

PNEUMATIC DIAPHRAGM PUMP (GMB)

Material: aluminium alloy, stainless steel, cast iron, engineering plastics and fluoroplastics

Maximum fluid working pressure: 6.0bar

Maximum air input pressure: 7.0bar



MAINTENANCE MANUAL

Please read the manual carefully before use for your safety in use!

TABLE OF CONTENTS

Installation.....1
 Operation2
 Equipment maintenance.....3
 Troubleshooting3
 Maintenance instructions.....4
 Diaphragm maintenance.....5
 Parts6-7
 Overall dimensions8-13
 Characteristics of diaphragm materials.....Back cover

Specification List: ● = Available / = N/A

Type	Feed Inlet/Outlet	Connecting Type			Pump Body Material					
		NPT	BSPT	Flange	Cast iron	Aluminum alloy	Stainless steel	PPR	PVDF	Fluorinated ethylene propylene (F ₄₆)
GMB-10	3/8"	●	●	/	●	●	●	●	●	/
GMB -15	1/2"	●	●	/	●	●	●	●	●	/
GMB -25	1"	●	●	●	●	●	●	●	●	●
GMB -40	1 1/2"	●	●	●	●	●	●	●	●	●
GMB -50	2	●	●	●	●	●	●	●	●	/
GMB -65	2 1/2"	●	●	●	●	●	●	●	●	/
GMB -80	3"	●	●	●	●	●	●	/	/	/
GMB -100	4"	/	/	●	●	●	●	/	/	/

Material Code

Material	English Abbreviation	Abbreviation Code	Material	English Abbreviation	Abbreviation Code
Cast iron	Cast iron	C	Fluorinated ethylene propylene	Teflon-FEP	TFF
Aluminum alloy	Aluminum	A	Polytetrafluoroethylene	PTFE	F4
Stainless steel	Stainless steel	S	Butadiene-acrylonitrile rubber	Buna-N	B
Polypropylene	PP	PP	Neoprene	Neoprene	N
Polyethylene	PE	PE	Ethylene-propylene rubber	EPDM	E
Vinylidene fluoride	PVF2	K	Fluorine rubber	Viton	V

MATERIAL INSTRUCTIONS

Pump body material: 1. Cast iron (C); 2. Aluminum alloy (A); 3. Stainless steel (S); 4. Polypropylene (PP); 5. Polyvinylidene fluoride (K)
Diaphragm material: 1. Butadiene-acrylonitrile rubber (B); 2. Neoprene (N); 3. Fluorine rubber (V); 4. Polytetrafluoroethylene (F4); 5. Fluorinated ethylene propylene (TFF)
Sealing ball: 1. Butadiene-acrylonitrile rubber (B); 2. Neoprene (N); 3. Fluorine rubber (V); 4. Polytetrafluoroethylene (F4); 5. Ceramic (A)
Sealing ball seat: 1. Butadiene-acrylonitrile rubber (B); 2. Neoprene (N); 3. Fluorine rubber (V); 4. Polytetrafluoroethylene (F4)

INSTALLATION

GENERAL

The typical installation as shown in the figure is only for general instructions for selecting and installing system parts, and you can contact our technical department to get help in system design.

WARNING

To reduce personal injuries caused by splashing of toxic or corrosive fluids onto skin or into eyes, please don't move the pump when there is pressure inside it. Once the pump falls, the fluid will splash or leak, so please release pressure before moving the pump.

If the pump needs to be moved when it's very heavy, two persons or above shall grasp the pump's discharge pipe firmly, lift it up and then move it.

AIR PIPELINE

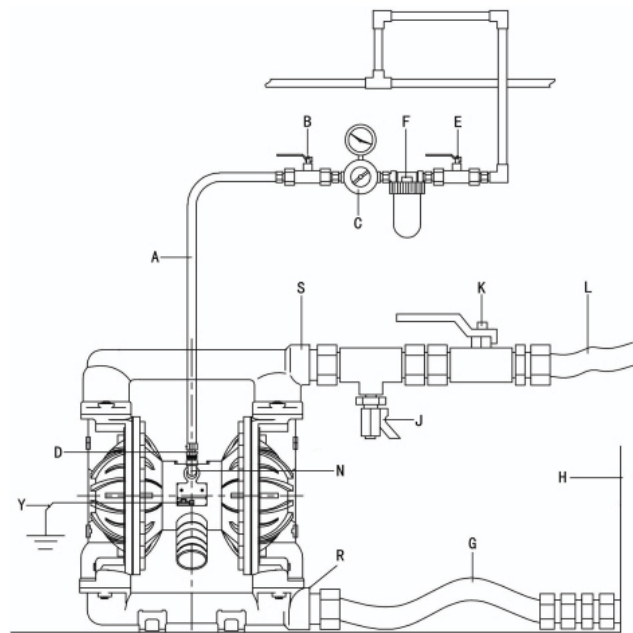
WARNING

A pressure relief main air valve (B) shall be mounted in the pump to release the remaining air supply accumulated between the valve and the pump. The air accumulated in the pump can lead to the pump's accidental actions easily and accordingly result in possible personal injuries, such as splashing of toxic and corrosive fluids onto skin or into eyes.

1. Install accessories of the air supply pipe as shown in the figure. Fix those accessories on walls or brackets and ensure that such accessories are conductive.
 - a. Install an air transformer and an air pressure gauge (C) to control the fluid pressure, and the fluid's outlet pressure shall be in conformity with the set pressure of the transformer.
 - b. A pressure relief main air valve (B) is mounted close to the pump to release accumulated air, and another main valve (E) is mounted in the upper reaches (in the direction of air admission) of all air pipe accessories so as to isolate this part in cleaning and maintenance.
 - c. Install an air filter (F) to filter dust and water in the compressed air supply.
2. Connect the air supply pipe's quick joint (D) to one end of the air pipe. To avoid accidents, don't connect the quick joint to the air supply joint before preparations for starting the pump have been finished.

FIXING OF PUMP

- Make sure that the bracket can support weight of the pump, the hose and accessories as well as vibrations caused by running of the pump.
- Fluid suction tube: use a grounded suction tube (G) and make sure the pump's fluid inlet (R) tightens the liquid inlet joint.



- A. Air supply pipe
- B. Pressure relief air valve (ball valve)
- C. Air transformer
- D. Air supply pipe quick joint
- E. Main air valve (ball valve)
- F. Air supply filter
- G. Liquid suction tube
- H. Liquid feed vessel
- J. Liquid discharge valve
- K. Liquid globe valve (ball valve)
- L. Liquid pipe
- N. Air supply inlet
- R. Fluid inlet
- S. Fluid outlet

- If the pump's fluid inlet pressure is 25% higher than the outlet pressure, the ball valve will not be able to be closed at an enough speed, thus leading to the pump's inefficient running.
- When the liquid inlet pressure is higher than 1bar, the diaphragm's life will be shortened.

REMOVAL OF FLUID PIPE

1. The pump's fluid outlet (S) tightens the liquid outlet joint reliably.
2. A liquid discharge valve (J) is mounted near the fluid outlet.
3. A globe valve (K) is mounted on the fluid outlet pipeline.

