OPERATOR'S MANUAL SD10X-XXX-XXX-BXXX

INCLUDING: OPERATION, INSTALLATION AND MAINTENANCE

RELEASED: 7-29-16
REVISED: 3-29-19
(REV: E)

1" FDA SANITARY DIAPHRAGM PUMP
1:1 RATIO (METALLIC)

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.

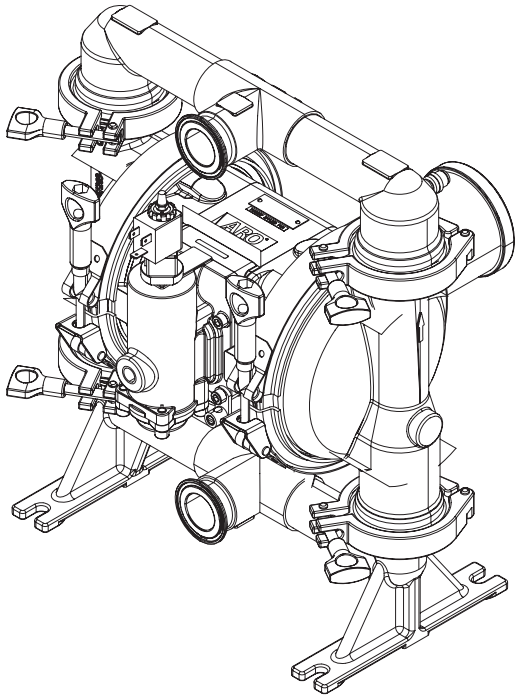
SERVICE KITS

Refer to Model Description Chart to match the pump material options.
637493-XX for fluid section repair kits information (see page 5).
NOTE: This kit also contains several air motor seals which will need to be replaced.
637495 for air section repair (see page 7).
637496-X for major air valve assembly (see page 9).
637541-X-X for Solenoid Valve Block assembly (see page 2)

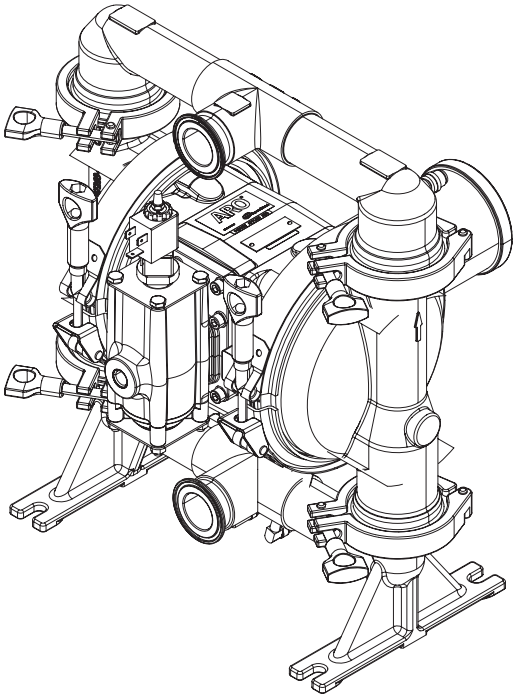
PUMP DATA

Models..... see Model Description Chart for "-XXX".
Pump Type..... Metallic Air Operated Double Diaphragm
Material..... see Model Description Chart
Weight
SD10S-XXX-XXX-BXXX ..... 58.4 lbs (26.5 kgs)
SD10R-XXX-XXX-BXXX ..... 47.33 lbs (21.47 kgs)
Maximum Air Inlet Pressure ..... 120 psig (8.3 bar)
Maximum Material Inlet Pressure..... 10 psig (0.69 bar)
Maximum Outlet Pressure..... 120 psig (8.3 bar)
Maximum Flow Rate..... 54 gpm (204.4 lpm)
Displacement / Cycle @ 100 psig..... 0.258 gal (0.98 lit)
Maximum Particle Size..... 1/8" dia (3.2 mm)
Maximum Temperature Limits (diaphragm / ball / seal material)
Santoprene®..... -40 to 225° F (-40° to 107° C)
PTFE..... 40 to 225° F (4° to 107° C)
Hytrel®..... -20° to 180° F (-29° to 82°C)
Dimensional Data..... see page 14
Mounting Dimension..... see page 14
Noise Level @ 70 psig, 60 cpm ..... 80.6 dB(A)①

① The pump sound pressure levels published here have been updated to an Equivalent Continuous Sound Level (LA_{eq}) to meet the intent of ANSI S1.13-1971, CAGI-PNEUROP S5.1 using four microphone locations.



SD10S-XXX-XXX-BXXX



SD10R-XXX-XXX-BXXX

Figure 1

INGERSOLL RAND COMPANY LTD
209 NORTH MAIN STREET – BRYAN, OHIO 43506
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ARO Ingersoll Rand

MODEL DESCRIPTION CHART

SD XX - X X X X - X X X - B X X X

Pump Type

SD - Electronic Interface Air Operated Diaphragm

Pump Size

10 - 1" Diaphragm Pump

Center Section Material

R - White Polypropylene
S - Stainless Steel

Port

C - 1-1/2" Sanitary Flange

Fluid Caps and Manifold Material

S - 316L Stainless Steel

Hardware Material

S - Stainless Steel

Seat Material

C - Hytrel
K - PVDF
S - 316L Stainless Steel

Ball Material

C - Hytrel
M - Medical Grade Santoprene
S - 316L Stainless Steel
T - PTFE

Diaphragm Material

C - Hytrel
M - Medical Grade Santoprene
T - PTFE / Santoprene
K - PTFE Composite (**Note**: See special diaphragm installation instructions on page 4 and on page 15-20.)

Revision Level

B - Revision

Specialty Code 1 (Blank if no Specialty Code)

A - Solenoid 120VAC
B - Solenoid 12VDC
C - Solenoid 240VAC
D - Solenoid 24VDC
N - Solenoid with no coil
S - Cycle Sensing On Major Valve
0 - Standard Valve Block (No Solenoid)

Specialty Code 2 (Blank if no Specialty Code)

E - End of stroke feedback + Leak Detection
F - End of stroke feedback
L - Leak Detection
N - End of Stroke without Connector / Leak Detection
P - End of Stroke without Connector
0 - No Option

Special Testing

Testing for special testing options, please contact your nearest ARO Customer Service Representative or Distributor

Fluid Section Service Kit Selection

Example: Models SD10S-CSS-S M M-BXXX
Fluid Section Service Kit # 637493-MM

SD10X-XXX-XXX-BXXX

637493 - X X
Ball — Diaphragm

1" Solenoid Valve Block service Kit 637541-X-X

Valve Block Materials

4- White Non-Metallic
5- Stainless steel (Electrical polish)
For solenoid Option, choose letter in Specialty Code 1 from
"MODEL DESCRIPTION CHART"

Includes items:105, 111, 128, 132, 135, 136, 137, 138, 139, 140, 141, 166, 200, 233, 403, 413, 414, 415, 416, 417, 418, 419, 420, 421 and 429

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.

- Do not exceed the maximum inlet air pressure as stated on the pump model plate.
- 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.

⚠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 ensure continuity. Ohmmeter should show 0.1 ohms or less.
- Submerse 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 ID 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 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.

⚠WARNING MISAPPLICATION HAZARD. All fluid contact materials must be FDA compliant and meet the United States Code of Federal Regulations (CFR) Title 21, Section 177.

⚠ 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 it's 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 ARO replacement parts to assure compatible pressure rating and longest service life.

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

NOTICE Replacement warning labels are available upon request: "Static Spark & Diaphragm Rupture" pn \ 94080.

NOTICE For best sealing results, use a standard sanitary clamp style gasket of a flexible material such as EPDM, Buna-N, fluoroelastomer, or silicone.

NOTICE SANITIZE THE PUMP BEFORE FIRST USE. It is the user's responsibility to properly sanitize the pump before first use. It is up to the user whether this will include disassembling and cleaning individual parts or simply flushing pump with a sanitizing solution.

⚠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.

GENERAL DESCRIPTION

The ARO diaphragm pump offers high volume delivery even at low air pressure and a broad range of material compatibility options are available. Refer to the model and option chart. ARO pumps feature stall resistant design, modular air motor / fluid sections.
Air operated double diaphragm pumps utilize a pressure differential in the air chambers to alternately create suction and a positive fluid pressure in the fluid chambers, valve checks ensure a positive flow of fluid.
Pump cycling will begin as air pressure is applied and 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.

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 "O" ring lubricant which is applied during assembly or repair.
- If lubricated air is present, make sure that it is compatible with the "O" rings and seals in the air motor section of the pump.

INSTALLATION

- Verify correct model / configuration prior to installation.
- Re-torque all external fasteners as per specifications prior to start up.
- Pumps are tested in water at assembly. Flush pump with compatible fluid prior to installation.
- When the diaphragm pump is used in a forced-feed (flooded inlet) situation, it is recommended that a "Check Valve" be installed at the air inlet.
- Material supply tubing should be at least the same diameter as the pump inlet manifold connection.
- Material supply hose must be reinforced, non-collapsible type compatible with the material being pumped.
- Piping must be adequately supported. Do not use the pump to support the piping.
- Use flexible connections (such as hose) at the suction and discharge. These connections should not be rigid piped and must be compatible with the material being pumped.
- Secure the diaphragm pump legs to a suitable surface (level and flat) to ensure against damage by vibration.
- Pumps that need to be submersed must have both wet and non-wet components compatible with the material being pumped.
- Submersed pumps must have exhaust pipe above liquid level. Exhaust hose must be conductive and grounded.
- Flooded suction inlet pressure must not exceed 10 psig (0.69 bar).

OPERATING INSTRUCTIONS

- Always flush the pump with a solvent compatible with the material being pumped if the material being pumped is subject to "setting up" when not in use for a period of time.
- Disconnect the air supply from the pump if it is to be inactive for a few hours.

PARTS AND SERVICE KITS

Refer to the part views and descriptions as provided on pages 5 through 9 for parts identification and service kit information.

- Certain ARO "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.

MAINTENANCE

- 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 the 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.

FLUID SECTION DISASSEMBLY

1. Remove (61) outlet manifold and (60) inlet manifold.
2. Remove (22) balls, (19 and 33) "O" rings (if applicable) and (21) seats.
3. Remove (15) fluid caps.

NOTE: Only PTFE diaphragm models use a primary (7) diaphragm and a backup (8) diaphragm.

