

## 2" Stainless Steel Flap-Valve Pump 1:1 RATIO



**READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.**

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.

### SERVICE KITS

Refer to "Model Description Chart" to match the pump material options.

**DP21-AIR50** for Air Section repair (see page 10).

**DP27AS-Flu50-X** for fluid section repair (see page 5).

### PUMP DATA

Models..... see Model Description Chart for "-XXX".

Pump Type... Stainless Steel, Air Operated, Flap-Valve Type

Material..... see Model Description Chart

Weight ..... Stainless Steel: 64.5kgs

### Air Inlet(Female):

3/8"BSPT(3/8"NPT Available On Request)

**Fluid Outlet:** Rp 2 (2" BSP,parallel)

2" NPT

**Fluid Inlet(Female):** Rp 2 (2" BSP,parallel)

2" NPT

**Maximum Flow Rate:** 100GPM(480LPM)

**Max. Operating Pressure:** 120psi(8.3bar)

**Fluid Pressure Range:** 20-120psi(1.4-8.3bar)

**Suspended Solids Max. Dia.:** 40mm

**Maximum Dry Suction Lift:** 19feet(5.8m)

Maximum Temperature Limits(Diaphragm/ball/seat material)

Acetal .....	10° to 180° F (-12° to 82° C)
E.P.R. ....	-60° to 280° F (-51° to 138° C)
Hytrel® .....	-20° to 180° F (-29° to 82° C)
Neoprene .....	0° to 200° F (-18° to 93° C)
Nitrile .....	10° to 180° F (-12° to 82° C)
Polypropylene .....	35° to 175° F (2° to 79° C)
Polyurethane .....	10° to 150° F (-12° to 66° C)
P.V.D.F. (Kynar®) .....	10° to 200° F (-12° to 93° C)
Santoprene® .....	-40° to 225° F (-40° to 107° C)
PTFE .....	40° to 225° F (4° to 107° C)
Viton® .....	-40° to 350° F (-40° to 177° C)

Dimensional Data..... see page 11

### MODEL DESCRIPTIONS:

DP27	-	50	X	X	X	X	X
		PumpSize	CenterBody Mat.	FluidCaps ManifoldMat.	Diaphragm Material	Fluid Connections	Hardware

Pump Size	50-2"				
CenterBody Mat.	A-Aluminum			C-CastIron	
FluidCaps ManifoldMat.	A - Aluminum			S -StainlessSteel	C-CastIron
Diaphragm Material	2-Nitrile	4-PTFE/Santoprene	9-Hytrel	B-Santoprene	
FluidConnections	N-NPTThreads	F-FlangeANSI150	B-BSPThreads	F-FlangePN10/PN16	
Hardware	S-StainlessSteel			C-CarbonSteel	

### Service Repair Kits:

DP21-Air50(air section)

DP27AS-Flu50-X(fluid section)

Diaphragm Material

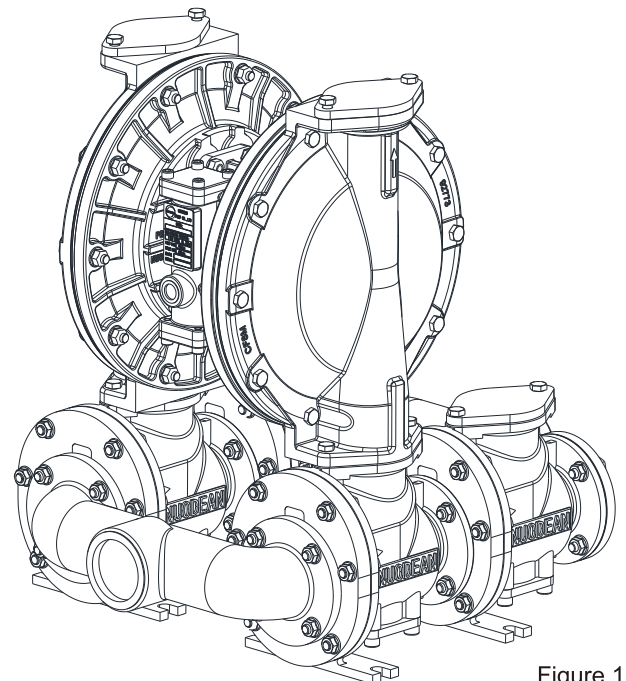


Figure 1

### GENERAL DESCRIPTION

Our 2" flap-valve pump offers high volume delivery even at low air pressures, and is designed to pump fluids containing solids up to 40mm in diameter.

Refer to the model and option chart. Our pumps features stall-resistant design, maintenance-free air motor with a long lifespan, modular air motor/ fluid sections.

Our 2" flap-valve pumps utilize a pressure differential in the air chambers to alternately create suction and positive fluid pressure in the fluid chambers, flap-valves insure a positive flow of fluid.

Pump cycling will begin as air pressure is applied and it will continue to pump and keep up with the demand.

It will build and maintain line pressure and will stop cycling once maximum line pressure is reached(dispensing device closed) and will resume pumping as needed.

**NOTICE:** All possible options are shown in the chart, however, certain combinations may not be recommended, consult a representative or the factory if you have questions concerning availability.



## OPERATING AND SAFETY PRECAUTIONS

**READ, UNDERSTAND, AND FOLLOW THIS INFORMATION TO AVOID INJURY AND PROPERTY DAMAGE.**



EXCESSIVE AIR PRESSURE  
STATIC SPARK



HAZARDOUS MATERIALS  
HAZARDOUS PRESSURE

**⚠ WARNING** EXCESSIVE AIR PRESSURE. Can cause personal injury, pump damage or property damage.

- Be sure material hoses and other components are able to withstand fluid pressures developed by this pump. Check all hoses for damage or wear. Be certain dispensing device is clean and in proper working condition.
- Do not exceed the maximum inlet air pressure as stated on the pump model plate.

