O ring can cause paint leakage.

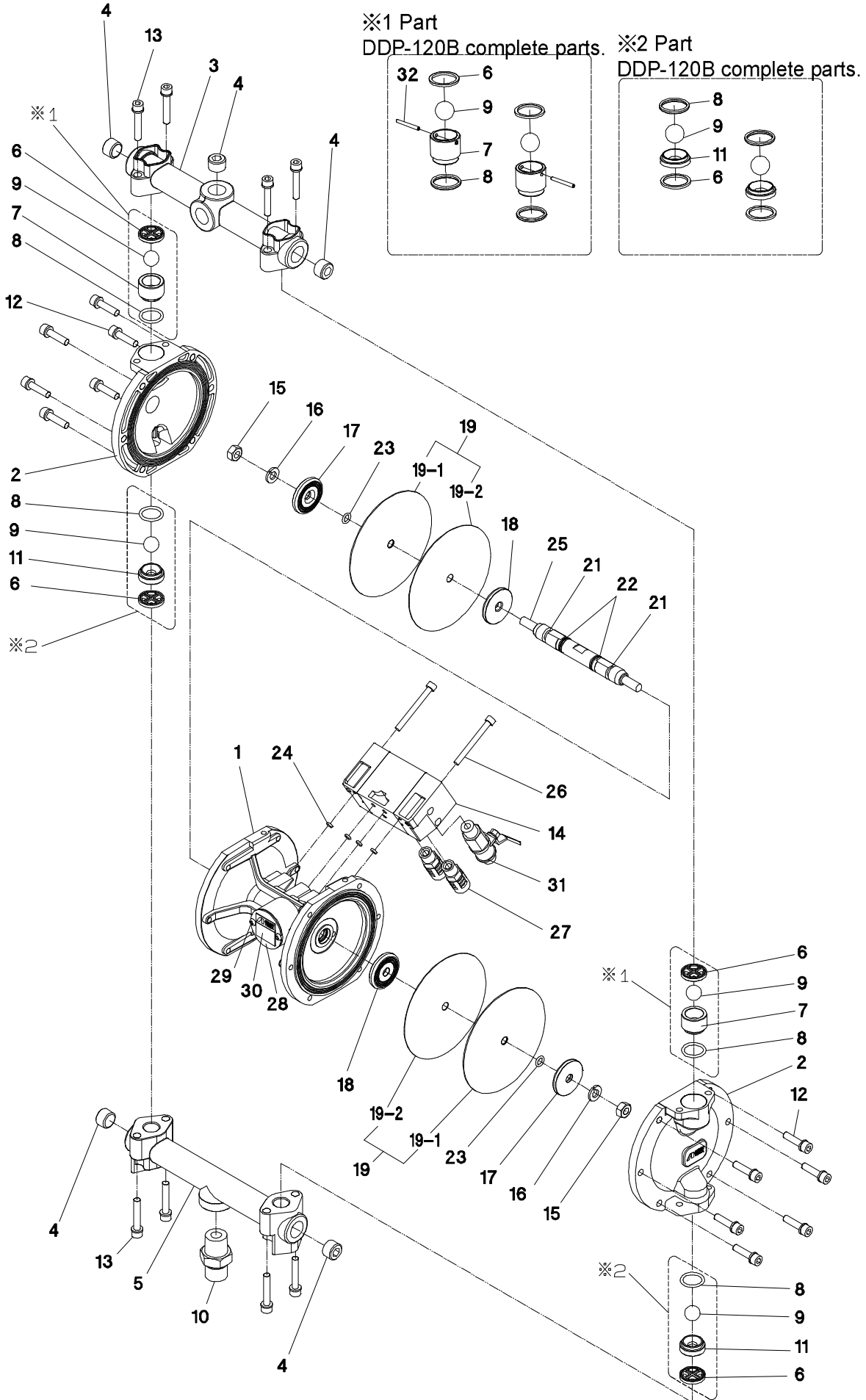


**Job 1** When removing intake valve, push steel ball from lid of paint room side with minus driver. You can remove both the steel ball and intake valve at the same time.