NOTE: Do not stretch or bend the clamp during disassembly. Loosen the fastener to free the clamp and move the clamp to the air cap side of the pump to remove the fluid cap.

4. Remove the (14) screw and (6) diaphragm washer (if applicable) (7) or (7 / 8) diaphragms, and (5) backup washer.

NOTE: Do not scratch or mar the surface of (1) diaphragm rod.

FLUID SECTION REASSEMBLY

- Reassemble in reverse order. Refer to the torque requirements on page 5.
- Clean and inspect all parts. Replace worn or damaged parts with new parts as required.
- Lubricate (1) diaphragm rod and (144) "U" cups with Lubriplate® FML-2 grease (94276 grease packet is included in service kit).
- For models with PTFE diaphragms: Item (8) Santoprene diaphragm is installed with the side marked "AIR SIDE" towards the pump center body. Install the (7) PTFE diaphragm with the side marked "FLUID SIDE" towards the (15) fluid cap.

NOTE: For PTFE one-piece composite diaphragm SPECIAL INSTRUCTIONS. Refer page 15-20 for more detailed INSTALLATION SEQUENCES: Apply 5-8 psig of air pressure to ensure the first air connecting side of the air cap. Tighten PTFE one-piece composite diaphragm on connecting rod, ensuring back side of diaphragm is flush with backup washer and connecting rod, then insert rod into pump center body. Push diaphragm to first side then clamp on fluid cap. Install and tighten diaphragm on other side, in similar fashion to other side. Apply 5-8 psig of air pressure to slowly draw diaphragm down, taking care not to activate trip pin (and thus shifting the diaphragm). Install second fluid cap.

- Examine torque settings after the pump has been re-started and run a while.

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• Santoprene® is a registered trademark of Monsanto Company, licensed to Advanced Elastomer Systems, L.P. • ARO® is a registered trademark of Ingersoll Rand Company •
• Lubriplate® is a registered trademark of Lubriplate Division (Fiske Brothers Refining Company) • 262™, 271™ and 572™ are trademarks of Henkel Loctite Corporation •

PARTS LIST / SD10X-XXX-XXX-BXXX FLUID SECTION

❶ 637493-XX FLUID SECTION SERVICE KITS INCLUDE: BALLS (See "Ball Options", refer to -XX in Service Kit chart below), DIAPHRAGMS (See "Diaphragm Options", refer to -XX in Service Kit chart below), and items 19, 33, 70, 175, and 180 (listed below) plus 174 and 94276 Lubriplate FML-2 grease (page 7).

SEAT OPTIONS SD10X-XXX-XXX-BXXX			
	"21"		
-XXX	Seat	Qty	Mtl
-CXX	96152-C	(4)	[H]
-KXX	94707-2	(4)	[K]
-SXX	97299	(4)	[SS]

BALL OPTIONS SD10X-XXX-XXX-BXXX			
	❶ "22" (1-1/4" diameter)		
-XXX	Ball	Qty	Mtl
-XCX	93278-C	(4)	[H]
-XMX	93278-M	(4)	[Msp]
-XSX	92408	(4)	[SS]
-XTX	93278-4	(4)	[T]

DIAPHRAGM OPTIONS SD10X-XXX-XXX-BXXX													
	❶ Service kit -XX = (Ball)	❶ "7"			❶ "8"			❶ "19" (1/8" x 2-1/8" OD)			❶ "33" (1/8" x 1-5/8" OD)		
-XXX	-XX = (Diaphragm)	Diaphragm	Qty	Mtl	Diaphragm	Qty	Mtl	Gasket	Qty	Mtl	Gasket	Qty	Mtl
-XXC	637493-XC	97291-C	(2)	[H]	----	--	--	93282	(4)	[T]	93281	(4)	[T]
-XXM	637493-XM	97291-M	(2)	[Msp]	----	--	--	93282	(4)	[T]	93281	(4)	[T]
-XXT	637493-XT	97293-4	(2)	[T]	97294-A	(2)	[SP]	93282	(4)	[T]	93281	(4)	[T]
-XXK	637493-XK	97432	(2)	[TC]	----	--	--	93282	(4)	[T]	93281	(4)	[T]

NOTE: Gasket items 19 and 33 are not required with seat options -CXX.

CENTER SECTION PART OPTIONS SD10X-XXX-XXX-BXXX				
Item	Description (size)	Qty	Part No.	Mtl
43	Ground Lug (see page 9) (SD10S-XXX-XXX-BXXX only)	(1)	93004	[Co]
68	Air Cap	(1)	97285-3	[SS]
69	Air Cap	(1)	97285-4	[SS]
131	Screw (M8 x 1.25 - 6g x 100 mm)	(4)	96655	[SS]
❷180	Washer	(4)	96006	[Co]
195	Nut (M8 x 1.25 - 6h)	(4)	96005	[SS]

MATERIAL CODE	
[B]	= Nitrile
[C]	= Carbon Steel
[Co]	= Copper
[H]	= Hytrel
[K]	= PVDF
[Msp]	= Medical Grade Santoprene
[SP]	= Santoprene
[SS]	= Stainless Steel
[T]	= PTFE
[TC]	= PTFE Composite

COMMON PARTS				
Item	Description (size)	Qty	Part No.	Mtl
1	Rod	(1)	97426	[C]
	(SD10X-XXX-XXK-BXXX Only)		97447	
5	Backup Washer	(2)	97296	[SS]
	(SD10X-XXX-XXK-BXXX)		93441-1	
★6	Diaphragm Washer	(2)	97296	[SS]
★9	Washer	(2)	97297	[SS]
★14	Screw (M12 x 1.75 - 6g x 25 mm)	(2)	97298	[SS]
15	Fluid Cap	(2)	97283	[SS]
60	Inlet Manifold	(1)	97288	[SS]
61	Outlet Manifold	(1)	97289	[SS]
❶❷70	Gasket	(2)	95843	[B]
74	Pipe Plug (SD10X-XXX-XXX-BXFX, SD10X-XXX-XXX-BX0X, SD10X-XXX-XXX-BXPX)	(2)	Y17-51-S	[SS]
82	Sanitary Clamp (2.5")	(4)	97292	[SS]
83	Band-Clamp, Diaphragm	(2)	97290	[SS]
❶❷144	"U" Cup (3/16" x 1-1/8" OD)	(2)	Y186-49	[B]
❶❷175	"O" Ring (3/32" ID x 13/16" OD)	(2)	Y325-114	[B]

❷ Items included in Air motor kit parts, see pages 7 and 9.
★ Items are not required with diaphragm options - SD10X-XXX-XXK-BXXX.

COLOR CODE		
Material	**Diaphragm Color**	**Ball Color**
Medical Grade Santoprene	Natural	Natural
Santoprene (backup)	Green	N/A
PTFE	White	White
Hytrel	Cream	Cream

FOR THE AIR MOTOR SECTION, SEE PAGES 7 and 9.

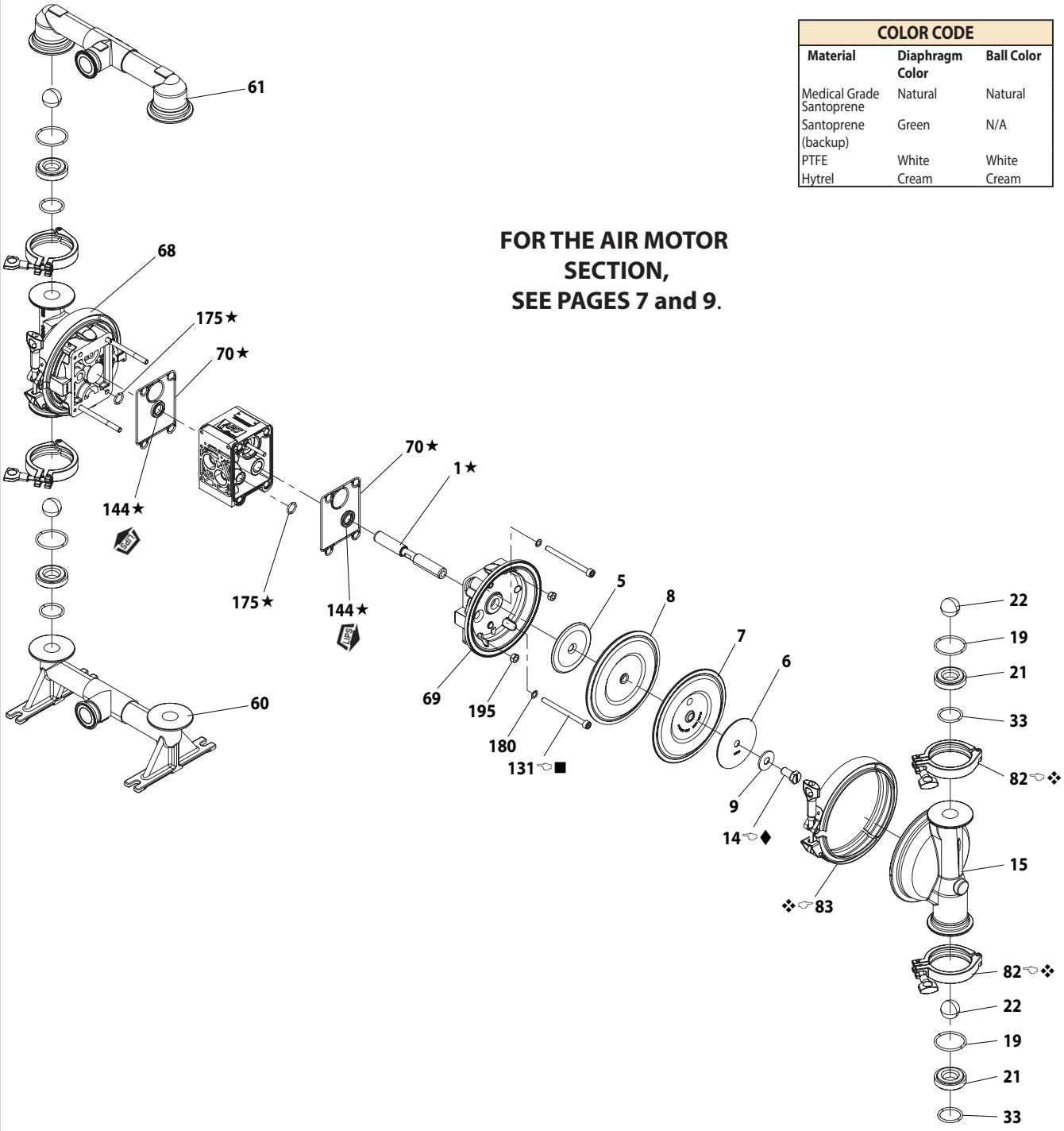


Figure 2

☞ ASSEMBLY TORQUE REQUIREMENTS ☜

NOTE: DO NOT OVERTIGHTEN FASTENERS.
ALL FASTENERS ARE METRIC.