OPERATION

FIRST OPERATION

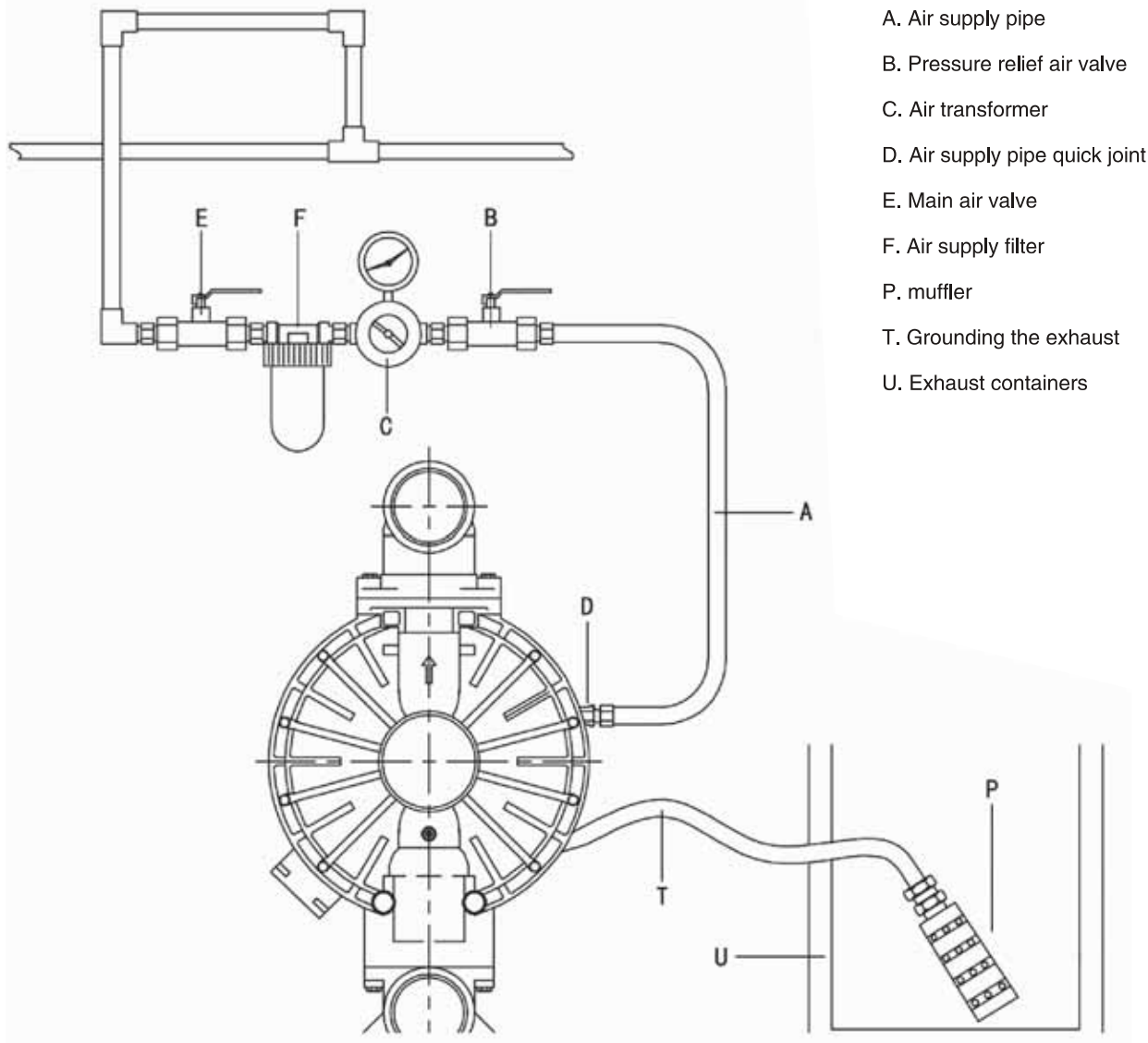
1. Wash the pump before first operation.
2. The pump is tested with water before delivery, and if water may contaminate your working fluid, it's necessary to use a dissolving solvent to clean the pump thoroughly.
3. Don't limit exhausting of air at the air discharge port because excessive limiting of the air discharge port may result in instable running of the pump.
4. Open the air transformer (C) slowly until the pump begins to start; keep the pump running slowly until all air in the pipeline is exhausted; and then start the pump all around. Run the pump for some time in washing to clean the pump and the pipeline thoroughly.
5. It's necessary to double check, debug and overhaul the pump at the end of each shift.

INSTALLATION OF LONG-DISTANCE DISCHARGE PORT

CAUTION

Air exhausted from the pump may contain pollutants, and if it may contaminate your working fluid, please put it far away for exhaust and ventilation. See the diagram.

1. Unload the muffler (P) on the pump's discharge port.
2. Install a grounded air exhaust pipe (T) and connect the muffler to the other end of the pipe. If the pipe's length is more than 4.5m, it's necessary to use a pipe with a bigger diameter to prevent the pipe from being folded or twisted.
3. Place a vessel (U) below the air discharge port to collect the fluid discharged from the air discharge port when the diaphragm goes wrong.



EQUIPMENT MAINTENANCE

LUBRICATION

The air valve is designed to be free of lubricating oil, and if required, two drops of lubricating oil (white oil) can be applied into the pump's air inlet every 200 hours or once half a month. Don't apply too much lubricating oil because oil is discharged from the muffler and may contaminate the fluid supply or other devices, and excessive lubricating oil may cause faults of the pump.

WASHING AND STORAGE

Wash the pump often to prevent the fluid from getting dry and hard or being frozen to damage the pump. Before storing the pump (whether for long or for a short time), wash the pump with a dissolving solvent.

TIGHTEN BOLTS AT JOINTS

Check all hoses before each operation, and replace them immediately if necessary. Check and make sure that all bolts have been tightened and will not leak. Check the fastening state of bolts every 3 months at least.

PREVENTIVE MAINTENANCE MEASURES

To establish a preventive maintenance system is very important for prevention from splashing or leak caused by damages to the diaphragm.

TROUBLESHOOTING

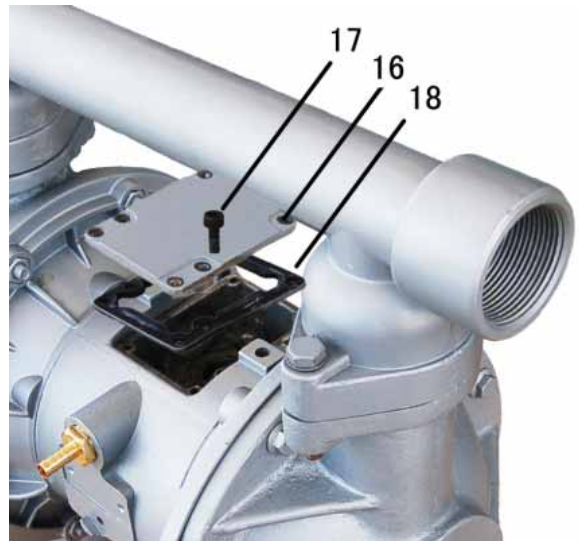
Note: Check and remove reasons for all possible faults before disassembling the pump.