**⚠ WARNING** STATIC SPARK. Can cause explosion resulting in severe injury or death. Ground pump and pumping system.

- Sparks can ignite flammable material and vapors.
- The pumping system and object being sprayed must be grounded when it is pumping, flushing, recirculating or spraying flammable materials such as paints, solvents, lacquers, etc. or used in a location where surrounding atmosphere is conducive to spontaneous combustion. Ground the dispensing valve or device, containers, hoses and any object to which material is being pumped.
- Secure pump, connections and all contact points to avoid vibration and generation of contact or static spark.
- Consult local building codes and electrical codes for specific grounding requirements.
- After grounding, periodically verify continuity of electrical path to ground. Test with an ohmmeter from each component (e.g., hoses, pump, clamps, container, spray gun, etc.) to ground to insure continuity. Ohmmeter should show 0.1 ohms or less.
- Submerge the outlet hose end, dispensing valve or device in the material being dispensed if possible. (Avoid free streaming of material being dispensed.)
- Use hoses incorporating a static wire.
- Use proper ventilation.
- Keep inflammables away from heat, open flames and sparks.
- Keep containers closed when not in use.

**⚠ WARNING** Pump exhaust may contain contaminants. Can cause severe injury. Pipe exhaust away from work area and personnel.

- In the event of a diaphragm rupture, material can be forced out of the air exhaust muffler.
- Pipe the exhaust to a safe remote location when pumping hazardous or inflammable materials.
- Use a grounded 3/8 minimum i.d. hose between the pump and the muffler.

**⚠ WARNING** HAZARDOUS PRESSURE. Can result in serious injury or property damage. Do not service or clean pump, hoses or dispensing valve while the system is pressurized.

- Disconnect air supply line and relieve pressure from the system by opening dispensing valve or device and / or carefully and slowly loosening and removing outlet hose or piping from pump.

**⚠ WARNING** HAZARDOUS MATERIALS. Can cause serious injury or property damage. Do not attempt to return a pump to the factory or service center that contains hazardous material. Safe handling practices must comply with local and national laws and safety code requirements.

- Obtain Material Safety Data Sheets on all materials from the supplier for proper handling instructions.

**⚠ WARNING** EXPLOSION HAZARD. Models containing aluminum wetted parts cannot be used with 1,1,1-trichloroethane, methylene chloride or other halogenated hydrocarbon solvents which may react and explode.

- Check pump motor section, fluid caps, manifolds and all wetted parts to assure compatibility before using with solvents of this type.

**⚠ CAUTION** Verify the chemical compatibility of the pump wetted parts and the substance being pumped, flushed or recirculated. Chemical compatibility may change with temperature and concentration of the chemical(s) within the substances being pumped, flushed or circulated. For specific fluid compatibility, consult the chemical manufacturer.

**⚠ CAUTION** Maximum temperatures are based on mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperature. Consult the chemical manufacturer for chemical compatibility and temperature limits. Refer to PUMP DATA on page 1 of this manual.

**⚠ CAUTION** Be certain all operators of this equipment have been trained for safe working practices, understand its limitations, and wear safety goggles / equipment when required.

**⚠ CAUTION** Do not use the pump for the structural support of the piping system. Be certain the system components are properly supported to prevent stress on the pump parts.

- Suction and discharge connections should be flexible connections (such as hose), not rigid piped, and should be compatible with the substance being pumped.

**⚠ CAUTION** Prevent unnecessary damage to the pump. Do not allow pump to operate when out of material for long periods of time.

- Disconnect air line from pump when system sits idle for long periods of time.

**⚠ CAUTION** Use only genuine replacement parts to assure compatible pressure rating and longest service life

**NOTICE** Replacement warning labels are available upon request: Static Spark PN \ 93122 & Diaphragm Rupture PN \ 93616-1.

**NOTICE** RE-TORQUE ALL FASTENERS BEFORE OPERATION. Creep of housing and gasket materials may cause fasteners to loosen. Re-torque all fasteners to insure against fluid or air leakage.

**⚠ WARNING** = Hazards or unsafe practices which could result in severe personal injury, death or substantial property damage.

**⚠ CAUTION** = Hazards or unsafe practices which could result in minor personal injury, product or property damage.

**NOTICE** = Important installation, operation or maintenance information.

## AIR AND LUBE REQUIREMENTS

**⚠ WARNING EXCESSIVE AIR PRESSURE.** Can cause pump damage, personal injury or property damage.

- A filter capable of filtering out particles larger than 50 microns should be used on the air supply. There is no lubrication required other than the ring lubricant which is applied during assembly or repair.
- If lubricated air is present, make sure that is compatible with the Nitrile rings in the air motor section of the pump.

## OPERATING INSTRUCTIONS

- Disconnect the air supply from the pump if it is to be inactive for a few hours.
- The outlet material volume is governed not only by the air supply but also by the material supply available at the inlet. The material supply tubing should not be too small or restrictive. Be sure not to use hose which might collapse.
- Secure the diaphragm pump legs to a suitable surface to insure against damage by vibration.

## MAINTENANCE

Refer to the part views and descriptions as provided on page 4 through 7 for parts identification and Service Kit information.

- Certain Smart Parts are indicated which should be available for fast repair and reduction of down time.
- Service kits are divided to service two separate diaphragm pump functions: 1. AIR SECTION, 2. FLUID SECTION. The FLUID SECTION is divided further to match typical part MATERIAL OPTIONS.
- Provide a clean work surface to protect sensitive internal moving parts from contamination from dirt and foreign matter during service disassembly and reassembly.
- Keep good records of service activity and include pump in preventive maintenance program.
- Before disassembling empty captured material in the outlet manifold by turning the pump upside down to drain material from the pump.