(14) Screw, tighten to 25 - 30 ft lbs (33.9 - 40.7 Nm).
(82) Manifold clamp, 26.5 - 39.8 in lbs (3 - 4.5 Nm).
(83) Fluid cap clamp, 8.85 - 10.7 ft lbs (12 - 14.5 Nm)
(131) screws, 12 - 17 ft lbs (16.3 - 23.0 Nm).

LUBRICATION / SEALANTS

★ Apply Lubriplate FML-2 grease to all "O" rings, "U" cups and mating parts.
■ Apply Loctite® 242™ to threads at assembly.
♦ Apply Loctite® 271™ to threads at assembly.
❖ Apply anti-seize compound to threads at assembly.

PARTS LIST / SD10X-XXX-XXX-BXXX AIR MOTOR SECTION

❷ Indicates parts included in 637495 air section service kit shown below and items (70), (144), (175) and (180) shown on page 5.

Item	Description (size)	Qty	Part No.	Mtl
101	Center Body (SD10S-XXX-XXX-BXXX)	(1)	97034-1	[SS]
	(SD10R-XXX-XXX-BXXX)	(1)	97026-1	[P]
103	Bushing	(1)	97391	[D]
105	Screw (M6 x 1 -6g) (SD10S-XXX-XXX-BXXX) (16 mm long)	(4)	95991	[SS]
	(SD10R-XXX-XXX-BXXX) (130 mm long)	(4)	95886	[SS]
107	End Plate (SD10R-XXX-XXX-BXXX only)	(2)	95840	[SS]
111	Spool (SD10S-XXX-XXX-B0XX)	(1)	95835	[P]
	(SD10S-XXX-XXX-BSXX)	(1)	95835-1	[P]
	(All SD10S with Solenoid)	(1)	95835-2	[P]
	(SD10R-XXX-XXX-B0XX)	(1)	96293	[P]
	(SD10R-XXX-XXX-BSXX)	(1)	96293-1	[P]
	(All SD10R with Solenoid)	(1)	96293-2	[P]
118	Actuator Pin	(2)	95839	[SS]
121	Sleeve	(2)	95123	[D]
126	Plug (SD10S-XXX-XXX-BX0X), (SD10S-XXX-XXX-BXLX)	(1)	Y17-13-S	[SS]
	(SD10R-XXX-XXX-BX0X), (SD10R-XXX-XXX-BXLX)	(1)	93897-1	[P]
128	Pipe Plug (1/8 - 27 NPT x .27") (SD10S-XXX-XXX-BXXX only)	(1)	Y17-50-S	[SS]
❷ 132	Gasket	(1)	96170	[B]
133	Washer (1/4") (SD10S-XXX-XXX-BXXX)	(3)	Y14-416-T	[SS]
	(M6) (SD10R-XXX-XXX-BXXX)	(6)	95931	[SS]
134	Screw (M6 x 1 - 6g x 35 mm) (SD10S-XXX-XXX-BXXX)	(4)	95887	[SS]
	(SD10R-XXX-XXX-BXXX)	(6)	95887	[SS]
135	Valve Housing (SD10S-XXX-XXX-B0XX, SD10S-XXX-XXX-BSXX)	(1)	95939-7	[SS]
	(All SD10S with Solenoid)	(1)	95939-8	[SS]
	(SD10R-XXX-XXX-B0XX, SD10R-XXX-XXX-BSXX)	(1)	96174-5	[P]
	(All SD10R with Solenoid)	(1)	96174-7	[P]
136	End Cap (SD10S-XXX-XXX-BXXX)	(1)	95938-1	[SS]
	(SD10R-XXX-XXX-BXXX)	(1)	95833-1	[P]
❷137	Gasket	(1)	95844	[B]
❷138	"U" Cup (3/16" x 1-5/8" OD)	(1)	Y186-53	[B]
❷139	"U" Cup (3/16" x 1-1/8" OD)	(1)	Y186-49	[B]
140	Valve Insert	(1)	95838	[Ck]
141	Valve Plate	(1)	95885	[Ck]
❷166	Gasket	(1)	96171	[B]
❷167	Pilot Piston (includes 168 and 169)	(1)	67164	[D]
168	"O" Ring (3/32" x 5/8" OD)	(2)	94433	[U]
169	"U" Cup (1/8" x 7/8" OD)	(1)	Y240-9	[B]
170	Piston Sleeve	(1)	94081	[D]
❷171	"O" Ring (3/32" x 1-1/8" OD)	(1)	Y325-119	[B]
❷172	"O" Ring (1/16" x 1-1/8" OD)	(1)	Y325-22	[B]
❷173	"O" Ring (3/32" x 1-3/8" OD)	(2)	Y325-123	[B]
❶❷174	"O" Ring (1/16" x 1/2" OD)	(2)	Y325-202	[B]
❷ 176	Diaphragm (check valve)	(2)	95845	[U]
181	Roll Pin (5/32" OD x 1/2" long)	(4)	Y178-52-S	[SS]
197	Leak Detector Sensor Adapter (not shown) (SD10X-XXX-XXX-BXEX), (SD10X-XXX-XXX-BXLX), (SD10X-XXX-XXX-BXNX)	(1)	95088	
198	Leak Detector Sensor Cable (not shown) (SD10X-XXX-XXX-BXEX), (SD10X-XXX-XXX-BXLX), (SD10X-XXX-XXX-BXNX)	(1)	95087	

Item	Description (size)	Qty	Part No.	Mtl
❷ 200	Gasket (SD10S-XXX-XXX-BXXX)	(1)	96172	[B]
	(SD10R-XXX-XXX-BXXX)	(1)	95842	[B]
201	Muffler	(1)	97295	[SS]
233	Adapter Plate	(1)	95832	[P]
236	Nut (M6 x 1 - 6g) (SD10R-XXX-XXX-BXXX only)	(4)	95924	[SS]
283	Leak Detector Sensor (SD10X-XXX-XXX-BXEX), (SD10X-XXX-XXX-BXLX) (SD10X-XXX-XXX-BXNX)	(2)	96270-1	
403	Valve (All SD10X with Solenoid)	(1)	114102	
407	Carrot Plug (All SD10X with Solenoid)	(1)	96316	
410	Sensor (for Cycle Sensing) (SD10X-XXX-XXX-BSXX)	(1)	95276	
410	ASM, Adapter - Sensor (SD10X-XXX-XXX-BXEX), (SD10X-XXX-XXX-BXFX)	(1)	97119	
	ASM, Adapter - Sensor (SD10X-XXX-XXX-BXNX), (SD10X-XXX-XXX-BXPX)	(1)	97504	
411	Adapter (SD10X-XXX-XXX-BAXX), (SD10X-XXX-XXX-BBXX), (SD10X-XXX-XXX-BCXX), (SD10X-XXX-XXX-BDXX), (SD10X-XXX-XXX-BNXX)	(1)	96953	
	Adapter (for Cycle Sensing) (SD10S-XXX-XXX-BSXX)	(1)	96583	
	Adapter (for Cycle Sensing) (SD10R-XXX-XXX-BSXX)	(1)	96581	
413	Coil Nut (All SD10X with solenoid)	(1)	119380	
414	Coil, 120VACAC (SD10X-XXX-XXX-BAXX)	(1)	116218-33	
	Coil, 12VDC (SD10X-XXX-XXX-BBXX)	(1)	116218-38	
	Coil, 240VACAC (SD10X-XXX-XXX-BCXX)	(1)	116218-35	
	Coil, 24VDC (SD10X-XXX-XXX-BDXX)	(1)	116218-39	
415	O-Ring (All SD10X with Solenoid)	(1)	114103	
416	O-Ring (All SD10X with Solenoid)	(1)	114104	
417	Screw (All SD10X with Solenoid)	(2)	96728647	
418	Tube (All SD10X with Solenoid)	(1)	15309974	
419	Seal (All SD10X with Solenoid)	(1)	96957	
420	Snap Ring (All SD10X with Solenoid)	(1)	Y147-43	
421	Retainer (All SD10X with Solenoid)	(1)	15309990	
425	Magnet (for Cycle Sensing) (SD10X-XXX-XXX-BSXX)	(1)	95275	
428	O-Ring (All SD10X with Solenoid)	(1)	Y325-13	
429	Solenoid Muffler (All SD10X with Solenoid)	(1)	116464	
❶❷	Lubriplate FML-2 grease	(1)	94276	
	Lubriplate Grease Packets (10)		637308	
❶ Items included in fluid section service kit, see pages 5 and 6.				

MATERIAL CODE	
[B]	= Nitrile
[Br]	= Brass
[Ck]	= Ceramic
[D]	= Acetal
[P]	= Polypropylene
[Sp]	= Santoprene
[SS]	= Stainless Steel
[U]	= Polyurethane

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 metallic surfaces, and nicks or cuts in "O" rings.
- Take precautions to prevent cutting "O" rings upon installation.
- Lubricate "O" rings with Lubriplate FML-2 grease.
- Do not over-tighten fasteners. Refer to torque specification block on view.
- Re-torque fasteners following restart.
- SERVICE TOOLS - To aid in the installation of (168) "O" rings onto the (167) pilot piston, use tool # 204130-T, available from ARO.

PILOT VALVE DISASSEMBLY

1. A light tap on (118) actuator pin should expose the opposite (121) sleeve, (167) pilot piston and other parts.
2. Remove (170) sleeve. Inspect inner bore of sleeve for damage.

PILOT VALVE REASSEMBLY

1. Clean and lubricate parts not being replaced from service kit.
2. Install new (171 and 172) "O" rings. Replace (170) sleeve.
3. Install new (168) "O" rings and (169) "U" cup. **NOTE:** Lip direction. Lubricate and replace (167) pilot piston.
4. Reassemble remaining parts. Replace (173 and 174) "O" rings.

