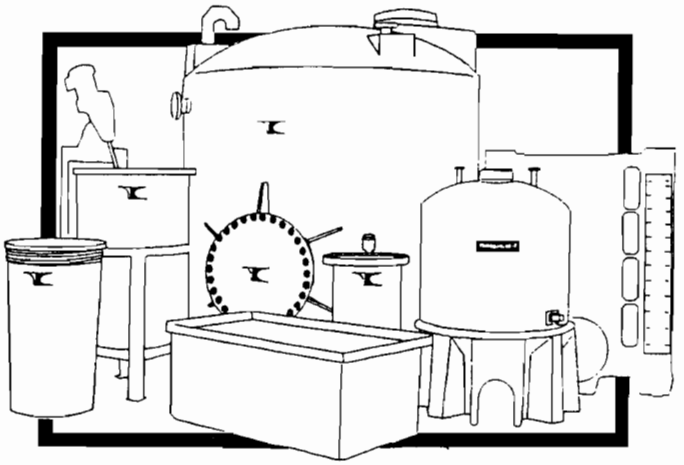
ITEM #451-T7
New

TERRACON CORPORATION

INSTALLATION AND MAINTENANCE GUIDE



Thank you for specifying a Terracon Thermoplastic Tank System. We have suited this system to your specific needs. Observing the precautions listed below will ensure that your Terracon Tank will provide excellent service life.

DELIVERY INSPECTION

Always check tanks on arrival for gouges, pinholes, or obvious defects. Check off parts on the shipping copy of the order to ensure that all parts are delivered. Check unloading area for rocks, sharp objects or other items which could damage the tank.

HANDLING

Avoid sharp blows and sharp edges during handling. Never roll a tank on its fittings. Fittings must not be used as lifting points. Extra handling care should be exercised in extremely cold weather.

INSTALLATION

Vertical Flat Bottom Tanks - The tank should rest on a level, even base of concrete, asphalt, sand, pea gravel, fine soil (held so that it will not wash), or wood so that the entire bottom of the tank is fully supported. Do not place a tank on washed gravel, crushed stone, uneven ground or unsupported base.

Horizontal Tanks - Most of Terracon's rotationally molded horizontal tanks have baffles and legs molded in and are provided with tie down rings. There is no need for costly saddles or skids. These tanks can be used for stationary storage or transport of certain liquids. The same installation precautions should be observed for horizontal tanks as detailed above.

VENTS

Before using your tank, check vents for possible blockage. Caution - Draining any tank with vents closed can cause implosion.

TEMPERATURE

150°F is the maximum operating temperature for standard Terracon tanks. Higher temperatures are acceptable under some circumstances. Check with factory before using vessel for storage at elevated temperatures. External heat sources should be kept away from the tank as they may cause damage or shorten tank life.

FITTINGS/PIPING/APPURTENANCES

Molded thermoplastic tanks are engineered to allow for some expansion when loaded. To prevent damage to the tank or to the piping system, always include a section of hose or flexible expansion member in the permanent piping system. All valves and piping, solid or otherwise, should be supported by means other than the tank. Flanges are 150 lb ANSI standard flat faced. Mating flanges MUST be flat faced. Mating flanges or threaded connections must be made of similar material.

In large tanks all welded-in couplings, nozzles or flanges shall be front and back welded unless otherwise specified or internal access is precluded.

TESTING AND FINAL INSPECTION

Water test all vessels for a minimum of twelve (12) hours before usage. Testing will identify or prevent problems which may arise from plumbing leaks or shipping damages.

CHEMICAL COMPATIBILITY

All products stored should be used in accordance with Terracon's Chemical Suitability Chart. Always check with Terracon Corporation for compatibility of chemicals not listed on the chemical resistance chart.

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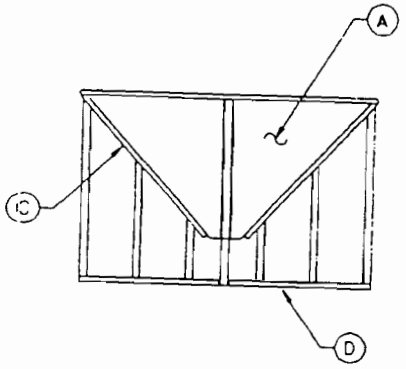
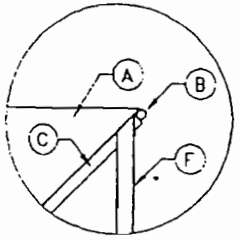
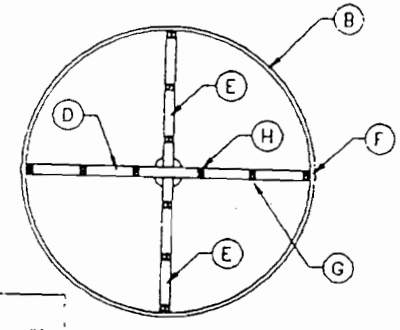
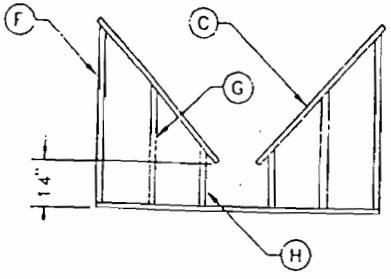
PART OR DWG. NO.	REV.
71021-2	A









NOTES

KEY	NO	DESCRIPTION
A	1	FULL PAN: FORMED FROM 12 GA. SHEET STEEL ROLLED TO A 45 DEG. ANGLE WITH 86" DIA. TOP AND 9"DIA. BOTTOM OPENING
B	1	SUPPORT RING: 1 1/4" SCH 80 BLACK PIPE ROLLED TO AN 88" O.D.
C	4	TOP SUPPORT: 3"X 4.1 "C" CHANNEL 55 3/8" LONG
D	1	BOTTOM FOOT PADS: 3"X 4.1 "C" CHANNEL 83 1/2" LONG
E	2	BOTTOM FOOT PAD: 3"X 4.1 "C" CHANNEL 40 1/4" LONG
F	4	OUTER LEGS: 2"X 2"X 3/16" BOX TUBE CUT TO A 45 DEG. ANGLE 56 1/2" LONG SIDE
G	4	MIDDLE LEGS: 2"X 2"X 3/16" BOX TUBE CUT TO A 45 DEG. ANGLE 39" LONG SIDE
H	4	INSIDE LEGS: 2"X 2"X 3/16" BOX TUBE CUT TO A 45 DEG. ANGLE 21 1/2" LONG SIDE

1ST SUBMITTAL
SPECIALIZED ENVIRONMENTAL STAND FOR T-7 TANK

SCALE	TOLERANCE	REV/LTR
NTS		

MATERIAL: SEE NOTES

DRAWN	DAY	MO.	YR.	RELEASED	SHEET NO.
CSS	21	10	97		

PART OR DWG. NO. 71021-2

TERRACON CORPORATION
5 BOYNTON ROAD
HOPPING BROOK PARK
HOLLISTON, MA 01748 USA

TITLE: CXC2600-RS SUPPORT STAND SPECIALIZED ENVIRONMENTAL STAND FOR T-7 TANK

REV: A

Approved 11-10-97

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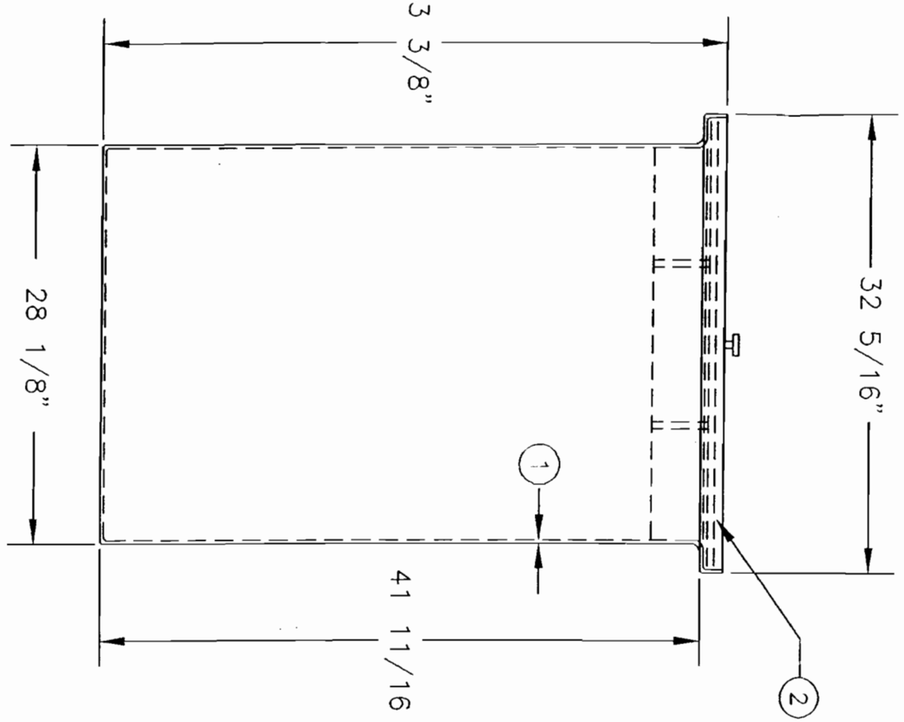
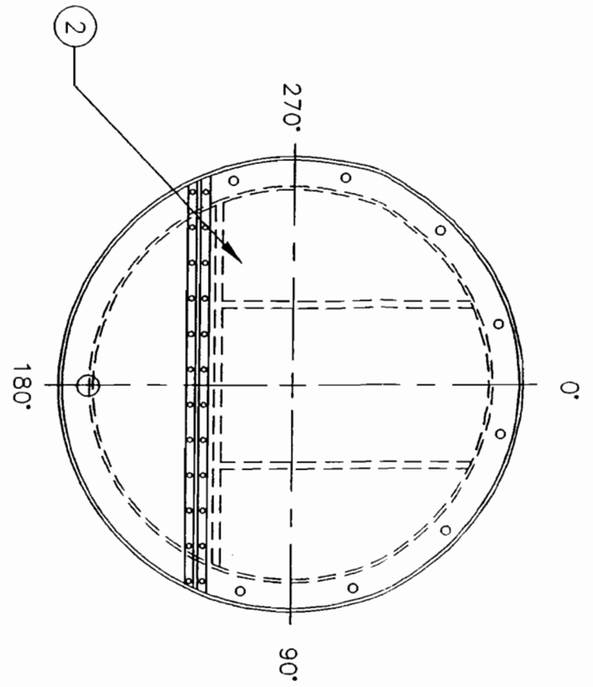
ITEM #451-T8

PART OR DWG. NO.	REV.
71017-1	A

T-8 THICKENER CATCH TANK





FITTINGS				
MK	SIZE	DESCRIPTION	ELEV.	DEG.

NOTES

1. 1/4" WALL LINEAR POLYETHYLENE, NATURAL TRANSLUCENT WHITE.
2. BOLT ON HINGED COVER, 304 S.S. PIANO HINGE, 316 S.S. BOLTING HARDWARE, CLOSED CELL GASKET, MIXER SUPPORT PACKAGE, (TO SUPPORT 100 LB. LOAD).

1ST SUBMITTAL
SPECIALIZED ENVIRONMENTAL
T-6 COAGULANT STORAGE TANK

SCALE	TOLERANCE	REV'LTR
1 : 10		

MATERIAL: LLDPE

DRAWN	DAY	MO.	YR.	RELEASED	SHEET NO.
CSS	17	10	97		

PART OR DWG. NO. 71017-1

TERRACON CORPORATION
5 BOYNTON ROAD
HOPPING BROOK PARK
HOLLISTON, MA 01746 USA

TITLE: COF0817 100 GAL. CYL. TANK
SPECIALIZED ENVIRONMENTAL
T-8 THICKENER CATCH TANK

REV. A

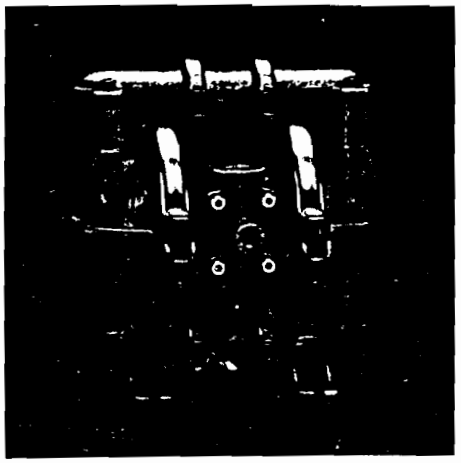
ISO 9001 Est. 1955 QUALITY SYSTEM

WILDEN®

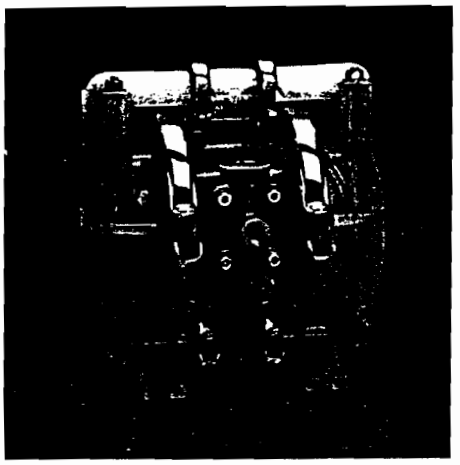
AIR OPERATED DOUBLE DIAPHRAGM PUMPS

M1 Engineering Operation and Maintenance

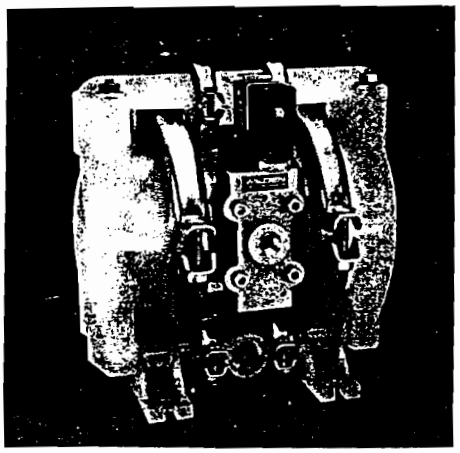
MODEL M1 METAL
MODEL M1 CHAMP
MODEL M1 FOOD PROCESSING
MODEL M1 SOLENOID-OPERATED
MODEL M1 CARBON-FILLED ACETAL
MODEL M1 ULTRAPURE III



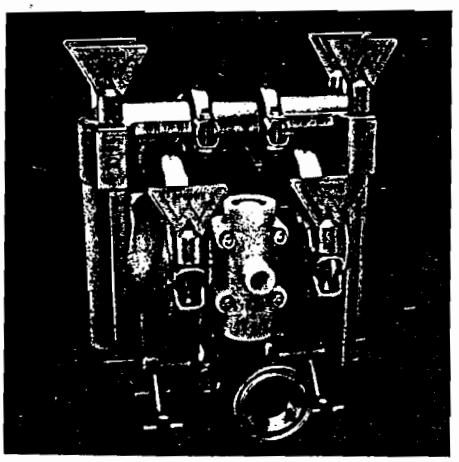
M1 METAL *LUBED AND LUBE-FREE*



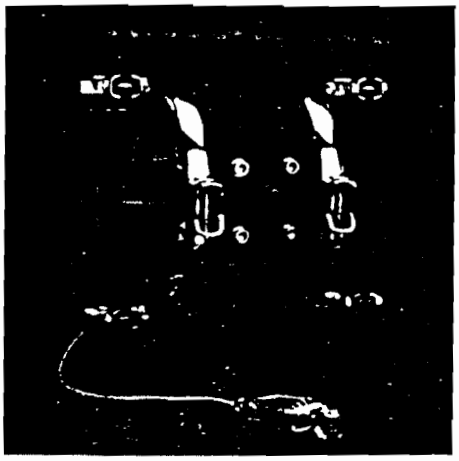
M1 CHAMP *LUBED AND LUBE-FREE*



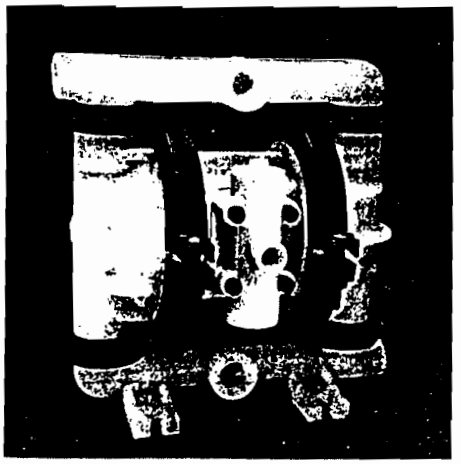
M1 SOLENOID-OPERATED *CHAMP AND METAL*



M1 FOOD PROCESSING *LUBED AND LUBE-FREE*



M1 CARBON-FILLED ACETAL



M1 ULTRAPURE III

THE WILDEN PUMP — HOW IT WORKS

The Wilden diaphragm pump is an air-operated, positive displacement, self-priming pump. These drawings show flow pattern through the pump upon its initial stroke. It is assumed the pump has no fluid in it prior to its initial stroke.

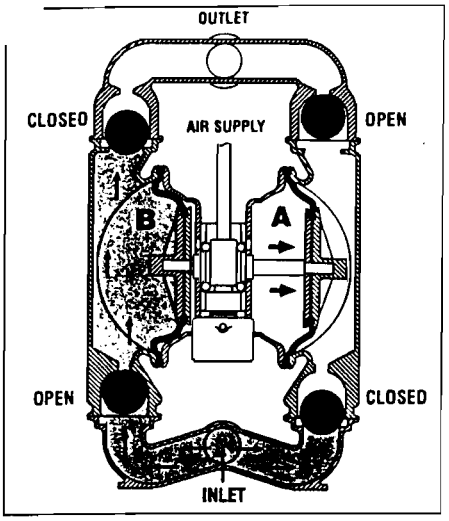


FIGURE 1 The air valve directs pressurized air to the back side of diaphragm A. The compressed air is applied directly to the liquid column separated by elastomer diaphragms. The diaphragm acts as a separation membrane between the compressed air and liquid, balancing the load and removing mechanical stress from the diaphragm which allows for millions of flex cycles. The compressed air moves the diaphragm away from the center block of the pump. The opposite diaphragm is pulled in by the shaft connected to the pressurized diaphragm. Diaphragm B is now on its suction stroke; air behind the diaphragm has been forced out to the atmosphere through the exhaust port of the pump. Diaphragm A is working against atmospheric air pressure. The movement of diaphragm B toward the center block of pump creates a vacuum within chamber B. Atmospheric sure forces fluid into the inlet manifold forcing the inlet ball off its seat. Liquid is free to move past the inlet e ball and fill the liquid chamber.

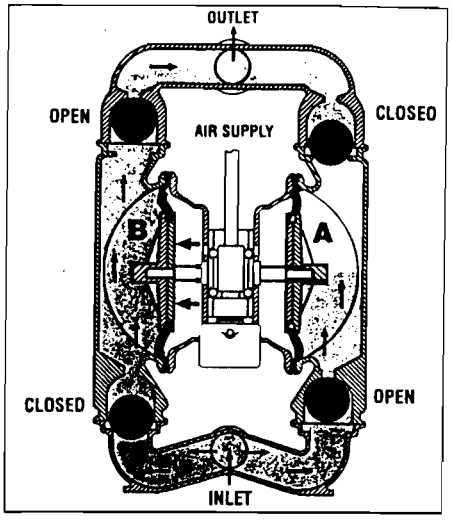


FIGURE 2 When the pressurized diaphragm, diaphragm A, reaches the limit of its discharge stroke, the air valve redirects pressurized air to the back side of diaphragm B. The pressurized air forces diaphragm B away from the center block while pulling diaphragm A to the center block. Diaphragm B is now on its discharge stroke. Diaphragm B forces the inlet valve ball onto its seat due to the hydraulic forces developed in the liquid chamber and manifold of the pump. These same hydraulic forces lift the discharge valve ball off its seat, while the opposite discharge valve ball is forced onto its seat, forcing fluid to flow through the pump discharge. The movement of diaphragm A to the center block of the pump creates a vacuum within liquid chamber A. Atmospheric pressure forces fluid into the inlet manifold of the pump. The inlet valve ball is forced off its seat allowing the fluid being pumped to fill the liquid chamber.

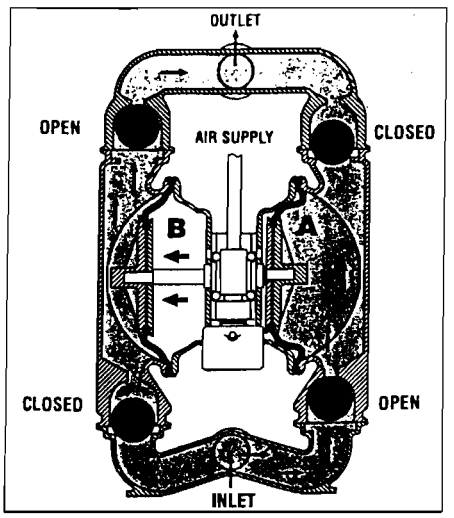
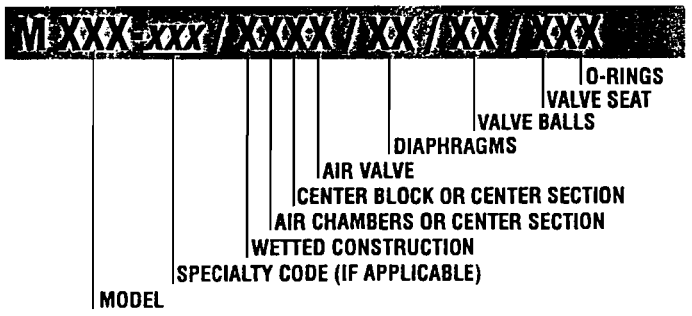


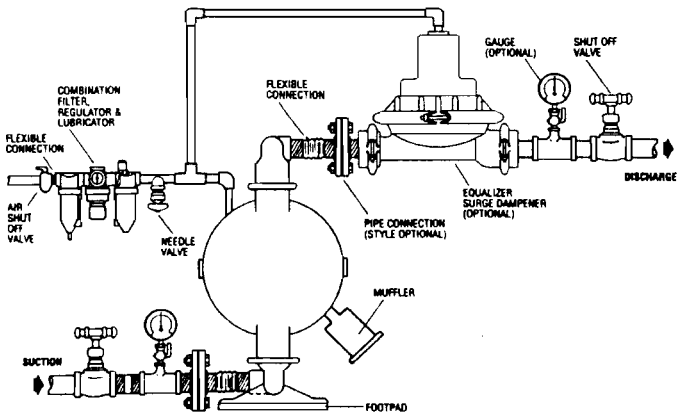
FIGURE 3 At completion of the stroke, the air valve again redirects air to the back side of diaphragm A, which starts diaphragm B on its exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one exhaust and one discharge stroke. This constitutes one complete pumping cycle. The pump may take several cycles to completely prime depending on the conditions of the application.

WILDEN PUMP DESIGNATION SYSTEM



In the case where a center section is used instead of a center block and air chambers, the designation will be as follows: Aluminum = AA, Polypropylene = PP, Carbon-filled Acetal = GG, Nylon = YY, Acetal = LL

SUGGESTED INSTALLATION



CAUTIONS! READ FIRST

Temperature Limits:		
Carbon-filled Acetal	-20°F to 150°F	(-28.9°C to 65.6°C)
Polypropylene	+32°F to 175°F	(0°C to 79.4°C)
PVDF	+10°F to +225°F	(-12.2°C to 107.2°C)
Teflon® PFA	-20°F to 300°F	(-28.9°C to 148.9°C)

CAUTION: Maximum temperature limits are based upon mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperatures. Consult engineering guide for chemical compatibility and temperature limits.

CAUTION: ALWAYS WEAR SAFETY GLASSES WHEN OPERATING PUMP. WHEN DIAPHRAGM RUPTURE OCCURS, MATERIAL BEING PUMPED MAY BE FORCED OUT AIR EXHAUST.

"Champ" series pumps are made of virgin plastic and are not UV stabilized. Direct sunlight for prolonged periods can cause deterioration of plastics.

NOTE: Standard pumps must be lubricated. Wilden suggests an arctic 5 weight oil (ISO grade 15). Unless (F) is present pump must be lubricated.

WARNING: Prevention of static sparking — If static sparking occurs, fire or explosion could result. Pump, valves, and containers must be grounded when handling flammable fluids and whenever discharge of static electricity is a hazard. To ground the Wilden "Champ," all clamp bands must be grounded to a proper grounding point.

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CAUTION: DO NOT EXCEED 125 PSIG AIR SUPPLY PRESSURE.
BLOW OUT AIR LINE FOR 10 TO 20 SECONDS BEFORE ATTACHING TO PUMP TO MAKE SURE ALL PIPE LINE DEBRIS IS CLEAR. ALWAYS USE AN IN-LINE AIR FILTER.

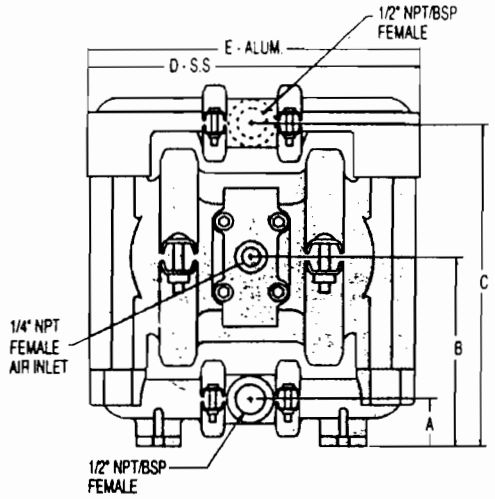
WARNING: The solenoid valve should not be used in an area where explosion proof equipment is required unless Nema 7 valve is specified.

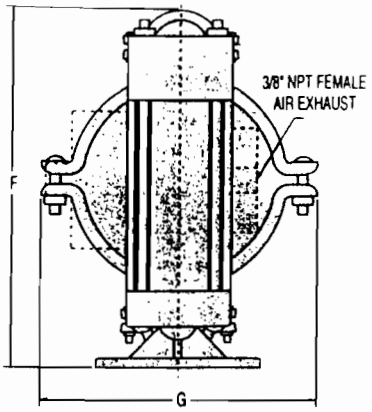
Carbon-filled acetal must be adequately grounded through strap provided.

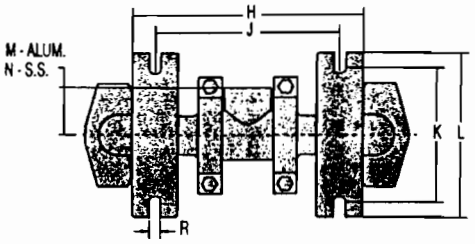
When removing end cap using compressed air, the air valve end cap may come out with considerable force. Hand protection such as a padded glove or a rag should be used to capture the end cap.

CAUTION: Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container.

SECTION 1A — DIMENSIONAL DRAWING
MODEL M1 METAL PUMP



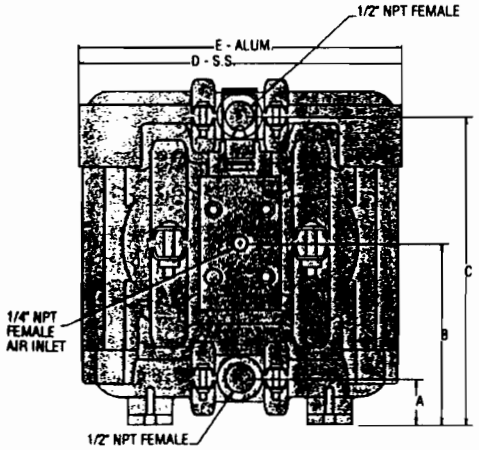


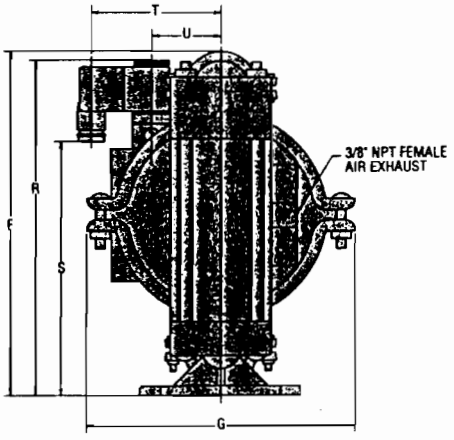


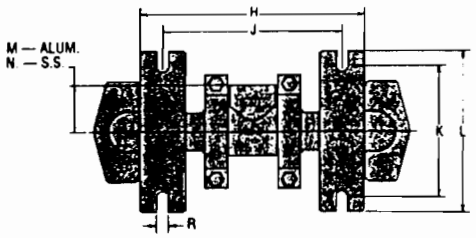
DIMENSIONS – M1 (METAL)		
ITEM	STANDARD (inch)	METRIC (mm)
A	1 1/8	28.6
B	4 9/16	115.9
C	7 13/16	198.5
D	8	203.2
E	8 5/32	207.2
F	8 3/4	222.3
G	6 7/8	174.6
H	5 1/2	139.7
J	4 13/32	111.9
K	3 1/4	82.6
L	4	101.6
M	1 3/16	30.2
N	1 3/16	30.2
P	9/32	7.1

BSP threads available.

SECTION 1B — DIMENSIONAL DRAWING
MODEL M1 METAL SOLENOID-OPERATED PUMP



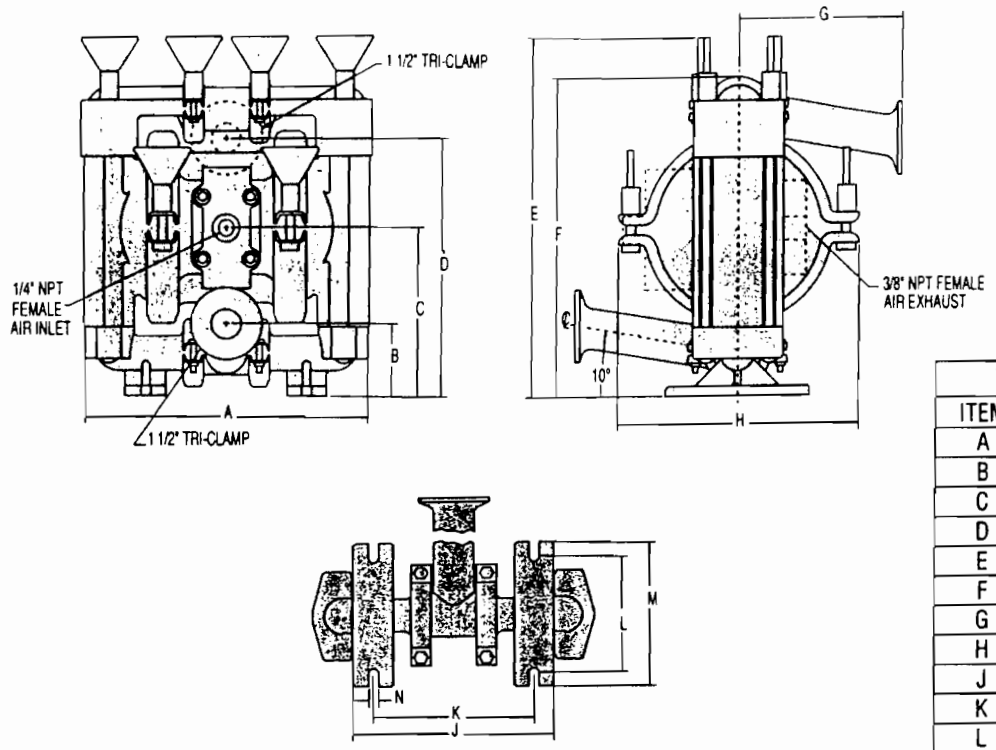




DIMENSIONS – M1 SOLENOID OPERATED (METAL)		
ITEM	STANDARD (inch)	METRIC (mm)
A	1 1/8	28.6
B	4 5/16	115.9
C	7 13/16	198.5
D	8	203.2
E	8 5/32	207.2
F	8 3/4	222.3
G	6 7/8	174.6
H	5 1/2	139.7
J	4 13/32	111.9
K	3 1/4	82.6
L	4	101.6
M	1 3/16	30.2
N	1 3/16	30.2
P	9/32	7.1
R	8 7/8	225.4
S	6 3/8	161.9
T	3 7/32	81.8
U	1 3/4	44.5

*BSP threads available.

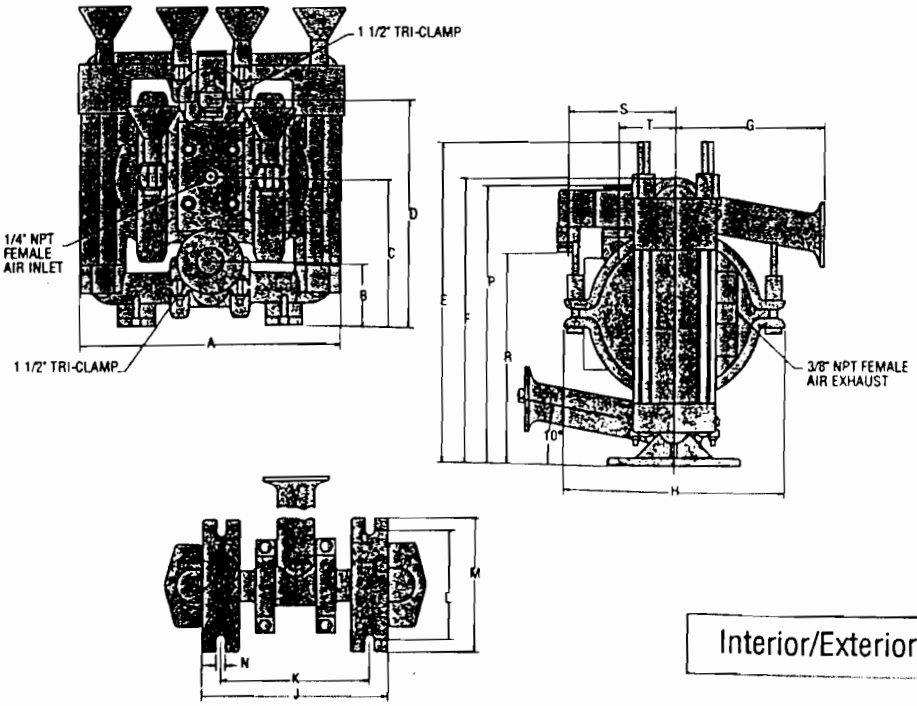
SECTION 1C — DIMENSIONAL DRAWING
MODEL M1 FOOD PROCESSING PUMP



DIMENSIONS – M1 (FOOD PROCESSING)		
ITEM	STANDARD (inch)	METRIC (mm)
A	8 1/32	204.0
B	1 29/32	48.4
C	4 21/32	118.3
D	6 7/8	174.6
E	10 1/32	254.8
F	8 3/4	222.3
G	4 17/32	115.1
H	6 13/16	173.0
J	5 5/8	142.9
K	4 15/32	113.5
L	3 1/4	82.6
M	4	101.6
N	9/32	7.1

Interior/Exterior Food Processing finish is 50 GRIT.

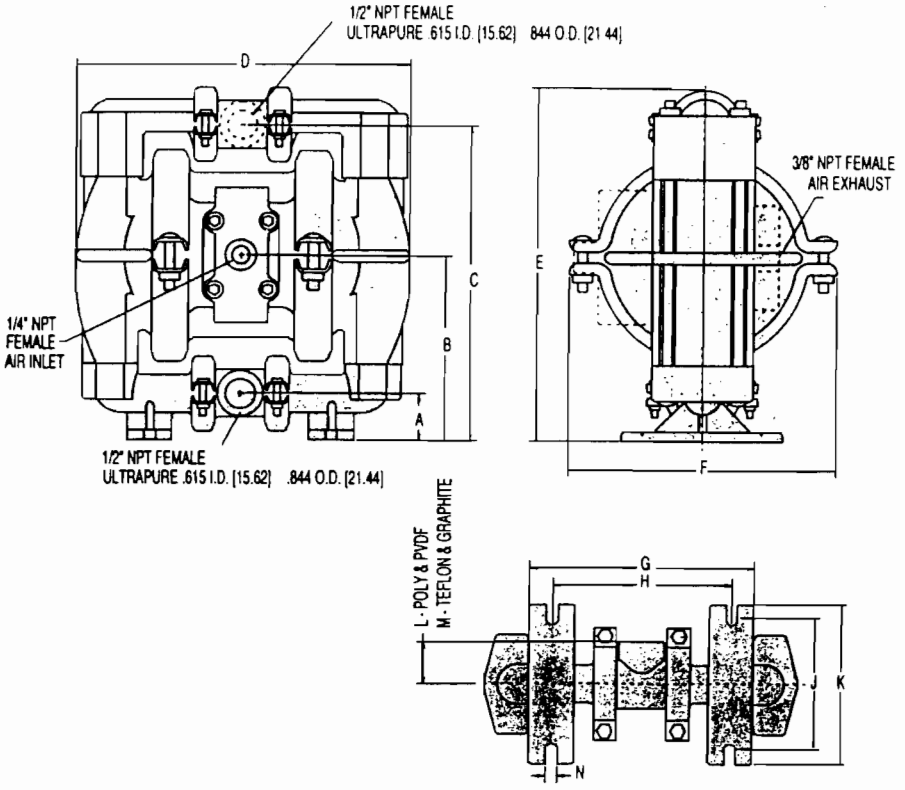
SECTION 1D — DIMENSIONAL DRAWING
MODEL M1 FOOD PROCESSING SOLENOID-OPERATED PUMP



DIMENSIONS – M1 SOLENOID OPERATED (FOOD GRADE)		
ITEM	STANDARD (inch)	METRIC (mm)
A	8 1/32	204.0
B	1 29/32	48.4
C	4 21/32	118.3
D	6 7/8	174.6
E	10 1/32	254.8
F	8 3/4	222.3
G	4 17/32	115.1
H	6 13/16	173.0
J	5 5/8	142.9
K	4 15/32	113.5
L	3 1/4	82.6
M	4	101.6
N	9/32	7.1
P	8 15/32	215.1
R	6 13/32	162.7
S	3 7/32	81.8
T	1 3/4	44.5

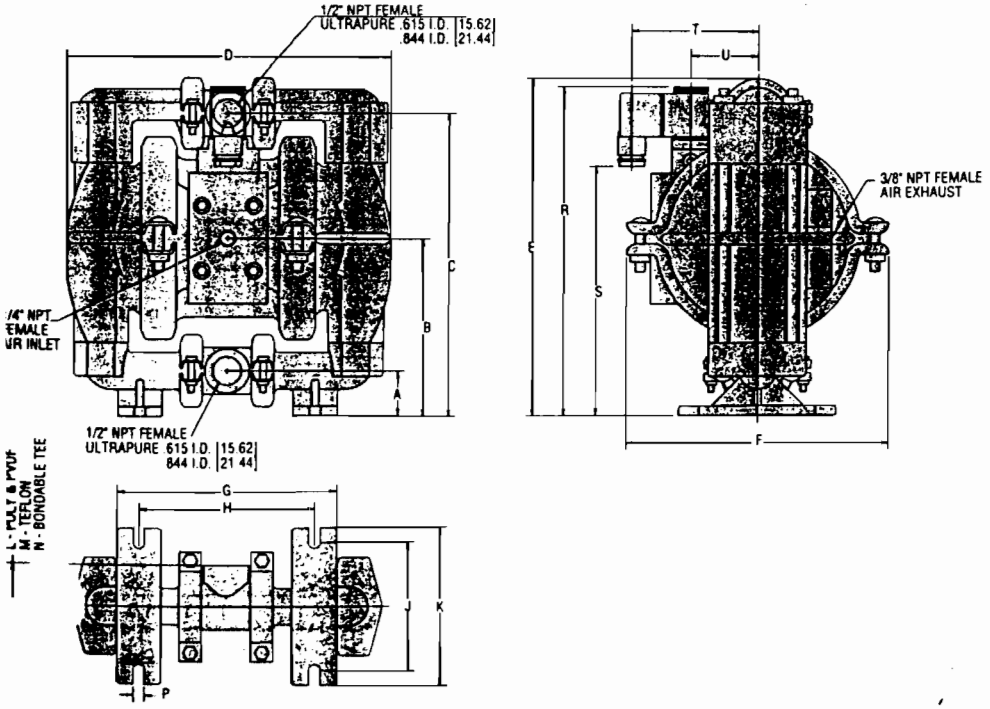
Interior/Exterior Food Processing finish is 50 GRIT.

SECTION 1E — DIMENSIONAL DRAWING
MODEL M1 CHAMP PUMP (Plastic)



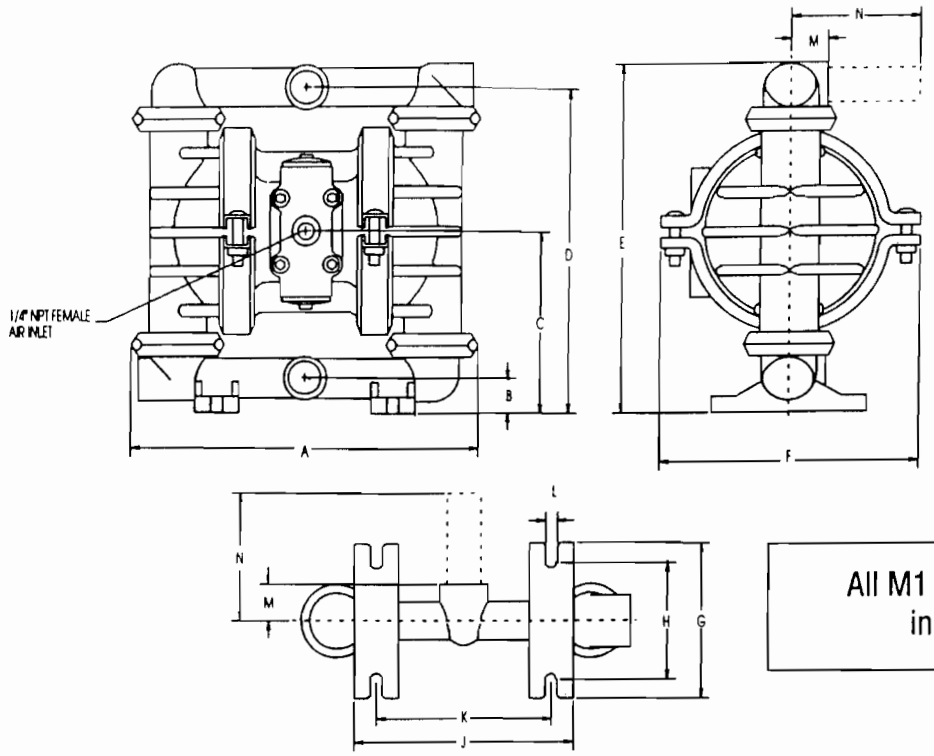
DIMENSIONS – M1 (PLASTIC)		
ITEM	STANDARD (inch)	METRIC (mm)
A	1 5/32	29.3
B	4 1/2	114.2
C	7 11/16	195.3
D	8 3/16	207.8
E	8 5/8	219.1
F	7	177.8
G	5 21/32	143.7
H	4 1/2	114.2
J	3 1/4	82.6
K	4	101.5
L	1 3/32	27.8
M	27/32	21.4
N	9/32	7.1

SECTION 1F — DIMENSIONAL DRAWING
MODEL M1 CHAMP (Plastic)
SOLENOID-OPERATED PUMP



DIMENSIONS – M1 SOLENOID OPERATED (PLASTIC)		
ITEM	STANDARD (inch)	METRIC (mm)
A	1 5/32	29.4
B	4 1/2	114.2
C.	7 11/16	195.3
D	8 3/16	208.0
E	8 5/8	219.1
F	7	177.8
G	5 21/32	143.7
H	4 1/2	114.2
J	3 1/4	82.6
K	4	101.6
L	1 3/32	27.8
M	27/32	21.4
N	3 5/16	83.4
P	9/32	7.1
R	8 3/8	212.7
S	6 5/16	160.3
T	3 7/32	81.8
U	1 3/4	44.5

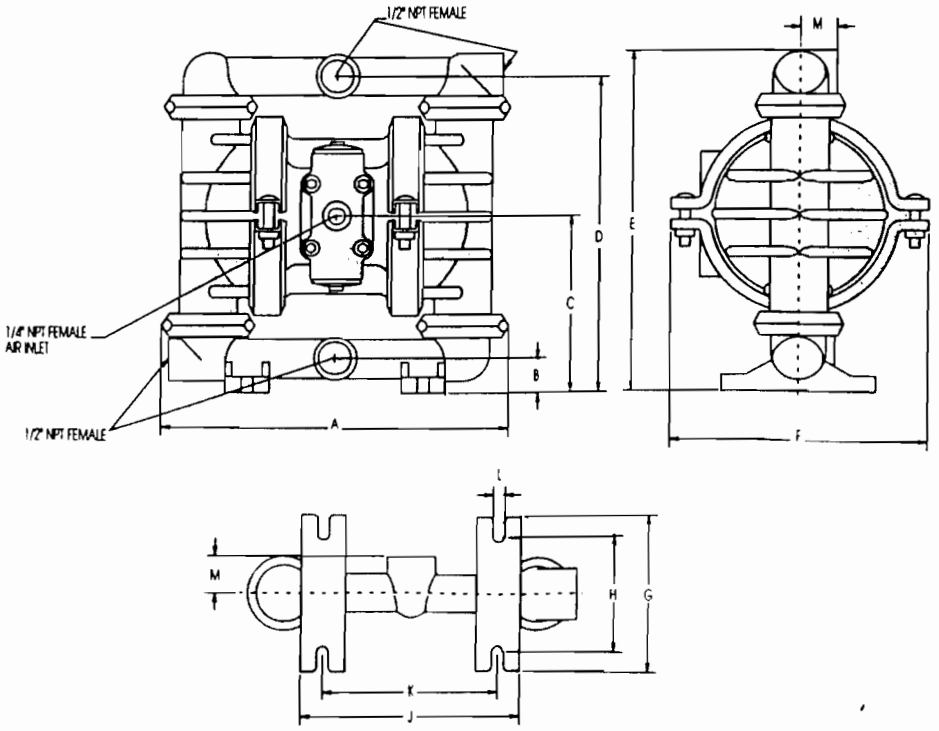
SECTION 1G — DIMENSIONAL DRAWING
MODEL M1 ULTRAPURE III PUMP (Teflon® PFA)



DIMENSIONS – M1 (ULTRAPURE III)		
ITEM	STANDARD (inch)	METRIC (mm)
A	8 7/8	223.6
B	15/16	23.6
C	4 3/4	119.7
D	8 3/8	211
E	9	226.7
F	6 3/4	170.0
G	4	100.8
H	3	75.6
J	5 5/8	141.7
K	4 1/2	113.4
L	1/4	6.3
M	1	25.2
FOR BONDABLE TEE SECTION		
N	3 5/16	83.5

All M1 Ultrapure pumps are assembled in a Class 10,000 cleanroom.

SECTION 1H — DIMENSIONAL DRAWING
MODEL M1 CARBON-FILLED ACETAL



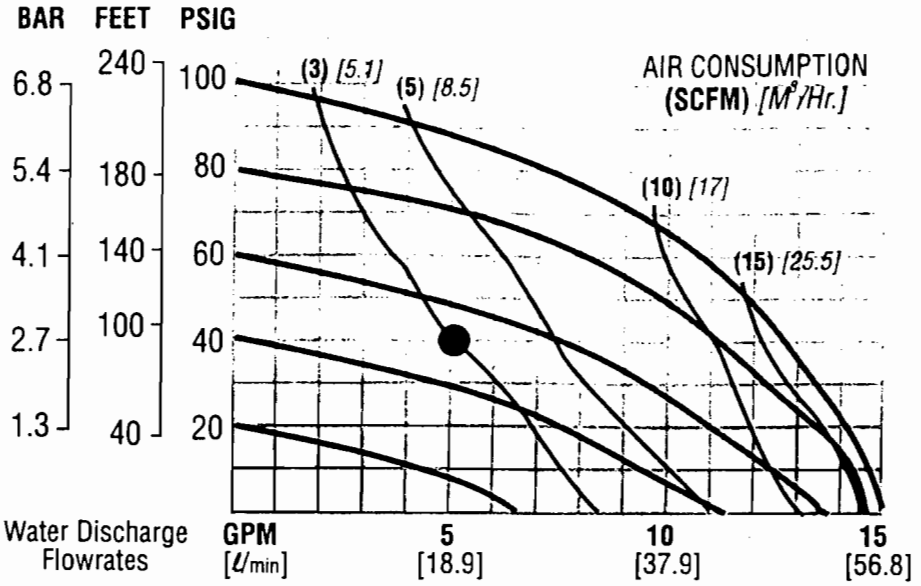
DIMENSIONS – M1 CARBON-FILLED ACETAL (WITH ONE PIECE MANIFOLD)		
ITEM	STANDARD (inch)	METRIC (mm)
A	8 25/32	223.0
B	1	25.4
C	4 21/32	118.3
D	8 1/2	215.9
E	9 3/32	231.0
F	6 3/4	171.4
G	4 1/16	103.2
H	9 3/32	83.3
J	5 3/4	146.0
K	4 9/32	116.7
L	9/32	7.1
M	1	25.4

SECTION 2A — MODEL M1 METAL (Rubber/TPE-Fitted) Pump Performance Curve

Weight.....Aluminum 12 lbs.
Stainless Steel 19.5 lbs.
Air Inlet.....¼" Female NPT
Inlet.....½" Female NPT[1]
Outlet.....½" Female NPT[1]
Suction Lift.....**Rubber 10' Dry**
25' Wet
TPE 7' Dry
25' Wet
Displacement per Stroke.... .026 gal.[2]
Solenoid-operated .016 gal.
Max. Size Solids.....1/16" Dia.

Example: To pump 5 gpm against a discharge pressure of 40 psig requires 50 psig and 3 scfm air consumption. (See dot on chart.)

[1]BSP threads available.
[2]Displacement per stroke calculated at 70 psig air inlet against 30 psig discharge head pressure.



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

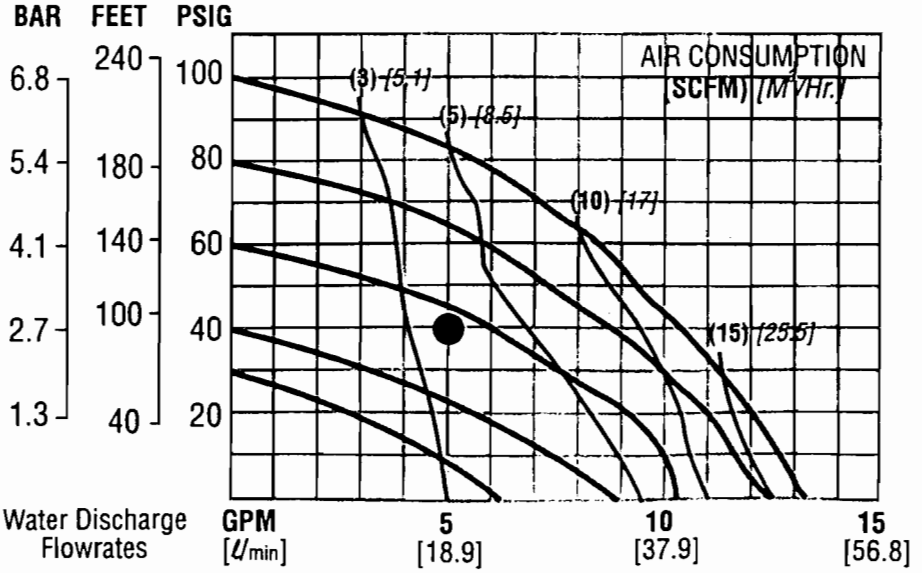
For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 2B — MODEL M1 METAL (Teflon®-Fitted) Pump Performance Curve

Weight.....Aluminum 12 lbs.
Stainless Steel 19.5 lbs.
Air Inlet.....¼" Female NPT
Inlet.....½" Female NPT[1]
Outlet.....½" Female NPT[1]
Suction Lift.....**8' Dry**
25' Wet
Displacement per stroke..... .02 gal.[2]
Solenoid-operated .013 gal.
Max. Size Solids.....1/16" Dia.

Example: To pump 5 gpm against a discharge pressure of 40 psig requires 57 psig and 3.8 scfm air consumption. (See dot on chart.)

[1]BSP threads available.
[2]Displacement per stroke calculated at 70 psig air inlet against 30 psig discharge head pressure.



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

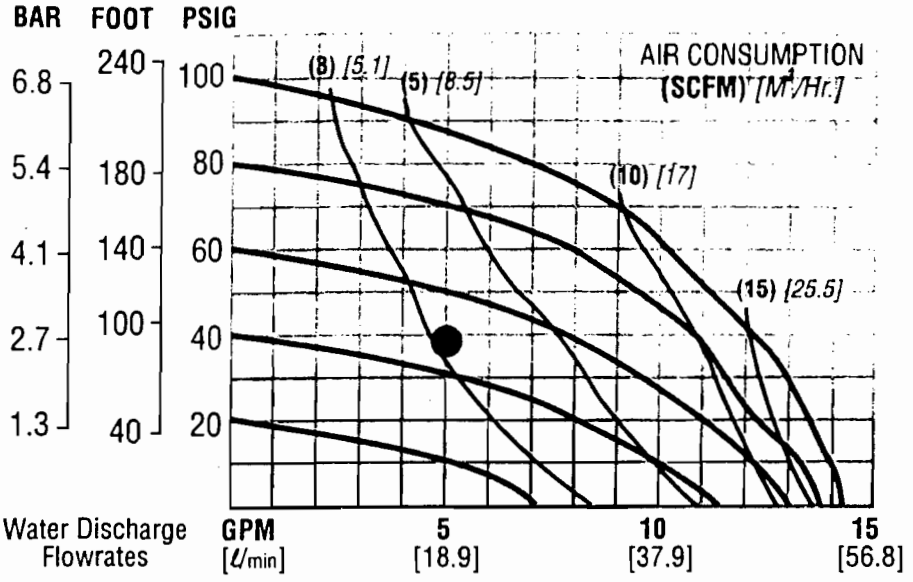
For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 2C — MODEL M1 CHAMP (Rubber/TPE-Fitted) Pump Performance Curve

Weight .....Polypropylene 9.25 lbs.
PVDF 10.75 lbs.
Air Inlet .....¼" Female NPT
Inlet.....½" Female NPT
Outlet .....½" Female NPT
Suction Lift .....**Rubber 10' Dry**
25' Wet
TPE 8'Dry
25' Wet
Displacement per stroke..... .018 gal.[1]
Lube-free .027 gal.[1]
Solenoid-operated .018 gal.[1]
Max. Size Solids .....⅛" Dia.

Example: To pump 5 gpm against a discharge pressure of 40 psig requires 50 psig and 3.2 scfm air consumption. (See dot on chart.)

[1]Displacement per stroke calculated at 70 psig air inlet against 30 psig discharge head pressure.



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

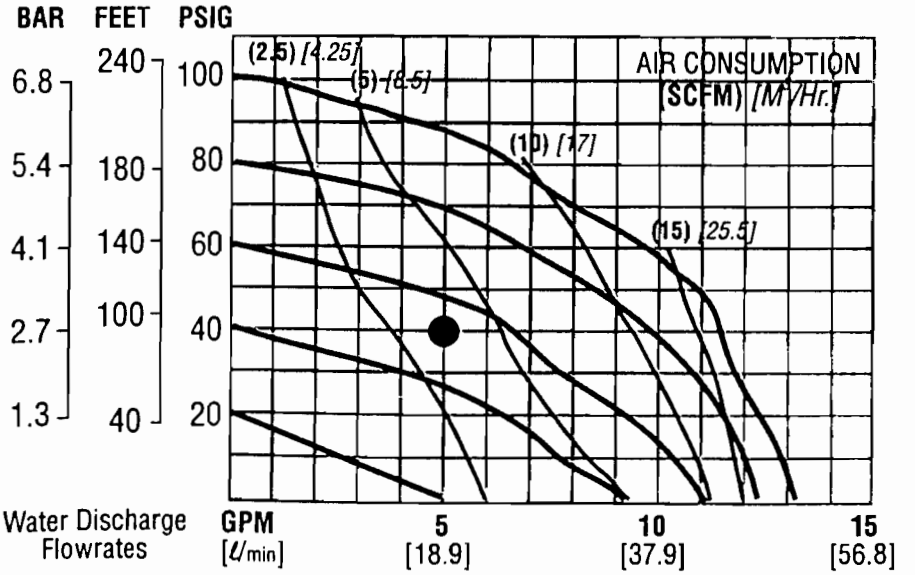
SECTION 2D — MODEL M1 CHAMP (Teflon®-Fitted) Pump Performance Curve

Weight .....Polypropylene 9.25 lbs.
PVDF 10.75 lbs.
Teflon® PFA 11.6 lbs.
Air Inlet .....¼" Female NPT
Inlet.....½" Female NPT
Outlet .....½" Female NPT
Suction Lift.....**7' Dry**[1]
25' Wet
Displacement per stroke..... .015 gal.[2]
Lube-free .021 gal.[2]
Solenoid-operated .014 gal.[2]
Max. Size Solids .....⅛" Dia.

Example: To pump 5 gpm against a discharge pressure of 40 psig requires 52 psig and 3.7 scfm air consumption. (See dot on chart.)

[1]M1 pumps with wetted construction of Teflon® and Teflon® valve seats have a dry suction lift of 6'.

[2]Displacement per stroke calculated at 70 psig air inlet against 30 psig discharge head pressure.



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 3A

INSTALLATION — M1 AIR-OPERATED PUMPS

The Model M1 has a 1/2" inlet and 1/2" outlet and is designed for flows to 14 gpm. The **M1 Metal** pump is manufactured with wetted parts of aluminum or stainless steel. The center section of the **M1 Metal** pump is of nylon construction. The **M1 Champ** pump is manufactured with wetted parts of PVDF, polypropylene, graphite-filled polypropylene, or Teflon® PFA. The center section of the **M1 Champ** is constructed of polypropylene or carbon-filled Acetal. Two types of air distribution systems are available: *LUBED AND LUBE-FREE*. The Lubed air distribution system consists of a brass air valve body, aluminum air valve piston, Buna-N O-rings and a bronze center section bushing. The LUBE-FREE air distribution system is constructed solely of high-tech, engineered thermoplastics which function together without lubrication. The encircled letters "LF" stamped on the top of the pump's center section denotes that the pump is LUBE-FREE. The lube-free air valve body is off-white in color and also has "LF" molded into the valve body. A variety of diaphragms, valve balls, valve seats, and O-rings are available to satisfy temperature, chemical compatibility, abrasion and flex concerns.

The suction pipe size should be at least 1/2" diameter or larger if highly viscous material is being pumped. The suction hose must be non-collapsible, reinforced type as the M1 is capable of pulling a high vacuum. Discharge piping should be at least 1/2"; larger diameter can be used to reduce friction losses. It is critical that all fittings and connections are airtight - a reduction or loss of pump suction capability will result.

The M1 can be used in submersible applications only when both wetted and non-wetted portions are compatible with the material being pumped. If the pump is to be used in a submersible application, a hose should be attached to the pump's air exhaust and the exhaust air piped above the liquid level.

If the pump is to be used in a self-priming application, be sure that all connections are airtight and that the suction lift is within the pump's ability. Note: Materials of construction and elastomer material have an effect on suction lift parameters. Please refer to pump performance data.

Pumps in service with a positive suction head are most efficient when inlet pressure is limited to 7–10 psig. Premature diaphragm failure may occur if positive suction is 11 psig and higher.

THE MODEL M1 WILL PASS 1/16" SOLIDS. WHENEVER THE POSSIBILITY EXISTS THAT LARGER SOLID OBJECTS MAY BE SUCKED INTO THE PUMP, A STRAINER SHOULD BE USED ON THE SUCTION LINE.

CAUTION: DO NOT EXCEED 125 PSIG AIR SUPPLY PRESSURE.

BLOW OUT AIR LINE FOR 10 TO 20 SECONDS BEFORE ATTACHING TO PUMP TO MAKE SURE ALL PIPE LINE DEBRIS IS CLEAR. ALWAYS USE AN IN-LINE AIR FILTER.

SECTION 3B

INSTALLATION — M1 SOLENOID-OPERATED PUMPS

The solenoid-operated Model M1 has a ½" inlet and ½" outlet and is designed for flows to 8.5 gpm. This maximum flow rate was calculated at 550 strokes per minute with 100 psig air inlet against 0 psig discharge head. The **M1 Champ** pump is manufactured with wetted parts of pure, unpigmented PVDF, polypropylene or Teflon® PFA. The center section of the **M1 Champ** is constructed of polypropylene. The **M1 Metal** pump is manufactured with wetted parts of aluminum or 316 stainless steel. The center section of the **M1 Metal** pump is of nylon construction. A variety of diaphragms, valve balls, and O-rings are available to satisfy temperature, chemical compatibility, abrasion and flex concerns.

In the solenoid-operated pump models, the standard air valve is replaced with a two position, four-way solenoid valve that has a single operator and spring return.

When the solenoid is unpowered, one air chamber is pressurized with air, while the opposite chamber is exhausted. When electric power is applied, the solenoid shifts, and the pressurized air chamber is exhausted while the opposite chamber is pressurized. By alternately applying and removing power, the solenoid-operated pump runs like a standard Wilden pump.

The speed of the pump is controlled electrically. Since each stroke is controlled by an electrical signal, the pump is ideal for batching and other electrically controlled dispensing applications.

Although the speed of the pump is controlled electrically, the air pressure is important. Air pressure displaces the fluid, and if the pressure is insufficient to complete the physical stroke before an electronic impulse signals the pump to shift, the stroke will not be completed, and the displacement per stroke will be reduced. This does not harm the unit in any way, but it may cause inaccuracy when attempting to batch specific quantities with high precision.

The suction pipe size should be at least ½" diameter or larger if highly viscous material is being pumped. The suction hose must be non-collapsible, reinforced type as the M1 is capable of pulling a high vacuum. Discharge piping should be at least ½"; larger diameter can be used to reduce friction losses. It is critical that all fittings and connections are airtight or a reduction or loss of pump suction capability will result.

All wiring used to operate the pump should be placed and connected according to the proper electrical codes. It is important that the wiring is of adequate gauge to carry the current required to operate the pump. In addition, it is necessary that the electrical power supply is large enough to supply the current required to operate the pump. Wiring should be above ground level if possible (in case of fluid spill or leakage), and all wiring and connections which could become wet or damp should be made watertight.

If the pump is to be used in a self-priming application, be sure that all connections are airtight and that the suction lift is within the pump's ability. Note: Materials of construction and elastomer material have an effect on suction lift parameters. Please refer to pump performance data.

Pumps in service with a positive suction head are most efficient when inlet pressure is limited to 7–10 psig. Premature diaphragm failure may occur if positive suction head is 11 psig and higher.

The solenoid valve is rated for continuous duty; however, stopping on an even number stroke count insures that the electrical power is off when pump is stopped. This practice is safer and also eliminates unwanted strokes when the system is shut down and electrical power is off.

THE MODEL M1 WILL PASS 1/16" SOLIDS. WHENEVER THE POSSIBILITY EXISTS THAT LARGER SOLID OBJECTS MAY BE SUCKED INTO THE PUMP, A STRAINER SHOULD BE USED ON THE SUCTION LINE.

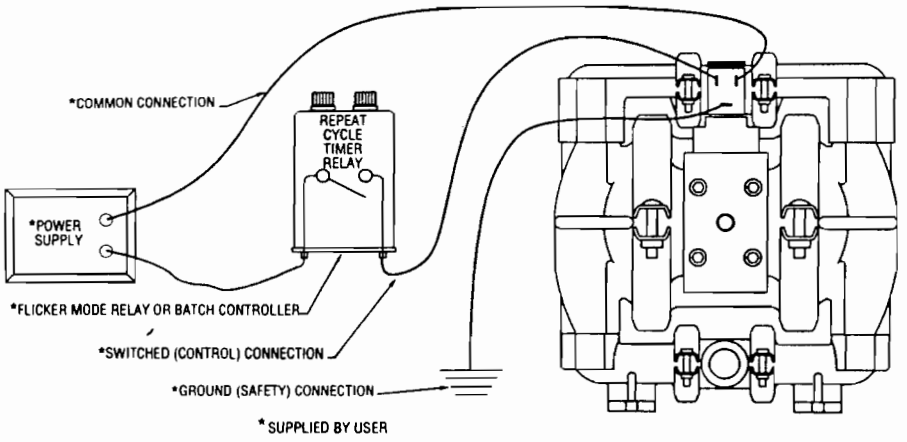
CAUTION: DO NOT EXCEED 125 PSIG AIR SUPPLY PRESSURE.

BLOW OUT AIR LINE FOR 10 TO 20 SECONDS BEFORE ATTACHING TO PUMP TO MAKE SURE ALL PIPE LINE DEBRIS IS CLEAR. ALWAYS USE AN IN-LINE AIR FILTER.

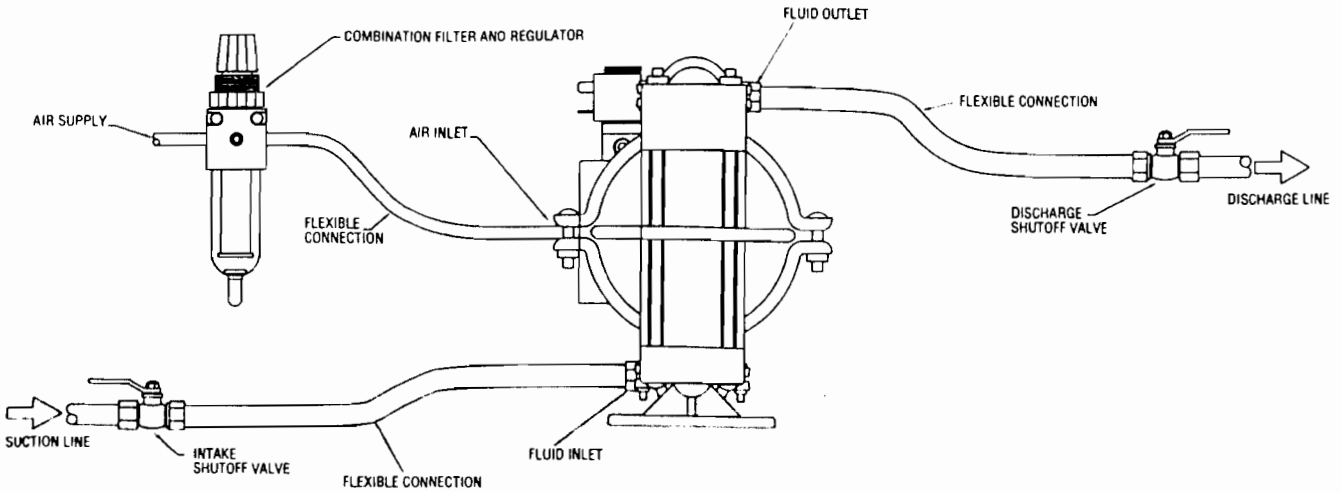
WARNING: The solenoid valve should not be used in an area where explosion proof equipment is required unless Nema 7 valve is specified.

There are three coil options available in both Nema 4 and Nema 7 ratings. One coil allows for 110V AC operation, one allows for 24V DC operation, and the third allows for either 24V AC or 12V DC operation.

ELECTRICAL CONNECTIONS



PLUMBING CONNECTIONS



SECTION 3C

WILDEN SOLENOID-OPERATED PUMPS

QUICK REFERENCE

	M1 PLASTIC		M1 METAL	
SPECIFICATIONS	**RUBBER**	**TEFLON**	**RUBBER**	**TEFLON**
Maximum Flow Rate at 0 Head	7.5 gpm	7 gpm	8 gpm	7.4 gpm
# of Strokes per Minute @ Maximum Flow[1]	600	600	600	600
Maximum Air Pressure	125 psi	125 psi	125 psi	125 psi
Minimum Air Pressure Required	45 psi	45 psi	45 psi	45 psi
Displacement per Stroke[2]	.018 gal.	.014 gal.	.016 gal.	.013 gal.
Air Inlet Size (Female NPT)	1/4"	1/4"	1/4"	1/4"
Dry Suction Lift	10'	7'	10'	8'
Wet Suction Lift	25'	25'	25'	25'
Lubrication (Pre-Lube)	Buna Compatible NLGI Grade 2 Grease			
Inner Piston P/N	01-3710-01-150	01-3710-01-150	01-3710-01-150	01-3710-01-150
Terminal Connector P/N	00-2130-99	00-2130-99	00-2130-99	00-2130-99

[1]Maximum flow based on full stroke completion.
[2]Displacement per stroke is dynamic. Above figures were calculated with 70 psi air pressure against 30 psi discharge head at 200 strokes per minute.

ELECTRICAL INFORMATION

VOLTAGE	PART NUMBER	RATING	AMPS (INRUSH)	AMPS (HOLDING)	RESISTIVITY (OHMS)
24V DC	00-2110-99-150	NEMA 4	.25	.25	96
24V DC	00-2110-99-154	NEMA 7	.25	.25	25
24V DC[5]	00-2110-99-157	—	.135	.135	177
12V DC	00-2110-99-151	NEMA 4	.445	.445	26
12V DC	00-2110-99-153	NEMA 7	.445	.445	26
24V AC[3]	00-2110-99-151	NEMA 4	.445	.34	26
24V AC[3]	00-2110-99-153	NEMA 7	.445	.34	26
110V AC[4]	00-2110-99-155	NEMA 4	.25	.166	156
110V AC[4]	00-2110-99-156	NEMA 7	.25	.166	156

[3]24 Volts @ 60 Hz., 22 Volts @ 50 Hz.
[4]120 Volts @ 60 Hz., 110 Volts @ 50 Hz.
[5]Meets European standards and regulations, Cenelec/PTB file # EX-91.C.2027

SECTION 3D

INSTALLATION — MODEL M1 ULTRAPURE III AND CARBON-FILLED ACETAL

The M1 Ultrapure III was engineered in response to your request for a reliable, lube-free, sealless pump constructed of the purest materials available to industry. The M1 carbon-filled Acetal was engineered in response to your request for a reliable, lube-free, sealless pump constructed of conductive and solvent compatible materials available to industry. The UPIII utilizes specially engineered "wrap-around" clamp bands apply uniform pressure to all sealing surfaces. The Wil-Seal™ O-ring design which utilizes inboard and outboard O-rings increase sealing capability. The LUBE-FREE air valve constructed solely of plastic composites in conjunction with a newly designed center section, enhances reliability and pump performance. These selected plastic composites have the ability to function together without lubrication, which reduces contamination and fugitive emissions via the air exhaust port.

The suction pipe size should be at least ½" diameter or larger if highly viscous matreial is being pumped. The suction hose must be non-collapsible, reinforced type as the M1 is capable of pulling a high vacuum. Discharge piping should be at least ½"; larger diameter can be used to reduce friction losses. It is critical that all fittings and connections are air-tight or a reduction or loss of pump suction capability will result. The carbon-filled acetal pump employs a one-piece manifold allowing for a variety of plumbing options. Simply plug the unused port of each manifold.

The M1 can be used in submersible applications only when both wetted and non-wetted portions are compatible with the material being pumped. If the pump is to be used in a submersible application, a hose should be attached to the pump's air exhaust and the exhaust air piped above the liquid level.

If the pump is to be used in a self-priming application, be sure that all connections are airtight and that the suction lift is within the pump's ability. The M1 Ultrapure III has a dry suction lift of 6 feet.

Pumps in service with a positive suction head are most efficient when inlet pressure is limited to 7–10 psig. Premature diaphragm failure may occur if positive suction is 11 psig and higher.

THE MODEL M1 WILL PASS 1/16" SOLIDS. WHENEVER THE POSSIBILITY EXISTS THAT LARGER SOLID OBJECTS MAY BE SUCKED INTO THE PUMP, A STRAINER SHOULD BE USED ON THE SUCTION LINE.

CAUTION: DO NOT EXCEED 125 PSIG AIR SUPPLY PRESSURE.

BLOW OUT AIR LINE FOR 10 TO 20 SECONDS BEFORE ATTACHING TO PUMP TO MAKE SURE ALL PIPE LINE DEBRIS IS CLEAR. ALWAYS USE AN IN-LINE AIR FILTER.

TEMPERATURE LIMITS:
Ultrapure II & III +40°F to +200°F (4.4°C to 148.9°C)

SECTION 4

SUGGESTED OPERATION AND MAINTENANCE INSTRUCTIONS — AIR-OPERATED M1 PUMPS

INSTALLATION: Months of careful planning, study, and selection efforts can result in unsatisfactory pump performance if installation details are left to chance.

Premature failure and long term dissatisfaction can be avoided if reasonable care is exercised throughout the installation process.

LOCATION: Noise, safety, and other logistical factors usually dictate that "utility" equipment be situated away from the production floor. Multiple installations with conflicting requirements can result in congestion of utility areas, leaving few choices for siting of additional pumps.

Within the framework of these and other existing conditions, every pump should be located in such a way that four key factors are balanced against each other to maximum advantage.

1. ACCESS: First of all, the location should be accessible. If it's easy to reach the pump, maintenance personnel will have an easier time carrying out routine inspections and adjustments. Should major repairs become necessary, ease of access can play a key role in speeding the repair process and reducing total downtime.

2. AIR SUPPLY: Every pump location should have an air line large enough to supply the volume of air necessary to achieve the desired pumping rate (see pump performance chart). Use air pressure up to a maximum of 125 psi depending upon pumping requirements.The use of an air filter before the pump will ensure that the majority of any pipeline contaminants will be eliminated.

