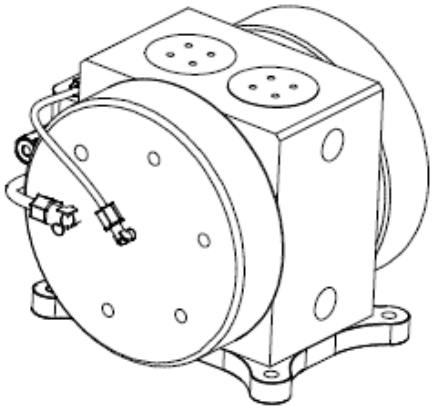
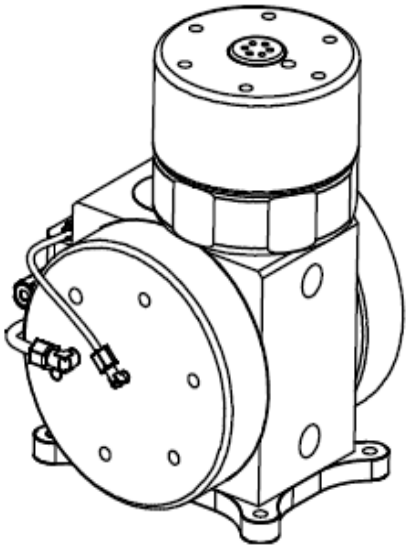




AIR-OPERATED BELLOWS PUMPS

MANUAL

CONTENTS

Ⅰ、GENERAL ……3

Ⅱ、UPON RECEIVED ……3

Ⅲ、CAUTION BEFORE OPERATION ……3

Ⅳ、MODLE AND MATERIAL INDICATION …… ……4

Ⅴ、TECHNICAL DATA.……5

Ⅵ、OPERATION TEMPERATURE ……5

Ⅶ、INSTALLATION …… 6

Ⅷ、PERFORMANCE CURVE …… 7-8

3/8” DT20/DT20-F …… 7

1/2” DT50/ DT50-F…… 7

3/4” DT80/ DT80-F …… 8

1” DT100/ DT100-F …… 8

Ⅸ、EXPLODED DRAWING ……9

Ⅹ、SPARE PARTS LIST ……10

ⅩⅠ、OUTLINE DIMENSION……11~14

ⅩⅡ、OPTIONAL ACCESSORY……15~21

1、Pulsation dampener……15~20

2、Stroke counter……21

3、Leak sensor……21

4、Stroke counter+Leak sensor……21

ⅩⅢ、TROUBLESHOOTING ……22

ⅩⅣ、WARRANTY / SERVICE ……22

Ⅰ、GENERAL

Thank you for purchasing DINO AIR-OPERATED BELLOWS PUMP. Each pump follows standard test procedure and is conducted testing in CLASS 100 clean room.

Caution: Before installation, please read through this manual carefully and follow the installation instructions.

Ⅱ、UPON RECEIVED

1、Please check the tag outside the box is in line with what you have ordered.
2、Please check the tightness of muffler and bellows and reassemble until they are tightened up to the pump.
3、Please check if the pump or accessories are visibly damaged during shipment.

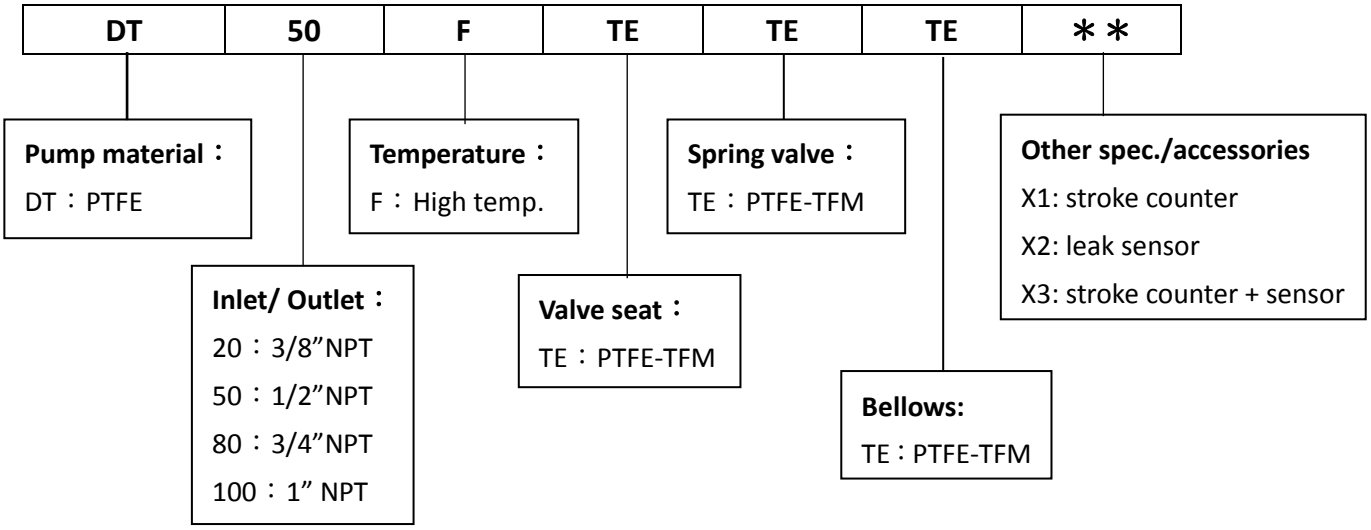
Caution: Do not move a pump by holding a muffler as a supporting point to prevent muffler damage.

Ⅲ、CAUTION BEFORE OPERATION

1、Please follow safety and health regulation and wear appropriate equipments such as goggles, gloves, protective clothing or protective shoes if necessary.
2、Do not leave the work area while equipment is energized.
3、Pump must be operated within its performance. Failure due to misuse is not covered under warranty.
4、Dino shall not be liable for any damage arising from using non-Dino parts or modifying privately.
5、Please release liquid inside the pump and flush with adequate liquid if the pump will not be used for a long time. Keep the pump in a ventilated area.
6、When the Bellows Pump stop working, total system pressure can not be over 0.1mpa, if the pressure is over 0.1 mpa, pressure relief system is needed.
7、If the pumping liquid contains poisonous material or might emit a slight odour, please keep workplace ventilated and please wear the protective equipment.
8、Before returning a pump to Dino, the remaining liquid in the pump should be drained to the greatest extent possible and flushed with water to avoid any accidents during shipment.
9、During operation, please ensure to fill the tubings with liquid and to open the valve on the inlet and outlet ports.
10、Please ensure to close the valve and discharge the liquid before shutting off the air supply.
11、Pumping the liquid which will easily crystalize, rough petroleum solvents and the liquid containing slurries will shorten the life of the pump.
12、Before using polishing slurry or stripper, please contact your supplier or distributor.
13、Please contact your supplier or distributor if the temp of the liquid you are going to use is below 5 degree C.
14、The Maximum viscosity is 100 cps

.

Ⅳ、MODEL AND MATERIAL INDICATION



PIPE TAPER INFORMATION

NPT-American National Pipe Taper Threads

Pipe size	Threads per Inch TPI-pitch	Nominal outside Pipe Diameter OD		Thread angle	Thread Pitch length	
		(in)	(mm)		(in)	(mm)
1/4"	NPT18	0.54	13.7	60	0.0556	1.412
3/8"	NPT 18	0.675	17.1	60	0.0556	1.412
1/2"	NPT14	0.84	21.3	60	0.0714	1.814
3/4"	NPT14	1.05	26.7	60	0.0714	1.814
1"	NPT 11 1/2	1.315	33.4	60	0.087	2.21
1 1/4"	NPT 11 1/2	1.66	42.2	60	0.087	2.21

