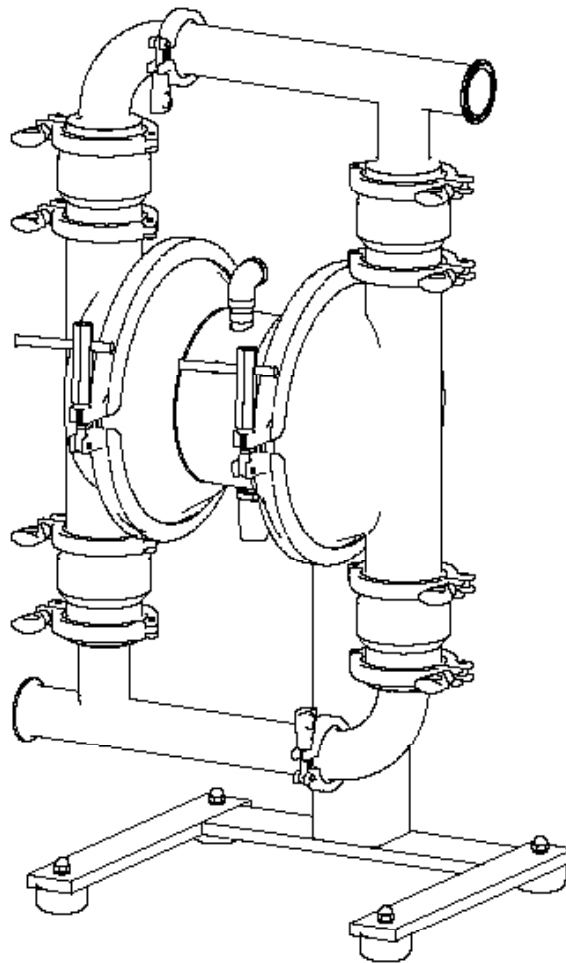




Operation and Maintenance Guide



TS50-SOX-CEX-XXF

Models	Descriptions
TS50-SOX-CEX-XXF	Teryair 2" Diaphragm Pump TerySan Stainless Steel FDA-EPDM End Port

Read this manual carefully before installing, operating or servicing this equipment. It's the responsibility of the employer to ensure this manual is read by the operator. Please preserve this manual.

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## Pump Nomenclature

Position	1	2	3	4	5	6	7	8	9	10	11
<b>Example</b>	<b>TS</b>	<b>50</b>	<b>S</b>	<b>O</b>	<b>X</b>	<b>C</b>	<b>E</b>	<b>X</b>	<b>A</b>	<b>F</b>	<b>X</b>
<b>Example: TS50-SOX-CEX-AFX</b>											
Position 1 Range	Position 2 Size	Position 3 Body	Position 4 Diaphragm/Valve	Position 5 Back up	Position 6 Port	Position 7 Port Position	Position 8 Speciality Code	Position 9 Safety Code	Position 10 Sanitary Code	Position 11 Speciality Code	
TS - Sanitary	50 - 2"	S - Polished Stainless 316	O- EPDM	X - None	C - TriClamp BS 4825-3	E - End Ported X - None	P - Pulse Dampener  R - Remote Solenoid Driven  T - Trolley Mounted X - None	A - ATEX/IECEX  X - None	F - FDA / EN1935	S - Speed Controller  C - Cycle Counter  D - Diaphragm Monitoring X - None	

## Operating and Safety

### Instructions



#### Warning: Static Electricity

Static sparks can cause explosion resulting in severe injury or death.

Ground the pump and the pump connections like hoses and containers into which or from the fluid is being transferred. Connect the grounding wire to any bolt on the pump.

Check continuity of electrical path to ground at regular intervals.

Consult local building and electrical codes for grounding requirements where needed.

Use hoses containing a grounding wire.



#### Warning: Pump Exhaust

In case of a diaphragm failure, fluid being pumped may spray out from the exhaust of the pump. This may cause severe injury depending on the fluid being pumped.

