OPERATOR'S MANUAL SD05X-XXX-XXX-AXX

INCLUDING: OPERATION, INSTALLATION AND MAINTENANCE

RELEASED: 2-14-25
REVISED: 7-3-26
(REV: C)

1/2" 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.

637583-XXX for fluid section with seat repair kits information (see page 5).

637583-XX for fluid section without seat repair kits information (see page 5).

NOTE: This kit also contains several air motor seals which will need to be replaced.

637428 for air section repair (see page 7).

PUMP DATA

Models..... see Model Description Chart for "-XXX"
Pump Type..... Air Operated Double Diaphragm
Material..... see Model Description Chart
Weight..... 20.72 lbs (9.4 kgs)
Maximum Air Inlet Pressure ..... 100 psig (6.9 bar)
Maximum Material Inlet Pressure 10 psig (0.69 bar)
Maximum Outlet Pressure..... 100 psig (6.9 bar)
Air Consumption @ 40 psig..... 1 cfm / gallon (approx.)
Maximum Flow Rate (flooded inlet) 12.0 gpm (45.4 lpm)
Displacement / Cycle @ 100 psig. 0.039 gal. (0.15 lit.)
Maximum Particle Size ..... 3/32" dia. (2.4 mm)
Maximum Temperature Limits
(Diaphragm / Ball / Seat material)
Santoprene®..... -40° to 225° F (-40° to 107° C)
PTFE..... 40° to 225° F (4° to 107° C)
Dimensional Data..... see page 13
Noise Level @ 70 psig, 60 cpm . 75.0 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.

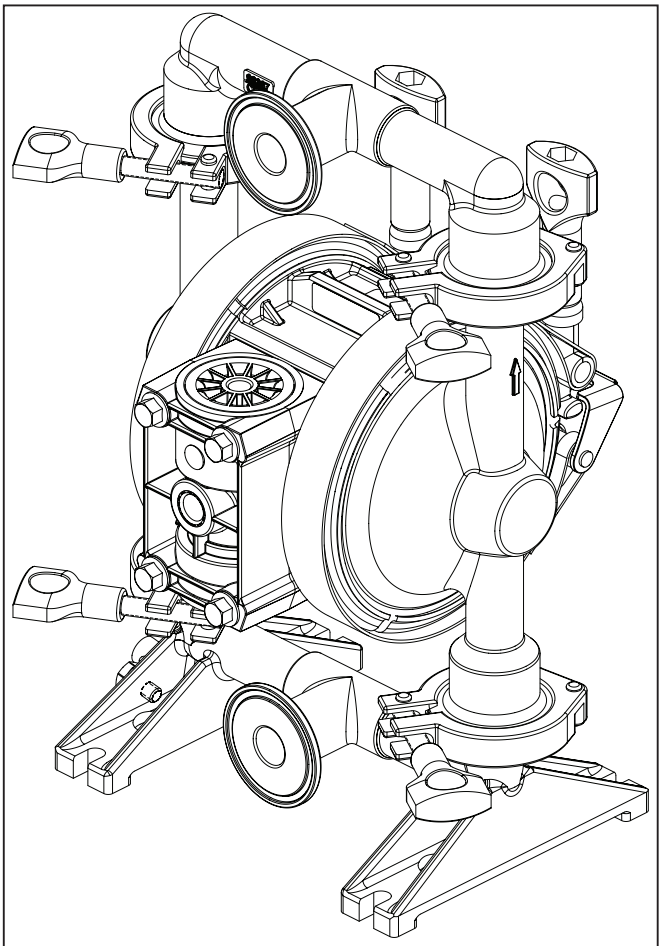


Figure 1

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ARO®

MODEL DESCRIPTION CHART

SD X X - X X X - X X X - A X X

Pump Type

SD - Electronic Interface Air Operated Diaphragm

Pump Size

05 - 1/2" Diaphragm Pump

Center Section Material

R - Polypropylene

Fluid Connection

C - 1/2" Sanitary Flange

Fluid Caps and Manifold Material

S - 316L Stainless Steel

Hardware Material

S - Stainless Steel

Seat Material

S - 316L Stainless Steel

Ball Material

M - Medical Grade Santoprene
T - PTFE

Diaphragm Material

K - PTFE Composite
L - Long Life PTFE/Santoprene
M - Medical Grade Santoprene
T - PTFE / Santoprene

Revision Level

A - Revision

Specialty Code 1 (Blank if no Specialty Code)

A - Solenoid 120 VAC
B - Solenoid 12 VDC
C - Solenoid 240 VAC
D - Solenoid 24 VDC
E-Solenoid 12 VDC NEC/CEC
F-Solenoid 24 VDC NEC/CEC
G-Solenoid 12 VDC ATEX/IECEx
H-Solenoid 24 VDC ATEX/IECEx
J-Solenoid 120 VAC NEC/CEC
K- Solenoid 220 VAC ATEX / IECEx
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
G-End of Stroke ATEX/IECEx/NEC/CECx
H-End of Stroke + Leak Detection ATEX / IECEx / NEC / CEC
L - Leak Detection
M- Leak Detection ATEX / IECEx / NEC / CEC
R- End of Stroke NEC
T- End of Stroke NEC / Leak Detection NEC
U- Leak Detection CCC
0 - No Option

Fluid Section Service Kit Selection

Example: Models SD05R-CSS-S M M-AXX
Fluid Section Service Kit # 637583-MM

SD05X-XXX-XXX-AXX

637583 - XX
Ball — Diaphragm

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 insure continuity:
  - For "intrinsically safe" applications: ohmmeter should show less than 1 ohm.
  - For "ordinary" applications: ohmmeter should show less than 5 ohms.
  - Pump components surface resistance: materials are generally considered conductive with resistance less than 1 X 10^6 ohms.
- 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 Install the pump in the vertical position. The pump may not prime properly if the balls do not check by gravity upon start-up.

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" pn \ 93616-1, 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, ball checks ensure 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.

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.

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.
- 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.
- 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.
- Secure the diaphragm pump legs to a suitable surface to ensure against damage by vibration.

MAINTENANCE

- Certain ARO "Smart Parts" are indicated which should be available for fast repair and reduction of down time.
- 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.
- Service kits are available to service two separate diaphragm pump functions: 1. AIR SECTION, 2. FLUID SECTION. The Fluid Section is divided further to match typical active Material Options.
- Before disassembling, empty captured material in the outlet manifold by turning the pump upside down to drain material from the pump.