Ⅴ、TECHNICAL DATA

＊high-temperature resistance PTFE material

Model	DT20	DT50	DT80	DT100	DT20F	DT50F	DT80F	DT100F
Weight	9.3kg	12.5kg	17kg	20kg	11.5kg	15.5kg	21kg	25kg
Material	PTFE	PTFE	PTFE	PTFE	PTFE*	*PTFE	*PTFE	*PTFE
Air pressure operating range	1~7kg	1~7kg	1~7kg	1~7kg	1~7kg	1~kg	1~7kg	1~7kg
Flow rate （L/min）	21.6	48	81	110	21.6	48	81	110
Liquid outlet/inlet	3/8”	1/2”	3/4”	1”	3/8”	1/2”	3/4”	1”
Air connection	3/8”	3/8”	3/8”	3/8”	3/8”	3/8”	3/8”	3/8”
Max. operating temp.	130℃	130℃	130℃	130℃	200℃	200℃	200℃	200℃
Suction lift, dry	2mwc	2mwc	2mwc	2mwc	2mwc	2mwc	2mwc	2mwc
Suction lift, wet	6mwc	6mwc	6mwc	6mwc	6mwc	6mwc	6mwc	6mwc
Max. particle	0.5mm	0.5mm	0.5mm	0.5mm	0.5mm	0.5mm	0.5mm	0.5mm

(Test condition：room temperature pure water, fully open inlet and outlet valve)

Ⅵ、OPERATION TEMPERATURE

Model / Operating pressure	DT20/50/80/100	DT20F/50F/80F/100F
1 bar	130℃	200℃
2 bar	120℃	180℃
3 bar	110℃	160℃
4 bar	100℃	140℃
5 bar	90℃	120℃
6 bar	75℃	95℃
7 bar	60℃	70℃

＊Temperature varies based on pressure.

Ⅶ、INSTALLATION

1、Before installation, make sure to leave enough space for connection configuration and repair purpose.

2、DINO air-operated bellows pump requires the use of CDA (Clean Dry Air) or nitrogen and the proper sized air lines.

3、Before installation, to avoid the shard from pipework left in the tubings stabbing into the bellows, please clean the shard carefully.

4、Make sure all the connections are well-sealed to avoid any liquid and air leaky.

5、When installing the tubing connection, take gross pipe loss into account. (horizontal and vertical distance at liquid outlet and inlet, liquid gravity and viscosity) Air driven pump has to push better than its gross pipe loss when air supply pressure has to be lower than the maximum operating pressure. For instance, if the gross pipe loss is 2 kg/㎠, the air supply pressure has to be higher than the gross pressure under normal operation.

6、The best installation is with the pump as near the reservoir as possible.

7、**Pump installation-** With the special design of check spring valve, the pump can work well without horizontal installation.

8、To avoid solids or any shard introducing into bellows, low flow-resistance filter should be installed in the inlet line.

9、**Liquid temperature-** Pumps must be operated within their respective temperature to pressure. If not, Dino does not cover such damage under warranty.

10、The size of liquid solids cannot be over 0.5mm. Otherwise, the solids will plug up the pump and cause pump deformed. Dino doesn't warrant such damage.

11、**Boiling liquid-** In the event of pumping liquid at or near their boiling point, it must be remembered that the boiling temperature of any liquid reduces under vacuum conditions. Depending on the temperature of outlet/inlet lines and the liquid, the situation might be different. Boiling liquid in the inlet line will cause a pump running erratically and shorten its life.

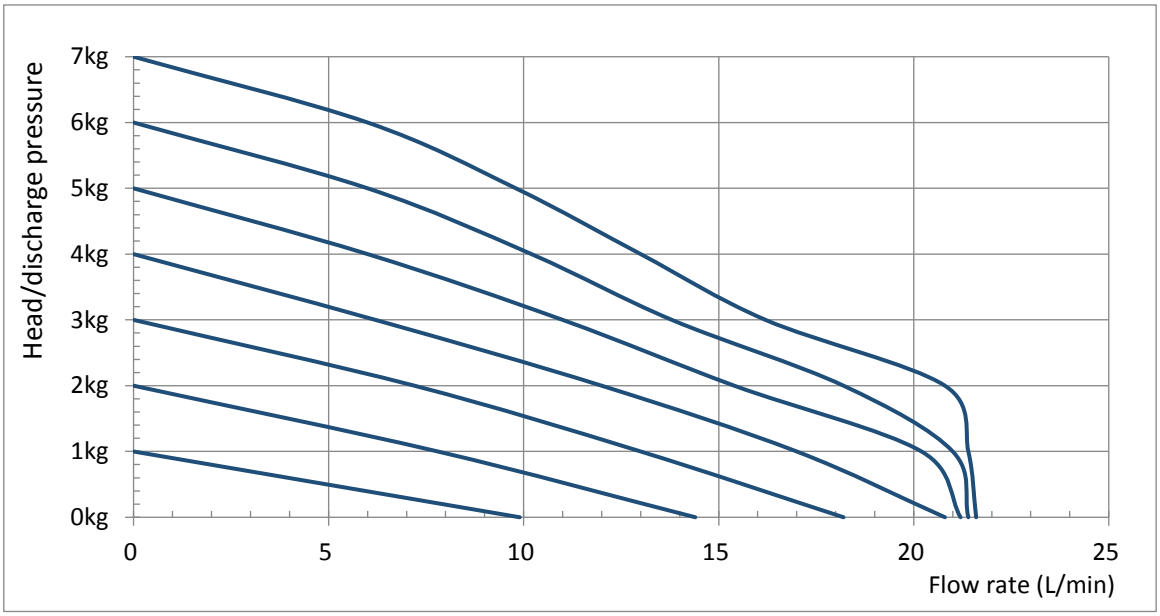
12、Selecting a pump which its performance exceed the operating conditions. This can prolong its life expectancy.

13、**FLAMMABLE SOLVENTS-** High purity pumps are frequently used to pump flammable solvents. High purity pumps are constructed from insulating materials (PTFE and PFA). To avoid ignition by static charge, the pump needs to be grounded properly.

Caution: The operators who operate flammable solvents should be having proper vocational training and understand the liquid characteristic.

Ⅷ、PERFORMANCE CURVE

◆ DT20/DT20F (PFA 3/8”→1/2”)

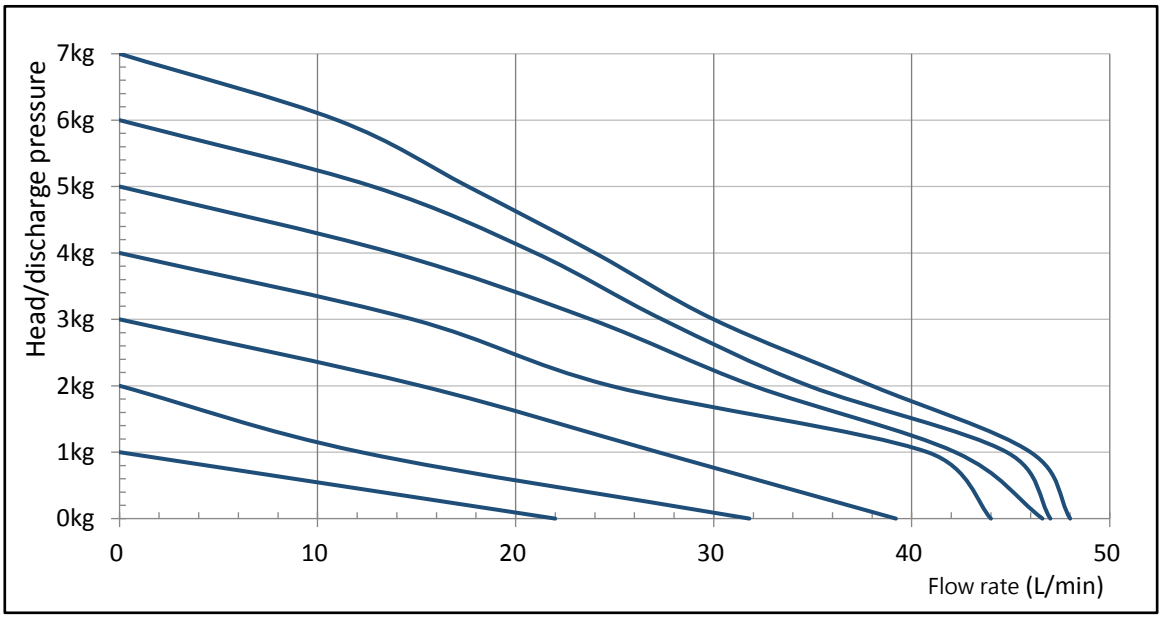


* Test condition: Pure water at room temperature, Fully open fluid inlet/outlet 1/2" PFA tube with inside diameter 9.53mm, air pipe(ID:4mm)
* Performance curves may vary based on application.