If the fluid is hazardous, pipe away the exhaust to a safe remote location using a generous diameter pipe preferably with a grounding arrangement, and refit the muffler at the end of this arrangement.

Always wear safety glasses while in the vicinity of an operating pump.



#### Warning: Over pressure / Hazardous Pressure

Do not exceed the max supply air pressure of 100 PSI.

Make sure all connected hoses and pipelines are rated to operate safely with the pressures generated by pump of 100 PSI.

Do not open or handle pump or hoses while pressurized.

Disconnect air supply line and relieve pressure from the system by carefully opening discharge and supply lines.

### **Air supply for the pump**

The Tery San pumps need Non lubricated air ,which is in compliance to the strict FDA norms for the Pneumatically operated pumps in the Food and Pharmaceutic industries.

These Tery San Pumps are equipped with the Non lubricated air valves which makes the pumps the most Hygienic pump to be used in the above mentioned industries as they don't exhaust the contaminated oil vapour in the plants.The Air supply should be dry and clean having no dirt in it.

The contaminated air supply reduces the working life of the parts and reduces the efficiency of the pump that calls for the high working and maintenance cost. Filters are recommended to be used to get clean dirt free air.

### **Operation**

The pump shall have all the fittings having good sealing to avoid the leak of air or product.

The suction pipe diameter should never be less than the diameter of the suction manifold. Larger diameters may be used if extremely viscous materials are to be pumped.

When using the pumps in a permanent installation attached to rigid piping, the use of flexible

couplings on both the suction and discharge ports of the pump is recommended to reduce

vibration due to the reciprocating nature of the pump.

Non-collapsible reinforced hose must be used on the suction side of the pump if hoses are to be used in place of piping

### **Maintaining and cleaning**

It is the responsibility of the user that he has to clean the pump as per the norms set by FDA.

Strict compliance with governmental regulations regarding specific processes and suitable chemicals is the sole responsibility of the customer.

The pump has two types of the parts..Wet and Dry

Wet parts are those who come inot the contact of food like outerchamber inlet and outlet of the pumps.They need to clean after every shift as work ends.

The Dry parts get wear and tear in their working life and they need to get replaced once get worn out ,as per the "Repair kit "mentioned in this manual.

### **Clean in place**

Most plants have their own guidelines for Clean In Place (CIP). Please follow your plant's

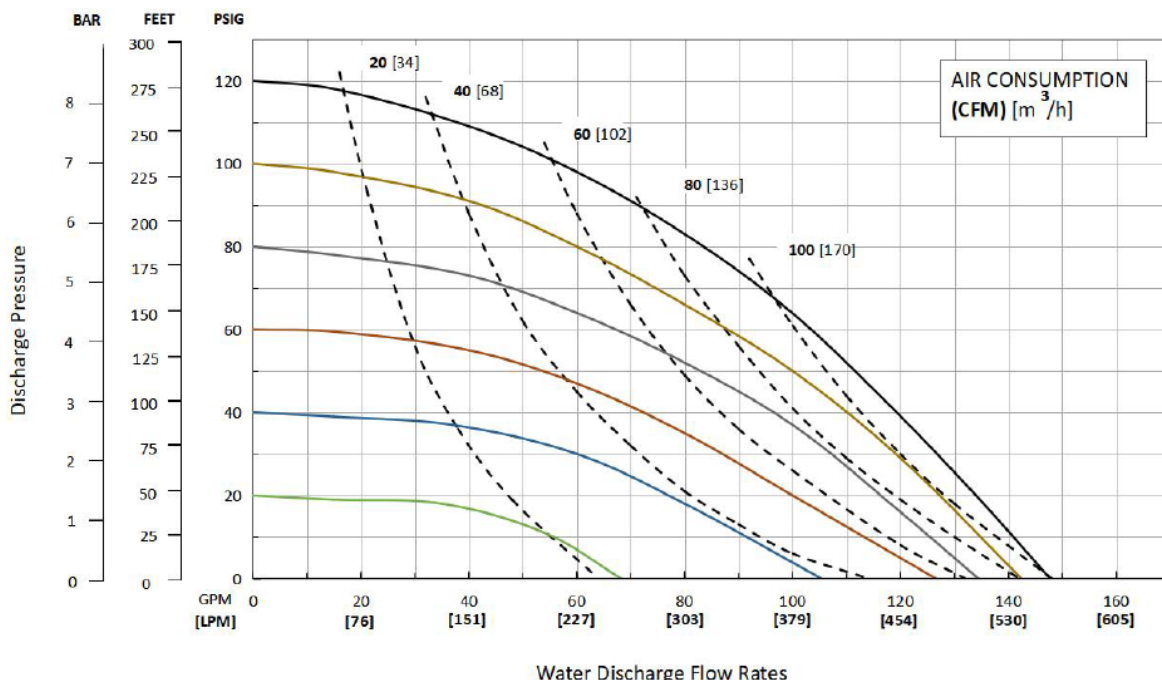
requirements.