## HORIZONTAL SECTION DISASSEMBLY

1. Remove Group "A". See Figure 2.
2. Remove inlet manifold (22) & outlet manifold (46). See Figure 2
3. According Figure 3 & Figure 4 , Disassembly the parts one by one.

## HORIZONTAL SECTION REASSEMBLY

1. Reassembly in reverse order.
2. Clean and inspect all parts. Replace worn or damaged parts with new parts as required.
3. Replace all o-rings, and sufficiently lubricate them with white grease.
4. Especially Sufficiently Lubricate O-rings (24) ,O-rings (25) ,when reassembly them. Important!

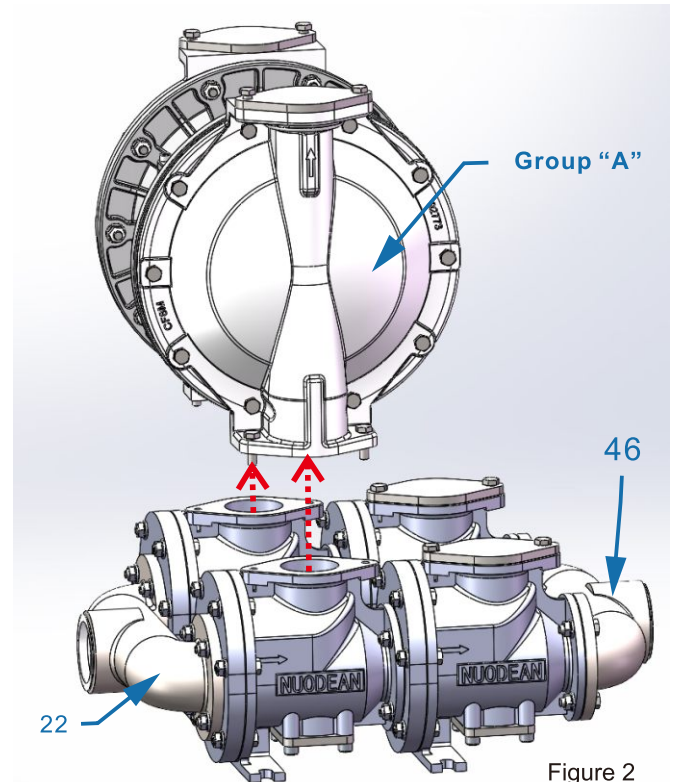


Figure 2

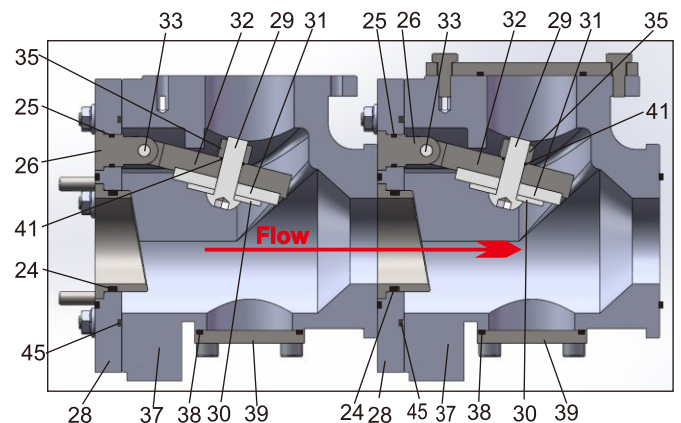


Figure 3





# PARTS LIST / DP27-50ASXXX HORIZONTAL SECTION

Position Number	Description	Part Number	Material	Quantity
21	Nut	NDA-PX12	Stainless Steel	48
22	Stainless Steel Inlet Manifold	NDA-PC145-1	Stainless Steel 316	1
23	Seat	NDA-PE94	Stainless Steel	4
24	O-Ring 53*3.55 (i.d.*sec.)	NDA-PY31	Viton	4
25	O-Ring 16*1.8 (i.d.*sec.)	NDA-PY32	Viton	4
26	Adapter	NDA-PD78	Stainless Steel	4
27	Screw M8*35	NDA-PX19	Stainless Steel	16
28	Stainless Steel Adapter Plate	NDA-PM69	Stainless Steel	4
29	Screw M12*35	NDA-PX79	Stainless Steel	4
30	Plate	NDA-PH76	Stainless Steel	4
31	Gasket	NDA-PF90	Viton	4
32	Flap	NDA-PM70	Stainless Steel	4
33	Pin Shaft	NDA-PD79	Stainless Steel	4
34	Split Pin 2.5*16	NDA-PV101	Stainless Steel	4
35	Nut M12	NDA-PX80	Stainless Steel	4
36	Bolt M8*35	NDA-PX81	Stainless Steel	24
37	Aluminum Chamber Body	NDA-PA71	Aluminum	4
	Stainless Steel Chamber Body	NDA-PA72	Stainless Steel 316	4
38	O-Ring 55*2.65 (i.d.*sec.)	NDA-PY33	Viton	4
39	Plate	NDA-PJ70	Stainless Steel	4
40	Screw M8*15	NDA-PX82	Stainless Steel	16
41	O-Ring 12*1.5 (i.d.*sec.)	NDA-PY34	Viton	4
42	Bolt M8*20	NDA-PX83	Stainless Steel	4
43	Cover	NDA-PJ71	Stainless Steel	2
44	O-Ring 57*2.65 (i.d.*sec.)	NDA-PY35	Viton	2
45	O-Ring 71.8*3.1 (i.d.*sec.)	NDA-PY36	Viton	6
46	Stainless Steel outlet Manifold	NDA-PC146-1	Stainless Steel 316	1
47	Bolt M8*30	NDA-PX60	Stainless Steel	8
48	O-Ring 108.5*2.65	NDA-PY37	Viton	4
49	O-Ring 63.09*3.53 (i.d.*sec.)	Y327-230	Viton	2
50	Ring	92776	Stainless Steel 316	4