Head/Discharge pressure	1kg	2kg	3kg	4kg	5kg	6kg	7kg
Flow rate	5.2	7.8	9.4	9.4	9.6	9.6	9.6

* Test condition: Fully open fluid inlet/outlet 3/8" PFA tube with inside diameter 6.35mm,air pipe(ID:4mm)

◆ DT50/DT50F (PFA 1/2”→3/4”)

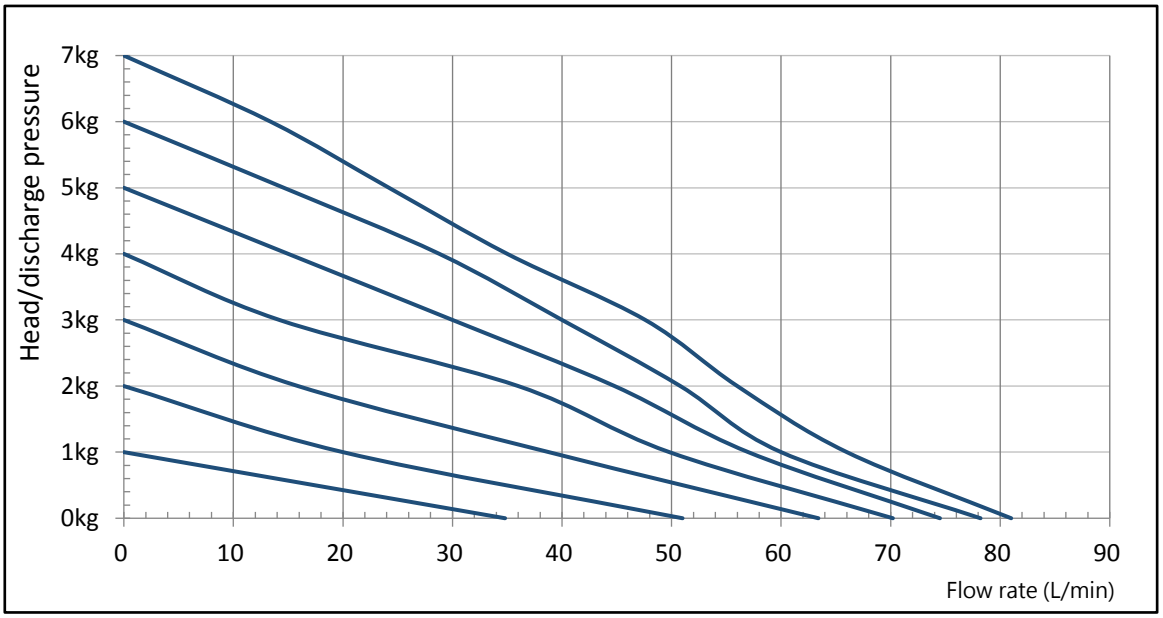


* Test condition: Pure water at room temperature, Fully open fluid inlet/outlet 3/4" PFA tube with inside diameter 15.88mm, air pipe(ID:4mm)
* Performance curves may vary based on application.

Head/Discharge pressure	1kg	2kg	3kg	4kg	5kg	6kg	7kg
Flow rate	12.8	19.8	22.6	22.8	22.8	22.8	23.0

* Test condition: Fully open fluid inlet/outlet 1/2" PFA tube with inside diameter 9.53mm, air pipe(ID:4mm)

◆ DT80/DT80F (PFA 3/4”→1”)



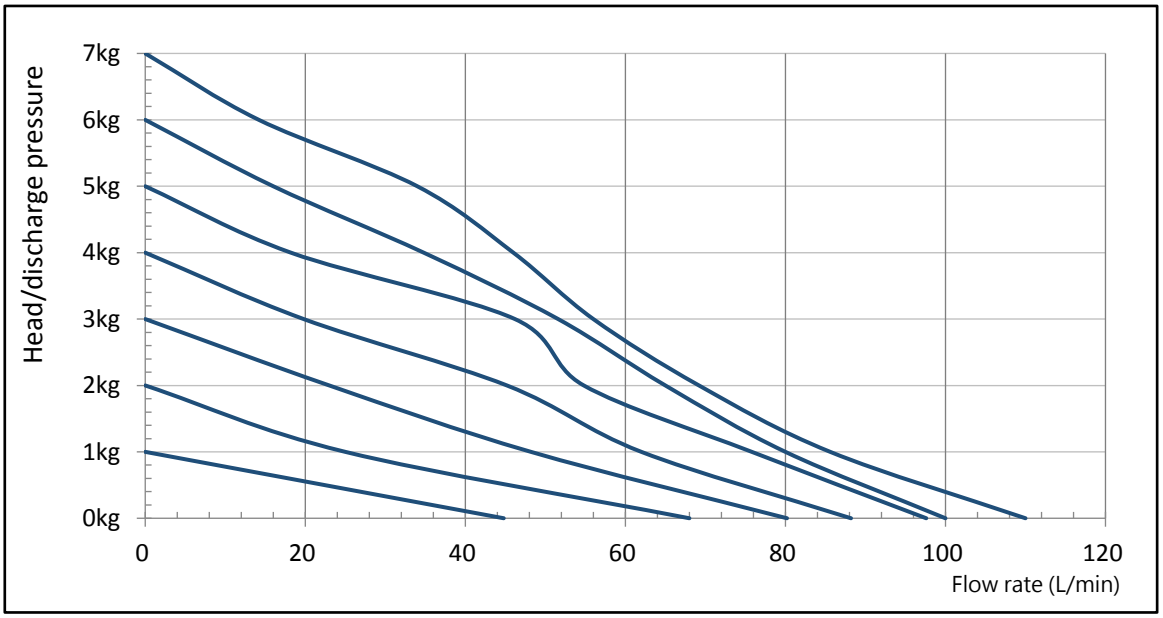
*Test condition: Pure water at room temperature, Fully open fluid inlet/outlet 1" PFA tube with inside diameter 22.23mm, air pipe(ID:4mm)

* Performance curves may vary based on application.

Head/Discharge pressure	1kg	2kg	3kg	4kg	5kg	6kg	7kg
Flow rate	27.0	42.0	49.8	55.0	60.0	62.8	65.0

* Test condition: Fully open fluid inlet/outlet 3/4" PFA tube with inside diameter 15.88mm, air pipe(ID:4mm)

◆ DT100/DT100F (PFA 1”→1-1/4”)