FOR LUBED PUMPS: For best results, the pumps should use an air filter, regulator, and lubricator system. The use of a lubricant, suitable for the application, helps perform a number of functions. Lubricants reduce friction to minimize required shifting forces and reduce wear. Lubricants provide a protective coating against some forms of corrosion and contaminants. **Wilden suggests a hydraulic oil with arctic characteristics (ISO 15-5Wt.) This oil is chemically compatible with the center block O-rings and has a low pour point to guard against problems associated with low temperatures.** The amount of lubrication required is directly related to the amount of oil introduced from the factory air system. We therefore suggest that the lowest setting on the lubricator be utilized and then increased as necessary.

FOR LUBE-FREE PUMPS: For best results, the pump should use an air filter and regulator. Lube-free pump models do not require lubrication during assembly or while in operation. Pump discharge rate can be controlled by limiting the volume and/or pressure of the air supply to the pump. The use of a needle valve installed at the air inlet to the pump is suggested for this purpose. Pump discharge rate can also be controlled by throttling the pump discharge by installing a valve in the discharge line of the pump when the need to control the pump from a remote location exists. When the pump discharge pressure equals or exceeds the air supply pressure, the pump will stall out; no bypass or pressure relief valve is needed, and pump damage will not occur. When operation is controlled by a solenoid valve in the air line, a three-way valve should be used. Pumping volume can be set by counting the number of strokes per minute.

A muffler installed on the pump's air exhaust will give quiet exhaust. Sound levels are reduced below OSHA specifications using a Wilden muffler.

FOR SOLENOID PUMPS: For best results, the pumps should use an air filter and a regulator. The use of an air filter before the pump inlet will ensure that the majority of pipeline contaminants will be eliminated. The solenoid operated pump is permanently lubricated during assembly, and requires no additional lubrication under normal operation. If the unit runs under extreme conditions (continuous operation at high speeds), it may be necessary to relubricate center block with a **buna compatible NLGI Grade 2 grease** every 50 million cycles. Continuous lubrication with a compatible oil is not harmful, and will provide longer seal life, but it may flush all grease out of the unit.

Pump discharge rate is controlled electrically by varying the rate of alternation of the stroke signals. The pump will continue to shift if the liquid discharge line is closed, however no media will be pumped. This will not harm the pump in any way, but it is wasteful of the pressurized air. The pump will not shift until the air inlet pressure exceeds the minimum supply pressure requirement of approximately 40 psig. A minimum of 45 psi is recommended to ensure reliable operation.

A muffler can be installed to reduce the amount of noise generated by the pump. Use of the specified Wilden muffler will reduce noise levels below OSHA specifications.

3. ELEVATION: Selecting a site that is well within the pump's suction lift capability will assure that loss-of-prime troubles will be eliminated. In addition, pump efficiency can be adversely affected if proper attention is not given to elevation (see pump performance chart).

4. PIPING: Final determination of the pump site should not be made until the piping problems of each possible location have been evaluated. The impact of current and future installations should be considered ahead of time to make sure that inadvertent restrictions are not created for any remaining sites.

The best choice possible will be site involving the shortest and the straightest hook-up of suction and discharge piping. Unnecessary elbows, bends, and fittings should be avoided. Pipe sizes should be selected so as to keep friction losses within practical limits. All piping should be supported independently of the pump. In addition, it should line up without placing stress on the pump fittings.

Expansion joints can be installed to aid in absorbing the forces created by the natural reciprocating action of the pump. If the pump is to be bolted down to a solid foundation, a mounting pad placed between the pump and foundation will assist in minimizing pump vibration. Flexible connections between the pump and rigid piping will also assist in minimizing pump vibration. If quick-closing valves are installed at any point in the discharge system, or if pulsation within a system becomes a problem, a surge suppressor should be installed to protect the pump, piping and gauges from surges and water hammer.

When pumps are installed in applications involving flooded suction or suction head pressures, a gate valve should be installed in the suction line to permit closing of the line for pump service.

INSPECTIONS: Periodic inspections have been found to offer the best means for preventing unscheduled pump downtime.

Individuals responsible for checking and maintaining lubrication levels in the pumps should also check for any abnormal noise or leakage. Personnel familiar with the pumps' construction and service should be informed of any abnormalities that are detected.

RECORDS: When service is required, a record should be made of all necessary repairs and replacements. Over a period of time, such records can become a valuable tool for predicting and preventing future maintenance problems and unscheduled downtime. In addition, accurate records make it possible to identify pumps that are poorly suited to their applications.

SECTION 5A
TROUBLESHOOTING — AIR-OPERATED M1 PUMPS

Pump will not run or runs slowly.

1. Check air inlet screen and air filter for debris.
2. Check for sticking air valve, flush air valve in solvent.
3. Check for worn out air valve. If piston face in air valve is shiny instead of dull, air valve is probably worn beyond working tolerances and must be replaced.
4. Check center block O-rings. If worn excessively, they will not seal and air will simply flow through pump and out air exhaust. Use only Wilden O-rings as they are of special construction and ISO 15-5 wt oil with arctic characteristics.
5. Check for rotating piston in air valve.
6. Check for over-torquing of air valve (lube-free only). Over-torquing may cause air valve piston to stick.

Pump runs but little or no product flows.

1. Check for pump cavitation; slow pump speed down to match thickness of material being pumped.
2. Check for sticking ball checks. If material being pumped is not compatible with pump elastomers, swelling may occur. Replace ball check valves and O-ring with the proper elastomers.
3. Check to make sure all suction connections are air tight, especially clamp bands around intake balls.

Pump air valve freezes.

Check for excessive moisture in compressed air. Either install dryer or hot air generator for compressed air.

Air bubbles in pump discharge.

1. Check for ruptured diaphragm.
2. Check tightness of clamp bands, and the integrity of the O-rings, especially at intake manifold.

Product comes out air exhaust.

1. Check for diaphragm rupture.
2. Check tightness of piston plates to shaft.

Pump rattles.

1. See RBG E9 Troubleshooting Guide.
2. Create false discharge head or suction lift.

SECTION 5B
TROUBLESHOOTING — SOLENOID-OPERATED M1 PUMPS

Pump will not run.

1. Check for pressurized air at the inlet. (Min. 45 psig.)
2. Check air inlet and filter for debris.
3. Connect a test lamp to the two wires which run to pump and ensure that the lamp cycles on and off.
4. Make sure that the air valve manual override (small red knob on front of valve) is switched to the "0" position.
5. Check pilot pressure vent at the top of the operator/coil assembly to ensure that it is not clogged.
6. Check for a worn out air valve. If air continually blows out the exhaust in very large quantities, the air valve seals may be worn beyond their ability to function. In this case, the valve must be replaced.

NOTE: Before the valve is scrapped, it is possible that it may be saved by completely disassembling the valve, cleaning all components and relubricating the valve.

Pump runs but little or no fluid comes out.

1. Check that the discharge isolation valve is not closed.
2. Check that the electronic signal is slow enough that the pump is able to complete each physical stroke before it is signaled to change direction. The time required to complete the stroke is determined by a variety of factors which include fluid viscosity and head pressure. The shaft can be viewed if the muffler is removed to verify that the pump is stroking.
3. Check for pump cavitation; slow pump speed down to match the thickness of the material being pumped.
4. Check for sticking ball check valves. If the material being pumped is not compatible with the pump elastomers, swelling may occur. Replace ball check valves and O-ring with the proper elastomers.
5. Check to make sure that all suction connections are air tight, and that the clamp bands are properly tightened.

Pump air passages blocked with ice.

Check for excessive moisture in compressed air line. As the air expands out the exhaust during the operation of the pump, water vapor entrapped in the compressed air can freeze and block the air passageways in the pump. If this occurs, it may be necessary to install a coalescing filter, an air dryer, or a hot air generator for the compressed air.

Air bubbles in pump discharge.

1. Check for ruptured diaphragm.
2. Check tightness of clamp bands, and the integrity of the O-rings, especially at intake manifold.

Product comes out of the air exhaust.

1. Check for diaphragm rupture.
2. Check tightness of piston plates to shaft.

Pump rattles.

1. See RBG E9 Troubleshooting Guide.
2. Create false discharge head or suction lift.

SECTION 6A

DIRECTIONS FOR DISASSEMBLY/REASSEMBLY
AIR-OPERATED AND SOLENOID-OPERATED M1 METAL AND M1 CHAMP (PLASTIC)

CAUTION: Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container.

The Wilden® M1 has a 1/2" inlet and a 1/2" outlet and is designed for flows up to 14 gpm. The single-piece center section, consisting of center block and air chambers, is molded from glass-filled polypropylene or graphite-filled Acetal on the Champ and nylon on the Metal pump. All fasteners and hardware are stainless steel and the air valve is manufactured of brass or high-tech, engineered thermoplastics. All O-rings used in the pump are of a special material and shore hardness which should only be replaced with factory-supplied parts.

Tools required to perform maintenance on the Model M1 pumps are 3/16 inch Allen wrench, 7/16 inch, 5/16 inch, and 3/8 inch wrenches, two open end adjustable wrenches, and an O-ring pick.

PLEASE read all directions before starting disassembly.

NOTE: The following directions for disassembly and reassembly pertain to both metal and plastic constructed Wilden pumps. There are a few differences which are discussed in the text.The procedures for the solenoid-operated M1 are the same except for the air distribution system.

DISASSEMBLY

Step 1.

Before actual disassembly is started, turn pump upside down and drain all liquid trapped in the pump into a suitable container. Be sure to use proper caution if liquid is corrosive or toxic. Mark each liquid chamber to its respective air chamber for easy alignment during reassembly.

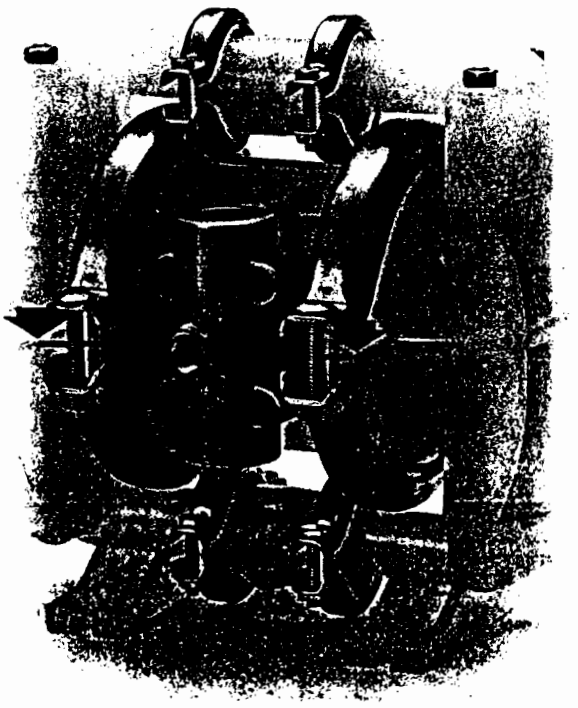


Figure 1

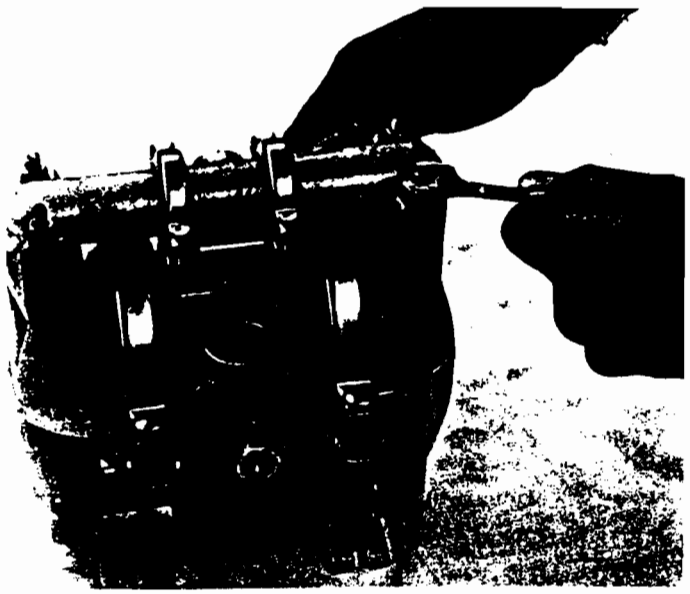


Figure 2

Start by removing the nuts from the four long bolts that hold the top and bottom manifold to the center section.

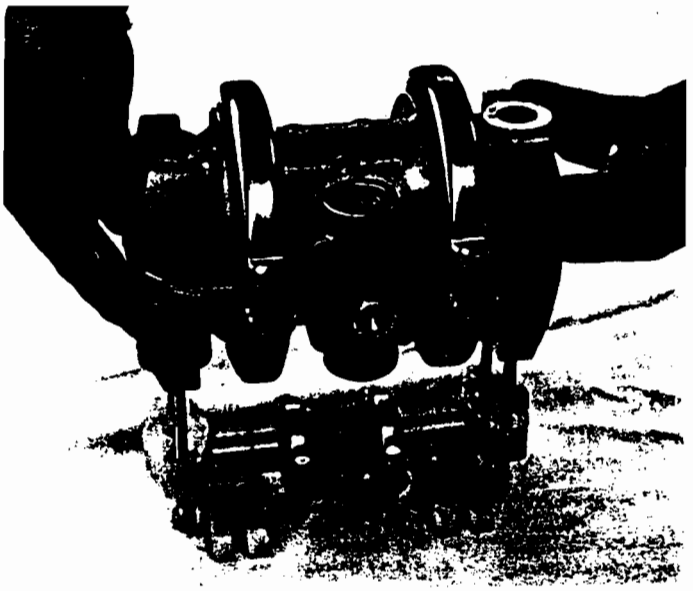
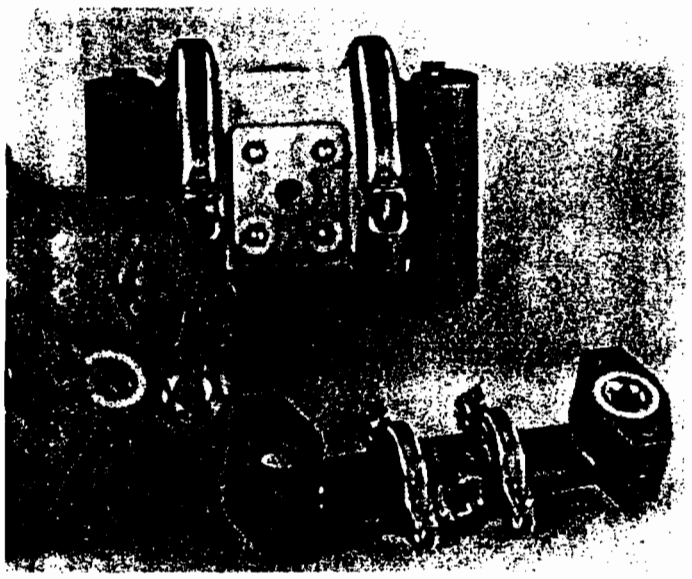
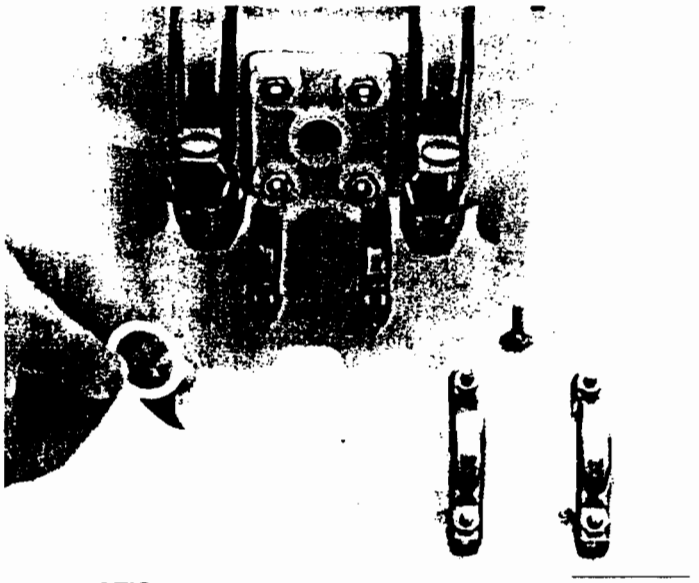


Figure 3

Remove the top manifold and lift the center section off the inlet manifold.



M1 METAL *Figure 4A*



M1 PLASTIC *Figure 4B*

Step 2.

Set the center section aside and inspect the discharge manifold. The discharge valve ball, seat, and sealing O-rings should now be inspected for wear and chemical attack. If the ball is round and not deeply scratched, it is still serviceable. Inspect the seat area where the ball valve rests. It should be smooth with no cuts. If this area is damaged, poor vacuum will result.

METAL PUMPS are constructed with a single valve seat O-ring configuration. Solid Teflon® PTFE O-rings are utilized when pump is Teflon®-fitted. These Teflon® O-rings should be replaced when reassembled. *(Figure 4A.)*

PLASTIC PUMPS are constructed with a double valve seat O-ring configuration. Teflon® encapsulated O-rings are utiilized when pump is Teflon®-fitted. These O-rings may be reused. *(Figure 4B.)*

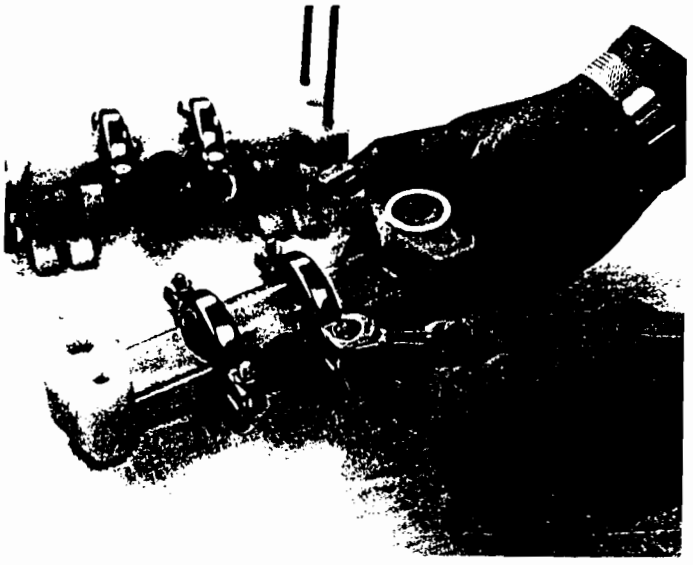


Figure 5

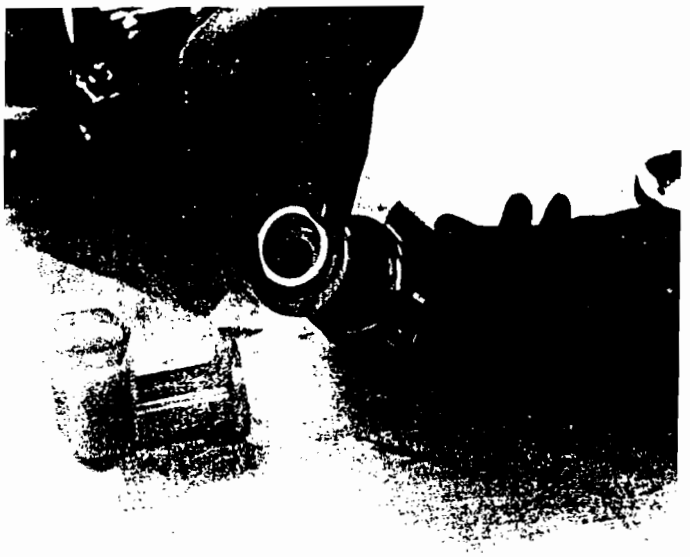
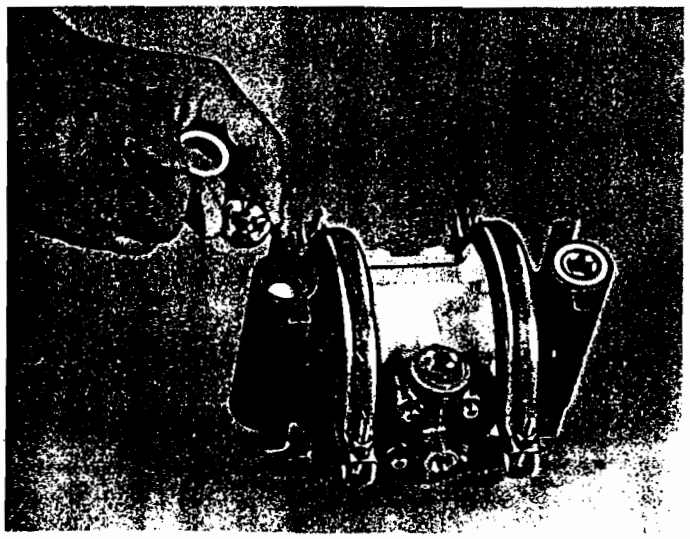


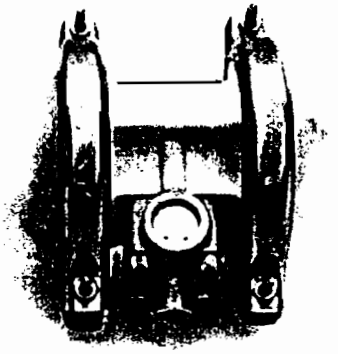
Figure 5A

Step 3.

Normally the inlet or discharge manifold should not be disassembled during pump maintenance or repair. However, if this is necessary, or if the angle of the discharge or inlet opening needs to be changed, the clamp bands should be completely removed and the band itself should be disassembled. Taking the bands apart is necessary to simplify manifold reassembly. Set the manifold and bands aside.



M1 METAL *Figure 6A*



M1 PLASTIC *Figure 6B*

Step 4.

Turn the pump center section upside down and remove and inspect the inlet valve balls, seats, and sealing O-rings. If damage is apparent, or swelling or cracking of the valve balls is observed, these parts should be replaced upon pump reassembly.

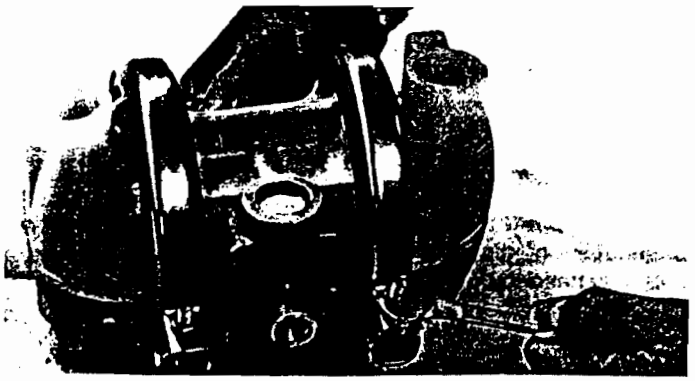


Figure 7

Use a 7/16-inch wrench to remove the clamp bands that hold the liquid chambers to the one-piece center section.

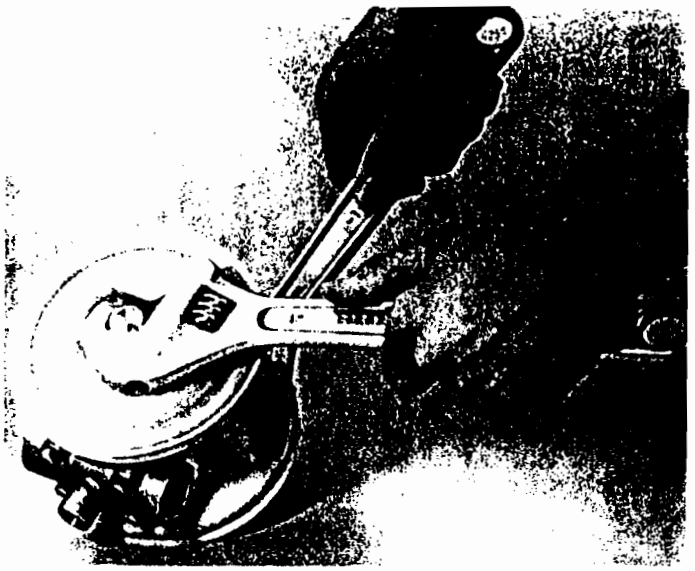


Figure 8A

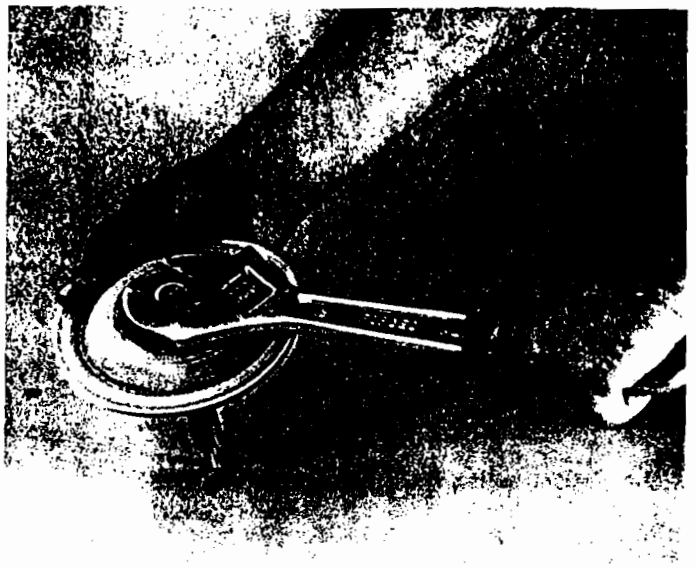


Figure 8B

Step 5.

Use the two adjustable wrenches to loosen the diaphragm piston plate from the connecting shaft. Only one piston plate will loosen. Remove it and the diaphragm. Remove the shaft and attached diaphragm from the center block. To remove the diaphragm from the shaft, hold the outer rim of the diaphragm and loosen the diaphragm piston plate with the adjustable wrench. If the plate will not loosen, the shaft must be placed in a vise. **Protect the shaft from damage by using wood blocks or soft jaws in the vise.** The plate can now be easily removed with the adjustable wrench.

At this point of disassembly, all wetted parts of the pump are available for inspection or repair.

If inspection, and/or servicing, of the non-wetted air section is necessary, please see Section 2.

REASSEMBLY

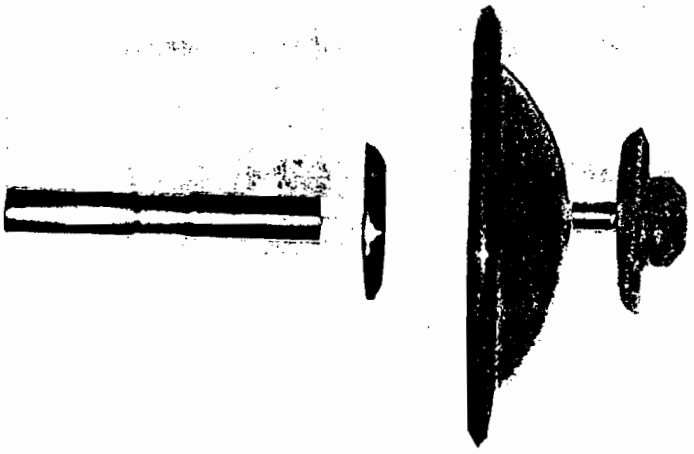


Figure 9A

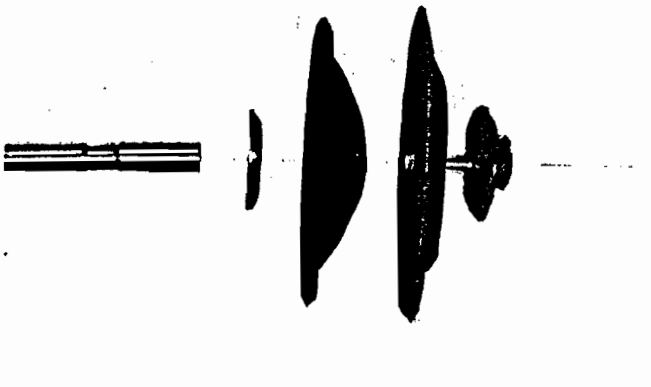


Figure 9B

Step 1.

First, install diaphragm and inner and outer piston on shaft. Observe **this side out** markings on diaphragm. Hand tighten only at this time, the outer piston to the shaft. Note: Pumps equipped with Teflon® diaphragms require that back-up diaphragm (P/N 01-1060-51) be used. See *Figure 9B.* O-rings and/or slipper seals may need to be replaced.

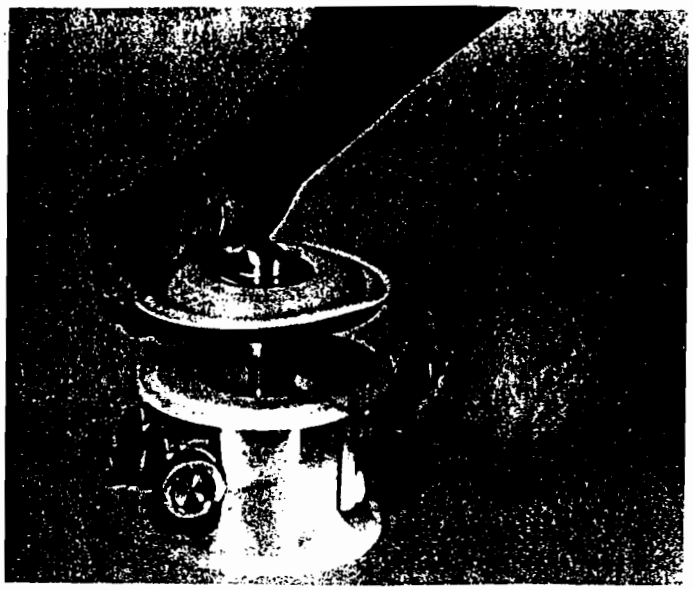


Figure 10A

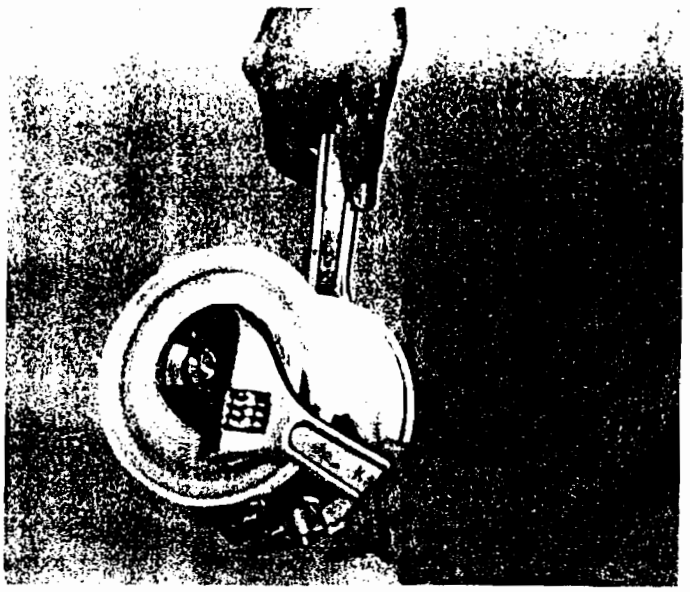


Figure 10B

Step 2.

Insert the shaft through the center block bushing. Install the opposite outer piston, diaphragm(s) and inner piston and tighten to the required torque specifications* (Item #2). **NOTE:** For lubed models, Wilden suggests an oil with arctic characteristics (ISO 15-5 wt.) to lubricate bushing prior to inserting shaft. Lube-free models do not require any lubrication during assembly or while in operation.

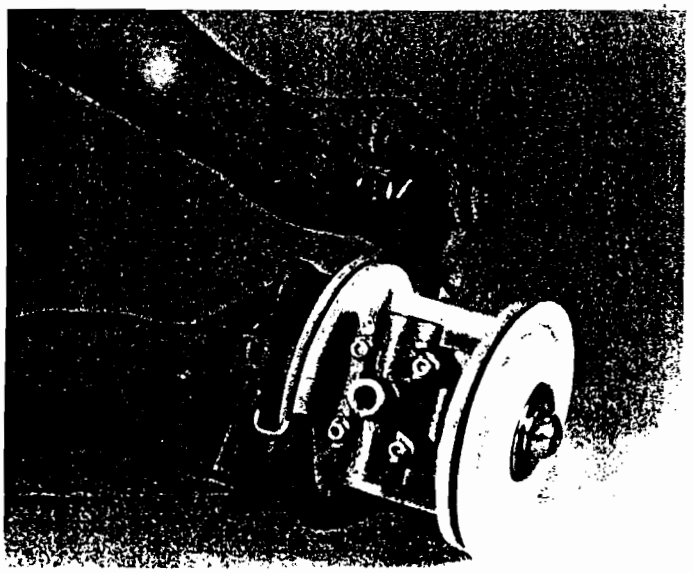


Figure 11A

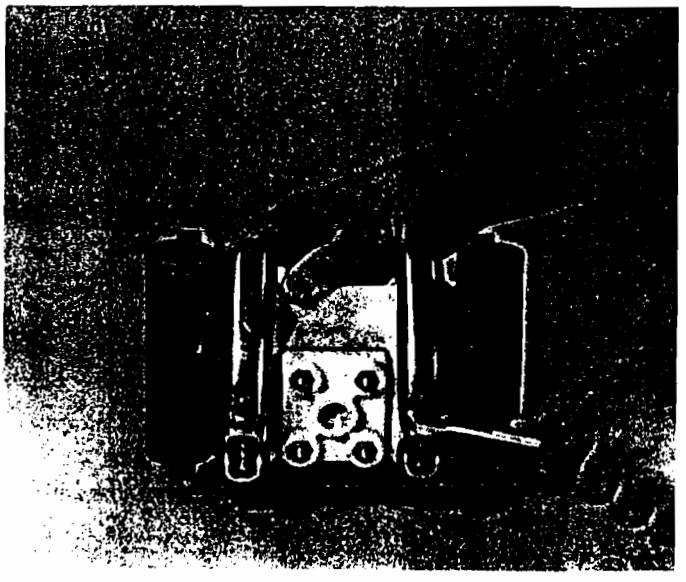


Figure 11B

Step 3.

Rubber/TPE Diaphragms. Locate one diaphragm so that its outer bead gently rests in the groove provided for it in the center section. Place the water chamber on the diaphragm using the alignment marks previously made during disassembly. Install and tighten the clamp band to the required torque specification*.

Install the second water chamber as above. Note: It may be necessary to adjust the diaphragm position slightly so that the bead gently rests in its groove in the center section.

*Refer to Section 8 for the required torque specifications.

Step 3A.

Teflon® Diaphragms. M1 Plastic Pumps fitted with Teflon® diaphragms require the use of a Teflon® gasket kit, P/N 01-9500-99. The Teflon® gasket material in this kit is an expanded type of Teflon® which is very strong but soft. Its use assures a positive seal tween the Teflon® diaphragm outer bead and its corresponding groove in the water chamber. This gasket material should be placed each time the pump is disassembled. No gasket material is needed in the assembly of metal pumps.

Figure 12A

Select a strip of 1/4" wide material approximately 15 inches in length and carefully remove the covering from the adhesive strip (see *Figure 12A).* Ensure that the adhesive remains attached to the gasket material.

Figure 12B

Starting at any point, place the gasket strip in the center of the diaphragm bead groove on the water chamber and press lightly on the gasket to ensure that the adhesive holds it in place during assembly (see *Figure 12B).*

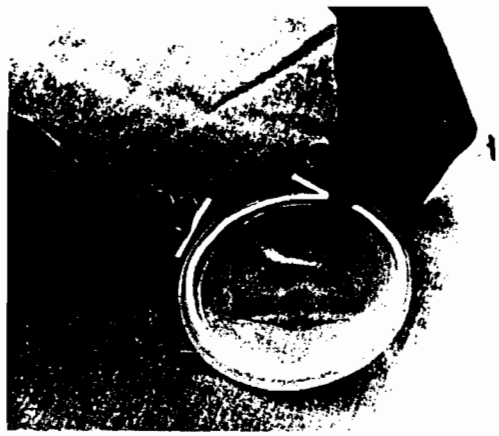


Figure 12C

The ends of the gasket strip should overlap approximately 1/2 inch (see *Figure 12C).*

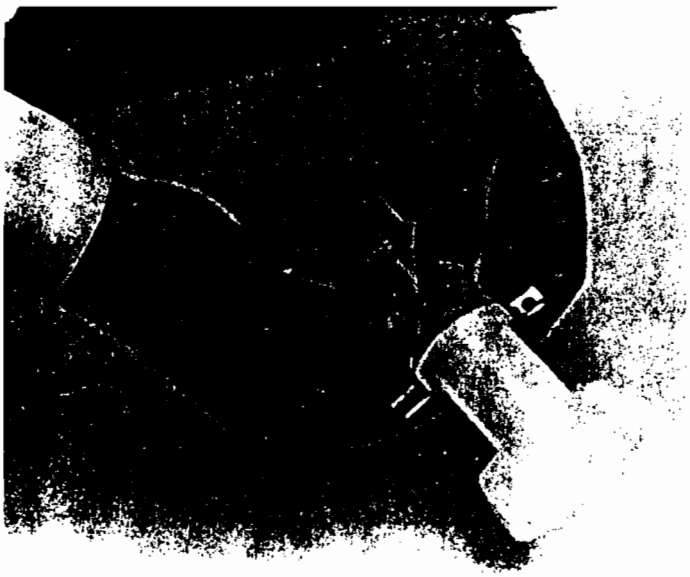


Figure 13A

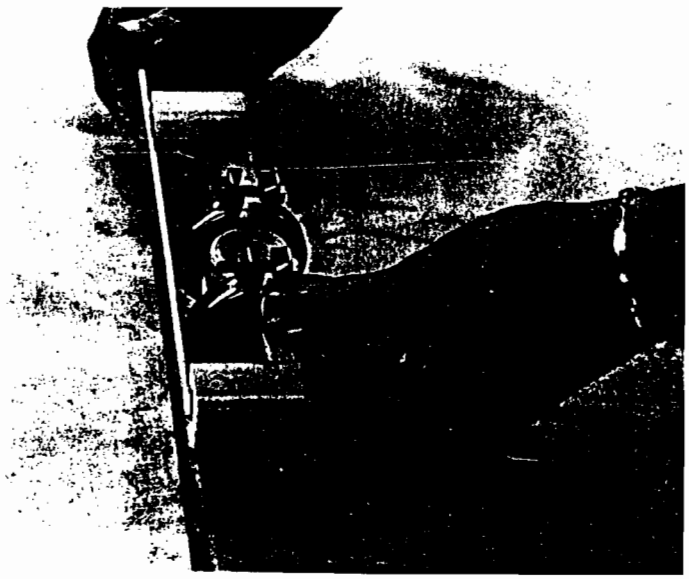


Figure 13B

Step 4.

Manifold Assembly. If the inlet and/or discharge manifold was taken apart, it should be reassembled now. The easiest way to do this is to take one half clamp band and wedge it onto the flanges of the elbow and center T-section. (See *Figure 13A).* This holds the two parts together while the second half band is installed and the bolts are hand-tightened. Attach the other elbow to the center T-section as above. Align the manifold parts as in *Figure 13B,* and tighten the clamps to the required torque specification*. Note: All VDF and Teflon® pumps fitted with Teflon® elastomers, utilize gasket material around the seat area as well. If sealing is a concern, ıe gasket material can be used with the polypropylene pumps as well.

*Refer to Section 8 for the required torque specifications.

Step 5.

If the pump is equipped with optional Teflon® diaphragms, valve balls, and sealing rings around the valve seats, new Teflon® gaskets must be installed. The small flange manifold connections of the M1 "Champ" PVDF and Teflon® pumps are sealed with a Teflon® O-ring and a circular gasket. The gaskets are held in place during assembly by two adhesive strips. After installing the valve balls, valve seats and O-rings in the bottom of each water chamber and discharge manifold elbow place a circular gasket in position. No gasket material is needed for metal construction.

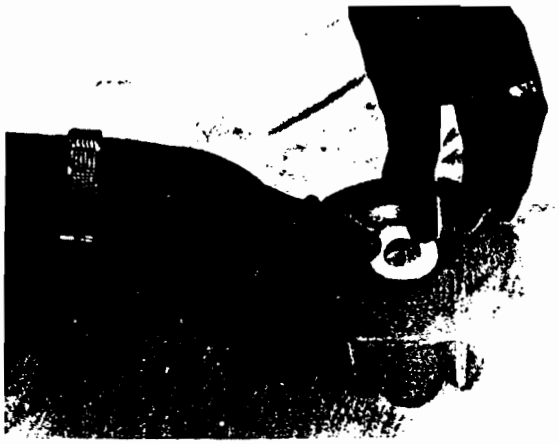


Figure 13B

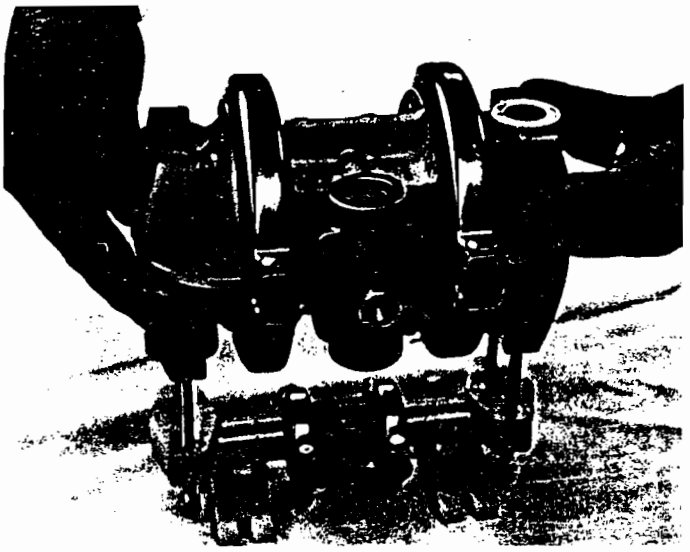


Figure 14A

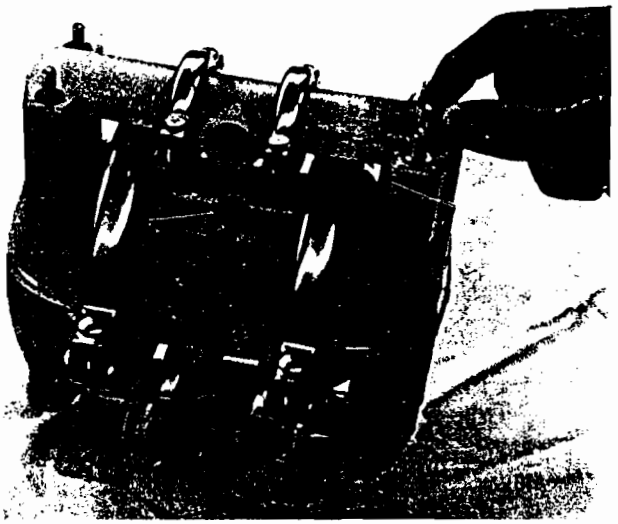


Figure 14B

Step 6.

Make sure the valve balls, valve seats, sealing O-rings, and Teflon® gaskets, if needed, are installed. Install the four long body bolts into the inlet manifold and place the main body of the pump onto the inlet housing. Place the discharge manifold on the center section. Put the washers and nuts on the bolts and tighten to the required torque specification*.

Step 7.

Retighten all clamp bands. When all maintenance and/or repairs are accomplished, an air line should be connected to the pump's air valve and the pump run dry. Be sure to blow out air line for 10 to 20 seconds before reinstalling pump in service. Good suction should be observed at the pump inlet. Approximately 10 inches of vacuum, should be observed with pumps fitted with rubber diaphragms and 7 inches with pumps fitted with Teflon® diaphragms. If pump does not operate or pull sufficient vacuum, refer to troubleshooting section.

*Refer to Section 8 for the required torque specifications.

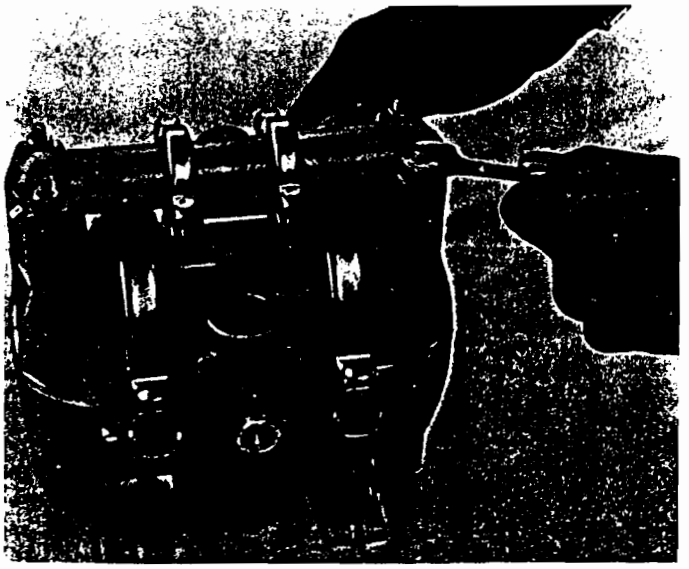


Figure 15B

SECTION 6B

DIRECTIONS FOR DISASSEMBLY/REASSEMBLY SINGLE-PIECE MANIFOLD PUMPS

CAUTION: Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container.

The Wilden® single-piece manifold pump models are air-operated, double-diaphragm pumps with all wetted parts molded in Teflon® PFA and carbon-filled acetal. The single-piece center section, consisting of center block and air chambers, is molded from glass-filled Polypropylene on UP models and carbon-filled acetal on conductive models. All fasteners and hardware are stainless steel. The primary diaphragm is constructed of Teflon® PTFE. All wetted sealing O-rings are Teflon® encapsulated Viton on the UPII, carbon-filled acetal, and Chemraz® on the UPIII. The standard air distribution system is used on UPII. The UPIII and carbon-filled Acetal air distribution system is made solely of plastic composites and is lube-free. All O-rings used in the pump are of a special material, and should only be replaced with Wilden factory-supplied parts.

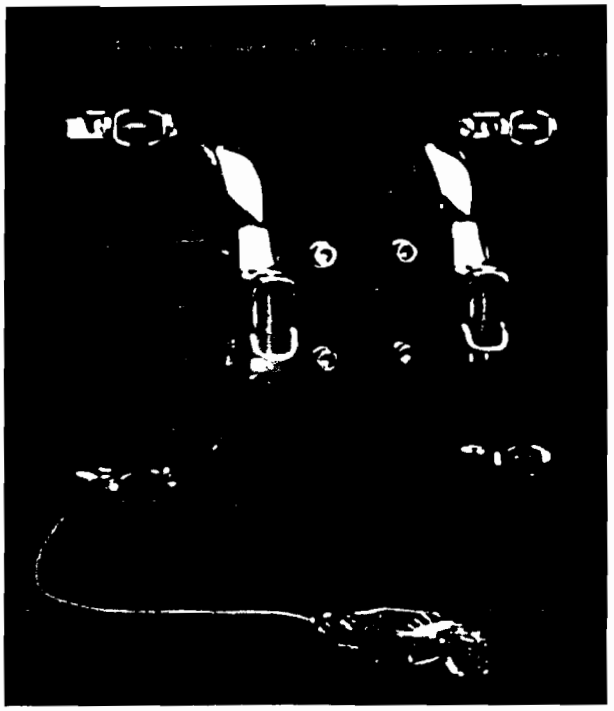
Tools required to perform maintenance on the Model M1 pump are: 3/16-inch, 5/16-inch and 9/64-inch Allen wrench, 7/16-inch wrench, two open end adjustable wrenches, and an O-ring pick.

PLEASE read all directions before starting disassembly.

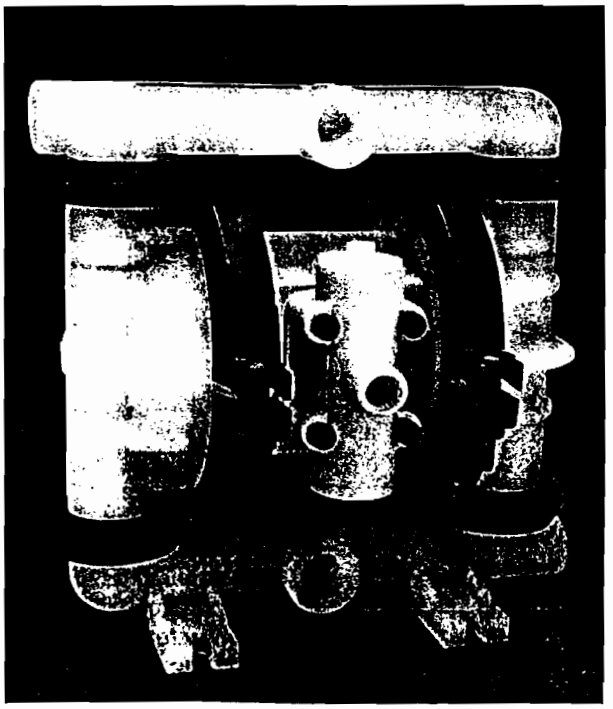
DISASSEMBLY

Step 1.

Before actual disassembly is started, turn pump upside down and drain all liquid trapped in the pump into a suitable container. Be sure to use proper caution if liquid is corrosive or toxic. Mark each liquid chamber to its respective air chamber for easy alignment during reassembly.



M1 Carbon-filled Acetal



M1 UPIII Teflon® PFA Construction

NOTE: The UPIII pump is photographed for the assembly instructions. The carbon-filled acetal instructions are the same unless noted.

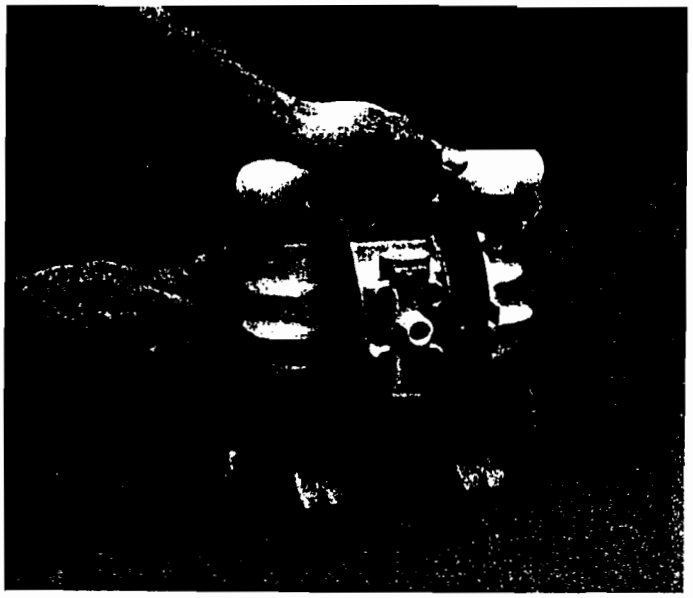


Figure 2

Step 1.

Using an appropriate sized Allen wrench, remove clamp bands that hold the discharge manifold to the water chambers.

NOTE: Carbon-filled acetal pumps are shipped with a grounding strap. The strap is attached to the manifold clamp band bolt. This strap must be attached via the clip to a proper grounding point.

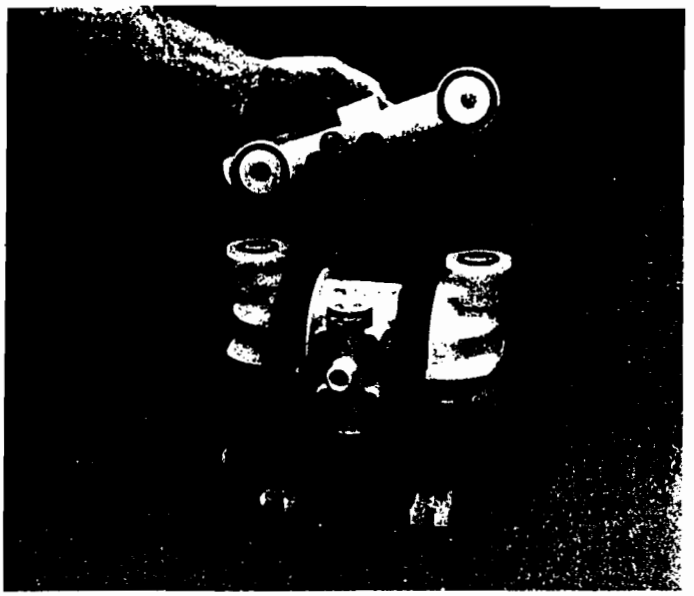


Figure 3

Step 2.

Remove discharge manifold. It is now possible to inspect the outboard O-rings.

NOTE: The carbon-filled acetal pump has a removable end plug. Teflon® tape must be used to assure a proper seal. End plug placement will vary depending upon installation logistics.

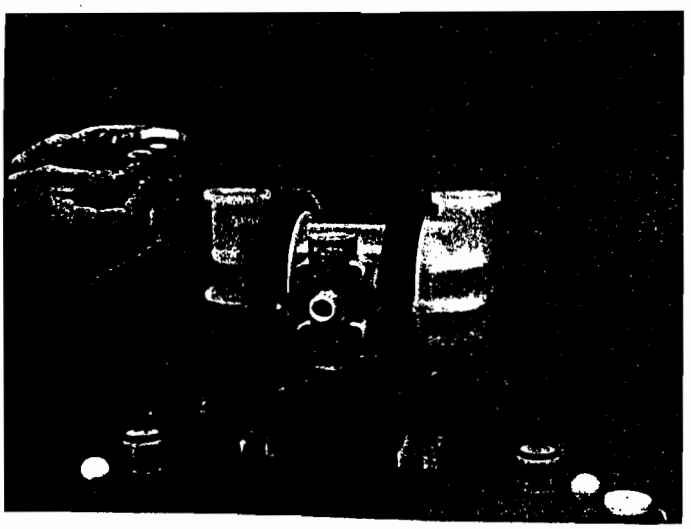


Figure 4

Step 3.

Remove the O-ring, ball cage and ball valve from the water chamber. It is now possible to inspect these parts (see *Figure 4).* Using the O-ring pick, remove the seat and seat O-ring from the water chamber for further inspection. If swelling, cracking or other damage is apparent, these parts must be replaced.

Figure 5

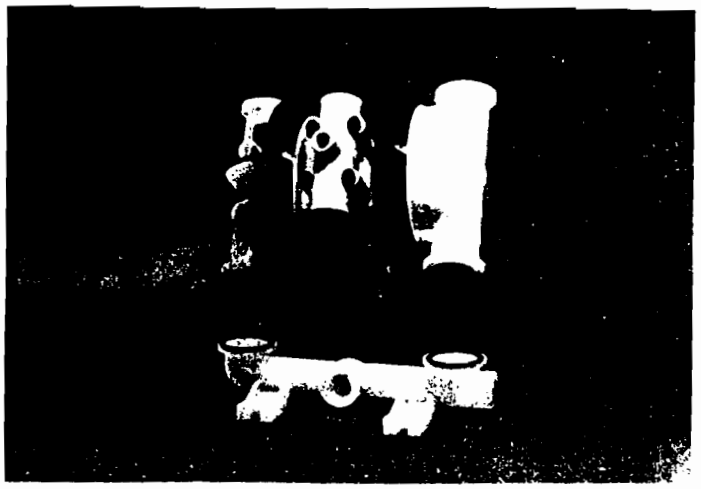


Figure 6

Step 4.

Loosen and remove clamp bands from around the inlet manifold (see *Figure 5).* Lift center section off of the inlet manifold (see *Figure 6).* It is now possible to inspect the outboard O-rings on the inlet manifold.

Step 5.

Place center section upside-down on a flat surface. Remove the O-ring, seat and valve ball from the bottom of the water chamber. It is now possible to inspect these parts. If swelling, cracking or other damage is apparent these parts must be replaced (see *Figure 7).*

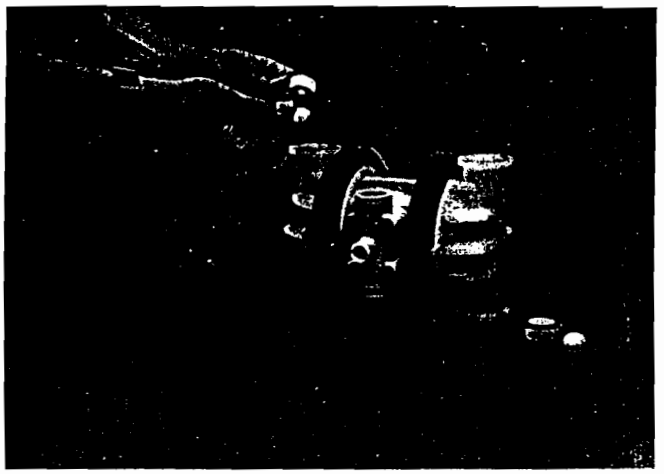


Figure 7

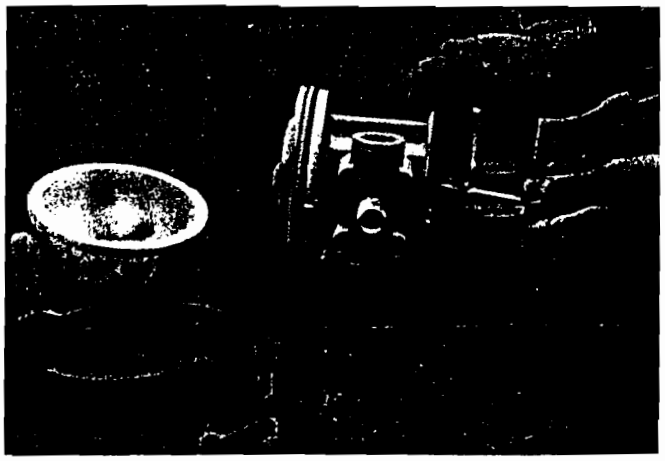


Figure 8

Step 6.

Loosen and remove clamp bands from around the water chambers (see *Figure 8).* This allows for inspection of the primary and containment diaphragms. Use the six point box wrench to loosen the diaphragm outer piston plate from the connecting shaft.

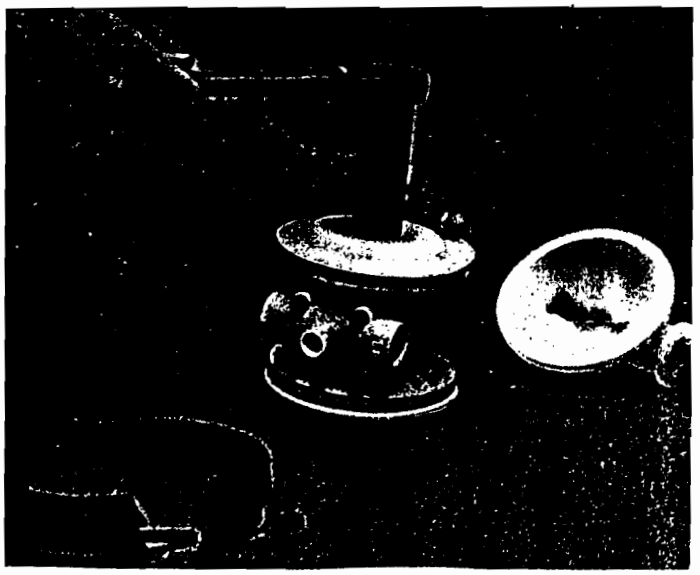


Figure 9

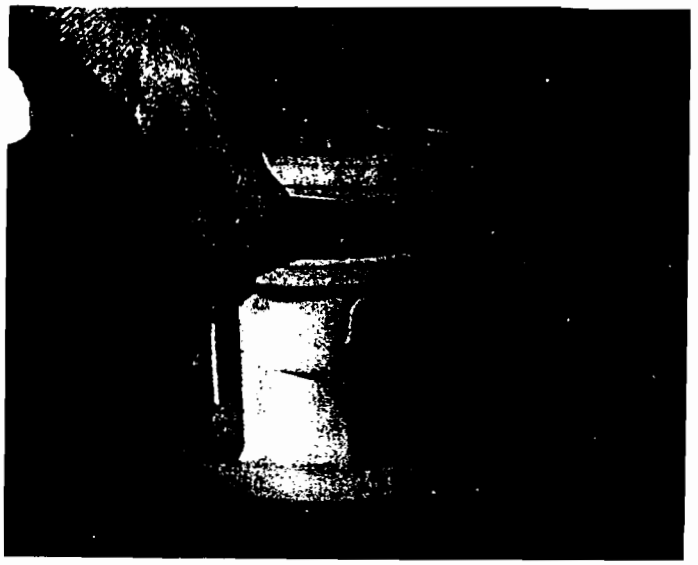


Figure 10

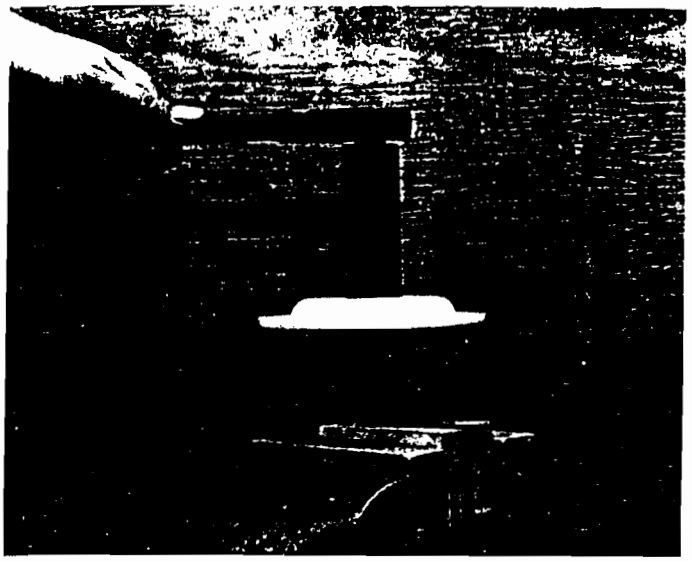


Figure 11

Step 7.

Only one piston plate will loosen in Step 6. Remove it and the diaphragms. Remove the shaft and attached diaphragms from the center block. To remove the diaphragms from the shaft, hold the outer rim of the diaphragm and loosen the diaphragm piston plate with the box wrench. If the plate will not loosen, the shaft must be placed in a vise. **Protect the shaft from damage by using wood blocks or soft jaws in the vise.** The plate can now be easily removed with the box wrench.

At this point of disassembly, all wetted parts of the pump are available for inspection or repair.

If inspection and/or servicing of the non-wetted air section is necessary, please see Section 6C and 6D.

,EASSEMBLY

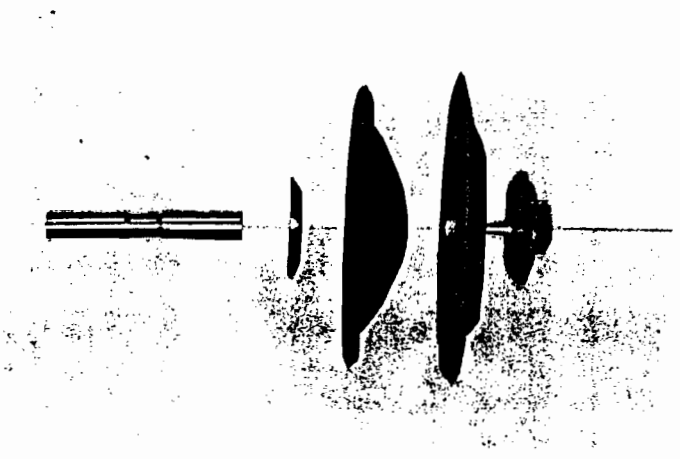


Figure 12A

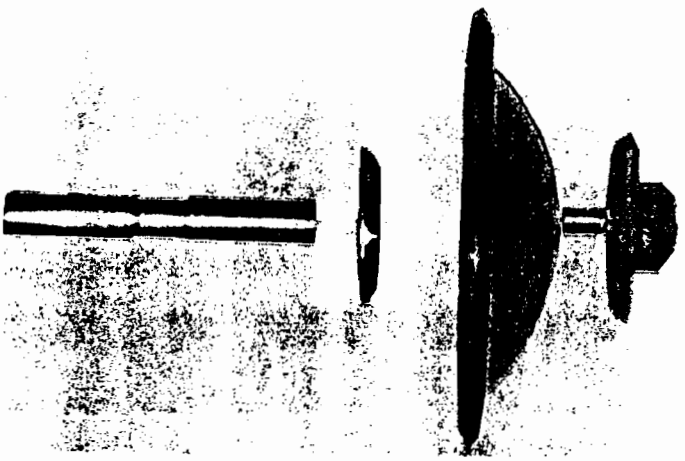


Figure 12B

Step 1.

Insert the outer piston stud through the Teflon® diaphragm, containment diaphragm and inner piston. Hand-tighten this assembly onto the shaft. The back-up diaphragm is utilized for sealing purposes. It is installed between the containment diaphragm and bead area of the center section. (See *Figure 12A).* Note: Rubber/TPE fitted carbon-filled acetal models do not have back-up diaphragm. (See *Figure 12B).*

p 2.

rt the shaft through the center section bushing. Install the opposite back-up O-ring, inner piston, diaphragms, and outer piston and tighten to the required torque specifications*. (See *Figure 13.)*

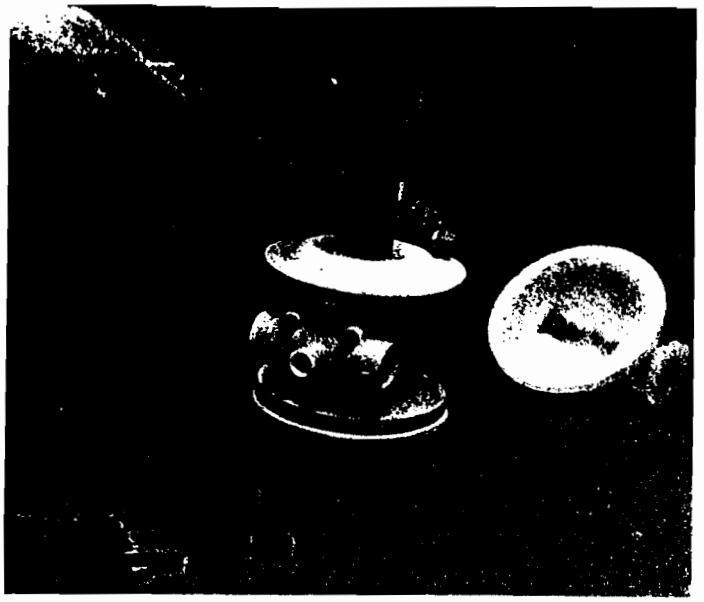


Figure 13

*Refer to Section 8 for the required torque specifications.

Step 3.

Teflon® Diaphragms. M1 pumps fitted with Teflon® diaphragms require the use of a Teflon® gasket kit, P/N 01-9500-99. The Teflon® gasket material in this kit is an expanded type of Teflon® which is very strong but soft. Its use assures a positive seal between the Teflon® diaphragm outer bead and its corresponding groove in the water chamber. This gasket material should be replaced each time the pump is disassembled.

Figure 14

ct a strip of 1/4" wide material proximately 15 inches in length and carefully remove the covering from the adhesive strip (see *Figure 14).* Ensure that the adhesive remains attached to the gasket material.

Figure 15

Starting at any point, place the gasket strip in the center of the diaphragm bead groove on the water chamber and press lightly on the gasket to ensure that the adhesive holds it in place during assembly (see *Figure 15).*

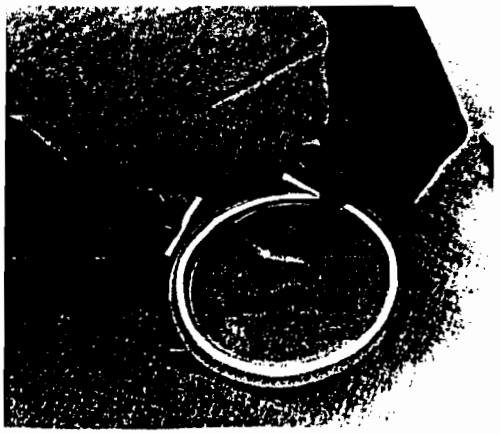


Figure 16

The ends of the gasket strip should overlap approximately 1/2 inch (see *Figure 16).*

Figure 17

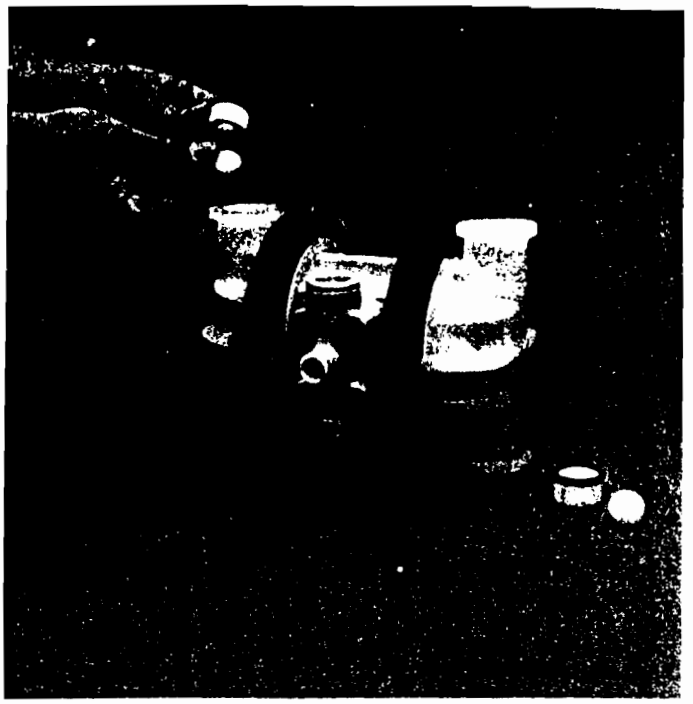


Figure 18

Step 4.

Attach water chambers to the center block making certain to realign your marks (see *Figure 17).* Replace large clamp bands and tighten to the required torque specification*.

Step 5.

With center section upside-down, insert valve balls, seat and O-rings into the bottom of the water chambers. Install outboard O-rings in inlet manifold. Realign the inlet manifold (see *Figure 18)* and attach clamp bands. Tighten to the required torque specification*. The inlet should be facing the same direction as the air valve.

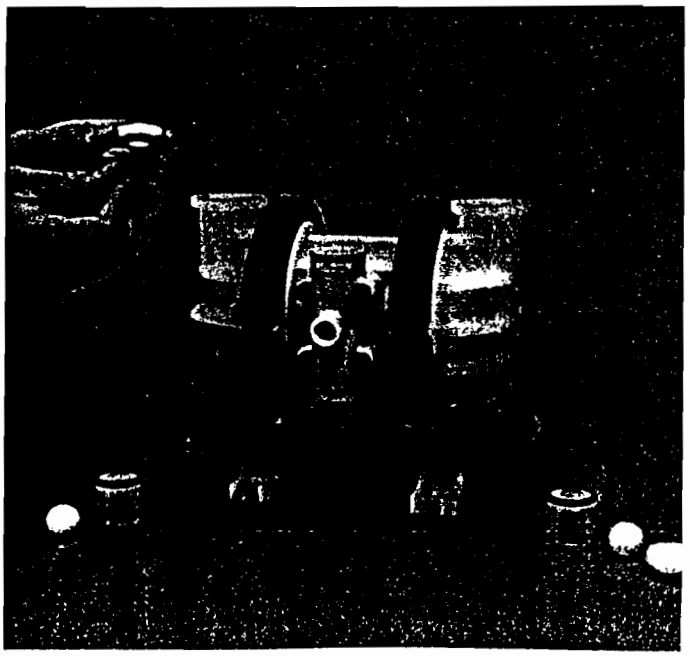


Figure 19

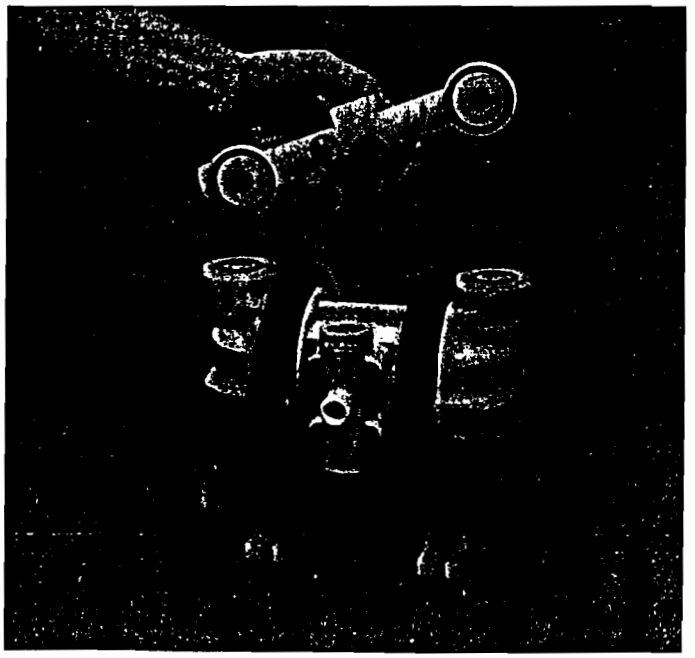


Figure 20

Step 6.

ırn the pump right-side-up. Insert the seat with O-ring .stalled in bottom groove, ball valve, ball cage and O-ring in the top of the water chamber. Install outboard Chemraz® O-rings in discharge manifold. Realign the discharge manifold with the discharge facing toward the air valve. Attach clamp bands (see *Figure 20).* Tighten to the required torque specification*.

*Refer to Section 8 for the required torque specifications.

SECTION 6C

LUBED PUMPS
AIR VALVE / CENTER SECTION REPAIR / MAINTENANCE

The center section assembly consists of both the air valve body and piston and the center section. The unique design of the air valve relies only on differential pressure to cause the air valve to shfit. It is reliable and simple to maintain. The bushing in the center block, along with the diaphragm shaft, provides the signal to tell the air valve to shift. The following procedure will ensure that the air valve on your Wilden pump will provide long trouble-free service.