Symptom	Reason	Solution
The pump cannot maintain the pressure in a halted state	The ball (3) or the ball seat (4) is worn out.	Replace the worn part.
The pump fails to work or just stops after working once	The air valve is jammed or dirty.	Wash the air valve.
	The ball (3) is seriously worn out or seized inside the ball seat (4) or the feed (1; 6) pipe.	Replace the ball or the ball seat.
	The air valve is jammed.	Release pressure and wash the valve.
The pump running is not stable	The suction tube is jammed.	Check the suction tube and clean it.
	The ball (3) is tenacious or the ball seat (4) fails.	Clean or replace it.
	The diaphragm (9) is broken.	Replace it.
	Air exhausting is suffocated.	Remove air exhausting restrictions or replace.
There are air bubbles in the fluid	The suction tube is loose.	Tighten the suction tube.
	The diaphragm (9) is broken.	Replace it.
	The feed pipe (6) is loose and the seal between the feed pipe and the ball seat (4) is damaged.	Tighten the bolt (2) and replace the ball seat (4).
	The external press plate bolt (7) is loose.	Tighten or replace it.
	The O-ring (5) is damaged.	Replace it.
The exhausted air contains the fluid	The diaphragm (9) is broken.	Replace it.
	The external press plate bolt (7) is loose.	Tighten or replace it.
	The O-ring (5) is damaged.	Replace it.
Excessive air is exhausted when the pump stops	The air valve set's air change ring (21), O-ring (20), air change press disc (22), locating piece (28), piston O-ring (27) or pilot pin O-ring (24) is worn out.	Repair or replace it.
	The pitman shaft O-ring (32) is worn out.	Replace it.
There is air leakage inside the pump	The air valve bonnet (16) or bolt (17) is loose.	Tighten the bolt.
	The air valve's sealing gasket (18) or intermediate washer (14) is damaged.	Check and replace it.
	The air valve bonnet bolt (17) is loose.	Tighten the bolt.
The fluid leaks from the check valve inside the pump	The feed pipe (1; 6) is loose and the seal between the feed pipe and the ball seat (4) is damaged.	Tighten the feed pipe bolt (2) and replace the ball seat (4).

MAINTENANCE INSTRUCTIONS

MAINTENANCE OF AIR VALVE (RIGHT FIGURE)

1. Disassemble 6 bolts (17), the air valve bonnet (16) and the sealing gasket (18).
2. Move the air valve slider (19) to the middle position and unload it; disassemble the air change ring (21) and the O-ring (20); and clamp out the pilot valve block (28) vertically with nipper pliers.
3. Disassemble two drive pistons (26) and the piston O-ring (27) from the bearing (30), the pilot pin (25) from the linked connecting rod and the O-ring (24) from the pilot pin (25).
4. Check the press disc (22), and if it's damaged, disassemble 3 bolts (29), the press disc (22) and the sealing gasket (23).
5. Check the piston bearing and the linked connecting rod (30, 31), and if the piston bearing and the linked connecting rod are taper and damaged, it's necessary to disassemble parts of the fluid part first and then take them out from the outside.
6. Clean all parts, check whether any of them is worn out or damaged, and replace them if necessary.

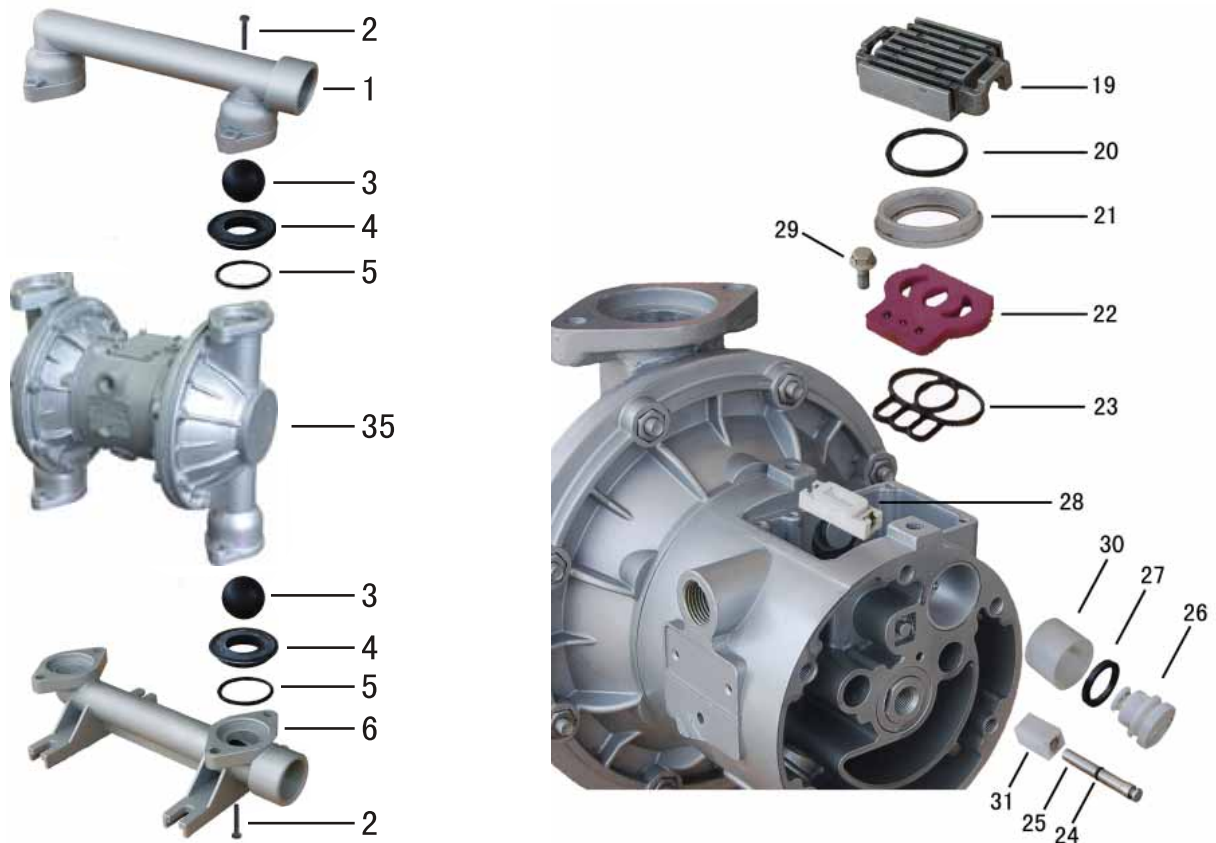


MAINTENANCE OF BALL VALVE (FIGURE BELOW)