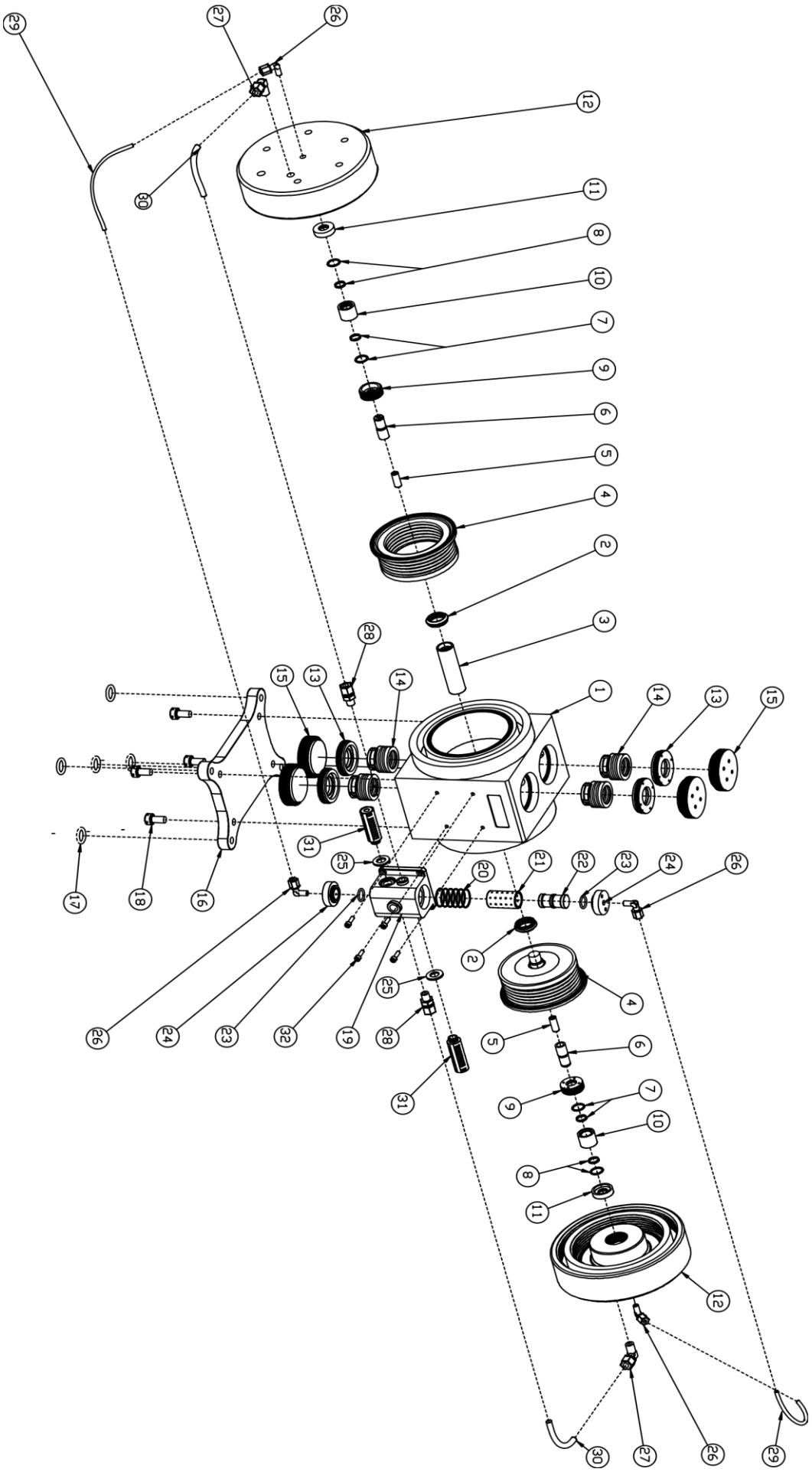
* Test condition: Pure water at room temperature, Fully open fluid inlet/outlet 1-1/4" PFA tube with inside diameter 27.55mm, air pipe(ID:4mm)

* Performance curves may vary based on application.

Head/Discharge pressure	1kg	2kg	3kg	4kg	5kg	6kg	7kg
Flow rate	43.8	64.0	76.2	84.8	90.2	94.0	97.8

* Test condition: Fully open fluid inlet/outlet 1" PFA tube with inside diameter 22.23mm, air pipe(ID:4mm)

Ⅸ、EXPLODED DRAWING



X、SPARE PARTS LIST

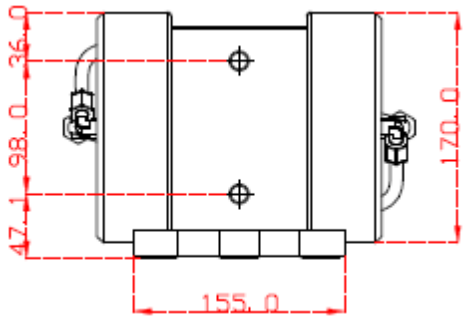
DINO Bellows Pump Model				DT20-TETETE DT20F-TETETE	DT50-TETETE DT50F-TETETE	DT80-TETETE DT80F-TETETE	DT100-TETETE DT100F-TETETE
Item	**Description**	**Q'ty**	**Material**	**Part No.**	**Part No.**	**Part No.**	**Part No.**
1	Pump Body	1	PTFE	D1-20-20001	D1-50-50001	D1-80-80001	D1-100-10001
2	Shaft sleeve	2	TFM	D1-58-60001	D1-58-60001	D1-58-60001	D1-58-60001
3	Shaft	1	TFM	D1-20-20002	D1-50-50002	D1-80-80002	D1-100-10002
4	Bellows	2	TFM	D1-20-20003	D1-50-50003	D1-80-80003	D1-100-10003
5	screw, valve rod, Bellows	2	PEEK	D1-58-60002	D1-58-60002	D1-58-60002	D1-58-60002
6	Valve rod, bellows	2	CERAMIC	D1-30-30001	D1-30-30001	D1-70-30001	D1-70-30001
7	O-ring set Side cap	2	PTFE	D1-58-60003	D1-58-60003	D1-58-60003	D1-58-60003
8	O-ring set, Side cap	2	PTFE	D1-58-60004	D1-58-60004	D1-58-60004	D1-58-60004
9	Switch valve cover	2	PEEK	D1-58-60005	D1-58-60005	D1-58-60005	D1-58-60005
10	Switch valve socket	2	PEEK	D1-30-30002	D1-30-30002	D1-70-30002	D1-70-30002
11	Switch valve Back Cover	2	PEEK	D1-58-60006	D1-58-60006	D1-58-60006	D1-58-60006
12	Side housing	2	PP	D1-20-20004	D1-50-50004	D1-80-80004	D1-100-10004
			PTFE	D1-T20-20004	D1-T50-50004	D1-T80-80004	D1-T100-10004
13	valve seat	4	TFM	D1-20-20005	D1-50-50005	D1-80-80005	D1-100-10005
14	Spring valve	4	TFM	D1-20-20006	D1-50-50006	D1-80-80006	D1-100-10006
15	Upper, lower plugs,Valve seat	4	TFM	D1-20-20007	D1-50-50007	D1-80-80007	D1-100-10007
16	Base Plate	1	HPE	D1-20-20008	D1-50-50008	D1-80-80008	D1-100-10008
17	O-ring, Base Plate	5	VT	D1-58-60007	D1-58-60007	D1-58-60007	D1-58-60007
18	Screw, Base Plate	4	UPE	D1-58-60008	D1-58-60008	D1-58-60008	D1-58-60008
＊19	Air valve casing	1	UPE	D1-58-70001	D1-58-70001	D1-58-70001	D1-58-70001
＊20	O-ring, air valve	6	VT	D1-58-70002	D1-58-70002	D1-58-70002	D1-58-70002
＊21	Air valve casing	1	CERAMIC	D1-58-70003	D1-58-70003	D1-58-70003	D1-58-70003
＊22	Shuttle shaft, air valve	1	CERAMIC	D1-58-70004	D1-58-70004	D1-58-70004	D1-58-70004
＊23	O-ring	2	VT	D1-58-70005	D1-58-70005	D1-58-70005	D1-58-70005
＊24	Side cap, air valve	2	PETP	D1-58-70006	D1-58-70006	D1-58-70006	D1-58-70006
＊25	Muffler Gasket	2	FOAM	D1-58-70007	D1-58-70007	D1-58-70007	D1-58-70007
26	Air Inlet Elbow	4	PVDF	D1-58-90001	D1-58-90001	D1-58-90001	D1-58-90001
27	Air Inlet Elbow	2	PVDF	D1-58-90002	D1-58-90002	D1-58-90002	D1-58-90002
28	Air joint	2	PVDF	D1-58-90003	D1-58-90003	D1-58-90003	D1-58-90003
29	Air supply pipe	2	PFA	D1-58-90004	D1-58-90004	D1-58-90004	D1-58-90004
30	Air supply pipe	2	PFA	D1-58-90005	D1-58-90005	D1-58-90005	D1-58-90005
31	Muffler	2	PP	D1-58-90006	D1-58-90006	D1-58-90006	D1-58-90006
32	Screw, air valve	4	PEEK	D1-58-90007	D1-58-90007	D1-58-90007	D1-58-90007