AIR VALVE BODY AND PISTON ASSEMBLY AND DISASSEMBLY

The air valve body and piston (P/N 01-2000-07) can be disconnected from the pump by removing the four socket-head cap screws which attach it to the center section. The piston in the air valve is aluminum with a dark gray anodized coating. The piston should move freely and the ports in the piston should line up with the ports on the face of the air valve body. The piston should also appear to be a dull, dark gray color. If the piston appears to be a shiny aluminum color, the air valve is probably worn beyond working tolerances and should be replaced.

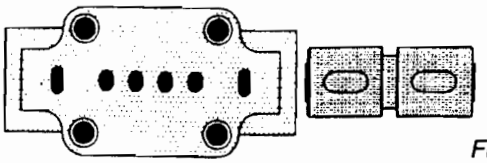


Figure A

If the piston does not move freely in the air valve, the entire air valve should be immersed in a cleaning solution. (NOTE: Do not force the piston by inserting a metal object.) This soaking should remove any accumulation of sludge and grit which is preventing the air valve piston from moving freely. If the air valve piston does not move freely after the above cleaning, the air valve should be disassembled as follows: Remove the snap ring from the top end of the air valve cylinder and apply an air jet to the 1/8-inch hole on the opposite end of the air valve face. **[CAUTION:** The air valve end cap (P/N 01-2330-23 may come out with considerable force. Hand protection such as a padded glove or a rag should be used to capture the end cap.] Inspect the piston and cylinder bore for nicks and scoring.

Inspect the air valve side of the center section for flatness and to insure no nicks or other damage exists that would prevent the air valve from sealing when installed. Inspect the two channels and their ports to make sure they are clean and the ports are open to the bushing. The air valve will not shift if these ports are plugged or an O-ring is in the wrong groove of the center section closing off a port. Inspect the air valve gasket and muffler plate gasket and replace if damaged. **Attach the air valve to the center section and tighten to the required torque specifications*.**

O-RING REPLACEMENT/ CENTER SECTION

The pump's center section consists of a molded housing with a bronze bushing. (Bushing is not removable.) This bushing has grooves cut into the inside diameter. O-rings are installed in these grooves. When the O-rings become worn or flat, they will no longer seal and must be replaced. This is most easily accomplished by using a tool called an O-ring pick, available through most industrial supply companies.

There are two versions of center sections: PRE-ENHANCED and ENHANCED. An encircled letter "E" stamped on the top of the center section denotes the ENHANCED type center section *(Figure C)*.

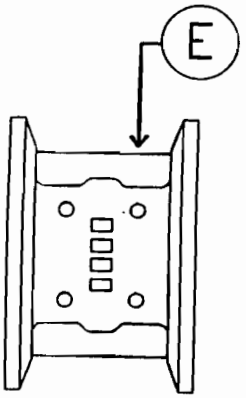
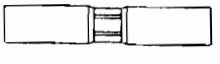
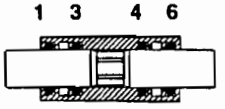


Figure C

If the encircled "E" is not present, a pre-enhanced shaft (01-3800-09) must be utilized. An enhanced (non-dented) shaft will not function correctly in the pre-enhanced center section. The center section O-rings (01-3200-52) must be installed in the appropriate grooves as shown (1, 3, 4, 6).



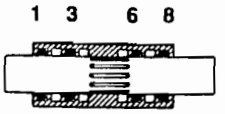
PRE-ENHANCED SHAFT



PRE-ENHANCED CONFIGURATION

e encircled "E" is present, an enhanced (01-3800-09-07) ..aft should be utilized to maximize performance. The center section O-rings (01-3200-52) must be installed in the appropriate grooves as shown (1, 3, 6, 8).

ENHANCED SHAFT



ENHANCED CONFIGURATION

*Refer to Section 8 for the required torque specifications.

SECTION 6D

LUBE-FREE PUMPS
AIR VALVE / CENTER SECTION REPAIR / MAINTENANCE

AIR VALVE/CENTER SECTION REPAIR/MAINTENANCE

The center section assembly consists of both the air valve body and piston, and the center section. The lube-free design utilizes high-tech, engineered thermoplastics in place of the brass air valve, aluminum piston, and bronze bushing. This new system also includes slipper seals to reduce the coefficient of friction between the shaft and center section. This lube-free design includes the straight shaft and altered exhaust port configuration utilized in the enhanced M1 air distribution system. Low start-up pressure, on/off reliability, and increased sealing in a dead-head condition are a few of the advantages of the lube-free air distribution system. The selected thermoplastics have the ability to function together without lubrication making the M1 Wilden pump truly lube-free. ***The M1 lube-free pumps are not pre-lubed with oil or grease.***

AIR VALVE BODY AND PISTON ASSEMBLY AND DISASSEMBLY

The air valve body and piston (P/N 01-2000-65-200) is externally serviceable by removing the four socket-head cap screws which attach it to the center section. The lube-free air valve body is off-white in color and has an encircled "LF" molded into the exterior. The thermoplastic air valve piston is gray color like the aluminum lubed style, but is differentiated by a "D-shaped hole" in the top of the piston, and two small holes in the annular groove. (See *Figure B.)*

The piston should move freely and the ports in the piston must line-up with the ports on the face of the air valve body (see *Figure B).* If the piston does not move freely in the valve body, the entire air valve assembly should be immersed in a mild soap solution to remove any accumulation of sludge and/or grit. If the air valve does not move freely after the above cleaning, the air valve should be disassembled as follows: Remove the snap ring from the top of the air valve cylinder and apply an air jet to the 1/8" hole on the opposite end of the air valve face. Caution: The end cap may come out with considerable force. Verify that the guide pin molded into one of the end caps (P/N 01-2300-23-200) is straight and smooth to allow the piston to shift properly. Inspect the piston and cylinder bore for nicks and scoring. Small nicks can be dressed with fine sandpaper and the piston returned to service. Clean and reassemble. **Install air valve to center section and tighten to the required torque specifications*.**

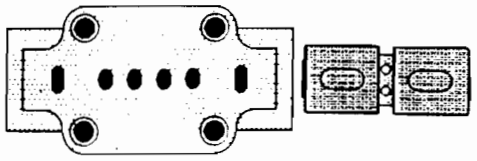


Figure B

O-RING REPLACEMENT/CENTER SECTION

The M1 lube-free Champ series pumps are constructed with a glass-filled polypropylene center section with a thermoplastic bushing. The M1 lube-free Metal pumps are constructed with a nylon center section with a thermoplastic bushing. These center sections are easily distinguished by the encircled letter "LF" stamped on the top of the center section. These bushings are not removable. This bushing has grooves cut into the inside diameter where back-up O-rings and slipper seals are installed. It is important that the correct O-ring is utilized. The back-up O-ring for the lube-free model has a bigger diameter and smaller cross-section in comparison to the "Lubed" model. The straight shaft (P/N 01-3800-09-07) must be utilized in the lube-free pump.

The back-up O-ring is installed first. This is most easily accomplished by using a tool called an O-ring pick, available through most industrial supply companies. The O-rings must be installed in the appropriate grooves as shown in *Figure C* (1, 3, 6, 8). Upon completion of the O-ring installation, the slipper seals (P/N 01-3210-55-200) must be installed in the same grooves (1, 3, 6, 8). This task is accomplished by utilizing long nose pliers and a flat head screw driver. Please see *Figures D, E,* and *F.*

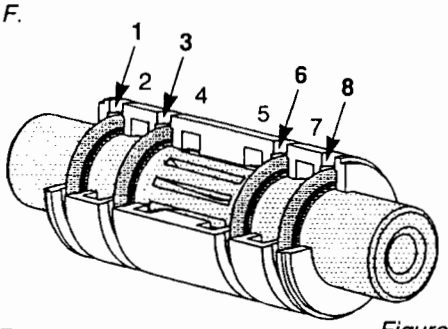


Figure C

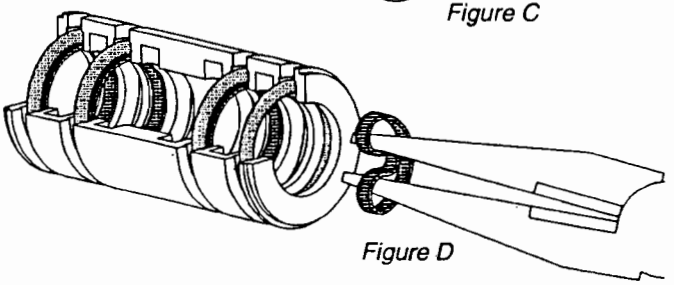


Figure D

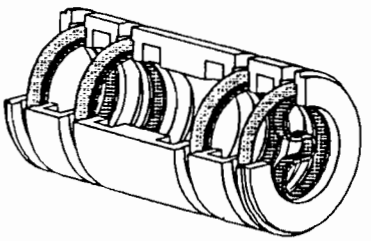


Figure E

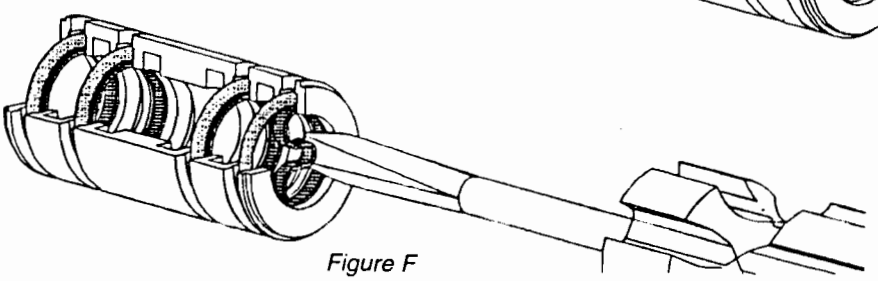
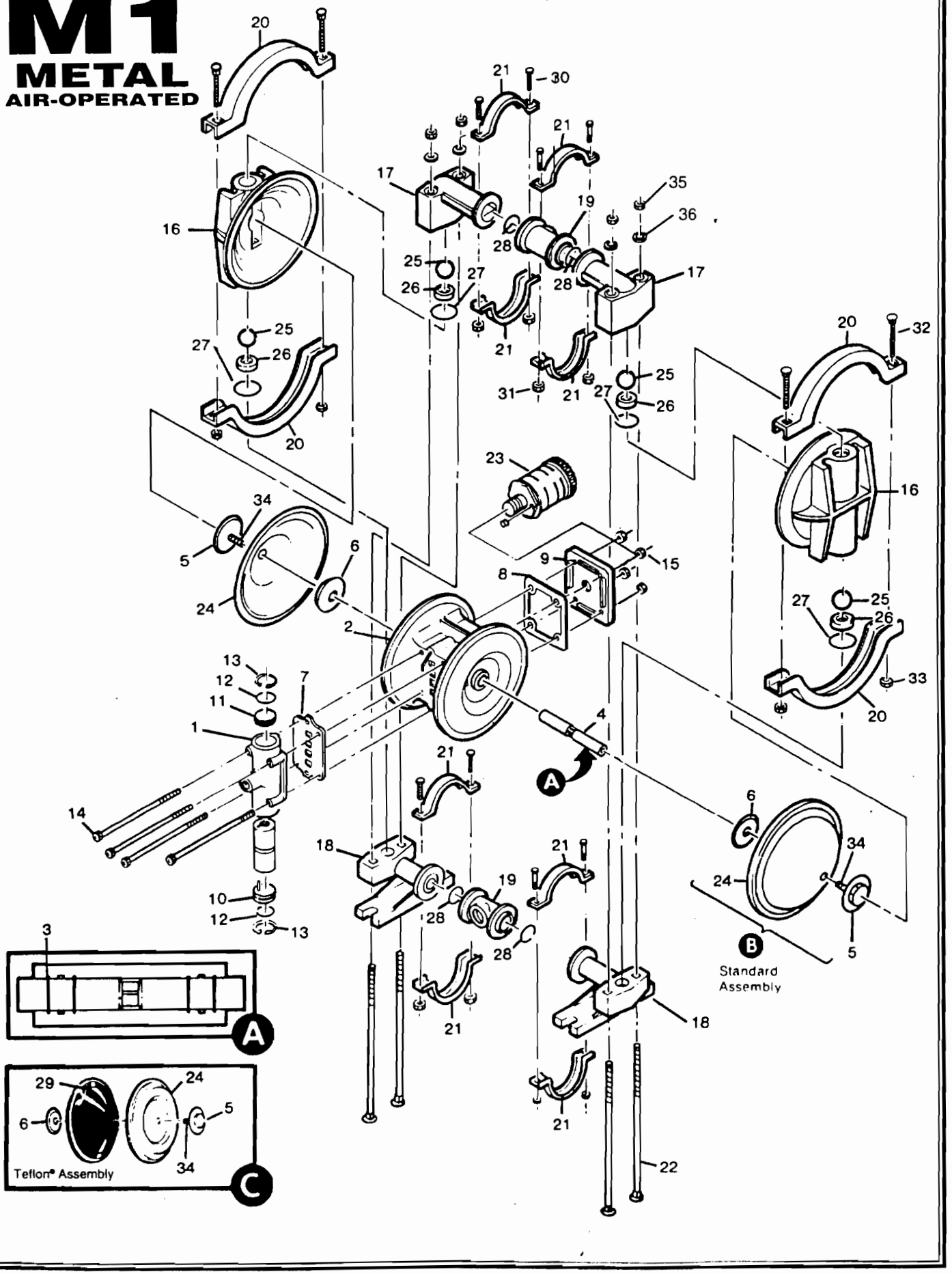


Figure F

M1
METAL
AIR-OPERATED



MODEL M1 METAL

Item	Part Description	Qty. Per Pump	Rubber-Fitted M1/ AYYB P/N	Rubber-Fitted M1/ SYYB P/N	Teflon®-Fitted M1/AYYB/ TF/TF/ATF P/N	Teflon®-Fitted M1/SYYB/ TF/TF/STF P/N	Food Processing M1-70/ SYYB Saniflex™ P/N	Food Processing M1-70/SYYN TF/TF/STF Teflon® P/N
1	Air Valve Assembly*	1	01-2000-07	01-2000-07	01-2000-07	01-2000-07	01-2000-06	01-2000-06
2	Center Section	1	01-3152-23	01-3152-23	01-3152-23	01-3152-23	01-3152-23	01-3152-23
3	Center Block O-Ring	4	01-3200-52	01-3200-52	01-3200-52	01-3200-52	01-3200-52	01-3200-52
4	Shaft	1	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07
5	Pistons/Outer	2	01-4570-01	01-4570-03	01-4570-01	01-4570-03	01-4570-03	01-4570-03
6	Pistons/Inner	2	01-3710-01	01-3710-01	01-3710-01	01-3710-01	01-3710-01	01-3710-01
7	Air Valve Gasket	1	01-2600-52	01-2600-52	01-2600-52	01-2600-52	01-2600-52	01-2600-52
8	Muffler Plate Gasket	1	01-3500-52	01-3500-52	01-3500-52	01-3500-52	01-3500-52	01-3500-52
9	Muffler Plate	1	01-3180-23	01-3180-23	01-3180-23	01-3180-23	01-3180-23	01-3180-23
10	End Cap w/Guide	1	01-2300-23	01-2300-23	01-2300-23	01-2300-23	01-2300-23	01-2300-23
11	End Cap w/o Guide	1	01-2330-23	01-2330-23	01-2330-23	01-2330-23	01-2330-23	01-2330-23
12	Buna O-Ring - 115 70 Shore	2	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52
13	End Cap Snap Ring	2	01-2650-03	01-2650-03	01-2650-03	01-2650-03	01-2650-03	01-2650-03
14	Air Valve Cap Screw ¼"-20 x 4½"	4	01-6000-03	01-6000-03	01-6000-03	01-6000-03	01-6000-03	01-6000-03
15	Air Valve Cap Screw Nut ¼"-20	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03
16	Water Chamber	2	01-5000-01	01-5000-03	01-5000-01	01-5000-03	01-5000-03	01-5000-03
17	Discharge Manifold Elbow	2	01-5230-01	01-5230-03	01-5230-01	01-5230-03	01-5230-03	01-5230-03
18	Inlet Manifold Elbow	2	01-5220-01	01-5220-03	01-5220-01	01-5220-03	01-5220-03	01-5220-03
19	Manifold "T" Section	2	01-5160-01	01-5160-03	01-5160-01	01-5160-03	01-5160-03-70	01-5160-03-70
20	Clamp Band (Large)	2	01-7300-03	01-7300-03	01-7300-03	01-7300-03	01-7300-03	01-7300-03
21	Clamp Band (Small)	4	01-7100-03	01-7100-03	01-7100-03	01-7100-03	01-7100-03	01-7100-03
22	Vertical Bolt ¼"-20 x 7⅞"	4	01-6080-03	01-6080-03	01-6080-03	01-6080-03	01-6080-03	01-6080-03
23	Muffler	1	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99
24	Diaphragm	2	•	•	01-1010-55	01-1010-55	01-1010-55	01-1010-55
25	Valve Ball	4	•	•	01-1080-55	01-1080-55	01-1080-55	01-1080-55
26	Valve Seat	4	01-1120-01	01-1120-03	01-1120-01	01-1120-03	01-1120-03	01-1120-03
27	Valve Seat O-Ring	4	•	•	01-1200-55	01-1200-55	01-1200-55	01-1200-55
28	Manifold O-Ring	4	•	•	01-1300-55	01-1300-55	01-1300-55	01-1300-55
29	Back-up Diaphragm	2	N/R	N/R	01-1060-51	01-1060-51	01-1060-51	01-1060-51
30	Small Clamp Band Bolt #10-24 x 1¼"	8	01-6100-03	01-6100-03	01-6100-03	01-6100-03	01-6100-03	01-6100-03
31	Small Clamp Band Nut #10-24	8	01-6400-03	01-6400-03	01-6400-03	01-6400-03	01-6400-03	01-6400-03
32	Large Clamp Band Bolt ¼"-20 x 1¾"	4	01-6070-03	01-6070-03	01-6070-03	01-6070-03	01-6070-03	01-6070-03
33	Large Clamp Band Nut ¼"-20	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6650-03-70	04-6650-03-70
34	Shaft Stud	2	01-6150-08	01-6150-08	01-6150-08	01-6150-08	01-6150-08	01-6150-08
35	Vertical Bolt Nut ¼"-20	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03
36	Vertical Bolt Washer	4	01-6730-03	01-6730-03	01-6730-03	01-6730-03	01-6730-03	01-6730-03

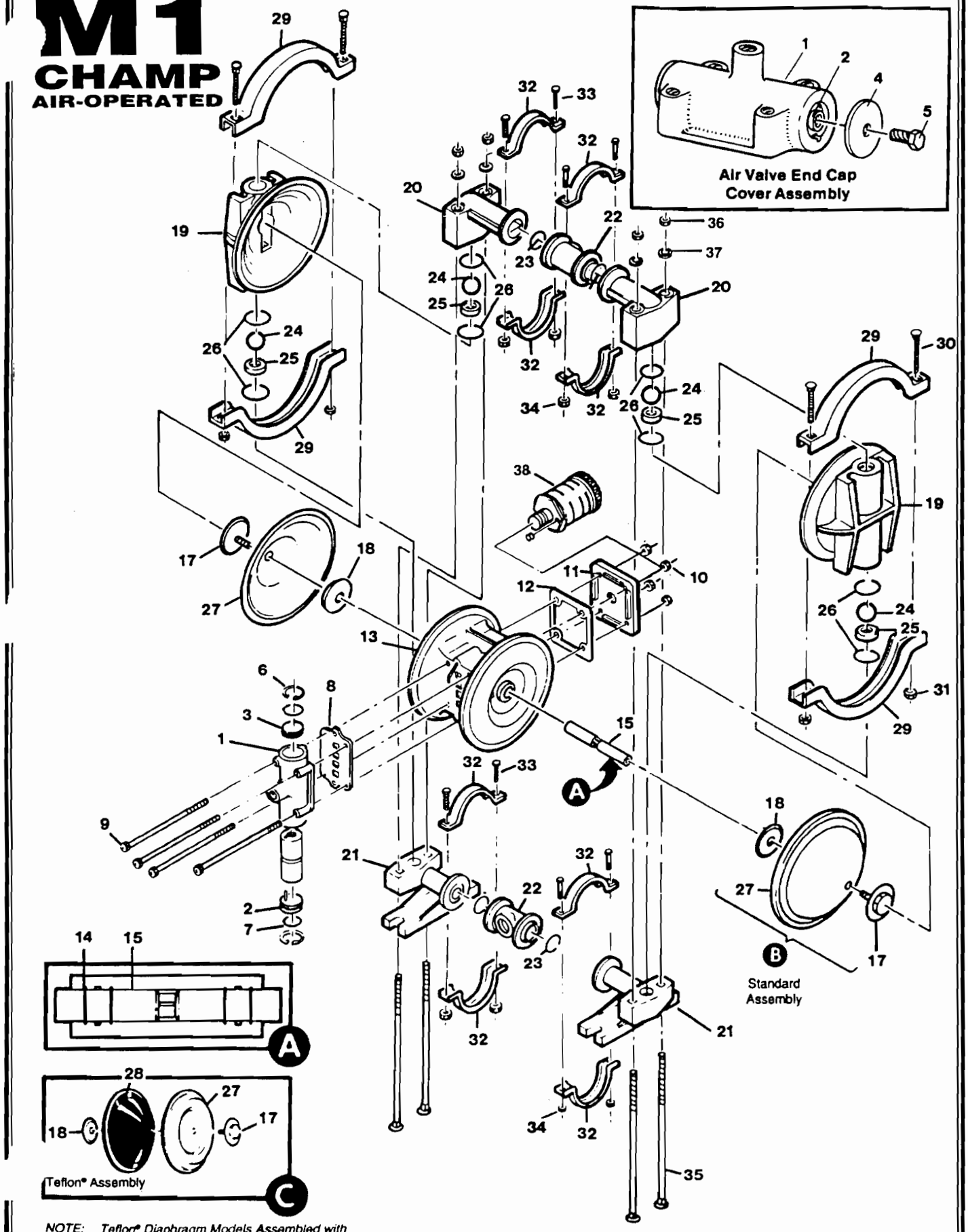
LUBE-FREE MODEL M1 METAL

Item	Part Description	Qty. Per Pump	Rubber-Fitted M1/ AYYZ *LF* P/N	Rubber-Fitted M1/ SYYZ *LF* P/N	Teflon®-Fitted M1-200/ AYYZ *LF* P/N	Teflon®-Fitted M1-200/ SYYZ *LF* P/N	Food Processing M1-73/ SYYZ *LF*-Saniflex™ P/N	Food Processing M1-73/ SYYN *LF*-Teflon® P/N
1	Air Valve Assembly — Lube-Free*	1	01-2000-65-200	01-2000-65-200	01-2000-65-200	01-2000-65-200	01-2000-65-200	01-2000-65-200
2	Nylon Center Section — Lube-Free	1	01-3150-23-200	01-3152-23-200	01-3150-23-200	01-3150-23-200	01-3150-23-200	01-3150-23-200
3	Buna O-Ring - 115 70 Shore	4	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52
	Slipper Seal (Not shown)	4	01-3210-55-200	01-3210-55-200	01-3210-55-200	01-3210-55-200	01-3210-55-200	01-3210-55-200
4	Shaft	1	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07
5	Pistons/Outer	2	01-4570-01	01-4570-03	01-4570-01	01-4570-03	01-4570-03	01-4570-03
6	Pistons/Inner	2	01-3710-01	01-3710-01	01-3710-01	00-3710-01	00-3710-01	01-3710-01
7	Air Valve Gasket	1	01-2600-52	01-2600-52	01-2600-52	01-2600-52	01-2600-52	01-2600-52
8	Muffler Plate Gasket	1	01-3500-52	01-3500-52	01-3500-52	01-3500-52	01-3500-52	01-3500-52
9	Muffler Plate	1	01-3180-23	01-3180-23	01-3180-23	01-3180-23	01-3180-23	01-3180-23
10	End Cap w/Plastic Guide	1	01-2300-23-200	01-2300-23-200	01-2300-23-200	01-2300-23-200	01-2300-23-200	01-2300-23-200
11	End Cap w/o Guide	1	01-2330-23	01-2330-23	01-2330-23	01-2330-23	01-2330-23	01-2330-23
12	Buna O-Ring - 115 70 Shore	2	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52
13	End Cap Snap Ring	2	01-2650-03	01-2650-03	01-2650-03	01-2650-03	01-2650-03	01-2650-03
14	Air Valve Cap Screw ¼"-20 x 4½"	4	01-6000-03	01-6000-03	01-6000-03	01-6000-03	01-6000-03	01-6000-03
15	Air Valve Cap Screw Nut ¼"-20	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03
16	Water Chamber	2	01-5000-01	01-5000-03	01-5000-01	01-5000-03	01-5000-03	01-5000-03
17	Discharge Manifold Elbow	2	01-5230-01	01-5230-03	01-5230-01	01-5230-03	01-5230-03	01-5230-03
18	Inlet Manifold Elbow	2	01-5220-01	01-5220-03	01-5220-01	01-5220-03	01-5220-03	01-5220-03
19	Manifold "T" Section	2	01-5160-01	01-5160-03	01-5160-01	01-5160-03	01-5160-03-70	01-5160-03-70
20	Clamp Band (Large)	2	01-7300-03	01-7300-03	01-7300-03	01-7300-03	01-7300-03	01-7300-03
21	Clamp Band (Small)	4	01-7100-03	01-7100-03	01-7100-03	01-7100-03	01-7100-03	01-7100-03
22	Vertical Bolt ¼"-20 x 7⅞"	4	01-6080-03	01-6080-03	01-6080-03	01-6080-03	01-6080-03	01-6080-03
23	Muffler	1	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99
24	Diaphragm	2	•	•	01-1010-55	01-1010-55	01-1010-56	01-1010-55
25	Valve Ball	4	•	•	01-1080-55	01-1080-55	01-1080-56	01-1080-55
26	Valve Seat	4	01-1120-01	01-1120-03	01-1120-01	01-1120-03	01-1120-03	01-1120-03
27	Valve Seat O-Ring	4	•	•	01-1200-55	01-1200-55	01-1200-56	01-1200-55
28	Manifold O-Ring	4	•	•	01-1300-55	01-1300-55	01-1300-56	01-1300-55
29	Back-up Diaphragm	2	N/R	N/R	01-1060-51	01-1060-51	N/R	01-1060-51
30	Small Clamp Band Bolt #10-24 x 1¼"	8	01-6100-03	01-6100-03	01-6100-03	01-6100-03	01-6100-03	01-6100-03
31	Small Clamp Band Nut #10-24	8	01-6400-03	01-6400-03	01-6400-03	01-6400-03	01-6400-03	01-6400-03
32	Large Clamp Band Bolt ¼"-20 x 1¾"	4	01-6070-03	01-6070-03	01-6070-03	01-6070-03	01-6070-03	01-6070-03
33	Large Clamp Band Nut ¼"-20	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6650-03-70	04-6650-03-70
34	Shaft Stud	2	01-6150-08	01-6150-08	01-6150-08	01-6150-08	01-6150-08	01-6150-08
35	Vertical Bolt Nut ¼"-20	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03
36	Vertical Bolt Washer	4	01-6730-03	01-6730-03	01-6730-03	01-6730-03	01-6730-03	01-6730-03

*Air Valve Assembly includes items 10, 11, 12, 13.
•Refer to corresponding elastomer chart at end of section.

SECTION 7B

M1 CHAMP
AIR-OPERATED



NOTE: Teflon® Diaphragm Models Assembled with Teflon® Gasket Kit At Factory (Not Shown)

MODEL M1 CHAMP RUBBER/TPE-FITTED

Item	Part Description	Qty. Per Pump	M1/PPPB P/N	M1/KPPB P/N	M1-502/PPPC P/N	M1-502/KPPC P/N
1	Air Valve Assembly	1	01-2000-07	01-2000-07	01-2000-05	01-2000-05
2	Air Valve End Cap w/Guide (Top)	1	01-2300-23	01-2300-23	01-2300-23	01-2300-23
3	Air Valve End Cap w/o Guide (Bottom)	1	01-2330-23	01-2330-23	01-2330-23	01-2330-23
4	Air Valve End Cap Cover	2	N/A	N/A	01-2420-55	01-2420-55
5	Air Valve End Cap Bolt	2	N/A	N/A	01-2450-22	01-2450-22
6	Snap Ring	2	01-2650-03	01-2650-03	01-2650-03	01-2650-03
7	Buna O-Ring - 115 70 Shore	2	01-2390-52	01-2390-52	01-2390-52	01-2390-52
8	Air Valve Gasket	1	01-2600-52	01-2600-52	01-2600-52	01-2600-52
9	Air Valve Screw	4	01-6000-03	01-6000-03	01-6000-05	01-6000-05
10	Air Valve Screw Nut	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05
11	Muffler Plate	1	01-3180-20	01-3180-20	01-3180-20	01-3180-20
12	Muffler Plate Gasket	1	01-3500-30	01-3500-30	01-3500-30	01-3500-30
13	Center Section	1	01-3152-20	01-3152-20	01-3152-20	01-3152-20
14	Center Block O-Ring	4	01-3200-52	01-3200-52	01-3200-52	01-3200-52
15	Shaft	1	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07
16	Shaft Stud[1]	2	N/A	N/A	N/A	N/A
17	Piston, Outer	2	01-4570-20-500	01-4570-21-500	01-4570-20-500	01-4570-21-500
18	Piston, Inner	2	01-3710-01	01-3710-01	01-3710-01	01-3710-01
19	Liquid Chamber	2	01-5000-20	01-5000-21	01-5000-20	01-5000-21
20	Discharge Manifold Elbow	2	01-5230-20	01-5230-21	01-5230-20	01-5230-21
21	Inlet Manifold Elbow	2	01-5220-20	01-5220-21	01-5220-20	01-5220-21
22	Manifold Tee Section (Female, Threaded)	2	01-5160-20	01-5160-21	01-5160-20	01-5160-21
23	Manifold O-Ring	4	•	•	•	•
24	Valve Ball	4	•	•	•	•
25	Valve Seats	4	01-1120-21-500	01-1120-21-500	01-1120-21-500	01-1120-21-500
26	Valve Seat O-Ring	8	•	•	•	•
27	Diaphragm	2	•	•	•	•
28	Back-up Diaphragm	2	N/A	N/A	N/A	N/A
29	Large Clamp Band	2	01-7300-03	01-7300-03	01-7300-05	01-7300-05
30	Large ClampBand Bolt	4	01-6070-03	01-6070-03	01-6070-05	01-6070-05
31	Large Clamp Band Nut	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05
32	Small Clamp Band	4	01-7100-03	01-7100-03	01-7100-05	01-7100-05
33	Small Clamp Band Bolt	8	01-6100-03	01-6100-03	01-6100-05	01-6100-05
34	Small Clamp Band Nut	8	01-6400-03	01-6400-03	01-6400-05	01-6400-05
35	Vertical Bolt	4	01-6080-03	01-6080-03	01-6080-05	01-6080-05
36	Vertical Bolt Nut	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05
37	Vertical Bolt Washer	4	01-6730-03	01-6730-03	01-6730-05	01-6730-05
38	Muffler	1	01-3510-99	01-3510-99	01-3510-99	01-3510-99

LUBE-FREE MODEL M1 CHAMP RUBBER/TPE-FITTED

Item	Part Description	Qty. Per Pump	M1-200/PPPZ *LF* P/N	M1-200/KPPZ *LF* P/N	M1-201/PPPZ *LF* P/N	M1-201/KPPZ *LF* P/N
1	Air Valve Assembly — Lube-free	1	01-2000-65-200	01-2000-65-200	01-2000-65-200	01-2000-65-200
2	Air Valve End Cap w/Plastic Guide (Top)	1	01-2300-23-200	01-2300-23-200	01-2300-23-200	01-2300-23-200
3	Air Valve End Cap w/o Guide (Bottom)	1	01-2330-23	01-2330-23	01-2330-23	01-2330-23
4	Air Valve End Cap Cover	2	N/A	N/A	01-2420-55	01-2420-55
5	Air Valve End Cap Bolt — Lube-free	2	N/A	N/A	01-2450-22-201	01-2450-22-201
6	Snap Ring	2	01-2650-03	01-2650-03	01-2650-03	01-2650-03
7	Buna O-Ring - 115 70 Shore	2	01-2390-52	01-2390-52	01-2390-52	01-2390-52
8	Air Valve Gasket	1	01-2600-52	01-2600-52	01-2600-52	01-2600-52
9	Air Valve Screw	4	01-6000-03	01-6000-03	01-6000-05	01-6000-05
10	Air Valve Screw Nut	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05
11	Muffler Plate	1	01-3180-20	01-3180-20	01-3180-20	01-3180-20
12	Muffler Plate Gasket	1	01-3500-52	01-3500-52	01-3500-52	01-3500-52
13	Polypropylene Center Section — Lube-free	1	01-3152-20-200	01-3152-20-200	01-3152-20-200	01-3152-20-200
14	Buna O-Ring - 115 70 Shore	4	01-2390-52	01-2390-52	01-2390-52	01-2390-52
	Slipper Seal (Not shown)	4	01-3210-55-200	01-3210-55-200	01-3210-55-200	01-3210-55-200
15	Shaft	1	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07
16	Shaft Stud[1]	2	N/A	N/A	N/A	N/A
17	Piston, Outer	2	01-4570-20-500	01-4570-21-500	01-4570-20-500	01-4570-21-500
18	Piston, Inner	2	01-3710-01	01-3710-01	01-3710-01	01-3710-01
19	Liquid Chamber	2	01-5000-20	01-5000-21	01-5000-20	01-5000-21
20	Discharge Manifold Elbow	2	01-5230-20	01-5230-21	01-5230-20	01-5230-21
21	Inlet Manifold Elbow	2	01-5220-20	01-5220-21	01-5220-20	01-5220-21
22	Manifold Tee Section (Female, Threaded)	2	01-5160-20	01-5160-21	01-5160-20	01-5160-21
23	Manifold O-Ring	4	•	•	•	•
24	Valve Ball	4	•	•	•	•
25	Valve Seats	4	01-1120-21-500	01-1120-21-500	01-1120-21-500	01-1120-21-500
26	Valve Seat O-Ring	8	•	•	•	•
27	Diaphragm	2	•	•	•	•
28	Back-up Diaphragm	2	N/A	N/A	N/A	N/A
29	Large Clamp Band	2	01-7300-03	01-7300-03	01-7300-05	01-7300-05
30	Large ClampBand Bolt	4	01-6070-03	01-6070-03	01-6070-05	01-6070-05
31	Large Clamp Band Nut	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05
32	Small Clamp Band	4	01-7100-03	01-7100-03	01-7100-05	01-7100-05
33	Small Clamp Band Bolt	8	01-6100-03	01-6100-03	01-6100-05	01-6100-05
34	Small Clamp Band Nut	8	01-6400-03	01-6400-03	01-6400-05	01-6400-05
35	Vertical Bolt	4	01-6080-03	01-6080-03	01-6080-05	01-6080-05
36	Vertical Bolt Nut	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05
37	Vertical Bolt Washer	4	01-6730-03	01-6730-03	01-6730-05	01-6730-05
38	Muffler	1	01-3510-99	01-3510-99	01-3510-99	01-3510-99

[1]Shaft stud is molded into outer piston on all plastic pumps
•Refer to corresponding elastomer chart at end of section

MODEL M1 CHAMP TEFLON®-FITTED

Item	Part Description	Qty. Per Pump	M1/PPPB P/N	M1/KPPB P/N	M1-502/PPPC P/N	M1-502/KPPC P/N	M1-502/TPPB P/N	M1-502/TPPC P/N	M1-622/TPPB P/N	M1-612/TPPC P/N
1	Air Valve Assembly	1	01-2000-07	01-2000-07	01-2000-05	01-2000-05	01-2000-07	01-2000-05	01-2000-07	01-2000-05
2	Air Valve End Cap w/Guide (Top)	1	01-2300-23	01-2300-23	01-2300-23	01-2300-23	01-2300-23	01-2300-23	01-2300-23	01-2300-23
3	Air Valve End Cap w/o Guide (Bottom)	1	01-2330-23	01-2330-23	01-2330-23	01-2330-23	01-2330-23	01-2330-23	01-2330-23	01-2330-23
4	Air Valve End Cap Cover	2	N/A	N/A	01-2420-55	01-2420-55	N/A	01-2420-55	N/A	01-2420-55
5	Air Valve End Cap Bolt	2	N/A	N/A	01-2450-22	01-2450-22	N/A	01-2450-22	N/A	01-2450-22
6	Snap Ring	2	01-2650-03	01-2650-03	01-2650-03	01-2650-03	01-2650-03	01-2650-03	01-2650-03	01-2650-03
7	Buna O-Ring - 115 70 Shore	2	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52
8	Air Valve Gasket	1	01-2600-52	01-2600-52	01-2600-52	01-2600-52	01-2600-55	01-2600-55	01-2600-55	01-2600-55
9	Air Valve Screw	4	01-6000-03	01-6000-03	01-6000-05	01-6000-05	01-6000-03	01-6000-05	01-6000-03	01-6000-05
10	Air Valve Screw Nut	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05	04-6400-03	04-6400-05	04-6400-03	04-6400-05
11	Muffler Plate	1	01-3180-20	01-3180-20	01-3180-20	01-3180-20	01-3180-20	01-3180-20	01-3180-20	01-3180-20
12	Muffler Plate Gasket	1	01-3500-52	01-3500-52	01-3500-52	01-3500-52	01-3500-55	01-3500-55	01-3500-55	01-3500-55
13	Center Section	1	01-3152-20	01-3152-20	01-3152-20	01-3152-20	01-3152-20	01-3152-20	01-3152-20	01-3152-20
14	Center Block O-Ring	4	01-3200-52	01-3200-52	01-3200-52	01-3200-52	01-3200-52	01-3200-52	01-3200-52	01-3200-52
15	Shaft	1	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07
16	Shaft Stud*	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	Piston, Outer	2	01-4570-20-500	01-4570-21-500	01-4570-20-500	01-4570-21-500	01-4570-22-500	01-4570-22-500	01-4570-22-500	01-4570-22-500
18	Piston, Inner	2	01-3710-01	01-3710-01	01-3710-01	01-3710-01	01-3710-01	01-3710-01	01-3710-01	01-3710-01
19	Liquid Chamber	2	01-5000-20	01-5000-21	01-5000-20	01-5000-21	01-5000-22	01-5000-22	01-5000-22	01-5000-22
20	Discharge Manifold Elbow	2	01-5230-20	01-5230-21	01-5230-20	01-5230-21	01-5230-22	01-5230-22	01-5230-22	01-5230-22
21	Inlet Manifold Elbow	2	01-5220-20	01-5220-21	01-5220-20	01-5220-21	01-5220-22	01-5220-22	01-5220-22	01-5220-22
22	Manifold Tee Section	2	01-5160-20	01-5160-21	01-5160-20	01-5160-21	01-5160-22	01-5160-22	01-5160-22-622	01-5160-22-622
23	Manifold O-Ring	4	01-1300-59-500	01-1300-60-500	01-1300-59-500	01-1300-60-500	01-1300-60-500	01-1300-60-500	01-1300-60-500	01-1300-60-500
24	Valve Ball	4	01-1080-55	01-1080-55	01-1080-55	01-1080-55	01-1080-55	01-1080-55	01-1080-55	01-1080-55
25	Valve Seats	4	01-1120-21-500	01-1120-21-500	01-1120-21-500	01-1120-21-500	01-1120-22-500	01-1120-22-500	01-1120-22-500	01-1120-22-500
26	Valve Seat O-Ring	8	00-1230-59	00-1230-60	00-1230-59	00-1230-60	00-1230-60	00-1230-60	00-1230-60	00-1230-60
27	Diaphragm	2	01-1010-55	01-1010-55	01-1010-55	01-1010-55	01-1010-55	01-1010-55	01-1010-55	01-1010-55
28	Back-up Diaphragm	2	01-1060-51	01-1060-51	01-1060-51	01-1060-51	01-1060-51	01-1060-51	01-1060-51	01-1060-51
29	Large Clamp Band	2	01-7300-03	01-7300-03	01-7300-05	01-7300-05	01-7300-03	01-7300-05	01-7300-03	01-7300-05
30	Large Clamp Band Bolt	4	01-6070-03	01-6070-03	01-6070-05	01-6070-05	01-6070-03	01-6070-05	01-6070-03	01-6070-05
31	Large Clamp Band Nut	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05	04-6400-03	04-6400-05	04-6400-03	04-6400-05
32	Small Clamp Band	4	01-7100-03	01-7100-03	01-7100-05	01-7100-05	01-7100-03	01-7100-05	01-7100-03	01-7100-05
33	Small Clamp Band Bolt	8	01-6100-03	01-6100-03	01-6100-05	01-6100-05	01-6100-03	01-6100-05	01-6100-03	01-6100-05
34	Small Clamp Band Nut	8	01-6400-03	01-6400-03	01-6400-05	01-6400-05	01-6400-03	01-6400-05	01-6400-03	01-6400-05
35	Vertical Bolt	4	01-6080-03	01-6080-03	01-6080-05	01-6080-05	01-6080-03	01-6080-05	01-6080-03	01-6080-05
36	Vertical Bolt Nut	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05	04-6400-03	04-6400-05	04-6400-03	04-6400-05
37	Vertical Bolt Washer	4	01-6730-03	01-6730-03	01-6730-05	01-6730-05	01-6730-03	01-6730-05	01-6730-03	01-6730-05
38	Muffler	1	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99

LUBE-FREE MODEL M1 CHAMP TEFLON®-FITTED

Item	Part Description	Qty. Per Pump	M1-200/ PPPZ *LF* P/N	M1-200/ KPPZ *LF* P/N	M1-201/ PPPZ *LF* P/N	M1-201/ KPPZ *LF* P/N	M1-200/ TPPZ *LF* P/N	M1-201/ TPPZ *LF* P/N	M1-625/ TPPZ *LF* P/N	M1-615/ TPPZ *LF* P/N
1	Air Valve Assembly — Lube-free	1	01-2000-65-200	01-2000-65-200	01-2000-65-200	01-2000-65-200	01-2000-65-200	01-2000-65-200	01-2000-65-200	01-2000-65-200
2	Air Valve End Cap w/Plastic Guide (Top)	1	01-2300-23-200	01-2300-23-200	01-2300-23-200	01-2300-23-200	01-2300-23-200	01-2300-23-200	01-2300-23-200	01-2300-23-200
3	Air Valve End Cap w/o Guide (Bottom)	1	01-2330-23	01-2330-23	01-2330-23	01-2330-23	01-2330-23	01-2330-23	01-2330-23	01-2330-23
4	Air Valve End Cap Cover	2	N/A	N/A	01-2420-55	01-2420-55	N/A	01-2420-55	N/A	01-2420-55
5	Air Valve End Cap Bolt — Lube-free	2	N/A	N/A	01-2450-22-201	01-2450-22-201	N/A	01-2450-22-201	N/A	01-2450-22-201
6	Snap Ring	2	01-2650-03	01-2650-03	01-2650-03	01-2650-03	01-2650-03	01-2650-03	01-2650-03	01-2650-03
7	Buna O-Ring - 115 70 Shore	2	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52
8	Air Valve Gasket	1	01-2600-52	01-2600-52	01-2600-52	01-2600-52	01-2600-48	01-2600-48	01-2600-48	01-2600-48
9	Air Valve Screw	4	01-6000-03	01-6000-03	01-6000-05	01-6000-05	01-6000-03	01-6000-05	01-6000-03	01-6000-05
10	Air Valve Screw Nut	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05	04-6400-03	04-6400-05	04-6400-03	04-6400-05
11	Muffler Plate	1	01-3180-20	01-3180-20	01-3180-20	01-3180-20	01-3180-20	01-3180-20	01-3180-20	01-3180-20
12	Muffler Plate Gasket	1	01-3500-52	01-3500-52	01-3500-52	01-3500-52	01-3500-55	01-3500-55	01-3500-55	01-3500-55
13	Polypropylene Center Section — Lube-free	1	01-3152-20-200	01-3152-20-200	01-3152-20-200	01-3152-20-200	01-3152-20-200	01-3152-20-200	01-3152-20-200	01-3152-20-200
14	Buna O-Ring - 115 70 Shore	4	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52	01-2390-52
	Slipper Seal (Not shown)	4	01-3210-55-200	01-3210-55-200	01-3210-55-200	01-3210-55-200	01-3210-55-200	01-3210-55-200	01-3210-55-200	01-3210-55-200
15	Shaft	1	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07
16	Shaft Stud*	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
17	Piston, Outer	2	01-4570-20-500	01-4570-21-500	01-4570-20-500	01-4570-21-500	01-4570-22-500	01-4570-22-500	01-4570-22-500	01-4570-22-500
18	Piston, Inner	2	01-3710-01	01-3710-01	01-3710-01	01-3710-01	01-3710-01	01-3710-01	01-3710-01	01-3710-01
19	Liquid Chamber	2	01-5000-20	01-5000-21	01-5000-20	01-5000-21	01-5000-22	01-5000-22	01-5000-22	01-5000-22
20	Discharge Manifold Elbow	2	01-5230-20	01-5230-21	01-5230-20	01-5230-21	01-5230-22	01-5230-22	01-5230-22	01-5230-22
21	Inlet Manifold Elbow	2	01-5220-20	01-5220-21	01-5220-20	01-5220-21	01-5220-22	01-5220-22	01-5220-22	01-5220-22
22	Manifold Tee Section (Female, Threaded)	2	01-5160-20	01-5160-21	01-5160-20	01-5160-21	01-5160-22	01-5160-22	01-5160-22-622	01-5160-22-622
23	Manifold O-Ring	4	01-1300-59-500	01-1300-60-500	01-1300-59-500	01-1300-60-500	01-1300-60-500	01-1300-60-500	01-1300-60-500	01-1300-60-500
24	Valve Ball	4	01-1080-55	01-1080-55	01-1080-55	01-1080-55	01-1080-55	01-1080-55	01-1080-55	01-1080-55
25	Valve Seats	4	01-1120-21-500	01-1120-21-500	01-1120-21-500	01-1120-21-500	01-1120-22-500	01-1120-22-500	01-1120-22-500	01-1120-22-500
26	Valve Seat O-Ring	8	00-1230-59	00-1230-60	00-1230-59	00-1230-60	00-1230-60	00-1230-60	00-1230-60	00-1230-60
27	Diaphragm	2	01-1010-55	01-1010-55	01-1010-55	01-1010-55	01-1010-55	01-1010-55	01-1010-55	01-1010-55
28	Back-up Diaphragm	2	01-1060-51	01-1060-51	01-1060-51	01-1060-51	01-1060-51	01-1060-51	01-1060-51	01-1060-51
29	Large Clamp Band	2	01-7300-03	01-7300-03	01-7300-05	01-7300-05	01-7300-03	01-7300-05	01-7300-03	01-7300-05
30	Large Clamp Band Bolt	4	01-6070-03	01-6070-03	01-6070-05	01-6070-05	01-6070-03	01-6070-05	01-6070-03	01-6070-05
31	Large Clamp Band Nut	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05	04-6400-03	04-6400-05	04-6400-03	04-6400-05
32	Small Clamp Band	4	01-7100-03	01-7100-03	01-7100-05	01-7100-05	01-7100-03	01-7100-05	01-7100-03	01-7100-05
33	Small Clamp Band Bolt	8	01-6100-03	01-6100-03	01-6100-05	01-6100-05	01-6100-03	01-6100-05	01-6100-03	01-6100-05
34	Small Clamp Band Nut	8	01-6400-03	01-6400-03	01-6400-05	01-6400-05	01-6400-03	01-6400-05	01-6400-03	01-6400-05
35	Vertical Bolt	4	01-6080-03	01-6080-03	01-6080-05	01-6080-05	01-6080-03	01-6080-05	01-6080-03	01-6080-05
36	Vertical Bolt Nut	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05	04-6400-03	04-6400-05	04-6400-03	04-6400-05
37	Vertical Bolt Washer	4	01-6730-03	01-6730-03	01-6730-05	01-6730-05	01-6730-03	01-6730-05	01-6730-03	01-6730-05
38	Muffler	1	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99

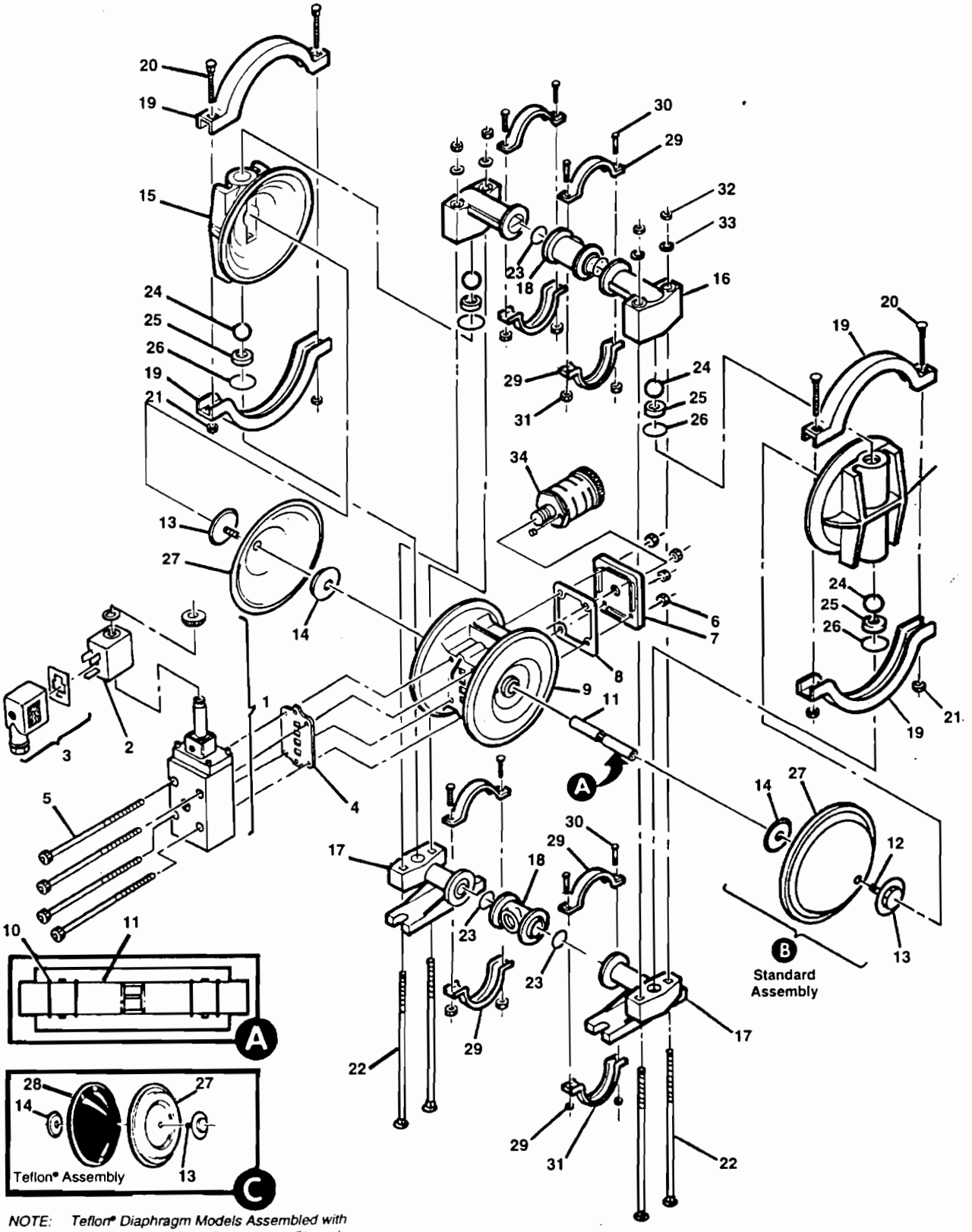
*Shaft stud is molded into outer piston on all plastic pumps.
*Refer to corresponding elastomer chart for correct part numbers.
-200 Specialty Code = Lube-Free
-625 Specialty Code = Ultrapure with Male Connections, Lube-Free
-615 Specialty Code = Ultrapure w/Male Connections, Lube-Free, PFA-Coated Hardware

SECTIONS 7C, 7D, 7E, 7F, 7G

EXPLODED VIEWS

M1 METAL — SOLENOID-OPERATED
M1 CHAMP — SOLENOID-OPERATED
M1 ELASTOMER OPTIONS
M1 ULTRAPURE III
M1 CARBON-FILLED ACETAL

M1
METAL
SOLENOID-OPERATED



NOTE: *Teflon® Diaphragm Models Assembled with Teflon® Gasket Kit At Factory (Not Shown)*

METAL MODEL M1 SOLENOID-OPERATED — DC

			Rubber-Fitted		Teflon®-Fitted		Food Processing	
Item	Part Description	Qty. Per Pump	M1-150/ AYYE P/N	M1-150/ SYYE P/N	M1-150/ AYYE P/N	M1-150/ SYYE P/N	M1-125/ SYYE Rubber P/N	M1-125/ SYYE Teflon® P/N
	24 Volt DC Valve Assembly[1]	1	01-2000-99-150	01-2000-99-150	01-2000-99-150	01-2000-99-150	01-2000-99-150	01-2000-99-150
1	Main Valve Body	1	01-2000-01-150	01-2000-01-150	01-2000-01-150	01-2000-01-150	01-2000-01-150	01-2000-01-150
2	24 Volt DC Coil	1	00-2110-99-150	00-2110-99-150	00-2110-99-150	00-2110-99-150	00-2110-99-150	00-2110-99-150
3	Terminal Connector	1	00-2130-99	00-2130-99	00-2130-99	00-2130-99	00-2130-99	00-2130-99
4	Air Valve Gasket	1	01-2600-52	01-2600-52	01-2600-52	01-2600-52	01-2600-52	01-2600-52
5	Air Valve Cap Screw	4	01-6000-03	01-6000-03	01-6000-03	01-6000-03	01-6000-03	01-6000-03
6	Air Valve Cap Screw Nut	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03
7	Muffler Plate	1	01-3180-23	01-3180-23	01-3180-23	01-3180-23	01-3180-23	01-3180-23
8	Muffler Plate Gasket	1	01-3500-52	01-3500-52	01-3500-52	01-3500-52	01-3500-52	01-3500-52
9	Center Section	1	01-3152-23	01-3152-23	01-3152-23	01-3152-23	01-3152-23	01-3152-23
10	Center Block O-Ring	4	01-3200-52	01-3200-52	01-3200-52	01-3200-52	01-3200-52	01-3200-52
11	Shaft	1	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07
12	Shaft Stud	2	01-6150-08	01-6150-08	01-6150-08	01-6150-08	01-6150-08	01-6150-08
13	Pistons/Outer	2	01-4570-01	01-4570-03	01-4570-01	01-4570-03	01-4570-03	01-4570-03
14	Pistons/Inner	2	01-3710-01-150	01-3710-01-150	01-3710-01-150	01-3710-01-150	01-3710-01-150	01-3710-01-150
15	Water Chamber	2	01-5000-01	01-5000-03	01-5000-01	01-5000-03	01-5000-03	01-5000-03
16	Discharge Manifold Elbow	2	01-5230-01	01-5230-03	01-5230-01	01-5230-03	01-5230-03	01-5230-03
17	Inlet Manifold Elbow	2	01-5220-01	01-5220-03	01-5220-01	01-5220-03	01-5220-03	01-5220-03
18	Manifold "T" Section	2	01-5160-01	01-5160-03	01-5160-01	01-5160-03	01-5160-03-70	01-5160-03-70
19	Clamp Band (Large)	2	01-7300-03	01-7300-03	01-7300-03	01-7300-03	01-7300-03	01-7300-03
20	Large Clamp Band Bolt	4	01-6070-03	01-6070-03	01-6070-03	01-6070-03	01-6070-03	01-6070-03
21	Large Clamp Band Nut	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6650-03-70	04-6650-03-70
22	Vertical Bolt	4	01-6080-03	01-6080-03	01-6080-03	01-6080-03	01-6080-03	01-6080-03
23	Manifold O-Ring	4	*	*	01-1300-55	01-1300-55	01-1300-55	01-1300-55
24	Valve Ball	4	*	*	01-1080-55	01-1080-55	01-1080-56	01-1080-55
25	Valve Seat	4	01-1120-01	01-1120-03	01-1120-01	01-1120-01	01-1120-03	01-1120-03
26	Valve Seat O-Ring	4	*	*	01-1200-55	01-1200-55	01-1200-56	01-1200-55
27	Diaphragm	2	*	*	01-1010-55	01-1010-55	01-1010-56	01-1010-55
28	Back-up Diaphragm	2	N/R	N/R	01-1060-51	01-1060-51	N/R	01-1060-51
29	Clamp Band (Small)	4	01-7100-03	01-7100-03	01-7100-03	01-7100-03	01-7100-03	01-7100-03
30	Small Clamp Band Bolt	8	01-6100-03	01-6100-03	01-6100-03	01-6100-03	01-6100-03	01-6100-03
31	Small Clamp Band Nut	8	01-6400-03	01-6400-03	01-6400-03	01-6400-03	01-6400-03	01-6400-03
32	Vertical Bolt Nut	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03
33	Vertical Bolt Washer	4	01-6730-03	01-6730-03	01-6730-03	01-6730-03	01-6730-03	01-6730-03
34	Muffler	1	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99

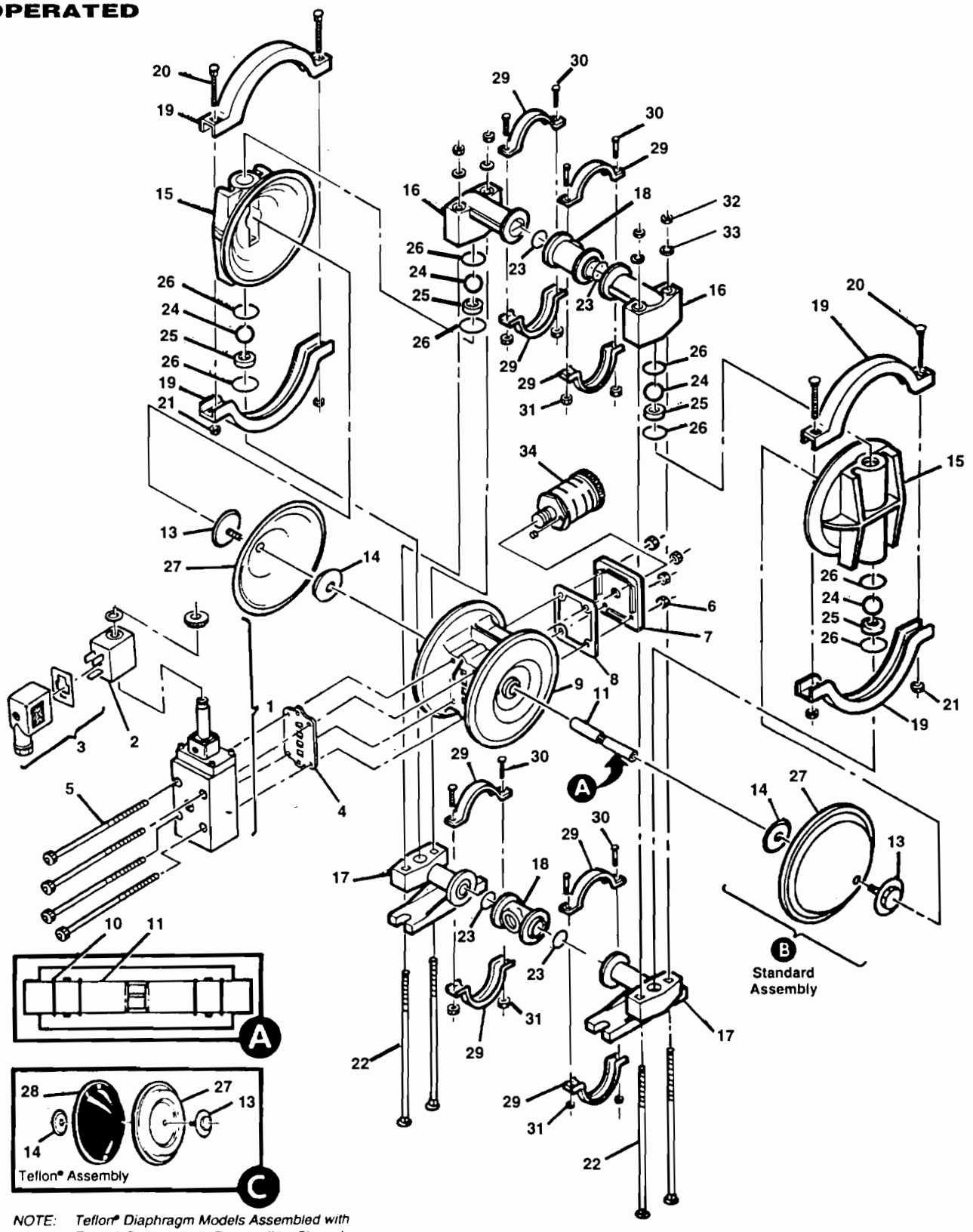
[1]Air valve assembly includes items 1, 2 and 3.

*Refer to end of section for elastomer options.

-150 Specialty Code = 24V DC Solenoid

-125 Specialty Code = Food Processing w/24V DC Solenoid

M1 CHAMP SOLENOID-OPERATED



NOTE: Teflon® Diaphragm Models Assembled with Teflon® Gasket Kit At Factory (Not Shown)

PLASTIC MODEL M1 SOLENOID-OPERATED — DC (RUBBER/TPE-FITTED)

			Rubber-Fitted		Teflon®-Fitted			
Item	Part Description	Qty. Per Pump	M1-150/PPPE P/N	M1-150/KPPE P/N	M1-150/PPPE P/N	M1-150/KPPE P/N	M1-150/TPPE P/N	M1-184/TPPE P/N
	24 Volt DC Valve Assembly[1]	1	01-2000-99-150	01-2000-99-150	01-2000-99-150	01-2000-99-150	01-2000-99-150	01-2000-99-150
1	Main Valve Body	1	01-2000-01-150	01-2000-01-150	01-2000-01-150	01-2000-01-150	01-2000-01-150	01-2000-01-150
2	24 Volt DC Coil	1	00-2110-99-150	00-2110-99-150	00-2110-99-150	00-2110-99-150	00-2110-99-150	00-2110-99-150
3	Terminal Connector	1	00-2130-99	00-2130-99	00-2130-99	00-2130-99	00-2130-99	00-2130-99
4	Air Valve Gasket	1	01-2600-52	01-2600-52	01-2600-52	01-2600-52	01-2600-52	01-2600-52
5	Air Valve Screw	4	01-6000-03	01-6000-03	01-6000-03	01-6000-03	01-6000-03	01-6000-05
6	Air Valve Screw Nut	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-05
7	Muffler Plate	1	01-3180-20	01-3180-23	01-3180-20	01-3180-20	01-3180-20	01-3180-20
8	Muffler Plate Gasket	1	01-3500-52	01-3500-52	01-3500-52	01-3500-52	01-3500-52	01-3500-52
9	Center Section	1	01-3152-20	01-3152-20	01-3152-20	01-3152-20	01-3152-20	01-3152-20
10	Center Block O-Ring	4	01-3200-52	01-3200-52	01-3200-52	01-3200-52	01-3200-52	01-3200-52
11	Shaft	1	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07
12	Shaft Stud	2	N/A	N/A	N/A	N/A	N/A	N/A
13	Piston, Outer	2	01-4570-20-500	01-4570-21-500	01-4570-20-500	01-4570-21-500	01-4570-22-500	01-4570-22-500
14	Piston, Inner	2	01-3710-01-150	01-3710-01-150	01-3710-01-150	01-3710-01-150	01-3710-01-150	01-3710-01-150
15	Liquid Chamber	2	01-5000-20	01-5000-21	01-5000-20	01-5000-21	01-5000-22	01-5000-22
16	Discharge Manifold Elbow	2	01-5230-20	01-5230-21	01-5230-20	01-5230-21	01-5230-22	01-5230-22
17	Inlet Manifold Elbow	2	01-5220-20	01-5220-21	01-5220-20	01-5220-21	01-5220-22	01-5220-22
18	Manifold Tee Section (Female, Threaded)	2	01-5160-20	01-5160-21	01-5160-20	01-5160-21	01-5160-22	01-5160-22
19	Large Clamp Band	2	01-7300-03	01-7300-03	01-7300-03	01-7300-03	01-7300-03	01-7300-05
20	Large Clamp Band Bolt	4	01-6070-03	01-6070-03	01-6070-03	01-6070-03	01-6070-03	01-6070-05
21	Large Clamp Band Nut	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-05
22	Vertical Bolt	4	01-6080-03	01-6080-03	01-6080-03	01-6080-03	01-6080-03	01-6080-05
23	Manifold O-Ring	4	*	*	01-1300-59-500	01-1300-60-500	01-1300-60-500	01-1300-60-500
24	Valve Ball	4	*	*	01-1080-55	01-1080-55	01-1080-55	01-1080-55
25	Valve Seats	4	01-1120-21-500	01-1120-21-500	01-1120-21-500	01-1120-21-500	01-1120-22-500	01-1120-22-500
26	Valve Seat O-Ring	8	*	*	00-1230-59	00-1230-59	00-1230-59	00-1230-59
27	Diaphragm	2	*	*	01-1010-55	01-1010-55	01-1010-55	01-1010-55
28	Back-up Diaphragm	2	N/A	N/A	01-1060-51	01-1060-51	01-1060-51	01-1060-51
29	Small Clamp Band	4	01-7100-03	01-7100-03	01-7100-03	01-7100-03	01-7100-03	01-7100-05
30	Small Clamp Band Bolt	8	01-6100-03	01-6100-03	01-6100-03	01-6100-03	01-6100-03	01-6100-05
31	Small Clamp Band Nut	8	01-6400-03	01-6400-03	01-6400-03	01-6400-03	01-6400-03	01-6400-05
32	Vertical Bolt Nut	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-05
33	Vertical Bolt Washer	4	01-6730-03	01-6730-03	01-6730-03	01-6730-03	01-6730-03	01-6730-05
34	Muffler	1	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99	01-3510-99

[1]Air valve assembly includes items 1, 2 and 3.
*Refer to end of section for elastomer options.

-150 Specialty Code = 24V DC Solenoid
-184 Specialty Code = 24V DC Solenoid, PFA-Coated Hardware

SOLENOID-OPERATED VALVE ASSEMBLY OPTIONS (CONSISTS OF VALVE BODY, COIL AND CONNECTOR)

Pump Models Designating Specialty Code #	Part Number	Description
151	01-2000-99-151	24V AC / 12V DC Valve Assembly
153	01-2000-99-153	24V AC / 12V DC Valve Assembly (NEMA 7)
150	01-2000-99-150	24V DC Valve Assembly
154	01-2000-99-154	24V DC Valve Assembly (NEMA 7)
157	01-2000-99-157	24V DC Valve Assembly[1]
155	01-2000-99-155	110V AC Valve Assembly
156	01-2000-99-156	110V AC Valve Assembly (NEMA 7)

ITEM 1 MAIN VALVE BODY OPTIONS

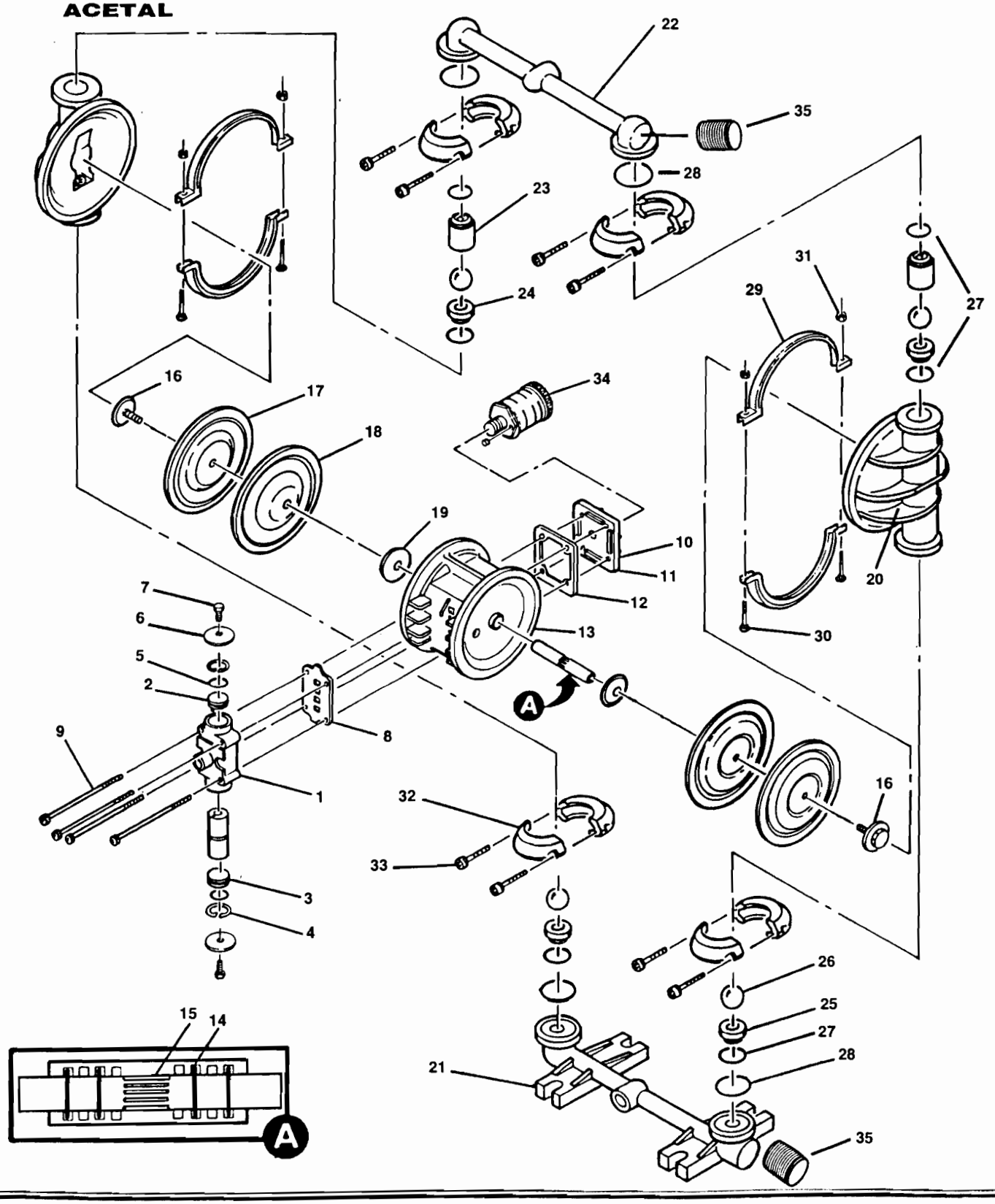
Part Number	Description
01-2000-01-150	Main Valve Body
01-2000-01-154	Main Valve Body (Nema 7)

ITEM 2 COIL OPTIONS

Pump Models Designating Specialty Code #	Part Number	Description
150	00-2110-99-150	24V DC Coil
151	00-2110-99-151	24V AC Coil
153	00-2110-99-153	24V AC, NEMA 7 Coil
154	00-2110-99-154	24V DC, NEMA 7 Coil
155	00-2110-99-155	110V AC Coil
156	00-2110-99-156	110V AC NEMA 7 Coil
157	00-2110-99-157	International 24V DC Coil

M1

ULTRAPURE II, ULTRAPURE III AND CARBON-FILLED ACETAL



MODEL M1 ULTRAPURE III TEFLON®-FITTED, LUBE-FREE

Item	Part Description	Qty. Per Pump	M1-520/ TPPZ *LF* P/N	M1-521/ TPPZ *LF* P/N	M1-522/ TPPZ *LF* P/N	M1-523/ TPPZ *LF* P/N
1	Air Valve Assembly — Lube-free	1	01-2000-65-200	01-2000-65-200	01-2000-65-200	01-2000-65-200
2	Air Valve End Cap w/Plastic Guide	1	01-2300-23-200	01-2300-23-200	01-2300-23-200	01-2300-23-200
3	Air Valve End Cap w/o Guide	1	01-2330-23	01-2330-23	01-2330-23	01-2330-23
4	Snap Ring	2	01-2650-03	01-2650-03	01-2650-03	01-2650-03
5	Buna O-Ring - 115 70 Shore	2	01-2390-52	01-2390-52	01-2390-52	01-2390-52
6	End Cap Cover	2	N/A	01-2420-55	N/A	01-2420-55
7	End Cap Bolt	2	N/A	01-2450-22-200	N/A	01-2450-22-201
8	Air Valve Gasket	1	01-2600-48	01-2600-48	01-2600-48	01-2600-48
9	Air Valve Cap Screws	4	01-6000-03	01-6000-05	01-6000-03	01-6000-05
10	Air Valve Nut	4	04-6400-03	04-6400-05	04-6400-03	04-6400-05
11	Muffler Plate	1	01-3180-20	01-3180-20	01-3180-20	01-3180-20
12	Muffler Plate Gasket	1	01-3500-55	01-3500-55	01-3500-55	01-3500-55
13	Polypropylene Center Section — Lube-free	1	01-3152-20-200	01-3152-20-200	01-3152-20-200	01-3152-20-200
	Slipper Seal (Not shown)	4	01-3210-55-200	01-3210-55-200	01-3210-55-200	01-3210-55-200
14	Buna O-Ring - 115 70 Shore	4	01-2390-52	01-2390-52	01-2390-52	01-2390-52
15	Shaft	1	01-3800-09-07	01-3800-09-07	01-3800-09-07	01-3800-09-07
16	Outer Piston	2	01-4570-22-500	01-4570-22-500	01-4570-22-500	01-4570-22-500
17	Teflon® PTFE Primary Diaphragm	2	01-1010-55	01-1010-55	01-1010-55	01-1010-55
18	Containment Diaphragm	2	01-1060-61	01-1060-61	01-1060-61	01-1060-61
19	Inner Piston	2	01-3710-01	01-3710-01	01-3710-01	01-3710-01
20	Water Chamber	2	01-5000-22	01-5000-22	01-5000-22	01-5000-22
21	Inlet Manifold	1	01-5080-22-520	01-5080-22-520	01-5080-22-522	01-5080-22-522
22	Discharge Manifold	1	01-5020-22-520	01-5020-22-520	01-5020-22-522	01-5020-22-522
23	Ball Cage	2	01-5350-22-520	01-5350-22-520	01-5350-22-520	01-5350-22-520
24	Valve Seat (Top)	2	01-1140-55	01-1140-55	01-1140-55	01-1140-55
25	Valve Seat (Bottom)	2	01-1160-55	01-1160-55	01-1160-55	01-1160-55
26	Valve Ball	4	01-1080-55	01-1080-55	01-1080-55	01-1080-55
27	Chemraz® Valve Seat O-Ring	6	01-1200-33-540	01-1200-33-540	01-1200-33-540	01-1200-33-540
28	Chemraz® Outboard O-Ring	4	01-1370-33	01-1370-33	01-1370-33	01-1370-33
29	Large Clamp Band	2	01-7300-03-520	01-7300-05-521	01-7300-03-520	01-7300-05-521
30	Large Carriage Bolt	4	01-6070-03	01-6070-05	01-6070-03	01-6070-05
31	Large Hex Nut	4	04-6400-03	04-6400-05	04-6400-03	04-6400-05
32	Small Clamp Band	4	01-7100-03-520	01-7100-05-521	01-7100-03-520	01-7100-05-521
33	Small Clamp Band Bolt*	8	01-6040-03-520	01-6040-05-521	01-6040-03-520	01-6040-05-521
34	Muffler	1	01-3510-99	01-3510-99	01-3510-99	01-3510-99

M1-520/TPPZ — Teflon® PFA with Teflon® PTFE elastomers, female threaded inlet/discharge connections and standard hardware.
M1-521/TPPZ — Teflon® PFA with Teflon® PTFE elastomers, female threaded inlet/discharge connections and Teflon®-coated hardware.
M1-522/TPPZ — Teflon® PFA with Teflon® PTFE elastomers, male non-threaded inlet/discharge connections and standard hardware.
M1-523/TPPZ — Teflon® PFA with Teflon® PTFE elastomers, male non-threaded inlet/discharge connections and Teflon®-coated hardware.