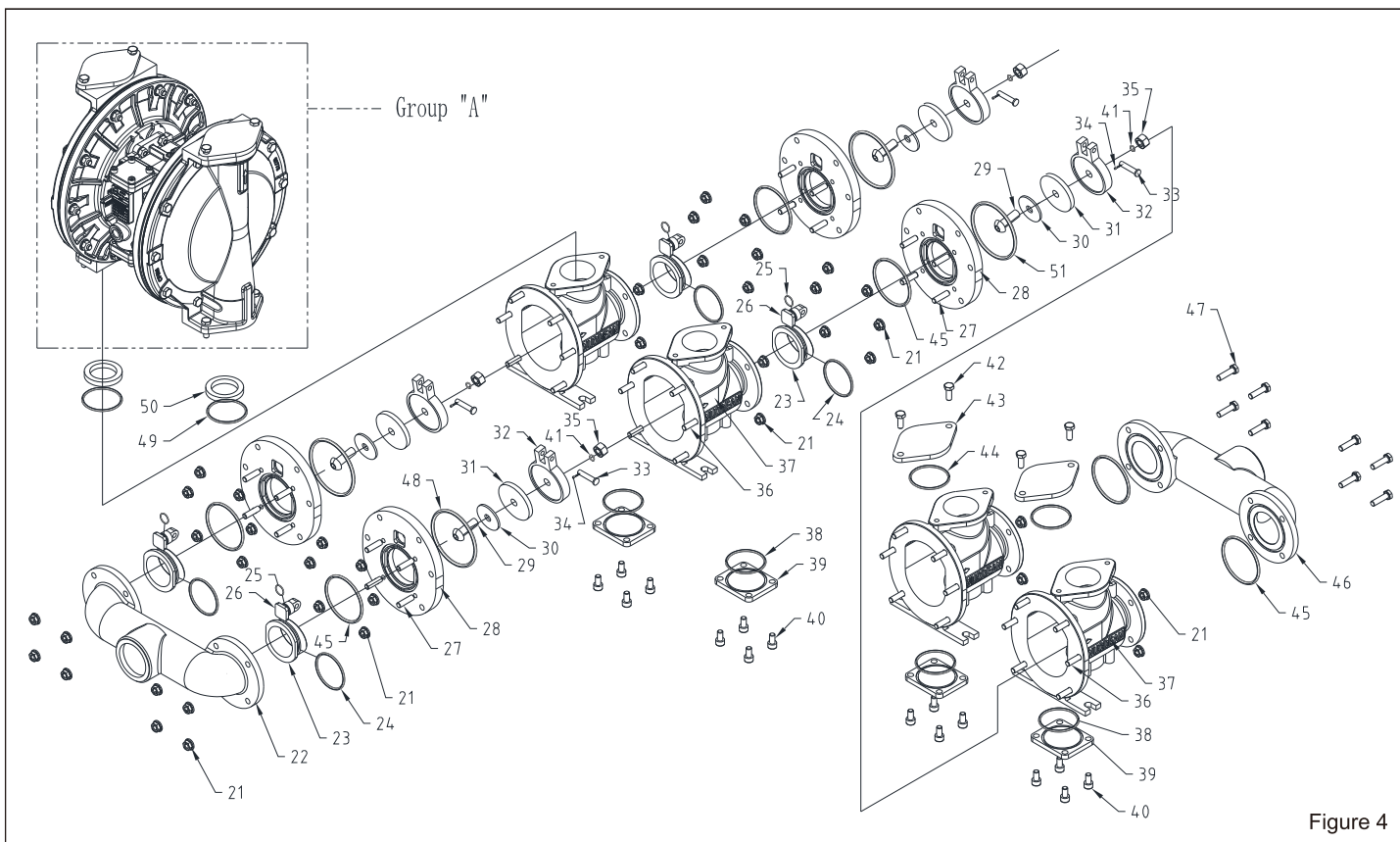


Figure 4

## GROUP “A” SECTION DISASSEMBLY

1. Remove (214),(213),(212). See Figure 5.
3. Remove (211),(209),(208),(207),(202),(206),(204),(203),(202),(201). See Figure 5.

**NOTE:** Only PTFE diaphragm models use a primary diaphragm(205) and a backup diaphragm (204). Refer to Figure 5.

## GROUP “A” SECTION RESASSEMBLY

- Reassemble in reverse order. Refer to Figure 5.
- Clean and inspect all parts. Replace worn or damaged parts with new parts as required.
- Lubricate(201) diaphragm rod with white grease.
- Be certain (205) or (205/204) diaphragm(s) align properly with (209) fluid caps before making final torque adjustments on bolt and nuts to avoid twisting the diaphragm.
- For models with PTFE diaphragms: Item (204) santoprene diaphragm is installed with the side marked AIR SIDE towards the pump center body. Install the PTFE Diaphragm with the side marked FLUID SIDE towards the fluid cap.
- When reassemble (130) Y-type rings, Pay attention to the orientation of Y-type rings (130), Must ensure correct installation. See Figure 10.
- Re-check torque settings after pump has been restarted and run awhile.