MAJOR VALVE DISASSEMBLY

1. Remove (135) valve housing and (233) adapter plate, exposing (132 and 166) gaskets and (176) diaphragms.
2. Insert a small flat blade screwdriver into the notch in the side of (135) valve housing and push in on tab to remove (233) adapter plate, releasing (140) valve insert, (141) valve plate, (200) gasket.
3. Remove (136) end cap and (137) gasket, releasing (111) spool.

MAJOR VALVE REASSEMBLY

1. Install new (138 and 139) "U" cups on (111) spool. **NOTE:** LIPS MUST FACE EACH OTHER.
2. Insert (111) spool into (135) valve housing.
3. Install (137) gasket on (136) end cap and assemble end cap to (135) valve housing, securing with (107) end plates (where applicable) and (105) screws.
4. Install (140) valve insert and (141) valve plate into (135) valve housing. **NOTE:** Assemble (140) valve insert with "dished" side toward (141) valve plate. Assemble (141) valve plate with part number identification toward (140) valve insert.
5. Assemble (200) gaskets and (233) adapter plate to (135) valve housing. **NOTE:** Assemble (233) adapter plate with notched side down.
6. Assemble (132 and 166) gaskets and (176) checks to (101) center body.
7. Assemble (135) valve housing and components to (101) center body, securing with (134) screws and (133) washers.

TROUBLESHOOTING

Product discharged from exhaust outlet.

- Check for diaphragm rupture.
- Check tightness of (14) diaphragm screw.

Air bubbles in product discharge.

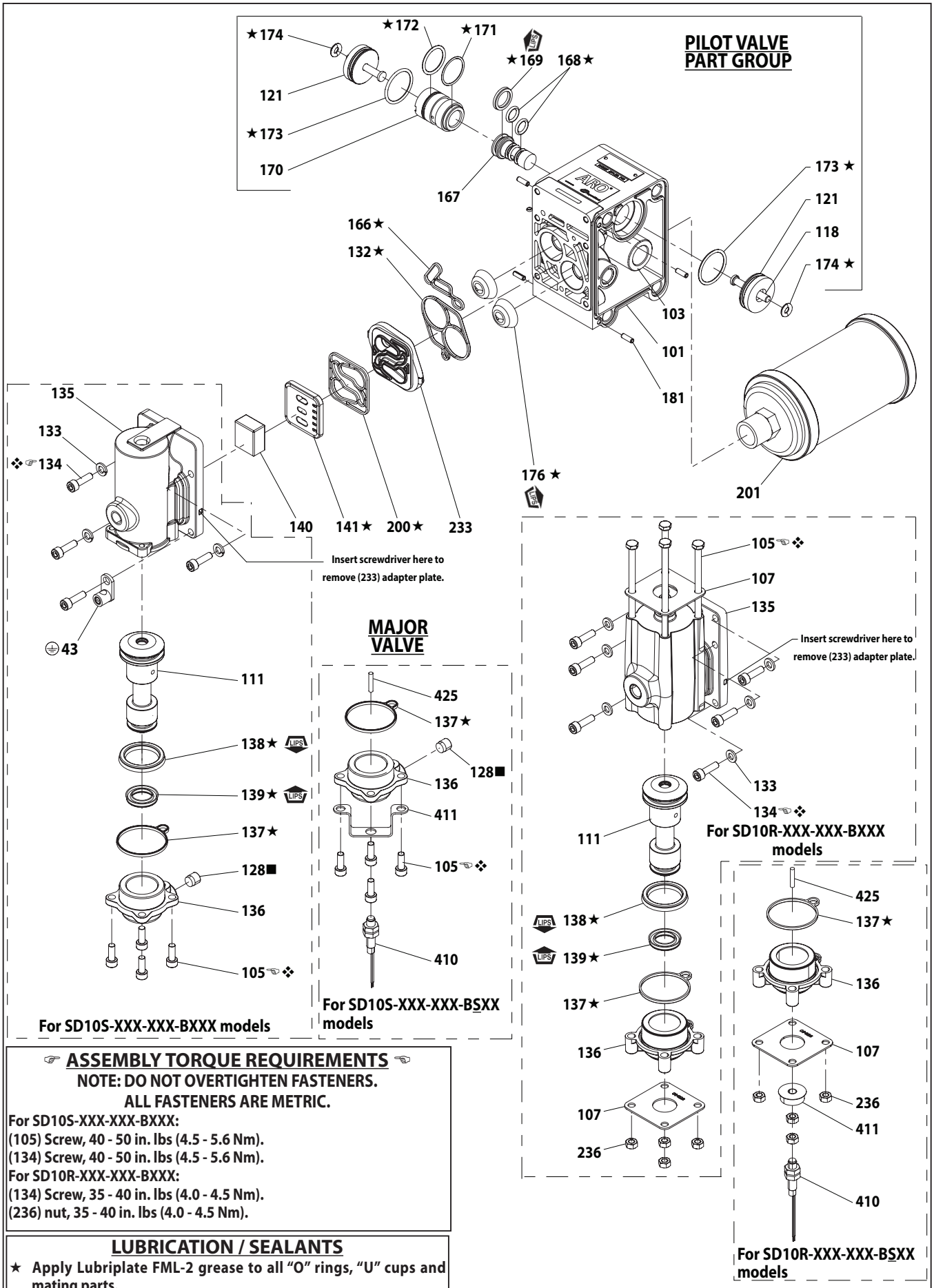
- Check connections of suction plumbing.
- Check "O" rings between intake manifold and inlet side fluid caps.
- Check tightness of (14) diaphragm screw.

Motor blows air or stalls.

- Check (176) check valve for damage or wear.
- Check for restrictions in valve / exhaust.

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 volume.
- 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.



☞ ASSEMBLY TORQUE REQUIREMENTS ☜

NOTE: DO NOT OVERTIGHTEN FASTENERS.
ALL FASTENERS ARE METRIC.

For SD10S-XXX-XXX-BXXX:
(105) Screw, 40 - 50 in. lbs (4.5 - 5.6 Nm).
(134) Screw, 40 - 50 in. lbs (4.5 - 5.6 Nm).
For SD10R-XXX-XXX-BXXX:
(134) Screw, 35 - 40 in. lbs (4.0 - 4.5 Nm).
(236) nut, 35 - 40 in. lbs (4.0 - 4.5 Nm).

LUBRICATION / SEALANTS

- ★ Apply Lubriplate FML-2 grease to all "O" rings, "U" cups and mating parts.
- ■ Apply PTFE tape to threads at assembly.
- ❖ Apply anti-seize compound to threads at assembly.

Figure 3

A replacement major valve service assembly is available separately, which includes the following:
637496 for models SD10S-XXX-XXX-BXXX: 105 (4), 111, 128, 132, 135, 136, 137, 138, 139, 140, 141, 166, 176 (2), 200 and 233.
637496-1 for models SD10R-XXX-XXX-BXXX: 105 (4), 107 (2), 111, 132, 135, 136, 137, 138, 139, 140, 141, 166, 176 (2), 200, 233 and 236 (4).

ELECTRONIC INTERFACE

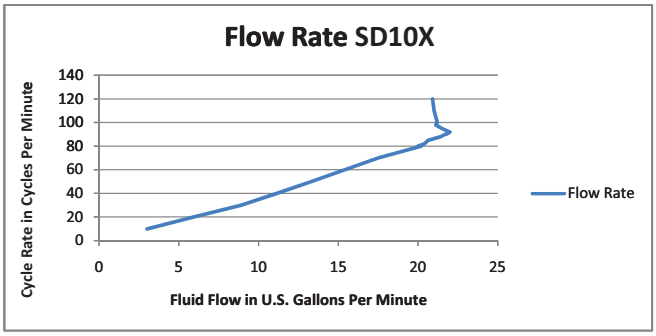
GENERAL DESCRIPTION

This electronic interface includes options for solenoid control, end of stroke feedback, leak detection (diaphragm failure), cycle counting on the major valve, and a ported motor with no major valve for user-supplied control directly to the two diaphragm air chambers.
Solenoid control allows the cycle rate of the pump to be controlled electronically.
With Solenoid control, when the solenoid is energized, the pump strokes and dispenses the fluid in one chamber. When the solenoid is de-energized, the pump strokes in the opposite direction, dispensing the fluid in the other chamber.
By providing continuous ON - OFF signals to the solenoid, the fluid transfer rate may be increased or decreased remotely.
End of stroke feedback can be used in conjunction with the solenoid valve to cycle the pump based upon completion of each stroke.
The leak detection option incorporates an optical fluid sensor in each air chamber to provide a signal when a diaphragm has failed and fluid is leaking through the pump.
The cycle counter option provides a closed contact output each time the pump completes a cycle. This option is not available combined with solenoid control.
The ported motor with no major valve is provided as an option for users who want to supply compressed air directly to each diaphragm and control the operation of the pump with their own external air controls.