MODEL M1 CARBON-FILLED ACETAL, LUBE-FREE

Item	Part Description	Qty. Per Pump	M1-200/ GGGQ Rubber P/N	M1-200/ GGGQ Teflon® P/N
1	Air Valve Assembly — Lube-free	1	01-2000-70-200	01-2000-70-200
2	Air Valve End Cap w/Guide	1	01-2300-23-200	01-2300-23-200
3	Air Valve End Cap w/o Guide	1	01-2330-23	01-2330-23
4	Snap Ring	2	01-2650-03	01-2650-03
5	Buna O-Ring - 115 70 Shore	2	01-2390-52	01-2390-52
6	End Cap Cover	2	N/A	N/A
7	End Cap Bolt	2	N/A	N/A
8	Air Valve Gasket	1	01-2600-52	01-2600-52
9	Air Valve Screw	4	01-6000-03	01-6000-03
10	Air Valve Nut	4	04-6400-03	04-6400-03
11	Muffler Plate	1	01-3180-16	01-3180-16
12	Muffler Plate Gasket	1	01-3500-52	01-3500-52
13	Carbon-filled Acetal Center Section	1	01-3152-16-200	01-3152-16-200
	Slipper Seal (Not shown)	4	01-3210-55-200	01-3210-55-200
14	O-Ring	4	01-2390-52	01-2390-52
15	Shaft	1	01-3800-09-07	01-3800-09-07
16	Outer Piston	2	01-4570-16	01-4570-16
17	Primary Diaphragm	2	—	01-1010-55
18	Containment Diaphragm	2	N/A	01-1060-51
19	Inner Piston	2	01-3710-01	01-3710-01
20	Liquid Chamber	2	01-5000-16	01-5000-16
21	Inlet Manifold	1	01-5080-16	01-5080-16
22	Discharge Manifold	1	01-5020-16	01-5020-16
23	Ball Cage	2	01-5350-16	01-5350-16
24	Valve Seat (Top)	2	01-1140-16	01-1140-16
25	Valve Seat (Bottom)	2	01-1160-16	01-1160-16
26	Valve Ball	4	—	01-1080-55
27	Valve Seat O-Ring	6	—	01-1200-60-520
28	Outboard O-Ring	4	02-1200-60-500	02-1200-60-500
29	Large Clamp Band Assembly*	2	01-7300-03	01-7300-03
30	Large Carriage Bolt	4	01-6070-03	01-6070-03
31	Large Hex Nut	4	04-6400-03	04-6400-03
32	Small Clamp Band Assembly*	4	01-7100-03	01-7100-03
33	Small Clamp Band Bolt	8	01-6100-03	01-6100-03
	Small Hex Nut (not shown)	9	01-6400-03	01-6400-03
34	Muffler	1	01-3510-99	01-3510-99
35	Pipe Plug	1	01-7010-16	01-7010-16
36	Grounding Strap (Not shown)	1	00-8300-99	00-8300-99

*Actual clamp band different than pictured.

SECTION 8

ELASTOMERS FOR M1 CHAMP MODELS

MATERIAL	DIAPHRAGM P/N	VALVE BALL P/N	VALVE SEAT P/N	VALVE SEAT O-RING P/N	MANIFOLD O-RING P/N
Polyurethane	01-1010-50	01-1080-50	N/A	01-1200-50	01-1300-50
Buna N	01-1010-52	01-1080-52	N/A	01-1200-52	01-1300-52
Viton	01-1010-53	01-1080-53	01-1120-53*	N/A	01-1300-53
Wil-Flex™	01-1010-58	01-1080-58	N/A	01-1200-58	01-1300-58
Saniflex	01-1010-56	01-1080-56	N/A	01-1200-56	01-1300-56
Teflon® PTFE	01-1010-55	01-1080-55	01-1120-22-500	N/A	01-1300-55
PVDF	N/A	N/A	01-1120-21-500	N/A	N/A
Teflon® Encapsulated/ Silicon	N/A	N/A	N/A	00-1230-59	N/A
Teflon® Encapsulated/ Viton	N/A	N/A	N/A	00-1230-60	N/A

*Must be used with part number 01-5010-21-500.

ELASTOMERS FOR M1 METAL MODELS

MATERIAL	DIAPHRAGM P/N	VALVE BALL P/N	VALVE SEAT P/N	VALVE SEAT O-RING P/N	MANIFOLD O-RING P/N
Polyurethane	01-1010-50	01-1080-50	N/A	01-1200-50	01-1300-50
Buna N	01-1010-52	01-1080-52	N/A	01-1200-52	01-1300-52
Viton	01-1010-53	01-1080-53	N/A	N/A	N/A
Wil-Flex™	01-1010-58	01-1080-58	N/A	01-1200-58	01-1300-58
Saniflex	01-1010-56	01-1080-56	N/A	01-1200-56	01-1300-56
Teflon® PTFE	01-1010-55	01-1080-55	N/A	01-1200-55	01-1300-55
Stainless Steel	N/A	N/A	01-1120-03	N/A	N/A
Aluminum	N/A	N/A	01-1120-01	N/A	N/A

TORQUE SPECIFICATIONS FOR MODEL M1 (PLASTIC AND METAL)

ITEM #	DESCRIPTION OF PART	REQUIRED TORQUE
1	Air Valve, Standard & Solenoid	20 in.-lbs. [2.3 m-N]
2	Outer Piston	75 in.-lbs. [8.7 m-N]
3	Small Clamp Band	15 in.-lbs. [1.7 m-N]
4	Large Clamp Band (Rubber-Fitted)	65 in.-lbs. [7.4 m-N]
5	Large Clamp Band (Teflon-Fitted)	85 in.-lbs. [9.6 m-N]
6	Vertical Bolts (Metal Pump)	125 in.-lbs. [14.1 m-N]
7	Vertical Bolts (Kynar [rubber only], all poly)	50 in.-lbs. [5.6 m-N]
8	Vertical Bolts (Kynar and PFA — Teflon-Fitted)	25 in.-lbs. [2.8 m-N]
9	Air Valve (All PFA pumps)	30 in.-lbs. [3.4 m-N]
10	Small Clamp Bands (All PFA pumps)	30 in.-lbs. [3.4 m-N]
11	Air Valve — Lube-Free	20 in.-lbs. [2.3 m-N]

MAINTENANCE RECORD

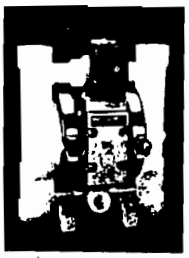
DATE	SERVICE RENDERED	SERVICED BY

WILDEN'S SPECIALTY PUMPS

M8 STALLION

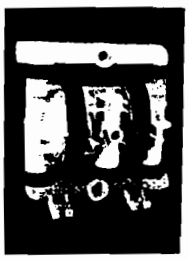
2" inlet. Solids clearance up to ⅜". Built to handle rough treatment. cast-in handles for easy portability, reinforced shaft and high impact polyurethane base.

SOLENOID-OPERATED



Each stroke of this pump is controlled by electrical impulses making it ideal for batching, metering, and other electrically controlled dispensing applications.

M1 ULTRAPURE III



½" inlet. Teflon® PFA construction, temperatures to 300°F. Up to 14 GPM. Materials of construction have been selected to reduce contamination while providing a safer work environment.

SANIFLO

Constructed with FDA approved materials: bead blasted 316 Stainless Steel construction with tri-clamp porting and wing-nut fasteners. Foodmaster™ (pictured) is USDA accepted.

THE WILDEN PUMP LINE

M.025 (CHAMP SERIES)

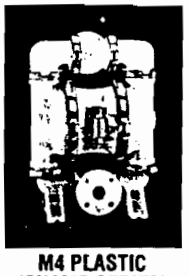
MODEL M.025

- ¼" Inlet
- 125 Max. PSIG
- Up To 4.5 GPM
- Max. Particle Size: ¼"

Materials of Construction:
PVDF, Acetal, Polypropylene, Carbon-filled Acetal

Suction Lift:

(Rubber)	Dry:	4.5'
	Wet:	25'
(Teflon®)	Dry:	4.5'
	Wet:	25'



M4 PLASTIC (CHAMP SERIES)

MODEL M4

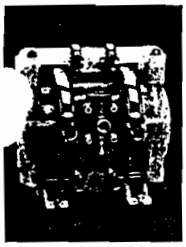
- 1½" Inlet
- 125 Max. PSIG
- Up To 73 GPM
- Max. Particle Size: ⅜"

Materials of Construction:
Aluminum, Cast Iron, Stainless Steel, Hastelloy, Polypropylene, PVDF, Teflon® PFA

Suction Lift:		Plastic	Metal
(Rubber)	Dry:	17'	21'
	Wet:	25'	25'
(Teflon®)	Dry:	7'	7'
	Wet:	25'	25'

M4 METAL

LUBE-FREE AVAILABLE



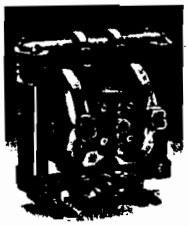
M1 PLASTIC (CHAMP SERIES)

MODEL M1

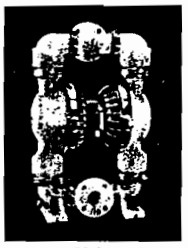
- ½" Inlet
- 110 Max. PSIG
- Up To 14 GPM
- Max. Particle Size: ⅛"

Materials of Construction:
Polypropylene, PVDF, Teflon®, Graphite-filled Polypropylene, Aluminum, Stainless Steel

Suction Lift:		Plastic	Metal
(Rubber)	Dry:	10'	10'
	Wet:	25'	25'
(Teflon®)	Dry:	7'	8'
	Wet:	25'	25'



M1 METAL



M8 PLASTIC (CHAMP SERIES)

MODEL M8

- 2" Inlet
- 125 Max. PSIG
- Up To 155 GPM
- Max. Particle Size: ¼"

Materials of Construction:
Aluminum, Cast Iron, Stainless Steel, Hastelloy, PVDF, Polypropylene

Suction Lift:		Plastic	Metal
(Rubber)	Dry:	17'	20'
	Wet:	25'	25'
(Teflon®)	Dry:	8'	8'
	Wet:	25'	25'

M8 METAL

LUBE-FREE AVAILABLE

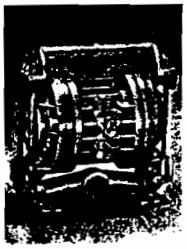
M2R PLASTIC (CHAMP SERIES)

MODEL M2

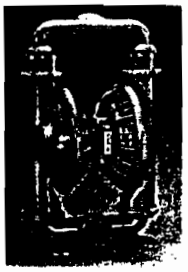
- 1" Inlet
- 125 Max. PStG
- Up To 37 GPM
- Max. Particle Size: ¼"

Materials of Construction:
Aluminum, Stainless Steel, Hastelloy, Polypropylene, PVDF

Suction Lift:		Plastic	Metal
(Rubber)	Dry:	17'	19'
	Wet:	25'	25'
(Teflon®)	Dry:	7'	8'
	Wet:	25'	25'



M2 METAL



M15

MODEL M15

- 3" Inlet
- 125 Max. PSIG
- Up To 230 GPM
- Max. Particle Size: ½"

Materials of Construction:
Aluminum, Cast Iron, Stainless Steel, Hastelloy

Suction Lift:

(Rubber)	Dry:	17'
	Wet:	25'
(Teflon®)	Dry:	14'
	Wet:	25'

M20

MODEL M20

- 4" Inlet
- 125 Max. PSIG
- Up To 304 GPM
- Max. Particle Size: 1½"

Materials of Construction:
Cast Iron

Suction Lift:
Dry: 13'
Wet: 25'

For further information contact your local Wilden distributor:

WILDEN PUMP & ENGINEERING COMPANY
22069 Van Buren St., Grand Terrace, CA 92313-5651
Telephone (909) 422-1730 • Fax (909) 783-3440

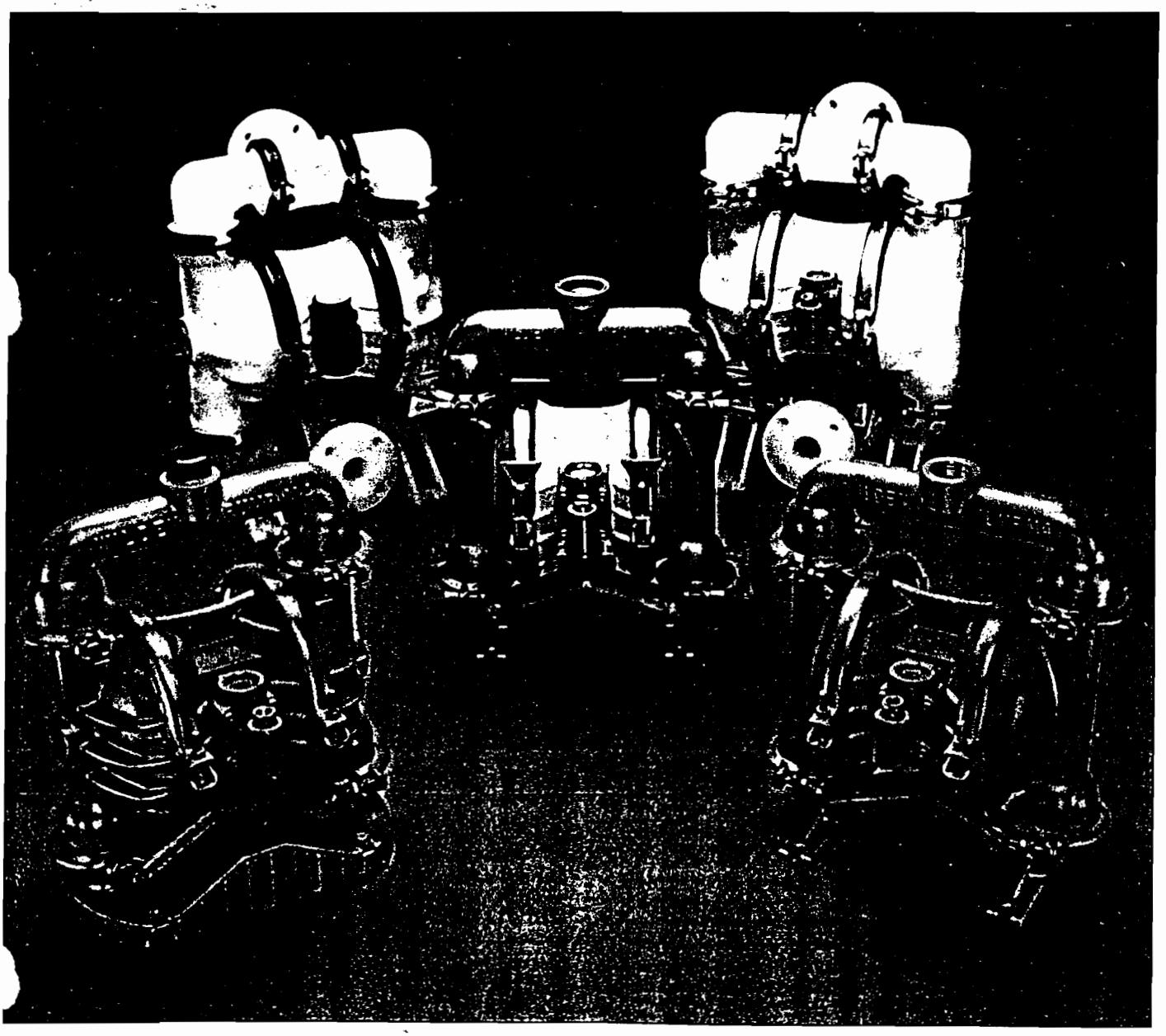
ISO 9001 Est. 1955 QUALITY SYSTEM

WILDEN®

AIR OPERATED DOUBLE DIAPHRAGM PUMPS

M4 Engineering Operation and Maintenance

MODEL M4 METAL
MODEL M4 CHAMP
MODEL M4 FOOD PROCESSING
MODEL M4 ULTRAPURE



RBG P/S-04 1/97

THE WILDEN PUMP — HOW IT WORKS

The Wilden diaphragm pump is an air-operated, positive displacement, self-priming pump. These drawings show flow pattern through the pump upon its initial stroke. It is assumed the pump has no fluid in it prior to its initial stroke.

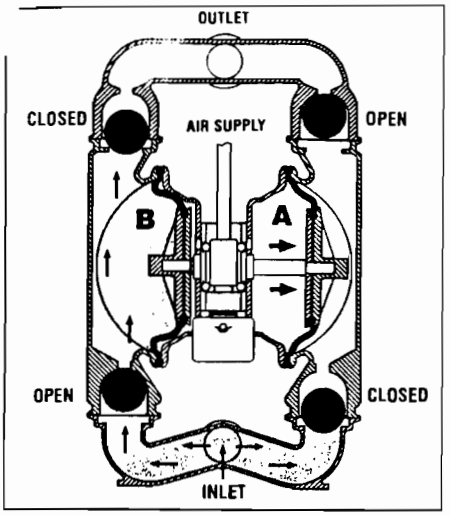


FIGURE 1 The air valve directs pressurized air to the back side of diaphragm A. The compressed air is applied directly to the liquid column separated by elastomer diaphragms. The diaphragm acts as a separation membrane between the compressed air and liquid, balancing the load and removing mechanical stress from the diaphragm which allows for millions of flex cycles. The compressed air moves the diaphragm away from the center block of the pump. The opposite diaphragm is pulled in by the shaft connected to the pressurized diaphragm. Diaphragm B is now on its suction stroke; air behind the diaphragm has been forced out to the atmosphere through the exhaust port of the pump. Diaphragm A is working against atmospheric air pressure. The movement of diaphragm B toward the center block of the pump creates a vacuum within chamber B. Atmospheric pressure forces fluid into the inlet manifold forcing the inlet valve ball off its seat. Liquid is free to move past the inlet valve ball and fill the liquid chamber.

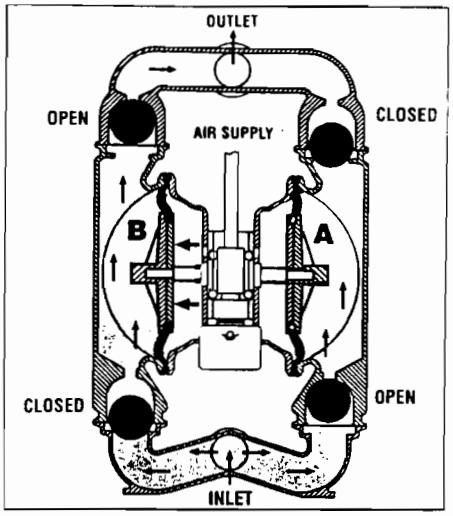


FIGURE 2 When the pressurized diaphragm, diaphragm A, reaches the limit of its discharge stroke, the air valve redirects pressurized air to the back side of diaphragm B. The pressurized air forces diaphragm B away from the center block while pulling diaphragm A to the center block. Diaphragm B is now on its discharge stroke. Diaphragm B forces the inlet valve ball onto its seat due to the hydraulic forces developed in the liquid chamber and manifold of the pump. These same hydraulic forces lift the discharge valve ball off its seat, while the opposite discharge valve ball is forced onto its seat, forcing fluid to flow through the pump discharge. The movement of diaphragm A to the center block of the pump creates a vacuum within liquid chamber A. Atmospheric pressure forces fluid into the inlet manifold of the pump. The inlet valve ball is forced off its seat allowing the fluid being pumped to fill the liquid chamber.

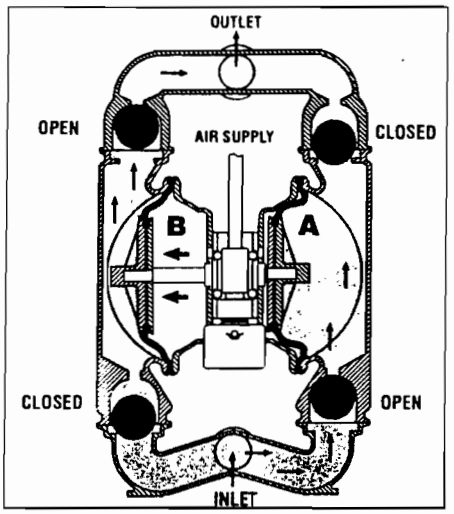
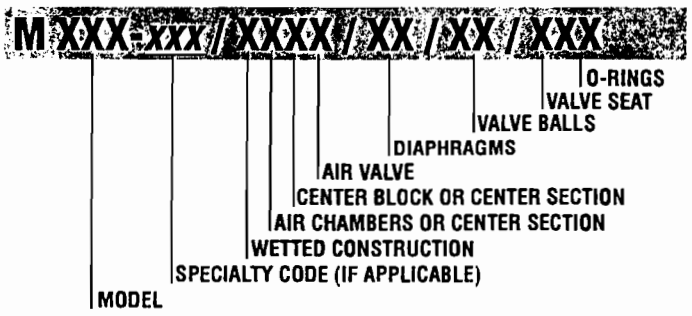


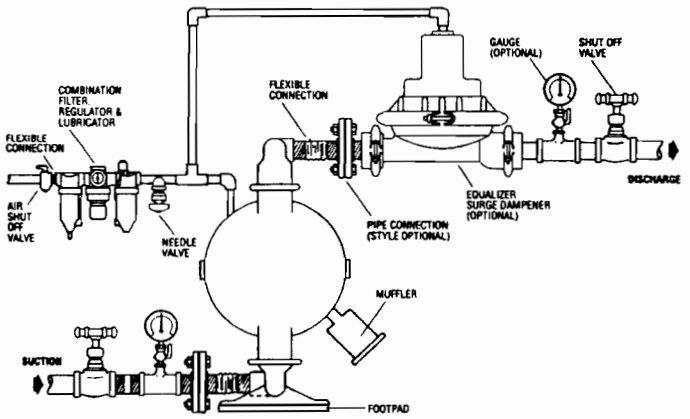
FIGURE 3 At completion of the stroke, the air valve again redirects air to the back side of diaphragm A, which starts diaphragm B on its exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one exhaust and one discharge stroke. This constitutes one complete pumping cycle. The pump may take several cycles to completely prime depending on the conditions of the application.

WILDEN PUMP DESIGNATION SYSTEM



In the case where a center section is used instead of a center block and air chambers, the designation will be as follows: Aluminum = AA, Polypropylene = PP, Carbon-filled Acetal = GG, Nylon = YY, Acetal = LL

SUGGESTED INSTALLATION



CAUTIONS! READ FIRST

NOTE: UL-listed pumps must not exceed 50 psig air supply pressure.

Temperature Limits:		
Polypropylene	+32°F to +175°F	0°C to 79°C
PVDF	+10°F to +225°F	–12°C to 107°C
Teflon® PFA	+20°F to +225°F	7°C to 107°C

CAUTION: Maximum temperature limits are based upon mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperatures. Consult engineering guide for chemical compatibility and temperature limits.

CAUTION: ALWAYS WEAR SAFETY GLASSES WHEN OPERATING PUMP. WHEN DIAPHRAGM RUPTURE OCCURS, MATERIAL BEING PUMPED MAY BE FORCED OUT AIR EXHAUST.

"Champ" series pumps are made of virgin plastic and are not UV stabilized. Direct sunlight for prolonged periods can cause deterioration of plastics.

NOTE: Pump must be lubricated. Wilden suggests an arctic 5 weight oil (ISO grade 15).

WARNING: Prevention of static sparking — If static sparking occurs, fire or explosion could result. Pump, valves, and containers must be grounded when handling flammable fluids and whenever discharge of static electricity is a hazard. To ground the Wilden "Champ," all clamp bands must be grounded to a proper grounding point.

®TEFLON IS A REGISTERED TRADEMARK OF E.I. DUPONT CORP.

TABLE OF CONTENTS

CAUTION: DO NOT EXCEED 125 PSIG AIR SUPPLY PRESSURE. (50 PSI ON UL MODELS.)

CAUTION: Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container.

BLOW OUT AIR LINE FOR 10 TO 20 SECONDS BEFORE ATTACHING TO PUMP TO MAKE SURE ALL PIPE LINE DEBRIS IS CLEAR. USE AN IN-LINE AIR FILTER.

NOTE: When installing Teflon® diaphragms, it is important to tighten outer pistons simultaneously (turning in opposite direction) to ensure a tight fit.

CAUTION: When removing the end cap using compressed air, the air valve end cap may come out with considerable force. Hand protection such as a padded glove or a rag should be used to capture the end cap.

NOTE: Before starting disassembly, mark a line from each liquid chamber to its corresponding air chamber. This line will assist in proper alignment during reassembly.

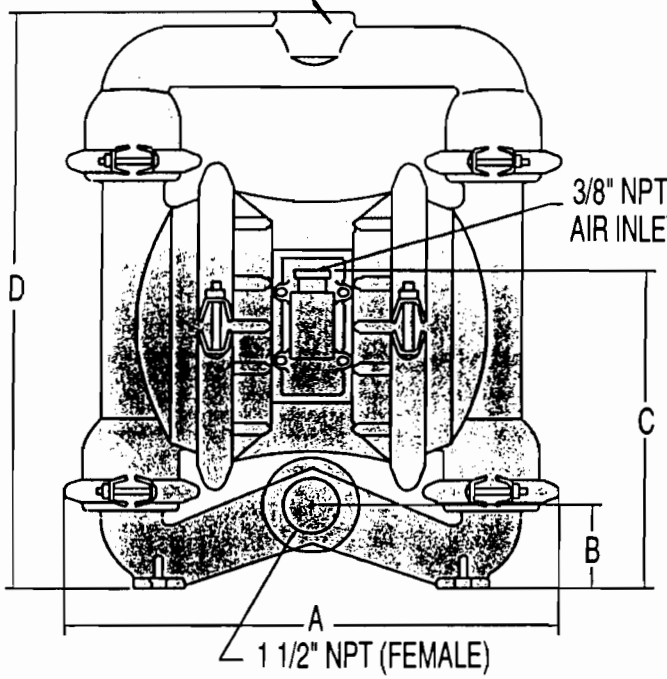
NOTE: On pumps equipped with Teflon® diaphragms, balls, and sealing rings, Teflon® gaskets should be used between the flanges of the manifold.

NOTE: AIR VALVE AND CENTER SECTION DISASSEMBLY/ REASSEMBLY IS SHOWN IN SECTION 6C.

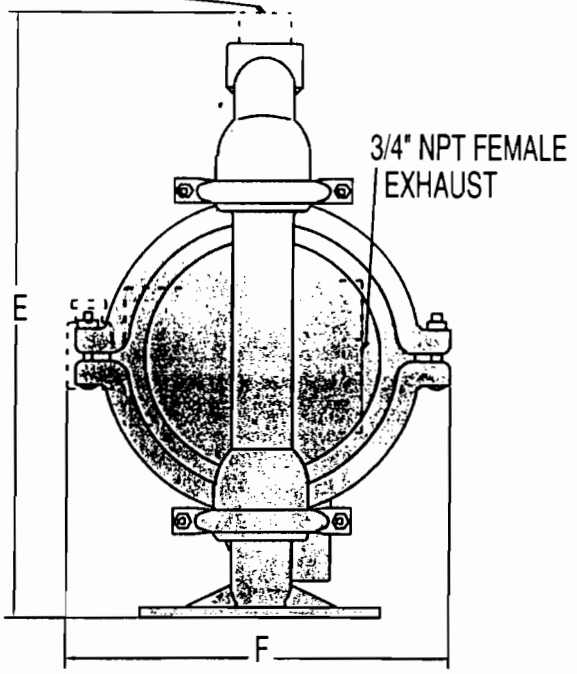
SECTION 1A

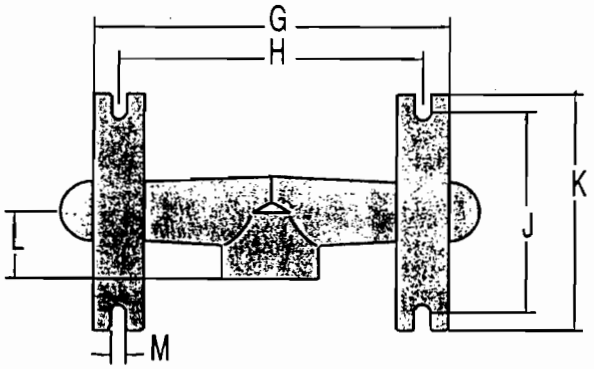
DIMENSIONAL DRAWING
IODEL M4 METAL PUMP

CAST IRON, STAINLESS STEEL & HASTELLOY
1 1/4" NPT (FEMALE)



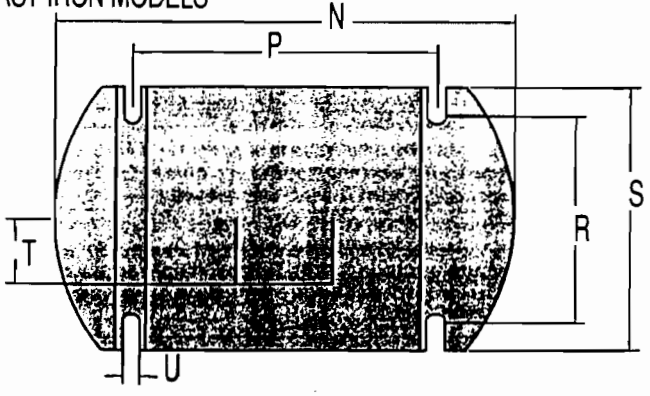
ALUM. - 1 1/4" NPT (MALE)





FOOTED BASE FOR STAINLESS STEEL &
HASTELLOY MODELS

BASE FOR ALUMINUM &
CAST IRON MODELS

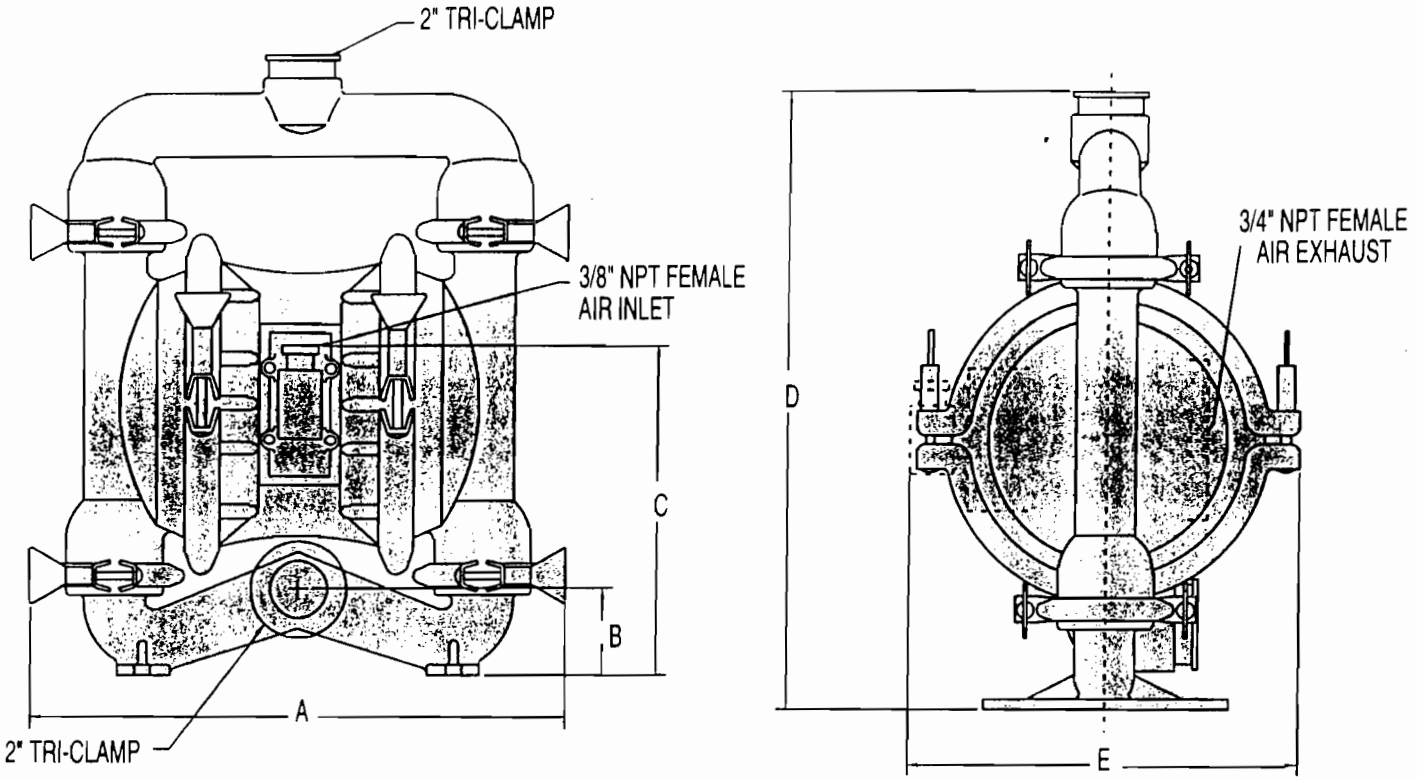


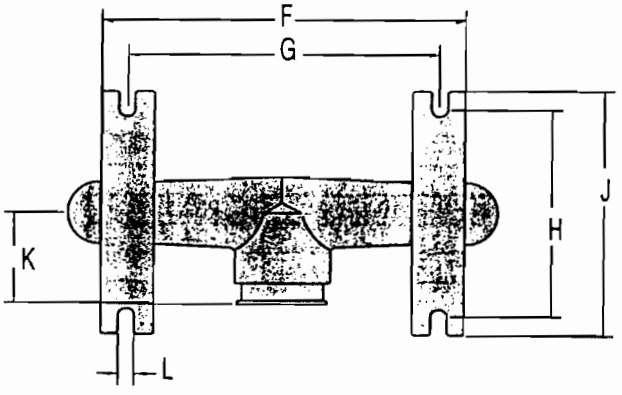
DIMENSIONS – M4 (METAL)		
ITEM	STANDARD (inch)	METRIC (mm)
A	14 17/32	369.1
B	2 15/32	62.7
C	9 9/32	235.8
D	16 7/8	428.6
E	17 7/8	454.0
F	11 5/16	287.4
G	10 5/16	261.9
H	8 3/16	223.8
J	6	152.4
K	7	177.8
L	2	50.8
M	7/16	11.1
N	13 7/32	335.7
P	8 3/4	222.3
R	5 15/16	150.8
S	7 21/32	194.5
T	1 29/32	48.4
U	1/2	12.7

BSP threads available.
Standard aluminum pumps are manufactured with mild steel nipples. Stainless steel nipples are available.

SECTION 1B

DIMENSIONAL DRAWING
MODEL M4 FOOD PROCESSING PUMP



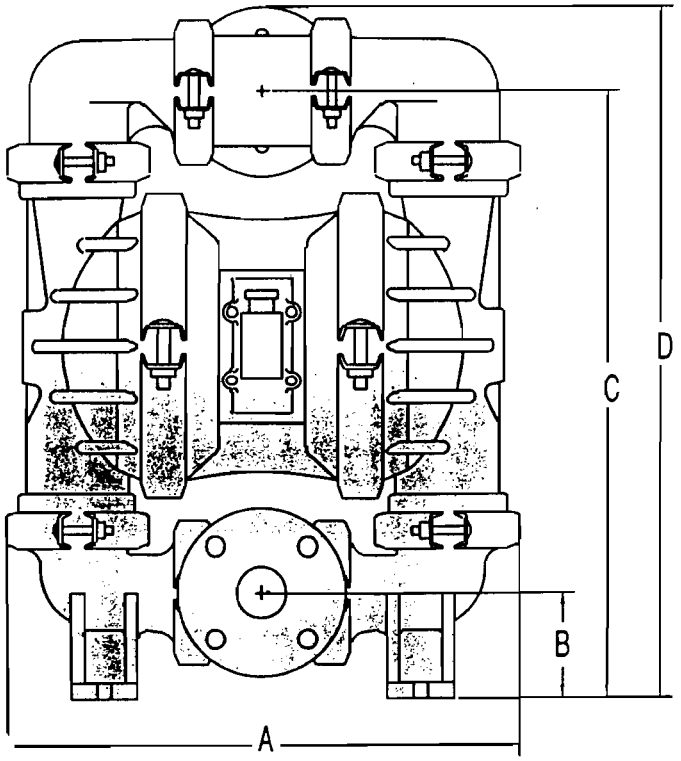


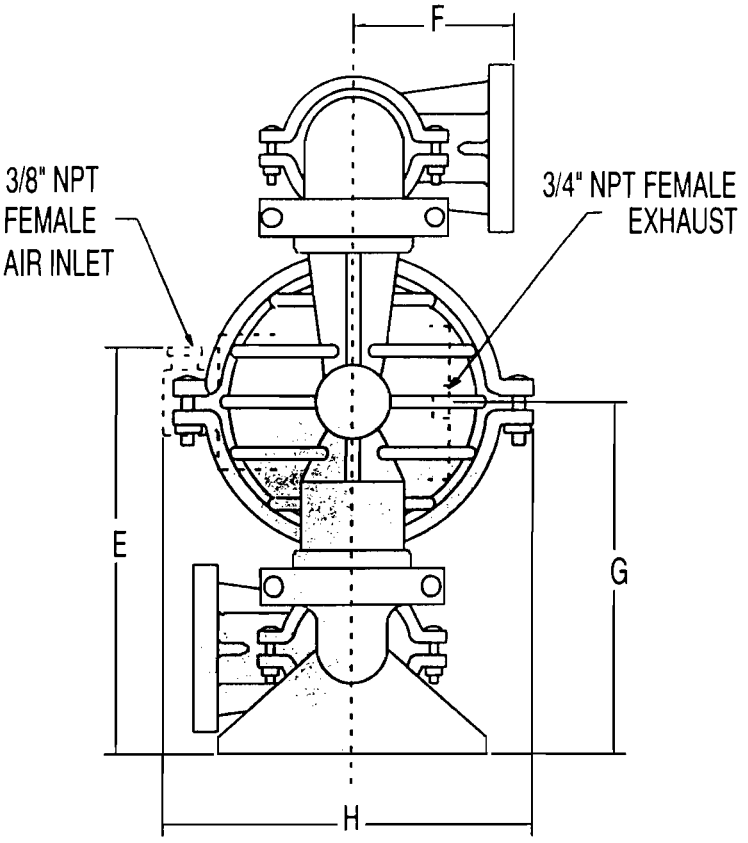
DIMENSIONS – M4 (FOOD GRADE)		
ITEM	STANDARD (inch)	METRIC (mm)
A	15 3/8	390.5
B	2 15/32	62.7
C	9 1/8	231.8
D	17 13/32	442.1
E	11 7/32	285.0
F	10 9/32	261.2
G	8 13/16	223.8
H	5 31/32	151.6
J	7	177.8
K	2 5/8	66.7
L	7/16	11.1

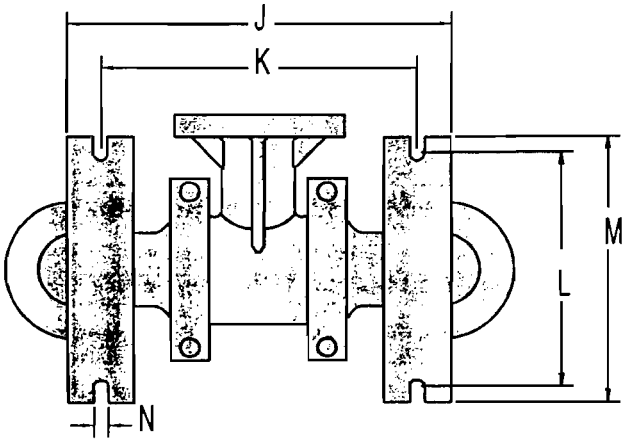
Interior/Exterior Food Processing finish is 50 GRIT.

SECTION 1C

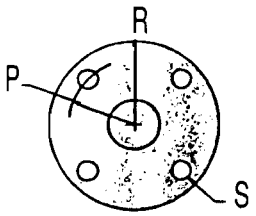
DIMENSIONAL DRAWING
MODEL M4 CHAMP AND ULTRAPURE PUMP







DIMENSIONS – M4 (PLASTIC)		
ITEM	STANDARD (inch)	METRIC (mm)
A	15 1/2	393.7
B	3 1/8	79.4
C	18 1/4	463.6
D	20 3/4	527.1
E	12	304.8
F	4 3/4	120.7
G	10 19/32	269.1
H	11 3/16	284.2
J	11 5/16	287.4
K	9 11/32	237.3
L	7 1/8	181.0
M	8 1/16	204.8
N	15/32	11.9
	ANSI (inch)	DIN (mm)
P	1 15/16 RAD.	55.2 RAD.
R	2 1/2 RAD.	75.2 RAD.
S	9/16 DIA.	18.0 DIA.



ANSI PIPE FLANGE
150 POUND CLASS
1 1/2" I.D.

All M4 Ultrapure pumps are assembled in a Class 10,000 Clean Room.

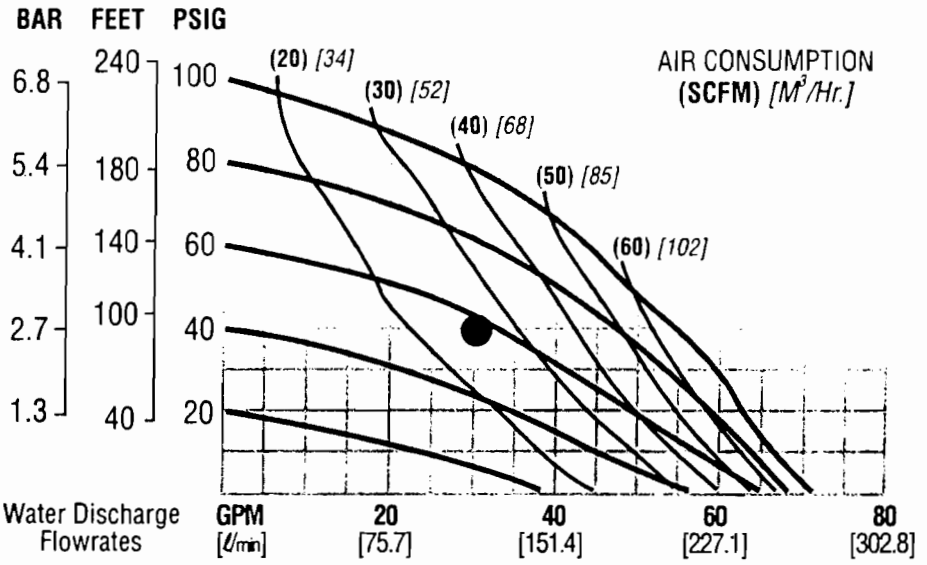
SECTION 2A
PUMP PERFORMANCE CURVES
MODEL M4 METAL (Rubber/TPE-Fitted)

Height .....16⅞"
Width .....14¹⁷⁄₃₂"
Depth .....11⁵⁄₁₆"
Ship Weight .....Aluminum 37 lbs.
Stainless Steel 52 lbs.
Cast Iron 56 lbs.
Hastelloy 58 lbs.
Air Inlet .....⅜" NPT
Inlet .....1½" NPT
Outlet .....1¼" NPT
Suction Lift .....**Rubber 21' Dry**
27' Wet
TPE 17' Dry
25' Wet
Displacement per Stroke .... .203 gal.[1]
Max. Size Solids .....³⁄₁₆" Dia.

Example: To pump 30 gpm against a discharge pressure head of 40 psig requires 58 psig and 27 scfm air consumption. (See dot on chart.)

[1]Displacement per stroke was calculated at 70 psig air inlet pressure against a 30 psig head pressure.

Caution: Do not exceed 125 psig air supply pressure. (50 psi on UL models.)



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

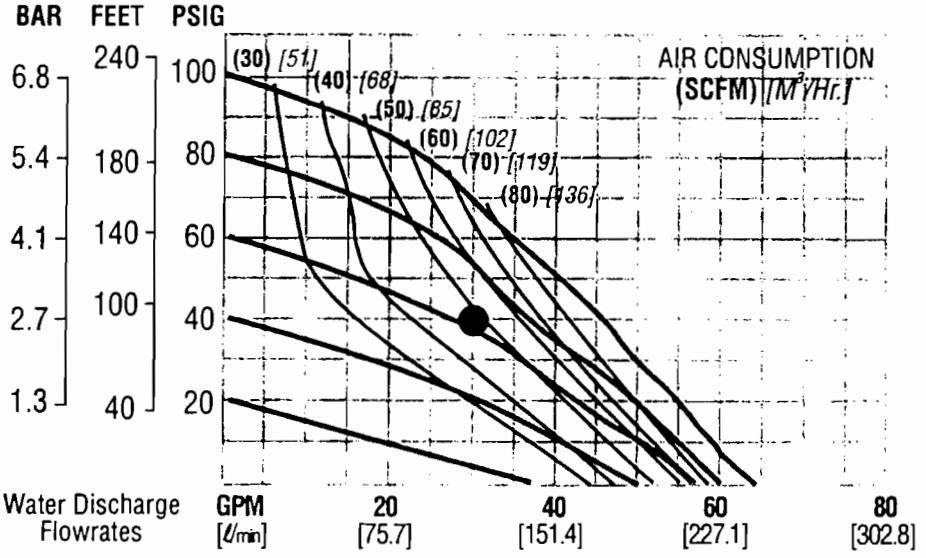
SECTION 2B
MODEL M4 METAL (Teflon®-Fitted)

Height .....16⅞"
Width .....14¹⁷⁄₃₂"
Depth .....11⁵⁄₁₆"
Ship Weight .....Aluminum 37 lbs.
Stainless Steel 52 lbs.
Cast Iron 56 lbs.
Hastelloy 58 lbs.
Air Inlet .....⅜" NPT
Inlet .....1½" NPT
Outlet .....1¼" NPT
Suction Lift .....7' Dry
25' Wet
Displacement per Stroke .... .119 gal.[1]
Max. Size Solids .....³⁄₁₆" Dia.

Example: To pump 30 gpm against a discharge pressure head of 40 psig requires 63 psig and 49 scfm air consumption. (See dot on chart.)

[1]Displacement per stroke was calculated at 70 psig air inlet pressure against a 30 psig head pressure.

Caution: Do not exceed 125 psig air supply pressure. (50 psi on UL models.)



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

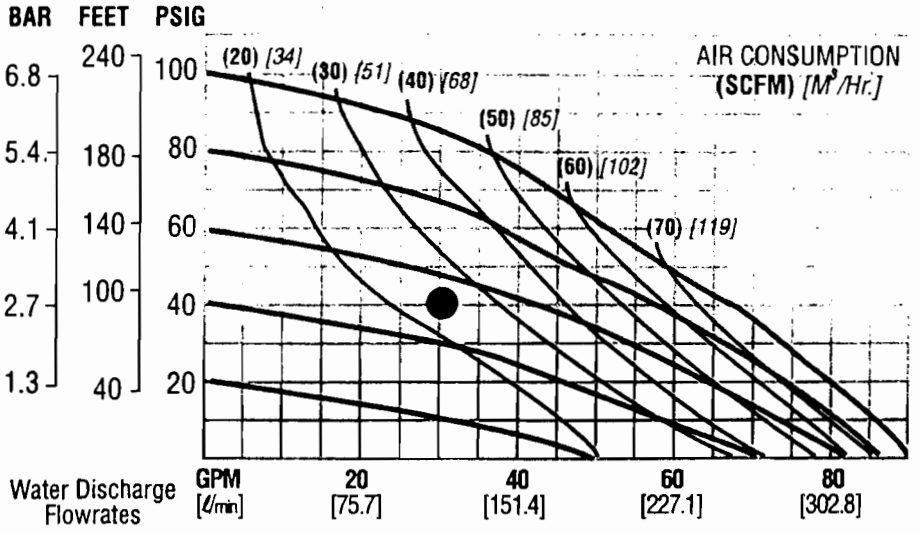
SECTION 2C
PUMP PERFORMANCE CURVES
MODEL M4 CHAMP (Rubber/TPE-Fitted)

Height .....20¾"
Width .....15½"
Depth .....11⅜"
Ship Weight .....Polypropylene 39 lbs.
PVDF 49 lbs.
Teflon® 52 lbs.
Air Inlet .....⅜" NPT
Inlet .....1½" Fl.
Outlet .....1½" Fl.
Suction Lift .....**Rubber 12' Dry**
25' Wet
TPE 13' Dry
25' Wet
Displacement per Stroke .... .291 gal.[1]
Max. Size Solids .....⅜" Dia.

Example: To pump 30 gpm against a discharge pressure head of 40 psig requires 51 psig and 24 scfm air consumption. (See dot on chart.)

[1]Displacement per stroke was calculated at 70 psig air inlet pressure against a 30 psig head pressure.

Caution: Do not exceed 125 psig air supply pressure. (50 psi on UL models.)



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 2D
MODEL M4 CHAMP (Teflon®-Fitted)

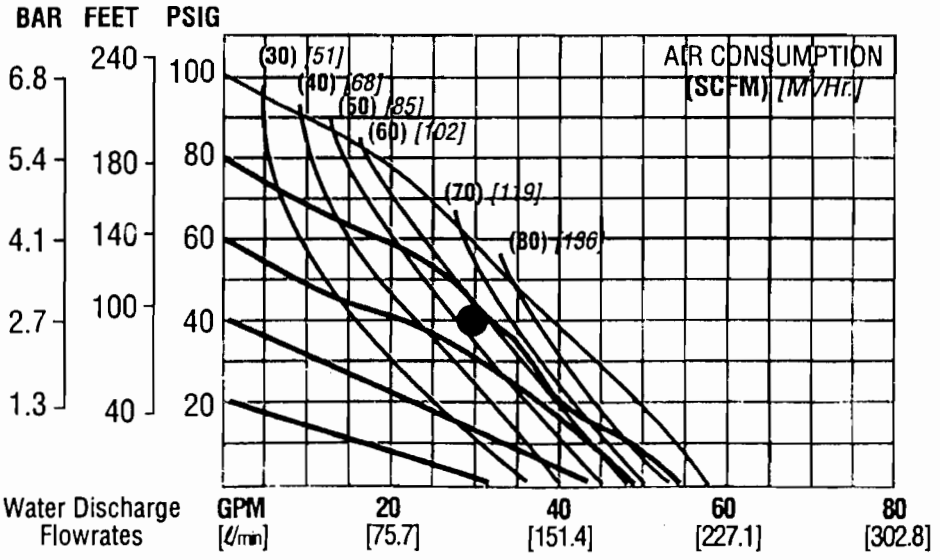
Height .....20¾"
Width .....15½"
Depth .....11⅜"
Ship Weight .....Polypropylene 39 lbs.
PVDF 49 lbs.
Teflon® 52 lbs.
Air Inlet .....⅜" NPT
Inlet .....1½" Fl.
Outlet .....1½" Fl.
Suction Lift .....7' Dry
25' Wet
Displacement per Stroke .... .126 gal.[1]
Max. Size Solids .....⅜" Dia.

Example: To pump 30 gpm against a discharge pressure head of 40 psig requires 78 psig and 58 scfm air consumption. (See dot on chart.)

[1]Displacement per stroke was calculated at 70 psig air inlet pressure against a 30 psig head pressure.

Caution: Do not exceed 125 psig air supply pressure. (50 psi on UL models.)

Note: M4 Ultrapure pumps have a dry suction lift of 6'.



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 3
INSTALLATION

The Model M4 has a 1½" inlet and 1¼" outlet and is designed for flows to 73 gpm. The **M4 Champ** pump is manufactured with wetted parts of pure, unpigmented PVDF, Teflon®, or polypropylene. The **M4 Metal** pump is manufactured with wetted parts of aluminum, cast iron, stainless steel or Hastelloy. The center section of the **M4** is constructed of glass-filled polypropylene. A variety of diaphragms, valve balls, and O-rings are available to satisfy temperature, chemical compatibility, abrasion and flex concerns.

The suction pipe size should be at least 1½" diameter or larger if highly viscous material is being pumped. The suction hose must be non-collapsible, reinforced type as the M4 is capable of pulling a high vacuum. Discharge piping should be at least 1½"; larger diameter can be used to reduce friction losses. It is critical that all fittings and connections are airtight or a reduction or loss of pump suction capability will result.

For M4 Champ models, Wilden offers 150 lb. ANSI and DIN flanges. The following details should be noted when mating these to pipe works:

- A 60–80 shore gasket that covers the entire flange face should be used.
- The gasket should be between .075" and .175" thickness.
- Mating flanges with flat as opposed to raised surfaces should be used for proper mechanical sealing.
- The flanges should be tightened to a minimum of 5 ft.-lbs. (6.8 m-N) but no more than 10 ft.-lbs. (13.5 m-N).

For M4 Champ models, a non-raised surfaced-flange adapter should be utilized when mating to the pump's inlet and discharge manifolds for proper sealing.

The M4 can be used in submersible applications only when both wetted and non-wetted portions are compatible with the material being pumped. If the pump is to be used in a submersible application, a hose should be attached to the pump's air exhaust and the exhaust air piped above the liquid level.

If the pump is to be used in a self-priming application, be sure that all connections are airtight and that the suction lift is within the pump's ability. Note: Materials of construction and elastomer material have an effect on suction lift parameters. See performance curve data..

Pumps in service with a positive suction head are most efficient when inlet pressure is limited to 7–10 psig. Premature diaphragm failure may occur if positive suction is 11 psig and higher.

THE MODEL M4 WILL PASS 3/16" SOLIDS. WHENEVER THE POSSIBILITY EXISTS THAT LARGER SOLID OBJECTS MAY BE SUCKED INTO THE PUMP, A STRAINER SHOULD BE USED ON THE SUCTION LINE.

CAUTION: DO NOT EXCEED 125 PSIG AIR SUPPLY PRESSURE. (50 PSI ON UL MODELS.)

ALUMINUM AND CAST IRON PUMPS ARE FUNCTION TESTED WITH WATER AND SODIUM SILICATE. PUMPS SHOULD BE THOROUGHLY FLUSHED WITH WATER BEFORE INSTALLING INTO PROCESS LINES. FDA AND USDA APPROVED PUMPS SHOULD BE CLEANED AND/OR SANITIZED BEFORE BEING USED ON EDIBLE PRODUCTS.

BLOW OUT AIR LINE FOR 10 TO 20 SECONDS BEFORE ATTACHING TO PUMP TO MAKE SURE ALL PIPE LINE DEBRIS IS CLEAR. ALWAYS USE AN IN-LINE FILTER.

SECTION 4
SUGGESTED OPERATION AND MAINTENANCE INSTRUCTIONS

INSTALLATION: Months of careful planning, study, and selection efforts can result in unsatisfactory pump performance if installation details are left to chance.

Premature failure and long term dissatisfaction can be avoided if reasonable care is exercised throughout the installation process.

LOCATION: Noise, safety, and other logistical factors usually dictate that "utility" equipment be situated away from the production floor. Multiple installations with conflicting requirements can result in congestion of utility areas, leaving few choices for siting of additional pumps.

Within the framework of these and other existing conditions, every pump should be located in such a way that four key factors are balanced against each other to maximum advantage.

1. ACCESS: First of all, the location should be accessible. If it's easy to reach the pump, maintenance personnel will have an easier time carrying out routine inspections and adjustments. Should major repairs become necessary, ease of access can play a key role in speeding the repair process and reducing total downtime.

2. AIR SUPPLY: Every pump location should have an air line large enough to supply the volume of air necessary to achieve the desired pumping rate (see pump performance chart). Use air pressure up to a maximum of 125 psi depending upon pumping requirements.

For best results, the pumps should use an air filter, regulator, and lubricator system. The use of an air filter before the pump will ensure that the majority of any pipeline contaminants will be eliminated. The use of a lubricant, suitable for the application, helps perform a number of functions. Lubricants reduce friction to minimize required shifting forces and reduce wear. Lubricants provide a protective coating against some forms of corrosion and contaminants. **Wilden suggests an oil with arctic characteristics (ISO 15-5Wt.)**

This oil is chemically compatible with the center block O-rings and has a low pour point to guard against problems associated with low temperatures. The amount of lubrication required is directly related to the amount of oil introduced from the factory air system. We therefore suggest that the lowest setting on the lubricator be utilized and then increased as necessary.

Pump discharge rate can be controlled by limiting the volume and/or pressure of the air supply to the pump. The use of a needle valve installed at the air inlet to the pump is suggested for this purpose. Pump discharge rate can also be controlled by throttling the pump discharge by installing a valve in the discharge line of the pump when the need to control the pump from a remote location exists. When the pump discharge pressure equals or exceeds the air supply pressure, the pump will stall out; no bypass or pressure relief valve is needed, and pump damage will not occur. When operation is controlled by a solenoid valve in the air line, a three-way valve should be used. Pumping volume can be set by counting the number of strokes per minute.

A muffler installed on the pump's air exhaust will give quiet exhaust. Sound levels are reduced below OSHA specifications using a Wilden muffler.

3. ELEVATION: Selecting a site that is well within the pump's suction lift capability will assure that loss-of-prime troubles will be eliminated. In addition, pump efficiency can be adversely affected if proper attention is not given to elevation (see pump performance chart).

4. PIPING: Final determination of the pump site should not be made until the piping problems of each possible location have been evaluated. The impact of current and future installations should be considered ahead of time to make sure that inadvertent restrictions are not created for any remaining sites.

The best choice possible will be a site involving the shortest and the straightest hook-up of suction and discharge piping. Unnecessary elbows, bends, and fittings should be avoided. Pipe sizes should be selected so as to keep friction losses within practical limits. All piping should be supported independently of the pump. In addition, it should line up without placing stress on the pump fittings.

Expansion joints can be installed to aid in absorbing the forces created by the natural reciprocating action of the pump. If the pump is to be bolted down to a solid foundation, a mounting pad placed between the pump and foundation will assist in minimizing pump vibration. Flexible connections between the pump and rigid piping will also assist in minimizing pump vibration. If quick-closing valves are installed at any point in the discharge system, or if pulsation within a system becomes a problem, a surge suppressor should be installed to protect the pump, piping and gauges from surges and water hammer.

When pumps are installed in applications involving flooded suction or suction head pressures, a gate valve should be installed in the suction line to permit closing of the line for pump service.

INSPECTIONS: Periodic inspections have been found to offer the best means for preventing unscheduled pump downtime.

Individuals responsible for checking and maintaining lubrication levels in the pumps should also check for any abnormal noise or leakage. Personnel familiar with the pumps' construction and service should be informed of any abnormalities that are detected.

RECORDS: When service is required, a record should be made of all necessary repairs and replacements. Over a period of time, such records can become a valuable tool for predicting and preventing future maintenance problems and unscheduled downtime. In addition, accurate records make it possible to identify pumps that are poorly suited to their applications.

SECTION 5
TROUBLESHOOTING

Pump will not run or runs slowly.

1. Check air inlet screen and air filter for debris.
2. Check for sticking air valve, flush air valve in solvent.
3. Check for worn out air valve. If piston face in air valve is shiny instead of dull, air valve is probably worn beyond working tolerances and must be replaced.
4. Check center block O-rings. If worn excessively, they will not seal and air will simply flow through pump and out air exhaust. Use only Wilden O-rings as they are of special construction and ISO 15-5 wt oil with arctic characteristics.
5. Check for rotating piston in air valve.
6. Check type of lubricant being used. A higher viscosity oil than suggested may cause the piston to stick or run erratically. Wilden suggests the use of a hydraulic oil with arctic characteristics (ISO 15-5 wt).

Pump runs but little or no product flows.

1. Check for pump cavitation; slow pump speed down to match thickness of material being pumped.
2. Check for sticking ball checks. If material being pumped is not compatible with pump elastomers, swelling may occur. Replace ball checks and O-rings with proper elastomers.
3. Check to make sure all suction connections are air tight, especially clamp bands around intake balls.

Pump air valve freezes.

Check for excessive moisture in compressed air. Either install dryer or hot air generator for compressed air.

Air bubbles in pump discharge.

1. Check for ruptured diaphragm.
2. Check tightness of clamp bands, especially at intake manifold.

Product comes out air exhaust.

1. Check for diaphragm rupture.
2. Check tightness of piston plates to shaft.

Pump rattles.

1. See RBG E9 Troubleshooting Guide.
2. Create false discharge head or suction lift.

SECTION 6A

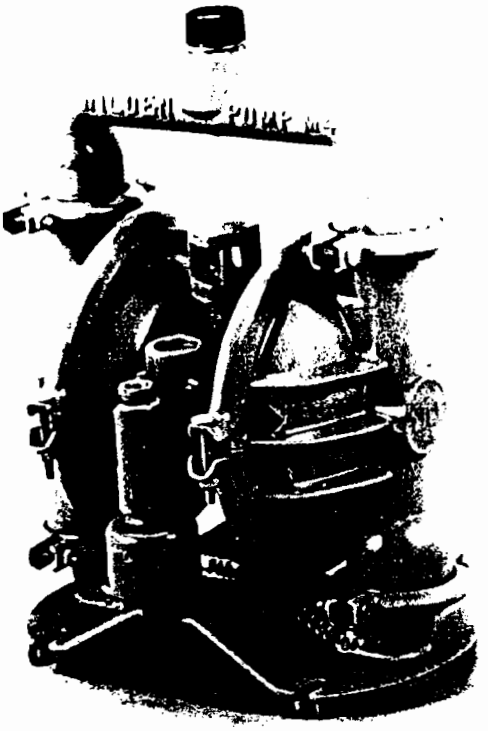
MODEL M4 METAL

DIRECTIONS FOR DISASSEMBLY/REASSEMBLY

CAUTION: Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container.

The Wilden M4 has a 1½" inlet and 1¼" outlet and is designed for flows up to 73 GPM. Its air distribution system is based on design simplicity and proven efficiency. The model M4 is available in aluminum, cast iron, 316 stainless steel, or Hastelloy wetted parts. The aluminum model features die-cast water chambers, which allow for streamlined contours, while reducing friction of fluid flow. For highly corrosive applications, polypropylene, Teflon® PFA, and PVDF models are available.

NOTE: Before starting disassembly, mark a line from each liquid chamber to its corresponding air chamber. This line will assist in proper alignment during reassembly.



DISASSEMBLY:

NOTE: Model used for these instructions incorporates rubber diaphragms, balls, and seats. Models with Teflon® diaphragms, balls and seats are the same except where noted.

Step 1.

Start by removing the two clamp bands that fasten the discharge manifold to the main body of the pump. *(Figures 1A* and *1B.)*

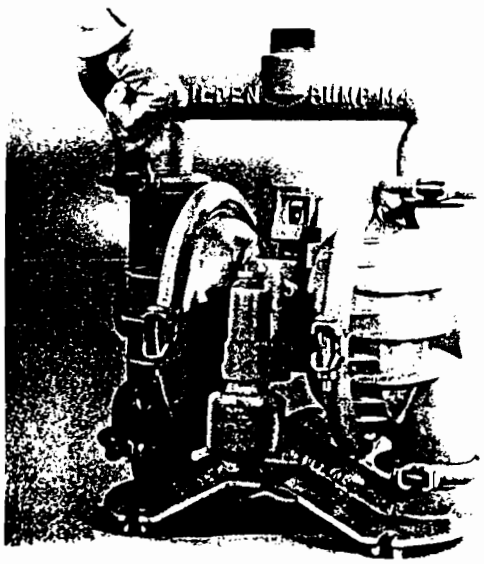


Figure 1A

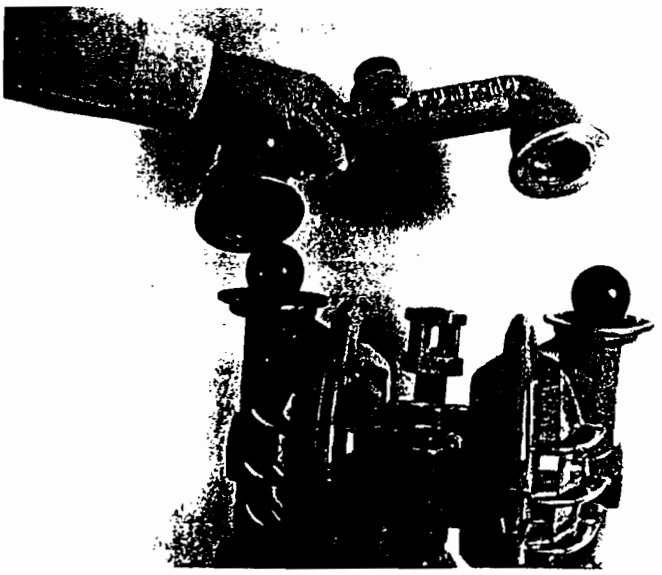


Figure 1B

Step 2.

Remove the two clamp bands that hold the inlet manifold to the main body of the pump. Lift the main body of the pump from the inlet manifold and set it to one side. The inlet ball valves, and seats are now available for examination. (See *Figure 2A.)* Next, remove large clamp bands which attach water chamber to the center section of the pump. (See *Figure 2B).*

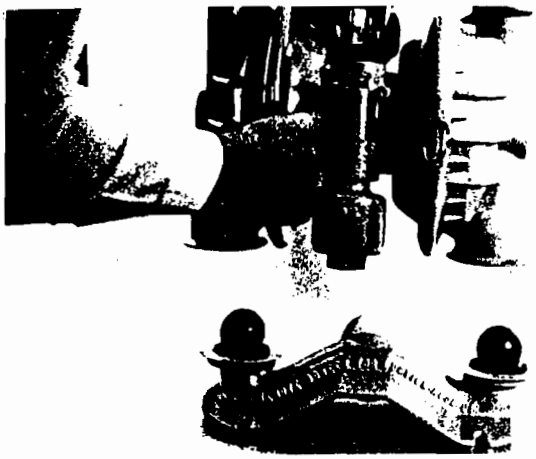


Figure 2A

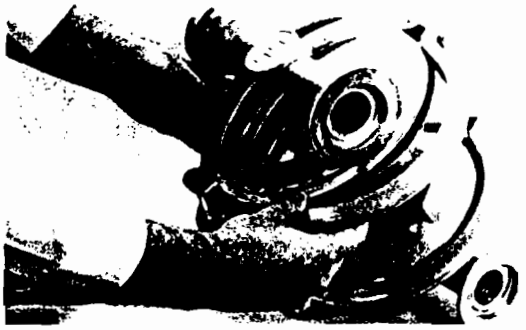


Figure 2B

Remove only one liquid chamber from the center section. This will expose the diaphragm and its piston plate. (See *Figure 2C.)* The diaphragm and the piston plate can be removed by unscrewing them from the connecting shaft with an adjustable wrench. The opposite diaphragm will be held tight by the opposite liquid chamber. (See *Figure 2D.)*

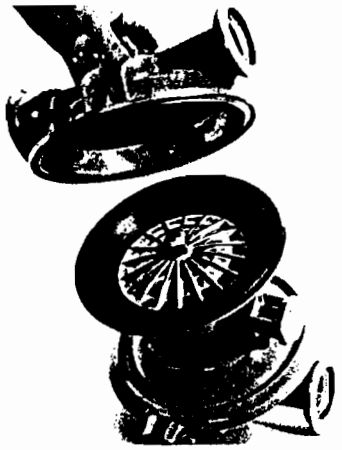


Figure 2C

Figure 2D

Now remove the opposite liquid chamber. The second diaphragm is now available for inspection and cleaning. (See *Figure 2E.)* If the second diaphragm is to be removed, **It is important not to score or mark the chrome-plated shaft.** A vise with wood blocks is suggested as a method of securing the shaft while removing the second diaphragm.

Figure 2E

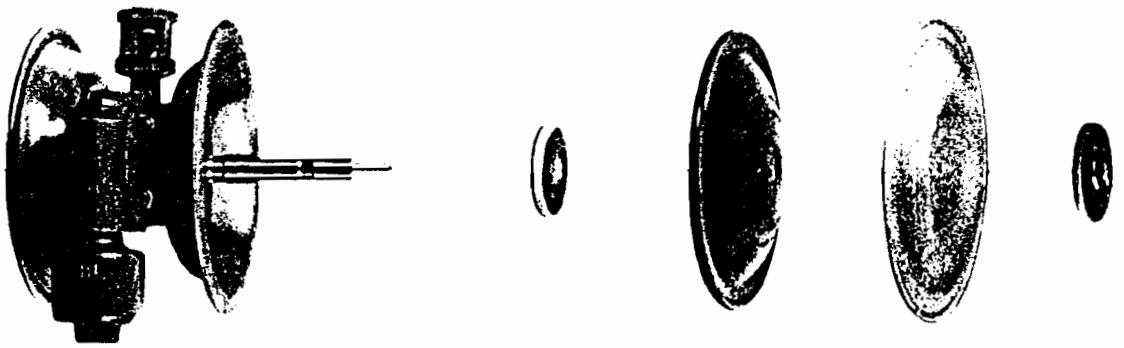
Figure 2F

Upon removing the diaphragms, the inner piston is now exposed and available for inspection. (See *Figure 2F.)*

ASSEMBLY

Exploded View Figure 3A

Step 1 (Rubber/TPE Diaphragms)



Exploded View Figure 3B

(Teflon® Diaphragms)

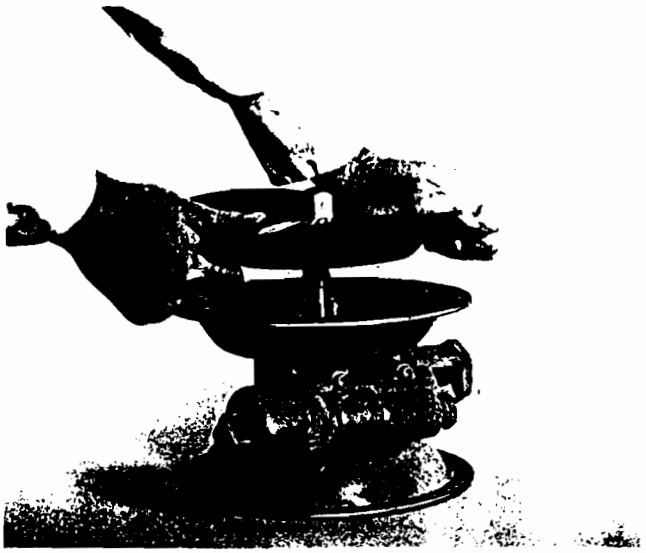


Figure 4A

Figure 4B

Step 2.

To install shaft, push shaft firmly through the bushing in the center block. Be sure to lubricate bushing with ISO Grade 15-5 wt. oil so that shaft may pass by the O-rings. (See *Figure 4A.)* Next, install outer piston to diaphragm assembly and tighten to the required torque specification*. (See *Figure 4B.)* Once opposite water chamber is attached to center section, place center section on its side and push second diaphragm assembly toward the lip of the air chamber until the outer ad of the diaphragm rests within this groove. Tighten outer ton per the torque specification*. (See *Figure 4C.)* The ıter clamp band can now be installed and tightened per the torque specification*. The center section can now be placed over the inlet manifold. Be sure to observe the previously made alignment marks. (See *Figures 4D* and *4E.)* **Note: When installing Teflon® diaphragms, it is important to tighten outer pistons simultaneously (turning in opposite direction) to ensure a tight fit.**

*Refer to Section 8 for torque specifications.