## PARTS LIST / DP27-50ASXXX GROUP “A” SECTION

Position Number	Description	Part Number	Material	Quantity	Remark
201	Rod	NDA-PD76	Stainless Steel	1	
202	O-Ring	Y328-16	PTFE	4	
203	Washer-Air Side	NDA-PH68	Steel	2	
204	Backer Diaphragm	94616	Santoprene	2	Only when No. 205 adopts 94617, this part is adopted; Otherwise, this part is not adopted.
205	Diaphragm	92755-1	Neoprene	2	Selected according to customer requirements
		92755-2	Nitrile	2	
		92755-3	Viton	2	
		94617	PTFE	2	
		94615-9	Hytrel	2	
		94615-A	Santoprene	2	
206	Washer-Fluid Side	92775	Stainless Steel	2	
207	Washer	93065	Stainless Steel	2	
208	Bolt M16x1.5x45	NDA-PX32	Stainless Steel	2	
209	Stainless Steel Fluid Cap	97621	Stainless Steel 316	2	Selected for SS pump
210	Nut M8	NDA-PX12	Stainless Steel	20	
211	Bolt M8x45	NDA-PX63	Stainless Steel	20	
212	Ring	92776	Stainless Steel 316	4	Selected for SS pump
213	O-Ring 63.09*3.53 (i. d.*sec.)	Y327-230	Viton	2	
214	Cover	NDA-PJ71	Stainless Steel	2	

# PARTS LIST / DP27-50ASXXX GROUP "A" SECTION

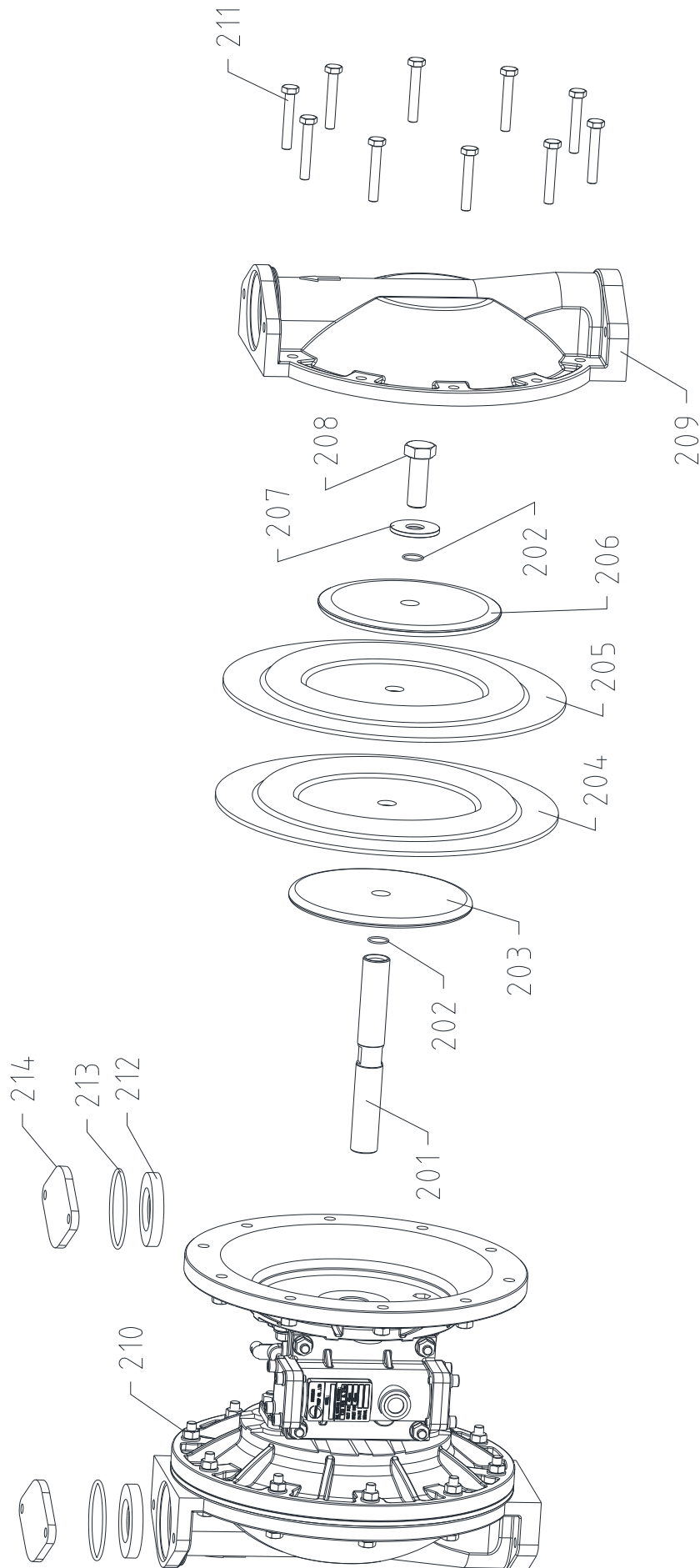


Figure 5

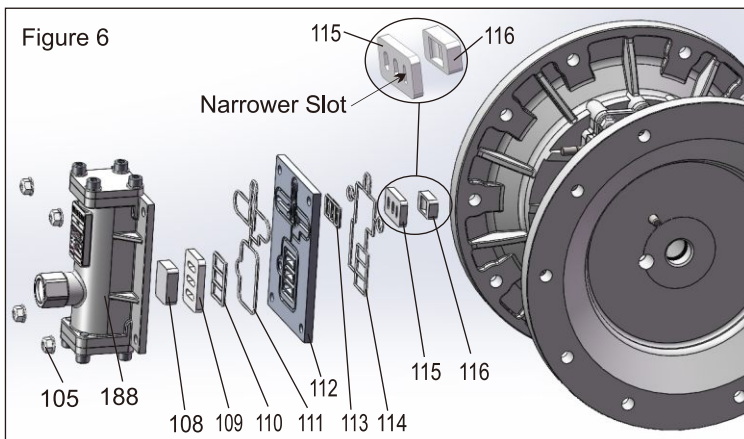
## AIR MOTOR SECTION SERVICE

Service is divided into two parts- 1. Pilot Valve, 2. Major Valve  
**GENERAL REASSEMBLY NOTES:**

- Air Motor Section Service is continued from Fluid Section repair.
- Inspect and replace old parts with new parts as necessary. Look for deep scratches on surfaces, and nicks or cuts in "O"rings and Y-type rings.
- Take precautions to prevent cutting "O"rings and Y-type rings upon installation.
- Lubricate "O"rings and Y-type rings with lubricant grease.
- Do not overtighten fasteners, refer to torque specification block on view.
- Re-torque fasteners following restart.