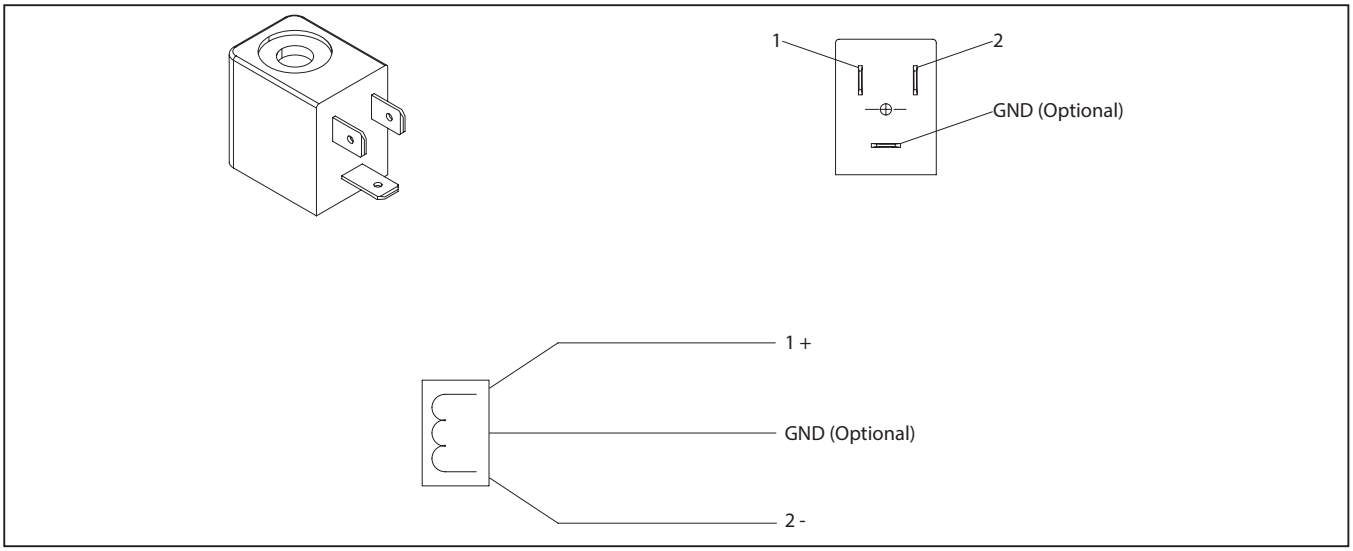
SOLENOID

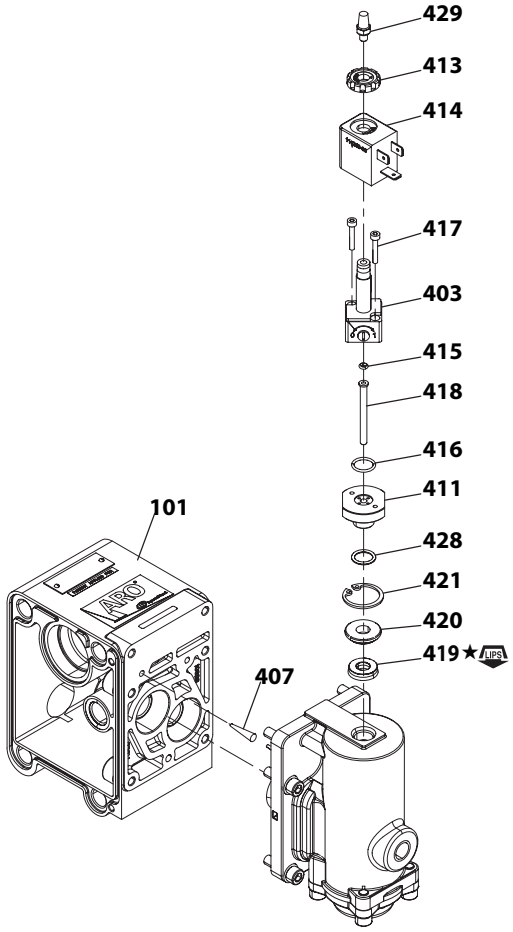
GENERAL DESCRIPTION

Without end of stroke feedback, solenoid control can only be used to cycle the pump based on timing. The following curves represent the flow rates of a pump based on timed operation of the solenoid at a common operating point of 70 psig air pressure and 30 psi of back pressure.

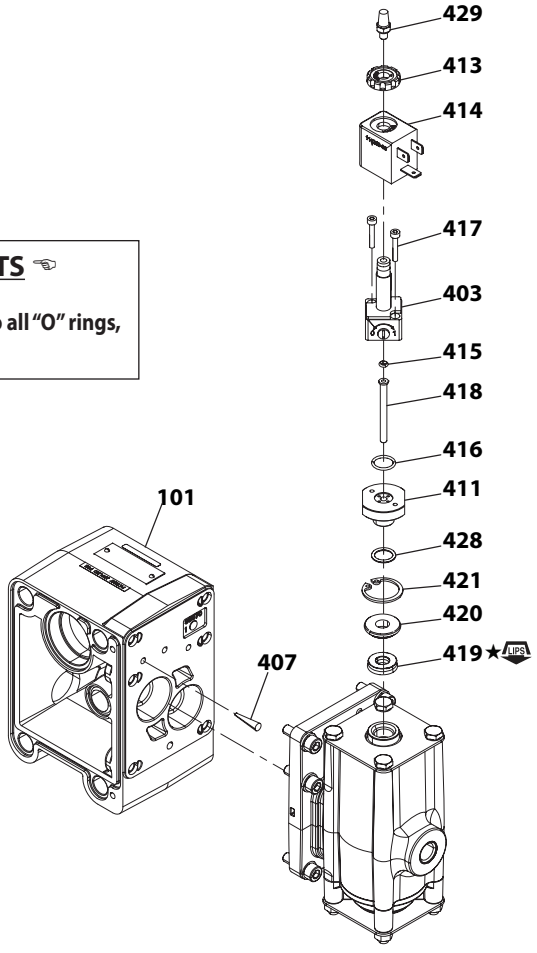


NON- HAZARDOUS DUTY SOLENOID WIRING DIAGRAM





For SD10S-XXX-XXX-BXXX models



For SD10R-XXX-XXX-BXXX models

☞ LUBRICATION / SEALANTS ☜

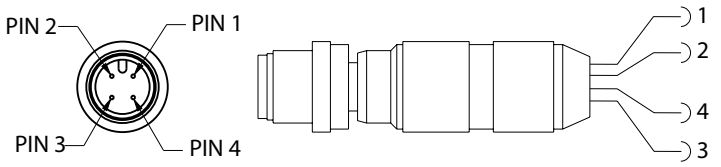
☆ **Apply Lubriplate FML-2 grease (94276) to all "O" rings, "U" cups and mating parts.**

Figure 4

NON - HAZARDOUS DUTY END OF STROKE

With End of Stroke feedback, the End of stroke sensor detects when the diaphragm rod has reached the end of each stroke. This allows closed loop control of the diaphragm pump, verifying each stroke is complete.

End of Stroke / Cycle Sensor Pinout, M12 Connector

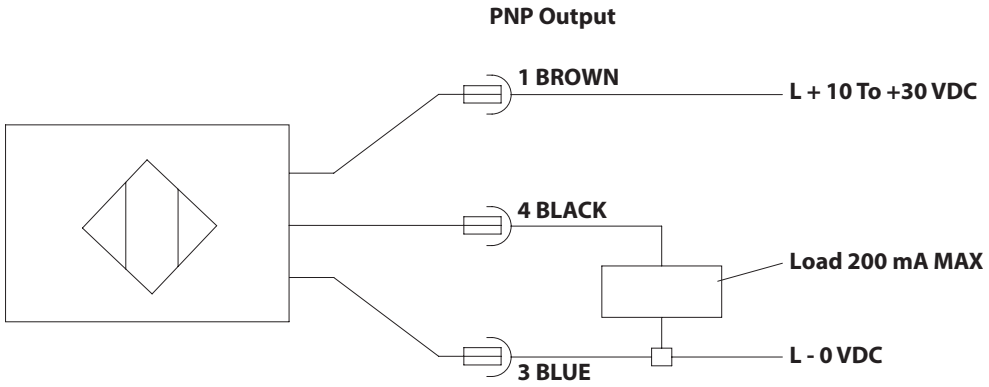


CABLE ASSEMBLY WIRING COLORS:

PIN 1 - BROWN, POSITIVE VOLTAGE (+10 TO +30 VDC)
PIN 2 - WHITE, NOT USED
PIN 3 - BLUE, ZERO VOLTS
PIN 4 - BLACK, SIGNAL

NOTE: WIRING COLORS ARE BASED ON AUTOMATION DIRECT CD12L AND CD12M 4-POLE CABLE ASSEMBLIES.

End of Stroke / Cycle Sensor Pinout, Wiring Diagram (No Connector)



PART LIST / SENSOR

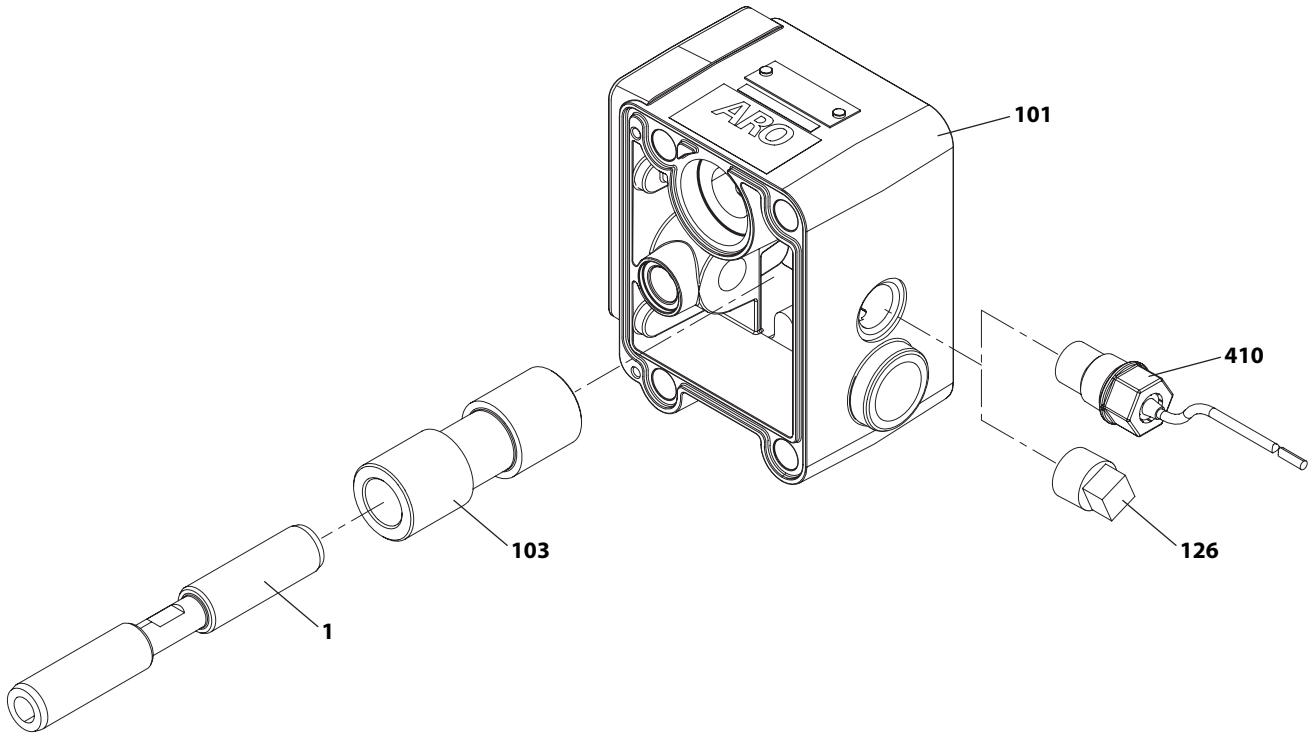


Figure 5

GENERAL DESCRIPTION

An ARO® diaphragm pump equipped with the ARO Leak Detection Sensor warns of a diaphragm failure by sensing the presence of liquid in the air chamber of the pump. This system uses a liquid sensor in each of the two air chambers which will send an output signal when fluid is detected.