Figure 4C

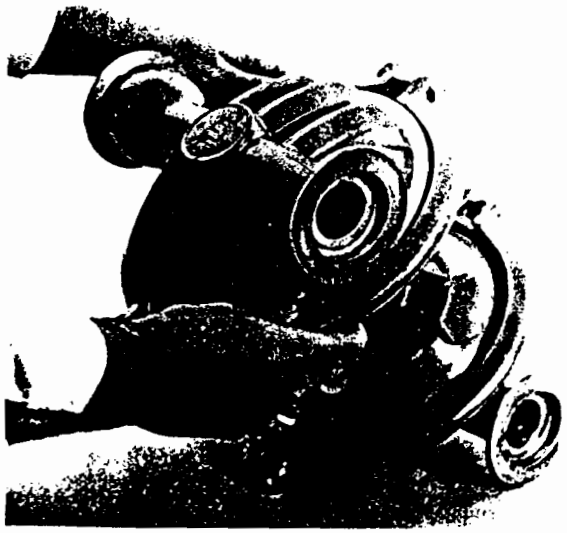


Figure 4D

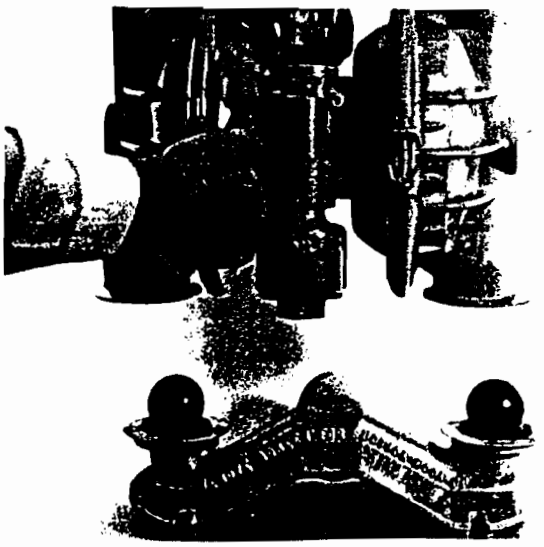


Figure 4E

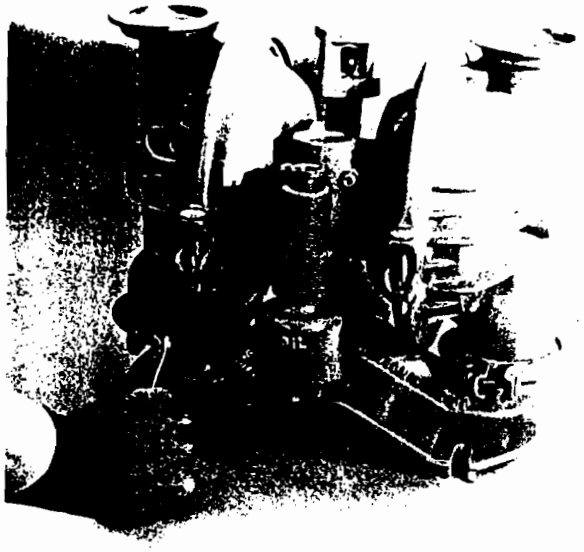


Figure 4F

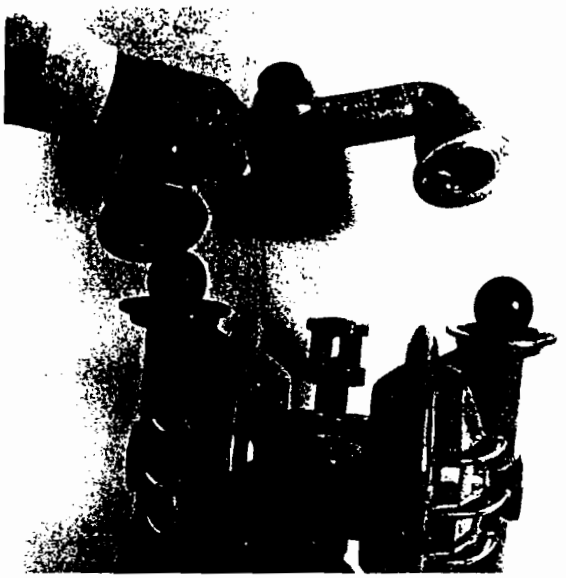


Figure 4G

Next, securely tighten small clamp bands around inlet manifold and water chambers. (See *Figure 4F.)* Finally, place discharge manifold over assembled center section (see *Figure 4G)* and secure small clamp bands. Tighten small clamp bands around inlet and discharge manifolds per the torque specification*.

*Refer to Section 8 for torque specifications.

Notes

SECTION 6B

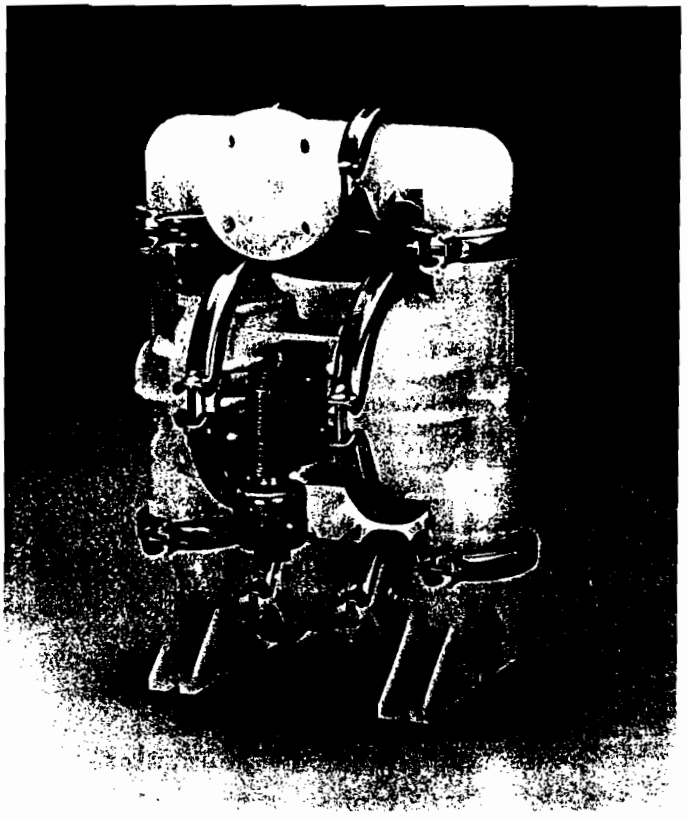
MODEL M4 CHAMP (PLASTIC)

DIRECTIONS FOR DISASSEMBLY/REASSEMBLY

CAUTION: Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container.

The Wilden "Champ" is a Wilden model M4 pump (1.5 inch) with all wetted parts of injection molded polypropylene, PVDF and Teflon® PFA material. Performance and operation of the "Champ" are essentially the same as other Wilden model M4 pumps of metal construction subject to temperature and chemical compatibility of the material being pumped with polypropylene, PVDF and Teflon® PFA.

NOTE: Before starting disassembly, mark a line from each liquid chamber to its corresponding air chamber. This line will assist in proper alignment during reassembly.



DISASSEMBLY:

NOTE: Model used for these instructions incorporates rubber diaphragms, balls, and O-rings. Models with Teflon® diaphragms, balls and seats are the same except where noted.

Step 1.

Start by removing the two clamp bands that fasten the discharge manifold to the main body of the pump.

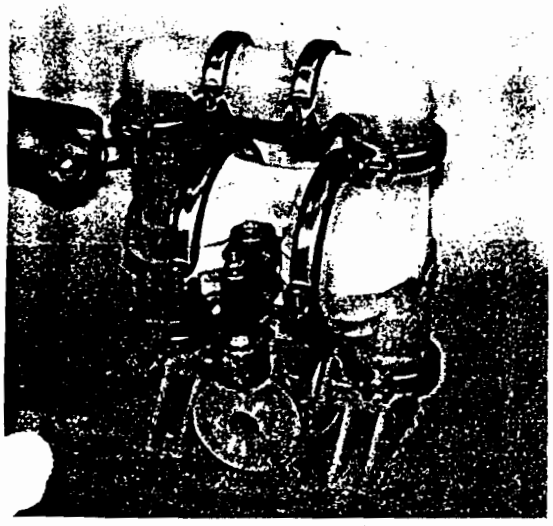


Figure 1A

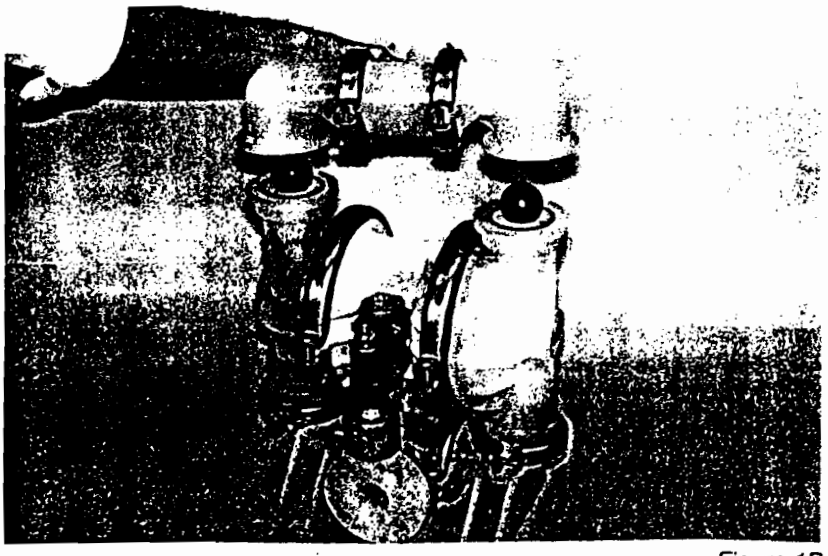


Figure 1B

Figure 2A

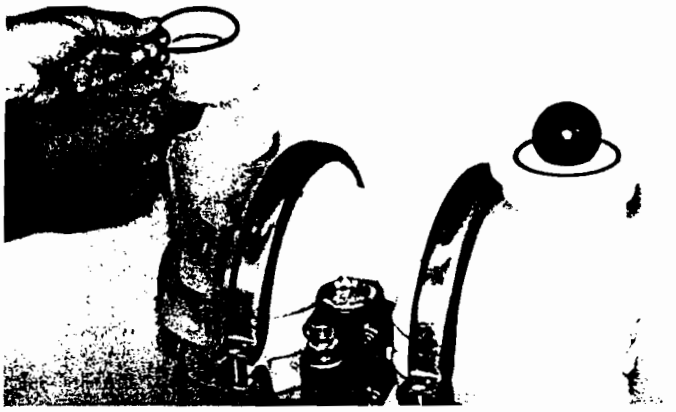


Figure 2B

Step 2.

The valve ball, round O-ring and the seat are now exposed for inspection. If the O-ring is flattened or out-of-round, it must be replaced. Valve ball and seat should be inspected for damage or excessive wear.

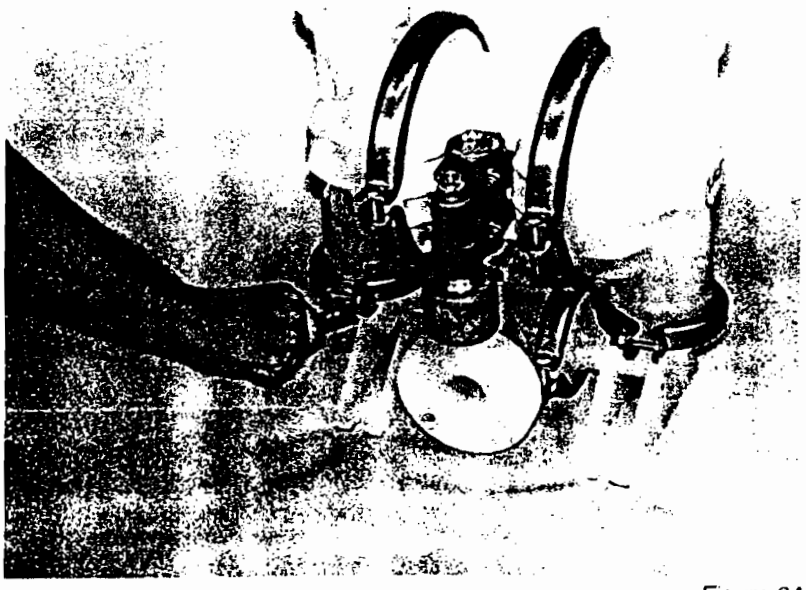


Figure 3A

Figure 3B

Step 3.

Remove the two clamp bands that hold the inlet manifold to the main body of the pump. Lift the main body of the pump from the inlet manifold and set it to one side. The inlet ball valves, seats and O-rings are now available for examination.

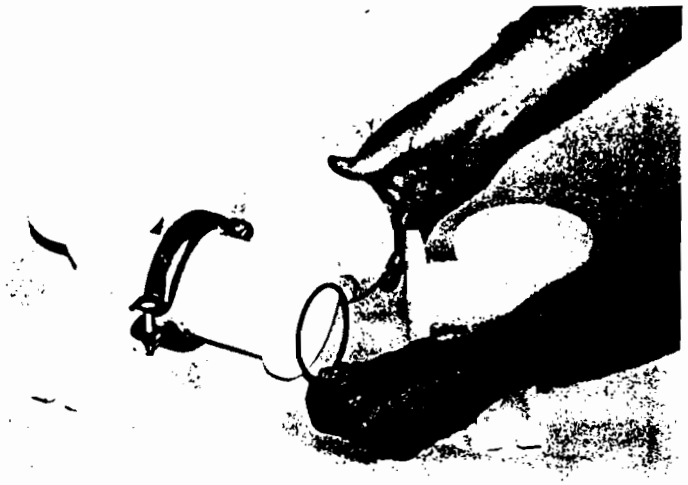


Figure 4A

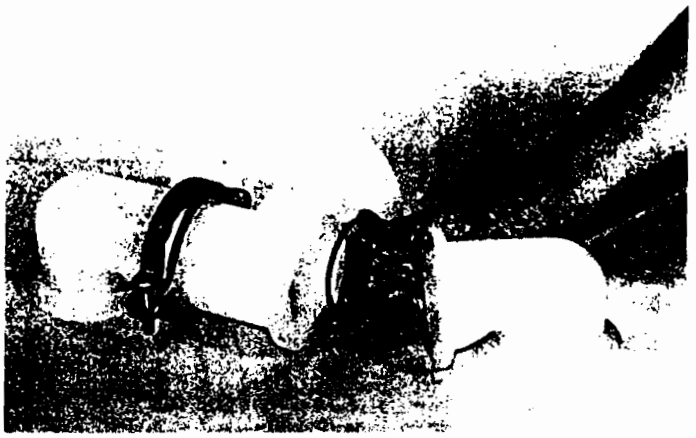


Figure 4B

Step 4.

Both inlet *(Figure 4A)* and discharge *(Figure 4B)* manifolds can now be disassembled by removing their clamp bands. Make sure the round O-rings are not damaged or swollen. These O-rings form the seal between the manifold ports and will not perform their function if damaged. **NOTE:** Manifolds do not normally need to be disassembled for maintenance.

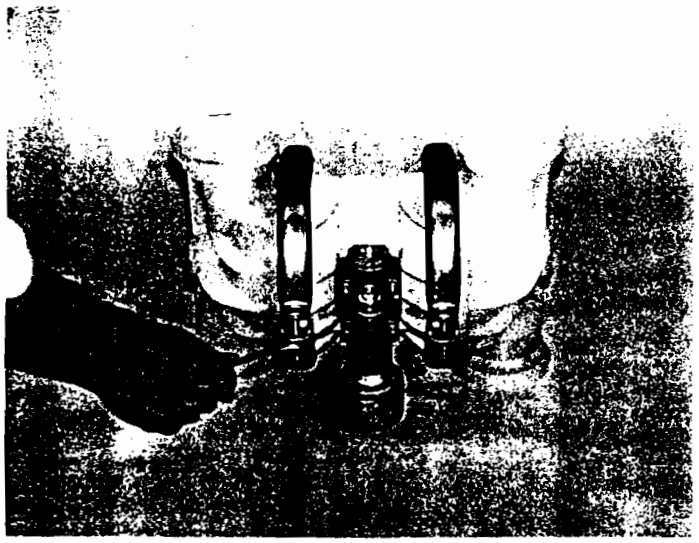


Figure 5A

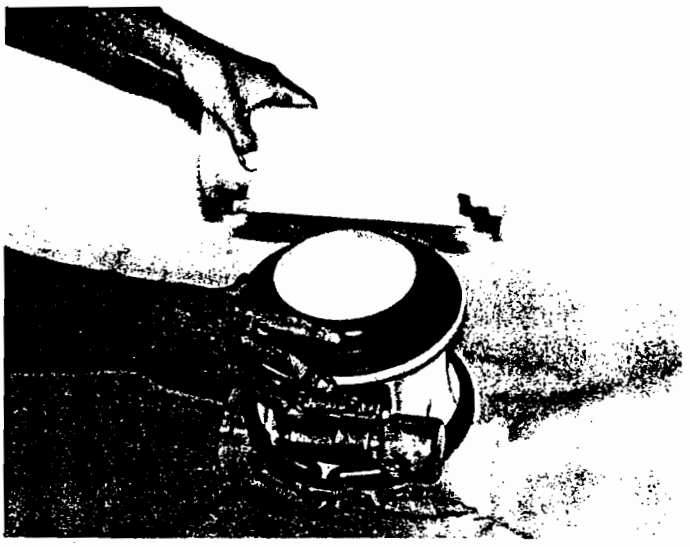


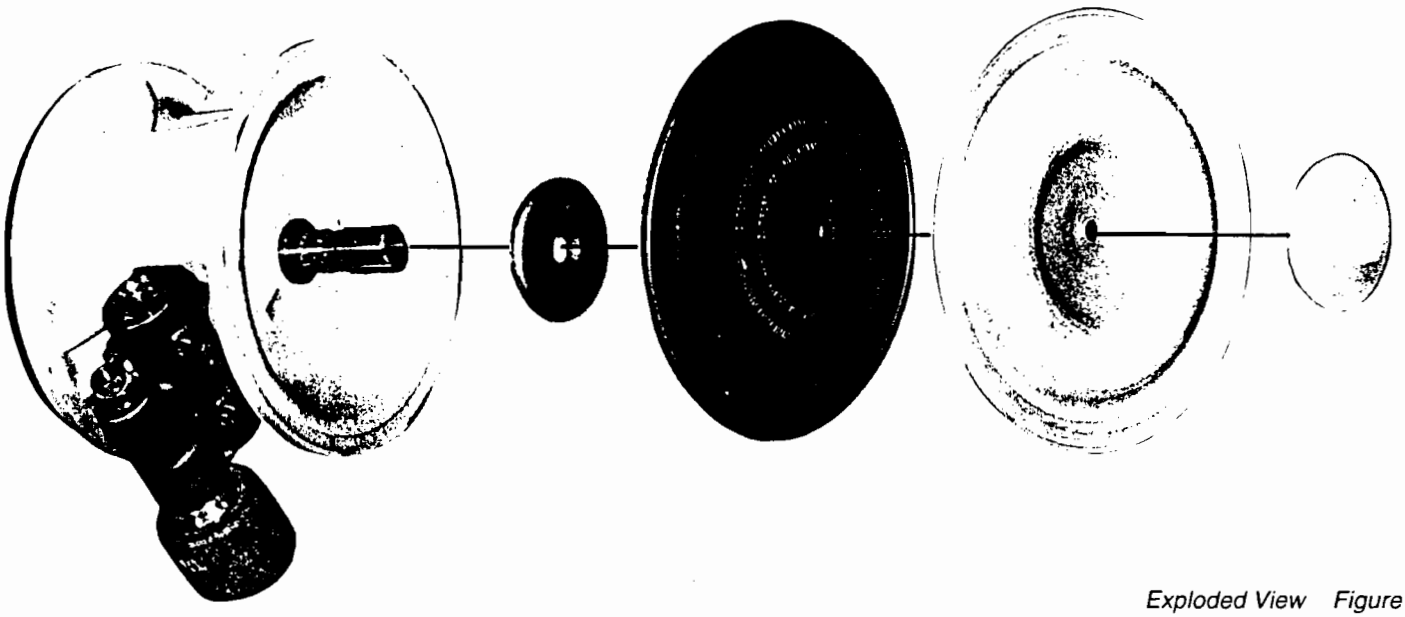
Figure 5B

Step 5.

Remove only one liquid chamber (P/N 04-5000-20) from the center section. This will expose the diaphragm and its piston plate. By grasping the outer edges of the diaphragm and turning counterclockwise, the diaphragm and piston plate can be removed by unscrewing them from the connecting shaft. The opposite diaphragm will be held tight by the opposite liquid chamber. **NOTE:** The shaft may unscrew from the opposite diaphragm. Flats are provided on the piston plate for a wrench if necessary. **It is important not to score or mark the chrome-plated shaft.** A vise with wood blocks is suggested as a method of securing the shaft while removing the second diaphragm. Now remove the opposite liquid chamber. The second diaphragm is now available for inspection and cleaning. If inspection and/or servicing of the non-wetted air section is necessary please see Section 6C.

Figure 5C

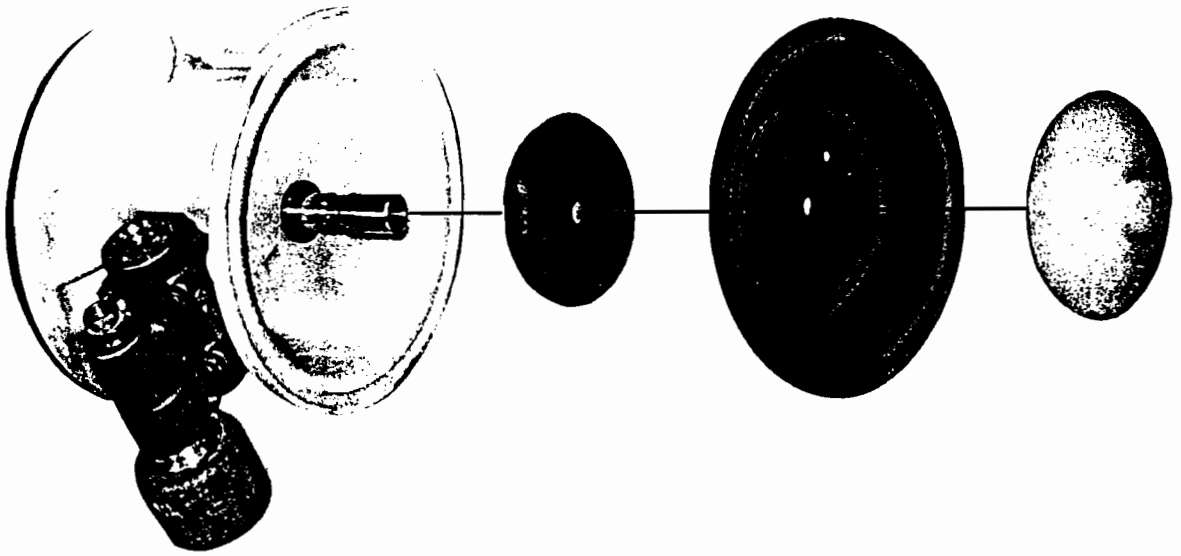
ASSEMBLY



Exploded View Figure 6A

Step 1. (Teflon® Diaphragms)

First, install diaphragm and inner and outer piston plates on shaft. Observe the **"This Side Out"** marking on the convex side of the diaphragm. Hand-tighten the outer piston to the shaft only, at this time. *(Figure 7A.)* Insert the shaft through the bushing until the outer bead of the diaphragm just touches the circumference groove of the air chamber.



Exploded View Figure 6B

(Rubber Diaphragms)

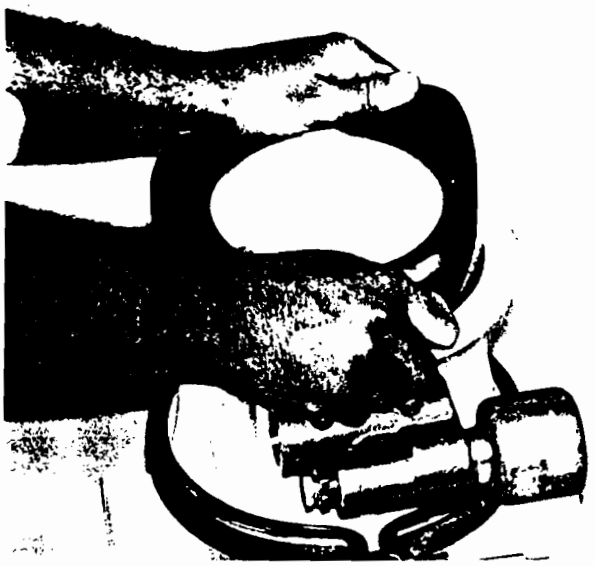


Figure 7A

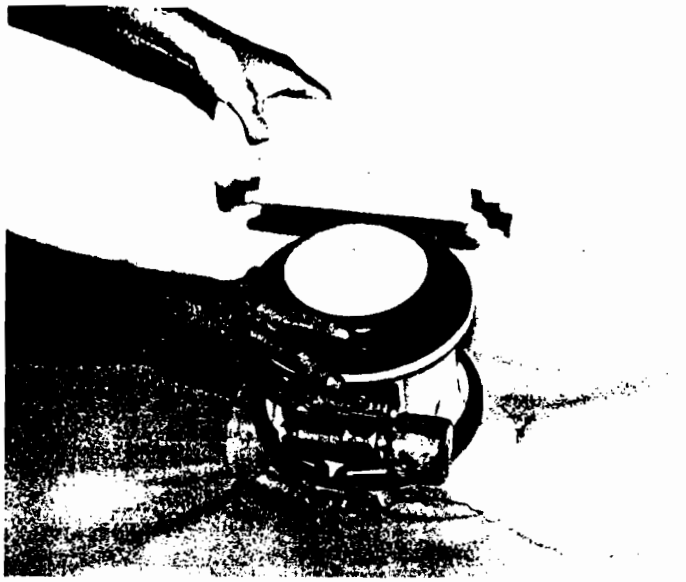


Figure 7B

Step 2.

Install the opposite diaphragm and inner and outer pistons; hand-tighten. Now tighten both diaphragm outer pistons simultaneously (turning in opposite directions) per the torque specification*. Install water chambers over the diaphragms using the alignment marks that were made during disassembly as a guide. (Direction of flow through the pump is bottom to top.) Install and tighten clamp bands per the torque specification*. *(Figures 7B and 7C.)*

*Refer to Section 8 for torque specifications.

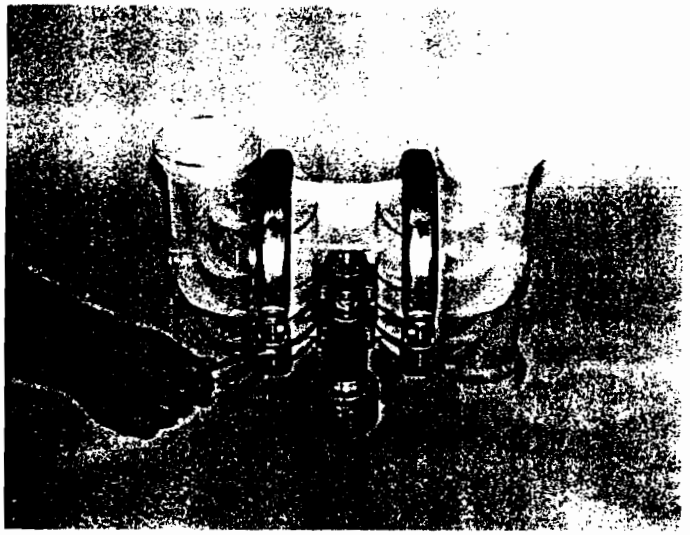


Figure 7C

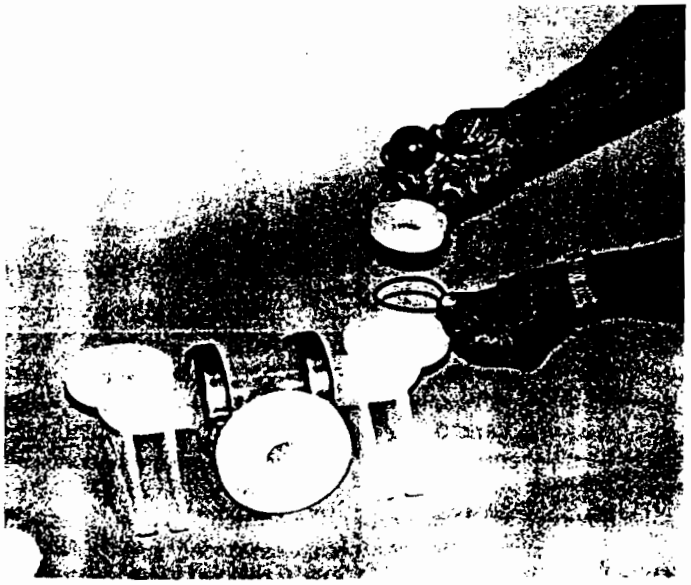


Figure 8A

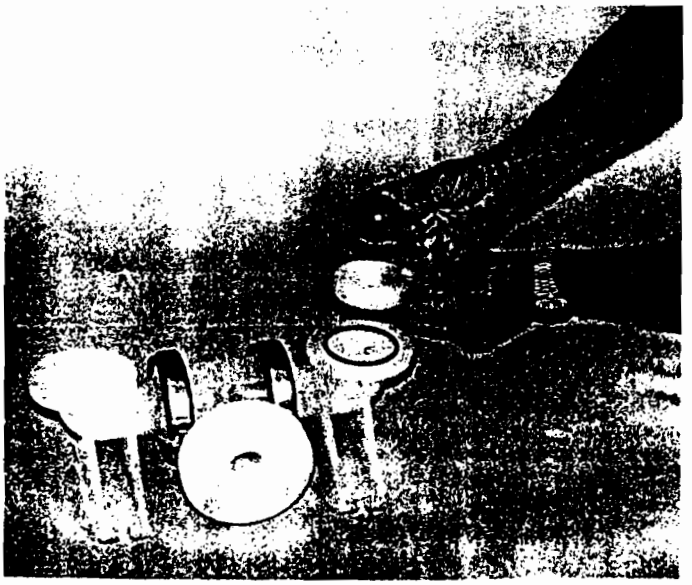


Figure 8B

Step 3.

Install inlet ball valve, O-ring and seat in sequential order as shown in *Figures 8A* and *8B*.

Step 4 (Teflon® Elastomers only).

M4 "Champ" pumps with Teflon® elastomers require the use of a Teflon® gasket kit (P/N 08-9500-99). The Teflon® gasket material in this kit is an expanded type of Teflon® which is very strong, but soft. Its use assures a positive seal between the Teflon® diaphragm outer bead and its corresponding groove in the water chamber. This gasket material should be replaced each time the pump is disassembled.

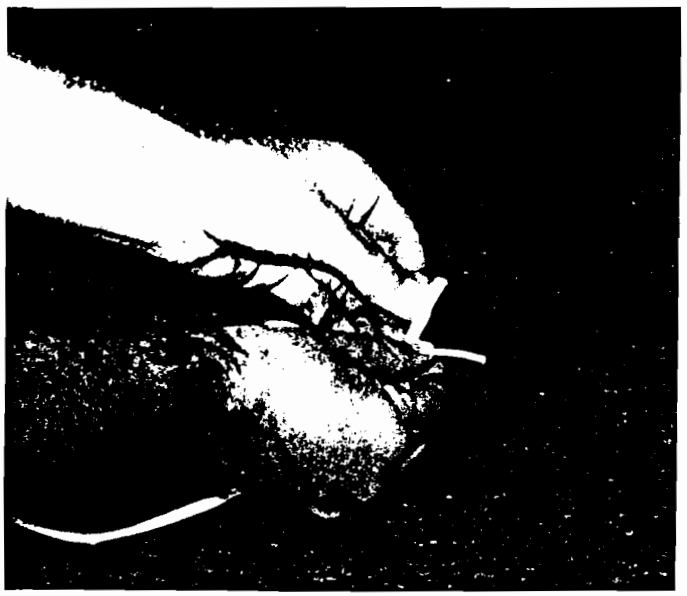


Figure 9A

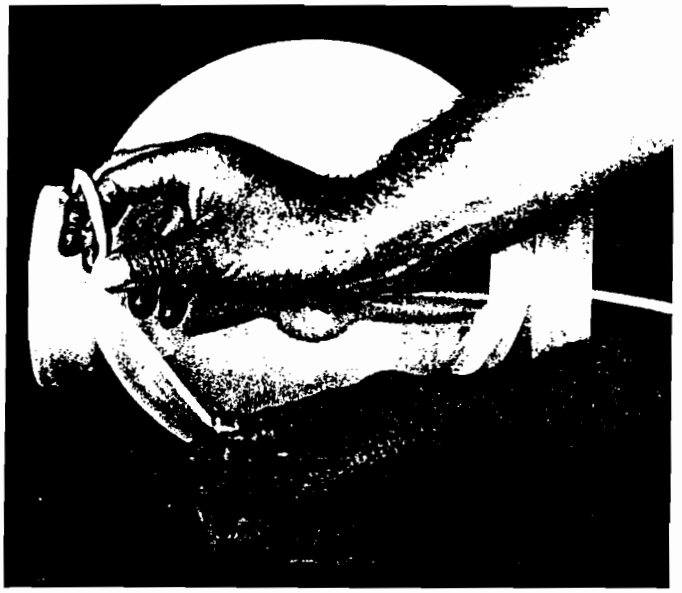


Figure 9B

Select a strip of 3/16"-wide material and carefully remove the covering from the adhesive strip (see *Figure 9A).* Ensure that the adhesive strip remains attached to the gasket material. Starting at any point, place the gasket strip in the center of the diaphragm bead groove on the chamber (P/N 04-5000-20) and press lightly on the gasket to ensure that adhesive holds it in place during assembly *(Figure 9B).* The ends of the gasket should overlap approximately ½-inch.

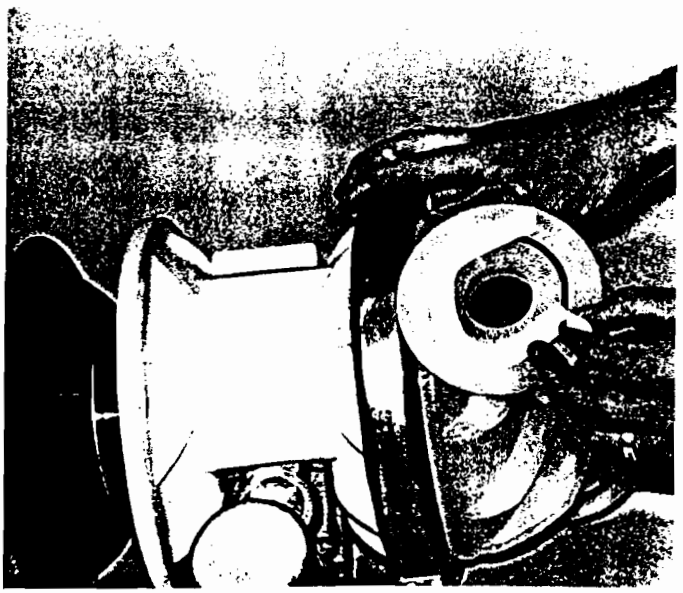


Figure 9C

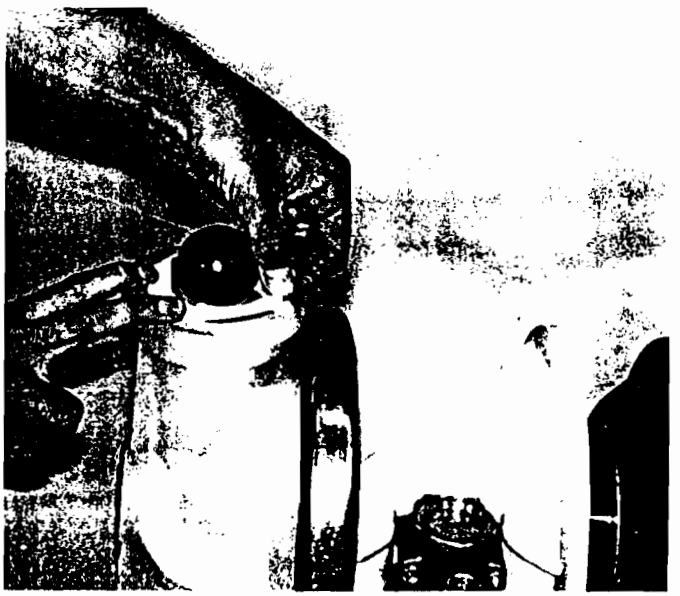


Figure 9D

All PVDF pumps with Teflon® elastomers utilize gasket material around the seat area as well. If sealing is a concern, the gasket material can be used with polypropylene pumps as well. Notice that the adhesive strip for the inlet and discharge manifold is 1/2", and that it, too, is wrapped in much the same way as in *Figures 9A* and *9B.* Make sure that adhesive strip covers the round O-ring completely.

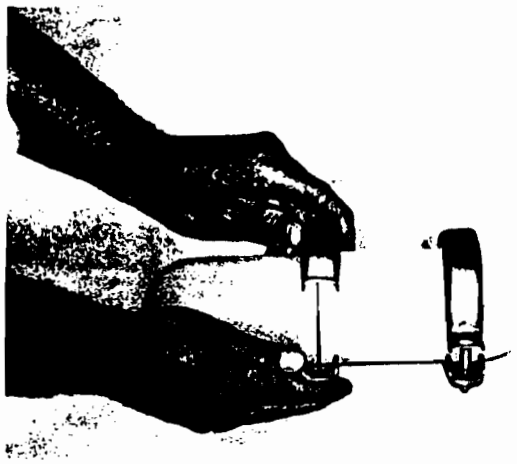


Figure 10A

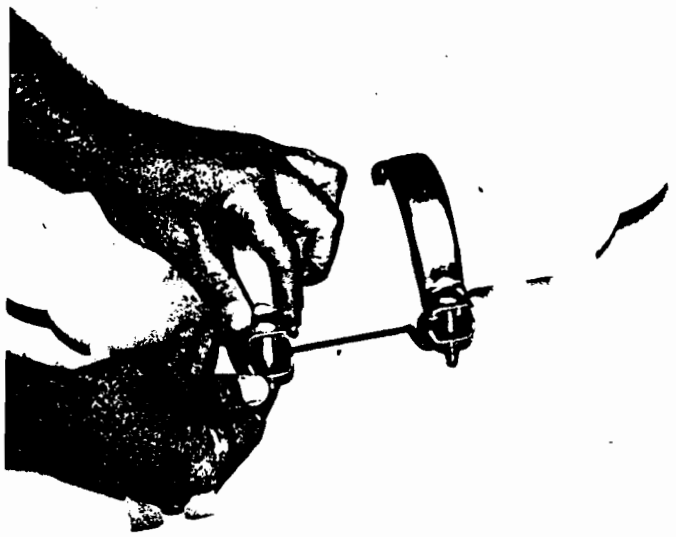


Figure 10B

Step 5.

Manifold Assembly: If the inlet and/or discharge manifold was taken apart, it should be reassembled now. The easiest way to do this is to take one half clamp band and wedge it onto the flanges of the elbow and center T-section. (See *Figure 10A).* Align the manifold parts as in *Figure 10C,* and tighten the clamps per the torque specification*. **NOTE:** On pumps equipped with Teflon® diaphragms, balls, and sealing rings, Teflon® gaskets should be used between the flanges of the manifold. (See **Step 9D.**)

*Refer to Section 8 for torque specifications.

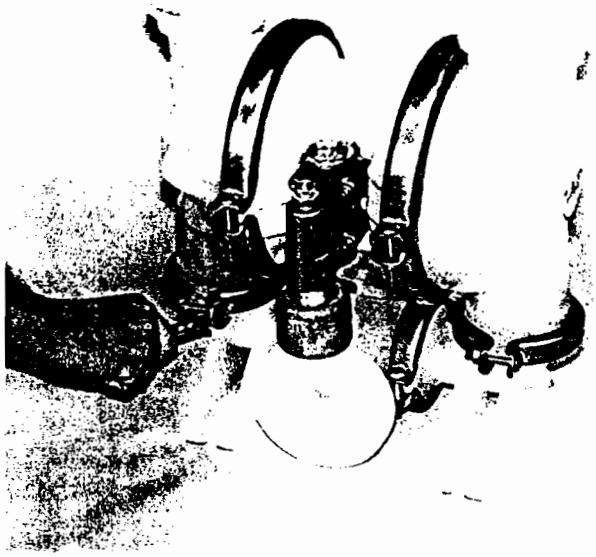


Figure 10C

Step 6.

Next, install the valve seat, O-ring, and valve ball on top of the liquid chamber. Tighten clamp bands per the torque specification* (Item #3).

Step 7.

Retighten all clamp bands, blow out air line for 10 to 20 seconds to make sure all pipeline debris is clear. Connect an air line to the pump and run it dry. The pump should shift evenly and good suction should be observed at the inlet.

JTE: AIR VALVE AND CENTER SECTION DISASSEMBLY/ REASSEMBLY IS SHOWN IN SECTION 6C.

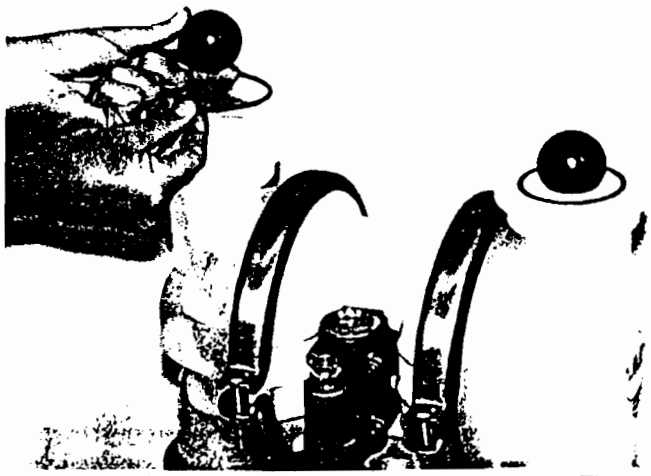


Figure 11

SECTION 6C

AIR VALVE / CENTER BLOCK DISASSEMBLY / REASSEMBLY

The air valve assembly consists of both the air valve body and piston and the center block. The unique design of the air valve relies only on differential pressure to effect the diaphragm shift. It is reliable and simple to maintain. The bushing in the center block, along with the diaphragm shaft, provides the "trigger" to tell the air valve to shift. The following procedure will ensure that the air valve on your Wilden pump will provide long trouble-free service.

AIR VALVE ASSEMBLY AND DISASSEMBLY:

The air valve (P/N 04-2000-07) can be disconnected from the pump by removing the four socket head cap screws which attach it to the center block. The piston should move freely and the ports in the piston should line up with the ports on the face of the air valve body (see *Figure D).* The piston should also appear to be dull, dark gray in color. If the piston appears to be a shiny aluminum color, the air valve is probably worn beyond working tolerances and should be replaced.

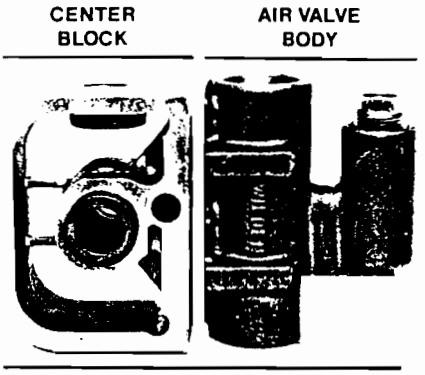


Figure A

If the piston does not move freely in the air valve, the entire air valve should be immersed in a cleaning solution. [**NOTE:** Do not force the piston by inserting a metal object.] This soaking should remove any accumulation of sludge and grit which is preventing the air valve piston from moving freely. Also, remove and clean the air valve screen (P/N 04-2500-03). If the air valve piston does not move freely after the above cleaning, the air valve should be disassembled as follows: Remove the snap ring from the top end of the air valve cylinder and apply an air jet to the 3/16-inch hole on the opposite end of the air valve face (see *Figure C).* **CAUTION:** The air valve end cap may come out with considerable force. Inspect the piston and cylinder bore for nicks and scoring.

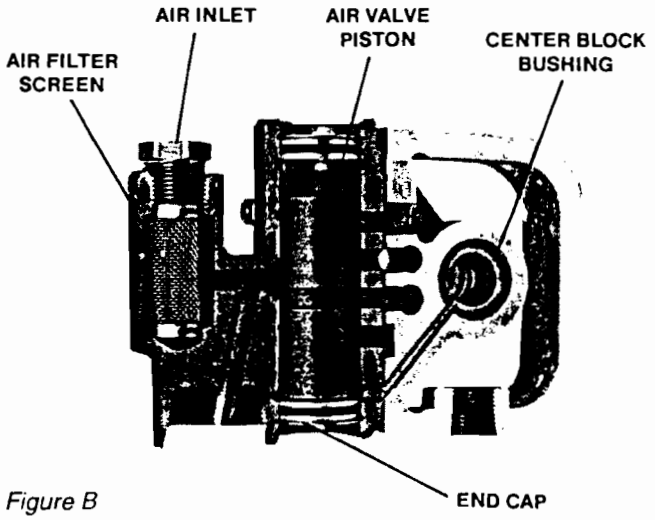


Figure B

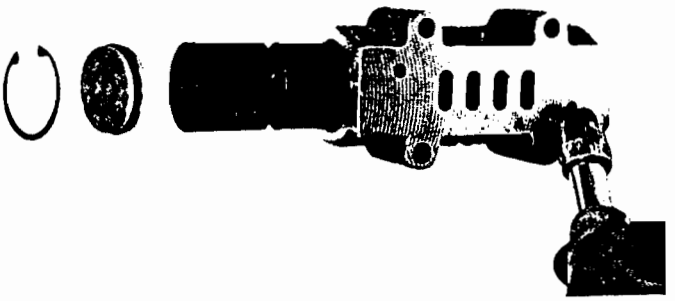


Figure C

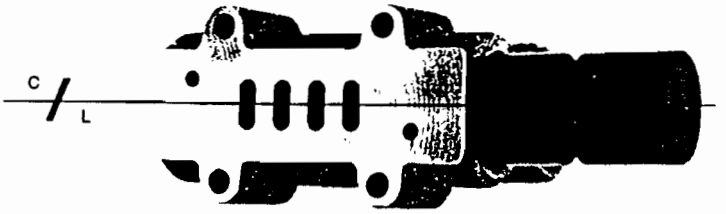


Figure D

Small nicks can usually be dressed out and the piston returned to service. Inspect the cylinder end caps (P/N 04-2300-23 has the piston guide pin and P/N 04-2330-23 does not.) Make sure that the guide pin is straight and smooth or the piston will not ·e freely in the cylinder. New O-rings (P/N 04-2390-52) ıld be installed on the end caps. Lubricate the O-rings with arctic 5 weight hydraulic oil (ISO grade 15) and install the end caps, assuring that proper alignment of the piston and cylinder ports is maintained (see *Figure D).* Reinstall air valve to center block of pump. Tighten per the torque specification*.

Figure F (Side View)

O-RING REPLACEMENT:

When the O-rings become worn or flat, they will no longer seal and must be replaced. This is most easily accomplished by using a tool called an O-ring pick, available through most industrial supply companies.

CENTER BLOCK ASSEMBLY (P/N 04-3100-01):

The pump's center block (P/N 04-3100-01) consists of a die cast housing with a cast-in-bronze bushing *(Figure G). Figure H* shows M4 injection-molded polypropylene center section (P/N 04-3150-20) and alignment with air valve.The bushing has eleven grooves cut on the inside diameter. There are seven O-rings that fit in these grooves (see *Figure E).* Since these O-rings form a part of the shifting function of the pump, it is necessary that they be located in the proper grooves. The bronze bushing is replaceable in cast iron center block only. When bushing wear becomes excessive, a new center block be used.

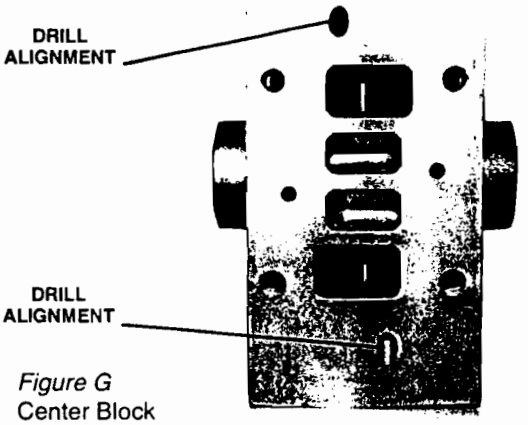


Figure G
Center Block
(Front View)

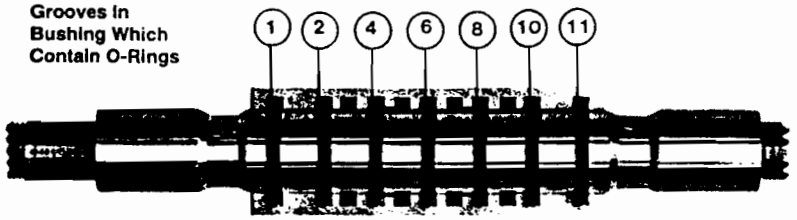


Figure E

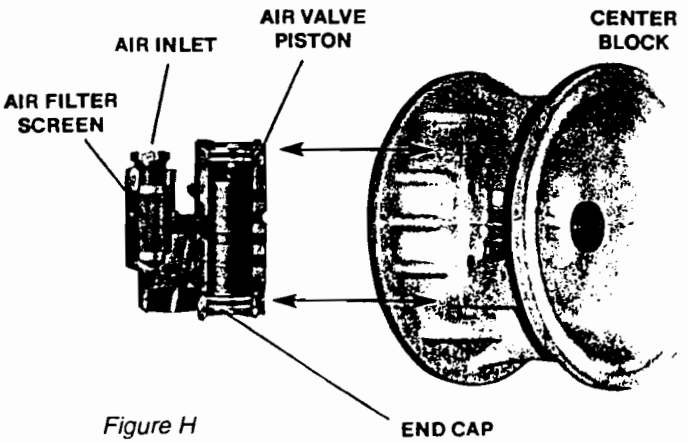


Figure H

*Refer to Section 8 for torque specifications.

SECTION 6D

TURBO 225 AIR DISTRIBUTION SYSTEM

The patent pending "TURBO 225" air distribution system is designed to combat the effect of "freezing." This condition can occur when air-operated, double-diaphragm pumps are operated on a moisture-laden air supply. Moisture held in suspension can crystallize to ice when the compressed air expands, pressure decreases, and temperature drops. The "TURBO 225" is designed to control the internal expansion of air, minimizing pressure and temperature reduction. By controlling the internal expansion of air and thus the crystallization of water to ice, the Wilden pump operates reliably without loss in performance.

The use of proprietary engineered thermoplastics decreases the coefficient of friction between mating parts enabling the pump to operate lubrication free intermittently. The solid piston with milled exhaust slots allows for efficient exhausting through the center section of the pump, reducing the "chilling effect" on the air valve piston. The thermoplastic air valve piston decreases the transfer of cold temperatures from the air exhaust to the main air supply further inhibiting "freezing" conditions.

In addition to the air valve changes, the center block O-rings have been replaced by a proprietary composite glide ring. This glide ring exhibits much longer life (5x the life of standard O-rings) and less susceptibility to chemical attack (hardening, shrinking, and/or cracking). No changes to center block grooves have been made, allowing these glide rings complete retrofittability to existing center blocks (see *Figure B).*

A straight shaft (non D-dented) must be utilized with the glide rings (see *Figure B).* This straight shaft reduces the coefficient of friction between it and the center block glide rings, extending the life of these seals.

Air Valve Assembly
P/N 04-2000-07-225

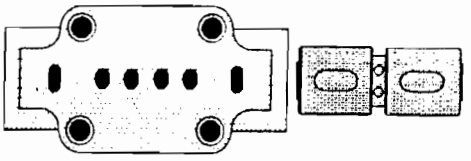
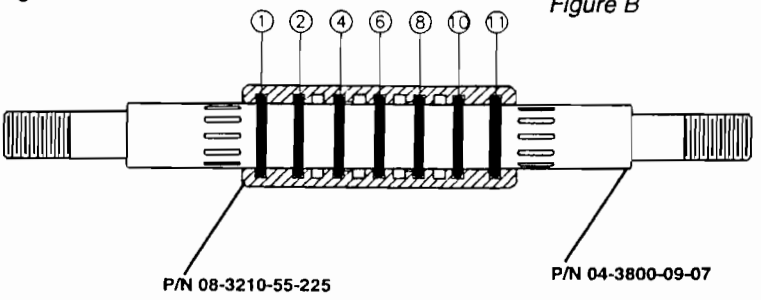
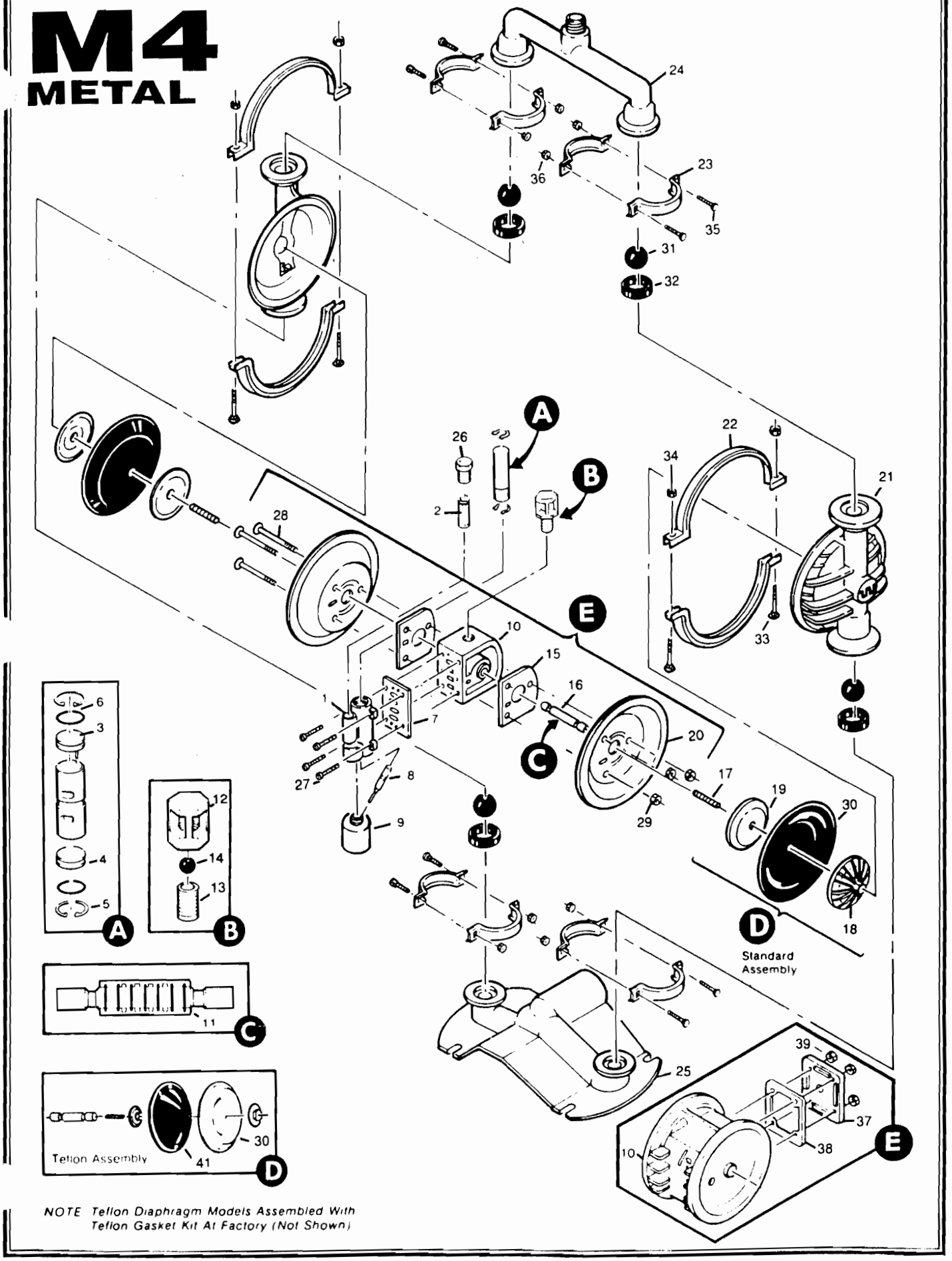


Figure A

Figure B



M4 METAL


A
B
C
D
E
Standard Assembly
Teflon Assembly
NOTE Teflon Diaphragm Models Assembled With Teflon Gasket Kit At Factory (Not Shown)

M4 RUBBER/TPE-FITTED

Item	Description	Qty. Per Pump	M4/ AMAB P/N	M4/ APPB P/N	M4-03/ AMAB P/N	M4-03/ APPB P/N	M4/ HPPB P/N	M4/ SPPB P/N	M4/ SNNN P/N	M4/ WPPB P/N	M4-22/ WPPB P/N	M4-70/ SNNN P/N	M4-70/ SPPN P/N
1	Air Valve'	1	04-2000-07	04-2000-07	04-2000-07	04-2000-07	04-2000-07	04-2000-07	04-2000-06	04-2000-07	04-2000-07	04-2000-06	04-2000-06
2	Air Valve Screen	1	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03
3	Air Valve Cap w/Guide (Top)	1	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23
4	Air Valve Cap w/o Guide (Bottom)	1	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23
5	Snap Ring	2	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03
6	Air Valve Cap O-Ring	2	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52
7	Air Valve Gasket — Buna	1	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52
8	Lubricator Capillary Rod Assy (Optional)	1	04-2900-99	04-2900-99	04-2900-99	04-2900-99	04-2900-99	04-2900-99	04-2900-99	04-2900-99	04-2900-99	04-2900-99	04-2900-99
9	Lubricator Oil Bottle (Optional)	1	04-2850-01	04-2850-01	04-2850-01	04-2850-01	04-2850-01	04-2850-01	04-2850-01	04-2850-01	04-2850-01	04-2850-01	04-2850-01
10	Center Section/Block	1	04-3100-01	04-3150-20	04-3100-01	04-3150-20	04-3150-20	04-3150-20	04-3100-06	04-3150-20	04-3150-20	04-3100-06	04-3150-20
11	O-Ring	7	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52
12	Check Body	1	08-3550-01	N/R	08-3550-01	N/R	N/R	N/R	08-3550-06	N/R	N/R	08-3550-06	N/R
13	Nipple ¼" x Close	1	08-7420-08	N/R	08-7420-03	N/R	N/R	N/R	08-7420-03	N/R	N/R	08-7420-03	N/R
14	Check Ball	1	08-1450-51	N/R	08-1450-51	N/R	N/R	N/R	08-1450-51	N/R	N/R	08-1450-51	N/R
15	Block Gasket — Buna	2	04-3520-52	N/R	04-3520-52	N/R	N/R	N/R	04-3520-52	N/R	N/R	04-3520-52	N/R
16	Shaft	1	04-3800-09	04-3800-09	04-3800-09	04-3800-09	04-3800-09	04-3800-09	04-3800-09	04-3800-09	04-3800-09	04-3800-09	04-3800-09
17	Shaft Stud (M4/WPPB: Bolt)	2	N/A	N/A	N/A	N/A	04-6150-08	04-6150-08	04-6150-08	04-6090-08	04-6090-08	04-6150-08	04-6150-08
18	Piston, Outer	2	04-4550-01	04-4550-01	04-4550-01	04-4550-01	04-4550-04	04-4550-03	04-4550-03	04-4550-08	04-4550-08	04-4550-03	04-4550-03
19	Piston, Inner	2	04-3700-08	04-3700-08	04-3700-08	04-3700-08	04-3700-08	04-3700-08	04-3700-08	04-3700-08	04-3700-08	04-3700-08	04-3700-08
20	Air Chamber	2	04-3650-08	N/R	04-3650-08	N/R	N/R	N/R	04-3650-06	N/R	N/R	04-3650-06	N/R
21	Water Chamber	2	04-5000-01	04-5000-01	04-5000-01	04-5000-01	04-5000-04	04-5000-03	04-5000-03	04-5000-02	04-5000-02	04-5000-03	04-5000-03
22	Clamp Band (Large)	2	04-7300-08	04-7330-08	04-7300-03	04-7330-03	04-7330-03	04-7330-03	04-7300-03	04-7330-08	04-7330-03	04-7300-03-70	04-7330-03-70
23	Clamp Band (Small)	4	04-7100-08	04-7100-08	04-7100-03	04-7100-03	04-7100-03	04-7100-03	04-7100-03	04-7100-08	04-7100-03	04-7100-03-70	04-7100-03-70
24	Discharge Manifold	1	04-5020-01	04-5020-01	04-5020-01-03	04-5020-01-03	04-5020-04	04-5020-03	04-5020-03	04-5020-02	04-5020-02	04-5020-03-70	04-5020-03-70
25	Inlet Housing	1	04-5080-01	04-5080-01	04-5080-01-03	04-5080-01-03	04-5080-04	04-5080-03	04-5080-03	04-5080-02	04-5080-02	04-5080-03-70	04-5080-03-70
26	Reducer Bushing ½" x ¼"	1	04-6950-07	04-6950-07	04-6950-07	04-6950-07	04-6950-07	04-6950-07	04-6950-03	04-6950-07	04-6950-07	04-6950-03	04-6950-03
27	Air Valve Cap Screw	4	04-6000-08	04-6000-03-500	04-6000-03	04-6000-03-500	04-6000-03-500	04-6000-03-500	04-6000-03	04-6000-03-500	04-6000-03-500	04-6000-03	04-6000-03-500
28	Hex Head Cap Screw ¼"-20 x 3"	3	04-6130-08	N/R	04-6130-08	N/R	N/R	N/R	04-6130-08	N/R	N/R	04-6130-08	N/R
29	Hex Head Nut ¼"-20	3	04-6400-08	N/R	04-6400-08	N/R	N/R	N/R	04-6400-08	N/R	N/R	04-6400-08	N/R
30	Diaphragm*	2	*	*	*	*	*	*	*	*	*	04-1010-56	04-1010-56
31	Valve Ball*	4	*	*	*	*	*	*	*	*	*	04-1080-56	04-1080-56
32	Valve Seat*	4	*	*	*	*	*	*	*	*	*	04-1120-56	04-1120-56
33	Large Clamp Band Bolt ¾₁₆"-18 x 2¼"	4	04-6070-08	04-6070-08	04-6070-03	04-6070-03	04-6070-03	04-6070-03	04-6070-03	04-6070-08	04-6070-03	04-6070-03	04-6070-03
34	Large Hex Nut ¾₁₆"-18	4	04-6420-08	04-6420-08	08-6400-03	08-6400-03	08-6400-03	08-6400-03	08-6400-03	04-6420-08	08-6400-03	08-6660-03-72	08-6660-03-72
35	Small Clamp Band Bolt ¼"-20 x 1¼"	8	04-6050-08	04-6050-08	01-6070-03	01-6070-03	01-6070-03	01-6070-03	01-6070-03	04-6050-08	01-6070-03	01-6070-03	01-6070-03
36	Small Hex Nut ¼"-20	8	04-6400-08	04-6400-08	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-08	04-6400-03	04-6650-03-70	04-6650-03-70
37	Muffler Plate	1	N/R	04-3180-20	N/R	04-3180-20	04-3180-20	04-3180-20	N/R	04-3180-20	04-3180-20	N/R	04-3180-20
38	Muffler Plate Gasket — Buna	1	N/R	04-3500-52	N/R	04-3500-52	04-3500-52	04-3500-52	N/R	04-3500-52	04-3500-52	N/R	04-3500-52
39	Air Valve Hex Nut ¼"-20	4	N/R	04-6400-03	N/R	04-6400-03	04-6400-03	04-6400-03	N/R	04-6400-03	04-6400-03	N/R	04-6400-03

'Air Valve Assembly includes items 2–6.

*For optional M4 Metal Pump elastomers, see end of section.

NOTE: Muffler (P/N 04-3510-99) (not shown) is standard on all M4 pumps. (Comes equipped with P/N 08-3250-08 ¾" 45 degree street elbow for metal center section only.)

NOTE: Muffler (P/N 08-3510-99) (not shown) is available upon request. (Comes equipped with P/N 08-3250-08 ¾" 45 degree street elbow.)

NOTE: Aluminum pumps are available with a screen base. Requires (1) 04-5620-01 (Screen), (4) 04-6140-08 (Bolt) and (4) 15-6720-08 (Washer).

BSP threads available.

-03 Specialty Code = Alloy-Fitted

-70 Specialty Code = Food Processing

-22 Specialty Code = Stainless Steel Clamp Bands

For Teflon®-fitted models, see next page.

SECTION 7B

M4 TEFLON®-FITTED

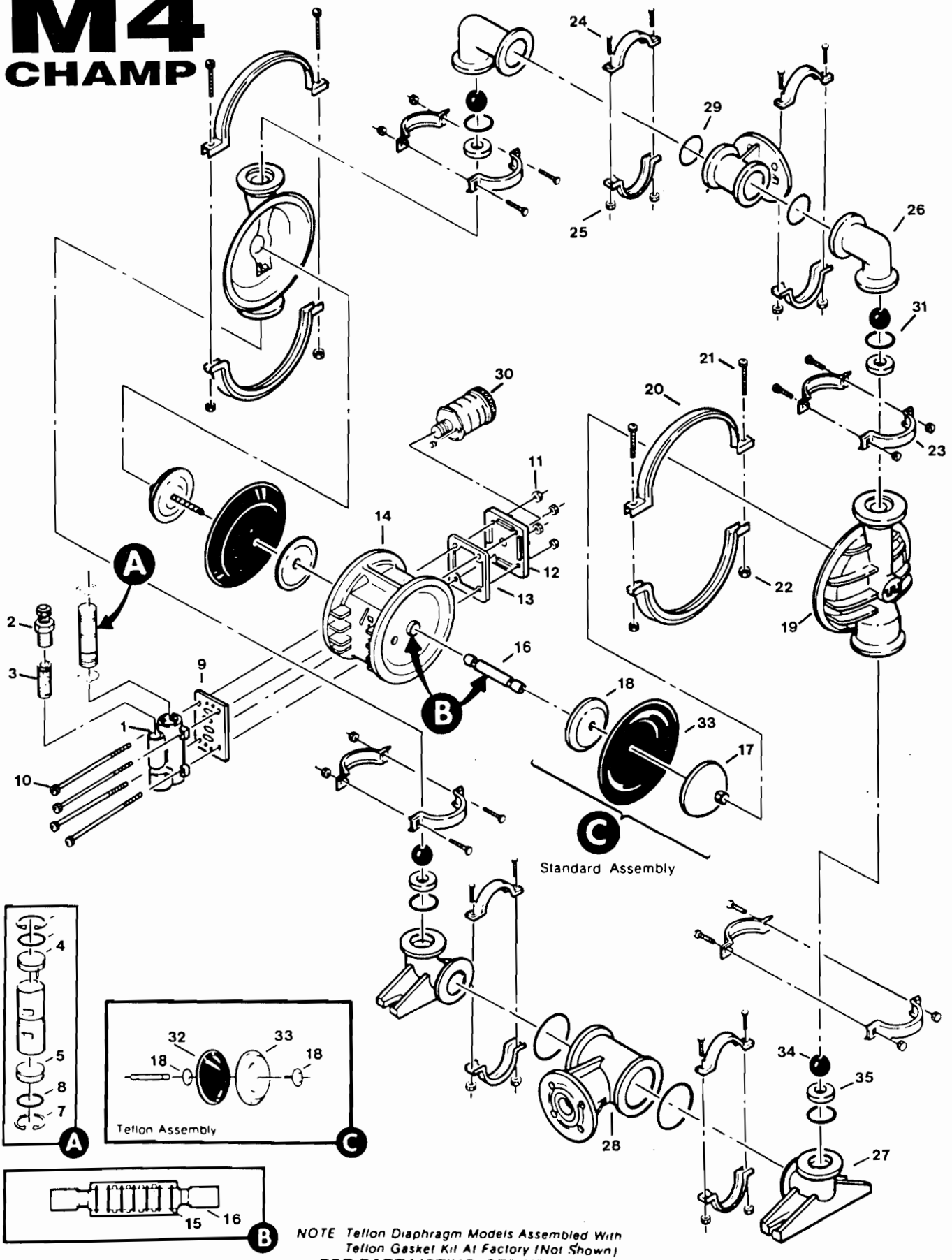
Item	Description	Qty. Per Pump	M4/ APPB P/N	M4-03/ APPB P/N	M4/ HPPB P/N	M4/ SPPB P/N	M4/ WPPB P/N	M4-70/ SNNN P/N	M4-70/ SPPN P/N
1	Air Valve[1]	1	04-2000-07	04-2000-07	04-2000-07	04-2000-07	04-2000-07	04-2000-06	04-2000-06
2	Air Valve Screen	1	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03
3	Air Valve Cap w/Guide (Top)	1	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23
4	Air Valve Cap w/o Guide (Bottom)	1	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23
5	Snap Ring	2	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03
6	Air Valve Cap O-Ring	2	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52
7	Air Valve Gasket — Buna	1	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52
8	Lubricator Capillary Rod Assy. (Optional)	1	04-2900-99	04-2900-99	04-2900-99	04-2900-99	04-2900-99	04-2900-99	04-2900-99
9	Lubricator Oil Bottle (Optional)	1	04-2850-01	04-2850-01	04-2850-01	04-2850-01	04-2850-01	04-2850-01	04-2850-01
10	Center Block	1	04-3150-20	04-3150-20	04-3150-20	04-3150-20	04-3150-20	04-3100-06	04-3150-20
11	O-Ring	7	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52
12	Check Body	1	N/R	N/R	N/R	N/R	N/R	08-3550-06	N/R
13	Nipple ¼" x Close	1	N/R	N/R	N/R	N/R	N/R	08-7420-03	N/R
14	Check Ball	1	N/R	N/R	N/R	N/R	N/R	08-1450-51	N/R
15	Block Gasket — Buna	2	N/R	N/R	N/R	N/R	N/R	04-3520-52	N/R
16	Shaft	1	04-3820-09	04-3820-09	04-3820-09	04-3820-09	04-3820-09	04-3820-09	04-3820-09
17	Shaft Stud	2	04-6150-08	04-6150-08	04-6150-08	04-6150-08	04-6150-08	04-6150-08	04-6150-08
18	Piston, Outer	2	04-4600-01	04-4600-01	04-4600-04	04-4600-03	04-4600-03	04-4600-03	04-4600-03
19	Piston, Inner	2	04-3750-01	04-3750-01	04-3750-01	04-3750-01	04-3750-01	04-3750-01	04-3750-01
20	Air Chamber	2	N/R	N/R	N/R	N/R	N/R	04-3650-06	N/R
21	Water Chamber	2	04-5000-01	04-5000-01	04-5000-04	04-5000-03	04-5000-02	04-5000-03	04-5000-03
22	Clamp Band (Large)	2	04-7330-03	04-7330-03	04-7330-03	04-7330-03	04-7330-03	04-7300-03-70	04-7330-03-70
23	Clamp Band (Small)	4	04-7100-03	04-7100-03	04-7100-03	04-7100-03	04-7100-03	04-7100-03-70	04-7100-03-70
24	Discharge Manifold	1	04-5020-01	04-5020-01-03	04-5020-04	04-5020-03	04-5020-02	04-5020-03-70	04-5020-03-70
25	Inlet Housing	1	04-5080-01	04-5080-01-03	04-5080-04	04-5080-03	04-5080-02	04-5080-03-70	04-5080-03-70
26	Reducer Bushing ½" x ¼"	1	04-6950-07	04-6950-07	04-6950-07	04-6950-07	04-6950-07	04-6950-03	04-6950-03
27	Air Valve Cap Screw ¼"-20 x 6 1/16"	4	04-6000-03-500	04-6000-03-500	04-6000-03-500	04-6000-03-500	04-6000-03-500	04-6000-03	04-6000-03-500
28	Hex Head Cap Screw ¼"-20 x 3"	3	N/R	N/R	N/R	N/R	N/R	04-6130-08	N/R
29	Hex Head Nut ¼"-20	3	N/R	N/R	N/R	N/R	N/R	04-6400-08	N/R
30	Diaphragm	2	04-1010-55	04-1010-55	04-1010-55	04-1010-55	04-1010-55	04-1010-55	04-1010-55
31	Valve Ball	4	04-1080-55	04-1080-55	04-1080-55	04-1080-55	04-1080-55	04-1080-55	04-1080-55
32	Valve Seat	4	04-1121-01	04-1121-01	04-1121-04	04-1121-03	04-1121-08	04-1121-03	04-1121-03
33	Large Clamp Band Bolt 5/16"-18 x 2¼"	4	04-6070-03	04-6070-03	04-6070-03	04-6070-03	04-6070-03	04-6070-03	04-6070-03
34	Large Hex Nut 5/16"-18	4	08-6400-03	08-6400-03	08-6400-03	08-6400-03	08-6400-03	08-6660-03-72	08-6660-03-72
35	Small Clamp Band Bolt ¼"-20 x 1¾"	8	01-6070-03	01-6070-03	01-6070-03	01-6070-03	01-6070-03	01-6070-03	01-6070-03
36	Small Hex Nut ¼"-20	8	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6650-03-70	04-6650-03-70
37	Muffler Plate	1	04-3180-20	04-3180-20	04-3180-20	04-3180-20	04-3180-20	N/R	04-3180-20
38	Muffler Plate Gasket — Buna	1	04-3500-52	04-3500-52	04-3500-52	04-3500-52	04-3500-52	N/R	04-3500-52
39	Air Valve Hex Nut ¼"-20	4	04-6400-03	04-6400-03	04-6400-03	04-6400-03	04-6400-03	N/R	04-6400-03
40	Valve Seat O-Ring[2] (Not shown)	4	04-1200-55	04-1200-55	04-1200-55	04-1200-55	04-1200-55	04-1200-55	04-1200-55
41	Back-up Diaphragm*	2	04-1060-56	04-1060-56	04-1060-56	04-1060-56	04-1060-56	04-1060-56	04-1060-56

[1]Air Valve Assembly includes items 2–6.
[2]Fluoro-Seal™ O-rings available upon request.
NOTE — Muffler (P/N 04-3510-99) (not shown) is standard on all pumps. (Metal center blocks come with a 45° street elbow.)
*Back-up Diaphragm for Teflon®-fitted pump. P/N 04-1060-56. Neoprene Back-up Diaphragm, P/N 04-1060-51, is available upon request for Teflon®-fitted pumps. Please consult your local distributor.
BSP threads available.
-03 Specialty Code = Alloy-Fitted
-70 Specialty Code = Food Processing

For exploded view, see previous page.