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• Santoprene® is a registered trademark of Celanese • Lubriplate® is a registered trademark of Lubriplate Division (Fiske Brothers Refining Company) •

PARTS LIST / SD05X-XXX-XXX-AXX FLUID SECTION

FLUID SECTION SERVICE KITS (637583 -XXX or 637583 -XX)

For Fluid Kits With Seats:

❶ **637583-XXX Fluid Section Service Kits include:** Seats (see SEAT Option, refer to -XXX in chart below), Balls (see BALL Option, refer to -XXX in chart below), DIAPHRAGMS (See "Diaphragm Options", refer to -XXX in Service Kit chart below), and items 19, plus items 144, 174 and 94276 Lubriplate FML-2 grease (page 7).

For Fluid Kits Without Seats:

❶ **637583-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 plus items 144, 174 and 94276 Lubriplate FML-2 grease (page 7).

SEAT OPTIONS SD05X-XXX-XXX-AXX			
	"21"		
-XXX	Seat	Qty	Mtl
-SXX	98379	(4)	[SS]

BALL OPTIONS SD05X-XXX-XXX-AXX			
	❶ "22" (3/4" diameter)		
-XXX	Ball	Qty	Mtl
-XMX	93100-M	(4)	[Msp]
-XTX	93100-4	(4)	[T]

DIAPHRAGM OPTIONS SD05X-XXX-XXX-AXX											
	❶ Service kit with Seat	❶ Service kit without Seat	❶ "7"			❶ "8"			❶ "19" (3/32" x 1-5/16" OD)		
-XXX	-XXX = (Seat) -XXX = (Ball) -XXX = (Diaphragm)	-XX = (Ball) -XX = (Diaphragm)	Diaphragm	Qty	Mtl	Diaphragm	Qty	Mtl	O-Ring	Qty	Mtl
-XXK	637583-XXK	637583-XK	98361	(2)	[TC]	----	--	--	93265	(4)	[T]
-XXL	637583-XXL	637583-XL	98383-L	(2)	[L]	93465	(2)	[SP]	93265	(4)	[T]
-XXM	637583-XXM	637583-XM	93465-M	(2)	[Msp]	----	--	--	93265	(4)	[T]
-XXT	637583-XXT	637583-XT	98383-T	(2)	[T]	93465	(2)	[SP]	93265	(4)	[T]

COMMON PARTS

Item	Description	Qty	Part No.	Mtl
1	Rod (shown on page 9)	(1)	97132	[SS]
	(SD05X-XXX-XXK-AXX Only)		98375	
5	Backup Washer	(2)	94645	[GFN]
	(SD05X-XXX-XXK-AXX Only)		98376	[SS]
6	Diaphragm Washer (Excludes SD05X-XXX-XXK-AXX)	(2)	98366	[SS]
14	Flange Bolt (5/16" - 18 x 3/4")	(2)	98381	[SS]
15	Fluid Cap	(2)	98369	[SS]
43	Ground Lug	(1)	93004	[Co]
60	Inlet Manifold	(1)	98368	[SS]
61	Outlet Manifold	(1)	98367	[SS]
82	1.5" Sanitary Clamp	(4)	98377	[SS]
83	5.5" Band-Clamp, Diaphragm	(2)	98409	[SS]

MATERIAL CODE	
[Co]	= Copper
[GFN]	= Glass Filled Nylon
[L]	= Long Life PTFE
[Msp]	= Medical Grade Santoprene
[SP]	= Santoprene
[SS]	= Stainless Steel
[T]	= PTFE
[TC]	= PTFE Composite