INSTALLATION AND WARNINGS

NOTE: ALL WIRING MUST COMPLY WITH ALL LOCAL AND / OR NATIONAL ELECTRICAL CODES.

- Electrical codes that apply must be strictly adhered to; failure to do so may lead to shock hazard or serious injury.
- Some local electrical codes may require the installation of rigid conduit.
- The Leak Detection Sensor components must be installed by a qualified electrician in compliance with all national, state and local codes and regulations to reduce the risk of electrical shock or other serious injury during installation and operation.
- ARO is not responsible for accidents resulting from improper installation of components or hardware.
- **HAZARDOUS VOLTAGE**. Do not attempt any service without disconnecting all electrical supply sources.

PART LIST / LEAK DETECTOR

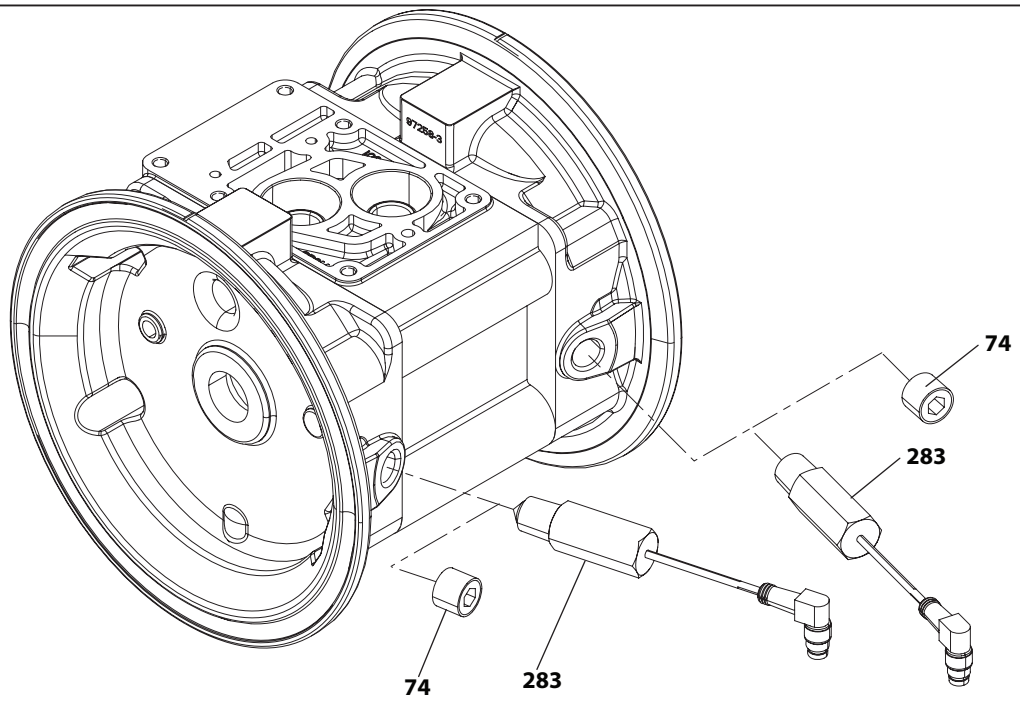
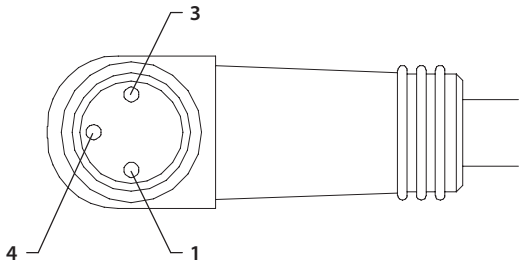


Figure 6

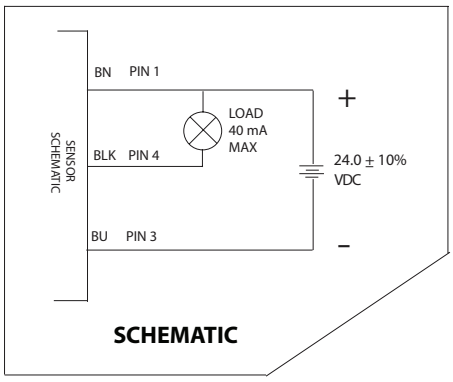
LEAK DETECTION - PINOUT DESCRIPTIONS

96270-1 SENSOR PINOUTS



Pinout	Function
1	+24 VDC
3	Ground
4	Signal

TURCK (PICOFAST) Connector PSW 3M -2/90



SCHEMATIC

Figure 7

Dimensions shown are for reference only, they are displayed in inches and millimeters (mm).

NOTE: Sanitary flange dimensions per 1-1/2 inch ASME BPE-2012 and ISO 2852-1993 38 mm.