SECTION 7C

M4 CHAMP



NOTE Teflon Diaphragm Models Assembled With Teflon Gasket Kit At Factory (Not Shown)

FOR PART LISTING, SEE NEXT PAGE

Wilden Model M4 "Champ"

			Rubber-Fitted				Teflon®-Fitted				Ultrapure			
	Part Description	Qty. Per Pump	M4/ PPPB Part No.	M4/ KPPB Part No.	M4-502/ PPPC Part No.	M4-502/ KPPC Part No.	M4/ PPPB Part No.	M4/ KPPB Part No.	M4-502/ PPPC Part No.	M4/ KPPC Part No.	M4/ TPPB Part No.	M4-502/ TPPC Part No.	M4-622/ TPPB Part No.	M4-612/ TPPC Part No.
1	Air Valve Assembly	1	04-2000-07	04-2000-07	04-2000-05	04-2000-05	04-2000-07	04-2000-07	04-2000-05	04-2000-05	04-2000-07	04-2000-05	04-2000-07	04-2000-05
2	Air Valve Bushing ⅞" x ⅝"	1	04-6950-07	04-6950-07	04-6950-05	04-6950-05	04-6950-07	04-6950-07	04-6950-05	04-6950-05	04-6950-07	04-6950-05	04-6950-07	04-6950-05
3	Air Valve Screen	1	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03	04-2500-03
4	Air Valve with Guide (Top)	1	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23	04-2300-23
5	Air Valve Cap without End Guide (Bottom)	1	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23	04-2330-23
6	End Cap Cover (Not shown)[2]	2	N/A	N/A	04-2420-55	04-2420-55	N/A	N/A	04-2420-55	04-2420-55	N/R	04-2420-55	N/R	04-2420-55
7	Air Valve Snap Ring	2	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03	04-2650-03
8	Air Valve Cap O-Ring	2	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52	04-2390-52
9	Air Valve Gasket — Buna	1	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-52	04-2600-55	04-2600-55	04-2600-55	04-2600-55
10	Air Valve Cap Screw ⅜"-20 x 6¾"	4	04-6000-03-500	04-6000-03-500	04-6000-05-500	04-6000-05-500	04-6000-03-500	04-6000-03-500	04-6000-05-500	04-6000-05-500	04-6000-03-500	04-6000-05-500	04-6000-03-500	04-6000-05-500
11	Air Valve Hex Nut ⅜"-20	4	04-6400-03	04-6400-03	04-6400-05	04-6400-05	04-6400-03	04-6400-03	04-6400-05	04-6400-05	04-6400-03	04-6400-05	04-6400-03	04-6400-05
12	Muffler Plate	1	04-3180-20	04-3180-20	04-3180-20	04-3180-20	04-3180-20	04-3180-20	04-3180-20	04-3180-20	04-3180-20	04-3180-20	04-3180-20	04-3180-20
13	Muffler Plate Gasket — Buna	1	04-3500-52	04-3500-52	04-3500-52	04-3500-52	04-3500-52	04-3500-52	04-3500-52	04-3500-52	04-3500-55	04-3500-55	04-3500-55	04-3500-55
14	Center Section	1	04-3150-20	04-3150-20	04-3150-20	04-3150-20	04-3150-20	04-3150-20	04-3150-20	04-3150-20	04-3150-20	04-3150-20	04-3150-20	04-3150-20
15	Center Section O-Ring	7	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52
16	Shaft	1	04-3800-09	04-3800-09	04-3800-09	04-3800-09	04-3820-09	04-3820-09	04-3820-09	04-3820-09	04-3820-09	04-3820-09	04-3820-09	04-3820-09
17	Piston, Outer	2	04-4550-20-500	04-4550-21-500	04-4550-20-500	04-4550-21-500	04-4600-20-500	04-4600-21-500	04-4600-20-500	04-4600-21-500	04-4600-22-500	04-4600-22-500	04-4600-22-500	04-4600-22-500
18	Piston, Inner	2	04-3700-08	04-3700-08	04-3700-08	04-3700-08	04-3750-01	04-3750-01	04-3750-01	04-3750-01	04-3750-01	04-3750-01	04-3750-01	04-3750-01
19	Water Chamber	2	04-5000-20	04-5000-21	04-5000-20	04-5000-21	04-5000-20	04-5000-21	04-5000-20	04-5000-21	04-5000-22	04-5000-22	04-5000-22	04-5000-22
20	Large Clamp Band	2	04-7300-03-500	04-7300-03-500	04-7300-05-500	04-7300-05-500	04-7300-03-500	04-7300-03-500	04-7300-05-500	04-7300-05-500	04-7300-03-500	04-7300-05-500	04-7300-03-500	04-7300-05-500
21	Large Carriage Bolt ⅜"-18 x 2½"	4	04-6070-03	04-6070-03	04-6070-05	04-6070-05	04-6070-03	04-6070-03	04-6070-05	04-6070-05	04-6070-03	04-6070-05	04-6070-03	04-6070-05
22	Hex Nut ⅜"-18	4	08-6400-03	08-6400-03	08-6400-05	08-6400-05	08-6400-03	08-6400-03	08-6400-05	08-6400-05	08-6400-03	08-6400-05	08-6400-03	08-6400-05
23	Small Clamp Band	8	04-7100-03-500	04-7100-03-500	04-7100-05-500	04-7100-05-500	04-7100-03-500	04-7100-03-500	04-7100-05-500	04-7100-05-500	04-7100-03-500	04-7100-05-500	04-7100-03-500	04-7100-05-500
24	Small Carriage Bolt ¼"-18 x 1½"	16	08-6050-03-500	08-6050-03-500	08-6050-05-500	08-6050-05-500	08-6050-03-500	08-6050-03-500	08-6050-05-500	08-6050-05-500	08-6050-03-500	08-6050-05-500	08-6050-03-500	08-6050-05-500
25	Hex Nut ¼"-18	16	08-6400-03	08-6400-03	08-6400-05	08-6400-05	08-6400-03	08-6400-03	08-6400-05	08-6400-05	08-6400-03	08-6400-05	08-6400-03	08-6400-05
26	Discharge Elbow	2	04-5230-20	04-5230-21	04-5230-20	04-5230-21	04-5230-20	04-5230-21	04-5230-20	04-5230-21	04-5230-22	04-5230-22	04-5230-22	04-5230-22
27	Inlet Elbow	2	04-5220-20	04-5220-21	04-5220-20	04-5220-21	04-5220-20	04-5220-21	04-5220-20	04-5220-21	04-5220-22	04-5220-22	04-5220-22	04-5220-22
28	Manifold Tee Section[3]	2	04-5160-20	04-5160-21	04-5160-20	04-5160-21	04-5160-20	04-5160-21	04-5160-20	04-5160-21	04-5160-22	04-5160-22	04-5160-22-622	04-5160-22-622
29	Tee-Section O-Ring	4	*	*	*	*	04-1300-59-500	04-1300-60-500	04-1300-59-500	04-1300-60-500	04-1300-60-500	04-1300-60-500	04-1300-60-500	04-1300-60-500
30	Muffler (Consult factory)	1	04-3510-99	04-3510-99	04-3510-99	04-3510-99	04-3510-99	04-3510-99	04-3510-99	04-3510-99	04-3510-99	04-3510-99	04-3510-99	04-3510-99
31	Valve Seat O-Ring	4	*	*	*	*	04-1200-59-500	04-1200-60-500	04-1200-59-500	04-1200-60-500	04-1200-60-500	04-1200-60-500	04-1200-60-500	04-1200-60-500
-	Back-up Diaphragm**	2	N/R	N/R	N/R	N/R	04-1060-56	04-1060-56	04-1060-56	04-1060-56	04-1060-56	04-1060-56	04-1060-56	04-1060-56
33	Diaphragm	2	*	*	*	*	04-1010-55	04-1010-55	04-1010-55	04-1010-55	04-1010-55	04-1010-55	04-1010-55	04-1010-55
34	Valve Ball	4	*	*	*	*	04-1080-55	04-1080-55	04-1080-55	04-1080-55	04-1080-55	04-1080-55	04-1080-55	04-1080-55
35	Valve Seat	4	04-1120-20-500	04-1120-21-500	04-1120-20-500	04-1120-21-500	04-1120-20-500	04-1120-21-500	04-1120-20-500	04-1120-21-500	04-1120-22-500	04-1120-22-500	04-1120-22-500	04-1120-22-500
36	Teflon® Gasket Kit (Not shown)	1	N/R	N/R	N/R	N/R	08-9500-99	08-9500-99	08-9500-99	08-9500-99	08-9500-99	08-9500-99	08-9500-99	08-9500-99

*Refer to M4 "Champ" elastomer chart at end of section.
**Back-up Diaphragm for Teflon®-fitted pump: P/N 04-1060-56. Neoprene Back-up Diaphragm, P/N 04-1060-51, is available upon request for Teflon®-fitted pumps. Please consult your local distributor.
[1]Air Valve Assembly includes items 2 through 8.
[2]End Cap Cover (P/N 04-2420-55) requires End Cap Bolt (P/N 04-2450-22).
[3]DIN Flange: Polypropylene = 04-5160-20-504 PVDF = 04-5160-21-504
-502 Specialty Code = PFA-Coated Hardware
-622 Specialty Code = Ultrapure w/Male Connection
-612 Specialty Code = Ultrapure, Male Connection, PFA-Coated

NOTE: Models M4-622/TPPR and M4-612/TPPC incorporate 1" male non-threaded inlet/discharge bondable connections.

For exploded view, see previous page.

SECTION 8

ELASTOMER OPTIONS & TORQUE SPECIFICATIONS FOR MODEL M4 (METAL AND PLASTIC)

M4 Metal Elastomer Options

Material	Diaphragms (2)	Valve Balls (4)	Valve Seats (4)	Valve Seat O-Rings (4)
Neoprene	04-1010-51	04-1080-51	04-1120-51	N/A
Polyurethane	04-1010-50	04-1080-50	04-1120-50	N/A
Buna N	04-1010-52	04-1080-52	04-1120-52	N/A
Wil-flex™	04-1010-58	04-1080-58	04-1120-58	N/A
Saniflex™	04-1010-56	04-1080-56	04-1120-56	N/A
Nordel	04-1010-54	04-1080-54	04-1120-54	N/A
Viton	04-1010-53	04-1080-53	04-1120-53	N/A
Fluoro-Seal™	N/A	N/A	N/A	04-1200-34
Teflon® PTFE	04-1010-55	04-1080-55	N/A	04-1200-55
Aluminum	N/A	N/A	04-1121-01	N/A
Carbon Steel	N/A	N/A	04-1121-08	N/A
Stainless Steel	N/A	N/A	04-1121-03	N/A
Hastelloy	N/A	N/A	04-1121-04	N/A

M4 "Champ" Elastomer Options

Material	Diaphragms (2)	Valve Balls (4)	Valve Seats (4)	Valve Seat O-Rings (4)	Tee-Section O-Rings (4)
Neoprene	04-1010-51	04-1080-51	N/A	N/A	N/A
Polyurethane	04-1010-50	04-1080-50	N/A	04-1200-50-500	04-1300-50-500
Buna N	04-1010-52	04-1080-52	N/A	04-1200-52-500	04-1300-52-500
Wil-flex™	04-1010-58	04-1080-58	N/A	N/A	N/A
Saniflex™	04-1010-56	04-1080-56	N/A	N/A	N/A
Nordel	04-1010-54	04-1080-54	N/A	N/A	N/A
Viton	04-1010-53	04-1080-53	N/A	N/A	N/A
Teflon® PTFE	04-1010-55	04-1080-55	N/A	N/A	N/A
Teflon® PFA	N/A	N/A	04-1120-22-500	N/A	N/A
Teflon® Encap. (Viton)	N/A	N/A	N/A	04-1200-60-500	04-1300-60-500
Teflon® Encap. (Silicon)	N/A	N/A	N/A	04-1200-59-500	04-1300-59-500
Polypropylene	N/A	N/A	04-1120-20-500	N/A	N/A
PVDF	N/A	N/A	04-1120-21-500	N/A	N/A

Torque Specifications

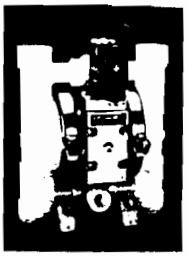
Item #	Description of Part	Maximum Torque	
		Metal Pumps	Plastic Pumps
1	Air Valve	30 in.-lbs. [3.4 m-N]	30 in.-lbs. [3.4 m-N]
2	Outer Piston	33 ft.-lbs. [44.7 m-N]	38 ft.-lbs. [51.5 m-N]
3	Small Clamp Band	30 in.-lbs.[3.4 m-N]	85 in.-lbs. [9.6 m-N]
4	Large Clamp Band (Rubber-Fitted)	95 in.-lbs. [10.7 m-N]	165 in.-lbs. [18.6 m-N]
5	Large Clamp Band (Teflon-Fitted)	120 in.-lbs. [13.5 m-N]	165 in.-lbs. [18.6 m-N]
6	Center Block Assembly	75 in.-lbs. [8.5 m-N]	—

WILDEN'S SPECIALTY PUMPS

M8 STALLION

2" inlet. Solids clearance up to ¾". Built to handle rough treatment cast-in handles for easy portability, reinforced shaft and high impact polyurethane base.

SOLENOID-OPERATED



Each stroke of this pump is controlled by electrical impulses making it ideal for batching, metering, and other electrically controlled dispensing applications.

M1 ULTRAPURE III

½" inlet. Teflon® PFA construction, temperatures to 300°F. Up to 14 GPM. Materials of construction have been selected to reduce contamination while providing a safer work environment.

SANIFLO

Constructed with FDA approved materials: bead blasted 316 Stainless Steel construction with tri-clamp porting and wing-nut fasteners. Foodmaster™ (pictured) is USDA accepted.

THE WILDEN PUMP LINE

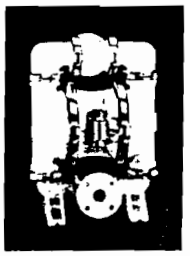
M.025 (CHAMP SERIES)

MODEL M.025

- ¼" Inlet
- 125 Max. PSIG
- Up To 4.5 GPM
- Max. Particle Size: ¼"

Materials of Construction:
PVDF, Acetal, Polypropylene, Carbon-filled Acetal

Suction Lift:		
(Rubber)	Dry: 4.5'	
	Wet: 25'	
(Teflon®)	Dry: 4.5'	
	Wet: 25'	



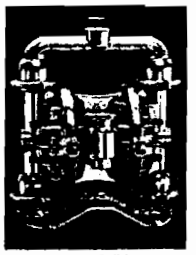
M4 PLASTIC (CHAMP SERIES)

MODEL M4

- 1½" Inlet
- 125 Max. PSIG
- Up To 73 GPM
- Max. Particle Size: ⅜"

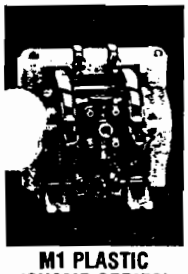
Materials of Construction:
Aluminum, Cast Iron, Stainless Steel, Hastelloy, Polypropylene, PVDF, Teflon® PFA

Suction Lift:	Plastic	Metal
(Rubber)	Dry: 17'	21'
	Wet: 25'	25'
(Teflon®)	Dry: 7'	7'
	Wet: 25'	25'



M4 METAL

LUBE-FREE AVAILABLE



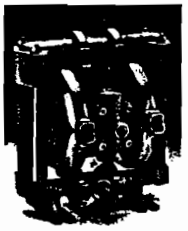
M1 PLASTIC (CHAMP SERIES)

MODEL M1

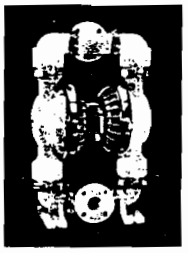
- ½" Inlet
- 110 Max. PSIG
- Up To 14 GPM
- Max. Particle Size: ⅛"

Materials of Construction:
Polypropylene, PVDF, Teflon®, Graphite-filled Polypropylene, Aluminum, Stainless Steel

Suction Lift:	Plastic	Metal
(Rubber)	Dry: 10'	10'
	Wet: 25'	25'
(Teflon®)	Dry: 7'	8'
	Wet: 25'	25'



M1 METAL



M8 PLASTIC (CHAMP SERIES)

MODEL M8

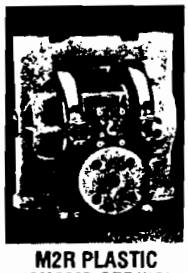
- 2" Inlet
- 125 Max. PSIG
- Up To 155 GPM
- Max. Particle Size: ½"

Materials of Construction:
Aluminum, Cast Iron, Stainless Steel, Hastelloy, PVDF, Polypropylene

Suction Lift:	Plastic	Metal
(Rubber)	Dry: 17'	20'
	Wet: 25'	25'
(Teflon®)	Dry: 8'	8'
	Wet: 25'	25'

M8 METAL

LUBE-FREE AVAILABLE



M2R PLASTIC (CHAMP SERIES)

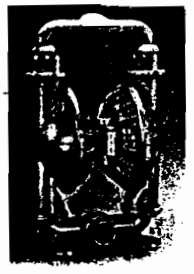
MODEL M2

- 1" Inlet
- 125 Max. PSIG
- Up To 37 GPM
- Max. Particle Size: ½"

Materials of Construction:
Aluminum, Stainless Steel, Hastelloy, Polypropylene, PVDF

Suction Lift:	Plastic	Metal
(Rubber)	Dry: 17'	19'
	Wet: 25'	25'
(Teflon®)	Dry: 7'	8'
	Wet: 25'	25'

M2 METAL



M15

MODEL M15

- 3" Inlet
- 125 Max. PSIG
- Up To 230 GPM
- Max. Particle Size: ¾"

Materials of Construction:
Aluminum, Cast Iron, Stainless Steel, Hastelloy

Suction Lift:	
(Rubber)	Dry: 17'
	Wet: 25'
(Teflon®)	Dry: 14'
	Wet: 25'

For further information contact your local Wilden distributor:

M20

MODEL M20

- 4" Inlet
- 125 Max. PSIG
- Up To 304 GPM
- Max. Particle Size: 1½"

Materials of Construction:
Cast Iron

Suction Lift:
Dry: 13'
Wet: 25'

WILDEN PUMP & ENGINEERING COMPANY
22069 Van Buren St., Grand Terrace, CA 92313-5651
Telephone (909) 422-1730 • Fax (909) 783-3440

ISO 9001 Est. 1955 QUALITY SYSTEM

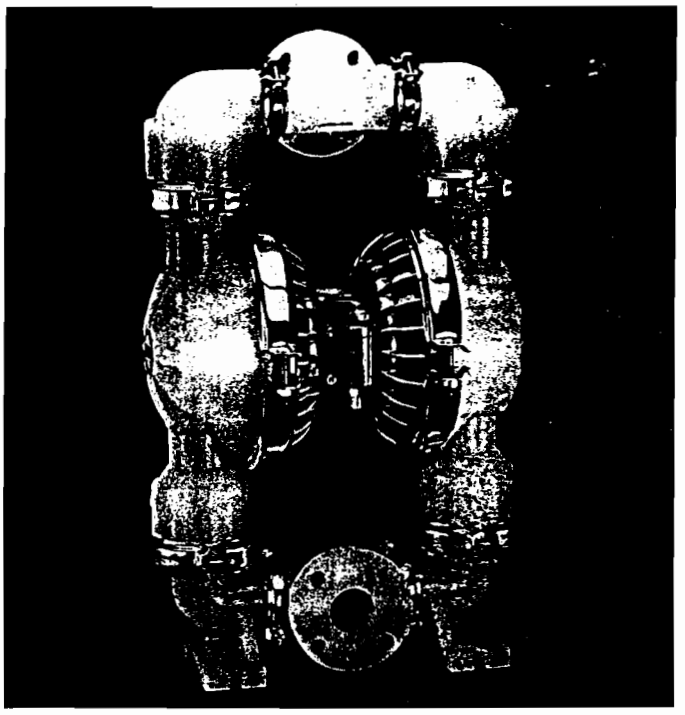
WILDEN®

AIR OPERATED DOUBLE DIAPHRAGM PUMPS

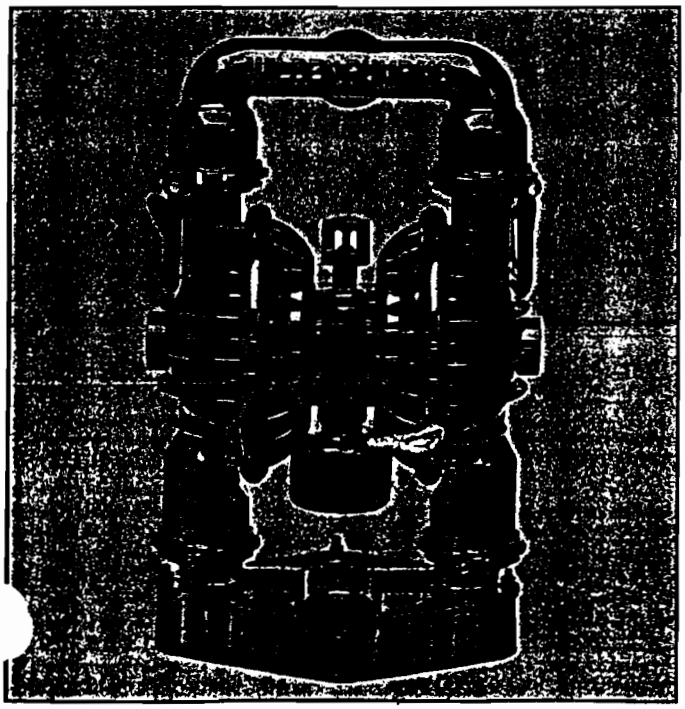
M8 Engineering Operation and Maintenance

MODEL M8 METAL
MODEL M8 CHAMP
MODEL M8 STALLION
MODEL M8 SANIFLO^{FDA}

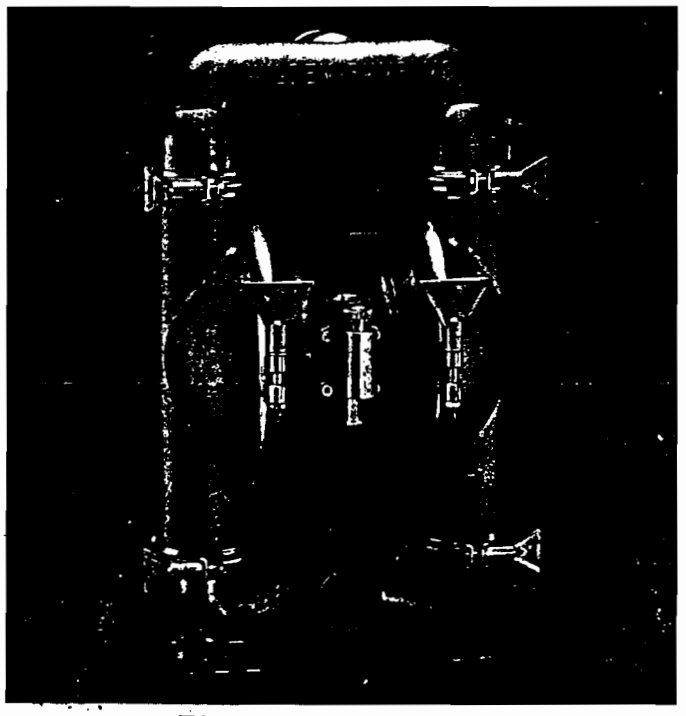
M8 METAL



M8 CHAMP



M8 STALLION



M8 SANIFLO^{FDA}

RBG P/S-08 6/97
REPLACES 6/96

THE WILDEN PUMP — HOW IT WORKS

The Wilden diaphragm pump is an air-operated, positive displacement, self-priming pump. These drawings show flow pattern through the pump upon its initial stroke. It is assumed the pump has no fluid in it prior to its initial stroke.

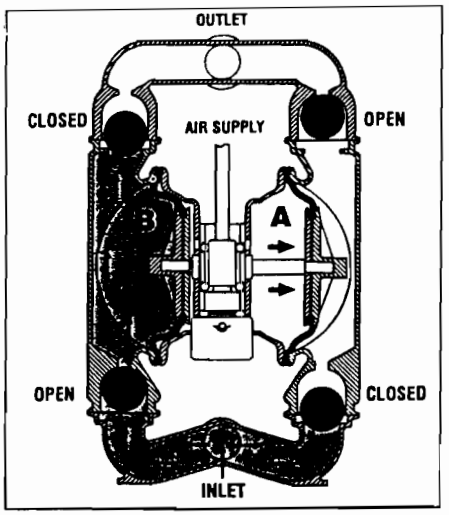


FIGURE 1 The air valve directs pressurized air to the back side of diaphragm A. The compressed air is applied directly to the liquid column separated by elastomer diaphragms. The diaphragm acts as a separation membrane between the compressed air and liquid, balancing the load and removing mechanical stress from the diaphragm which allows for millions of flex cycles. The compressed air moves the diaphragm away from the center block of the pump. The opposite diaphragm is pulled in by the shaft connected to the pressurized diaphragm. Diaphragm B is now on its suction stroke; air behind the diaphragm has been forced out to the atmosphere through the exhaust port of the pump. Diaphragm A is working against atmospheric air pressure. The movement of diaphragm B toward the center block of the pump creates a vacuum within chamber B. Atmospheric pressure forces fluid into the inlet manifold forcing the inlet valve ball off its seat. Liquid is free to move past the inlet valve ball and fill the liquid chamber.

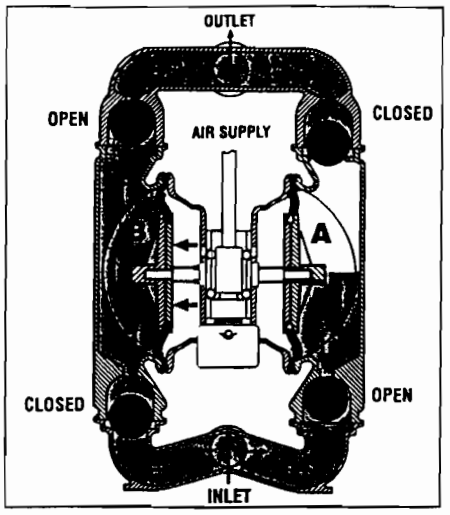


FIGURE 2 When the pressurized diaphragm, diaphragm A, reaches the limit of its discharge stroke, the air valve redirects pressurized air to the back side of diaphragm B. The pressurized air forces diaphragm B away from the center block while pulling diaphragm A to the center block. Diaphragm B is now on its discharge stroke. Diaphragm B forces the inlet valve ball onto its seat due to the hydraulic forces developed in the liquid chamber and manifold of the pump. These same hydraulic forces lift the discharge valve ball off its seat, while the opposite discharge valve ball is forced onto its seat, forcing fluid to flow through the pump discharge. The movement of diaphragm A to the center block of the pump creates a vacuum within liquid chamber A. Atmospheric pressure forces fluid into the inlet manifold of the pump. The inlet valve ball is forced off its seat allowing the fluid being pumped to fill the liquid chamber.

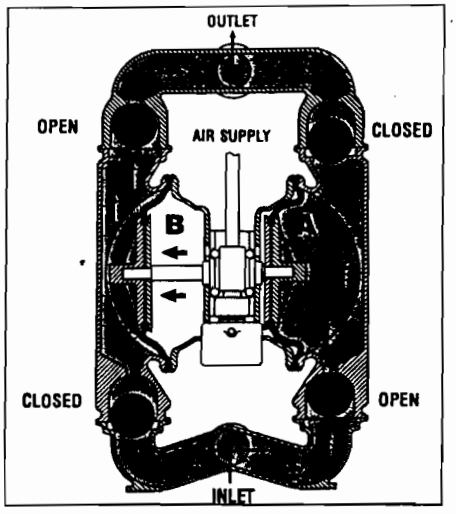
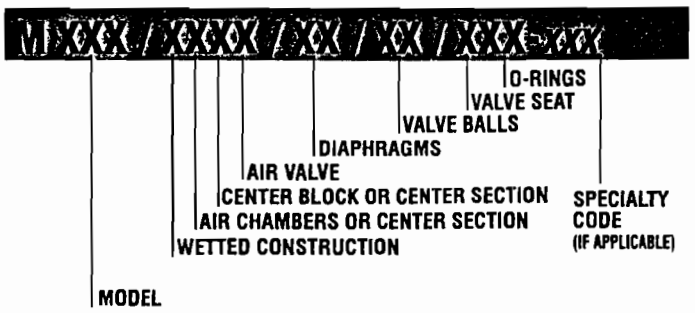


FIGURE 3 At completion of the stroke, the air valve again redirects air to the back side of diaphragm A, which starts diaphragm B on its exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one exhaust and one discharge stroke. This constitutes one complete pumping cycle. The pump may take several cycles to completely prime depending on the conditions of the application.

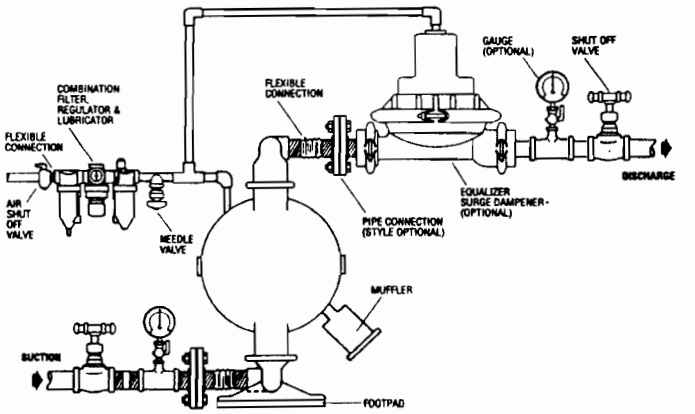
Class I & II Ozone NON USE Depleting Substances

WILDEN PUMP DESIGNATION SYSTEM



In the case where a center section is used instead of a center block and air chambers, the designation will be as follows: Aluminum = AA, Polypropylene = PP, Carbon-filled Acetal = GG, Nylon = YY, Acetal = LL

SUGGESTED INSTALLATION



CAUTIONS! READ FIRST

NOTE: UL-listed pumps must not exceed 50 psig air supply pressure.

Temperature Limits:

Polypropylene	**+32°F to 175°F**	**0°C to 79°C**
PVDF	**+10°F to +225°F**	**–12°C to 107°C**

CAUTION: Maximum temperature limits are based upon mechanical stress only. Certain chemicals will significantly reduce maximum safe operating temperatures. Consult engineering guide for chemical compatibility and temperature limits.

CAUTION: WEAR SAFETY GLASS. WHEN DIAPHRAGM RUPTURE OCCURS, MATERIAL BEING PUMPED MAY BE FORCED OUT AIR EXHAUST.

"Champ" series pumps are made of virgin plastic and are not UV stabilized. Direct sunlight for prolonged periods can cause deterioration of plastics.

NOTE: Pump must be lubricated. Wilden suggests an arctic 5 weight oil (ISO grade 15).

WARNING: Prevention of static sparking — If static sparking occurs, fire or explosion could result. Pump, valves, and containers must be grounded when handling flammable fluids and whenever discharge of static electricity is a hazard. To ground the Wilden "Champ," all clamp bands must be grounded to a proper grounding point.

®TEFLON IS A REGISTERED TRADEMARK OF E.I. DUPONT CORP.

TABLE OF CONTENTS

CAUTION: DO NOT EXCEED 125 PSIG AIR SUPPLY PRESSURE. (50 PSI ON UL MODELS.)

ALUMINUM AND CAST IRON PUMPS ARE FUNCTION TESTED WITH WATER AND SODIUM SILICATE. PUMPS SHOULD BE THOROUGHLY FLUSHED WITH WATER BEFORE INSTALLING INTO PROCESS LINES. FDA AND USDA APPROVED PUMPS SHOULD BE CLEANED AND/OR SANITIZED BEFORE BEING USED ON EDIBLE PRODUCTS. USE AN IN-LINE AIR FILTER.

CAUTION: DO NOT EXCEED 125 PSIG AIR SUPPLY PRESSURE.

BLOW OUT AIR LINE FOR 10 TO 20 SECONDS BEFORE ATTACHING TO PUMP TO MAKE SURE ALL PIPE LINE DEBRIS IS CLEAR. USE AN IN-LINE AIR FILTER.

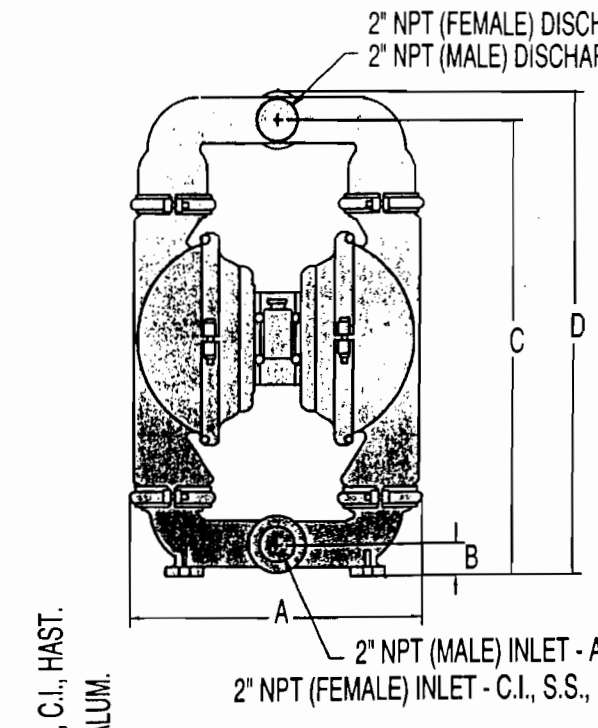
WARNING: Only the Nema 7 solenoid valve can be used in an area where explosion proof equipment is required. Nema 4 solenoid valves are not suitable.

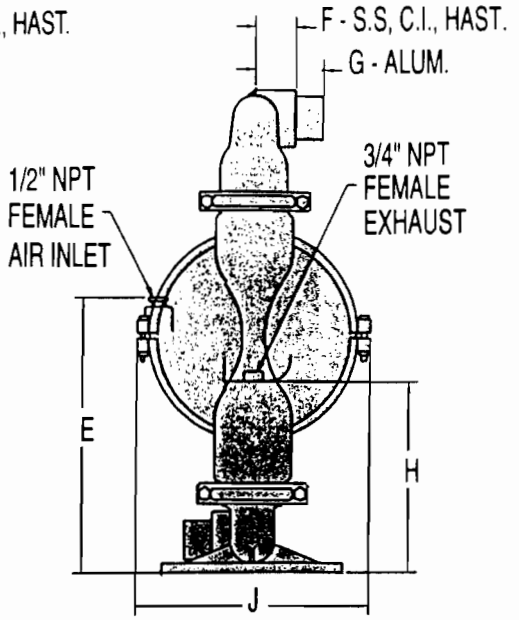
CAUTION: Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container.

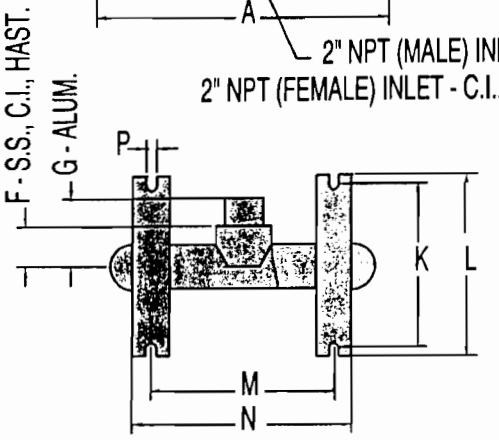
CAUTION: When removing the end cap using compressed air, the air valve end cap may come out with considerable force. Hand protection such as a padded glove or a rag should be used to capture the end cap.

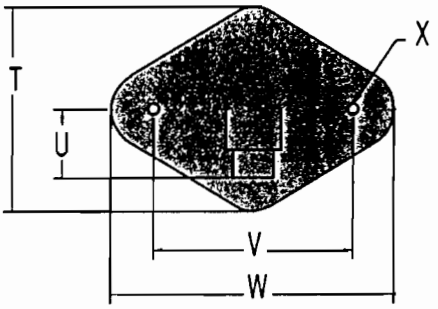
NOTES

SECTION 1A — DIMENSIONAL DRAWING
MODEL M8 METAL PUMP

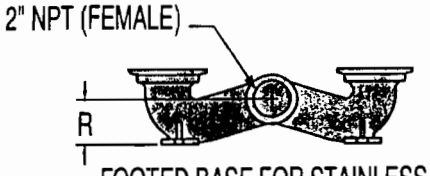








ALUMINUM BASE SCREEN MODEL

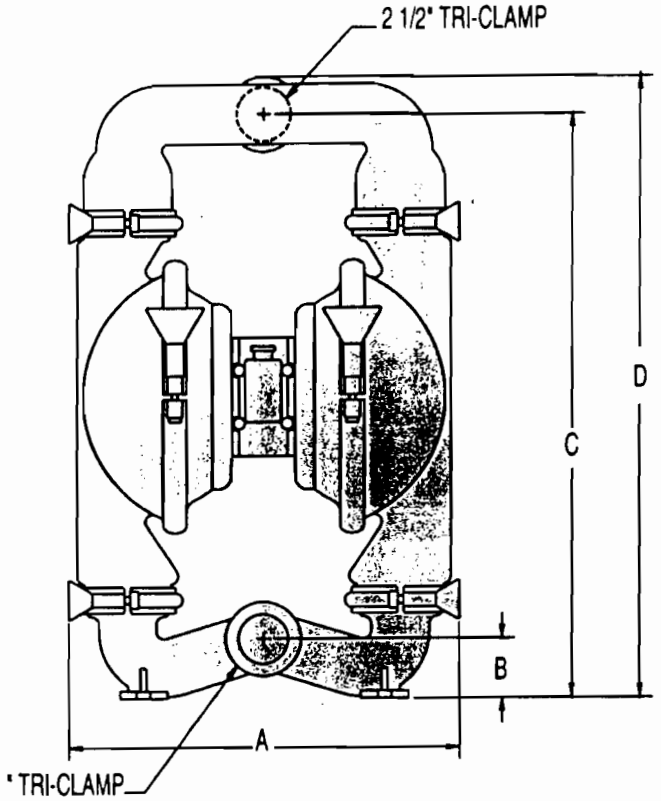


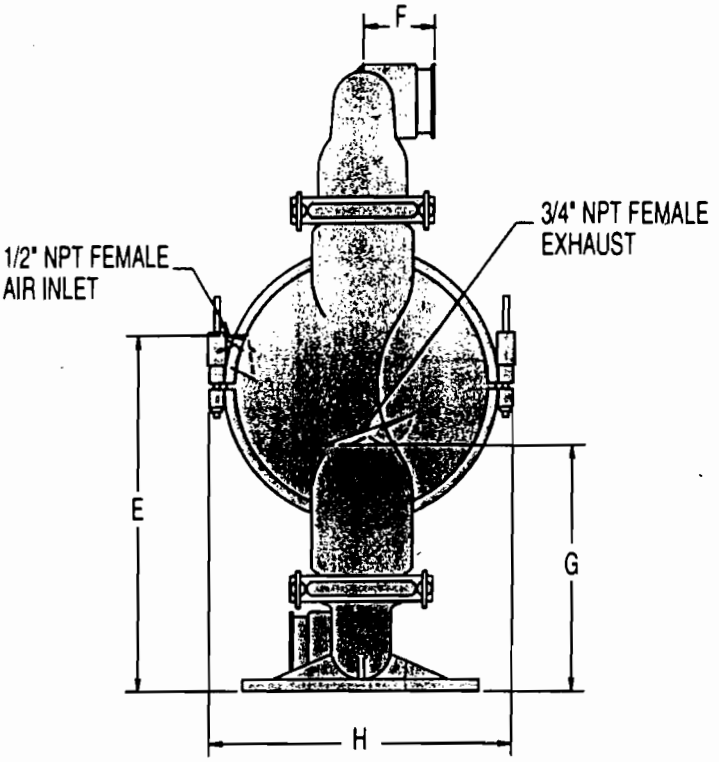
FOOTED BASE FOR STAINLESS STEEL & HASTELLOY MODELS

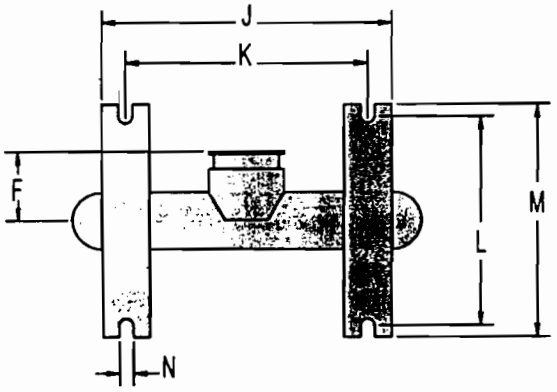
DIMENSIONS – M8 (METAL)		
ITEM	STANDARD (inch)	METRIC (mm)
A	15 29/32	404.0
B	1 7/8	47.6
C	24 3/4	628.7
D	26 11/32	669.2
E	14 21/32	372.3
F	2 1/4	57.2
G	4 3/32	104.0
H	10 21/32	270.7
J	13 1/2	342.9
K	9 1/32	229.4
L	10	254.0
M	10 1/16	255.6
N	12 11/32	313.5
P	9/16	14.3
R	2 1/2	63.5
S	2 1/32	51.6
T	11 3/32	281.8
U	4	101.6
V	11 1/32	280.2
W	15 7/32	386.6
X	Ø9/16	Ø14.3

BSP threads available.
Standard aluminum pumps are manufactured with mild steel nipples. Stainless steel nipples are available.

SECTION 1C — DIMENSIONAL DRAWING
MODEL M8 FOOD PROCESSING PUMP



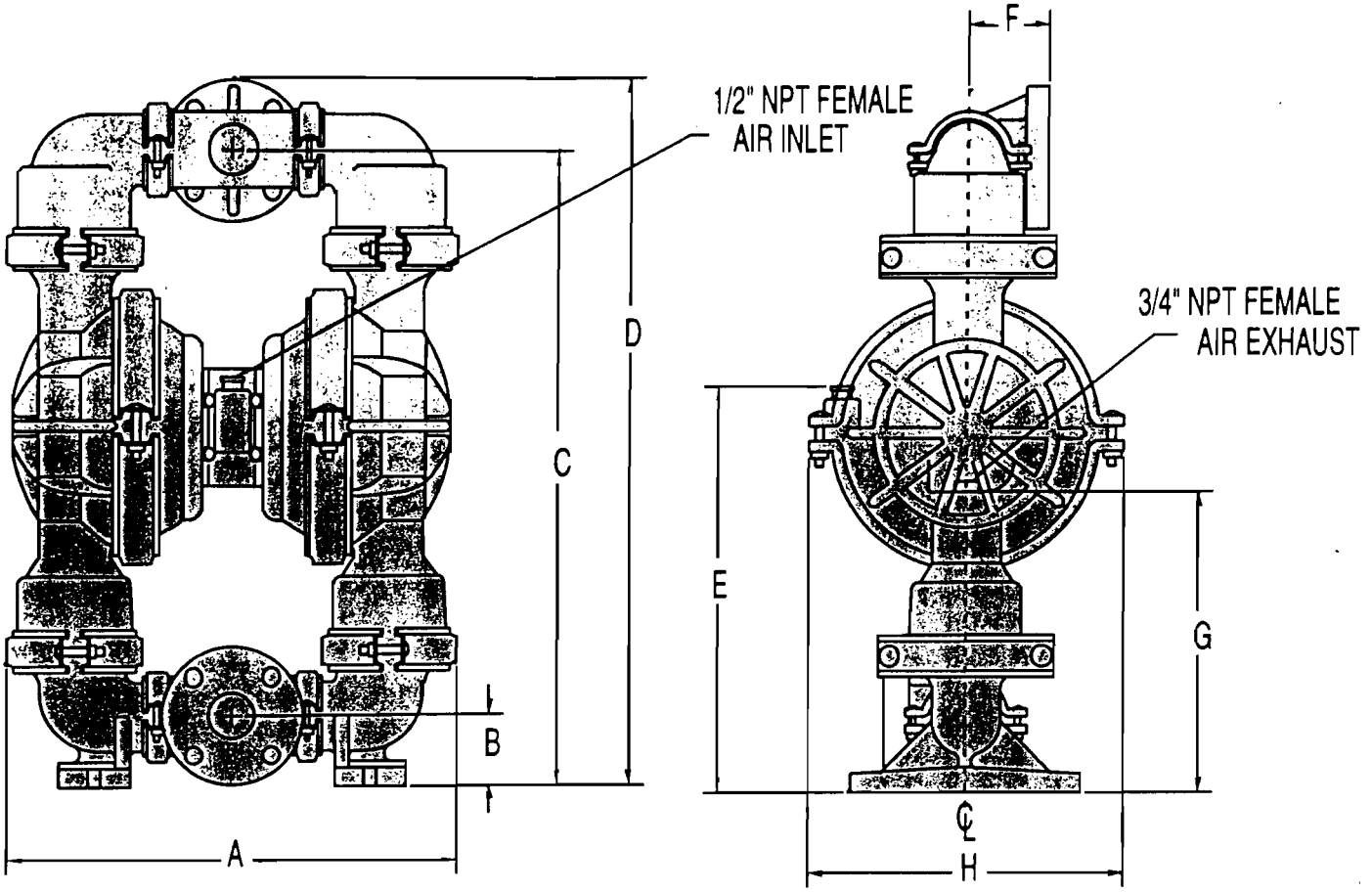




DIMENSIONS – M8 (FOOD GRADE)		
ITEM	STANDARD (inch)	METRIC (mm)
A	17 1/8	435.0
B	2 1/2	63.5
C	24 5/8	625.5
D	26 3/16	665.2
E	15	381.0
F	3	76.2
G	10 3/8	263.5
H	13 5/8	346.1
J	12	304.8
K	10	254.0
L	9	228.6
M	10	254.0
N	9/16	14.3

Interior/Exterior Food Processing finish is 50 GRIT.

SECTION 1D — DIMENSIONAL DRAWING
MODEL M8 CHAMP PUMP (Plastic)



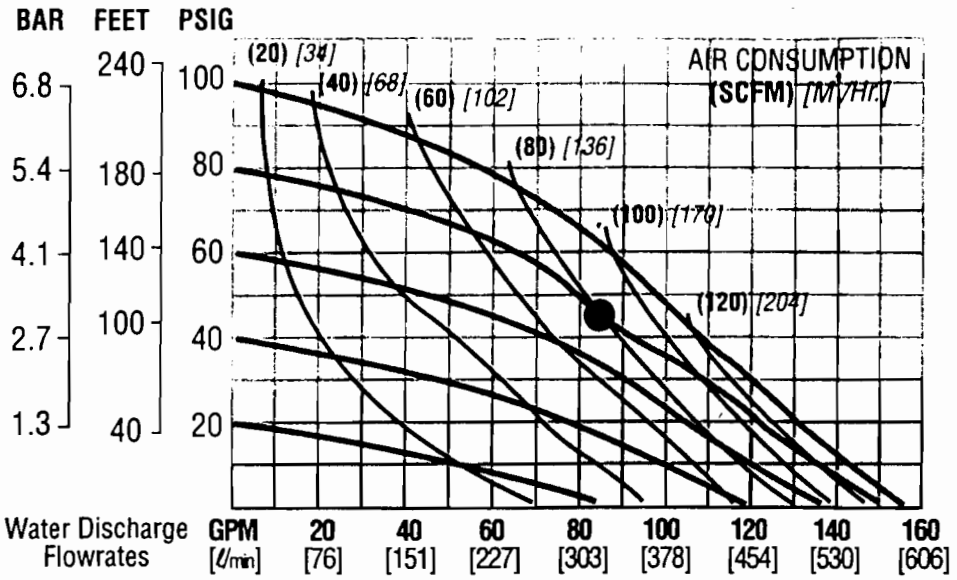
DIMENSIONS – M8 CHAMP (PLASTIC)		
ITEM	STANDARD (inch)	METRIC (mm)
A	19 11/32	491.3
B	3 1/32	77.0
C	27 9/32	693.0
D	30 5/16	770.0
E	17 15/16	455.6
F	3 1/2	88.9
G	13 9/16	344.5
H	13 3/32	332.6
J	15 7/32	386.6
K	12 1/16	306.4
L	9	228.6
M	10	254.0
N	9/16	14.3
	ANSI	DIN
P	2 3/8 RAD.	60.3 RAD
R	3 1/32RAD.	76.2 RAD.
S	25/32 DIA.	19.8 DIA.

SECTION 2A
WILDEN MODEL M8 METAL (Rubber/TPE-Fitted) PUMP PERFORMANCE CURVE

Height ..... 26 1/32"
Width ..... 15 29/32"
Depth ..... 13 1/2"
Ship Weight ..... Aluminum 67 lbs.
Cast Iron 112 lbs.
Stainless Steel 102 lbs.
Hastelloy 112 lbs.
Air Inlet ..... 1/2" Female NPT
Inlet ..... 2" NPT*
Outlet ..... 2" NPT*
Suction Lift ..... **Rubber 20' Dry**
25' Wet
TPE 13' Dry
25' Wet
Displacement per Stroke .... .725 gal.[1]
Max. Size Solids ..... 1/4" Dia.

Example: To pump 85 gpm against a discharge pressure of 45 psig requires 80 psig and 80 scfm air consumption. (See dot on chart.)

[1]Displacement per stroke was calculated at 70 psig air inlet pressure against a 30 psig head pressure.



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

*BSP threads available.

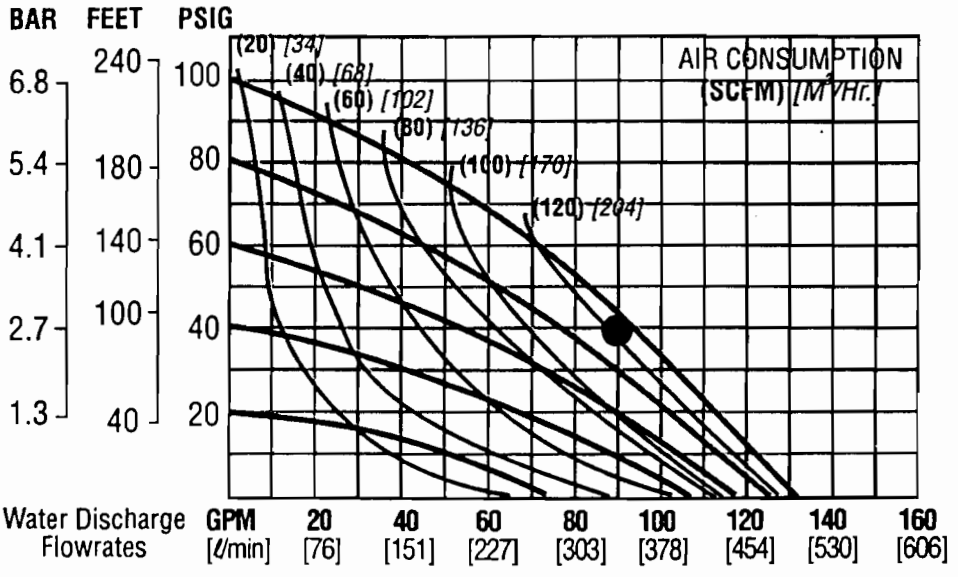
For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 2B
WILDEN MODEL M8 METAL (Teflon®-Fitted) Pump Performance Curve

Height ..... 26 1/32"
Width ..... 15 29/32"
Depth ..... 13 1/2"
Ship Weight ..... Aluminum 67 lbs.
Cast Iron 112 lbs.
Stainless Steel 102 lbs.
Hastelloy 112 lbs.
Air Inlet ..... 1/2" Female NPT
Inlet ..... 2" NPT*
Outlet ..... 2" NPT*
Suction Lift ..... 8' Dry
25' Wet
Displacement per Stroke .... .376 gal.[1]
Max. Size Solids ..... 1/4" Dia.

Example: To pump 90 gpm against a discharge pressure of 40 psig requires 95 psig and 122 scfm air consumption. (See dot on chart.)

[1]Displacement per stroke was calculated at 70 psig air inlet pressure against a 30 psig head ressure.



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

*BSP threads available.

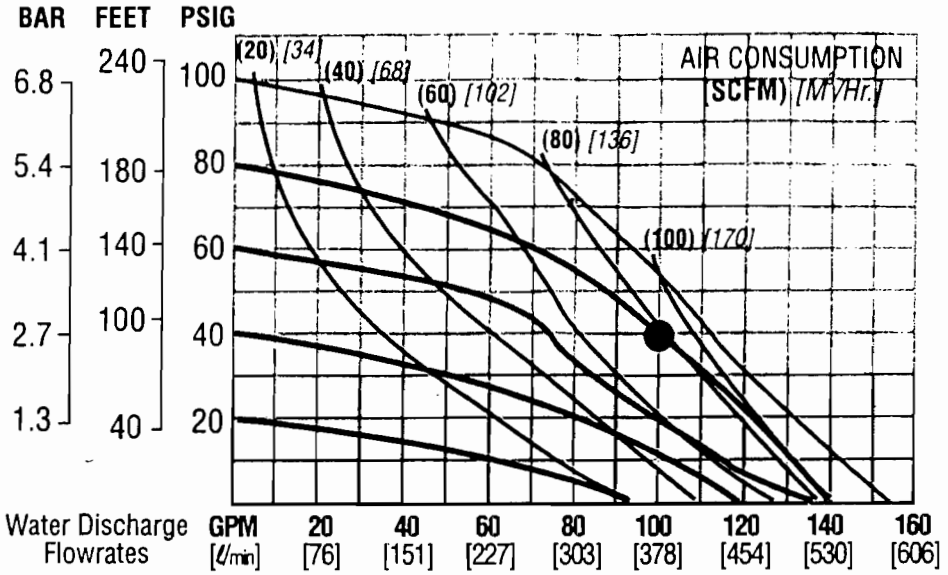
For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 2C
WILDEN MODEL M8 CHAMP (Rubber/TPE-Fitted) PUMP PERFORMANCE CURVE

Height .....30⅝"
Width .....19½"
Depth .....13⅜"
Ship Weight .....Polypropylene 74 lbs.
PVDF 96 lbs.
Air Inlet .....½" Female NPT
Inlet .....2"
Outlet .....2"
Suction Lift .....**Rubber 17' Dry**
25' Wet
TPE 12' Dry
25' Wet
Displacement per Stroke .... .741 gal.[1]
Max. Size Solids .....¼" Dia.

Example: To pump 100 gpm against a discharge pressure of 40 psig requires 80 psig and 80 scfm air consumption. (See dot on chart.)

[1]Displacement per stroke was calculated at 70 psig air inlet pressure against a 30 psig head pressure.



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

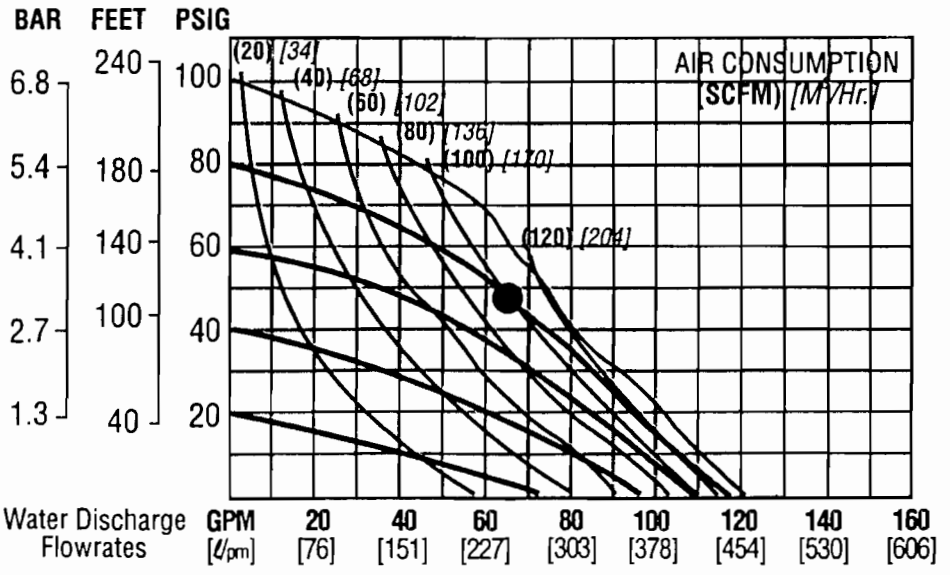
For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 2D
WILDEN MODEL M8 CHAMP (Teflon®-Fitted) PUMP PERFORMANCE CURVE

Height .....30⅝"
Width .....19½"
Depth .....13⅜"
Ship Weight .....Polypropylene 74 lbs.
PVDF 96 lbs.
Air Inlet .....½" Female NPT
Inlet .....2"
Outlet .....2"
Suction Lift .....8' Dry
25' Wet
Displacement per Stroke .... .390 gal.[1]
Max. Size Solids .....¼" Dia.

Example: To pump 66 gpm against a discharge pressure of 48 psig requires 80 psig and 100 scfm air consumption. (See dot on chart.)

[1]Displacement per stroke was calculated at 70 psig air inlet pressure against a 30 psig head pressure.



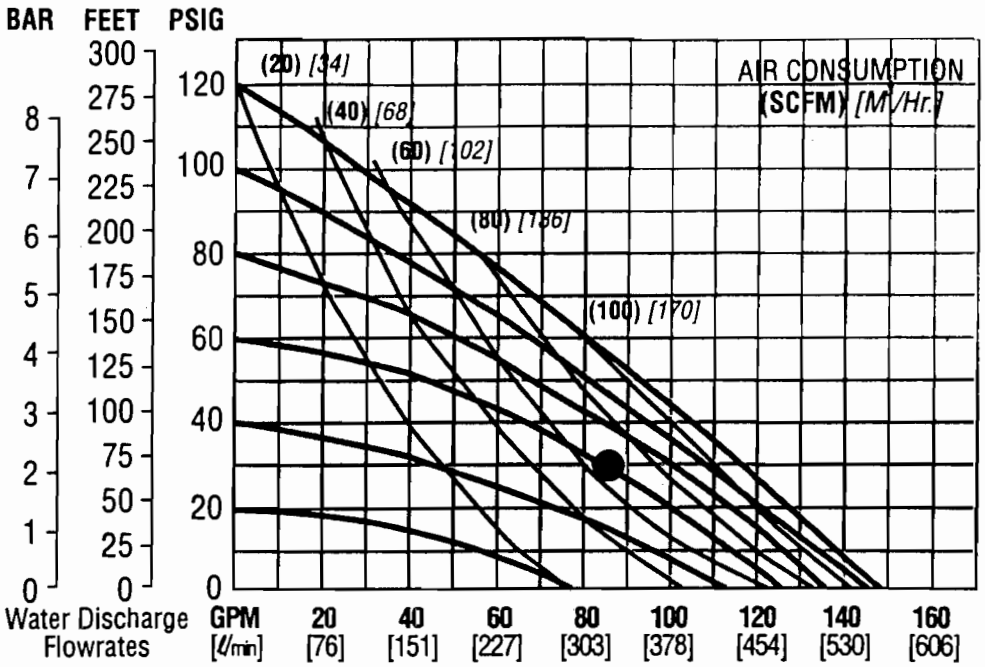
Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 2E
MODEL M8 STALLION (Ultra-Flex™-Fitted) PUMP PERFORMANCE CURVE

ight.....27¾₁₆"
Width.....16⅛"
Depth.....13⅝"
Weight.....73 lbs. (33.2 kg.)
Air Inlet.....½" Female NPT
Inlet.....2" NPT*
Outlet.....2" NPT*
Suction Lift.....10' Dry
25' Wet
Max. Size Solids.....¾" Dia.

Example: To pump 85 gpm against a discharge head of 30 psig requires 60 psig and 65 scfm air consumption. (See dot on chart.)



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

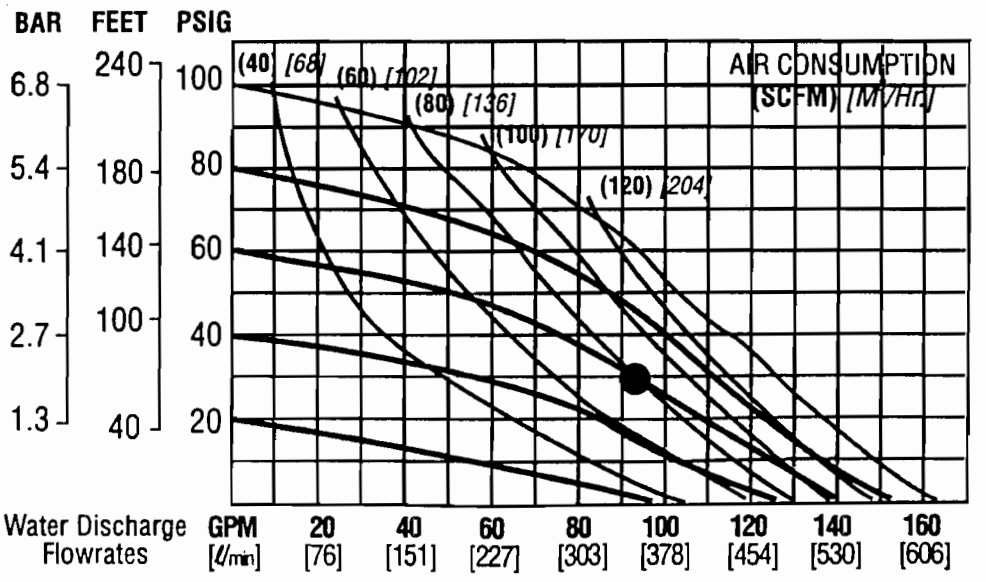
*BSP threads available.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 2F
MODEL M8 STALLION (TPE-Fitted) PUMP PERFORMANCE CURVE

Height.....27¾₁₆"
Width.....16⅛"
Depth.....13⅝"
Weight.....73 lbs. (33.2 kg.)
Air Inlet.....½" Female NPT
Inlet.....2" NPT*
Outlet.....2" NPT*
Suction Lift.....9' Dry
25' Wet
Max. Size Solids.....¾" Dia.

Example: To pump 92 gpm against a discharge pressure of 30 psig requires 60 psig and 80 scfm air consumption. (See dot on chart.)



Flow rates indicated on chart were determined by actually pumping water in calibrated tanks.

*BSP threads available.

For optimum life and performance, pumps should be specified so that daily operation parameters will fall in the center of the pump performance curve.

SECTION 3
INSTALLATION

The Model M8 has a 2" inlet and 2" outlet and is designed for flows to 155 gpm. The **M8 Champ** pump is manufactured with wetted parts of pure, unpigmented PVDF or Polypropylene. The **M8 Metal** is manufactured of aluminum, cast iron, stainless steel or Hastelloy. The center block of the **M8** is constructed of glass-filled polypropylene. A variety of diaphragms, valve balls, and O-rings are available to satisfy temperature, chemical compatibility, abrasion and flex concerns.

The suction pipe size should be at least 2" diameter or larger if highly viscous material is being pumped. The suction hose must be non-collapsible, reinforced type as the M8 is capable of pulling a high vacuum. Discharge piping should be at least 2"; larger diameter can be used to reduce friction losses. It is critical that all fittings and connections are airtight or a reduction or loss of pump suction capability will result.

For M8 Champ models, Wilden offers 150 lb. ANSI and DIN flanges. The following details should be noted when mating these to pipe works:

- A 60–80 shore gasket that covers the entire flange face should be used.
- The gasket should be between .075" and .175" thickness.
- Mating flanges with flat as opposed to raised surfaces should be used.
- The flanges should be tightened to a minimum of 5 ft./lbs. but no more than 10 ft./lb.

The M8 can be used in submersible applications only when both wetted and non-wetted portions are compatible with the material being pumped. If the pump is to be used in a submersible application, a hose should be attached to the pump's air exhaust and the exhaust air piped above the liquid level.

If the pump is to be used in a self-priming application, be sure that all connections are airtight and that the suction lift is within the pump's ability. Note: Materials of construction and elastomer material have an effect on suction lift parameters. Please consult Wilden distributors for specifics.

Pumps in service with a positive suction head are most efficient when inlet pressure is limited to 7–10 psig. Premature diaphragm failure may occur if positive suction is 11 psig and higher.

THE MODEL M8 WILL PASS 1/4" SOLIDS. THE M8 STALLION WILL PASS 3/4" SOLIDS. WHENEVER THE POSSIBILITY EXISTS THAT LARGER SOLID OBJECTS MAY BE SUCKED INTO THE PUMP, A STRAINER SHOULD BE USED ON THE SUCTION LINE.

CAUTION: DO NOT EXCEED 125 PSIG AIR SUPPLY PRESSURE. (50 PSI ON ALL UL MODELS.)

PUMPS SHOULD BE THOROUGHLY FLUSHED WITH WATER BEFORE INSTALLING INTO PROCESS LINES. FDA AND USDA APPROVED PUMPS SHOULD BE CLEANED AND/OR SANITIZED BEFORE BEING USED ON EDIBLE PRODUCTS.

BLOW OUT AIR LINE FOR 10 TO 20 SECONDS BEFORE ATTACHING TO PUMP TO MAKE SURE ALL PIPE LINE DEBRIS IS CLEAR. ALWAYS USE AN IN-LINE FILTER.

CAUTION: DO NOT HANG M8 STALLION PUMPS BY THEIR HANDLES.

SECTION 4
SUGGESTED OPERATION AND MAINTENANCE INSTRUCTIONS

INSTALLATION: Months of careful planning, study, and selection efforts can result in unsatisfactory pump performance if installation details are left to chance.

Premature failure and long term dissatisfaction can be avoided if reasonable care is exercised throughout the installation process.

LOCATION: Noise, safety, and other logistical factors usually dictate that "utility" equipment be situated away from the production floor. Multiple installations with conflicting requirements can result in congestion of utility areas, leaving few choices for siting of additional pumps.

Within the framework of these and other existing conditions, every pump should be located in such a way that four key factors are balanced against each other to maximum advantage.

1. ACCESS: First of all, the location should be accessible. If it's easy to reach the pump, maintenance personnel will have an easier time carrying out routine inspections and adjustments. Should major repairs become necessary, ease of access can play a key role in speeding the repair process and reducing total downtime.

2. AIR SUPPLY: Every pump location should have an air line large enough to supply the volume of air necessary to achieve the desired pumping rate (see pump performance chart). Use air pressure up to a maximum of 125 psi (50 psi on UL pumps) depending upon pumping requirements.

For best results, the pumps should use an air filter, regulator, and lubricator system. The use of an air filter before the pump will insure that the majority of any pipeline contaminants will be eliminated. The use of a lubricant, suitable for the application, helps perform a number of functions. Lubricants reduce friction to minimize required shifting forces and reduce wear. Lubricants provide a protective coating against some forms of corrosion and contaminants. **Wilden suggests an oil with arctic characteristics (ISO 15-5Wt.) This oil is chemically compatible with the center block O-rings and has a low pour point to guard against problems associated with low temperatures.** The amount of lubrication required is directly related to the amount of oil introduced from the factory air system. We therefore suggest that the lowest setting on the lubricator be utilized and then increased as necessary.

Pump discharge rate can be controlled by limiting the volume and/or pressure of the air supply to the pump. The use of a needle valve installed at the air inlet to the pump is suggested for this purpose. Pump discharge rate can also be controlled by throttling the pump discharge by installing a valve in the discharge line of the pump when the need to control the pump from a remote location exists. When the pump discharge pressure equals or exceeds the air supply pressure, the pump will stop; no bypass or pressure relief valve is needed, and pump damage will not occur. When operation is controlled by a solenoid valve in the air line, a three-way valve should be used. Pumping volume can be set by counting the number of strokes per minute.

A muffler installed on the pump's air exhaust will give quiet exhaust. Sound levels are reduced below OSHA specifications using a Wilden muffler.

3. ELEVATION: Selecting a site that is well within the pump's dynamic lift capability will assure that loss-of-prime troubles will be eliminated. In addition, pump efficiency can be adversely affected if proper attention is not given to elevation (see pump performance chart).

4. PIPING: Final determination of the pump site should not be made until the piping problems of each possible location have been evaluated. The impact of current and future installations should be considered ahead of time to make sure that inadvertent restrictions are not created for any remaining sites.

The best choice possible will be a site involving the shortest and the straightest hook-up of suction and discharge piping. Unnecessary elbows, bends, and fittings should be avoided. Pipe sizes should be selected so as to keep friction losses within practical limits. All piping should be supported independently of the pump. In addition, it should line up without placing stress on the pump fittings.

Expansion joints can be installed to aid in absorbing the forces created by the natural reciprocating action of the pump. If the pump is to be bolted down to a solid foundation, a mounting pad placed between the pump and foundation will assist in minimizing pump vibration. Flexible connections between the pump and rigid piping will also assist in minimizing pump vibration. If quick-closing valves are installed at any point in the discharge system, or if pulsation within a system becomes a problem, a surge suppressor should be installed to protect the pump, piping and gauges from surges and water hammer.

When pumps are installed in applications involving flooded suction or suction head pressures, a gate valve should be installed in the suction line to permit closing of the line for pump service.

INSPECTIONS: Periodic inspections have been found to offer the best means for preventing unscheduled pump downtime.

Individuals responsible for checking and maintaining lubrication levels in the pumps should also check for any abnormal noise or leakage. Personnel familiar with the pumps' construction and service should be informed of any abnormalities that are detected.

RECORDS: When service is required, a record should be made of all necessary repairs and replacements. Over a period of time, such records can become a valuable tool for predicting and preventing future maintenance problems and unscheduled downtime. In addition, accurate records make it possible to identify pumps that are poorly suited to their applications.

SECTION 5
TROUBLESHOOTING

Pump will not run or runs slowly.

1. Check air inlet screen and air filter for debris.
2. Check for sticking air valve, flush air valve in solvent.
3. Check for worn out air valve. If piston face in air valve is shiny instead of dull, air valve is probably worn beyond working tolerances and must be replaced.
4. Check center block O-rings. If worn excessively, they will not seal and air will simply flow through pump and out air exhaust. Use only Wilden O-rings as they are of special construction.
5. Check for rotating piston in air valve.
6. Check type of lubricant being used. A higher viscosity oil than suggested may cause the piston to stick or run erratically. Wilden suggests the use of a hydraulic oil with arctic characteristics (ISO 15-5 wt.).

Pump runs but little or no product flows.

1. Check for pump cavitation; slow pump speed down to match thickness of material being pumped.
2. Check for sticking ball checks. If material being pumped is not compatible with pump elastomers, swelling may occur. Replace ball checks and seal with proper elastomers.
3. Check to make sure all suction connections are air tight, especially clamp bands around intake balls.

Pump rattles.

1. See RBG E9 Troubleshooting Guide.
2. Create false discharge head or suction lift.

Pump air valve freezes.

Check for excessive moisture in compressed air. Either install dryer or hot air generator for compressed air.

Air bubbles in pump discharge.

1. Check for ruptured diaphragm.
2. Check tightness of clamp bands, especially at intake manifold.

Product comes out air exhaust.

1. Check for diaphragm rupture.
2. Check tightness of piston plates to shaft.

SECTION 6A

DIRECTIONS FOR DISASSEMBLY / REASSEMBLY — M8 METAL PUMP

CAUTION: Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container. Wear safety glasses. When diaphragm failure occurs, material being pumped may be forced out air exhaust.

The M8 has a 2" inlet and 2" outlet and is designed for flow up to 155 gpm. Its air distribution system is based upon design simplicity and proven efficiency. The model M8 is available in aluminum, cast iron, 316 stainless steel or Hastelloy wetted parts. It is available with optional screened inlet base for submersible applications. For highly corrosive applications, polypropylene and PVDF models are available.

NOTE: Before starting disassembly, mark a line from each liquid chamber to its corresponding air chamber. This line will assist in proper alignment during reassembly.

Disassembly:

NOTE: Models used for these instructions incorporate rubber diaphragms, balls and seats. Models with Teflon® diaphragms, balls and seats are the same except where noted.

Step 1

Start by removing the two clamp bands that fasten the discharge manifold to the main body of the pump *(Figure 1A* and *Figure 1B)*. The discharge valve balls and seats are now available for inspection.