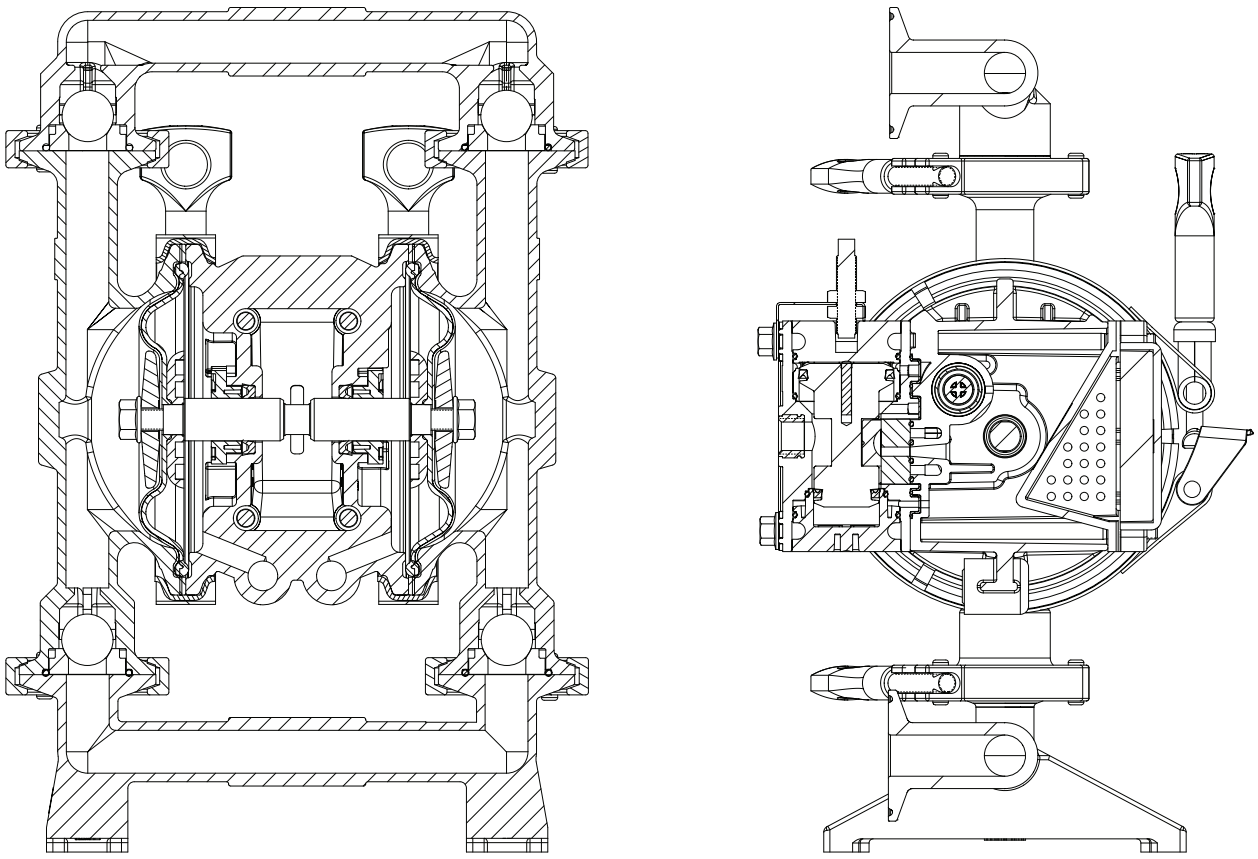


Figure 2

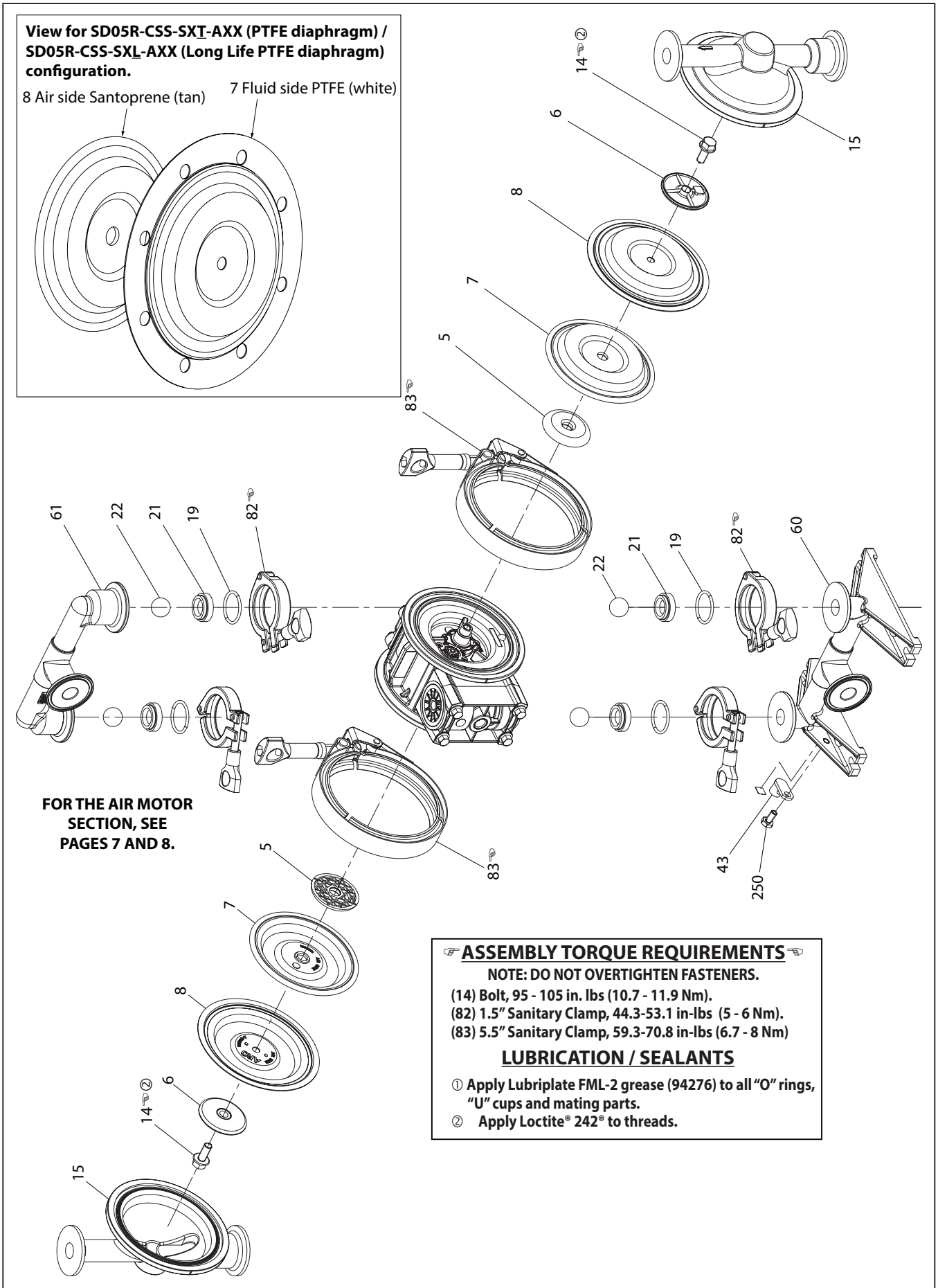

View for SD05R-CSS-SXT-AXX (PTFE diaphragm) / SD05R-CSS-SXL-AXX (Long Life PTFE diaphragm) configuration.
8 Air side Santoprene (tan)
7 Fluid side PTFE (white)
14 ②
6
15
8
7
5
83 ☞
61
22
21
19
82 ☞
60
43
250
FOR THE AIR MOTOR SECTION, SEE PAGES 7 AND 8.
ASSEMBLY TORQUE REQUIREMENTS
NOTE: DO NOT OVERTIGHTEN FASTENERS.
(14) Bolt, 95 - 105 in. lbs (10.7 - 11.9 Nm).
(82) 1.5" Sanitary Clamp, 44.3-53.1 in-lbs (5 - 6 Nm).
(83) 5.5" Sanitary Clamp, 59.3-70.8 in-lbs (6.7 - 8 Nm)
LUBRICATION / SEALANTS
① Apply Lubriplate FML-2 grease (94276) to all "O" rings, "U" cups and mating parts.
② Apply Loctite® 242® to threads.

Figure 3

PARTS LIST / SD05X-XXX-XXX-AXX AIR MOTOR SECTION

✓ Indicates parts included in 637428 air section repair kit.