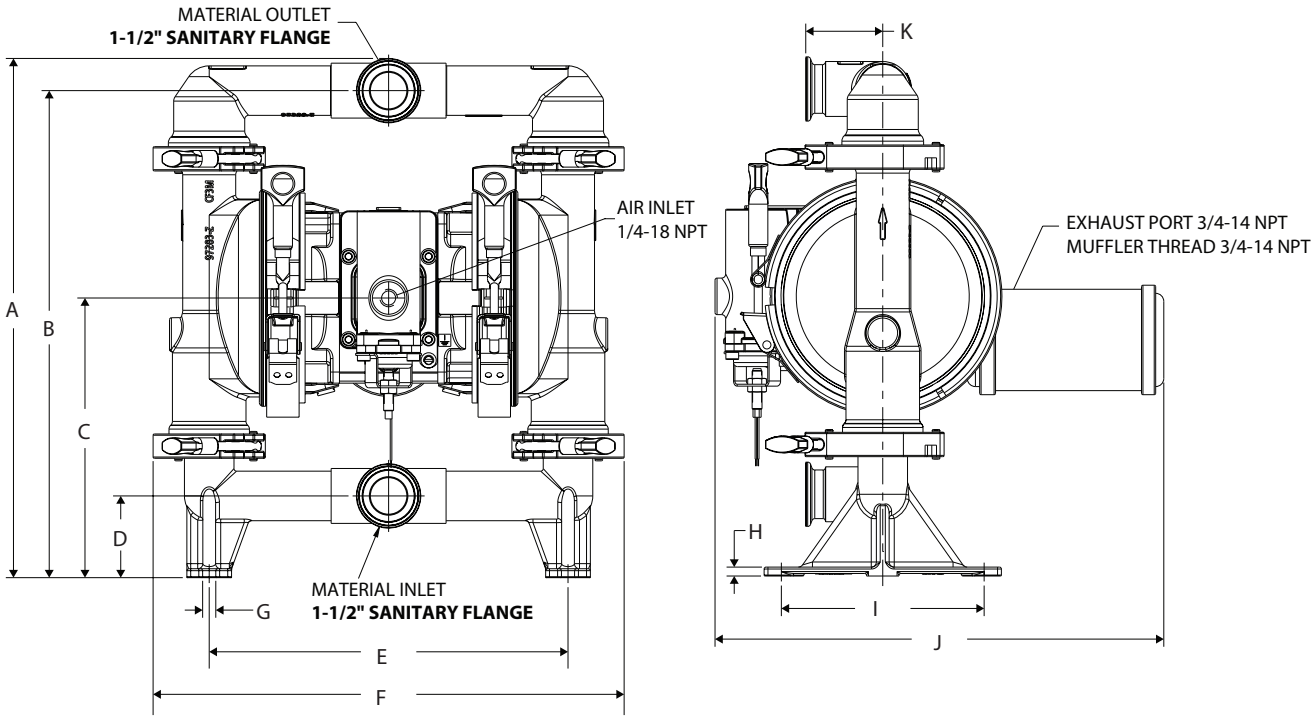


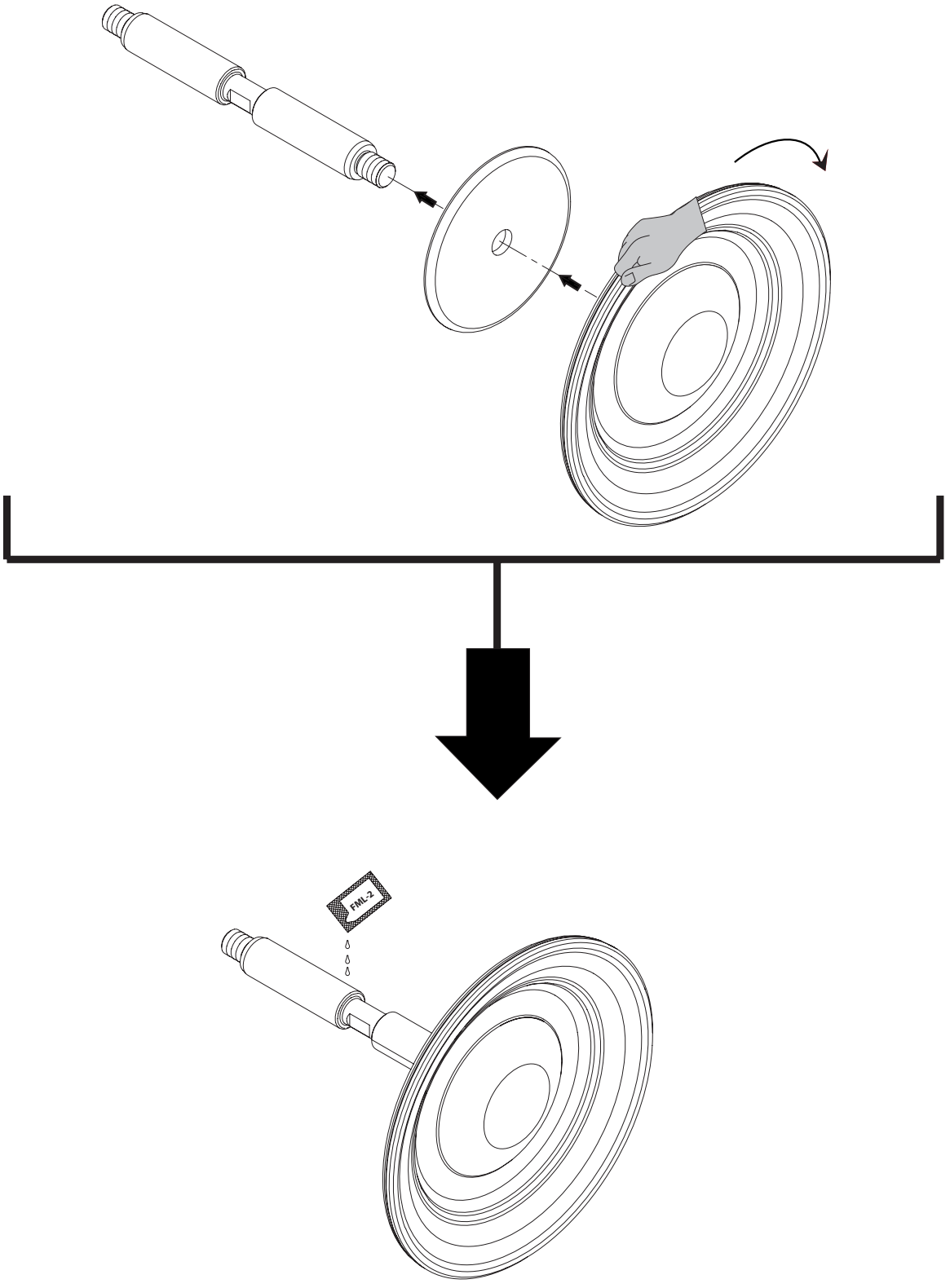
Figure 8

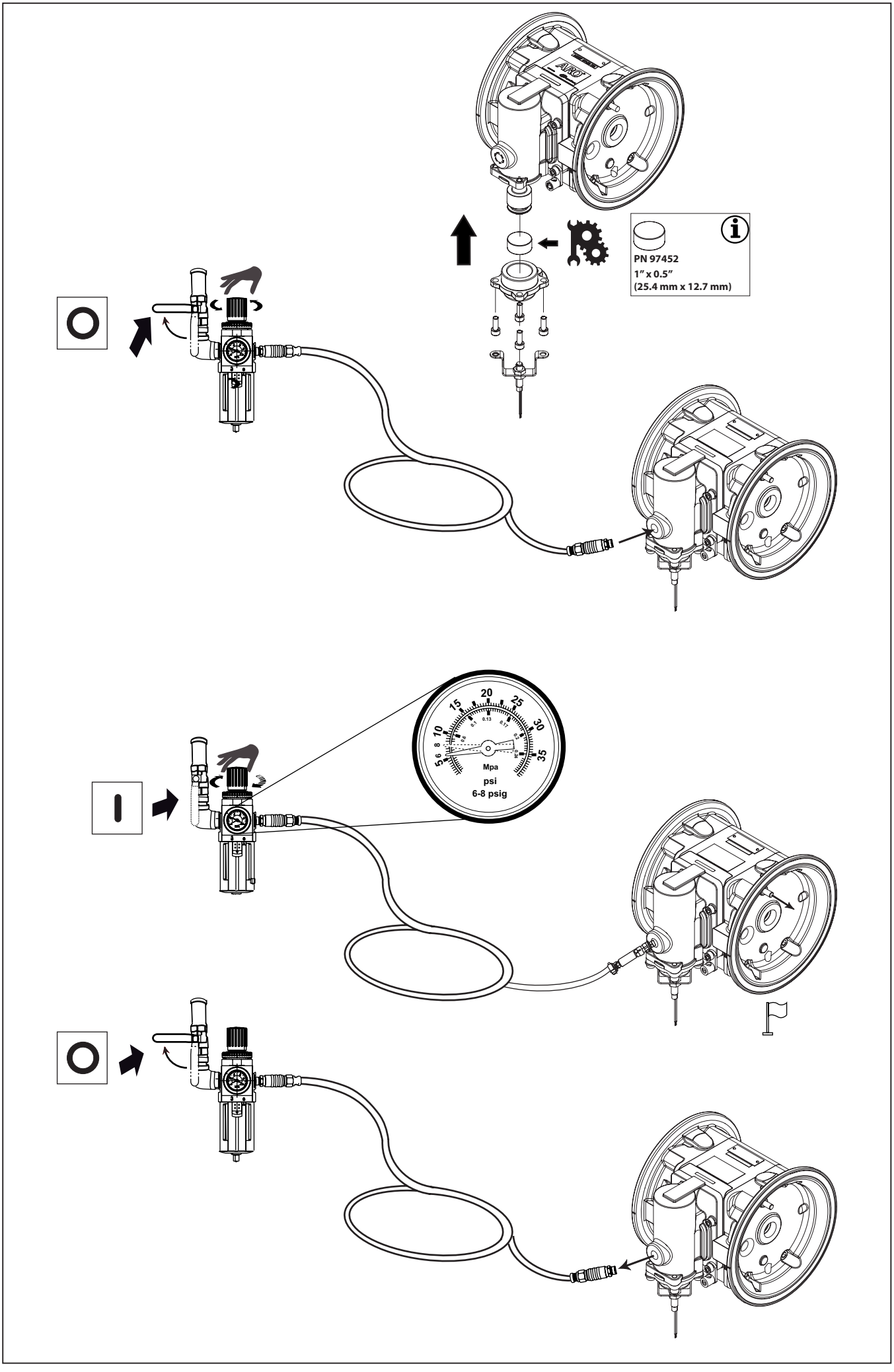
DIMENSIONS

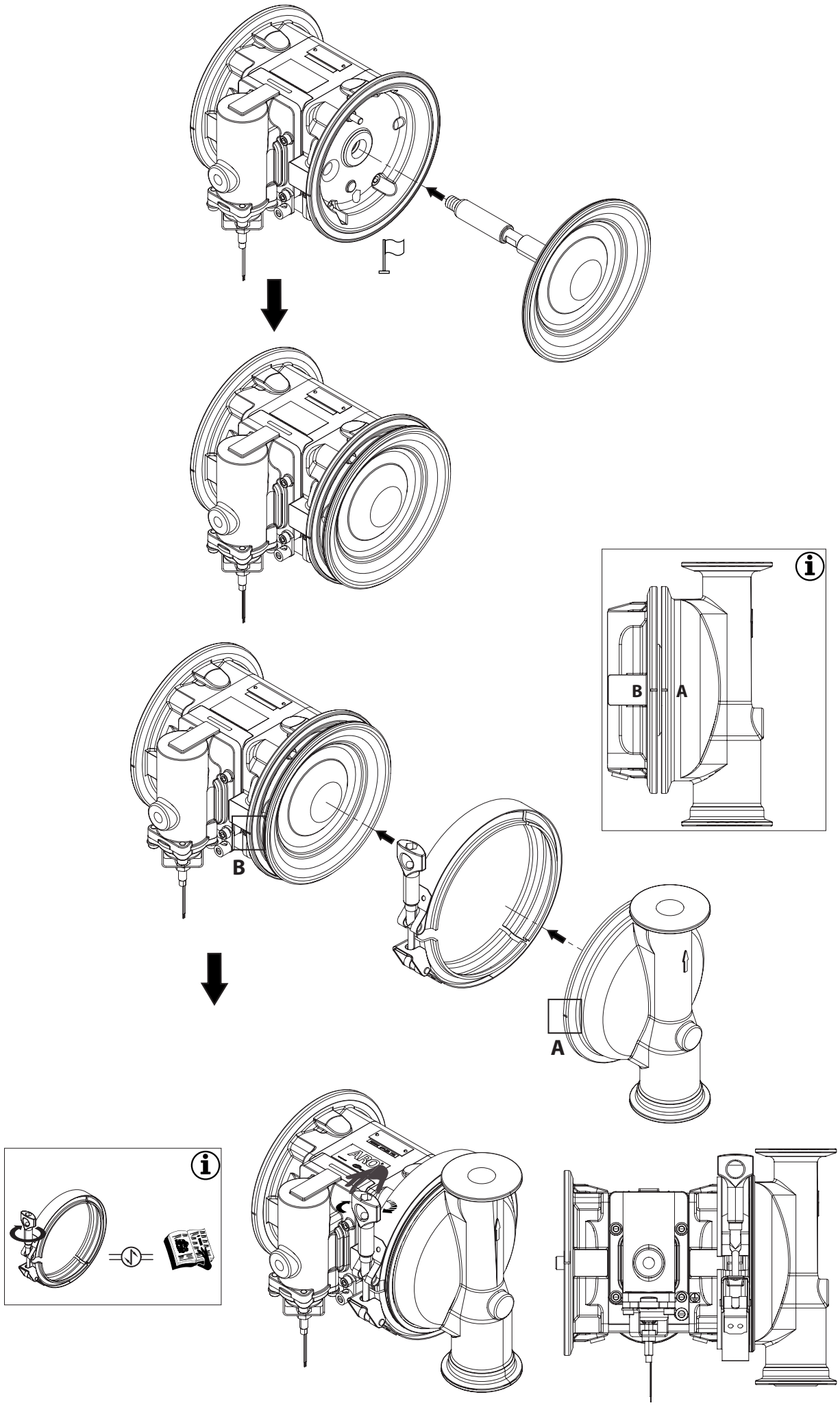
A - 16.0" (406.6 mm)	**E - 11.0" (281.0 mm)**	**K - 2.3" (60.3 mm)**
B - 15.0" (381.4 mm)	**F - 14.5" (368.9 mm)**	**I - 6.2" (158.8 mm)**
C - 8.6" (219.0 mm)	**G - 0.4" (10.3 mm)**	**J - 13.8" (351.4 mm) (SD10S-XXX-XXX-BXXX)**
D - 2.5" (64.0 mm)	**H - 0.2" (7.0 mm)**	**14.1" (358.5 mm) (SD10R-XXX-XXX-BXXX)**