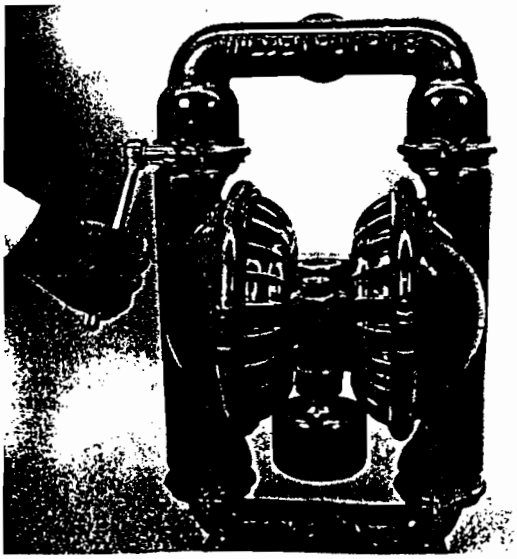


Figure 1A

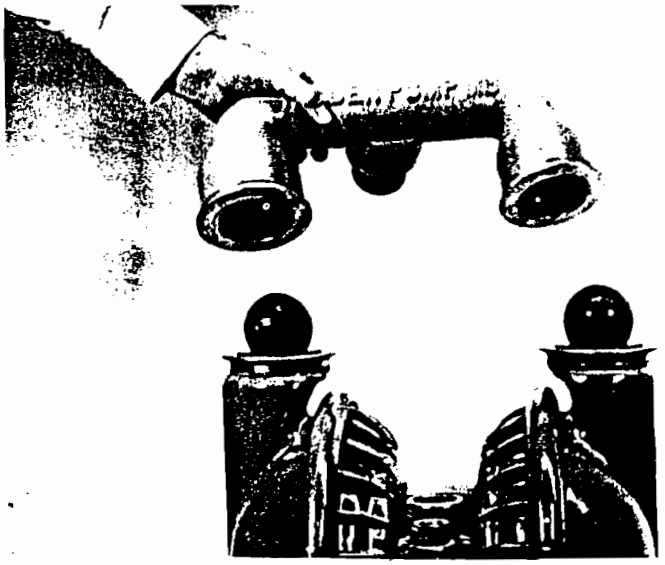


Figure 1B

Step 2

Remove the two clamp bands that hold the inlet manifold to the main body of the pump. Lift the main body of the pump from the inlet manifold and set it to one side. The inlet valves and seats are now available for examination (see *Figure 2A).* Next, remove large clamp band which attaches water chamber to the center section of the pump (see *Figure 2B).*

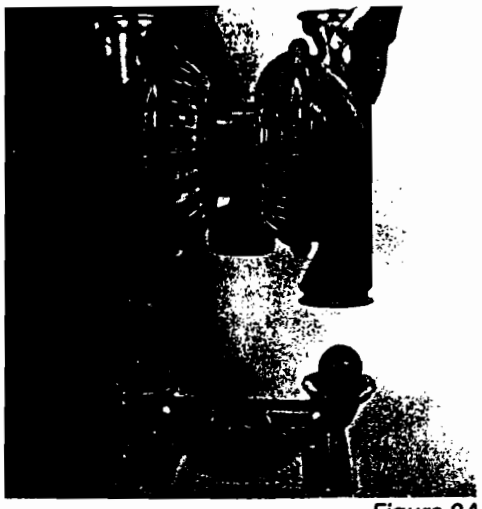


Figure 2A

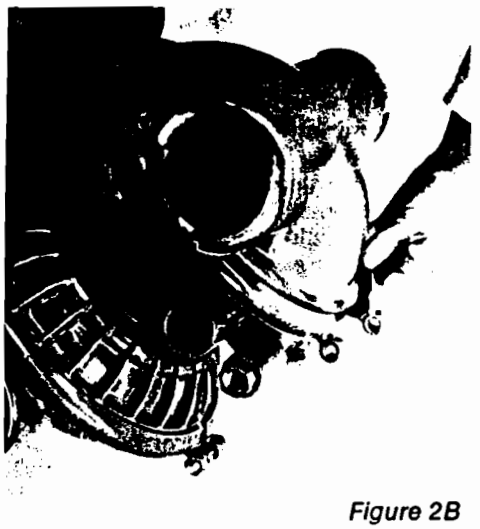


Figure 2B

Remove only one liquid chamber from the center section. This will expose the diaphragm and its piston plate (see *Figure 2C).* The diaphragm and the piston plate can be removed by unscrewing them fromthe connecting shaft with an adjustable wrench. The opposite diaphragm will be held tight by the opposite liquid chamber (see *Figure 2D).*

Figure 2C

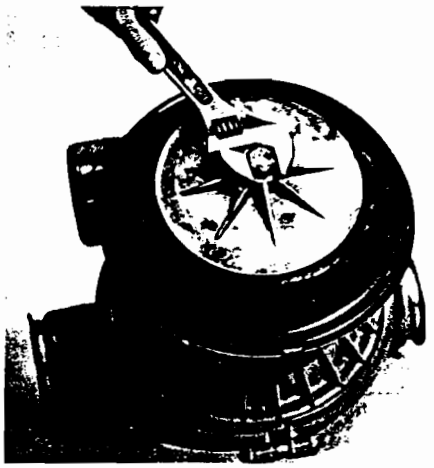


Figure 2D

Now remove the opposite liquid chamber. The second diaphragm is now available for inspection and cleaning (see *Figure 2E).* A vise with wood blocks is suggested as a method of securing the shaft while removing the second diaphragm. **It is important not to score or mark the chrome-plated shaft.**

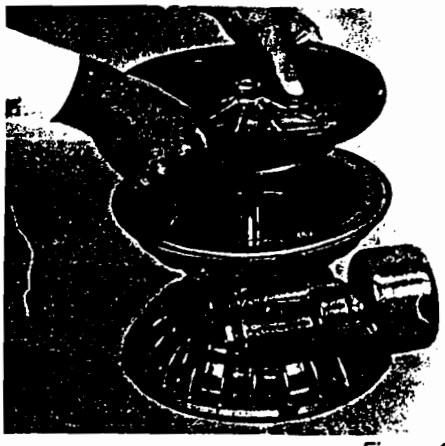
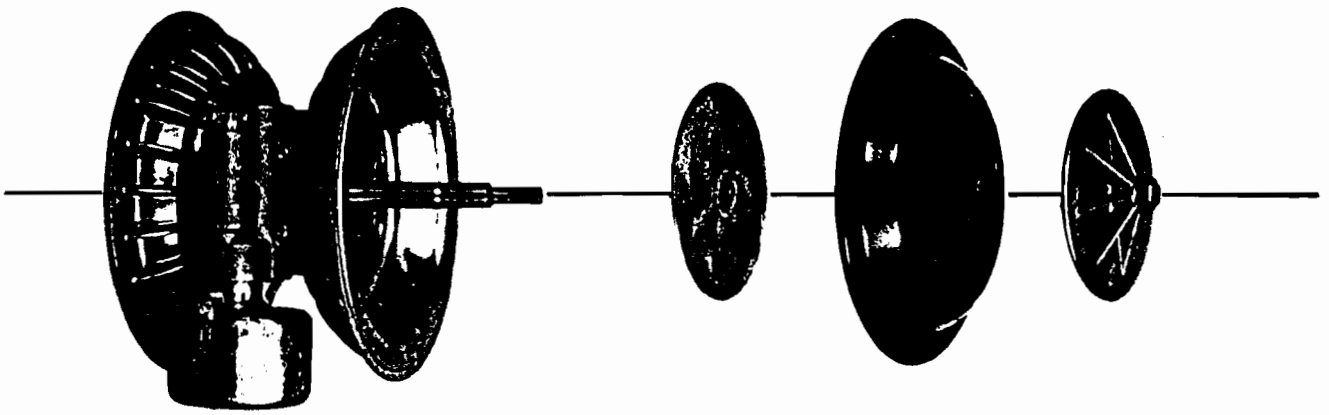


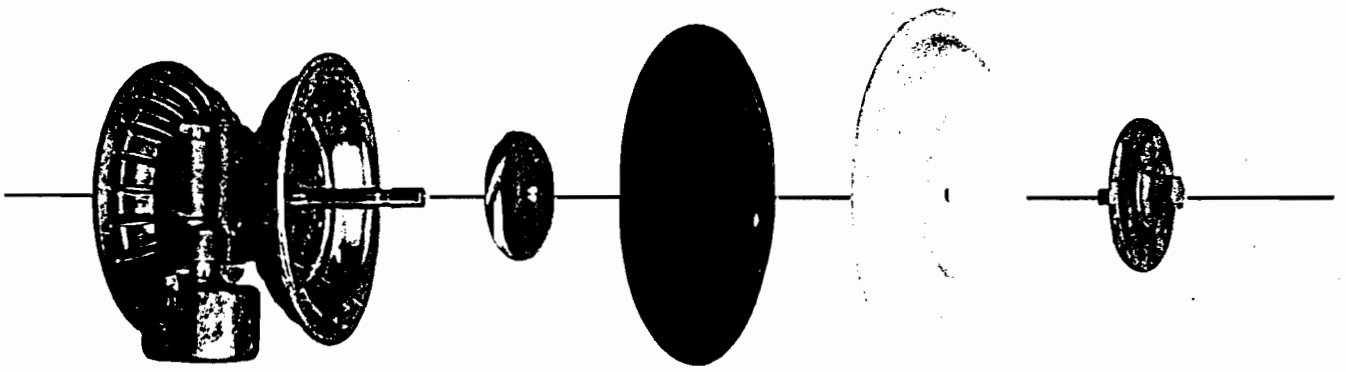
Figure 2E

Figure 2F

Upon removing the diaphragms, the inner piston is now exposed and available for inspection (see *Figure 2F).*



Step 1 *(RUBBER DIAPHRAGMS)* *Exploded View Figure 3A*



(TEFLON® DIAPHRAGMS) *Exploded View Figure 3B*

Figure 4A

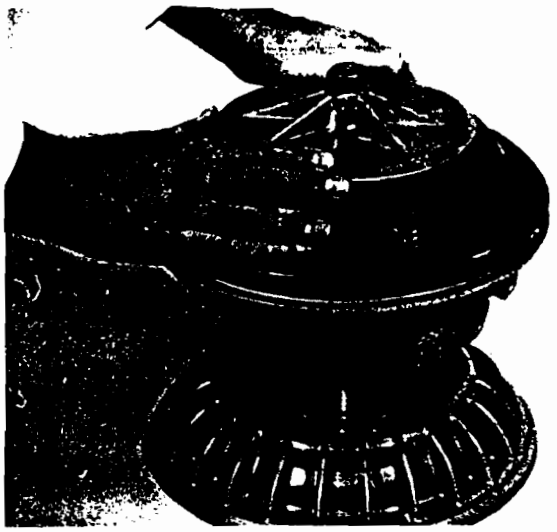


Figure 4B

Step 2

Before assembly, remove the O-rings from the center block bushing and flush center block removing grit and contaminants. Install new O-rings in center block. To install shaft, push shaft firmly through the bushing in the center block. Be sure to lubricate bushing and shaft with an ISO grade 15-5 wt. oil so that the shaft may pass by the O-rings (see *Figure 4A).* Next, push diaphragm down so that it fits into the lip of the air chamber *(Figure 4B).* Now turn the center section over and push it down so the diaphragm just installed collapses, exposing the shaft so that the other diaphragm can be installed *(Figure 4C).* Wil-Flex™ and Saniflex™ diaphragms are rigid and cannot be ·ced. These diaphragms should be inverted prior to feeding ıe shaft through the center bushing to allow for proper fit. ·Next, place the inner piston and opposite diaphragm in position for assembly. Once diaphragms are installed, it is important to tighten outer pistons simultaneously (turning in opposite directions) to ensure a tight, secure fit. Tighten per the torque specification*. *(Figure 4E).*

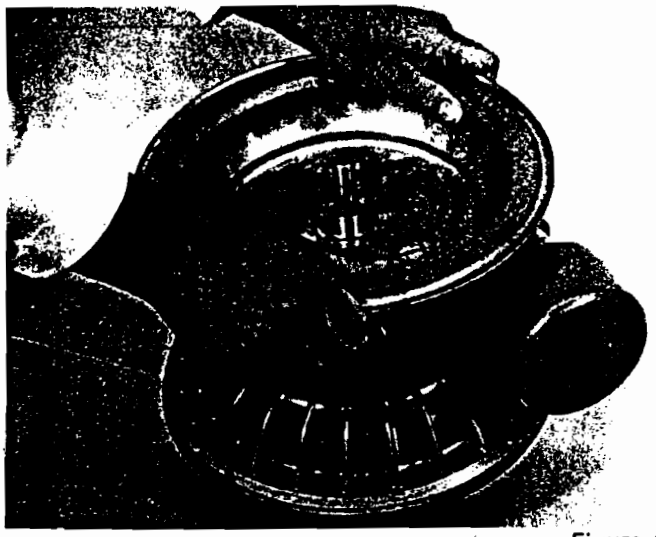


Figure 4C

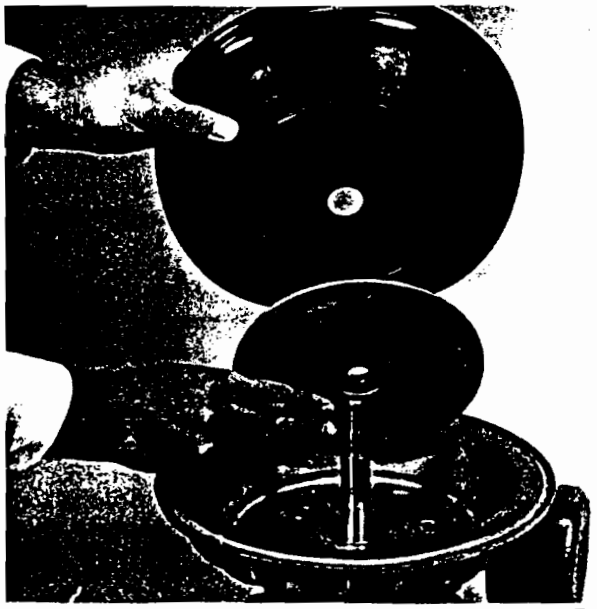


Figure 4D

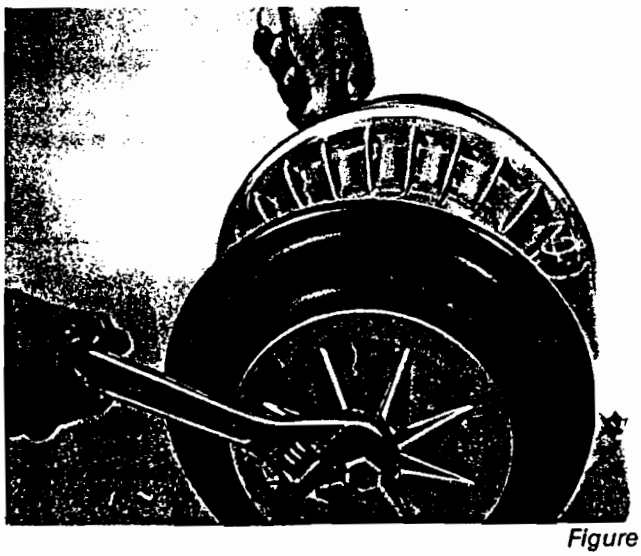


Figure 4E

*Refer to Section 8 for torque specifications.

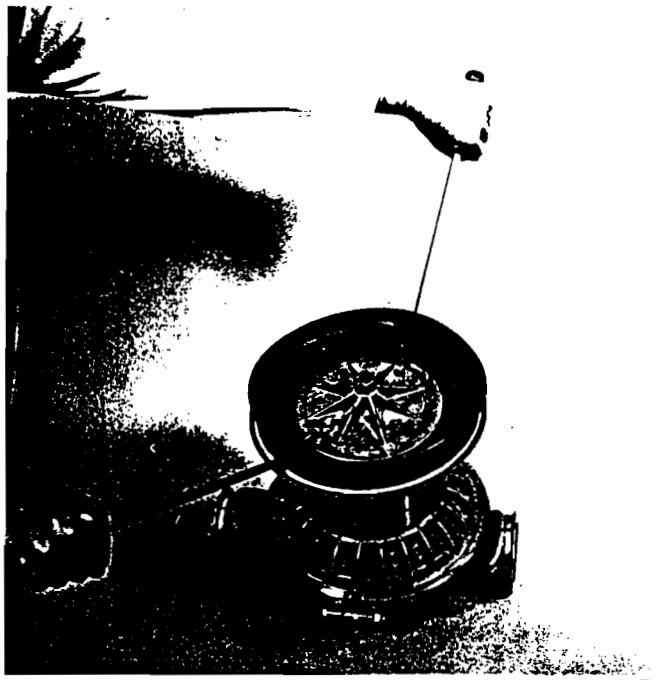


Figure 4F

Figure 4G

Now install the water chamber with large clamp band on the side in which the diaphragm is positioned outward with its bead positioned in the groove of the air chamber *(Figure 4G).* Center section should then be turned over so that diaphragm can be pushed up with pry bars to full stroke position so that opposite water chamber can be installed *(Figure 4F).* It is important to align the diaphragm bead with the grooves in the center section and water chamber. To do this the diaphragm must be positioned outward in a full stroke position *(Figure 4G).* Tighten per torque specification*. **CAUTION:** Both the top and bottom flange surfaces of the water chambers must be aligned so that they are level and in the same planes to prevent leakage.

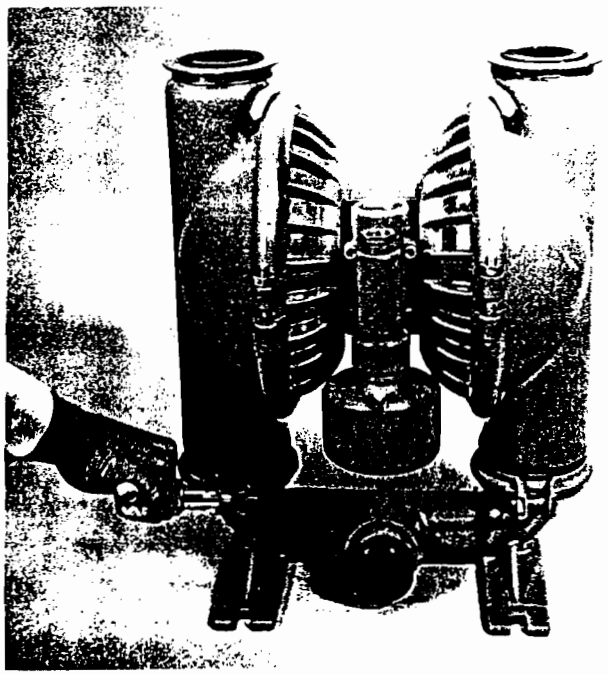


Figure 4H

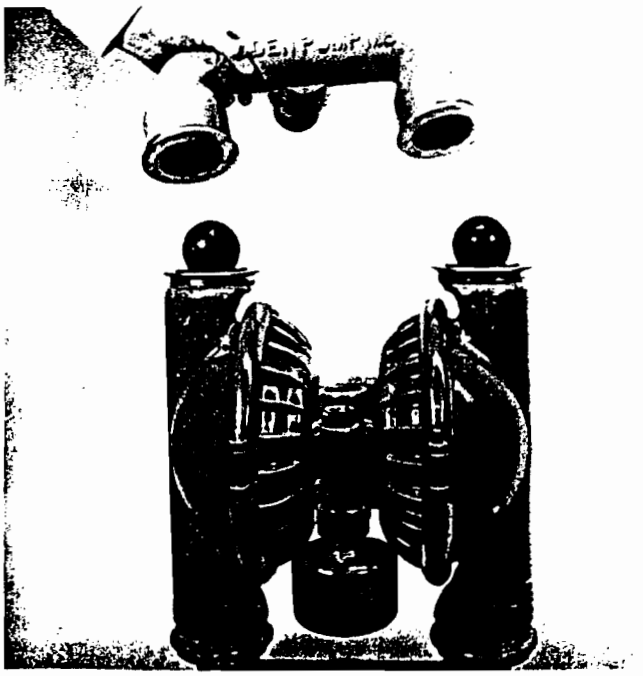


Figure 4I

Install the valve seats in the water chambers and inlet manifold with the molded seat O-ring down inside the seat recess. Next, securely tighten small clamp bands around inlet manifold and water chambers per the torque specification* *(Figure 4H).* Finally, place discharge manifold over assembled center section *(Figure 4I)* and tighten clamp bands per the torque specification*. **Blow out air line for 10 to 20 seconds to make sure all pipeline debris is clear.** Connect the air line and run pump dry. Good suction should be observed at inlet. Refer to Section 2 for suction lift data.

*Refer to Section 8 for torque specifications.

SECTION 6B

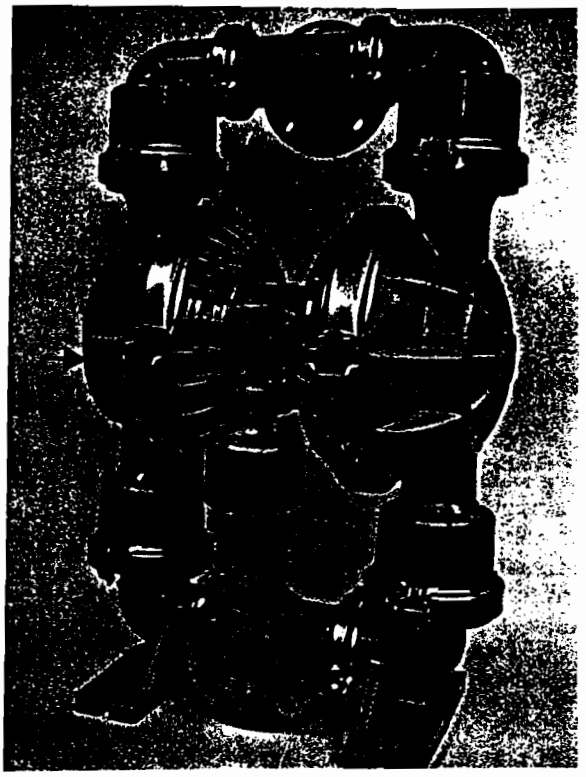
DIRECTIONS FOR DISASSEMBLY / REASSEMBLY — M8 CHAMP PUMP (PLASTIC)

CAUTION: Before any maintenance or repair is attempted, the compressed air line to the pump should be disconnected and all air pressure allowed to bleed from pump. Disconnect all intake, discharge, and air lines. Drain the pump by turning it upside down and allowing any fluid to flow into a suitable container.

The Wilden "Champ" is a Wilden model M8 pump (2-inch) with all-wetted parts of injection molded polypropylene or PVDF material. Performance and operation of the "Champ" are essentially the same as other Wilden model M8 pumps of metal construction subject to temperature and chemical compatibility of the material being pumped with polypropylene and PVDF.

The air valve, center section, and diaphragms are standard M8 components. The "Champ" pump differs, however, in that flanges (150 psi American Standard Pipe) are utilized instead of threaded inlet and discharge parts; increased external dimensions; and 10 sets of clamp bands instead of 6. Performance and operation are the same as a metal construction M8 with one exception: the maximum temperature for the polypropylene is limited to 175 degrees Fahrenheit and 225 degrees Fahrenheit for the PVDF.

NOTE: Before starting disassembly, mark a line from each liquid chamber to its corresponding air chamber. This line will assist in proper alignment during reassembly.



DISASSEMBLY:

NOTE: Model used for these instructions incorporates Teflon® diaphragms, balls, and valve seat O-rings. Models with rubber diaphragms, balls and O-rings are the same except where noted.

Step 1

Start by removing the two clamp bands that fasten the discharge manifold to the main body of the pump.

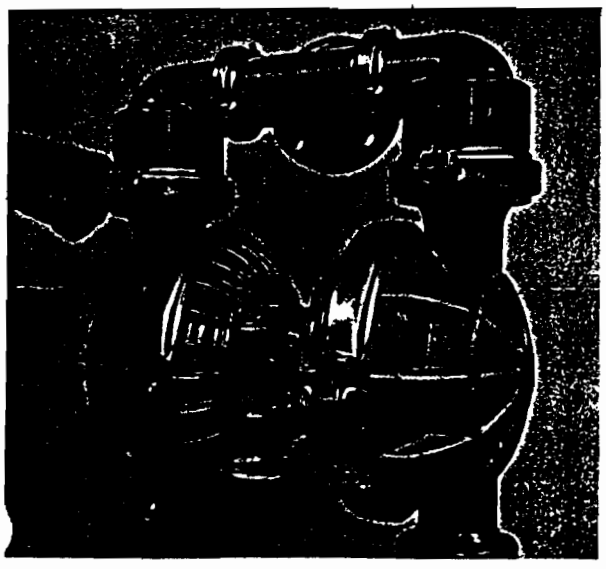


Figure 1A

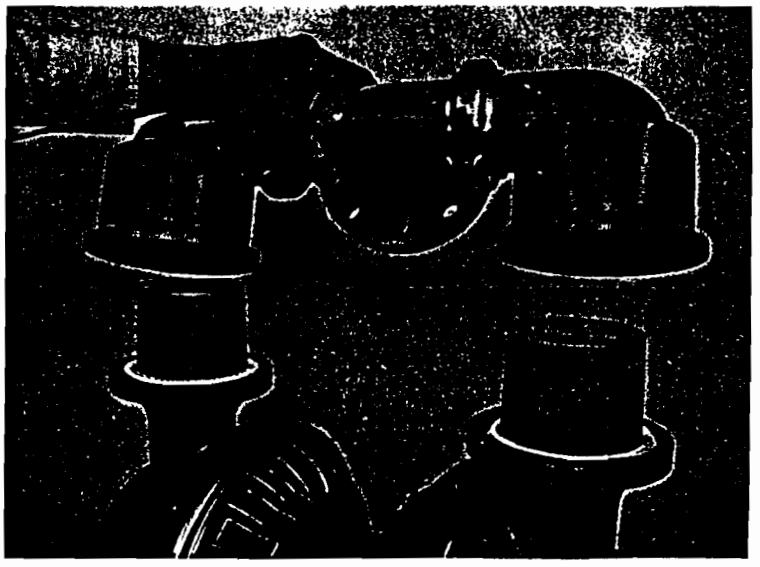


Figure 1B

Figure 2A

Figure 2B

Step 2

The valve ball, round O-ring and the seat are now exposed for inspection. If the O-ring is flattened or out-of-round, it must be replaced. Valve ball and seat should be inspected for damage or excessive wear.

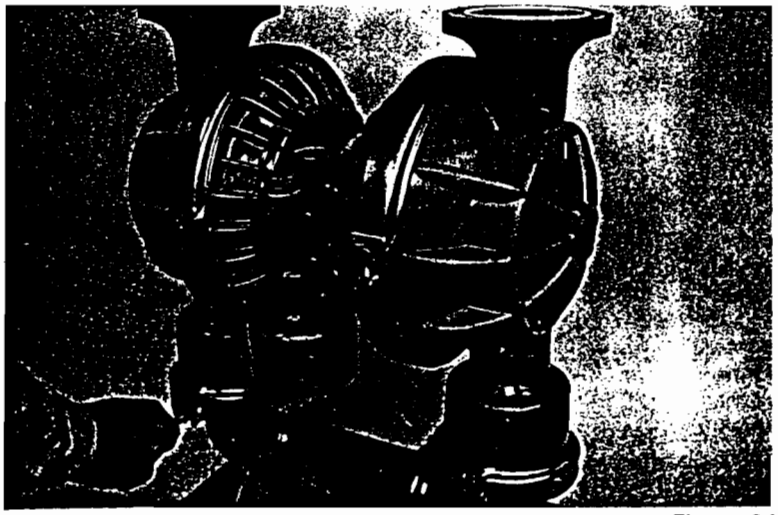


Figure 3A

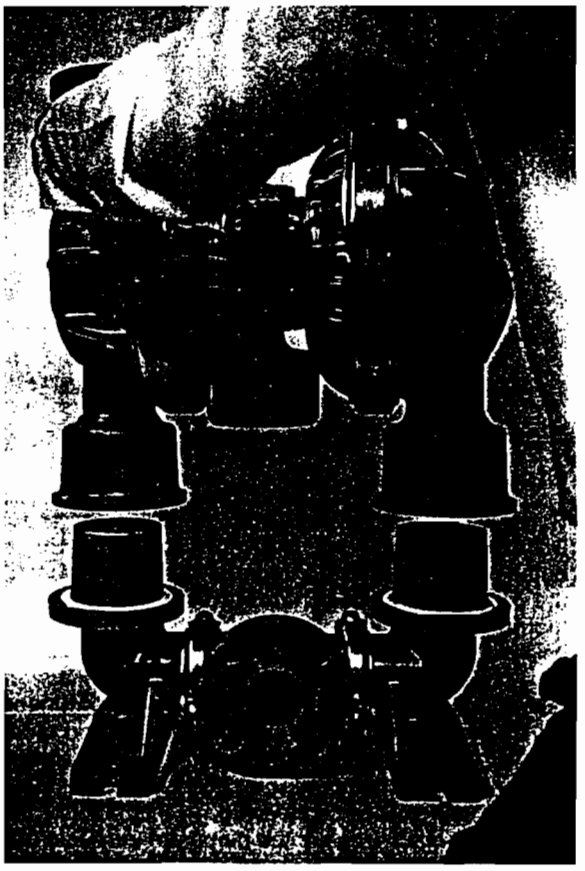


Figure 3B

Step 3

Remove the two clamp bands that hold the inlet manifold to the main body of the pump. Lift the main body of the pump from the inlet manifold and set it to one side. The inlet ball valves, cages, seats and O-rings are now available for examination.

Figure 4A

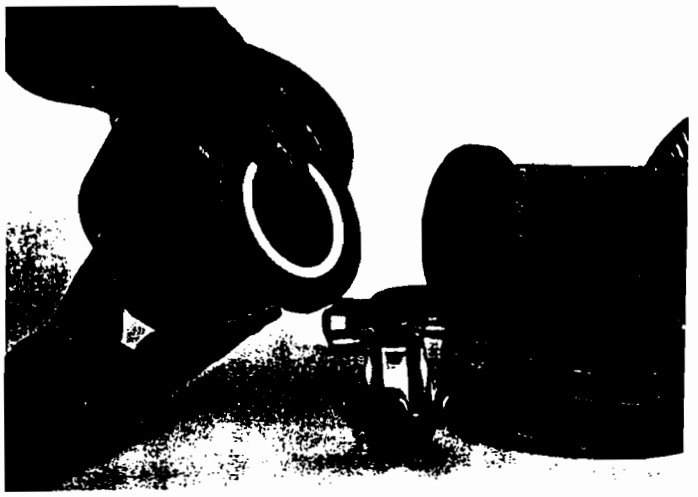


Figure 4B

Step 4

Both inlet *(Figure 4A)* and discharge *(Figure 4B)* manifolds can now be disassembled by removing their clamp bands. Make sure the round O-rings are not damaged or swollen. These O-rings form the seal between the manifold ports and will not perform their function if damaged. **NOTE:** Manifolds need not normally be disassembled for maintenance.

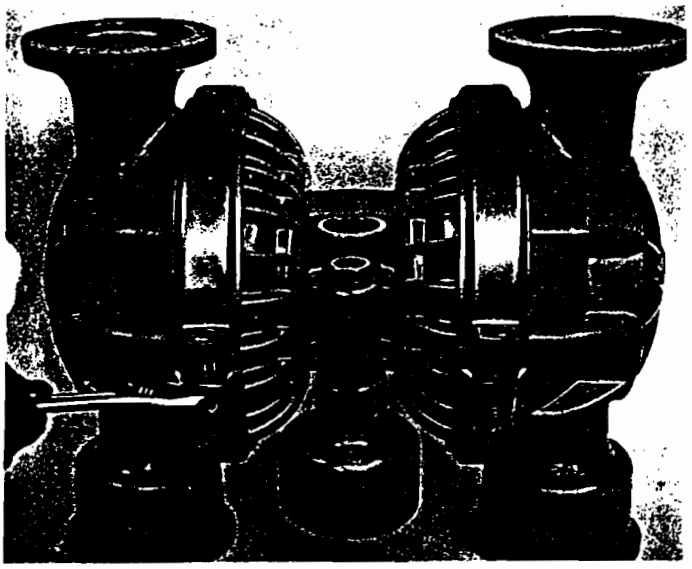


Figure 5A

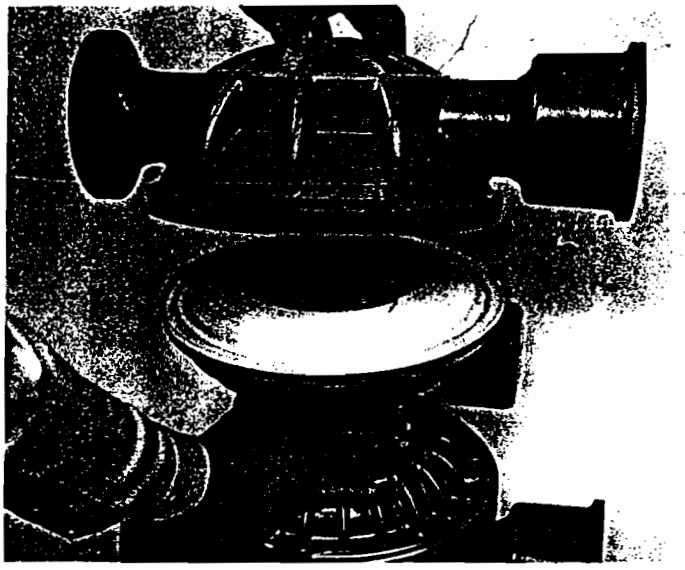


Figure 5B

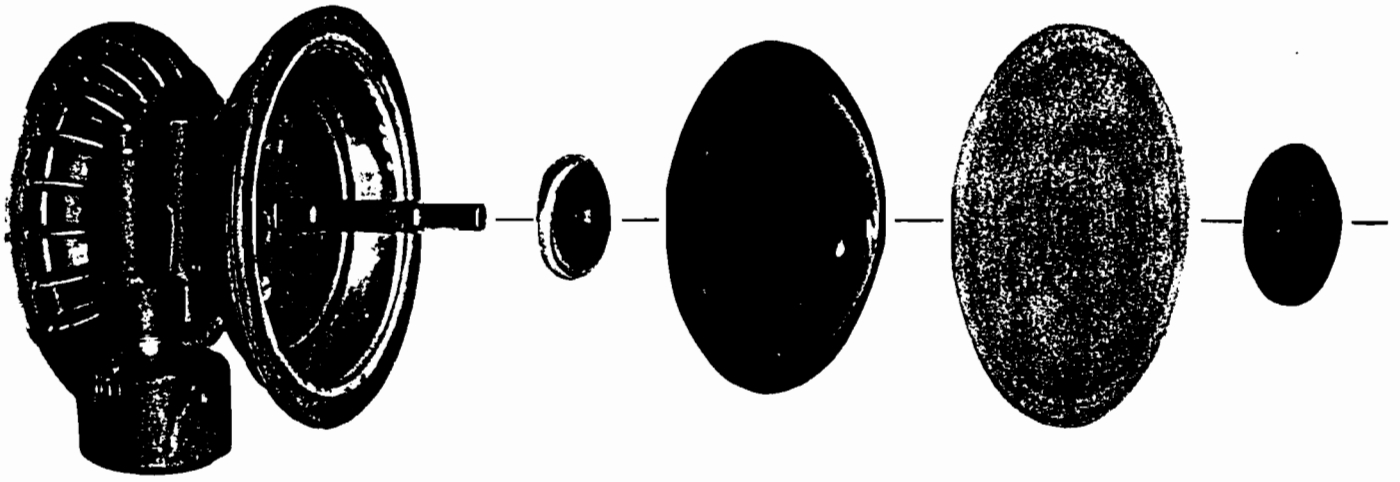
Step 5

Remove only one liquid chamber from the center section. This will expose the diaphragm and its piston plate. By grasping the outer edges of the diaphragm and turning counterclockwise, the diaphragm and piston plate can be removed by unscrewing them from the connecting shaft. The opposite diaphragm will be held tight by the opposite liquid chamber. **NOTE:** The shaft may unscrew from the opposite diaphragm. Flats are provided on the piston plate for a wrench if necessary. If needed, a vise with wood blocks is the recommended method of securing the shaft while removing the second outer piston. Now remove the opposite liquid chamber. The second diaphragm is now available for inspection and cleaning. At this point of disassembly, all liquid contact areas of the pump are available for inspection and cleaning.

If inspection and/or servicing of the non-wetted air section is necessary, please see Section 6A.

Figure 5C

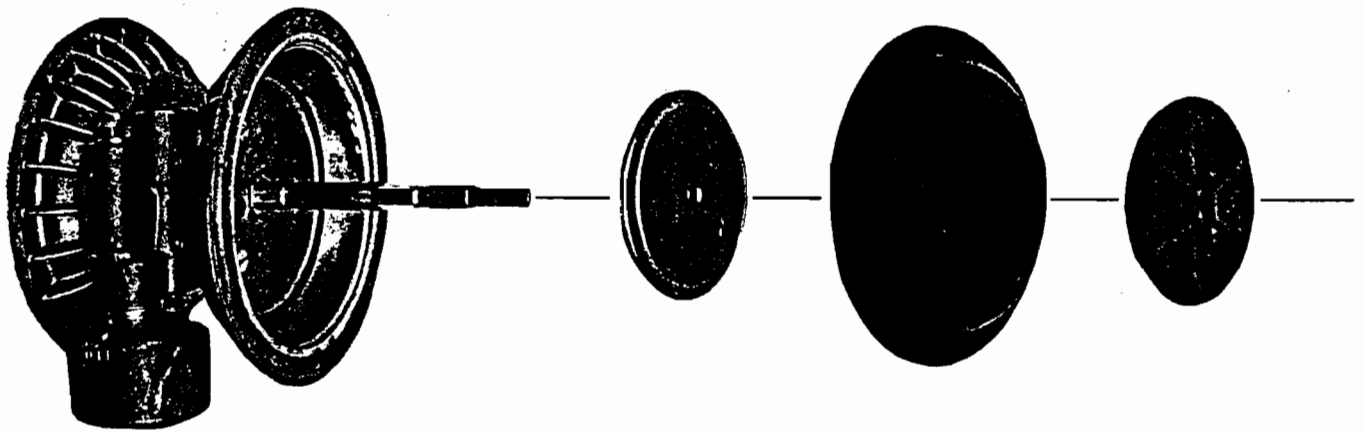
ASSEMBLY:



Exploded View Figure 6A

Step 1 (Teflon® Diaphragms)

First, install diaphragm and inner and outer piston plates on shaft. Observe the **"This Side Out"** marking on the convex side of the diaphragm. Hand-tighten the outer piston to the shaft only, at this time *(Figure 7A)*. Lubricate the center block bushing with a 5wt ISO grade 15 oil and insert the shaft through the bushing until the outer bead of the diaphragm just touches the circumference groove of the air chamber.



Exploded View Figure 6B

(Rubber Diaphragms)

Figure 7A

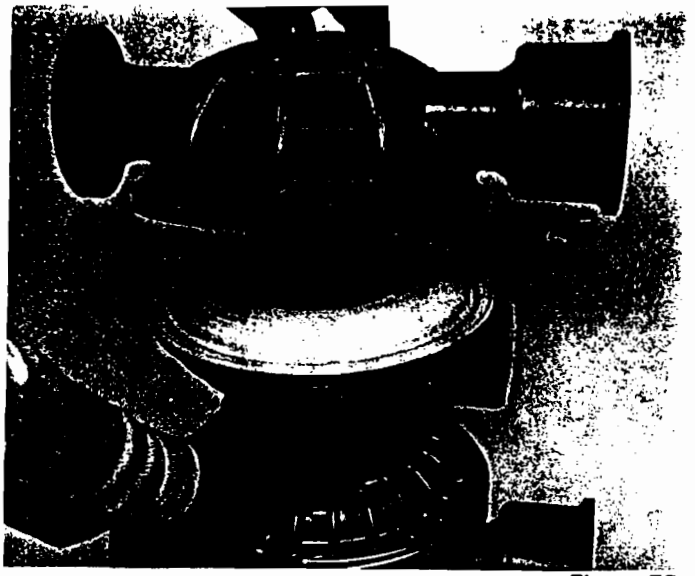


Figure 7B

Step 2

Install the opposite diaphragm and inner and outer pistons; hand-tighten. Now tighten both diaphragm outer pistons (we suggest two adjustable wrenches) simultaneously (turning in opposite directions) per the torque specifications* (Item #2 or #3). Install water chambers over the diaphragms using the alignment marks that were made during disassembly as a guide. (Direction of flow through the pump is bottom to top.) Install and tighten clamp bands per the torque specification*. *(Figures 7B* and *7C.)*

*Refer to Section 8 for torque specifications.

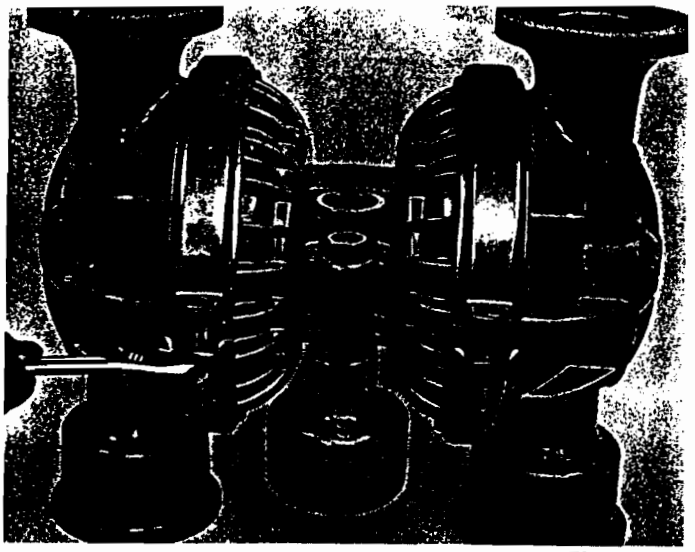


Figure 7C

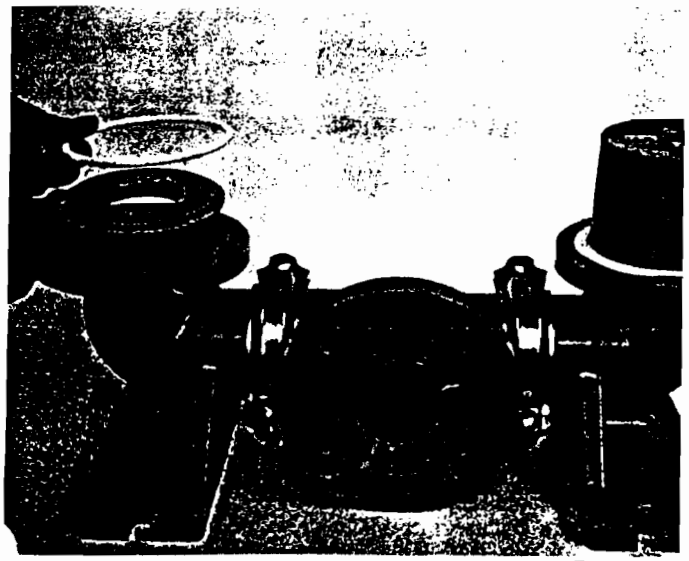


Figure 8A

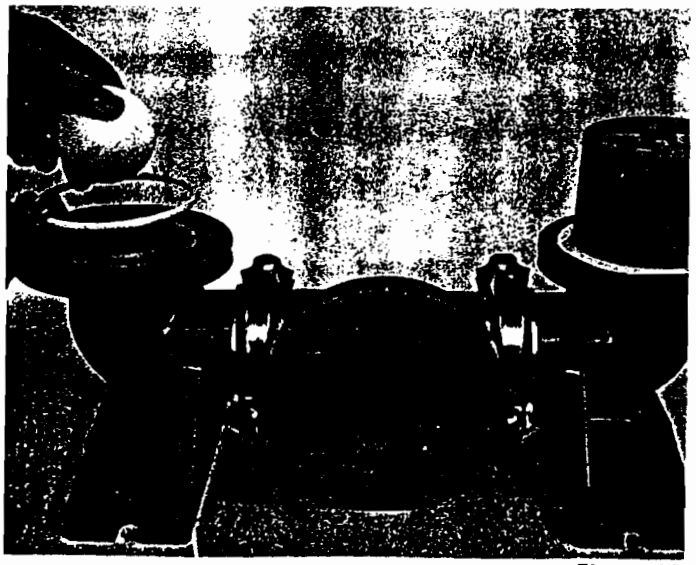


Figure 8B

Step 3

Install inlet ball valve, O-ring and seat in sequential order as shown in *Figures 8A* and *8B.*

Step 4 (Teflon® Elastomers only)

M8 "Champ" pumps with Teflon® elastomers require the use of a Teflon® gasket kit (P/N 08-9500-99). The Teflon® gasket material in this kit is an expanded type of Teflon® which is very strong, but soft. Its use assures a positive seal between the Teflon® diaphragm outer bead and its corresponding groove in the water chamber. This gasket material should be replaced each time the pump is disassembled.

Figure 9A

Select a strip of ¼"-wide material and carefully remove the covering from the adhesive strip (see *Figure 9A).* Ensure that the adhesive strip remains attached to the gasket material.

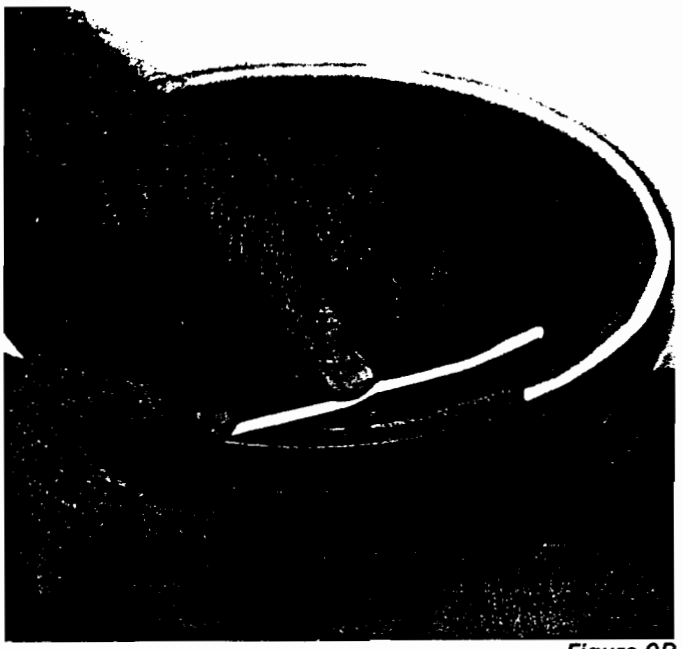


Figure 9B

Starting at any point, lay the gasket strip in the center of the diaphragm bead groove on the chamber and press lightly on the gasket to ensure that adhesive holds it in place during assembly *(Figure 9B).* The ends of the gasket should overlap approximately ½".

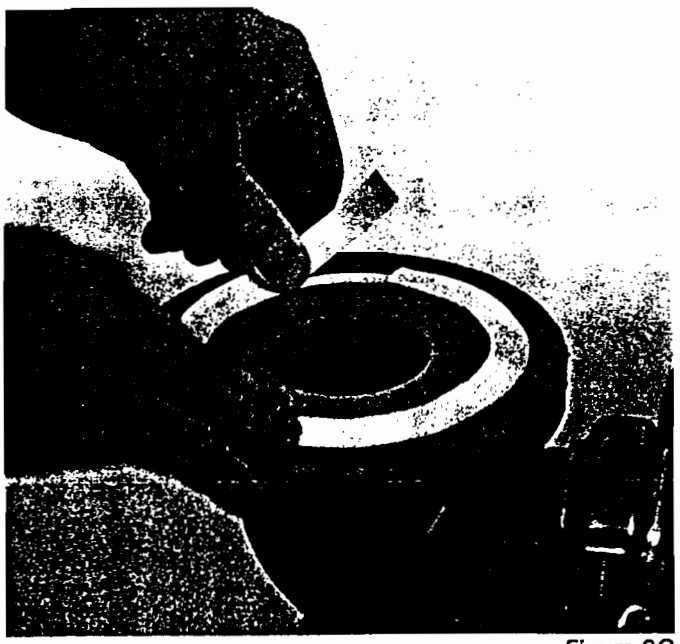


Figure 9C

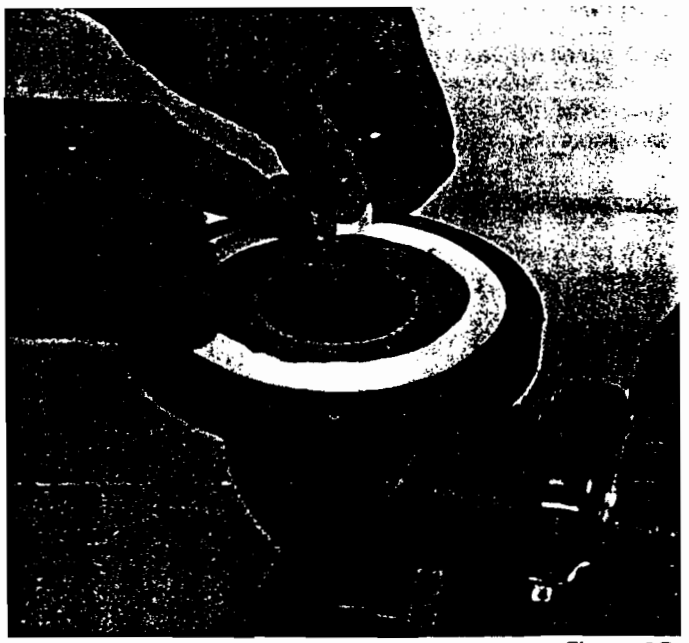


Figure 9D

All PVDF pumps with Teflon® elastomers utilize gasket material around the seat area as well. If sealing is a problem, the gasket material can be used with polypropylene pumps as well. Notice that the adhesive strip for the inlet and discharge manifold is ½-inch, and that it, too, is wrapped in much the same way as in *Figure 9A* and *9B.* Make sure that adhesive strip covers the round O-ring completely.

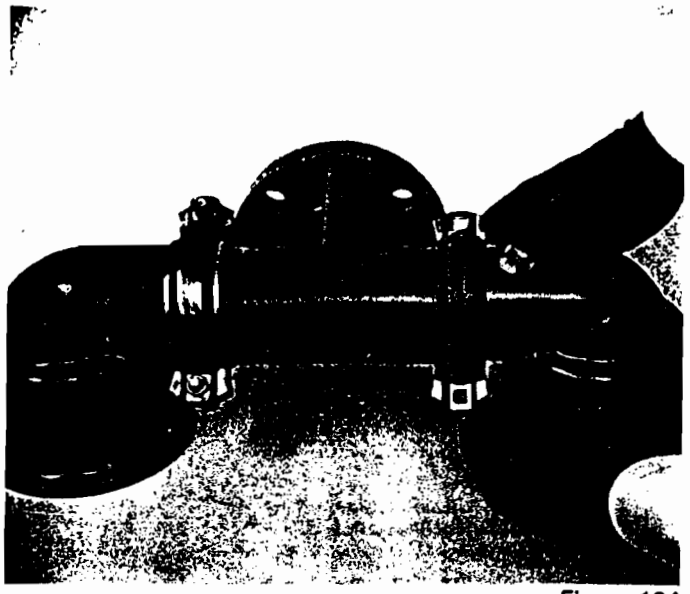


Figure 10A

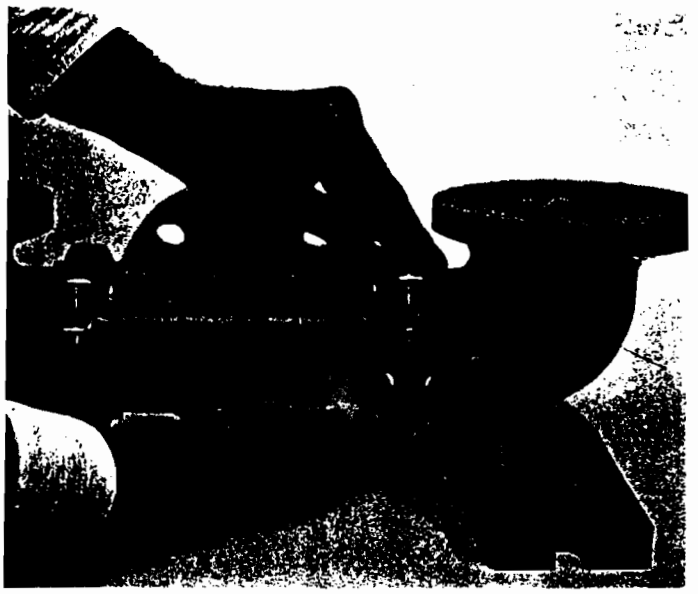


Figure 10B

Step 5

Manifold Assembly: If the inlet and/or discharge manifold was taken apart, it should be reassembled now. The easiest way to do this is to take one half clamp band and wedge it onto the flanges of the elbow and center T-section. (See *Figure 10A).* This holds the two parts together while the second half band is installed and the bolts are hand-tightened. Attach the other elbow to the center T-section and tighten per the torque specification*. *(Figure 10B).* Align the manifold parts as in *Figure* 2, and tighten the clamps per the torque specifications* :m #6). **NOTE:** On pumps equipped with Teflon® gaskets ..ould be used between the flanges of the manifold. (See *Step 9D).*

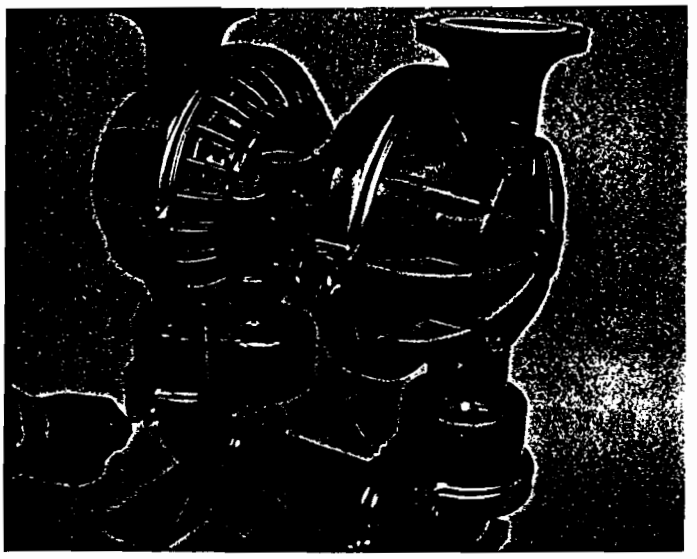


Figure 10C

Step 6

Next, install the valve seat, O-ring, and valve ball on top of the liquid chamber, place the ball valve cage over the valve ball, if previously removed. (See *Figures 11A* and *11B.)* Tighten clamps per the torque specifications*.

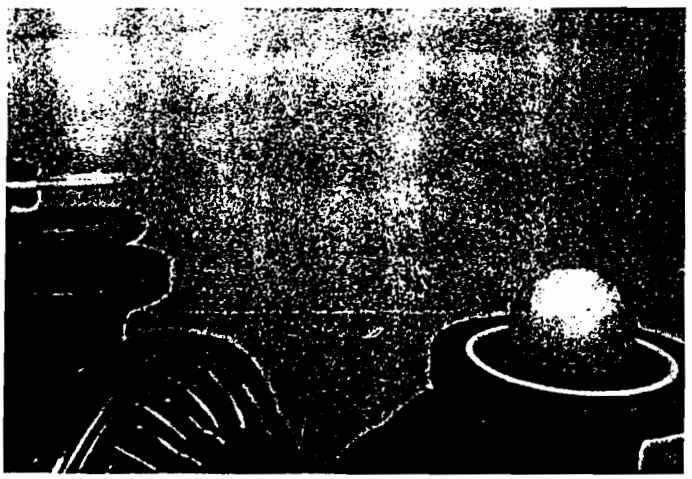


Figure 11A

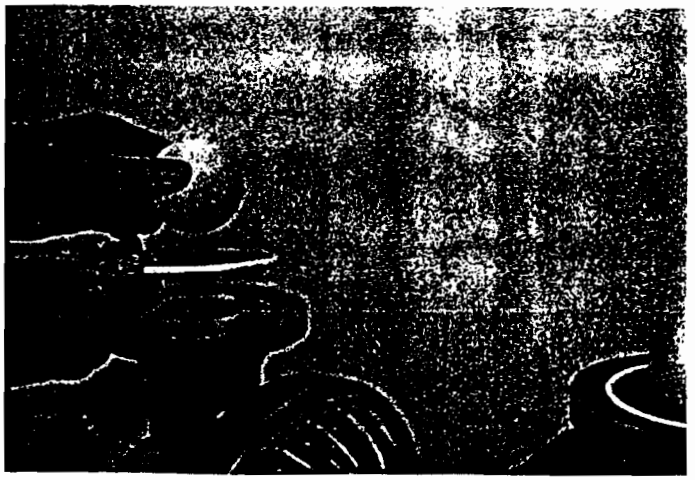


Figure 11B

ep 7

.etighten all clamp bands. **Blow out air lines for 10 to 20 seconds to make sure all pipeline debris is clear.** Connect air line to ne pump and run it dry.The pump should shift evenly and good suction should be observed at the inlet. Refer to Section 2 for suction lift data.

*Refer to Section 8 for torque specifications.

SECTION 6C

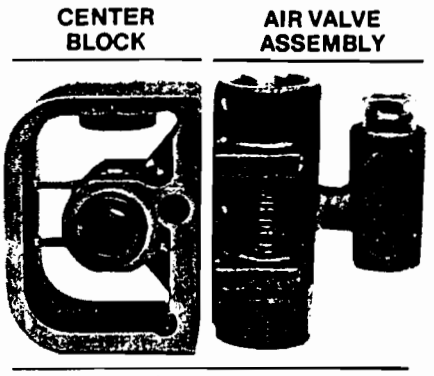
AIR VALVE / CENTER BLOCK DISASSEMBLY / REASSEMBLY

The air valve assembly consists of both the air valve body and piston and the center block. The unique design of the air valve relies only on differential pressure to effect the diaphragm shift. It is reliable and simple to maintain. The bushing in the center block, along with the diaphragm shaft, provides the "trigger" to tell the air valve to shift. The following procedure will ensure that the air valve on your Wilden pump will provide long trouble-free service.

AIR VALVE BODY AND PISTON ASSEMBLY AND DISASSEMBLY:

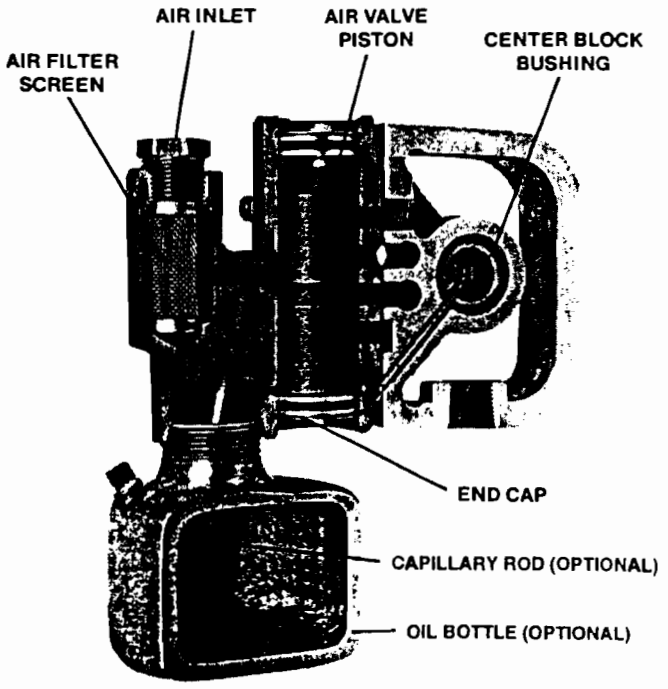
The air valve body and piston can be disconnected from the pump by removing the four socket head cap screws which attach it to the center block. The piston in the air valve is aluminum with a dark gray anodized coating. The piston should move freely and the ports in the piston should line up with the ports on the face of the air valve body (see below). The piston should also appear to be a dull, dark gray in color. If the piston appears to be a shiny aluminum color, the air valve is probably worn beyond working tolerance and should be replaced.

If the piston does not move freely in the air valve, the entire air valve should be immersed in a cleaning solution.



Center Section Assembly *Figure A*

[NOTE: Do not force the piston by inserting a metal object.] This soaking should remove any accumulation of sludge and grit which is preventing the air valve piston from moving freely. Also, remove and clean the air valve screen. If the air valve piston does not move freely after the above cleaning, the air valve should be disassembled as follows: remove the snap ring from the top end of the air valve cylinder and apply an air jet to the 3/16-inch hole on the opposite end of the air valve face. (See *Figure C.)* **CAUTION:** The air valve end cap may come out with considerable force. Hand protection such as a padded glove or rag should be used to capture the end cap.



NOTE: Air valve available with or without oil bottle and capillary rod. *Figure B*

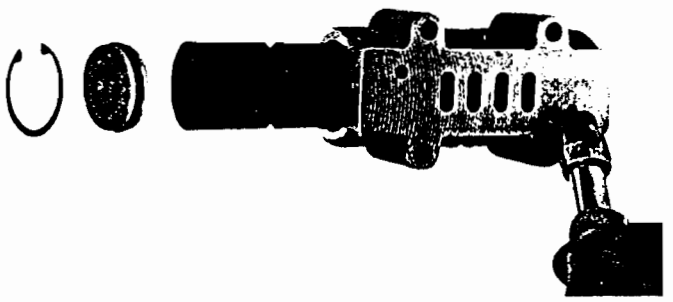


Figure C

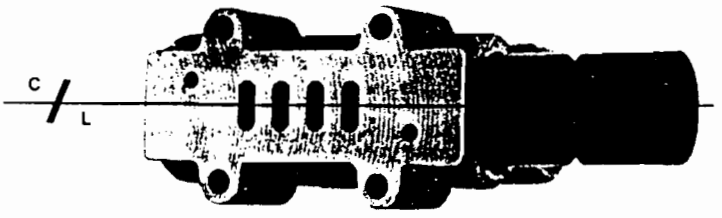


Figure D

Small nicks can usually be dressed out and the piston returned to service. Make sure that the guide pin is straight and smooth or the piston will not move freely in the cylinder. New O-rings should be installed on the end caps. Lubricate the O-rings and install the end caps, assuring that proper alignment of the piston and cylinder ports is maintained. (See *Figure D).* Reinstall air valve to center block of pump. Tighten per the torque specifications* (Item #1).

O-RING REPLACEMENT:

When the O-rings become worn or flat, they will no longer seal and must be replaced. This is most easily accomplished by using a tool called an O-ring pick, available through most industrial supply companies.

CENTER BLOCK ASSEMBLY:

The pump's center block consists of a polypropylene or die cast housing with a cast-in bronze bushing. The bushing has eleven grooves cut on the inside diameter. There are seven O-rings that fit in these grooves (see *Figure E).* Since these O-rings form a part of the shifting function of the pump, it is necessary that they be located in the proper grooves. The bronze bushing is replaceable in cast iron or stainless steel center blocks only. When bushing wear becomes excessive, a new center block must be used.

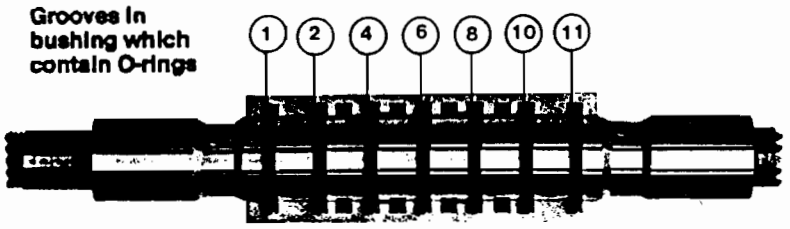


Figure E

P/N 08-3300-07 Bronze Bushing can be pressed into a stainless steel or cast iron center section. (See *Figure F).* When installing a new bushing, two bleeder holes which allow the pump to exhaust air must be drilled. A 7/32" drill should be used. (See *Figure G).*

Figure F (Side View)

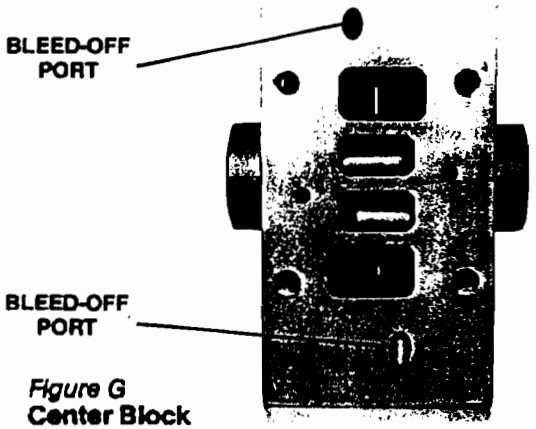


Figure G
Center Block
(Front View)

SECTION 6D
TURBO 225 AIR DISTRIBUTION SYSTEM

The patent pending "TURBO 225" air distribution system is designed to combat the effect of "freezing." This condition can occur when air-operated, double-diaphragm pumps are operated on a moisture-laden air supply. Moisture held in suspension can crystallize to ice when the compressed air expands, pressure decreases, and temperature drops. The "TURBO 225" is designed to control the internal expansion of air, minimizing pressure and temperature reduction. By controlling the internal expansion of air and thus the crystallization of water to ice, the Wilden pump operates reliably without loss in performance.

The use of proprietary engineered thermoplastics decreases the coefficient of friction between mating parts enabling the pump to operate lubrication free intermittently. The solid piston with milled exhaust slots allows for efficient exhausting through the center section of the pump, reducing the "chilling effect" on the air valve piston. The thermoplastic air valve piston decreases the transfer of cold temperatures from the air exhaust to the main air supply further inhibiting "freezing" conditions.

In addition to the air valve changes, the center block O-rings have been replaced by a proprietary composite glide ring. This glide ring exhibits much longer life (5x the life of standard O-rings) and less susceptibility to chemical attack (hardening, shrinking, and/or cracking). These changes to center block grooves have been made, allowing these glide rings complete retrofittability to existing center blocks (see *Figure B).*

A straight shaft (non D-dented) must be utilized with the glide rings (see *Figure B).* This straight shaft reduces the coefficient of friction between it and the center block glide rings, extending the life of these seals.

A "T" is used to denote Turbo 225-fitted pumps in the Wilden pump designation system. A "T" is also stamped on the edge of the air valve and the center section to designate Turbo 225 components.

Air Valve Assembly
P/N 08-2000-07-225

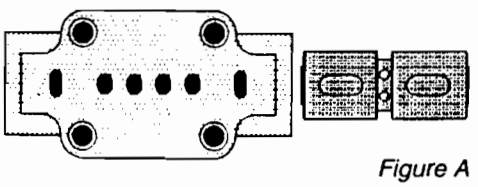
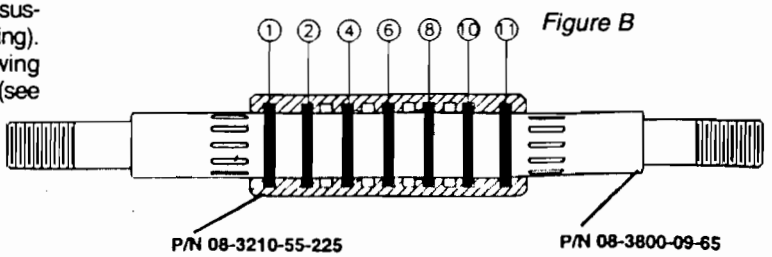


Figure A

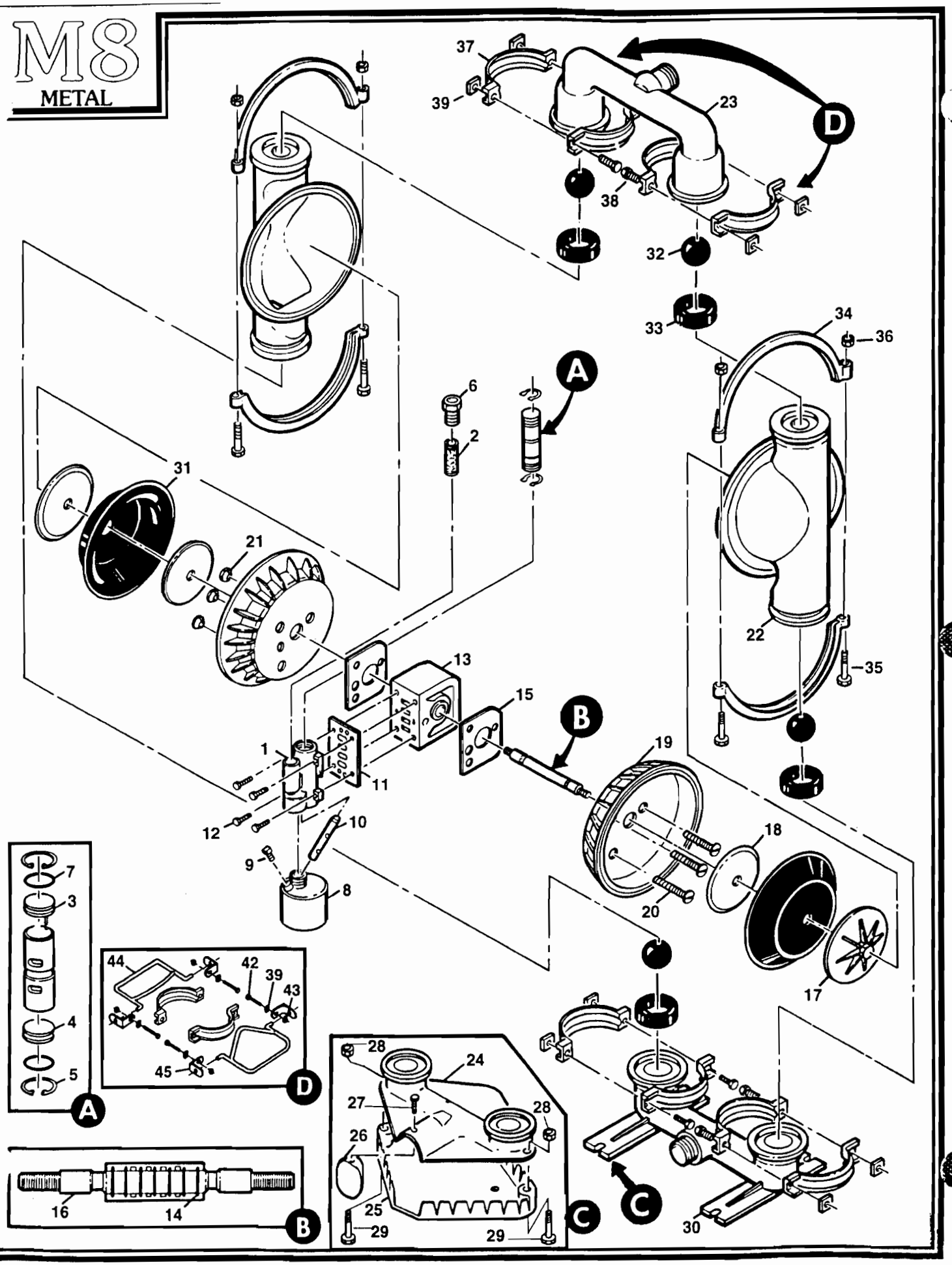
Figure B



MAINTENANCE RECORD

DATE	SERVICE RENDERED	SERVICED BY

M8
METAL


37
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A
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D
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26
25
29
29
C
30
16
14
B

Wilden Model M8 Metal with Rubber Fitted Elastomers

Item	Part Description	Qty.	M8/ AAPB-030 P/N	M8/ AAPB P/N	M8/ AAPB-033 P/N	M8/ AAPB-003 P/N	M8/ AAAB-030 P/N	M8/ AAAB-033 P/N	M8/ AAAB P/N	M8/ AAAB-003 P/N	M8/ HAPB P/N	M8/ HNNN P/N	M8/ HSSB P/N
1	Air Valve Assembly[1]	1	08-2000-07	08-2000-07	08-2000-07	08-2000-07	08-2000-07	08-2000-07	08-2000-07	08-2000-07	08-2000-07	08-2000-06	08-2000-07
2	Air Valve Screen	1	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07
3	Air Valve End Cap w/Guide (Top)	1	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23
4	Air Valve End Cap w/o Guide (Bottom)	1	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23
5	Air Valve Snap Ring	2	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03
6	Air Valve Bushing	1	08-6950-07	08-6950-07	08-6950-07	08-6950-07	08-6950-07	08-6950-07	08-6950-07	08-6950-07	08-6950-07	08-6950-07	08-6950-07
7	Air Valve Cap O-Ring	2	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52
8	Oil Bottle (Optional) w/Air Valve 08-2050-07	1	08-2850-01	08-2850-01	08-2850-01	08-2850-01	08-2850-01	08-2850-01	08-2850-01	08-2850-01	08-2850-01	N/A	08-2850-01
9	Plug (Optional)	1	08-7000-07	08-7000-07	08-7000-03	08-7000-03	08-7000-07	08-7000-03	08-7000-07	08-7000-07	08-7000-07	N/A	08-7000-07
10	Capillary Rod (Optional)	1	08-2900-99	08-2900-99	08-2900-99	08-2900-99	08-2900-99	08-2900-99	08-2900-99	08-2900-99	08-2900-99	N/A	08-2900-99
11	Air Valve Gasket — Buna	1	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52
12	Air Valve Screw ¼"-18 x 2½"	4	08-6000-08	08-6000-08	08-6000-03	08-6000-03	08-6000-08	08-6000-03	08-6000-08	08-6000-03	08-6000-03	08-6000-03	08-6000-03
13	Center Block	1	08-3100-20	08-3100-20	08-3100-20	08-3100-20	08-3100-01	08-3100-01	08-3100-01	08-3100-01	08-3100-20	08-3100-06	08-3100-03
14	Center Block O-Ring	7	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52
15	Block Gasket — Buna	2	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52
16	Shaft	1	08-3800-09	08-3800-09	08-3800-09	08-3800-09	08-3800-09	08-3800-09	08-3800-09	08-3800-09	08-3800-09	08-3800-09	08-3800-09
17	Piston, Outer	2	08-4550-01	08-4550-01	08-4550-01	08-4550-01	08-4550-01	08-4550-01	08-4550-01	08-4550-01	08-4550-04	08-4550-04	08-4550-04
18	Piston, Inner	2	08-3700-01	08-3700-01	08-3700-01	08-3700-01	08-3700-01	08-3700-01	08-3700-01	08-3700-01	08-3700-01	08-3700-01	08-3700-03
19	Air Chamber, Counter Sunk	2	08-3650-01	08-3650-01	08-3650-01	08-3650-01	08-3650-01	08-3650-01	08-3650-01	08-3650-01	08-3650-01	08-3650-06	08-3650-03
20	Air Chamber Screw ⅜"-16 x 3¾"	3	08-6200-08	08-6200-08	08-6200-08	08-6200-08	08-6200-08	08-6200-08	08-6200-08	08-6200-08	08-6200-08	08-6200-08	08-6200-03
21	Air Chamber Cone Nut ⅜"-16	3	08-6550-08	08-6550-08	08-6550-08	08-6550-08	08-6550-08	08-6550-08	08-6550-08	08-6550-08	08-6550-08	08-6550-08	08-6550-03
22	Water Chamber	2	08-5000-01	08-5000-01	08-5000-01	08-5000-01	08-5000-01	08-5000-01	08-5000-01	08-5000-01	08-5000-04	08-5000-04	08-5000-04
23	Discharge Manifold	1	08-5020-01	08-5020-01	08-5020-01-03	08-5020-01-03	08-5020-01	08-5020-01-03	08-5020-01	08-5020-01-03	08-5020-04	08-5020-04	08-5020-04
24	Inlet Housing for Screened Base	1	08-5080-01-30	N/A	08-5080-01-33	N/A	08-5080-01-30	08-5080-01-33	N/A	N/A	N/A	N/A	N/A
25	Screen Base for Item 24	1	08-5620-01	N/A	08-5620-01	N/A	08-5620-01	08-5620-01	N/A	N/A	N/A	N/A	N/A
26	Suction Hook Up Cover for Item 24	1	08-5660-01	N/A	08-5660-01	N/A	08-5660-01	08-5660-01	N/A	N/A	N/A	N/A	N/A
27	Cap Screw for Item 24 ⅜"-16 x ¾"	1	08-6140-08	N/A	08-6140-03	N/A	08-6140-08	08-6140-03	N/A	N/A	N/A	N/A	N/A
28	Cap Screw Nut ⅜"-16	2	08-6450-08	N/A	08-6450-03	N/A	08-6450-08	08-6450-03	N/A	N/A	N/A	N/A	N/A
29	Cap Screw ⅜"-16 x 3"	2	08-6120-08	N/A	08-6120-03	N/A	08-6120-08	08-6120-03	N/A	N/A	N/A	N/A	N/A
30	Inlet Housing for Footed Base	1	N/A	08-5080-01	N/A	08-5080-01-03	N/A	N/A	08-5080-01	08-5080-01-03	08-5080-04	08-5080-04	08-5080-04
31	Diaphragm*	2	*	*	*	*	*	*	*	*	*	*	*
32	Valve Ball*	4	*	*	*	*	*	*	*	*	*	*	*
33	Valve Seat*	4	*	*	*	*	*	*	*	*	*	*	*
34	Large Clamp Band	2	08-7300-08	08-7300-08	08-7300-03	08-7300-03	08-7300-08	08-7300-03	08-7300-08	08-7300-03	08-7300-03	08-7300-03	08-7300-03
35	Large Carriage Bolt ⅜"-16 x 3"	4	08-6120-08	08-6120-08	08-6120-03	08-6120-03	08-6120-08	08-6120-03	08-6120-08	08-6120-03	08-6120-03	08-6120-03	08-6120-03
36	Large Hex Nut ⅜"-16	4	08-6450-08	08-6450-08	08-6450-03	08-6450-03	08-6450-08	08-6450-03	08-6450-08	08-6450-03	08-6450-03	08-6450-03	08-6450-03
37	Small Clamp Band	4	08-7100-08	08-7100-08	08-7100-03	08-7100-03	08-7100-08	08-7100-03	08-7100-08	08-7100-03	08-7100-03	08-7100-03	08-7100-03
38	Small Hex Head Cap Screw ¼"-18 x 1¾"	8	08-6100-08	08-6100-08	08-6100-03	08-6100-03	08-6100-08	08-6100-03	08-6100-08	08-6100-03	08-6100-03	08-6100-03	08-6100-03
39	Small Hex Nut ¼"-18	8	08-6500-08	08-6500-08	08-6400-03	08-6400-03	08-6500-08	08-6400-03	08-6500-08	08-6400-03	08-6400-03	08-6400-03	08-6400-03
40	Muffler (Optional — not shown)	1	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99

Wilden Model M8 Metal with Rubber Fitted Elastomers (cont'd.)