If you are cleaning the pump along with your piping system at the same time, a bypass hose should be used to provide the additional flow required. It is recommended that the minimum flow rate for CIP of the pump be 5 ft/sec (1.5 m/s).

**Performance Data**

Ratio	1:1
Air Inlet Pressure Range	10-120 psig (0.7-8.0 bar)
Maximum Material Inlet Pressure	10 psig (0.7 bar)
Fluid Outlet Pressure Range	10-120 psig (0.7-8.0 bar)
Maximum Flow Rate (FDA-EPDM)	148 g.p.m. (559 lpm)
Maximum Particle Size	0.43” dia. (11 mm)
Wet Suction (FDA-EPDM)	27.88 ft (8.5 mtr)
Dry Suction (FDA-EPDM)	12.8 ft (3.8 mtr)

**Performance Graph FDA-EPDM**



**Caution: Temperature limitations and diaphragm options**

<b>FDA-EPDM</b>		<p>Excellent choice when pumping different viscous and semi solid food.</p> <p>It is chemically and doesn't react and create any change in the food.</p> <p>Temperature rang -20°C to +80°C (-4°F to +170°F)</p>
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## Maintenance

Regular inspection and maintenance schedules will greatly enhance the life of the pump and will ensure a trouble free and safe working environment with little chance of breakdowns.

Follow the instructions clearly in “Disassembly and Reassembly” of the pump and in the troubleshooting section.

Use genuine Teryair spares and if possible mention the serial number of the pump when ordering spares.

Always replace elastomers as a set, eg diaphragms, balls and seats.

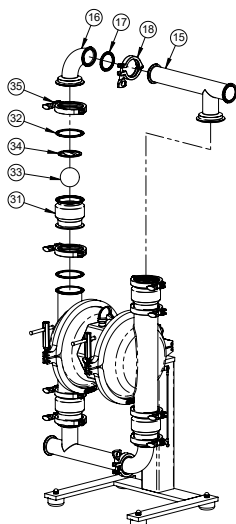
## Disassembly and Re assembly

- Shut off air supply and allow residual Pressure to bleed off.
- Disconnect air supply
- Disconnect suction and discharge piping
- Turn pump upside down allow process fluid to drain away. If fluid is hazardous due care should be taken.
- Make a mark to indicate the positioning of each liquid chamber relative to the housing.

NOTE: Replace worn parts with genuine TERYAIR parts for reliable performance.