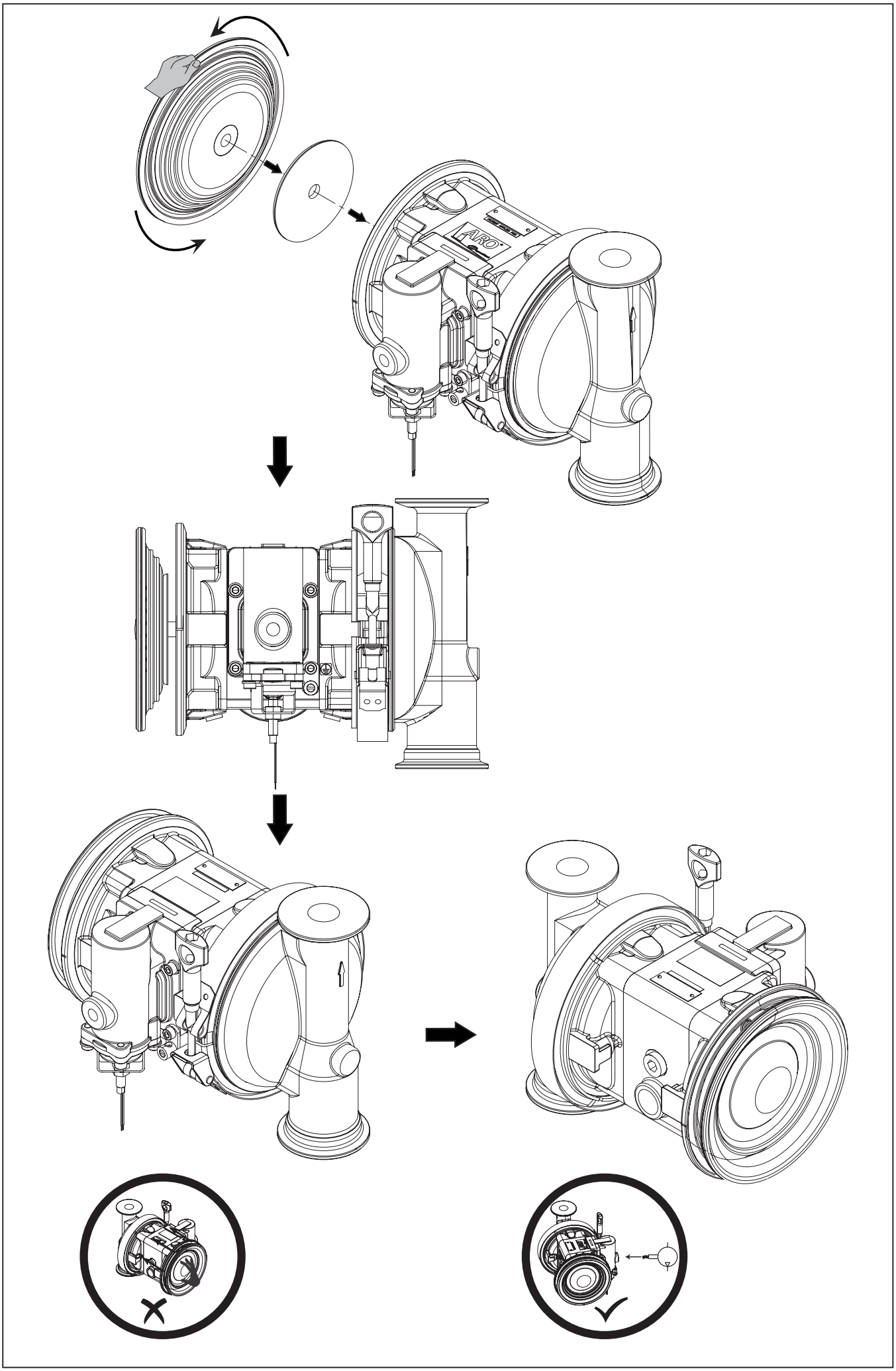
INSTALLATION SEQUENCE
(FOR PTFE COMPOSITE DIAPHRAGMS ONLY)

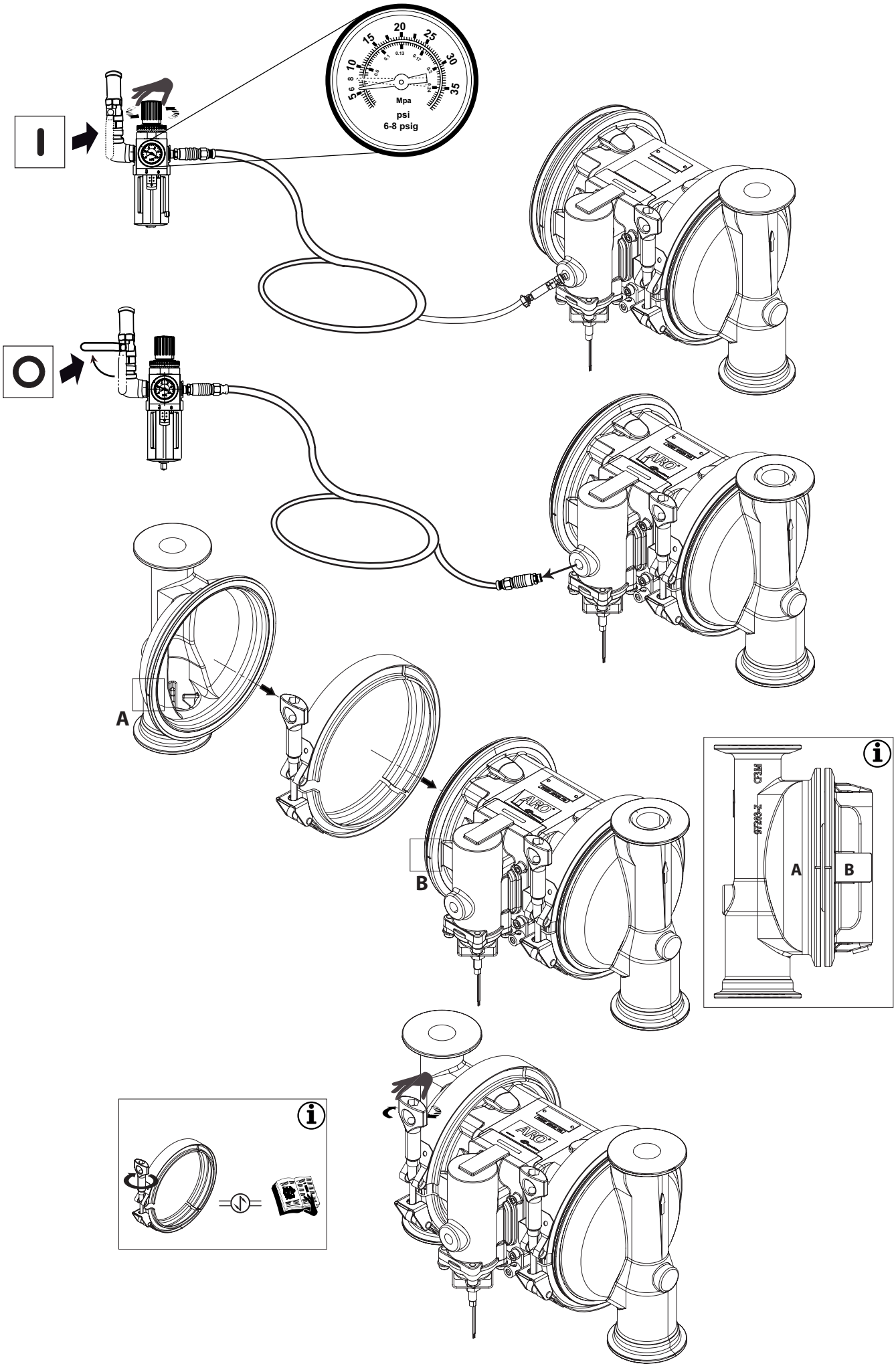


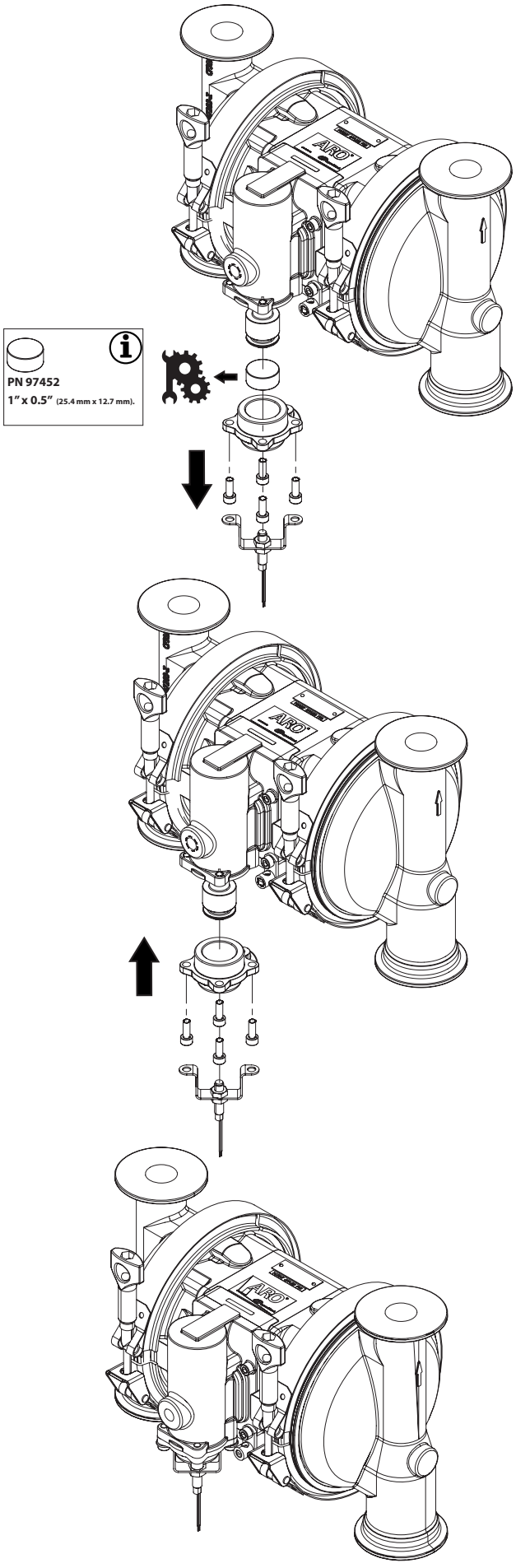



PN 97452
1" x 0.5"
(25.4 mm x 12.7 mm)
Mpa
psi
6-8 psig


B
A
B
A




Mpa
psi
6-8 psig
A
B
A
B


PN 97452
1" x 0.5" (25.4 mm x 12.7 mm).