## PILOT VALVE DISASSEMBLY

1. Remove (105) nut and (188) major valve.
2. Remove (108), (109), (110), (111), (112), (113), (114), (115), (116).



3. Remove (118) nut, (146) air cap, (129) air cap, and (121) gasket.
4. Remove (131) from (117), and remove (130) Y-type rings from (146) & (129).
5. Remove (127) o-rings, (124) pilot pins, (126) retainer rings, and (125) O-rings.
6. Remove (132) spool and (133) Y-type rings.
7. Remove (123) guide bushes and (122) o-rings.

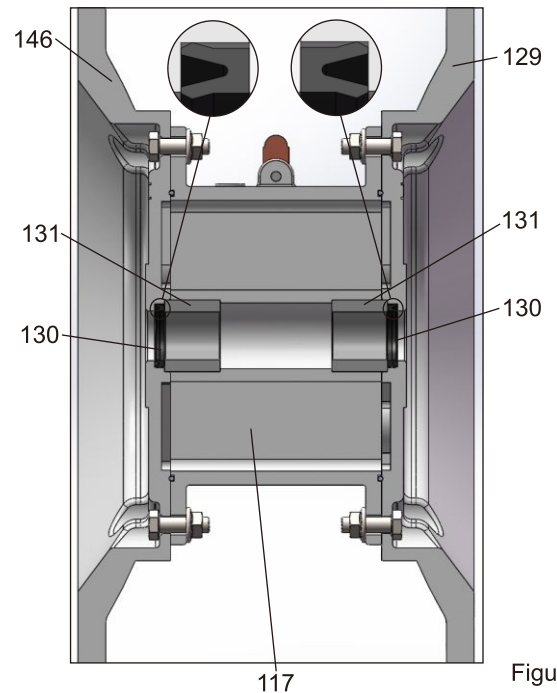
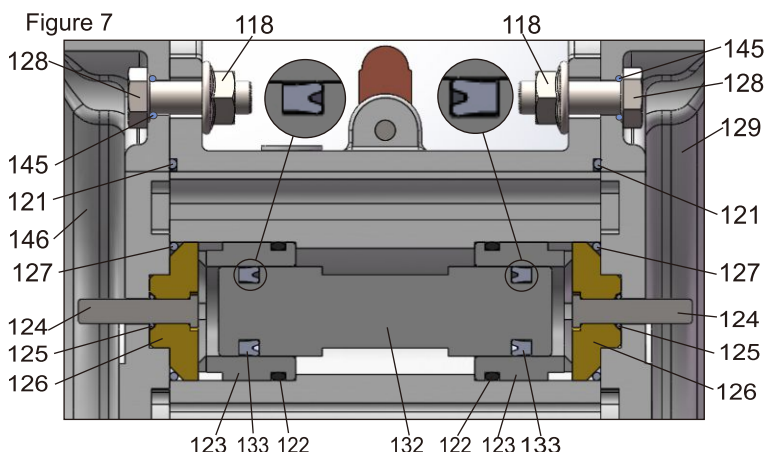


Figure 8

## PILOT VALVE REASSEMBLY

1. Replace all o-rings, Y-type rings and gaskets if worn or damaged. These are (110), (111), (113), (114), (145), (121), (127), (125), (133), (122), and (130).
2. Look for deep scratches or damages on sealing surfaces of (108) valve insert and (109) valve plate. If there are scratches or damages, Replace them.  
**Note:** (108) valve insert and (109) valve plate are not included in Air Section Repair Kit, but Keep them on hand in addition to the Service Kits for fast repair and reduction of down time.
2. Look for deep scratches or damages on sealing surfaces of (116) valve insert and (115) valve plate. If there are scratches or damages, Replace them.  
**Note:** (116) valve insert and (115) valve plate are not included in Air Section Repair Kit, but Keep them on hand in addition to the Service Kits for fast repair and reduction of down time.

3. Reassemble in reverse order.

### Note:

- In the process of reassembly, be careful and not brutal.
- Lubricate sufficiently all o-rings and Y-type rings with lubricant grease.
- Lubricate sufficiently the sealing surfaces with lubricant grease, where (109) valve plate and (108) valve insert contact with each other.
- Lubricate sufficiently the sealing surfaces with lubricant grease, where (115) valve plate and (116) valve insert contact with each other.
- Lubricate (124) pilot pins with lubricant grease.
- Pay attention to the orientation of Y-type rings (133) & (130), Must ensure correct installation.
- Pay attention to the orientation of (115) valve plate. Must ensure correct installation.

## MAJOR VALVE DISASSEMBLY

1. Remove (105)nuts, then remove the assembly of major valve.
2. Remove (109)valve plate and (108)valve insert.
3. Remove (101)screws, and (102) covers.
4. Remove (103)O-rings.
5. Remove (136),(134),(138) and (140).
6. Remove (141) and (104).
7. Remove (135)Y-type rings from (134) & (140); Remove (137) Y-type rings from (138); Remove (139)o-rings from (138) & (141).