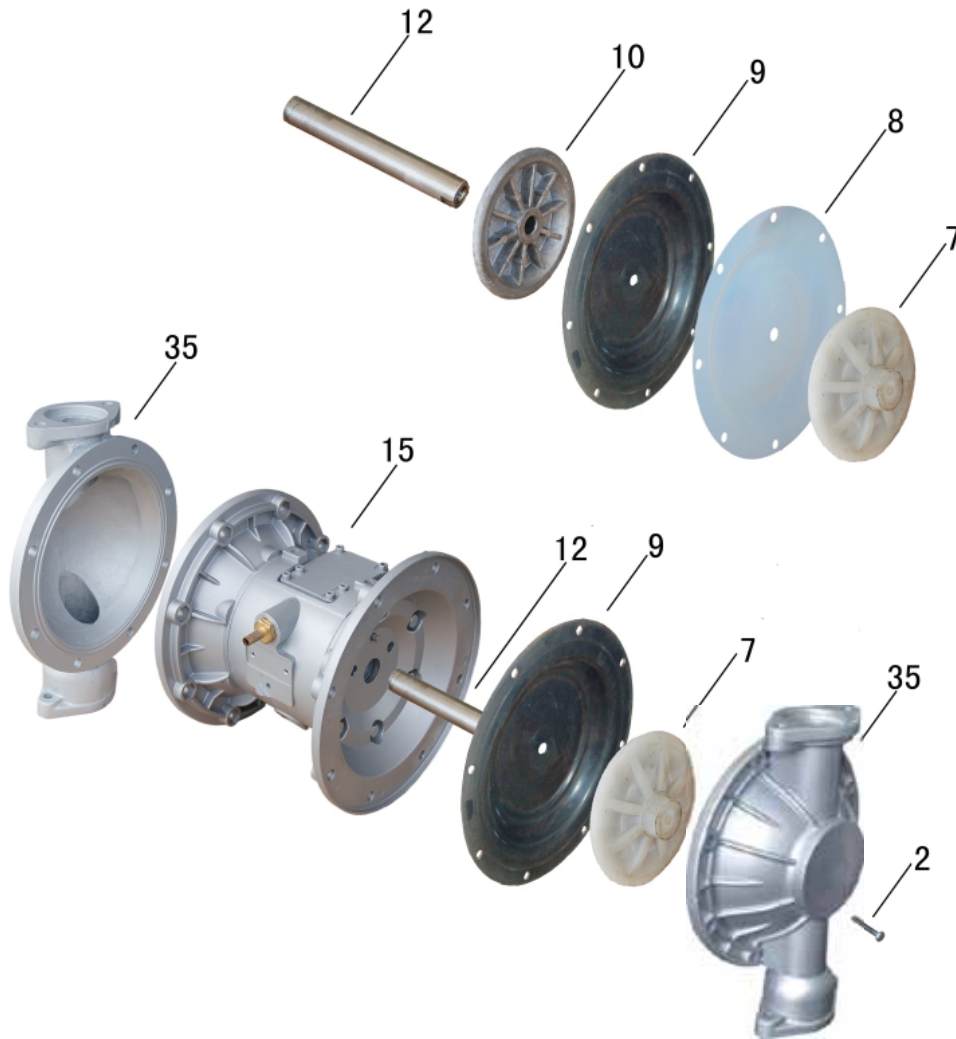
1. Unload the bolt (2) on the feed/discharge pipe (1; 6) and 4 bolts (2) on the column (35) with a socket wrench, and take out the ball (3), the ball seat (4) and the gasket ring (5) from the feed/discharge pipe (1; 6).

Caution! Some types of pumps are not provided with O-rings (5).

2. It's necessary to clean all parts, check whether any of them is worn out or damaged, and replace them if necessary.



DIAPHRAGM MAINTENANCE



DIAPHRAGM MAINTENANCE

1. Disassemble the feed/discharge pipe (1; 6) and the bolt (2) on the pump body to take out the column (35).
2. Release the external press plate (7), disassemble the bolt on one end of the pitman shaft (12) and unload the external press plate (7), the teflon diaphragm (8) (used in the teflon diaphragm set only), the diaphragm (9) and the internal press plate (10).

Caution! The pump with a teflon diaphragm includes a teflon diaphragm (8) and a rubber lining membrane (9).

3. Pull out the pitman shaft (12) and the other diaphragm (9) from the intermediate (15), clamp the spanner jaw of the pitman shaft with a monkey wrench and disassemble the other press plate (7) and the diaphragm.
4. Check abrasion and wrench conditions of the pitman shaft (12) and the bearing (33), and replace them if damaged.
5. Insert the prying tool of the O-ring into the intermediate (15) to hook out the connecting rod O-ring (32), and this step can be performed on condition that the bearing (33) is not unloaded.

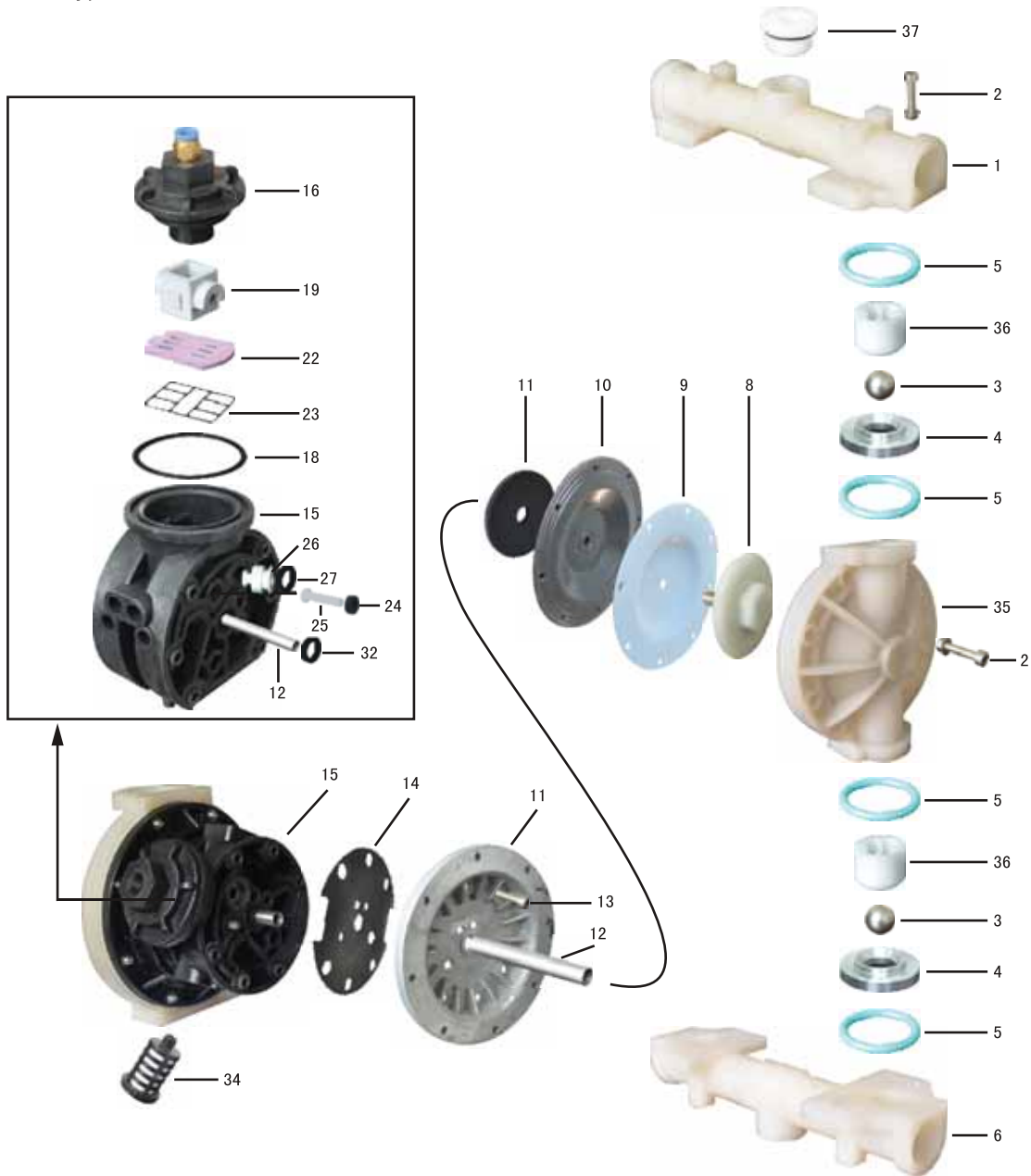
6. Clean all parts, check their abrasion and damages, and replace worn parts if necessary.

REINSTALLATION

1. Apply grease onto the axle pitman shaft O-ring (32) and install with the lip outwards.
2. Apply grease onto the pitman shaft (12) and mount it into the intermediate (15).
3. Install the diaphragm internal press plate (10), the diaphragm (9), the teflon diaphragm (8) and the diaphragm external press plate (7) in a correct way; and such parts must be installed correctly.
4. Apply the anti-loosening glue onto the thread of the external press plate (7) at the liquid end and tighten it with a wrench.
5. Connect the column (35) to the intermediate (15).
6. First tighten the long bolt and then the short one.
7. Reassemble the ball, the ball seat and the inlet/outlet pipe in a sequential order.