Item	Description (size)	Qty	Part No.	Mtl
101	Center Body	(1)	98365	[PPG]
103R	Cover (right side)	(1)	96091	[D]
103L	Cover (left side)	(1)	96351	[D]
107	Plug, Small	(1)	96353	[D]
111	Major Valve Spool	(1)	95919	[D]
	(Only SD05X-XXX-XXX-ASX)		96562	[D]
	(All SD05X with solenoid)		96955	[D]
118	Actuator Pin	(2)	97111	[SS]
✓ 121	Washer	(2)	96092	[D]
123	Screw (#4 - 20 x 1/2")	(8)	96093	[SS]
126	Plug (not shown) (SD05X-XXX-XXX-AX0), (SD05X-XXX-XXX-AXF), (SD05X-XXX-XXX-AXG), (SD05X-XXX-XXX-AXR)	(2)	93832-3	[K]
129	Muffler Assembly (SD05X-XXX-XXX-AX0), (SD05X-XXX-XXX-AXL), (SD05X-XXX-XXX-AXM), (SD05X-XXX-XXX-AXU)	(1)	67367-1	[PPG]
129	Cover Sensor Assembly (SD05X-XXX-XXX-AXE) (SD05X-XXX-XXX-AXF)	(1)	97053	
	(SD05X-XXX-XXX-AXG) (SD05X-XXX-XXX-AXH) (SD05X-XXX-XXX-AXR) (SD05X-XXX-XXX-AXT)	(1)	97406	
✓ 132	Air Manifold Gasket	(1)	96214-1	[B]
134	Flange Bolt (1/4" - 20 x 5-3/4")	(4)	94871	[SS]
135	Valve Block	(1)	96204-1	[PPG]
136	Plug, Large (SD05X-XXX-XXX-A0X)	(1)	96352	[D]
	(All SD05X with solenoid)	(1)	96971	[D]
✓ 137	"O" Ring (1/16" x 1-5/8" OD)	(3)	Y325-29	[B]
✓ 138	"U" Cup Packing (1/8" x 1" OD)	(1)	94395	[U]
✓ 139	"U" Cup Packing (1/8" x 1-7/16" OD)	(1)	96383	[U]
140	Valve Insert	(1)	93276	[CK]
141	Valve Plate	(1)	96173	[CK]
✓ 144	"U" Cup Packing (3/16" x 1" OD)	(2)	Y187-48	[B]
✓ 166	"O" Ring (1/16" x 1-1/4" OD)	(1)	Y325-24	[B]
✓ 167	Pilot Piston (includes 168 and 169)	(1)	67382	[D]
168	"O" Ring (1/16" x 7/16" OD)	(2)	96459	[U]
169	"U" Cup Packing (1/8" x 5/8" OD)	(1)	96384	[U]
170	Spool Bushing	(1)	96090	[D]
✓ 171	"O" Ring (1/16" x 13/16" OD)	(2)	Y325-17	[B]
✓ 173	"O" Ring (3/32" x 7/8" OD)	(2)	Y325-115	[B]
✓ 174	"O" Ring (3/32" x 11/32" OD)	(2)	Y325-105	[B]
197	Leak Detector Sensor Adapter (not shown) (SD05X-XXX-XXX-AXE), (SD05X-XXX-XXX-AXL)	(1)	95088	
198	Leak Detector Sensor Cable (not shown) (SD05X-XXX-XXX-AXE), (SD05X-XXX-XXX-AXL)	(1)	95087	
✓ 200	Porting Gasket	(1)	96364	[B]
201	Muffler (SD05X-XXX-XXX-AXE), (SD05X-XXX-XXX-AXF), (SD05X-XXX-XXX-AXG), (SD05X-XXX-XXX-AXH) SD05X-XXX-XXX-AXR), (SD05X-XXX-XXX-AXT)	(1)	93110-1	[C]
250	Screw (shown on page 6)	(1)	Y6-41-T	[SS]

Item	Description (size)	Qty	Part No.	Mtl
283	Leak Detector Sensor (SD05X-XXX-XXX-AXE), (SD05X-XXX-XXX-AXL)	(2)	96270-1	
	(SD05X-XXX-XXX-AXU)	(2)	98006	
	Leak Detector Sensor ATEX / IECEx / NEC / CEC (SD05X-XXX-XXX-XXH, SD05X-XXX-XXX-XXM), SD05X-XXX-XXX-XXT)	(2)	96270-2	
	Barrier Amplifier, End of Stroke ATEX / IECEx (SD05X-XXX-XXX-XXG), (SD05X-XXX-XXX-XXH)	(1)	97491	
	Barrier Amplifier, End of Stroke NEC / CEC (SD05X-XXX-XXX-XXR, SD05X-XXX-XXX-XXT)	(1)	97412	
	ZENER Barrier Leak Detection ATEX / IECEx / NEC / CEC (SD05X-XXX-XXX-XXH, SD05X-XXX-XXX-XXM, SD05X-XXX-XXX-XXT)	(1)	97414	
	ZENER BARRIER (CCC CER.) (SD05X-XXX-XXX-AXU)	(1)	98311	
403	Valve (All SD05X with Solenoid)	(1)	114102	
410	Sensor (SD05X-XXX-XXX-ASX)	(1)	95276	
411	Adapter (SD05X-XXX-XXX-ASX)	(1)	96563	
413	Coil Nut (All SD05X with solenoid)	(1)	119380	
414	Coil, 120 VAC (SD05X-XXX-XXX-AAX)	(1)	116218-33	
	Coil, 240 VAC (SD05X-XXX-XXX-ABX)	(1)	116218-38	
	Coil, 12 DC (SD05X-XXX-XXX-ACX)	(1)	116218-35	
	Coil, 24 DC (SD05X-XXX-XXX-ADX)	(1)	116218-39	
	Coil, 24VDC ATEX/IECEx (SD05X-XXX-XXX-AHX)	(1)	117345-39	
	Coil, 220VAC ATEX/IECEx (SD05X-XXX-XXX-AKX)	(1)	117345-35	
	Coil, 12VDC ATEX/IECEx (SD05X-XXX-XXX-AGX)	(1)	117345-38	
	Coil, 12VDC NEC/CE (SD05X-XXX-XXX-AEX)	(1)	114772-38	
	Coil, 24VDC NEC/CE (SD05X-XXX-XXX-AFX)	(1)	114772-39	
	Coil, 24VDC NEC/CE (SD05X-XXX-XXX-AJX)	(1)	114772-33	
415	O-Ring (All SD05X with Solenoid)	(1)	114103	
416	O-Ring (All SD05X with Solenoid)	(1)	114104	
417	Screw (All SD05X with Solenoid)	(2)	96728647	
418	Tube (All SD05X with Solenoid)	(1)	15309974	
419	Seal (All SD05X with Solenoid) (not shown)	(1)	96957	
420	Snap Ring (not shown) (All SD05X with Solenoid)	(1)	Y147-43	
421	Retainer (not shown) (All SD05X with Solenoid)	(1)	15309990	
425	Magnet (SD05X-XXX-XXX-ASX)	(1)	95275	
429	Solenoid Muffler (All SD05X with Solenoid)	(1)	116464	
✓	Lubriplate FML-2 Grease	(1)	94276	
	Lubriplate Grease, 10 Pack		637308	