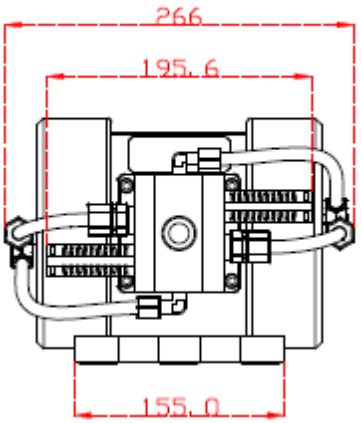
Repair Kit

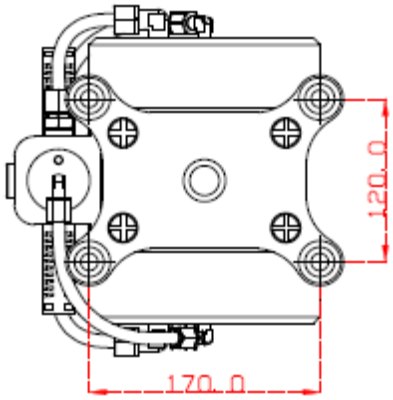
*Air valve assembly kit number is ***DS-1.***

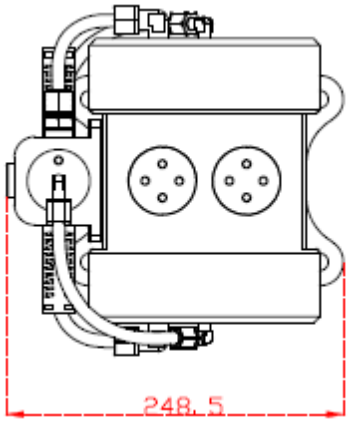
Ⅺ、OUTLINE DIMENSION

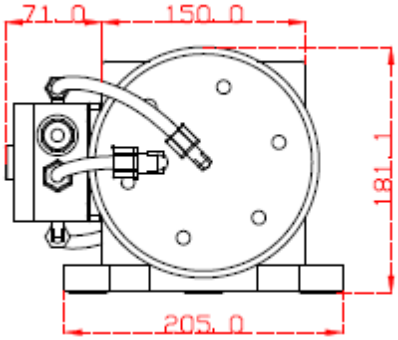
♦ **Model：DT20,DT20F** unit:mm





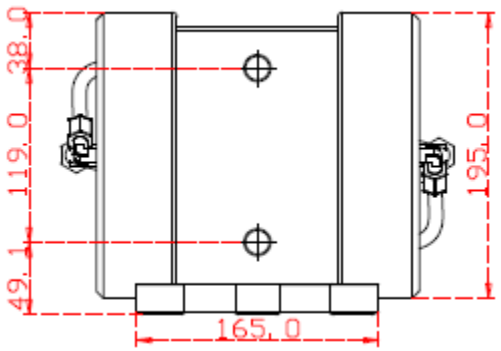


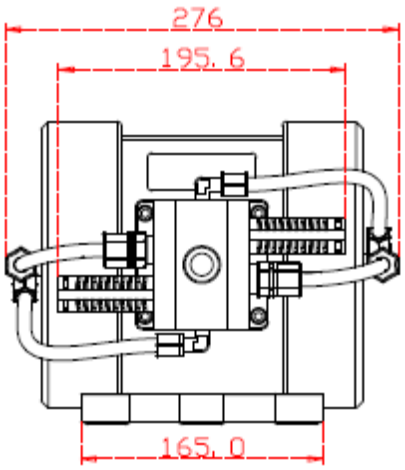


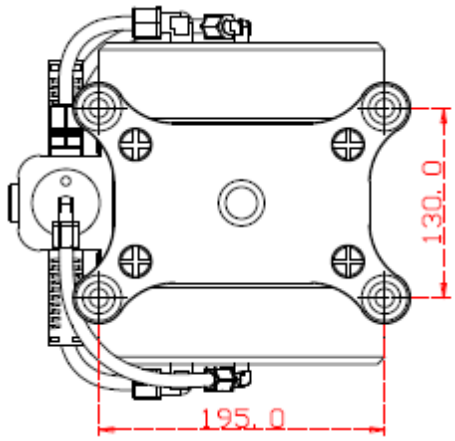


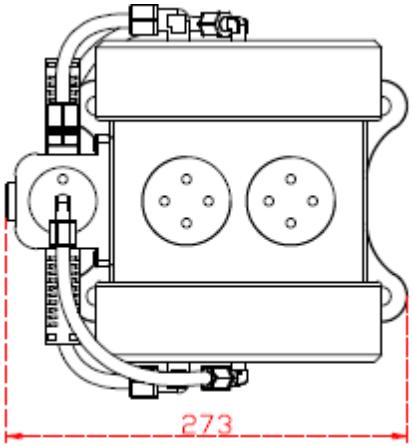
♦ **Model：DT50,DT50F**

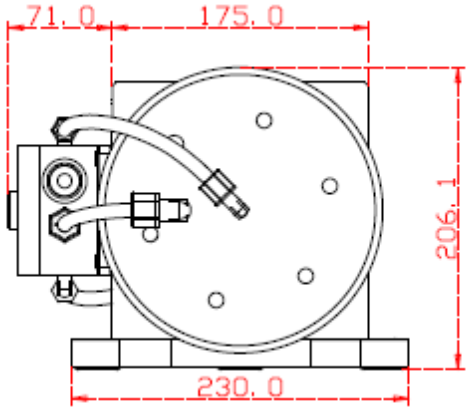
unit:mm





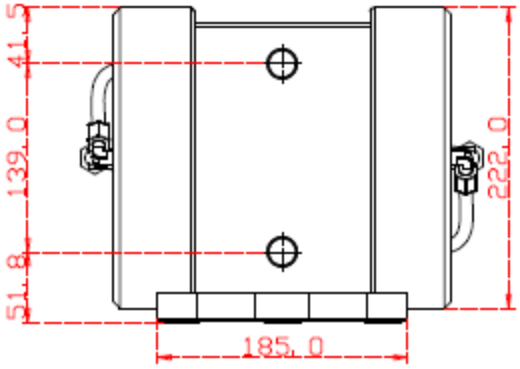


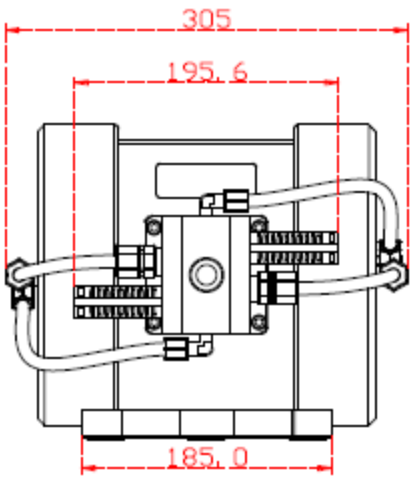


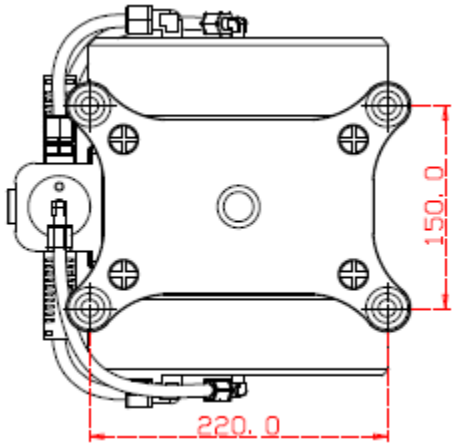


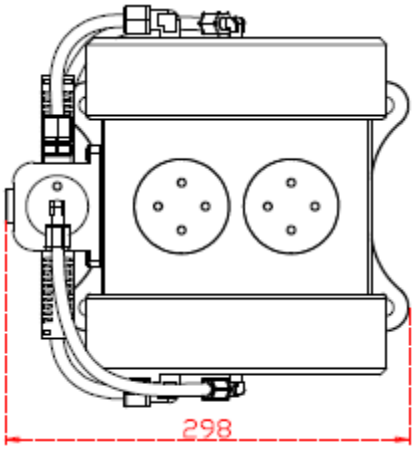
♦ **Model：DT80,DT80F**