PARTS

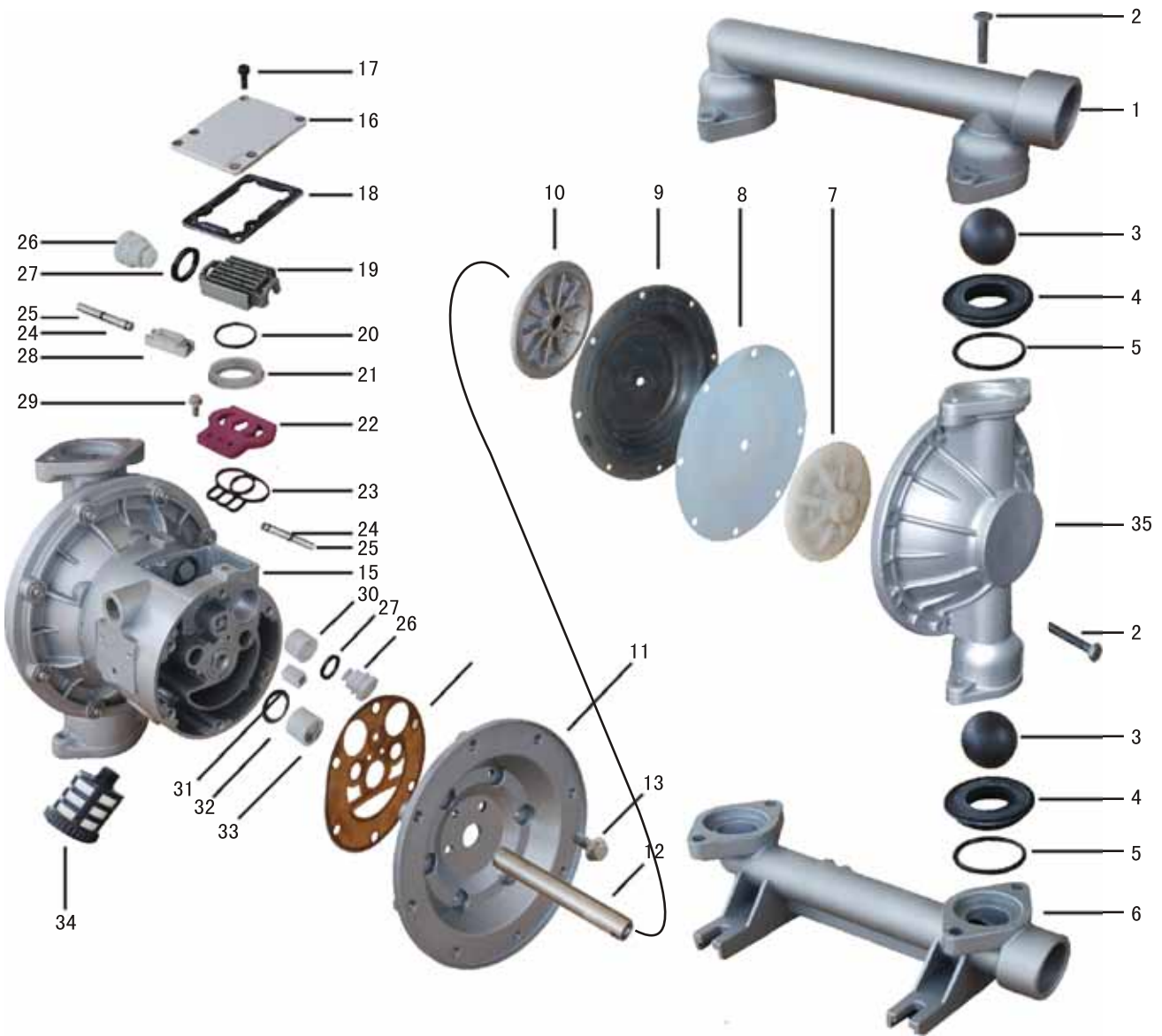
GMB10-15 Type



SN	Part Name	SN	Part Name	SN	Part Name	SN	Part Name
1	Discharge pipe	9	Teflon diaphragm	16	Air valve cover plate	26	Transmission piston
2	Bolt	10	Rubber diaphragm	18	o-ring	27	o-ring
3	Sealing ball	11	Internal press plate	19	seat	32	o-ring
4	Sealing ball seat	12	Pitman shaft	22	In air pressure plate	34	muffler
5	O-ring	13	Bolt	23	gasket	35	Column
6	Feed pipe	14	Intermediates gaskets	24	o-ring	36	Sealing ball set
8	External press plate	15	intermediates	25	Bolt positioning	37	bulkhead

PARTS

GMB25-50 Type



SN	Part Name	SN	Part Name	SN	Part Name	SN	Part Name
1	Discharge pipe	10	Internal press plate	19	Slider	28	Pilot valve block
2	Bolt	11	Pump bonnet	20	O-ring	29	Bolt
3	Sealing ball	12	Pitman shaft	21	Air change ring	30	Piston bearing
4	Sealing ball seat	13	Bolt	22	Air change press disc	31	Linked connecting rod
5	O-ring	14	Intermediate washer	23	Sealing gasket	32(27)	Pitman shaft O-ring
6	Feed pipe	15	Intermediate	24	Pilot pin O-ring	33	Connecting rod bearing
7	External press plate	16	Air valve cover plate	25	Pilot pin	34	Muffler
8	Teflon diaphragm	17	Bolt	26	Drive piston	35	Column
9	Rubber diaphragm	18	Sealing gasket	27	Piston O-ring		