MATERIAL CODE

[B] = Nitrile
[C] = Carbon Steel
[CK] = Ceramic
[D] = Acetal
[K] = PVDF
[PPG] =Glass Filled Polypropylene
[SS] = Stainless Steel
[SY] = Syn-Seal
[U] = Polyurethane

DIAPHRAGM PUMP SERVICE

GENERAL SERVICE NOTES:

- Inspect and replace old parts with new parts as necessary. Look for deep scratches on metallic surfaces, and nicks or cuts in "O" rings.
- Tools needed to complete disassembly and repair:
  - 7/8" socket or wrench, 1/2" socket or wrench, 3/8" socket or wrench, 3/8" Allen wrench, T-10 Torx screwdriver, torque wrench (measuring inch pounds), "O" ring pick.

FLUID SECTION DISASSEMBLY

1. Remove (61) top manifold.
2. Remove (19) "O" rings, (21) seats and (22) balls.
3. Remove (60) bottom manifold.
4. Remove (19) "O" rings, (21) seats and (22) balls.
5. Remove (15) fluid caps.
6. Remove (14) bolt, (6) diaphragm washer, (7) or (7 / 8) diaphragms and (5) washer.
7. Remove (1) connecting rod from air motor.
8. Carefully remove remaining (14) bolt, (6) diaphragm washer, (7) or (7 / 8) diaphragms and (5) washer from (1) connecting rod. Do not mar surface of connecting rod.

FLUID SECTION REASSEMBLY

- Reassemble in reverse order.
- Lubricate (1) connecting rod with Lubriplate or equivalent "O" ring lubricant.
- Connecting rod (1) should be installed using 96571 bullet, included in service kit.
- Install (5) washers with ID chamfer toward diaphragm.
- When replacing PTFE diaphragms, install the 93465 Santoprene diaphragm behind the PTFE diaphragm.

AIR MOTOR SECTION SERVICE

Service is divided into two parts - 1. Pilot Valve, 2. Major Valve.

- Air Motor Section service is continued from Fluid Section repair.

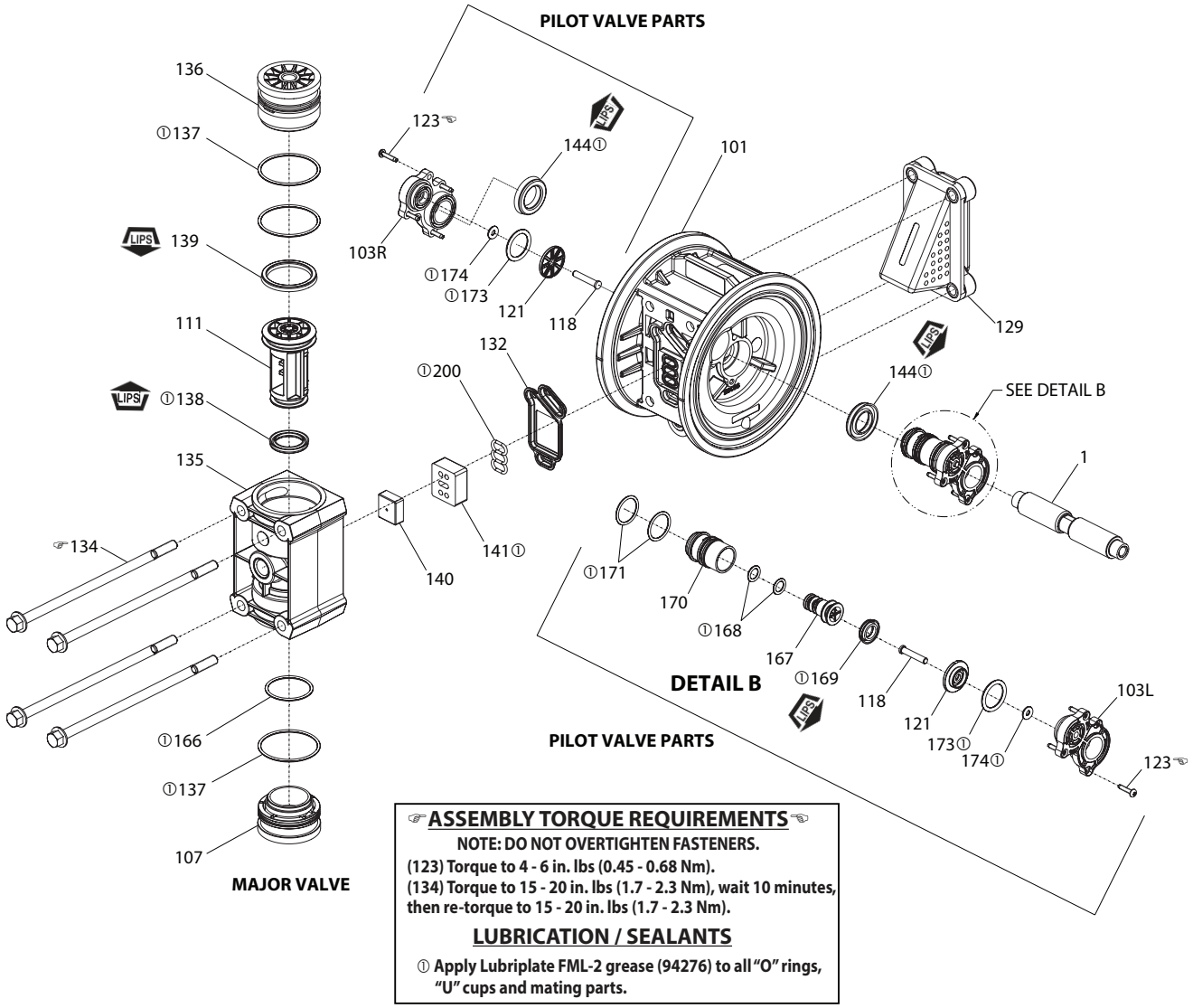


Figure 4

PILOT VALVE DISASSEMBLY

1. Remove (123) screws, releasing (103) covers, (121) washers, (118) actuator pins and (167) pilot piston.
2. Remove (170) spool bushing and inspect inner bore of bushing for damage.