## MAJOR VALVE REASSEMBLY

1. Replace all o-rings, Y-type rings and gaskets if worn or damaged. These are (103),(135),(139),(137).
  2. Look for deep scratches or damages on sealing surfaces of (109) valve plate and (108) valve insert. If there are scratches or damages, Replace them.
- Note:** (109)valve plate and (108) valve insert are not included in Air Section Repair Kit, but Keep them on hand in addition to the Service Kits for fast repair and reduction of down time.
3. Reassemble in reverse order.

### Note:

- In the process of reassembly, be careful and not brutal.
- Lubricate all o-rings and Y-type rings with lubricant grease.
- Lubricate the sealing surfaces with lubricant grease, where (109) valve plate and (108)valve insert contact with each other.
- Pay attention to the orientation of Y-type rings (135) & (137). Must ensure correct installation.
- Pay attention to the orientation of (108) valve insert. Must ensure correct installation.

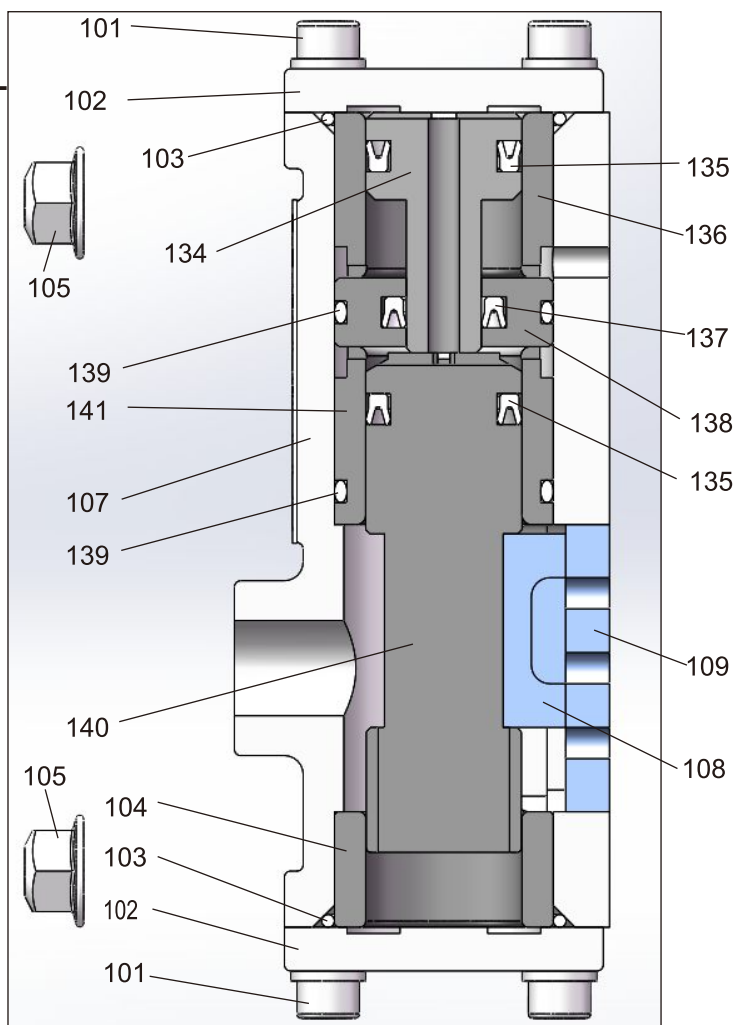


Figure 9



# PARTS LIST / DP27-50ASXXX AIR MOTOR SECTION



Figure 10

# PARTS LIST / DP27-50ASXXX AIR MOTOR SECTION

Position number	Description	Part number	Material	Quantity
101	Screw(M6*16)	NDA-PX16	Steel	8
	Screw(M6*16)	NDA-PX17	Stainless Steel	8
102	Motor Cap	NDA-PJ66	Aluminum	2
103	O-Ring 35*2.4(ID*Sec.)	NDA-PY14	Nitrile	2
104	Guide Bush	NDA-PK77	POM	1
105	Nut(M8)	NDA-PX11	Steel	4
	Nut(M8)	NDA-PX12	Stainless Steel	4
106	Screw(M8*40)	NDA-PX14	Stainless Steel	4
107	Air Valve Body	NDA-PI66	Aluminum	1
108	Valve Insert	NDA-PK83	Ceramic	1
109	Valve Plate	NDA-PK84	Ceramic	1
110	Gasket	NDA-PF67	Nitrile	1
111	Gasket	NDA-PF66	Nitrile	1
112	Adapter Plate	NDA-PN67	Aluminum	1
113	Gasket	NDA-PF69	Nitrile	1
114	Gasket	NDA-PF68	Nitrile	1
115	Valve Plate	NDA-PK75	Ceramic	1
116	Valve Insert	NDA-PK76	Ceramic	1
117	Pump Body	NDA-PA66	Aluminum	1
118	Nut(M8)	NDA-PX11	Steel	8
	Nut(M8)	NDA-PX12	Stainless Steel	8
119	Ground Lug	93004	Copper	1
120	Screw (M5x15)	NDA-PX15	Stainless Steel	1
121	Gasket	NDA-PF70	Nitrile	2
122	O-ring 25*2.65 (ID*Sec.)	NDA-PY15	Nitrile	2
123	Guide Bush	NDA-PK69	POM	2
124	Pilot Pin	NDA-PK140	Stainless Steel	2
125	O-ring 5*1.5 (ID*Sec.)	NDA-PY16	PU/NBR	2
126	Retainer Ring	NDA-PK139	Brass	2
127	O-Ring 25*2.65 (ID*Sec.)	NDA-PY15	Nitrile	2
128	Bolt (M8x25)	NDA-PX25	Steel	8
	Bolt (M8x25)	NDA-PX26	Stainless Steel	8
129	Right Air Cap	NDA-PB109	Aluminum	1
130	Y Seal Ring (31*23*4.5)	NDA-PS203	Nitrile	2
131	Bush	NDA-PG68	POM	2
132	Spool	NDA-PK73	POM	1
133	Y Seal Ring(18*10*4.5)	NDA-PS67	Nitrile	2
134	Shaft	NDA-PK80	Nitrile	1
135	Y Seal Ring(25x17x4.5)	NDA-PS68	Nitrile	2
136	Bush	NDA-PK79	POM	1
137	Y Seal Ring(20x12x4.5)	NDA-PS69	Nitrile	1
138	Retainer Ring	NDA-PK81	POM	1
139	O-ring 30*2.65(ID*Sec.)	NDA-PY18	Nitrile	2
140	Spool	NDA-PK78	POM	1
141	Guide Bush	NDA-PK82	POM	1
142	Muffler	93139	Polypropylene	1
143	O-ring 15*2.65 (ID*Sec.)	NDA-PY17	Nitrile	2
144	Plug 1/8"	NDA-PN106	Stainless Steel	1
145	O-ring 7*2(ID*Sec.)	NDA-PY25	Nitrile	8
146	Left Air Cap	NDA-PB108	Aluminum	1