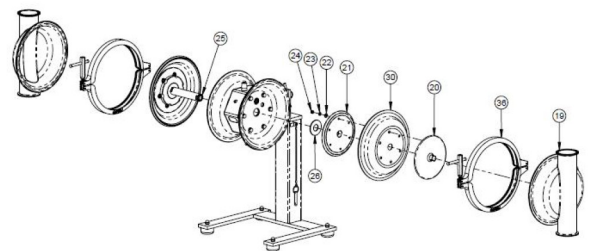
### 1) Replacement of Ball seat & Ball

- a. Loose the both side wing nut and open the big Tri-Clamp (35).
- b. Now pull the Outlet with Elbow assembly and remove Ball stopper (34), Big Flange Seal (32) and Valve Ball (33).
- c. Also open the next big Tri-Clamp (35) of Ball Housing & chamber assembly and remove the Ball Housing (31).
- d. Now replace the Big Flange Seal (32) and Valve Ball (33) if found damaged.
- e. Now loose the wing nut and open the small Tri-Clamp (18) and replace Small Flange Seal (17) if found damaged.
- f. f. Also clean the all removed parts and re-assemble as reverse step.
- g. Now loose the Locking Bolt (43) and pull the Locking Pin (40a) and change direction pump as 180°.
- h. Now repeat the process a, b, c, d, e & f to replace the bottom side Big Flange Seal (32), Valve Ball (33) and Small Flange Seal



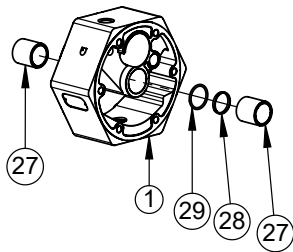
### 2) Replacement of Diaphragm

- a. Follow the steps a, b & c of replacement of ball and seal.
- b. Now loose the both side stud and open the bigger Tri-Clamp (36). Then pull the both side Outer Chamber (19).
- c. Now with the help of two spanner hold one of the across flat of one outer flange (20) and rotate the second outer flange (20) to disassemble the Diaphragm with Inner & outer Flange assembly from the shaft assembly.
- d. Now unscrew the 6 no.s of Hex. Nut (24) with Spring Washer (23) & Plain Washer (22) by using proper spanner.
- e. Now remove the Diaphragm (30) from Inner Flange (21) and Outer Flange (20) and replace if found damaged.
- f. Now pull out the half shaft assembly out of the shaft housing assembly. Now hold the shaft (25) in a vice with proper packing. Care must be taken not to damage the shaft outer surface. Now remove the outer flange (20) with spanner.
- g. Now repeat the above step d & e to replace the another Diaphragm (30).



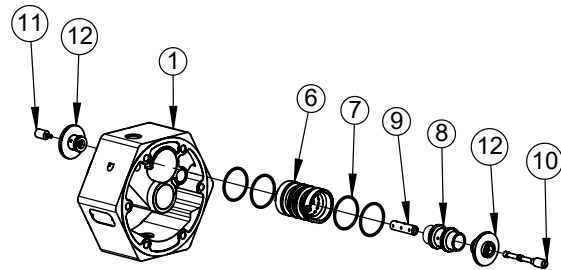
### 3.Replacement of Shaft Seal and Air Valve Assembly.

- a. Follow the all above steps.
- b. Now unscrew the both side 6 no.s of Hex. Bolt (4) with Spring Washer (5) by using proper spanner. Then pull the Air Disc (2) with Gasket (3) from centre Piece (1).
- c. Now remove the Sleeve (27) from both side of centre piece with O Ring (28) & Seal (29).
- d. Now replace the Gasket (3), Sleeve (27), O Ring (28) & Seal (29) if found damaged.
- e. Now unscrew the End Screw (11) & Secondary



Shaft (10) by using proper screw driver. Then pull the Side Plug assembly (12) and with End Screw & Secondary Shaft from both side.

- f. Now push the Piston Assembly (8) with Sleeve (9) from one side of centre piece. Now push the Sleeve (9) from Piston Assembly (8). Replace the Piston Assembly (8) or Sleeve (9) if damaged.
- g. Now press the Piston Sleeve (6) with 4 no.s of O Ring (7). Replace the O Ring (7) if found damaged.
- h. Now re-assemble the all above parts as reverse step.