GMB-10/15



Aluminum alloy



Stainless steel

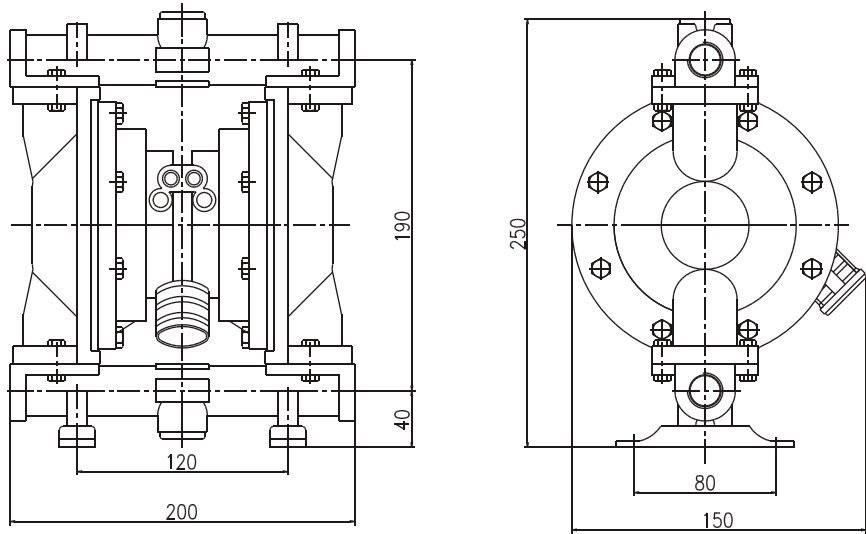


Fluoroplastics



Polypropylene

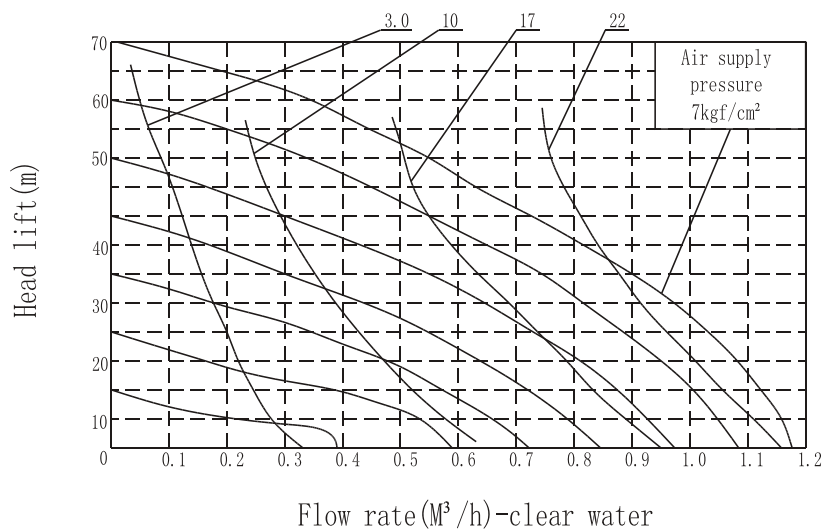
INSTALLATION DIMENSIONS



TECHNICAL PARAMETERS

Flow	0 ~ 2.4 m ³ /h				
Lift head	0 ~ 70 m				
Outlet pressure	0 ~ 6 kgf/cm ²				
Suction lift	0 ~ 5 m				
Allowable diameter of grains passing	0 ~ 1 mm				
Air supply pressure	0 ~ 7 kgf/cm ²				
Air consumption	0 ~ 300 L/min				
Inlet	1/4 inch				
Outlet	1/4 inch				
Net content kg	C:8	L:5	S:6.5	F:3	F2:3.5
Gross weight kg	Carton packaging, plus: 1.0kg				

15 Air consumption (m³/h)



GMB-25



Aluminum alloy



Engineering plastic

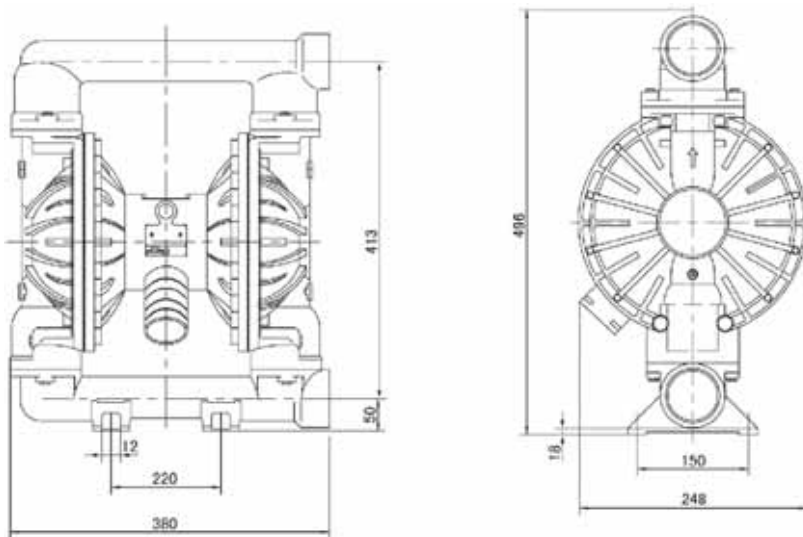


Stainless steel



Teflon lining

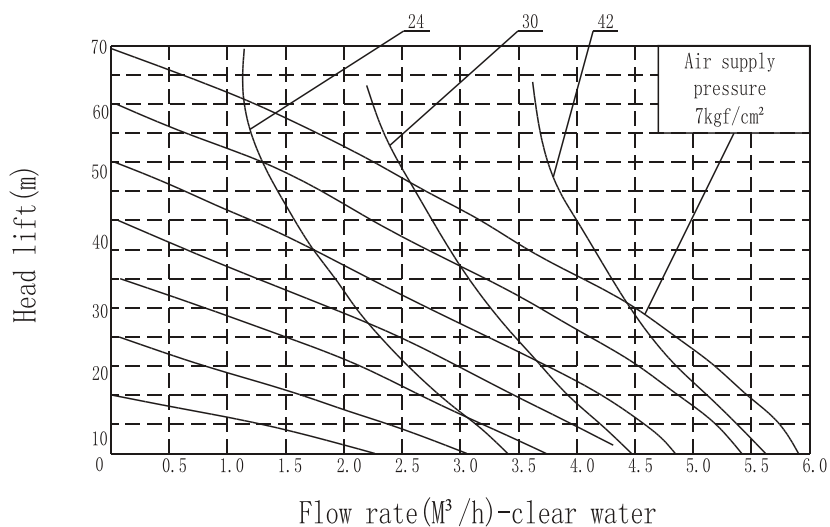
INSTALLATION DIMENSIONS



TECHNICAL PARAMETERS

Flow	0 ~ 3.6 m ³ /h				
Lift head	0 ~ 70 m				
Outlet pressure	0 ~ 6 kgf/cm ²				
Suction lift	0 ~ 5 m				
Allowable diameter of grains passing	0 ~ 2.5 mm				
Air supply pressure	0 ~ 7 kgf/cm ²				
Air consumption	0 ~ 600 L/min				
Inlet	1/2 inch				
Outlet	3/4 inch				
Net content kg	C:33	L:20	S:29	F:12	F2:14
Gross weight kg	Carton packaging, plus: 1.8kg				