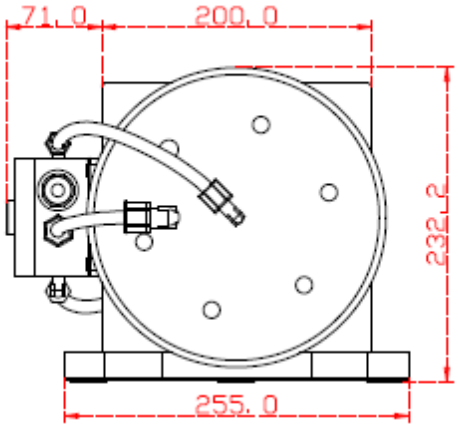
unit:mm





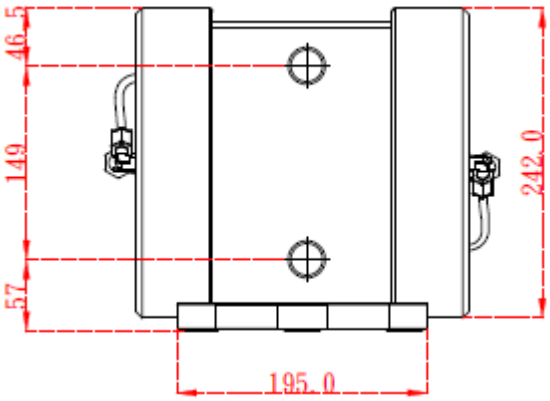


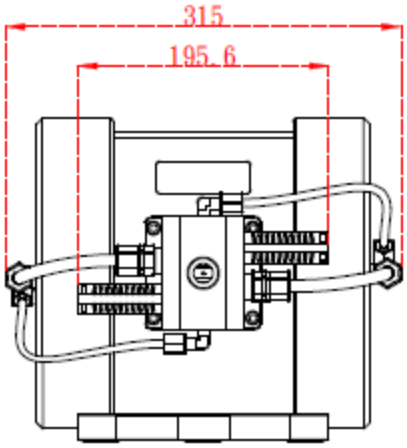


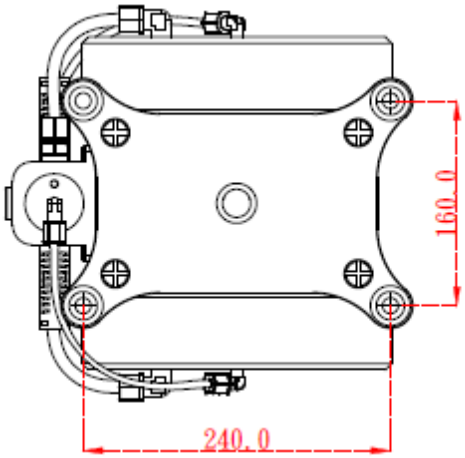


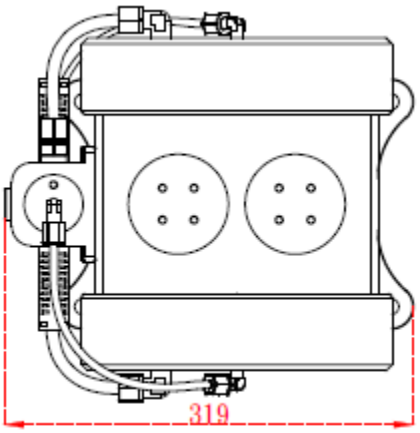
♦ **Model：DT100,DT100F**

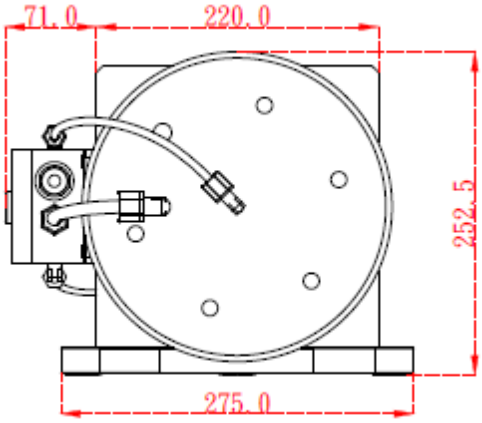
unit:mm









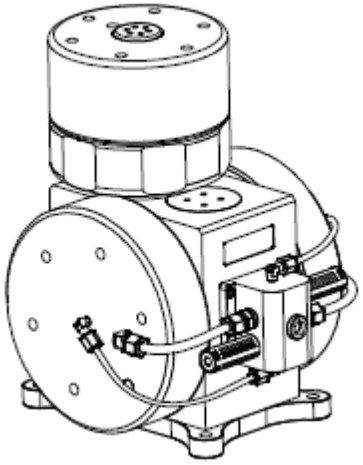


ⅩⅡ、OPTIONAL ACCESSORY

1、Pulsation dampener

Dampener Model	Material (Wetted/ Non-wetted)	Pump Model
DT100F-T1	*PTFE/PTFE	DT100F
DT80F-T1	*PTFE/PTFE	DT80F
DT50F-T1	*PTFE/PTFE	DT50F
DT20F-T1	*PTFE/PTFE	DT20F
DT100-T1	PTFE/NPP	DT100
DT80-T1	PTFE/NPP	DT80
DT50-T1	PTFE/NPP	DT50
DT20-T1	PTFE/NPP	DT20

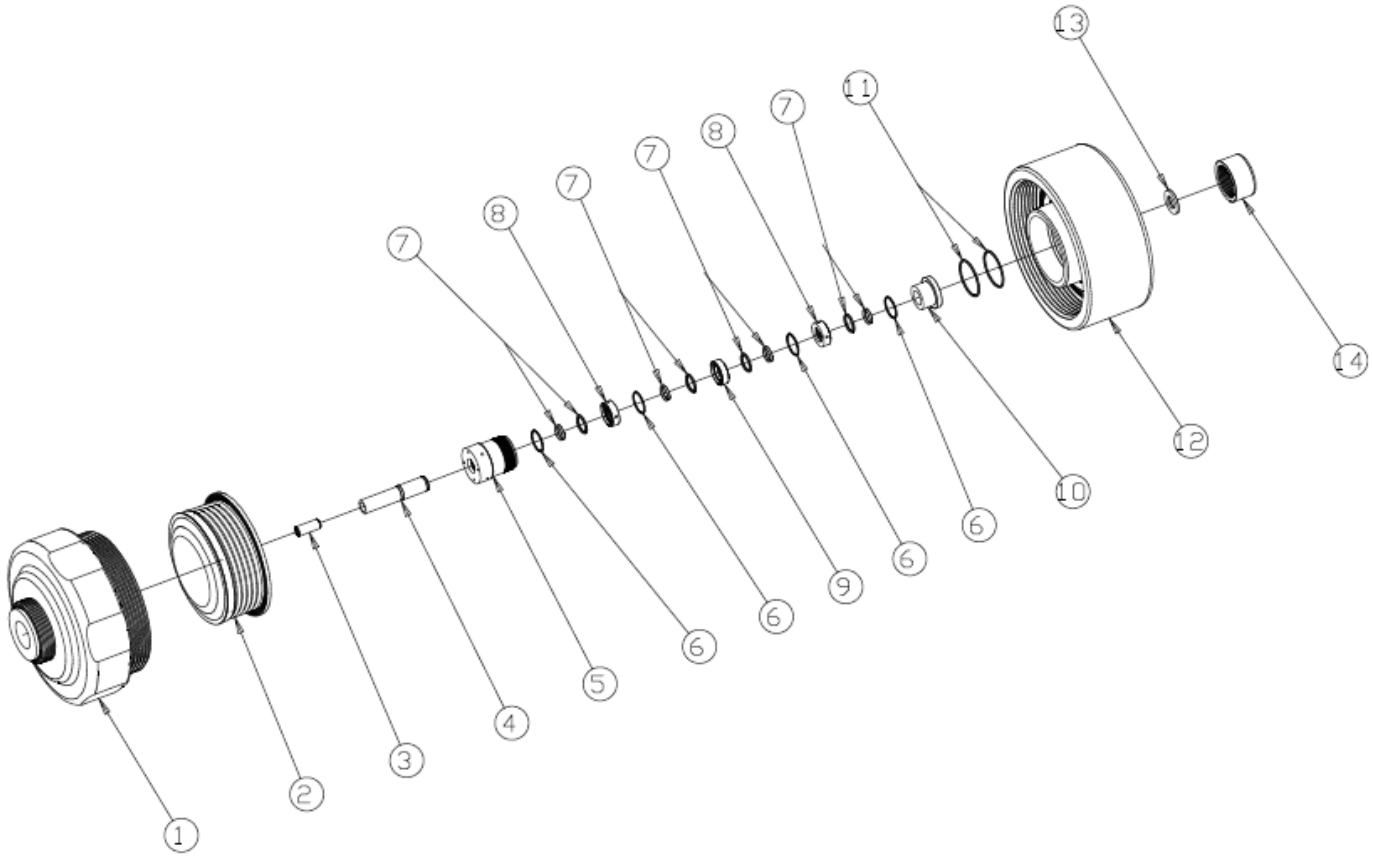
*high-temperature resistance PTFE.