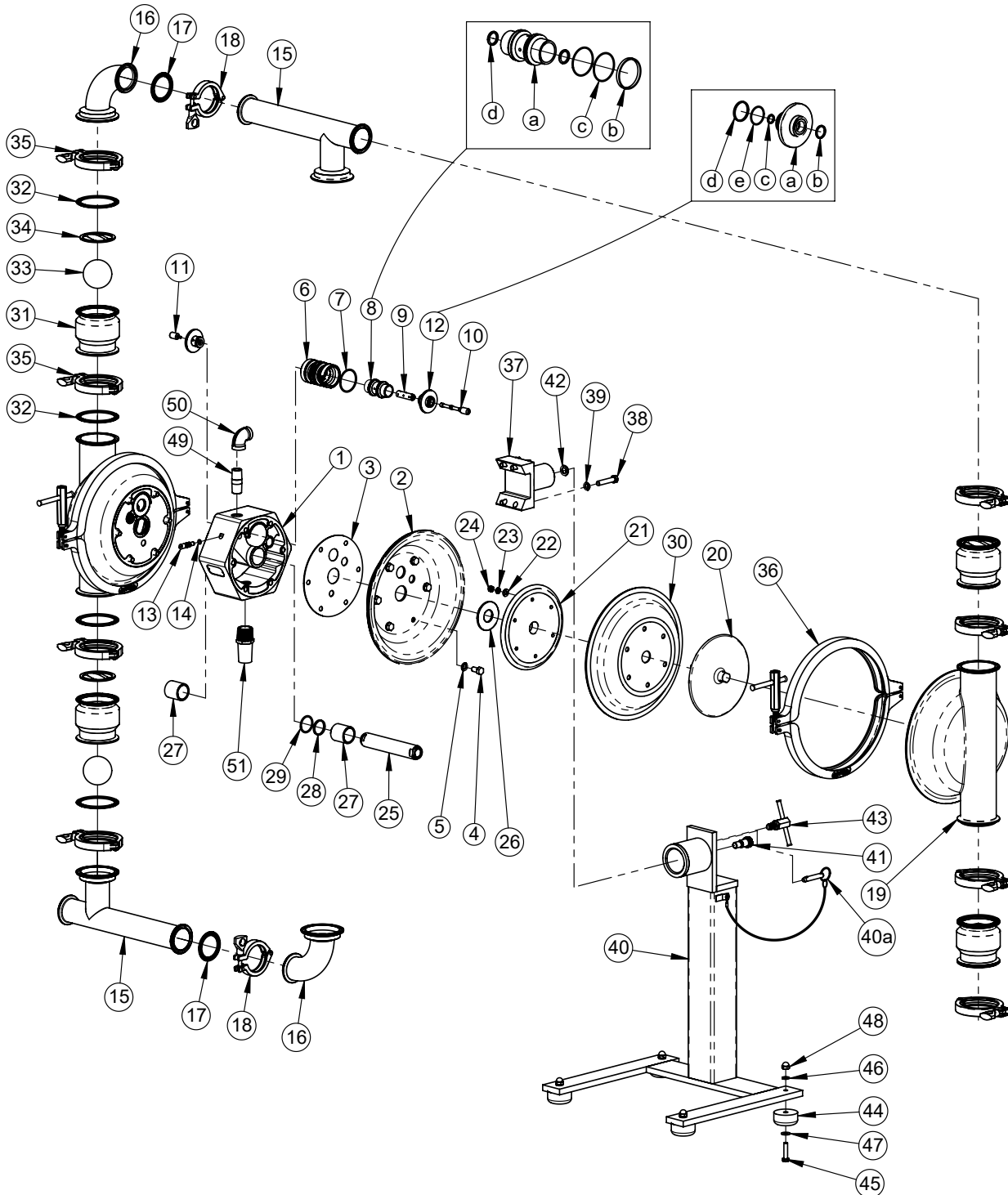
### Re-Assembly

Upon performing applicable maintenance to the air distribution system, the pump can now be reassembled. Please refer to the dis-assembly instructions for photos and parts placement. To reassemble the pump, follow the dis-assembly instructions in reverse order. The air distribution system needs to be assembled first, then the Diaphragms and finally the wetted path. Please find the applicable torque specifications on this page. The following tips will assist in the assembly process.