# TROUBLE SHOOTING

## Product discharged from exhaust outlet

- Check for diaphragm rupture.
- Check tightness of diaphragm nut.

## Air bubbles in product discharge.

- Check connections of suction plumbing.
- Check o-rings between intake manifold and fluid caps.
- Check tightness of diaphragm nut.

## Low output volume, erratic flow, or no flow.

- Check air supply.
- Check for plugged outlet hose.
- Check for kinked (restrictive) outlet material hose.
- Check for kinked (restrictive) or collapsed inlet material hose.
- Check for pump cavitation—suction pipe should be sized at least as large as the inlet thread diameter of the pump for proper flow if high viscosity fluids are being pumped. Suction hose must be a non-collapsing type, capable of pulling a high vacuum.
- Check all joints on the inlet manifolds and suction connections. These must be air tight.
- Inspect the pump for solid objects lodged in the diaphragm chamber or the seat area.

# DIMENSIONAL DATA

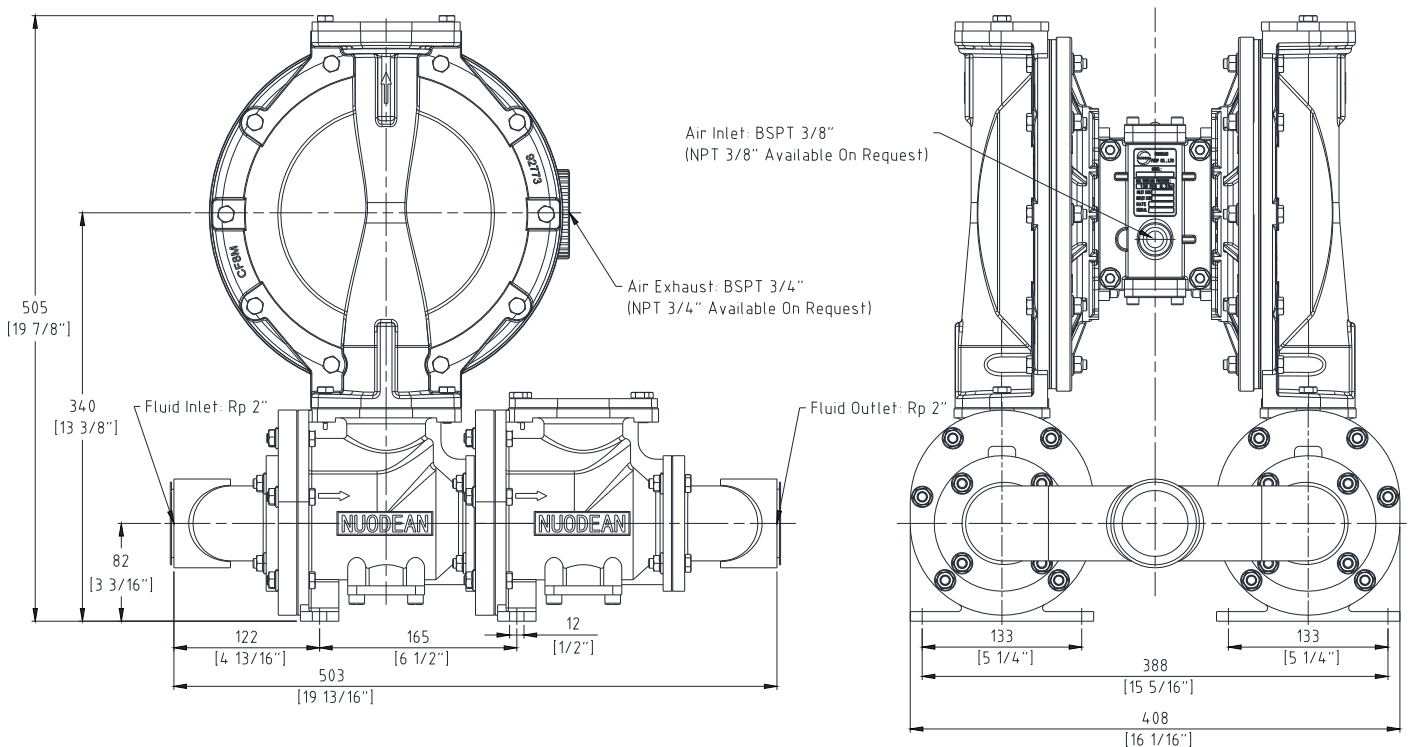


Figure 11