♦TECHNICAL DATA

Model	DT20-T1	DT50-T1	DT80-T1	DT100-T1	DT20T-T1	DT50T-T1	DT80T-T1	DT100T-T1
Air pressure operating range	1～7kg	1～7kg	1～7kg	1～7kg	1～7kg	1～7kg	1～7kg	1～7kg
Air connection	1/4”	1/4”	1/4”	1/4”	1/4”	1/4”	1/4”	1/4”
Max. operating temp.	130℃	130℃	130℃	130℃	200℃	200℃	200℃	200℃

♦EXPLOSION DRAWING



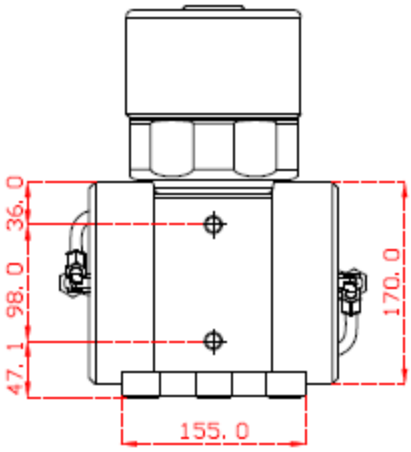
♦SPARE PARTS LIST

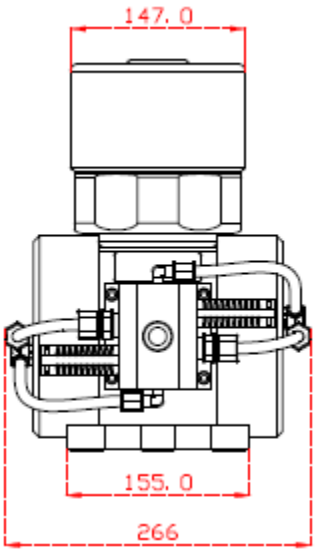
DINO Bellows Dampener Model				DT20-T1 DT20F-T1	DT50-T1 DT50F-T1	DT80-T1 DT80F-T1	DT100-T1 DT100F-T1
Item	**Description**	**Q'ty**	**Material**	**Part No.**			
1	Dampener base	1	PTFE	D3-T20-00001	D3-T50-00001	D3-T80-00001	D3-T100-00001
2	Bellows	1	TFM	D3-20-00002	D3-50-00002	D3-80-00002	D3-100-00002
3	Screw, valve rod, Bellows	1	PEEK	D1-58-60002	D1-58-60002	D1-58-60002	D1-58-60002
4	Dampener Valve rod, Bellows	1	CERAMIC	D3-58-00003	D3-58-00003	D3-58-00003	D3-58-00003
5	Dampener Air valve	1	PEEK	D3-58-00004	D3-58-00004	D3-58-00004	D3-58-00004
6	O-ring	4	VT	D3-58-00005	D3-58-00005	D3-58-00005	D3-58-00005
7	O-ring set, Side cap	4	PTFE	D1-58-60003	D1-58-60003	D1-58-60003	D1-58-60003
8	O-ring, dampener air valve	2	PEEK	D3-58-00006	D3-58-00006	D3-58-00006	D3-58-00006
9	O-ring, dampener air valve	1	PEEK	D3-58-00007	D3-58-00007	D3-58-00007	D3-58-00007
10	Cap, dampener air valve	1	PEEK	D3-58-00008	D3-58-00008	D3-58-00008	D3-58-00008
11	O-ring	2	VT	D3-58-00009	D3-58-00009	D3-58-00009	D3-58-00009
12	Side housing, dampener	1	PP	D3-20-00010	D3-50-00010	D3-80-00010	D3-100-00010
			PTFE	D3-T20-00010	D3-T50-00010	D3-T80-00010	D3-T100-00010
13	Gasket, muffler	1	FOAM	D1-58-70007	D1-58-70007	D1-58-70007	D1-58-70007
14	Cap, dampener air valve	1	TFM	D3-58-00011	D3-58-00011	D3-58-00011	D3-58-00011

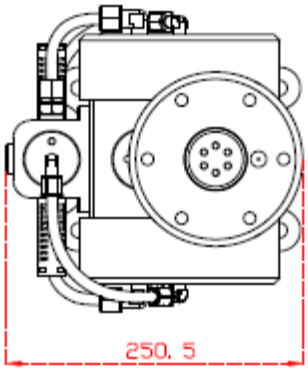
♦OUTLINE DIMENSION (PUMP TYPE DAMPENER)