- a. Clean the inside of the center section shaft bore to ensure no damage is done to new seals.
- b. Stainless bolts should be lubed to reduce the possibility of seizing during tightening.

- c. Level the water chamber side of the intake/ discharge manifold to ensure a proper sealing surface. This is most easily accomplished by placing them on a flat surface prior to tightening their clamp bands to the desired torque (see below for Torque Specifications).
- d. Be sure to tighten outer pistons simultaneously on PTFE-fitted pumps to ensure proper torque values.
- e. Ensure proper mating of liquid chambers to manifolds prior to tightening vertical bolts. Overhang should be equal on both sides.
- f. Concave side of disc spring in diaphragm assembly faces toward shaft.

### Exploded View for TS50 Sanitary Pump





## Bill of Materials for TS50 Sanitary Pump

ILLU. NO.	PART NO.	DESCRIPTION	Qty
1	2162701	Center Piece-SS	1
2	2163505	Air Disc-SS	2
3	2164002V	Gasket-TS50	2
4	2169001S	Hex Bolt	12
5	2169002S	Spring Washer	12
6	2162501	Piston Sleeve-TS50	1
7	2164005	O Ring	4
8	2169809	Piston Assembly	1
a	2162502	Piston-TS50	1
b	2163605	Seal	2
c	2164003	O Ring	4
d	2163606	D Seal	2
9	2162503	Sleeve for Sec. Shaft-TS50	1
10	2162707	Secondary Shaft-TS50	1
11	2162708	End Screw-TS50	1
12	2169807	Side Plug Assembly-TS50	2
a	2162504	Side Plug	2
b	2163607	D Seal	2
c	2163608	D Seal	2
d	2163611	Seal	2
e	2164006	O Ring	2
13	2162712A	Air Plug Assembly-TS50	1
14	2164001	O Ring	1
15	2163501	Inlet/Outlet-TS50	2
16	2163502	Elbow-TS50	2
17	2164101	Flange Seal	2
18	2169802	Tri Clamp Set	2
19	2163503	Outer Chamber-TS50	2
20	2162703	Outer Flange-TS50	2
21	2162001	Inner Flange-TS50	2
22	2169010S	Plain Washer	12

ILLU. NO.	PART NO.	DESCRIPTION	Qty
23	2169009S	Spring Washer	12
24	2169008S	Hex Nut	12
25	2162710	Primary Shaft-TS50	1
26	2162711	Spacer-TS50	2
27	2163603	Sleeve-TS50	2
28	2163604	Seal	1
29	2164004	O Ring	1
30	2164103	Diaphragm-TS50	2
31	2163504	Ball Housing-TS50	4
32	2164102	Flange Seal	8
33	2163601	Valve Ball	4
34	2162704	Ball Stopper-TS50	4
35	2169803	Tri Clamp Set	8
36	2169804	Tri Clamp Set-TS50	2
37	2163506	Shaft Housing Mounting Bracket-TS50	1
38	2169011S	Hex Bolt	4
39	2169002S	Spring Washer	4
40	2163507A	Pump Mounting Stand-TS50	1
a	2169805	Locking Pin Set-SS	1
41	2162705	Bracket Locking Bolt	1
42	2169003S	Spring Washer	1
43	2162706A	Locking Bolt	1
44	2164007	Shock Absorber	4
45	2169004S	Hex Bolt	4
46	2169005S	Spring Washer	4
47	2169006S	Plain Washer	4
48	2169007S	Dome Nut	4
49	2165002	Barrel Nipple	1
50	2165003	Elbow	1
51	2165001	Silencer	1