PILOT VALVE REASSEMBLY

1. Clean and lubricate parts not being replaced from service kit.
2. Assemble (171) "O" rings to (170) bushing and assemble bushing into (101) center body.
3. Lubricate and assemble (167) pilot piston assembly into (170) bushing.
4. Assemble (173 and 174) "O" rings and (121) washers to (103) covers, then insert (118) actuator pins through assembly.
5. Assemble (144) "U" cups (note the lip direction) and (103) covers to (101) center body, securing with (123) screws. **NOTE:** Tighten (123) screws to 4 - 6 in. lbs (0.45 - 0.68 Nm).

MAJOR VALVE DISASSEMBLY

1. Unthread (134) bolts, releasing (129) muffler assembly.
2. Pull (135) valve block and components from (101) center body.
3. Remove (132) gasket, (141) valve plate and (140) valve insert from (135) valve block.
4. Remove (134) bolts, releasing (107 and 136) plugs and (111) spool.

MAJOR VALVE REASSEMBLY

1. Assemble new (138 and 139) "U" cups on (111) spool - **LIPS MUST FACE EACH OTHER**.
2. Assemble (137) "O" rings to (136) large plug.
3. Assemble (137 and 166) "O" rings to (107) small plug.
4. Insert (111) spool into (136) large plug, then insert (136) large plug into (135) valve block, being sure the (111) spool is rotated to accept (140) valve insert.
5. Assemble (107) small plug into (135) valve block.
6. Assemble (140) valve insert and (141) valve plate to (135) valve block. **NOTE:** Assemble (140) valve insert with "dished" side toward (141) valve plate. Assemble (141) valve plate with identification dot toward (132) gasket.
7. Assemble (132 and 200) gaskets, (135) valve block and (129) muffler assembly to (101) center body, securing with (134) bolts. **NOTE:** Tighten (134) bolts to 15 - 20 in. lbs (1.7 - 2.3 Nm).

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.

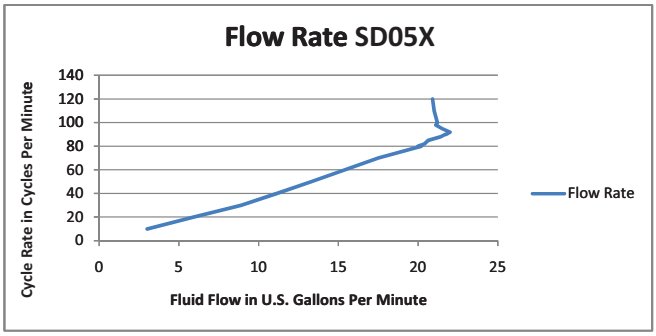
The cycle counter option provides a closed contact output each time the pump completes a cycle. This option is not available combined with solenoid control.

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.

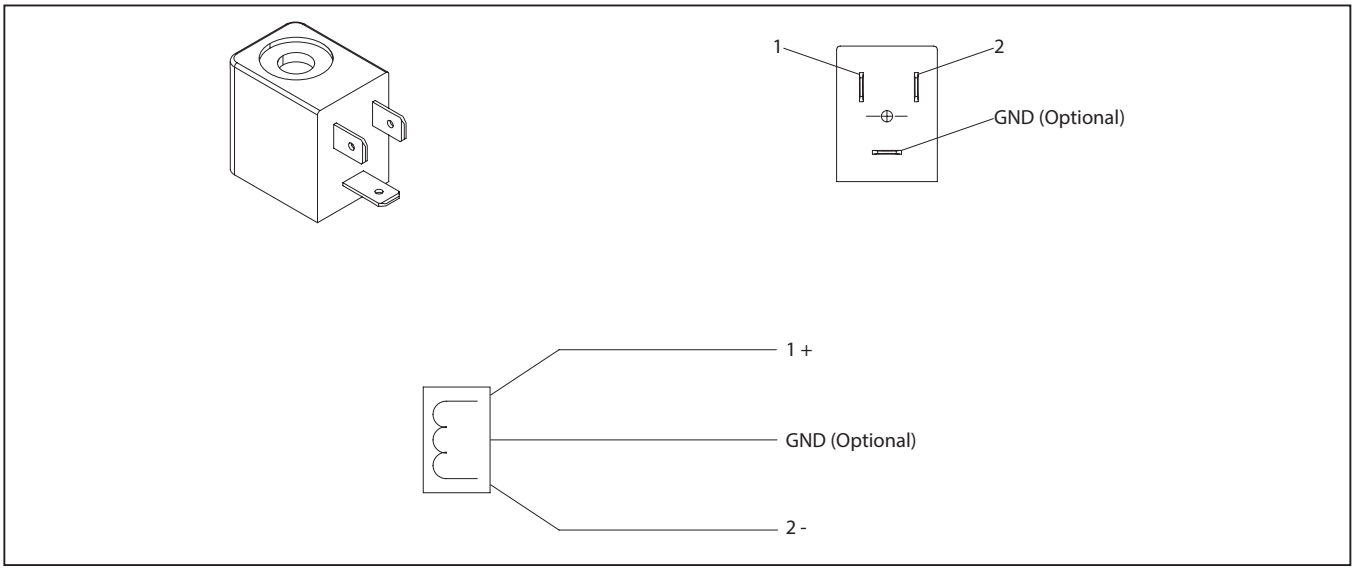
SOLENOID

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.