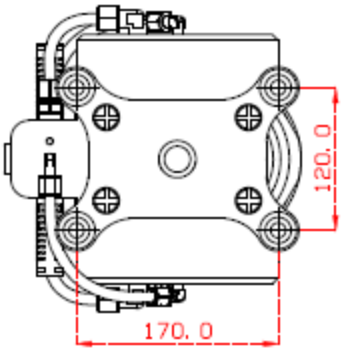
Model : DT20 , DT20F

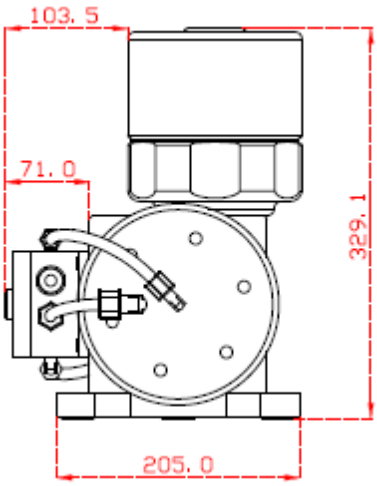
unit:mm





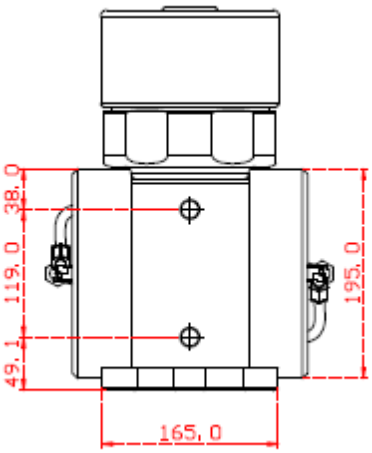


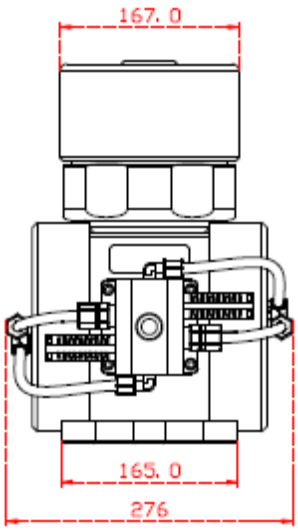


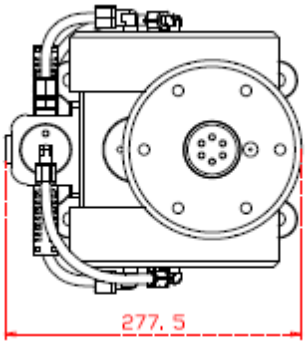


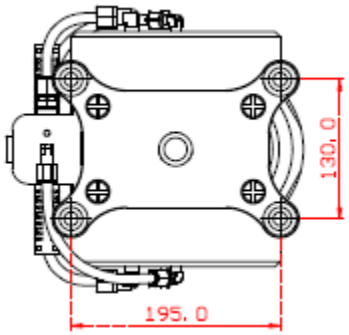
Model : DT50 , DT50F

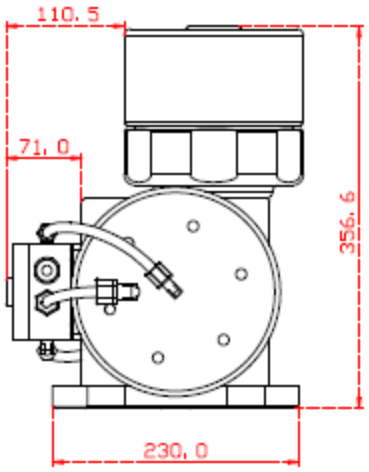
unit:mm





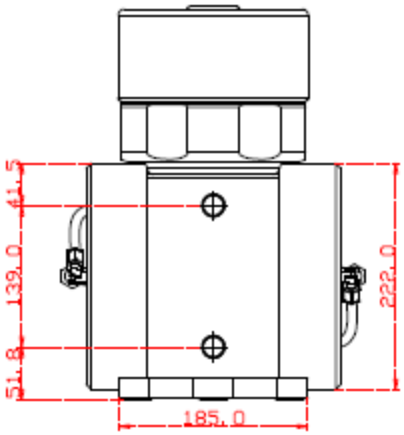


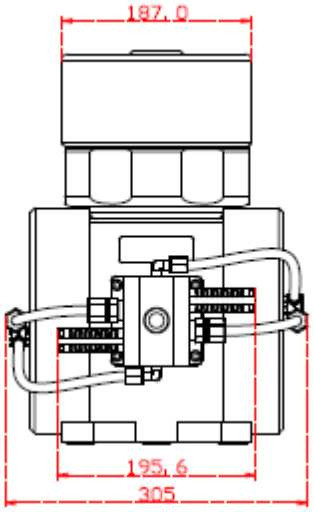


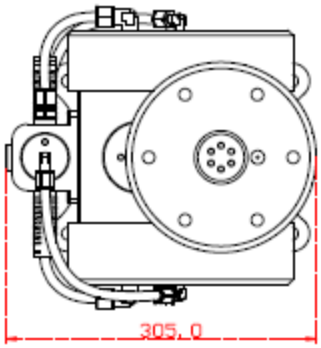


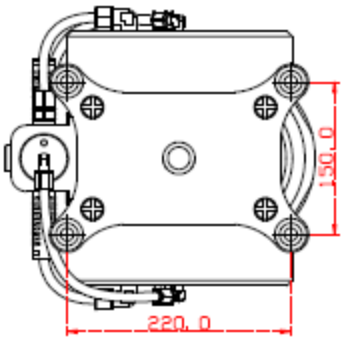
Model : DT80 , DT80F

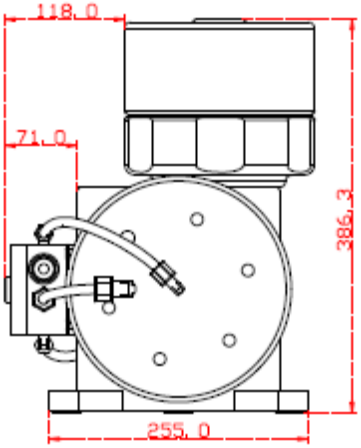
unit:mm





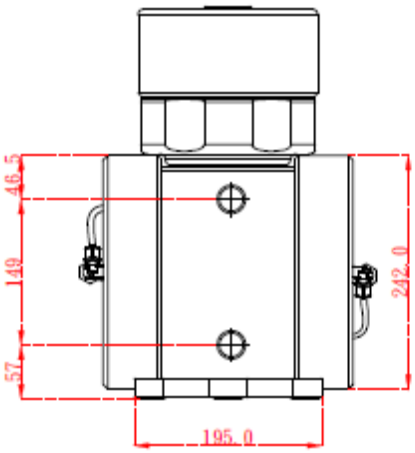


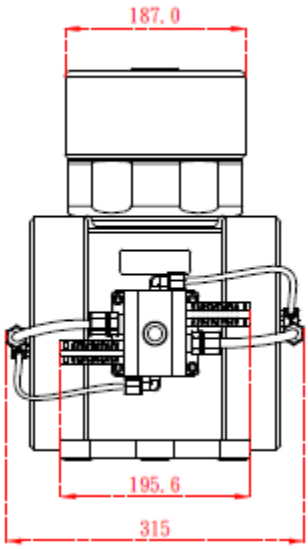


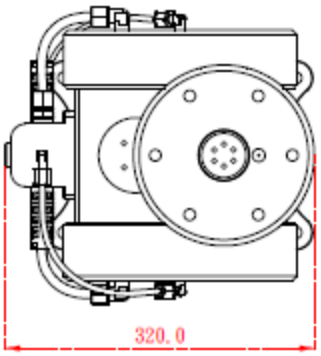


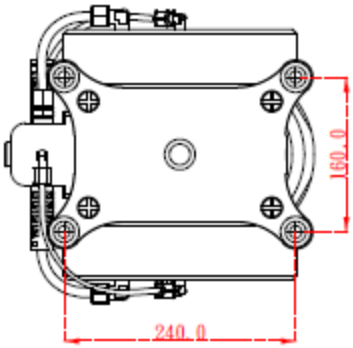
Model : DT100 , DT100F

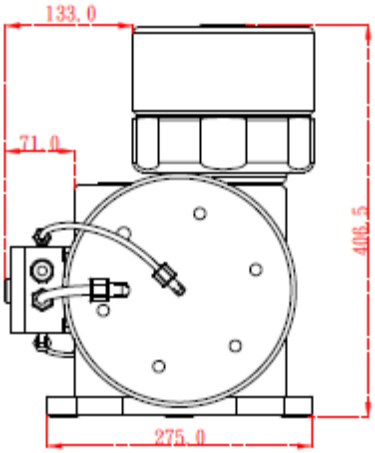
unit:mm











2、STROKE COUNTER :

(e.g. DT50-TETETE-**X1** for equipped stroke counter model)

DINO Bellows Pump Model				DT20-TETETE	DT50-TETETE	DT80-TETETE	DT100-TETETE
				DT20F-TETETE	DT50F-TETETE	DT80F-TETETE	DT100F-TETETE
Item	**Description**	**Q'ty**	**Signal**	**Part No.**			
1	Set,Stroke counter	1	NPN	D2-58-80001-N			
2	Set,Stroke counter	1	PNP	D2-58-80001-P			



3、LEAK SENSOR

(e.g. DT50-TETETE-**X2** for equipped leak sensor model)

DINO Bellows Pump Model				DT20-TETETE	DT50-TETETE	DT80-TETETE	DT100-TETETE
				DT20F-TETETE	DT50F-TETETE	DT80F-TETETE	DT100F-TETETE
Item	**Description**	**Q'ty**	**Signal**	**Part No.**			
1	Leak sensor	2	NPN	D1-58-80002			



4、STROKE COUNTER+LEAK SNESOR (X1+X2)

(e.g. DT50-TETETE-**X3** for equipped stroke counter+leak sensor model)

XIII、TROUBLESHOOTING

1、When pumps do not cycle, please check if the pumps are damaged during shipment and make sure the tightness of air inlet line. Pumps must be operated within its inlet pressure limitations. If the problem still remains after conducting above requested inspection, please contact your distributor.

2、**Under normal operation**- when pumps fail to pump liquid, please check if the inlet and outlet valves are open and if the inlet and outlet lines are clogged up. If the problem still remains after conducting above requested inspection, please contact your distributor.

Please contact your distributor or email to **info@dino.com.tw** if any problems occur. Do not disassemble the pumps or replace and parts without our authorization.

XIV、WARRANTY/ SERVICE

All AIR- OPERATED BELLOWS PUMP are warranted to the end user for one year after purchase date. Consumable parts and any failures due to misuse or natural disasters are not covered under warranty.

When you are going to order spare parts, please provide the below information,

1、Model/Serial Number
2、Material
3、Bore size
4、Part Number (please refer to the page10 in this manual)

Please contact your local distributor or email to **info@dino.com.tw**

DINO TECHNOLOGY CO., LTD.
No. 25.27, Ln. 458, Sec. 1, Wunhua N. Rd., Linkou Dist.,
New Taipei City 244, Taiwan
Tel :+886 2 26098823
Fax:+886 2 26098523
Webpage: www.dino.com.tw
Mail: info@dino.com.tw