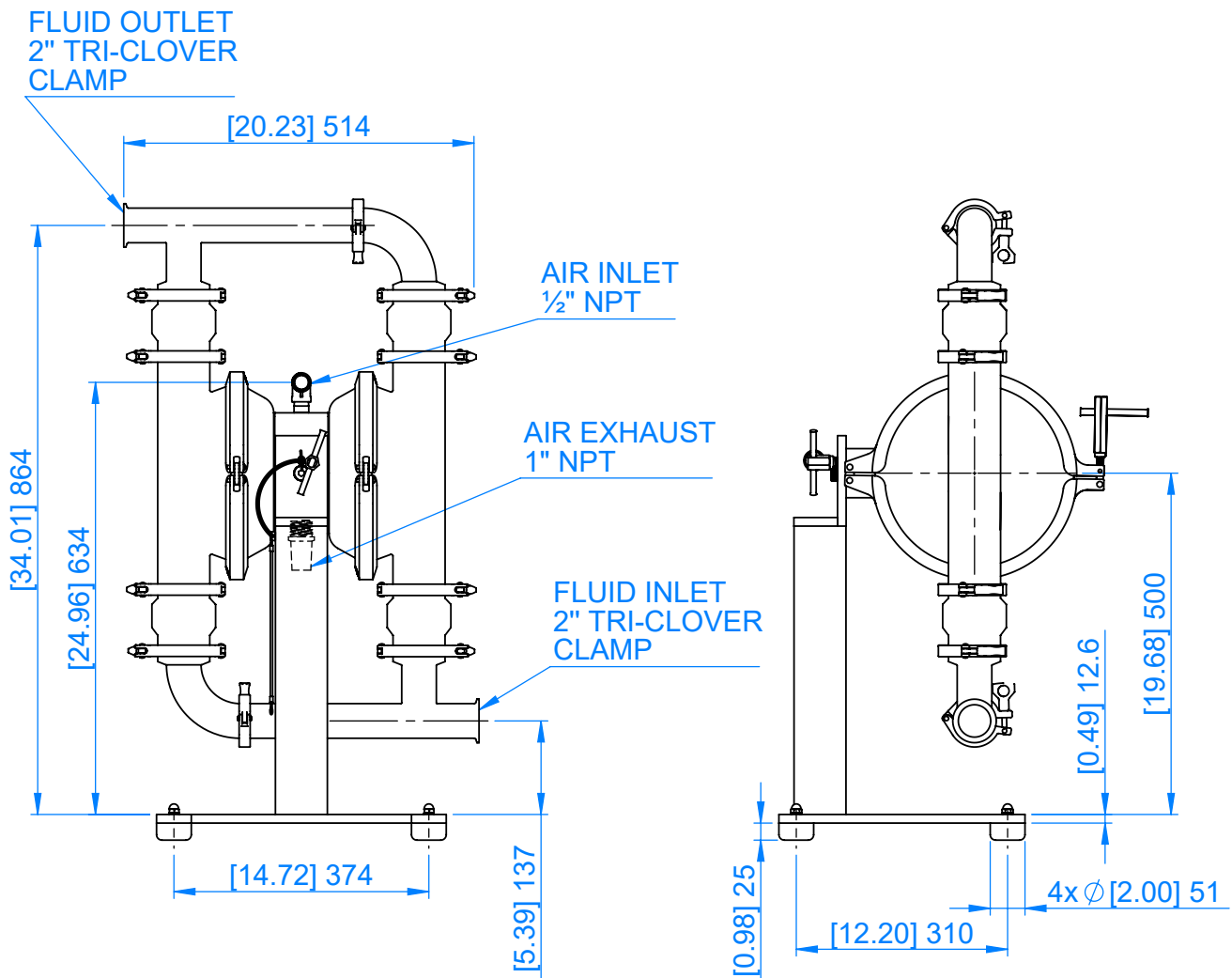
## Repair Kits for 2169702

ILLU. NO.	PARTNO.	DESCRIPTION	Qty
3	2164002V	Gasket-TS50	2
7	2164005	O Ring	4
8	2169809	Spool Assembly	1
12	2169807	Side Plug Assembly-TS50	2
13	2169801	Air Plug Assembly-TS50	1
27	2163604	Seal	1
28	2164004	O Ring	1
29	2164103	Diaphragm-TS50	2
31	2164102	Flange Seal (Big)-TS50	8
32	2163601	Valve Ball	4

## 2169701: Air Valve Replacement Kit (Integral valve)

ILLU. NO.	PARTNO.	DESCRIPTION	Qty
1	2162501	Sleeve-TS50	1
2	2164005	O Ring	4
3	2169809	Spool Assembly	1
a	2162502	Spool-TS50	1
b	2163605	Seal	2
c	2164003	O Ring	4
d	2163606	D Seal	2
4	2162503	Sleeve for Sec. Shaft-TS50	1
5	2162707	Secondary Shaft-TS50	1
6	2162708	End Screw-TS50	1
7	2169807	Side Plug Assembly-TS50	2
a	2162504	Side Plug	2
b	2163607	D Seal	2
c	2163608	D Seal	2
d	2163611	Seal	2
e	2164006	O Ring	2

## Dimensional Data





# Warranty Certificate

Every product manufactured by Teryair  
is built to meet the highest standards of quality.

Teryair warrants that the Products, accessories and parts manufactured or supplied by the company be free from defects in material and workmanship for a period of six months from date of Teryair authorized dealer invoice to customer, or one year from date of Teryair invoice to dealer, whichever is earlier. Failure due to normal wear, misapplication, or abuse is, of course, excluded from this warranty.

Since the use of Teryair products and parts is beyond our control, Teryair cannot guarantee the suitability of any product or part for a particular application and Teryair shall not be liable for any consequential damage or expense arising from the use or misuse of its products on any application. Teryair does not warranty bought out products or components such as electric motors and hardware but will assist in directing warranty queries to the dealer/manufacturer responsible. Teryair responsibility is limited solely to replacement or repair of defective Teryair products or components.