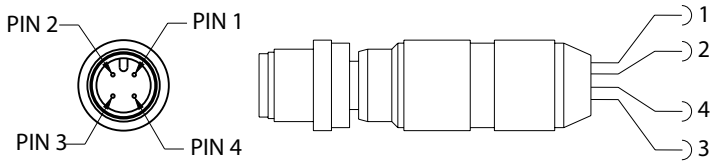
NON- HAZARDOUS DUTY SOLENOID WIRING DIAGRAM



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

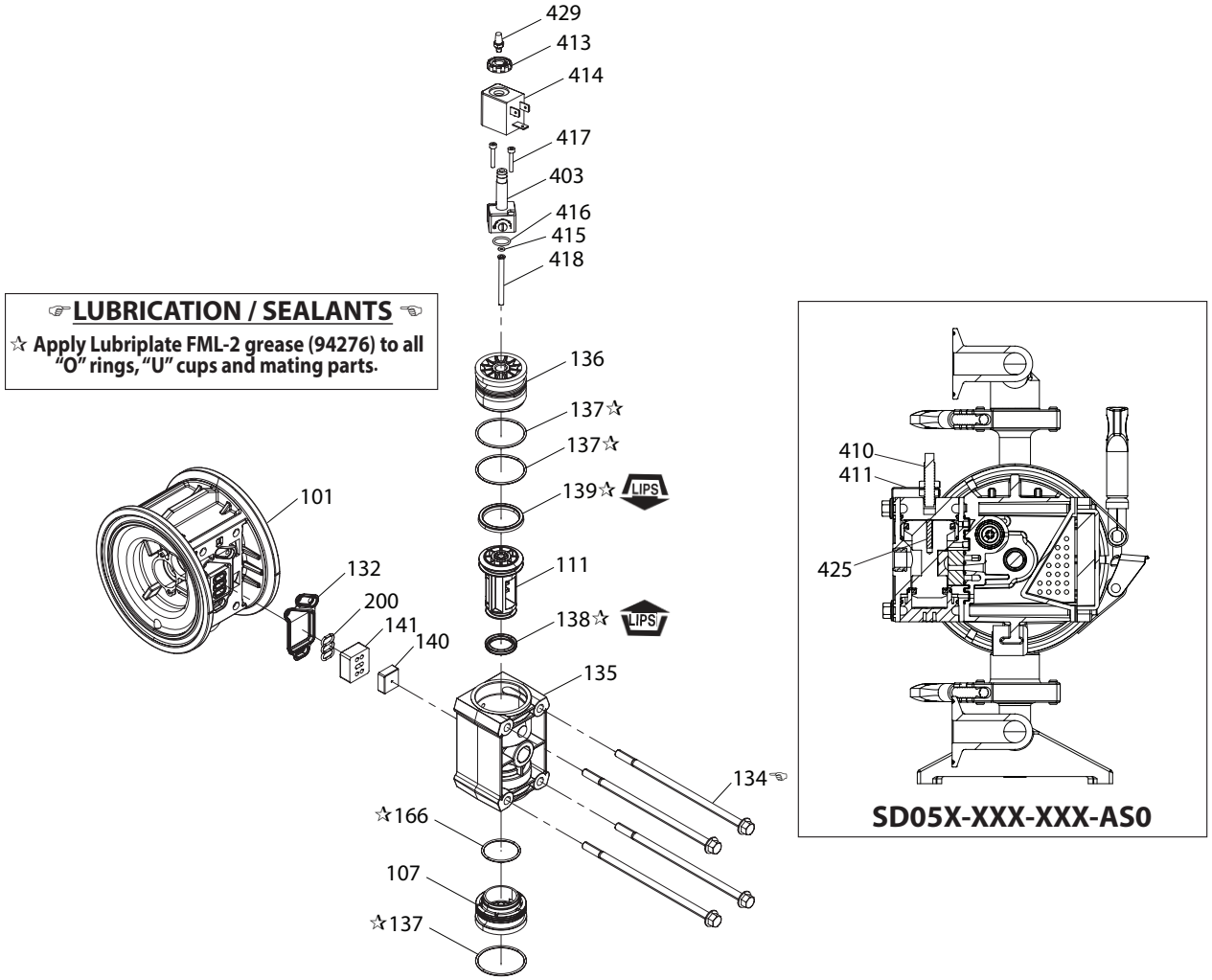


CABLE ASSEMBLY WIRING COLORS:

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.

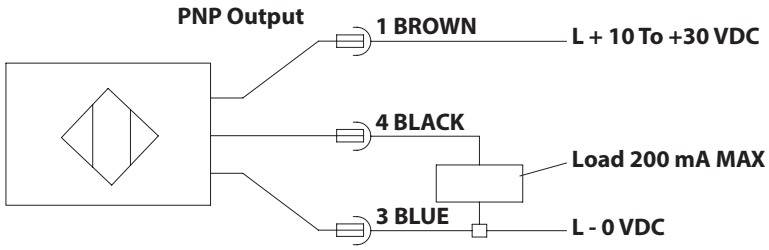
ELECTRONIC INTERFACE PART LIST



All SD05X with solenoid

Figure 5

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



PART LIST / SENSOR

SD05X-XXX-XXX-AXE, SD05X-XXX-XXX-AXF

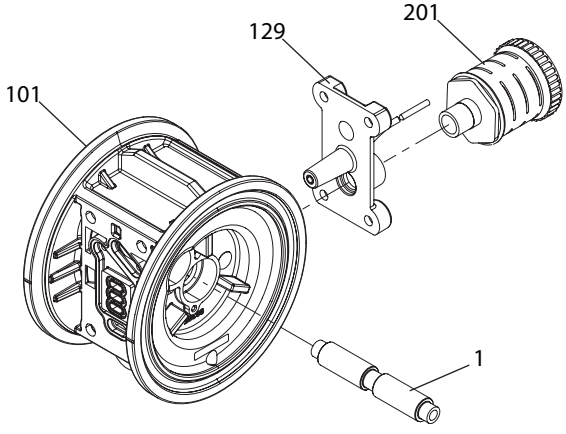


Figure 6

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 diaphragm failure detector 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 / SD05R-XXX-XXX-AXE, SD05R-XXX-XXX-AXL