**Job 2** When removing exhaust valve, enter fingers into inside of exhaust valve and pull it.

# 9. Parts list

9-1 Diaphragm pump DDP-90E•DDP-90EN•DDP-120B•DDP-120BN



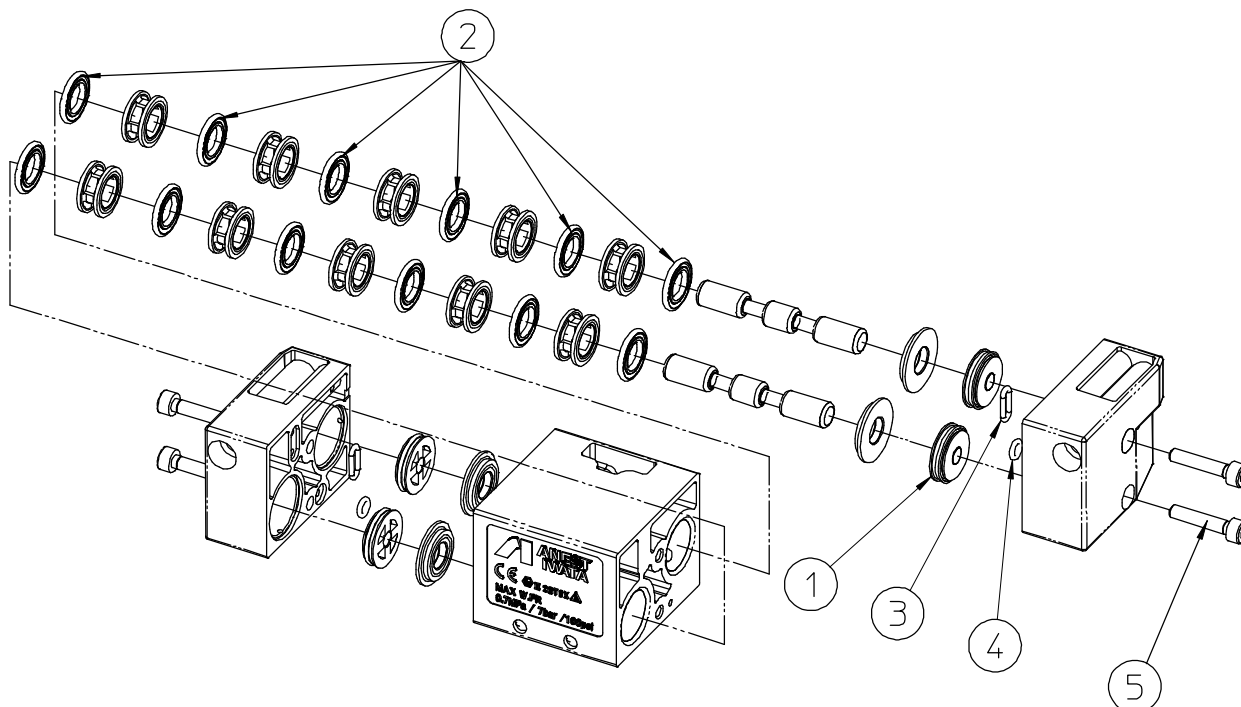
- ☆ marked parts are consumable parts.
- ○ or ● marked parts differ among onry model respectively.

No.	Parts name	Qty	90E	90EN	120B	120BN
1	Main body	1	○			●
2	Lid	2	It differs in all models			
3	Adaptor upper	1	○	●	○	●
4	Plug with hex. hole	4	○	●	○	●
5	Adaptor lower	1	○	●	○	●
☆ 6	Packing	4	○			●
☆ 7	Exhaust valve	2	○			●
☆ 8	O ring	4	○			●
☆ 9	Steel ball	4	○			●
10	Joint	1	○	●	○	●
☆ 11	Intake valve	2	○			●
12	Bolt with washer and hex. hole	12		○		
13	Bolt with washer and hex. hole	8		○		
☆ 14	Air operating valve (Spare parts set supplied with No.26 'bolt with hex. Hole')	1		○		
15	Hex. Nut	2		○		
16	Spring washer	2		○		
17	Diaphragm holder-out	2	○			●
18	Diaphragm holder-in	2	○			●
☆ 19	Diaphragm set	1	○			●
☆ 19-1	Diaphragm out	2	○			●
☆ 19-2	Diaphragm in	2	○			●
☆ 21	Y packing	2		○		
☆ 22	O ring	2		○		
☆ 23	O ring	2		○		
☆ 24	O ring	4	○			●
25	Rod	1		○		
26	Bolt with hex. hole	2		○		
27	Muffler	2		○		
28	Blanking cover	1		○		
29	Tapping screw	2		○		
30	Name plate	1	○			●
☆ 31	Ball valve	1		○		
☆ 32	Pin	2	—			●

## ■9. Parts list

### 9-2 Detailed drawing of air operating valve.

Service parts of air operating valve are supplied as a set of spare parts shown as below.



Spare parts set of air operating valve

No.	Part name	Qty	NOTE / SIZE
1	Piston set	4	Supplied as repair service kit
2	Spool packing	12	
3	O ring	2	S-8
4	O ring	2	S-4
5	Bolt with hex. hole	4	M4x20L







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