25 Air consumption (m³ /h)



GMB-40



Aluminum alloy



Engineering plastic

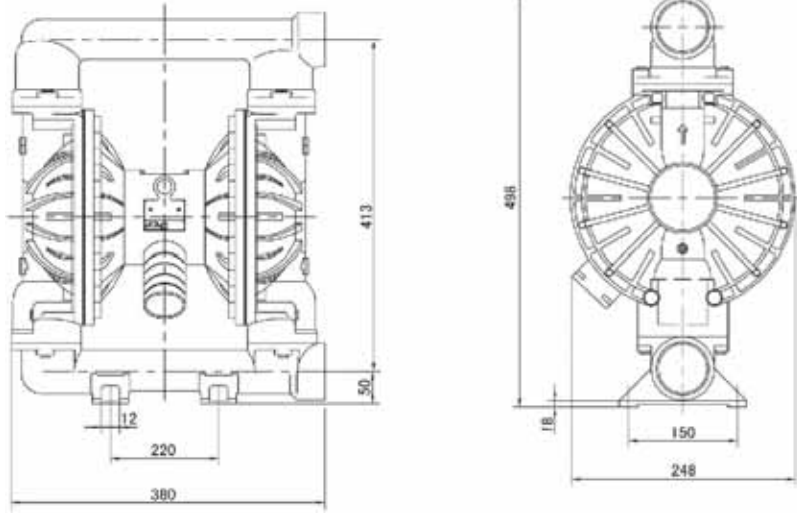


Stainless steel



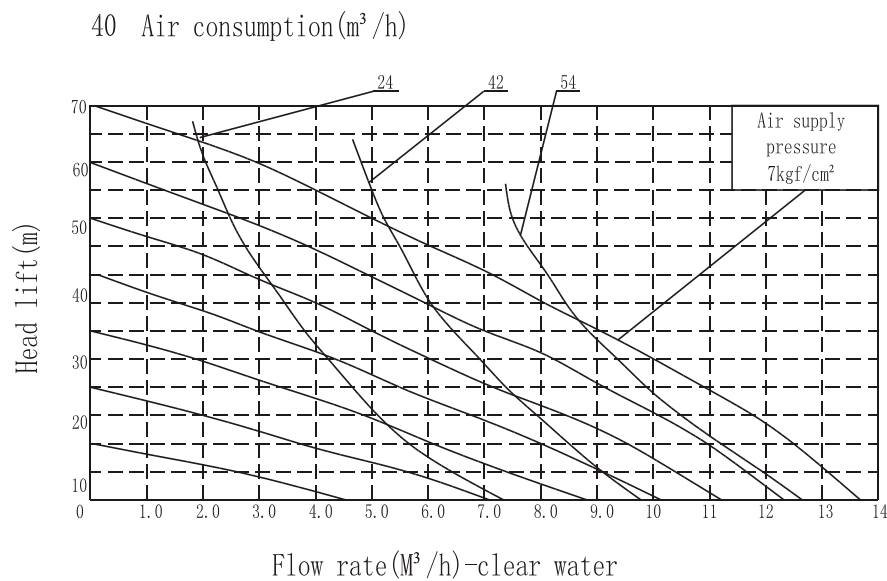
Teflon lining

INSTALLATION DIMENSIONS



TECHNICAL PARAMETERS

Flow	0 ~ 12.5 m ³ /h				
Lift head	0 ~ 70 m				
Outlet pressure	0 ~ 6 kgf/cm ²				
Suction lift	0 ~ 5 m				
Allowable diameter of grains passing	0 ~ 4.5 mm				
Air supply pressure	0 ~ 7 kgf/cm ²				
Air consumption	0 ~ 600 L/min				
Inlet	1/2 inch				
Outlet	3/4 inch				
Net content kg	C:34	L:20	S:30	F:12	F2:14
Gross weight kg	Carton packaging, plus: 1.8kg				



GMB-50



Engineering plastic



Aluminum alloy

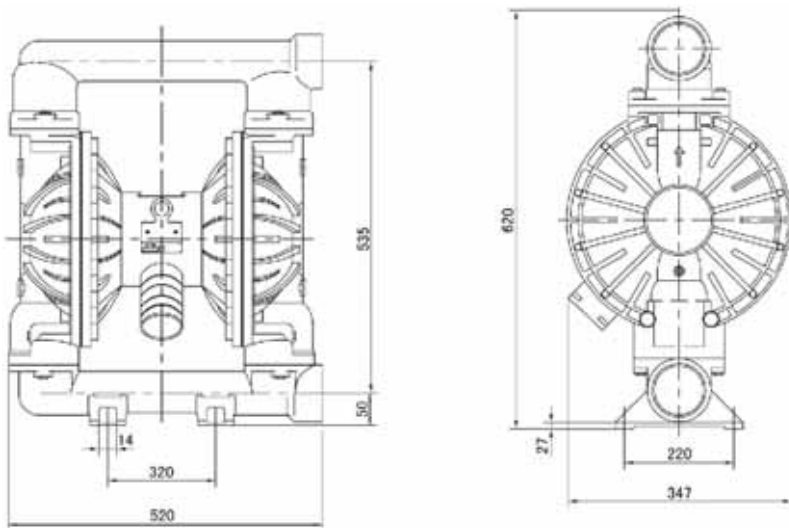


Stainless steel



Teflon lining

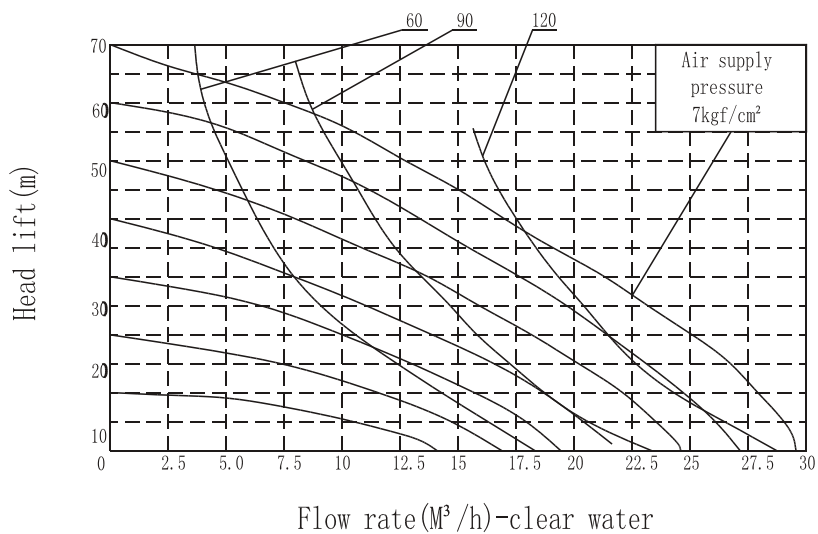
INSTALLATION DIMENSIONS



TECHNICAL PARAMETERS

Flow	0 ~ 22	m ³ /h		
Lift head	0 ~ 70	m		
Outlet pressure	0 ~ 6	kgf/cm ²		
Suction lift	0 ~ 5	m		
Allowable diameter of grains passing	0 ~ 8	mm		
Air supply pressure	0 ~ 7	kgf/cm ²		
Air consumption	0 ~ 900	L/min		
Inlet	1/2	inch		
Outlet	3/4	inch		
Net content kg	C:74	L:54	S:75	F:
Gross weight kg	Carton packaging, plus: 18kg			