Dealer/End User shall have no right or remedy and Teryair shall have no liability or obligation under the warranty, if: (i) a Product is altered, changed, modified or tampered with in any way, (ii) a Product is damaged after deposit with the transporter for shipment; (iii) a Product is not properly preserved, packaged, stored, processed or handled after receipt; (iv) a Product is not used and maintained in accordance with Teryair's recommended operating and maintenance manuals, instructions and procedures, if any; (v) a Product is not properly incorporated or installed in, or not properly combined with, an Other Product; (vi) the issue with a Product is directly or indirectly attributable to, or directly or indirectly results from or arises out of, a failure, substandard performance or other issue with another product, material, component or part not supplied by Teryair; (vii) the issue with a Product is directly or indirectly attributable to, or directly or indirectly results from or arises out of, compliance with any design, specification or other specific requirement of Dealer/End User; (viii) a Product is used in a manner, with a substance or for a purpose other than the normal manner, substance and purpose for which it is intended or is otherwise subjected to abnormal use or service; (ix) a Product is subjected to a power surge, brown out or other similar occurrence; (x) the issue with a Product is directly or indirectly attributable to, or directly or indirectly results from or arises out of, normal wear and tear of such Product (including, without limitation, things such as worn seals, diaphragms, balls, O rings, gaskets, chisels, cutters, hoses and other such wearing components; (xi) the issue with a Product is directly or indirectly.

Model Number : TS50 Series

A handwritten signature in blue ink, appearing to read "M. Yadav", is written over a horizontal line.

M Yadav, Q.A. Manager  
(Company Seal)

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