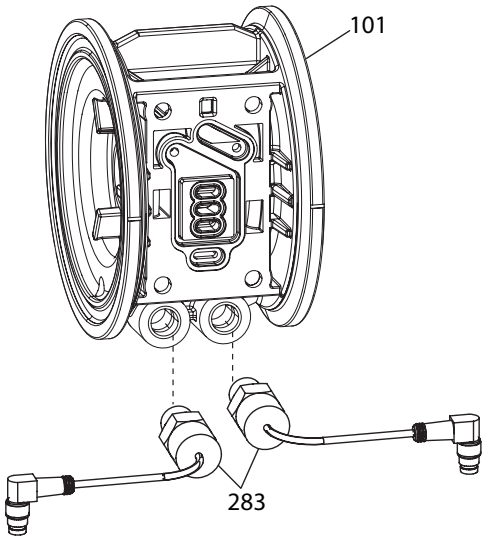
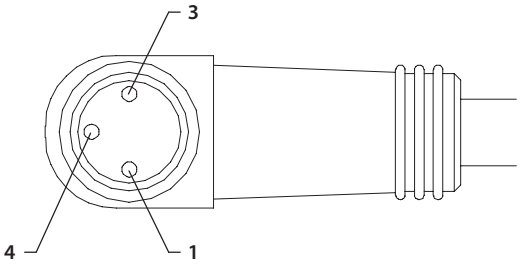


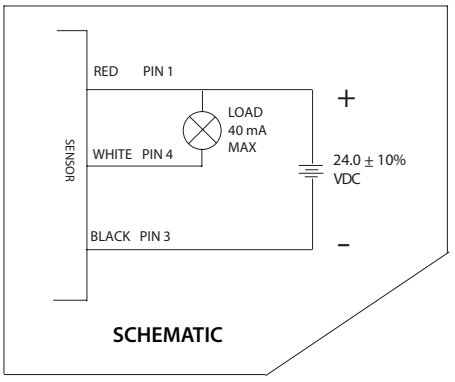
Figure 7

LEAK DETECTION (DIAPHRAGM FAILURE DETECTOR) - PINOUT DESCRIPTIONS

96270-1 SENSOR PINOUTS



Pin	Function	Color
1	+24 VDC	Red
3	Ground	Black
4	Signal	White



SCHEMATIC

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

Figure 8

TROUBLESHOOTING

Product discharged from air exhaust.
- Check for diaphragm rupture.
- Check tightness of (14) bolt.

Air bubbles in product discharge.
- Check connections of suction plumbing.
- Check "O" rings between intake manifold and fluid caps.
- Check tightness of (14) bolt.

Pump blows air out main exhaust when stalled on either stroke.
- Check "U" cups on (111) spool in major valve.
- Check (141) valve plate and (140) insert for wear.
- Check (169) "U" cup on (167) pilot piston.

Low output volume.
- Check air supply.
- Check for plugged outlet hose.
- For the pump to prime itself, it must be mounted in the vertical position so that the balls will check by gravity.
- 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 non-collapsible type, capable of pulling a high vacuum.
- Check all joints on the intake 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

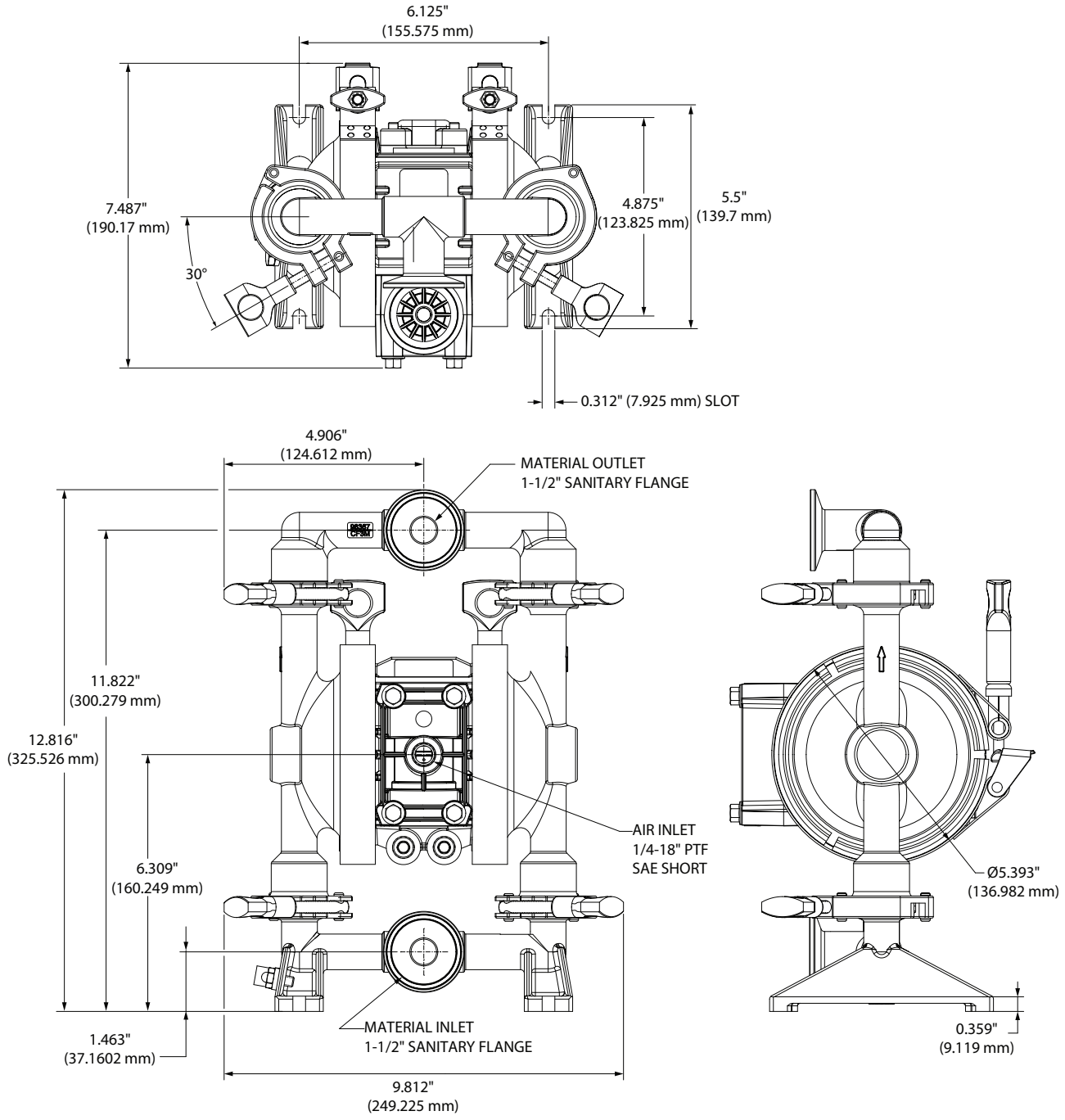


Figure 9