50 Air consumption (m³/h)

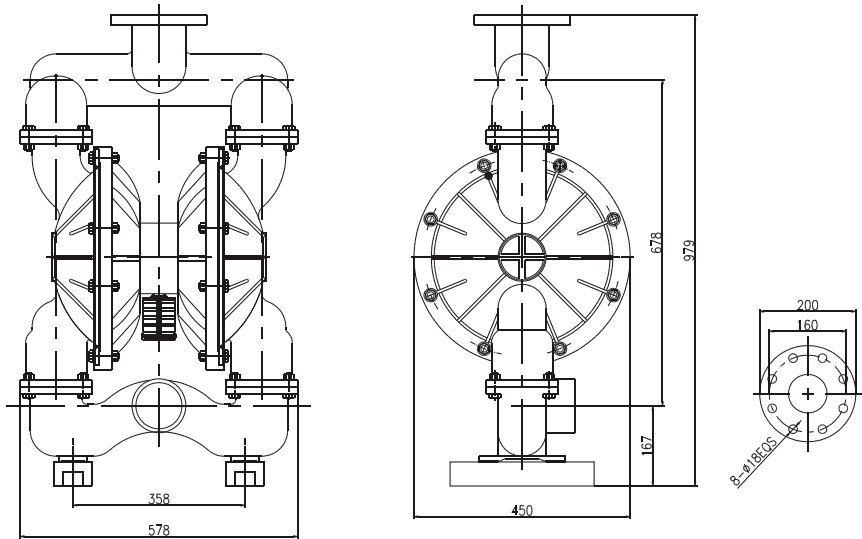


GMB-80

INSTALLATION DIMENSIONS



Metal pump



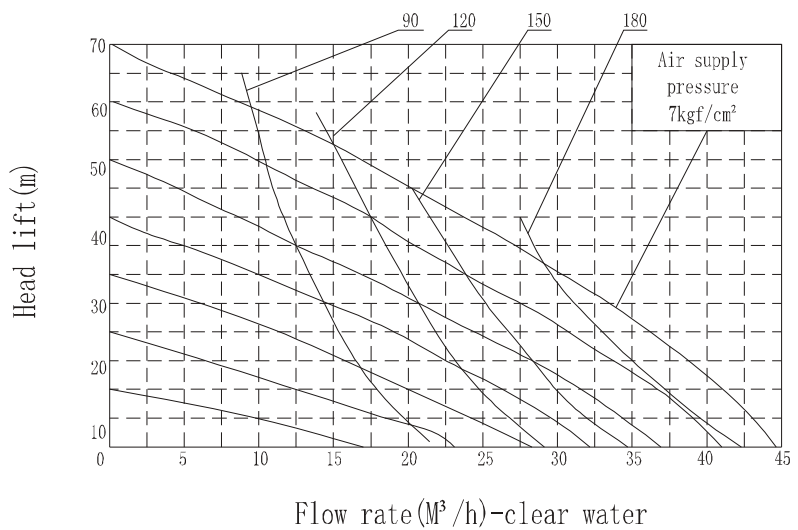
TECHNICAL PARAMETERS

Flow	0 ~ 35 m ³ /h		
Lift head	0 ~ 70 m		
Outlet pressure	0 ~ 6 kgf/cm ²		
Suction lift	0 ~ 5 m		
Allowable diameter of grains passing	0 ~ 10 mm		
Air supply pressure	0 ~ 7 kgf/cm ²		
Air consumption	0 ~ 1500 L/min		
Inlet	3/4 inch		
Outlet	1 inch		
Net content kg	C:170	L:98	S:130
Gross weight kg	Carton packaging, plus: 30kg		



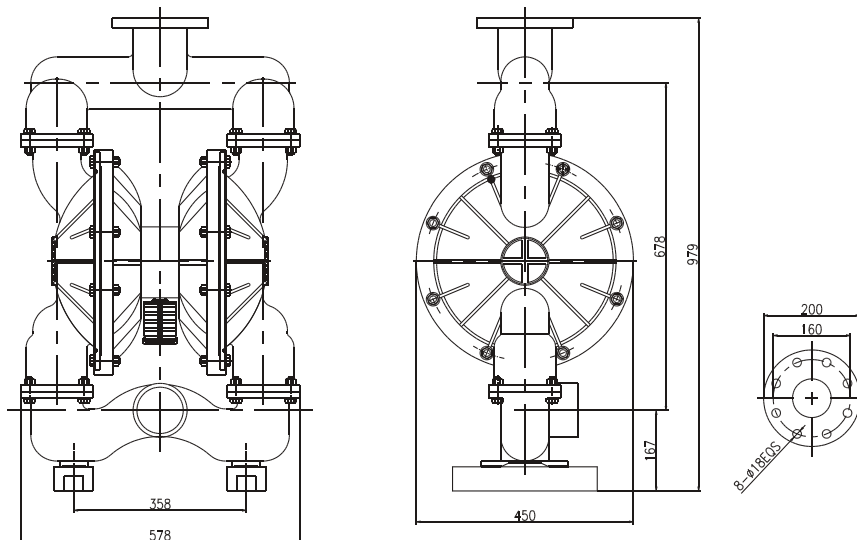
Metal pump

80 Air consumption (m³/h)



GMB-100

INSTALLATION DIMENSIONS

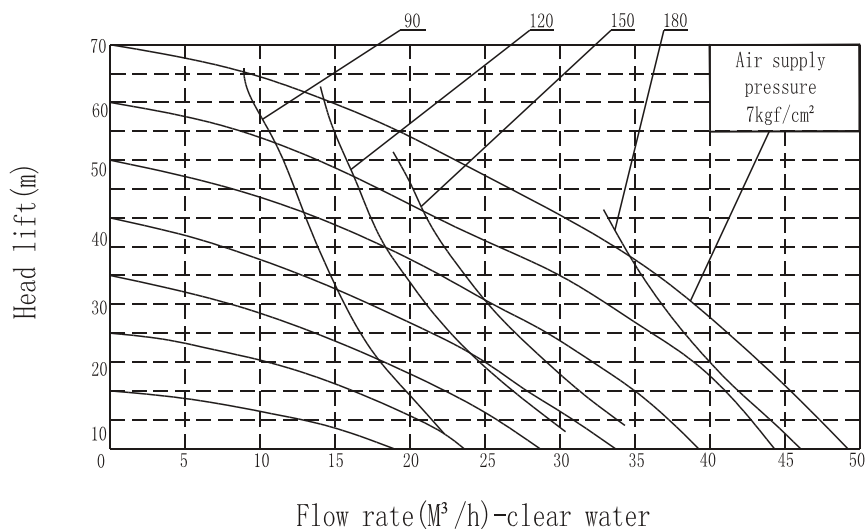


Metal pump

TECHNICAL PARAMETERS

Flow	0 ~ 50	m ³ /h	
Lift head	0 ~ 70	m	
Outlet pressure	0 ~ 6	kgf/cm ²	
Suction lift	0 ~ 5	m	
Allowable diameter of grains passing	0 ~ 12	mm	
Air supply pressure	0 ~ 7	kgf/cm ²	
Air consumption	0 ~ 1500	L/min	
Inlet	3/4	inch	
Outlet	1	inch	
Net content kg	C:166	L:98	S:130
Gross weight kg	Carton packaging, plus: 30kg		

100 Air consumption (m³/h)



CHARACTERISTICS OF DIAPHRAGM MATERIALS

Diaphragm Variety Medium Type	Butadiene– acrylonitrile rubber	Neoprene	Fluorine rubber	Polytetra– fluoroethylene	Fluorinated ethylene propylene
Fuming nitric acid	×	×	△	△	△
Concentrated nitric acid	×	×	△	△	△
Concentrated sulfuric acid	×	×	○	△	△
Concentrated hydrochloric acid	×	△	△	△	△
Concentrated phosphoric acid	×	△	△	△	△
Concentrated acetic acid	×	×	×	△	△
Concentrated sodium hydroxide	○	○	△	△	△
Anhydrous ammonia	△	△	△	△	△
Dilute nitric acid	×	×	○	△	△
Dilute sulphuric acid	△	△	△	△	△
Dilute hydrochloric acid	×	○	△	△	△
Dilute phosphoric acid	×	×	△	△	△
Dilute sodium hydroxide	○	○	△	△	△
Ammonia	△	△	×		△
Benzene	×	×	○	○	△
Gasoline	○	○	○	○	△
Petroleum	△	×	○	○	△
Carbon tetrachloride	○		○	○	△
Carbon bisulfide	○		×	○	△
Ethanol	○	○	○	○	△
Acetone	×	△	×	○	△
Cresol	×	△	△	○	△
Acetaldehyde	×	×	△	○	△
Ethylbenzene	×	×	△	○	△
Acrylonitrile	△	△	×	○	△
Butyl alcohol	○	○	○	○	△
Butadiene	○	×	△	○	△
Styrene	×	×	△	○	△
Aceta ethylene ethyl ester	×	×	×	○	△
Ether	×	×	×	○	△

Note: ○ — Long life, △ — Average life, × — Not available

This table only considers corrosion resistance. The flexibility of polytetrafluoroethylene is weaker than that of rubber, so its actual service life is subject to such factors as pressure, pump travel and impurities, and in contrast, fluorinated ethylene propylene is stronger in flexibility and malleability.