Model M8 Stallion Pump

Item	Part Description	Qty.	M8/ SAPB P/N	M8/ SSSB P/N	M8/ SWPB P/N	M8/ SSSS P/N	M8/ WAPB P/N	M8/ WWPB P/N	M8/ SSSN-070 P/N	M8/ AAAR-050 P/N	M8/ AAAR-050 P/N
1	Air Valve Assembly[1,2]	1	08-2000-07	08-2000-07	08-2000-07	08-2000-03	08-2000-07	08-2000-07	08-2000-06	08-2080-09-225	08-2080-07-225
2	Air Valve Screen	1	08-2500-07	08-2500-07	08-2500-07	08-2500-03	08-2500-07	08-2500-07	08-2500-03	08-2500-07	08-2500-07
3	Air Valve End Cap w/Guide (Top)	1	08-2300-23	08-2300-23	08-2300-23	08-2300-03	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23
4	Air Valve End Cap w/o Guide (Bottom)	1	08-2330-23	08-2330-23	08-2330-23	08-2330-03	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23
5	Air Valve Snap Ring	2	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03
6	Air Valve Bushing	1	08-6950-07	08-6950-07	08-6950-07	08-6950-03	08-6950-07	08-6950-07	08-6950-03	08-6950-07	08-6950-07
7	Air Valve Cap O-Ring	2	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52
8	Oil Bottle (Optional)[2]	1	08-2850-01	08-2850-01	08-2850-01	N/A	08-2850-01	08-2850-01	N/A	08-2850-01	08-2850-01
9	Plug (Optional)[2]	1	08-7000-07	08-7000-07	08-7000-07	N/A	08-7000-07	08-7000-07	N/A	08-7000-07	08-7000-07
10	Capillary Rod (Optional)[2]	1	08-2900-99	08-2900-99	08-2900-99	N/A	08-2900-99	08-2900-99	N/A	08-2900-99	08-2900-99
11	Air Valve Gasket — Buna	1	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52
12	Air Valve Screw ¼"-18 x 2½"	4	08-6000-03	08-6000-03	08-6000-03	08-6000-03	08-6000-08	08-6000-03	08-6000-03	08-6000-08	08-6000-08
13	Center Block	1	08-3100-20	08-3100-03	08-3100-20	08-3100-03	08-3100-20	08-3100-20	08-3100-03	08-3100-01-225	08-3100-01-225
14	Center Block O-Ring	7	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3210-55-225	08-3210-55-225
15	Block Gasket — Buna	2	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52
16	Shaft	1	08-3800-09	08-3800-09	08-3800-09	08-3800-09	08-3800-09	08-3800-09	08-3800-09	08-3820-09-07	08-3820-09-07
17	Piston, Outer	2	08-4550-03	08-4550-03	08-4550-03	08-4550-03	08-4550-02	08-4550-02	08-4550-03	08-4550-01	08-4560-01
18	Piston, Inner	2	08-3700-01	08-3700-03	08-3700-01	08-3700-03	08-3700-01	08-3700-01	08-3700-03	08-3700-01	04-3700-08
19	Air Chamber, Counter Sunk	2	08-3650-01	08-3650-03	08-3650-02	08-3650-03	08-3650-01	08-3650-02	08-3650-03	08-3650-01	08-3650-01
20	Air Chamber Screw ⅜"-16 x 3¾"	3	08-6200-08	08-6200-03	08-6200-08	08-6200-03	08-6200-08	08-6200-08	08-6200-03	08-6200-08	08-6200-08
21	Air Chamber Cone Nut ⅜"-16	3	08-6550-08	08-6550-03	08-6550-08	08-6550-03	08-6550-08	08-6550-08	08-6550-03	08-6550-08	08-6550-08
22	Water Chamber	2	08-5000-03	08-5000-03	08-5000-03	08-5000-03	08-5000-02	08-5000-02	08-5000-03	08-5000-01	08-5000-01
23	Discharge Manifold	1	08-5020-03	08-5020-03	08-5020-03	08-5020-03	08-5020-02	08-5020-02	08-5020-03-70	08-5020-01	08-5020-01
24	Inlet Housing for Screened Base	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	08-5080-01-30	08-5080-01-30
25	Screen Base for Item 24	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	08-5620-62	08-5620-62
26	Suction Hook Up Cover for Item 24	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	08-5660-01	08-5660-01
27	Cap Screw for Item 24 & 26 ⅜"-16 x ¾"	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	08-6140-08	08-6140-03
28	Cap Screw Nut ⅜"-16	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	08-6450-08	08-6450-03
29	Cap Screw ⅜"-16 x 3"	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	08-6120-08	08-6120-03
30	Inlet Housing for Footed Base	1	08-5080-03	08-5080-03	08-5080-03	08-5080-03	08-5080-02	08-5080-02	08-5080-03-70	—	N/A
31	Diaphragm*	2	*	*	*	*	*	*	08-1010-56	*	**
32	Valve Ball*	4	N/A	*	*	*	*	*	08-1080-56	*	**
33	Valve Seat*	4	N/A	N/A	N/A	N/A	N/A	N/A	08-1120-56	N/A	**
34	Large Clamp Band	2	08-7300-03	08-7300-03	08-7300-03	08-7300-03	08-7300-08	08-7300-03	08-7300-03-70	08-7300-08	08-7300-08S
35	Large Carriage Bolt ⅜"-16 x 3"	4	08-6120-03	08-6120-03	08-6120-03	08-6120-03	08-6120-08	08-6120-03	08-6120-03	08-6120-08	08-6120-08
36	Large Hex Nut ⅜"-16	4	08-6450-03	08-6450-03	08-6450-03	08-6450-03	08-6450-08	08-6450-03	08-6670-03-72	08-6450-08	08-6450-08
37	Small Clamp Band	4	08-7100-03	08-7100-03	08-7100-03	08-7100-03	08-7100-08	08-7100-03	08-7100-03-70	08-7100-08	08-7100-08S
38	Small Hex Head Cap Screw ¼"-18 x 1¾"[1]	8	08-6100-03	08-6100-03	08-6100-03	08-6100-03	08-6100-08	08-6100-03	08-6100-03	08-6100-08	08-6100-08
39	Small Hex Nut ¼"-18[1]	8	08-6400-08	08-6400-03	08-6400-03	08-6400-03	08-6500-08	08-6400-03	08-6660-03-72	08-6500-08	08-6500-08
40	Muffler (Optional — not shown)	1	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	N/A
41	Bumper Pad, Nylon (Not shown)	2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/R	N/R
42	Screw, HHC, ¾-18 x 2	4	N/R	N/R	N/R	N/R	N/R	N/R	N/R	08-6100-08-50	08-6100-08-50
43	Nut, Hex, ¾-18	4	N/R	N/R	N/R	N/R	N/R	N/R	N/R	04-6420-08	04-6420-08
44	Handle, Collapsible[3]	2	N/R	N/R	N/R	N/R	N/R	N/R	N/R	08-7250-08	08-7250-08
45	Bracket, Handle	4	N/R	N/R	N/R	N/R	N/R	N/R	N/R	08-7410-08	08-7410-08
46	Check Body (Not shown)	1	N/R	N/R	N/R	N/R	N/R	N/R	N/R	08-3550-01	08-3550-01
47	Check Ball (Not shown)	1	N/R	N/R	N/R	N/R	N/R	N/R	N/R	08-1450-51	08-1450-51
48	Pipe Nipple, Check Body (Not shown)	1	N/R	N/R	N/R	N/R	N/R	N/R	N/R	08-7420-08	08-7420-08
49	Spacer, Ultra-Flex (Not shown)	2	N/R	N/R	N/R	N/R	N/R	N/R	N/R	08-3860-08	08-3860-08

TRADITIONAL PIE SHAPED TPE DIAPHRAGM

ULTRA-FLEX™ FITTED DIAPHRAGM

[1]Air Valve Assembly includes parts through 08-2390-52. To order pump with oil bottle add letter D to model # (Example: M8/AAPD.)

[2]M8 Stallion pumps utilize only four (4) of P/N's 08-6100-03 and 08-6408-08 on the bottom manifold and water chambers.

[3]DO NOT hang Stallion pumps by their handles

*Refer to elastomer options at the end of section

NOTE: BSP threads available.

-003 Specialty Code = Alloy-Fitted

-030 Specialty Code = Screen Base

-033 Specialty Code = Screen Base and Alloy-Fitted

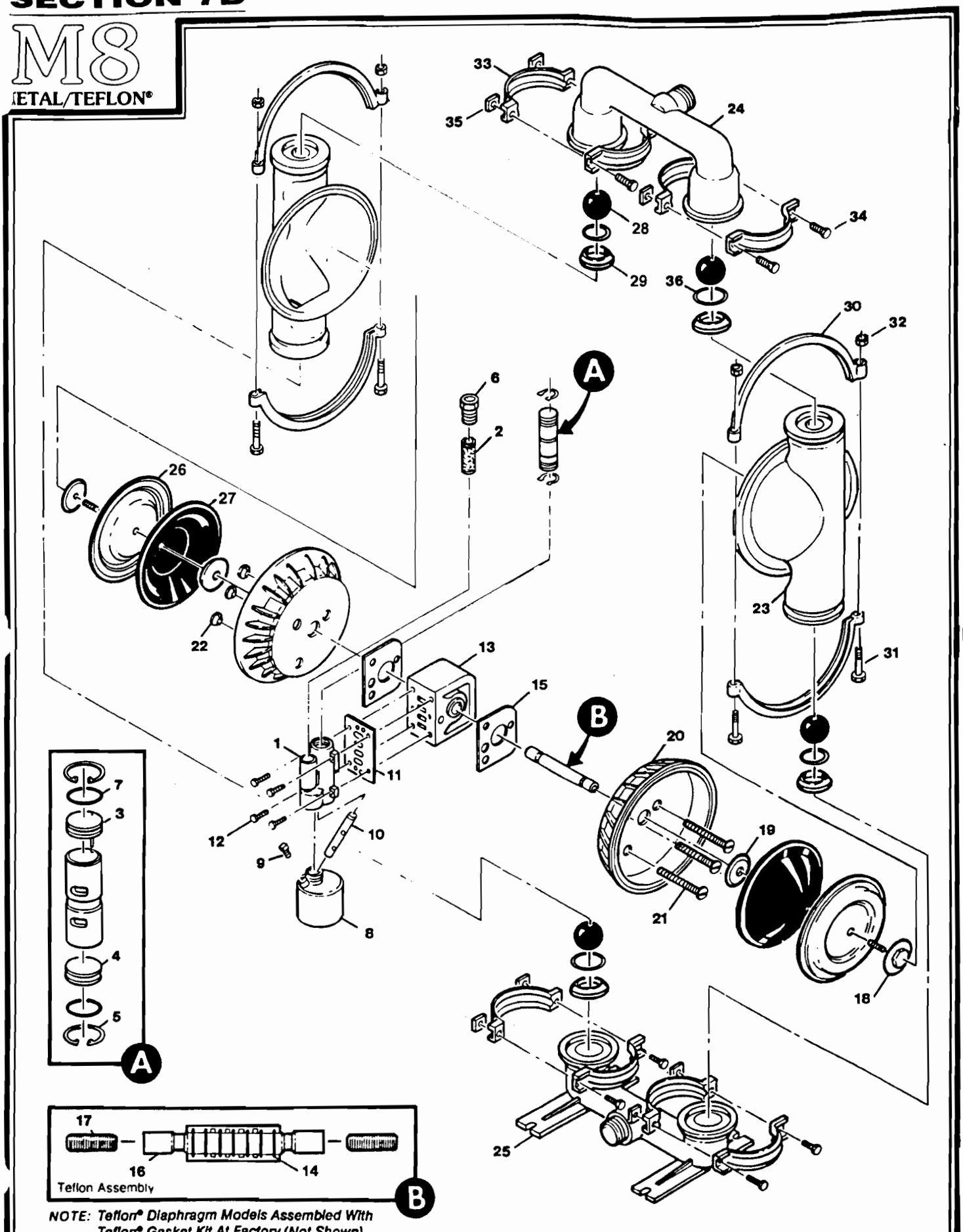
-050 Specialty Code = Stallion

-070 Specialty Code = Saniflo™

SECTION 7B

M8

ETAL/TEFLON®



NOTE: Teflon® Diaphragm Models Assembled With Teflon® Gasket Kit At Factory (Not Shown)

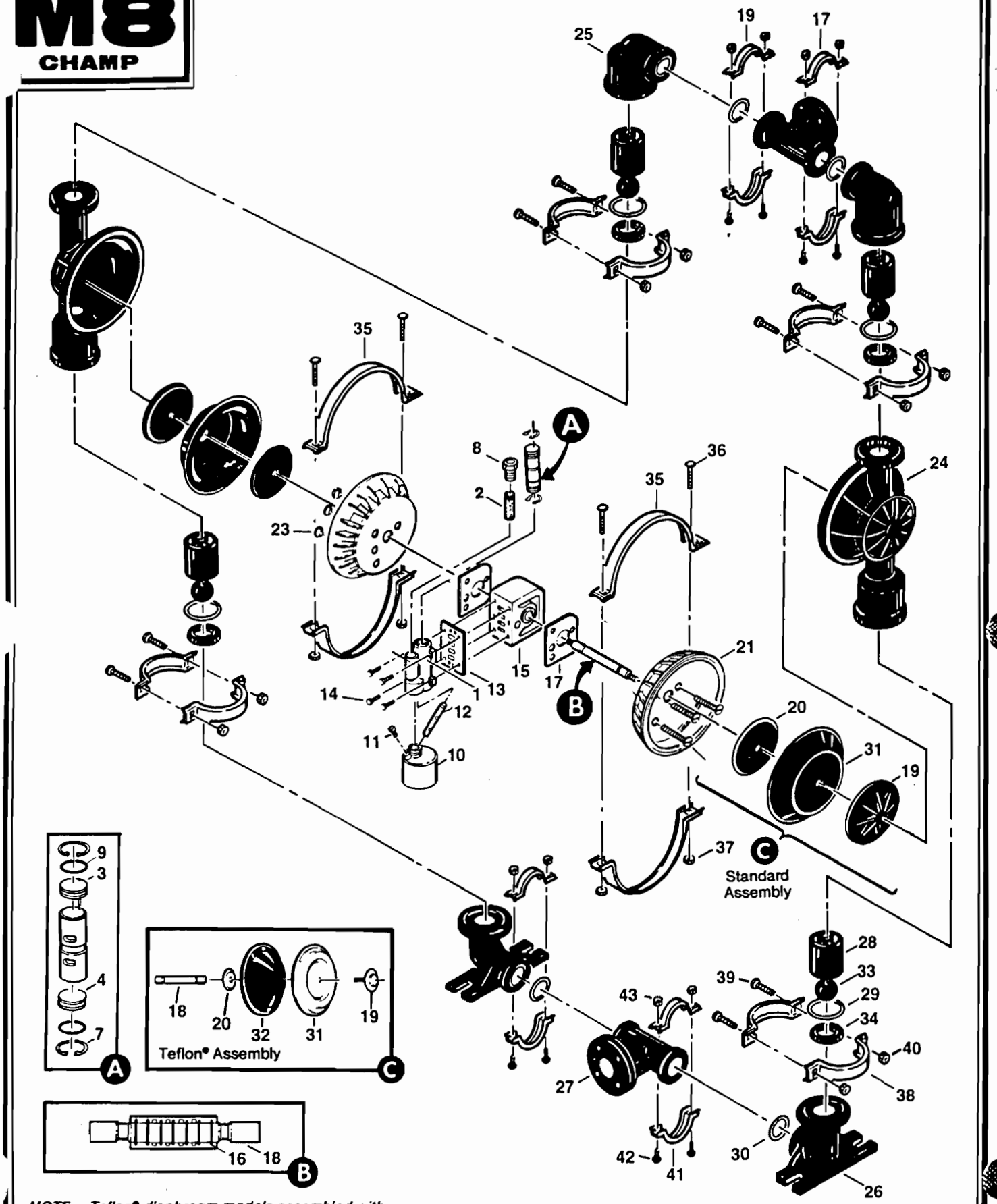
Wilden Model M8 Metal with Teflon® Elastomers

Item	Part Description	Qty.	M8/AAPB/ TF/TF/ATF P/N	M8/AAAB/ TF/TF/ATF P/N	M8/AAPB/ TF/TF/ATF-003 P/N	M8/AAAB/ TF/TF/ATF-003 P/N	M8/SAPB/ TF/TF/STF P/N	M8/SSSB/ TF/TF/STF P/N	M8/SWPB/ TF/TF/STF P/N
1	Air Valve Assembly[1]	1	08-2000-07	08-2000-07	08-2000-07	08-2000-07	08-2000-07	08-2000-07	08-2000-07
2	Air Valve Screen	1	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07
3	Air Valve End Cap w/Guide (Top)	1	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23
4	Air Valve End Cap w/o Guide (Bottom)	1	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23
5	Air Valve Snap Ring	2	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03
6	Air Valve Bushing ¾" x ⅜"	1	08-6950-07	08-6950-07	08-6950-07	08-6950-07	08-6950-07	08-6950-07	08-6950-07
7	Air Valve Cap O-Ring	2	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52
8	Oil Bottle (Optional)	1	08-2850-01	08-2850-01	08-2850-01	08-2850-01	08-2850-01	08-2850-01	08-2850-01
9	Plug (Optional)	1	08-7000-07	08-7000-07	08-7000-07	08-7000-07	08-7000-07	08-7000-07	08-7000-07
10	Capillary Rod (Optional)	1	08-2900-99	08-2900-99	08-2900-99	08-2900-99	08-2900-99	08-2900-99	08-2900-99
11	Air Valve Gasket — Buna	1	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52
12	Air Valve Screw ¾"-18 x 2½"	4	08-6000-08	08-6000-08	08-6000-03	08-6000-03	08-6000-03	08-6000-03	08-6000-03
13	Center Block	1	08-3100-20	08-3100-01	08-3100-20	08-3100-01	08-3100-20	08-3100-03	08-3100-20
14	Center Block O-Ring	7	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52
15	Block Gasket — Buna	2	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52
16	Shaft	1	08-3820-09	08-3820-09	08-3820-09	08-3820-09	08-3820-09	08-3820-09	08-3820-09
17	Shaft Stud ½"-20 x 1¼"	2	08-6150-08	08-6150-08	08-6150-08	08-6150-08	08-6150-08	08-6150-08	08-6150-08
18	Piston, Outer	2	08-4600-01	08-4600-01	08-4600-01	08-4600-01	08-4600-03	08-4600-03	08-4600-03
19	Piston, Inner	2	08-3750-01	08-3750-01	08-3750-01	08-3750-01	08-3750-01	08-3750-03	08-3750-01
20	Air Chamber, Counter Sunk	2	08-3650-01	08-3650-01	08-3650-01	08-3650-01	08-3650-01	08-3650-03	08-3650-02
21	Air Chamber Screw ½"-16 x 3¾"	3	08-6200-08	08-6200-08	08-6200-08	08-6200-08	08-6200-08	08-6200-03	08-6200-08
22	Air Chamber Nut ½"-16	3	08-6550-08	08-6550-08	08-6550-08	08-6550-08	08-6550-08	08-6550-03	08-6550-08
23	Water Chamber	2	08-5000-01	08-5000-01	08-5000-01	08-5000-01	08-5000-03	08-5000-03	08-5000-03
24	Discharge Manifold	1	08-5020-01	08-5020-01	08-5020-01-03	08-5020-01-03	08-5020-03	08-5020-03	08-5020-03
25	Inlet Housing, Footed	1	08-5080-01	08-5080-01	08-5080-01-03	08-5080-01-03	08-5080-03	08-5080-03	08-5080-03
26	Diaphragm[2]	2	08-1010-55	08-1010-55	08-1010-55	08-1010-55	08-1010-55	08-1010-55	08-1010-55
27	Diaphragm — Back-up[3]	2	08-1060-56	08-1060-56	08-1060-56	08-1060-56	08-1060-56	08-1060-56	08-1060-56
28	Valve Ball[2]	4	08-1080-55	08-1080-55	08-1080-55	08-1080-55	08-1080-55	08-1080-55	08-1080-55
29	Valve Seat[2]	4	08-1121-01	08-1121-01	08-1121-01	08-1121-01	08-1121-03	08-1121-03	08-1121-03
30	Large Clamp Band	2	08-7300-03	08-7300-03	08-7300-03	08-7300-03	08-7300-03	08-7300-03	08-7300-03
31	Large Carriage Bolt ½"-16 x 3"	4	08-6120-03	08-6120-03	08-6120-03	08-6120-03	08-6120-03	08-6120-03	08-6120-03
32	Large Hex Nut ½"-16	4	08-6450-03	08-6450-03	08-6450-03	08-6450-03	08-6450-03	08-6450-03	08-6450-03
33	Small Clamp Band	4	08-7100-03	08-7100-03	08-7100-03	08-7100-03	08-7100-03	08-7100-03	08-7100-03
34	Small Hex Head Cap Screw ¾"-18 x 1¾"	8	08-6100-03	08-6100-03	08-6100-03	08-6100-03	08-6100-03	08-6100-03	08-6100-03
35	Small Hex Nut ¾"-18	8	08-6400-03	08-6400-03	08-6400-03	08-6400-03	08-6400-03	08-6400-03	08-6400-03
36	Teflon® Valve Seat O-Ring[4]	4	08-1200-55	08-1200-55	08-1200-55	08-1200-55	08-1200-55	08-1200-55	08-1200-55
37	Muffler (Optional — not shown)	1	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99

Item	Part Description	Qty.	M8/SSSS/ TF/TF/STF P/N	M8/HAPB/ TF/TF/MTF P/N	M8/HSSB/ TF/TF/MT P/N	M8/HWPB/ TF/TF/MT P/N	M8/WAPB/ TF/TF/MTF P/N	M8/WWPB/ TF/TF/MTF P/N	M8/SSSN/ TF/TF/STF-070 P/N
1	Air Valve Assembly[1]	1	08-2000-03	08-2000-07	08-2000-07	08-2000-07	08-2000-07	08-2000-07	08-2000-06
2	Air Valve Screen	1	08-2500-03	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-03
3	Air Valve End Cap w/Guide (Top)	1	08-2300-03	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23
4	Air Valve End Cap w/o Guide (Bottom)	1	08-2330-03	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23
5	Air Valve Snap Ring	2	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03
6	Air Valve Bushing ¾" x ⅜"	1	08-6950-03	08-6950-07	08-6950-07	08-6950-07	08-6950-07	08-6950-07	08-6950-03
7	Air Valve Cap O-Ring	2	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52
8	Oil Bottle (Optional)	1	N/A	08-2850-01	08-2850-01	08-2850-01	08-2850-01	08-2850-01	N/A
9	Plug (Optional)	1	N/A	08-7000-07	08-7000-07	08-7000-07	08-7000-07	08-7000-07	N/A
10	Capillary Rod (Optional)	1	N/A	08-2900-99	08-2900-99	08-2900-99	08-2900-99	08-2900-99	N/A
11	Air Valve Gasket — Buna	1	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52
12	Air Valve Screw ¾"-18 x 2¾"	4	08-6000-03	08-6000-03	08-6000-03	08-6000-03	08-6000-03	08-6000-03	08-6000-03
13	Center Block	1	08-3100-03	08-3100-20	08-3100-03	08-3100-20	08-3100-20	08-3100-20	08-3100-03
14	Center Block O-Ring	7	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52
15	Block Gasket — Buna	2	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52
16	Shaft	1	08-3820-09	08-3820-09	08-3820-09	08-3820-09	08-3820-09	08-3820-09	08-3820-09
17	Shaft Stud ½"-20 x 1¼"	2	08-6150-08	08-6150-08	08-6150-08	08-6150-08	08-6150-08	08-6150-08	08-6150-08
18	Piston, Outer	2	08-4600-03	08-4600-04	08-4600-04	08-4600-04	08-4600-03	08-4600-03	08-4600-03
19	Piston, Inner	2	08-3750-03	08-3750-01	08-3750-03	08-3750-01	08-3750-01	08-3750-01	08-3750-03
20	Air Chamber, Counter Sunk	2	08-3650-03	08-3650-01	08-3650-03	08-3650-02	08-3650-01	08-3650-02	08-3650-03
21	Air Chamber Screw ½"-16 x 3¾"	3	08-6200-03	08-6200-08	08-6200-03	08-6200-08	08-6200-08	08-6200-08	08-6200-03
22	Air Chamber Nut ½"-16	3	08-6550-03	08-6550-08	08-6550-03	08-6550-08	08-6550-08	08-6550-08	08-6550-03
23	Water Chamber	2	08-5000-03	08-5000-04	08-5000-04	08-5000-04	08-5000-02	08-5000-02	08-5000-03
24	Discharge Manifold	1	08-5020-03	08-5020-04	08-5020-04	08-5020-04	08-5020-02	08-5020-02	08-5020-03-70
25	Inlet Housing, Footed	1	08-5080-03	08-5080-04	08-5080-04	08-5080-04	08-5080-02	08-5080-02	08-5080-03-70
26	Diaphragm[2]	2	08-1010-55	08-1010-55	08-1010-55	08-1010-55	08-1010-55	08-1010-55	08-1010-55
27	Diaphragm — Back-up[3]	2	08-1060-56	08-1060-56	08-1060-56	08-1060-56	08-1060-56	08-1060-56	08-1060-56
28	Valve Ball[2]	4	08-1080-55	08-1080-55	08-1080-55	08-1080-55	08-1080-55	08-1080-55	08-1080-55
29	Valve Seat[2]	4	08-1121-03	08-1121-04	08-1121-04	08-1121-04	08-1121-08	08-1121-08	08-1121-03
30	Large Clamp Band	2	08-7300-03	08-7300-03	08-7300-03	08-7300-03	08-7300-03	08-7300-03	08-7300-06-70
31	Large Carriage Bolt ½"-16 x 3"	4	08-6120-03	08-6120-03	08-6120-03	08-6120-03	08-6120-03	08-6120-03	08-6120-03
32	Large Hex Nut ½"-16	4	08-6450-03	08-6450-03	08-6450-03	08-6450-03	08-6450-03	08-6450-03	08-6670-03-72
33	Small Clamp Band	4	08-7100-03	08-7100-03	08-7100-03	08-7100-03	08-7100-03	08-7100-03	08-7100-03-70
34	Small Hex Head Cap Screw ¾"-18 x 1¾"	8	08-6100-03	08-6100-03	08-6100-03	08-6100-03	08-6100-03	08-6100-03	08-6100-03
35	Small Hex Nut ¾"-18	8	08-6400-03	08-6400-03	08-6400-03	08-6400-03	08-6400-03	08-6400-03	08-6660-03-72
36	Teflon® Valve Seat O-Ring[4]	4	08-1200-55	08-1200-55	08-1200-55	08-1200-55	08-1200-55	08-1200-55	08-1200-55
37	Muffler (Optional — not shown)	1	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99

[1]Air Valve Assembly includes parts through 08-2390-52. To order pump with oil bottle add letter D to model #. (Example: M8/AAPD.)
[2]Refer to corresponding elastomer options at end of section.
[3]Neoprene back-up diaphragms, P/N 08-1060-51, are available upon request. Please consult your local distributor.
[4]Fluoro-Seal™ O-rings, P/N 08-1200-34, are available upon request. See elastomer chart options at end of section.
NOTE: BSP threads available.
-003 Specialty Code = Alloy-Fitted
-070 Specialty Code = Food Processing

M8 CHAMP



NOTE: Teflon® diaphragm models assembled with Teflon® gasket kit at factory (not shown).

Wilden Model M8 Plastic Pump Parts

Item	Part Description	Qty.	W/RUBBER-FITTED ELASTOMERS				W/TEFLON®-FITTED ELASTOMERS			
			M8/ PAPB	M8/ PSSB	M8/ PWPB	M8/ PCPC-502	M8/PAPB/ TF/TF/PTS	M8/PSSB/ TF/TF/PTS	M8/PWPB/ TF/TF/PTS	M8/PCPC/ TF/TF/PTS-502
			P/N	P/N	P/N	P/N	P/N	P/N	P/N	P/N
1	Air Valve Assembly*	1	08-2000-07	08-2000-07	08-2000-07	08-2000-05	08-2000-07	08-2000-07	08-2000-07	08-2000-05
2	Air Valve Screen	1	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07
3	Air Valve End Cap w/Guide (Top)	1	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23
4	Air Valve End Cap w/o Guide (Bottom)	1	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23
5	End Cap Cover (Not shown)	2	N/R	N/R	N/R	08-2420-55	N/R	N/R	N/R	08-2420-55
6	End Cap Bolt (Not shown)	2	N/R	N/R	N/R	08-2450-22	N/R	N/R	N/R	08-2450-22
7	Air Valve Snap Ring	2	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03
8	Air Valve Bushing	1	08-6950-07	08-6950-07	08-6950-07	08-6950-05	08-6950-07	08-6950-07	08-6950-07	08-6950-05
9	Air Valve Cap O-Ring	2	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52
10	Oil Bottle (Optional)	1	08-2850-01	08-2850-01	08-2850-01	N/A	08-2850-01	08-2850-01	08-2850-01	N/A
11	Plug (optional)	1	08-7000-07	08-7000-07	08-7000-07	N/A	08-7000-07	08-7000-07	08-7000-07	N/A
12	Capillary Rod (Optional)	1	08-2900-99	08-2900-99	08-2900-99	N/A	08-2900-99	08-2900-99	08-2900-99	N/A
13	Air Valve Gasket — Buna	1	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52
14	Air Valve Screw	4	08-6000-03	08-6000-03	08-6000-03	08-6000-05	08-6000-03	08-6000-03	08-6000-03	08-6000-05
15	Center Block	1	08-3100-20	08-3100-03	08-3100-20	08-3100-20	08-3100-20	08-3100-03	08-3100-20	08-3100-20
16	Center Block O-Ring	7	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52
17	Block Gasket — Buna	2	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52
18	Shaft	1	08-3800-09	08-3800-09	08-3800-09	08-3800-09	08-3820-09	08-3820-09	08-3820-09	08-3820-09
19	Piston, Outer	2	08-4550-21-500	08-4550-21-500	08-4550-21-500	08-4550-21-500	08-4600-21-500	08-4600-21-500	08-4600-21-500	08-4600-21-500
20	Piston, Inner	2	08-3700-01	08-3700-03	08-3700-01	08-3700-01	08-3750-01	08-3750-03	08-3750-01	08-3750-01
21	Air Chamber, Counter Sunk	2	08-3650-01	08-3650-03	08-3650-02	08-3650-05	08-3650-01	08-3650-03	08-3650-02	08-3650-05
22	Air Chamber Screw - ⅜"-16 x 3¾"	3	08-6200-08	08-6200-03	08-6200-08	08-6200-03	08-6200-08	08-6200-03	08-6200-08	08-6200-03
23	Air Chamber Cone Nut ⅜"-16	3	08-6550-08	08-6550-03	08-6550-08	08-6550-03	08-6550-08	08-6550-03	08-6550-08	08-6550-03
24	Water Chamber	2	08-5000-20	08-5000-20	08-5000-20	08-5000-20	08-5000-20	08-5000-20	08-5000-20	08-5000-20
25	Discharge Elbow	2	08-5230-20	08-5230-20	08-5230-20	08-5230-20	08-5230-20	08-5230-20	08-5230-20	08-5230-20
26	Inlet Elbow	2	08-5220-20	08-5220-20	08-5220-20	08-5220-20	08-5220-20	08-5220-20	08-5220-20	08-5220-20
27	Manifold T-Section	2	08-5160-20	08-5160-20	08-5160-20	08-5160-20	08-5160-20	08-5160-20	08-5160-20	08-5160-20
28	Ball Guide Bushing	4	08-5350-20-500	08-5350-20-500	08-5350-20-500	08-5350-20-500	08-5350-20-500	08-5350-20-500	08-5350-20-500	08-5350-20-500
29	Valve Seat O-Ring*	4	•	•	•	•	08-1200-59-500	08-1200-59-500	08-1200-59-500	08-1200-59-500
30	Manifold O-Ring*	4	•	•	•	•	08-1300-59-500	08-1300-59-500	08-1300-59-500	08-1300-59-500
31	Diaphragm*	2	•	•	•	•	08-1010-55	08-1010-55	08-1010-55	08-1010-55
32	Diaphragm, Backup	2	N/A	N/A	N/A	N/A	08-1060-56	08-1060-56	08-1060-56	08-1060-56
33	Valve Ball*	4	•	•	•	•	08-1080-55	08-1080-55	08-1080-55	08-1080-55
34	Valve Seat	4	08-1120-20-500	08-1120-20-500	08-1120-20-500	08-1120-20-500	08-1120-20-500	08-1120-20-500	08-1120-20-500	08-1120-20-500
35	Large Clamp Band	2	08-7300-03-500	08-7300-03-500	08-7300-03-500	08-7300-05-500	08-7300-03-500	08-7300-03-500	08-7300-03-500	08-7300-05-500
36	Large Carriage Bolt ⅜"-16 x 2½"	4	08-6070-03-500	08-6070-03-500	08-6070-03-500	08-6070-05-500	08-6070-03-500	08-6070-03-500	08-6070-03-500	08-6070-05-500
37	Large Hex Nut ⅜"-16	4	08-6450-03	08-6450-03	08-6450-03	08-6420-05	08-6450-03	08-6450-03	08-6450-03	08-6420-05
38	Medium Clamp Band	4	08-7200-03-500	08-7200-03-500	08-7200-03-500	08-7200-05-500	08-7200-03-500	08-7200-03-500	08-7200-03-500	08-7200-05-500
39	Medium Carriage Bolt ¼"-18 x 2½"	8	04-6070-03	04-6070-03	04-6070-03	04-6070-05	04-6070-03	04-6070-03	04-6070-03	04-6070-05
40	Medium Hex Nut ¼"-18	8	08-6400-03	08-6400-03	08-6400-03	08-6400-05	08-6400-03	08-6400-03	08-6400-03	08-6400-05
41	Small Clamp Band	4	08-7100-03-500	08-7100-03-500	08-7100-03-500	08-7100-05-500	08-7100-03-500	08-7100-03-500	08-7100-03-500	08-7100-05-500
42	Small Hex Head Cap Screw ¼"-18 x 1½"	8	08-6050-03-500	08-6050-03-500	08-6050-03-500	08-6050-05-500	08-6050-03-500	08-6050-03-500	08-6050-03-500	08-6050-05-500
43	Small Square Nut	8	08-6400-03	08-6400-03	08-6400-03	08-6400-05	08-6400-03	08-6400-03	08-6400-03	08-6400-05
44	Muffler (Optional — not shown)	1	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99

Item	Part Description	Qty.	W/RUBBER-FITTED ELASTOMERS				W/TEFLON®-FITTED ELASTOMERS			
			M8/ KAPB	M8/ KSSB	M8/ KWPB	M8/ KCPC-502	M8/KAPB/ TF/TF/KTV	M8/KSSB/ TF/TF/KTV	M8/KWPB/ TF/TF/KTV	M8/KCPC/ TF/TF/KTV-502
			P/N	P/N	P/N	P/N	P/N	P/N	P/N	P/N
1	Air Valve Assembly*	1	08-2000-07	08-2000-07	08-2000-07	08-2000-05	08-2000-07	08-2000-07	08-2000-07	08-2000-05
2	Air Valve Screen	1	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07	08-2500-07
3	Air Valve End Cap w/Guide (Top)	1	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23	08-2300-23
4	Air Valve End Cap w/o Guide (Bottom)	1	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23	08-2330-23
5	End Cap Cover (Not shown)	2	N/R	N/R	N/R	08-2420-55	N/R	N/R	N/R	08-2420-55
6	End Cap Bolt (Not shown)	2	N/R	N/R	N/R	08-2450-22	N/R	N/R	N/R	08-2450-22
7	Air Valve Snap Ring	2	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03	08-2650-03
8	Air Valve Bushing	1	08-6950-07	08-6950-07	08-6950-07	08-6950-05	08-6950-07	08-6950-07	08-6950-07	08-6950-05
9	Air Valve Cap O-Ring	2	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52	08-2390-52
10	Oil Bottle (Optional)	1	08-2850-01	08-2850-01	08-2850-01	N/A	08-2850-01	08-2850-01	08-2850-01	N/A
11	Plug (Optional)	1	08-7000-07	08-7000-07	08-7000-07	N/A	08-7000-07	08-7000-07	08-7000-07	N/A
12	Capillary Rod (Optional)	1	08-2900-99	08-2900-99	08-2900-99	N/A	08-2900-99	08-2900-99	08-2900-99	N/A
13	Air Valve Gasket — Buna	1	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52	08-2600-52
14	Air Valve Screw	4	08-6000-03	08-6000-03	08-6000-03	08-6000-05	08-6000-03	08-6000-03	08-6000-03	08-6000-05
15	Center Block	1	08-3100-20	08-3100-03	08-3100-20	08-3100-20	08-3100-20	08-3100-03	08-3100-20	08-3100-20
16	Center Block O-Ring	7	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52	08-3200-52
17	Block Gasket — Buna	2	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52	08-3520-52
18	Shaft	1	08-3800-09	08-3800-09	08-3820-09	08-3800-09	08-3820-09	08-3820-09	08-3820-09	08-3820-09
19	Piston, Outer	2	08-4550-21-500	08-4550-21-500	08-4550-21-500	08-4550-21-500	08-4600-21-500	08-4600-21-500	08-4600-21-500	08-4600-21-500
20	Piston, Inner	2	08-3700-01	08-3700-03	08-3700-01	08-3700-01	08-3750-01	08-3750-03	08-3750-01	08-3750-01
21	Air Chamber, Counter Sunk	2	08-3650-01	08-3650-03	08-3650-02	08-3650-05	08-3650-01	08-3650-03	08-3650-02	08-3650-05
22	Air Chamber Screw ⅜"-16 x 3¾"	3	08-6200-08	08-6200-03	08-6200-08	08-6200-03	08-6200-08	08-6200-03	08-6200-08	08-6200-03
23	Air Chamber Cone Nut ⅜"-16	3	08-6550-08	08-6550-03	08-6550-08	08-6550-03	08-6550-08	08-6550-03	08-6550-08	08-6550-03
24	Water Chamber	2	08-5000-21	08-5000-21	08-5000-21	08-5000-21	08-5000-21	08-5000-21	08-5000-21	08-5000-21
25	Discharge Elbow	2	08-5230-21	08-5230-21	08-5230-21	08-5230-21	08-5230-21	08-5230-21	08-5230-21	08-5230-21
26	Inlet Elbow	2	08-5220-21	08-5220-21	08-5220-21	08-5220-21	08-5220-21	08-5220-21	08-5220-21	08-5220-21
27	Manifold T-Section	2	08-5160-21	08-5160-21	08-5160-21	08-5160-21	08-5160-21	08-5160-21	08-5160-21	08-5160-21
28	Ball Guide Bushing	4	08-5350-21-500	08-5350-21-500	08-5350-21-500	08-5350-21-500	08-5350-21-500	08-5350-21-500	08-5350-21-500	08-5350-21-500
29	Valve Seat O-Ring*	4	•	•	•	•	08-1200-60-500	08-1200-60-500	08-1200-60-500	08-1200-60-500
30	Manifold O-Ring*	4	•	•	•	•	08-1300-60-500	08-1300-60-500	08-1300-60-500	08-1300-60-500
31	Diaphragm*	2	•	•	•	•	08-1010-55	08-1010-55	08-1010-55	08-1010-55
32	Diaphragm, Backup	2	N/A	N/A	N/A	N/A	08-1060-56	08-1060-56	08-1060-56	08-1060-56
33	Valve Ball*	4	•	•	•	•	08-1080-55	08-1080-55	08-1080-55	08-1080-55
34	Valve Seat*	4	08-1120-21-500	08-1120-21-500	08-1120-21-500	08-1120-21-500	08-1120-21-500	08-1120-21-500	08-1120-21-500	08-1120-21-500
35	Large Clamp Band	2	08-7300-03-500	08-7300-03-500	08-7300-03-500	08-7300-05-500	08-7300-03-500	08-7300-03-500	08-7300-03-500	08-7300-05-500
36	Large Carriage Bolt ⅜"-16 x 2½"	4	08-6070-03-500	08-6070-03-500	08-6070-03-500	08-6070-05-500	08-6070-03-500	08-6070-03-500	08-6070-03-500	08-6070-05-500
37	Large Hex Nut ⅜"-16	4	08-6450-03	08-6450-03	08-6450-03	08-6420-05	08-6450-03	08-6450-03	08-6450-03	08-6420-05
38	Medium Clamp Band	4	08-7200-03-500	08-7200-03-500	08-7200-03-500	08-7200-05-500	08-7200-03-500	08-7200-03-500	08-7200-03-500	08-7200-05-500
39	Medium Carriage Bolt ¼"-18 x 2½"	8	04-6070-03	04-6070-03	04-6070-03	04-6070-05	04-6070-03	04-6070-03	04-6070-03	04-6070-05
40	Medium Hex Nut ¼"-18	8	08-6400-03	08-6400-03	08-6400-03	08-6400-05	08-6400-03	08-6400-03	08-6400-03	08-6400-05
41	Small Clamp Band	4	08-7100-03-500	08-7100-03-500	08-7100-03-500	08-7100-05-500	08-7100-03-500	08-7100-03-500	08-7100-03-500	08-7100-05-500
42	Small Hex Head Cap Screw ¼"-18 x 1½"	8	08-6050-03-500	08-6050-03-500	08-6050-03-500	08-6050-05-500	08-6050-03-500	08-6050-03-500	08-6050-03-500	08-6050-05-500
43	Small Square Nut ¼"-18	8	08-6400-03	08-6400-03	08-6400-03	08-6400-05	08-6400-03	08-6400-03	08-6400-03	08-6400-05
44	Muffler (optional — not shown)	1	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99	08-3510-99

*Refer to corresponding elastomer chart at end of section.

-502 Specialty Code = Teflon®-Coated Hardware

SECTION 8

ELASTOMER OPTIONS & TORQUE SPECIFICATIONS

Elastomers for M8 Metal Pumps

MATERIAL	DIAPHRAGMS	VALVE BALLS (4)	VALVE SEATS (4)	VALVE SEAT O-RING (4)
Polyurethane	08-1010-50	08-1080-50	08-1120-50	N/A
Neoprene	08-1010-51	08-1080-51	08-1120-51	N/A
Buna-N	08-1010-52	08-1080-52	08-1120-52	N/A
Nordel	08-1010-54	08-1080-54	08-1120-54	N/A
Viton	08-1010-53	08-1080-53	08-1120-53	N/A
Saniflex™	08-1010-56	08-1080-56	08-1120-56	08-1200-56[2]
Teflon® PTFE	08-1010-55	08-1080-55	N/A	08-1200-55[2]
Saniflex™ Back-up[2]	08-1060-56[1]	N/A	N/A	N/A
Wil-Flex™	08-1010-58	08-1080-58	08-1120-58	N/A
Fluoro-Seal™	N/A	N/A	N/A	08-1200-34[2]
Aluminum	N/A	N/A	08-1121-01	N/A
Stainless Steel	N/A	N/A	08-1121-03	N/A
Hastelloy	N/A	N/A	08-1121-04	N/A
Mild Steel	N/A	N/A	08-1121-08	N/A

[1]Use Saniflex™ back-up diaphragms with Teflon® diaphragms only.
[2]Utilized in conjunction with metallic seat.
NOTE: Neoprene back-up diaphragms, P/N 08-1060-51, are available upon request. Please consult your local distributor.

Elastomers for M8 Stallion

MATERIAL	DIAPHRAGMS	VALVE BALLS (4)	VALVE SEATS (4)
Polyurethane	08-1010-50	08-1080-62-50	08-1120-62-50
Wil-Flex™	08-1010-58	08-1080-58-50	08-1120-58-50
Saniflex™	08-1010-56	08-1080-56-50	08-1120-56-50
Neoprene	08-1020-51	08-1080-51-50	08-1120-51-50
Buna	08-1020-52	08-1080-52-50	08-1120-52-50
Viton	08-1020-53	08-1080-53-50	08-1120-53-50
Nordel (EPDM)	08-1020-54	08-1080-54-50	08-1120-54-50

Elastomers for M8 Champ Pumps (Plastic)

MATERIAL	DIAPHRAGM (2)	VALVE SEAT O-RING (4)	MANIFOLD O-RING (4)	VALVE BALL (4)
Polyurethane	08-1010-50	08-1200-50-500	08-1300-50-500	08-1080-50
Neoprene	08-1010-51	N/A	N/A	08-1080-51
Buna-N	08-1010-52	08-1200-52-500	08-1300-52-500	08-1080-52
Nordel	08-1010-54	N/A	N/A	08-1080-54
Viton	08-1010-53	N/A	N/A	08-1080-53
Saniflex™	08-1010-56	N/A	N/A	08-1080-56
Teflon® PTFE	08-1010-55[3]	N/A	N/A	08-1080-55
Saniflex™ Back-up	08-1060-56	N/A	N/A	N/A
Wil-Flex™	08-1010-58	N/A	N/A	08-1080-58
Teflon®-Encapsulated Silicone	N/A	08-1200-59-500[1]	08-1300-59-500[1]	N/A
Teflon®-Encapsulated Viton	N/A	08-1200-60-500[2]	08-1300-60-500[2]	N/A

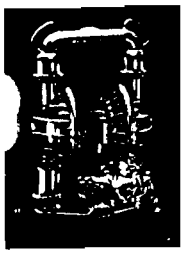
NOTES
[1]Teflon®-encapsulated silicone O-rings, 08-1200-59-500 and 08-1300-59-500, are standard on all Teflon®-fitted polypropylene pumps.
[2]Teflon®-encapsulated Viton O-rings, 08-1200-60-500 and 08-1300-60-500, are standard on all Teflon®-fitted PVDF pumps.
[3]Teflon® diaphragm, 08-1010-55, must be used with Saniflex™ back-up diaphragms, P/N 08-1060-56.
NOTE: Neoprene back-up diaphragm, P/N 08-1060-51, is available upon request. Please consult your local distributor.

Torque Specifications for M8 Pumps

ITEM #	DESCRIPTION OF PART	MAXIMUM TORQUE	
		METAL PUMPS	PLASTIC PUMPS
1	Air Valve	85 in.-lbs. [9.6 m-N]	60 in.-lbs. [6.8 m-N]
2	Outer Piston (Teflon-Fitted)	78 ft.-lbs. [105.8 m-N]	58 ft.-lbs. [78.6 m-N]
3	Outer Piston (Rubber-Fitted)	78 ft.-lbs. [105.8 m-N]	58 ft.-lbs. [78.6 m-N]
4	Small Clamp Band (Teflon-Fitted)	58 in.-lbs. [6.6 m-N]	55 in.-lbs. [6.2 m-N]
5	Small Clamp Band (Rubber-Fitted)	25 in.-lbs. [2.8 m-N]	55 in.-lbs. [6.2 m-N]
6	Medium Clamp Band	—	90 in.-lbs. [10.2 m-N]
7	Large Clamp Band (All)	35 ft.-lbs. [47.4 m-N]	28 ft.-lbs. [40.0 m-N]
8	Center Block Assembly	23 ft.-lbs. [31.1 m-N]	23 ft.-lbs. [31.2 m-N]
9	Polyurethane Screen Base	20 in.-lbs. [2.3 m-N]	—
10	Metal Screen Base	80 in.-lbs. [9.0 m-N]	—
11	Inlet Cover	80 in.-lbs. [9.0 m-N]	—
12	Stallion Handle	15 ft.-lbs. [20.4 m-N]	—

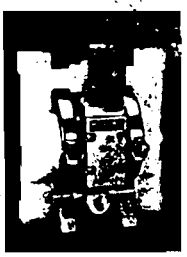
WILDEN'S SPECIALTY PUMPS

M8 STALLION



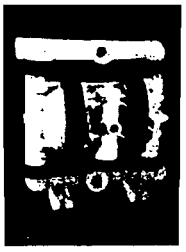
2" inlet. Solids clearance up to ¾". Built to handle rough treatment: cast-in handles for easy portability, reinforced shaft and high impact polyurethane base.

SOLENOID-OPERATED



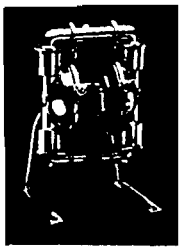
Each stroke of this pump is controlled by electrical impulses making it ideal for batching, metering, and other electrically controlled dispensing applications.

M1 ULTRAPURE III



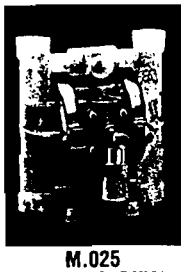
½" inlet. Teflon® PFA construction, temperatures to 300°F. Up to 14 GPM. Materials of construction have been selected to reduce contamination while providing a safer work environment.

SANIFLO



Constructed with FDA approved materials: bead blasted 316 Stainless Steel construction with tri-clamp porting and wing-nut fasteners. Foodmaster™ (pictured) is USDA accepted.

THE WILDEN PUMP LINE



M.025 (CHAMP SERIES)

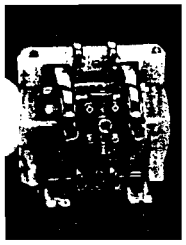
MODEL M.025

- ¼" Inlet
- Up To 4.5 GPM
- 125 Max. PSIG
- Max. Particle Size: ¼"

Materials of Construction:
PVDF, Acetal, Polypropylene, Carbon-filled Acetal

Suction Lift:		
(Rubber)	Dry:	4.5'
	Wet:	25'
(Teflon®)	Dry:	4.5'
	Wet:	25'

LUBE-FREE AVAILABLE



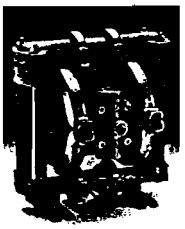
M1 PLASTIC (CHAMP SERIES)

MODEL M1

- ½" Inlet
- Up To 14 GPM
- 110 Max. PSIG
- Max. Particle Size: ⅛"

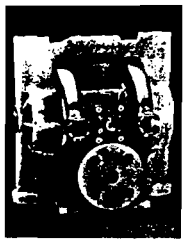
Materials of Construction:
Polypropylene, PVDF, Teflon®, Graphite-filled Polypropylene, Aluminum, Stainless Steel

Suction Lift:	Plastic	Metal
(Rubber)	Dry: 10'	10'
	Wet: 25'	25'
(Teflon®)	Dry: 7'	8'
	Wet: 25'	25'



M1 METAL

LUBE-FREE AVAILABLE



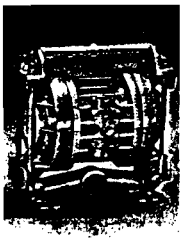
M2R PLASTIC (CHAMP SERIES)

MODEL M2

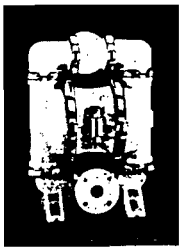
- 1" Inlet
- Up To 37 GPM
- 125 Max. PSIG
- Max. Particle Size: ¼"

Materials of Construction:
Aluminum, Stainless Steel, Hastelloy, Polypropylene, PVDF

Suction Lift:	Plastic	Metal
(Rubber)	Dry: 17'	19'
	Wet: 25'	25'
(Teflon®)	Dry: 7'	8'
	Wet: 25'	25'



M2 METAL



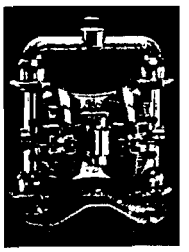
M4 PLASTIC (CHAMP SERIES)

MODEL M4

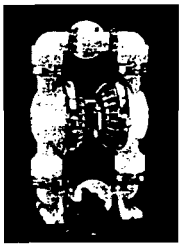
- 1½" Inlet
- Up To 73 GPM
- 125 Max. PSIG
- Max. Particle Size: ⅜"

Materials of Construction:
Aluminum, Cast Iron, Stainless Steel, Hastelloy, Polypropylene, PVDF, Teflon® PFA

Suction Lift:	Plastic	Metal
(Rubber)	Dry: 17'	21'
	Wet: 25'	25'
(Teflon®)	Dry: 7'	7'
	Wet: 25'	25'



M4 METAL



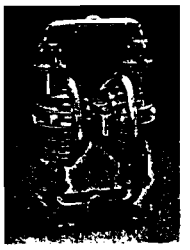
M8 PLASTIC (CHAMP SERIES)

MODEL M8

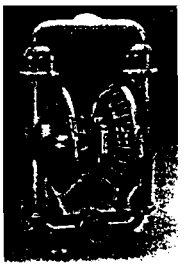
- 2" Inlet
- Up To 155 GPM
- 125 Max. PSIG
- Max. Particle Size: ¼"

Materials of Construction:
Aluminum, Cast Iron, Stainless Steel, Hastelloy, PVDF, Polypropylene

Suction Lift:	Plastic	Metal
(Rubber)	Dry: 17'	20'
	Wet: 25'	25'
(Teflon®)	Dry: 8'	8'
	Wet: 25'	25'



M8 METAL



M15

MODEL M15

- 3" Inlet
- Up To 230 GPM
- 125 Max. PSIG
- Max. Particle Size: ½"

Materials of Construction:
Aluminum, Cast Iron, Stainless Steel, Hastelloy

Suction Lift:		
(Rubber)	Dry:	17'
	Wet:	25'
(Teflon®)	Dry:	14'
	Wet:	25'

M20

MODEL M20

- 4" Inlet
- Up To 304 GPM
- 125 Max. PSIG
- Max. Particle Size: 1⅜"

Materials of Construction:
Cast Iron

Suction Lift:	
Dry:	13'
Wet:	25'

For further information contact your local Wilden distributor:

WILDEN PUMP & ENGINEERING COMPANY
22069 Van Buren St., Grand Terrace, CA 92313-5651
Telephone (909) 422-1730 • Fax (909) 783-3440
Internet http://www.wildenpump.com

WILKERSON CORPORATION

INSTALLATION AND MAINTENANCE SHEET

Regulator Model B18 and B28, B28A

⚠ WARNING ⚠

EXCEPT as otherwise specified by the manufacturer, this product is specifically designed for compressed air service, and use with any other fluid (liquid or gas) is a misapplication. For example, use with or injection of certain hazardous liquids or gases in the system (such as alcohol or liquid petroleum gas) could be harmful to the unit or result in a combustible condition or hazardous external leakage. Manufacturer's warranties are void in the event of misapplication, and manufacturer assumes no responsibility for any resulting loss. Before using with fluids other than compressed air, or for nonindustrial applications, or for life support systems consult manufacturer for written approval.

ATTENTION: Make sure bowl is fully inserted into body, and then fully turned to lock bowl in place before applying air pressure to unit. When bowl is properly installed, the alignment markings on the bowl/bowlguard assembly and the marks on the body will line up, indicating proper assembly. Failure to do so may cause air pressure to blow bowl off of unit, resulting in serious personal injury or death.

INSTALLATION

1. Refer to WARNING prior to installation.
2. Install as close to the point of use as possible.
3. Unit must be installed with the flow in the direction of the flow arrow on the body cover and with bowl down.
4. Avoid using reducing bushings, couplings, etc., whenever possible to install this product. These devices restrict air flow and can affect performance.
5. Install filter/regulator in a vertical position with bowl side down.
6. Maximum inlet pressure and temperatures are as follows:
   - —Plastic bowl/bowl guard assembly:
     - —150 psig (10,3 bar)
     - —125°F (51,7°C)
   - —Metal bowl with sight gauge:
     - —250 psig (17,2 bar)
     - —175°F (79,4°C)
7. This product is supplied with two auxiliary ports located on the front and rear faces of the body. These ports may be used as additional filtered/regulated ports or for pressure gauges. A pipe plug is supplied to block the unused port. Make sure pipe plug is sealed before installation.
8. To increase regulated pressure, pull adjusting knob up and turn clockwise. To reduce pressure, turn knob counterclockwise. To lock knob, push down.
9. To panel mount this unit the following applies:
   - —Model B18: Panel clearance hole diameter = 1.94" (49,3 mm).
   - —Model B18: Panel thickness 3/16" (4,8 mm) Max.
   - —Model B28: Panel clearance hole diameter = 2.44" (61,9 mm).
   - —Model B28: Panel thickness 3/16" (4,8 mm) to drain stem.
10. To install a drain line, use the following procedure:
    - —On units with the MANUAL DRAIN, attach flexible tubing having an I.D. of 3/16" (4,8 mm) to drain stem.
    - —On units with the AUTOMATIC FLOAT DRAIN, install using a 1/8 NPT fitting and flexible tubing.

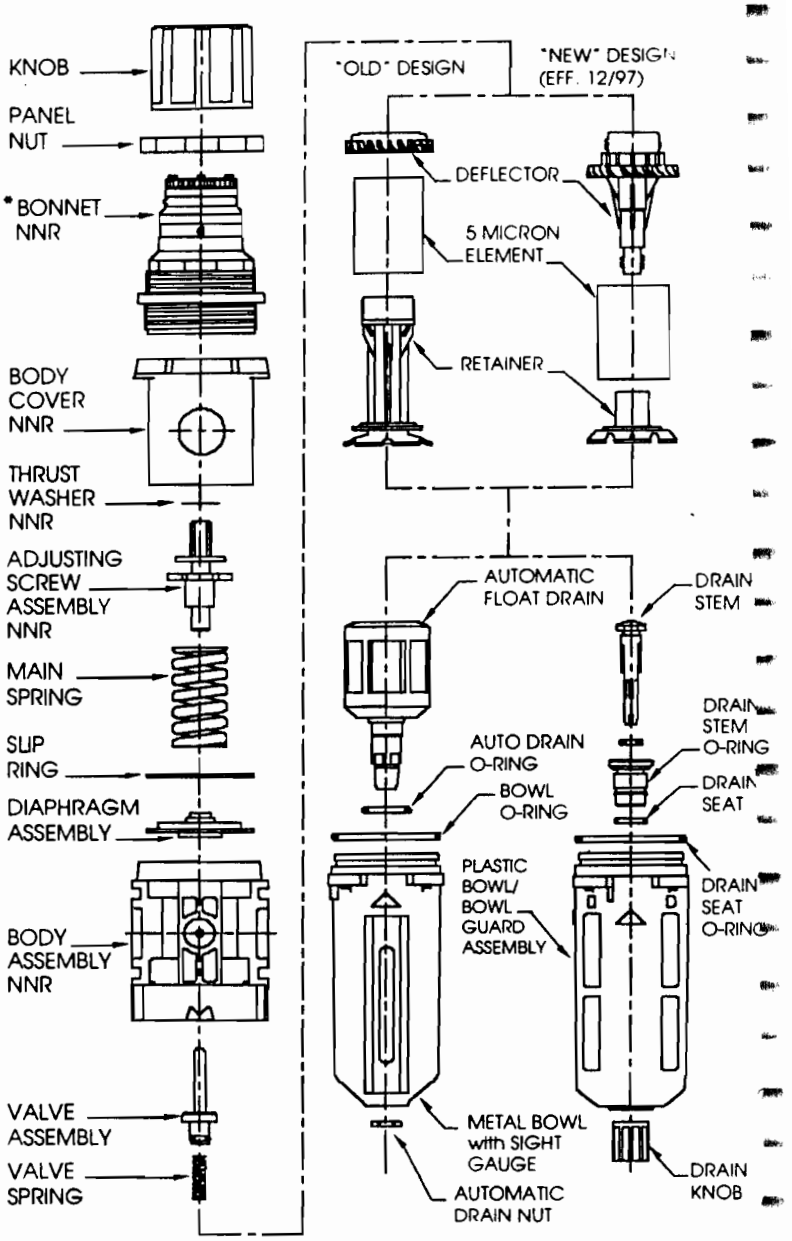
MAINTENANCE

⚠ **DEPRESSURIZE SYSTEM BEFORE ATTEMPTING SERVICE!**

THIS UNIT MAY BE SERVICED WITHOUT REMOVING THE UNIT FROM THE COMPRESSED AIR LINE. UNIT SHOULD BE SERVICED AT LEAST EVERY SIX MONTHS.

NOTE: The B28 and B28A (series A) have different internal parts and require the use of different repair kits. The B28A is current design and production began in December 1997. For identification purposes, the Bonnet of the B28 has "28A" permanently marked in two places on the shoulder above the panel nut threads. Also, internally the body has raised characters "28A." Once the diaphragm is removed, this can be seen. Parts from B28 and B28A units are NOT interchangeable. You can NOT use B28 unit parts in B28A units; nor can you use B28A parts in B28 units. When repairing the B28 and the B28A units, make your identification by looking for the identifying "28A" mark on the bonnet, and then select the repair part numbers accordingly from the parts listed on the back of this sheet. If you are unsure of which regulator you have, contact your local Wilkerson distributor or call Wilkerson.

1. Filter element replacement:
   a. DEPRESSURIZE both upstream and downstream pressure.
   b. Remove bowl/bowl guard assembly by pushing up on bowl assembly and turning counter-clockwise (viewed from below). Clean inside of bowl using a clean, dry cloth. Inspect plastic bowl for damage and replace if necessary.
   c. Remove filter element by turning retainer counter-clockwise.
   d. Remove old element and discard. On series B28, care must be taken at this step not to lose or misplace the valve spring and valve assembly, as these components may be removed during this procedure.
   e. Install a new filter element and reassemble in reverse order. See table on reverse side for torque values.
2. Valve assembly:
   a. Depressurize both upstream and downstream pressure.
   b. Remove bowl/bowl guard assembly and element retainer assembly as outlined in maintenance Step #1. Additionally, the 28A deflector needs to be removed. Care must be taken at this step not to lose or misplace the valve spring and valve assembly, as these components may be removed during this procedure.



MAINTENANCE (cont.)

   c. Remove the valve spring and valve assembly, if not already done.
   d. Inspect all seals and components for damage and replace as required. Clean seals and components with mild detergent and water (No Solvents!). Use a clean, dry cloth to wipe any contamination from the valve seat inside the body.
   e. Lubricate valve stem and lower valve o-ring seal with a light coat of Parker O-Lube™ lubricant, or equivalent.
   f. Reassemble in reverse order. See table on reverse side for torque values.
3. ⚠ Main Spring and Diaphragm:
   a. Depressurize unit, both upstream and downstream.
   b. Turn adjusting knob counterclockwise to remove all spring force, then remove bonnet by turning counter-clockwise.
   c. Remove adjusting screw assembly, main spring, slip ring and diaphragm assembly.

* 28A PERMANENTLY MARKED ON 28A BONNET

NNR = Not Normally Replaced

(Repair Kits and Replacement Parts see reverse side.)

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Printed in U.S.A.

MAINTENANC

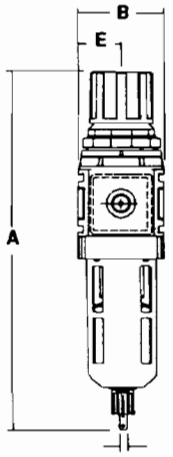
d. Inspect diaphragm and the relief seat, on relieving models, for damage or contamination. Replace diaphragm assembly if necessary. Clean relief seat with a soft, dry cloth. Reassemble in the reverse order making sure slip ring is properly positioned on top of the diaphragm. Bonnet torque values are shown in the table below.

4. Liquid level in the bowl must be kept below the level indicator line as marked. It is recommended practice to drain a unit equipped with the manual drain at least once during an eight (8) hour period. To do so, rotate the drain knob to the left one or two turns.*
5. To clean the AUTOMATIC FLOAT DRAIN, remove the drain nut and drain. DO NOT DISASSEMBLE THIS DRAIN! Clean the drain in warm soapy water and blow dry with compressed air. (NO SOLVENTS!)
6. Before returning unit to service, insure that all seals have been properly reinstalled or replaced and components requiring torque have been properly tightened. Also, insure that bowl seal o-ring and bowl have been installed properly and that the bowl is in the locked position and the drain is properly secured.

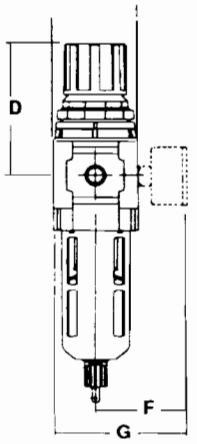
TROUBLE-SHOOTING LEAKS

1. If regulated pressure begins to creep, an uncontrolled rise in regulated pressure, it will most likely be caused by contamination on the valve seat. Refer to Maintenance Step #2, Valve Assembly to remedy the condition.
2. If the unit leaks from the vent holes in the bonnet, it may be caused by contamination on the diaphragm relief seat, seal deterioration of relief seat or diaphragm damage. Refer to Steps #2 and #3 under maintenance to remedy the condition. Replace all damaged or worn components.

***NOTE: In the event the drain knob is over-rotated, it may become disengaged from the drain stem. In such a case, pull down on both the knob and the stem while rotating clockwise to re-engage. (viewed from below.)**



FRONT VIEW



SIDE VIEW

DIMENSIONS

INCHES
(millimeters)

Models	Torque Specifications: Retainer	Deflector	Bonnet	A	B	C	D	E	F	G
B18	**9-11 in. - lbs.** (1,0-1,2 N-m)	**19-21 in. lbs.** (2,1-2,4 N-m)	**23-25 ft. - lbs.** (31,2-33,9 N-m)	**10.0** (254)	**2.36** (60)	**2.26** (60)	**3.66** (93)	**1.2** (30)	**2.57** (65)	**3.74** (95)
B28, B28A	**9-11 in. - lbs.** (1,0-1,2 N-m)	**19-21 in. lbs.** (2,1-2,4 N-m)	**23-25 ft. - lbs.** (31,2-33,9 N-m)	**11.4** (291)	**2.9** (73)	**2.9** (73)	**4.1** (149)	**1.44** (37)	**2.83** (72)	**4.27** (108)

REPAIR KITS AND REPLACEMENT PARTS

Note: Standard seal material is Nitrile.

	Tamper Resistant Kit	Aluminum Panel Nut	Plastic Panel Nut	Self-Relieving Diaphragm Kit	Nonrelieving Diaphragm Kit	Valve Assembly (Valve stem-valve spring)	Pressure Springs 0-30 PSIG (0-2,1 bar)	Pressure Springs 0-60 PSIG (0-4,1 bar)	Pressure Springs 0-125 PSIG (0-8,6 bar)	Pressure Springs 0-250 PSIG (0-17,2 bar)	Element, 5 Micron	Element, Retainer & Deflector Kit	Adjusting Knob
B18	**RRP-96-671**	**RRP-96-673**	**RRP-96-675**	**RRP-96-656**	**RRP-96-657**	**RRP-96-658**	**RRP-96-659**	**RRP-96-660**	**RRP-96-661**	**RRP-96-662**	**FRP-96-639**	**FRP-96-641**	**RRP-16-340-000**
B28	**RRP-96-672**	**RRP-96-674**	**RRP-96-676**	**RRP-96-682**	**RRP-96-683**	**RRP-96-684**	**RRP-96-614'**	**RRP-96-615'**	**RRP-96-624'**	**RRP-96-625'**	**FRP-96-653**	**FRP-96-655'**	**RRP-16-341-000**
B28A	**RRP-96-672**	**RRP-96-674**	**RRP-96-676**	**RRP-96-986**	**RRP-96-987**	**RRP-96-049**	**RRP-96-163**	**RRP-96-164**	**RRP-96-165**	**RRP-96-166**	**FRP-96-653**	**FRP-96-283**	**RRP-16-341-000**

'No longer available after December 1997. Replaced with 28A kits.

ACCESSORIES

Joiner set.....GPA-96-601
T-Bracket.....GPA-96-602
T-Bracket with Joiner set.....GPA-96-603
L-Bracket (R18).....GPA-96-606
L-Bracket (R28).....GPA-96-607
Pressure Gauges:
0-30 PSI.....RRP-96-663
0-60 PSI.....RRP-96-664
0-160 PSI.....RRP-96-665
0-300 PSI.....RRP-96-666
0-2,0 bar.....RRP-96-667
0-4,2 bar.....RRP-96-668
0-11,2 bar.....RRP-96-669
0-21 bar.....RRP-96-670

DRAINS

Manual Drain.....GRP-96-685
Automatic Mechanical Drain (Nitrile)-1/8 NPT.....GRP-95-973
Low Flow Drain (Nitrile)-1/8 NPT.....GRP-95-400
Automatic Drain (Fluorocarbon)-1/8 NPT.....GRP-95-981
Low Flow Drain (Fluorocarbon)-1/8 NPT.....GRP-96-500

Automatic Mechanical Drain (Nitrile)-1/8 BSP.....GRP-96-200
Low Flow Drain (Nitrile)-1/8 BSP.....GRP-96-600
Automatic Drain (Fluorocarbon)-1/8 BSP.....GRP-96-300
Low Flow Drain (Fluorocarbon)-1/8 BSP.....GRP-96-700

WILKERSON
CORPORATION

FICHE D'INSTALLATION ET D'ENTRETIEN

Régulateur modèles B18 et B28

⚠ AVERTISSEMENT ⚠

SAUF indication contraire du fabricant, le présent produit est spécifiquement conçu pour fonctionner à l'air comprimé et son utilisation avec tout autre fluide (liquide ou gazeux) constitue un usage abusif. Par exemple, l'utilisation du produit avec certains liquides ou gaz dangereux (tels que l'alcool ou le gaz de pétrole liquéfié) ou l'injection de tels liquides ou gaz dans le système risque d'endommager le dispositif ou de produire des conditions favorables à la combustion ou des fuites dangereuses à l'extérieur. Les garanties accordées par le fabricant sont nulles en cas d'usage abusif et le fabricant se dégage de toute responsabilité concernant toute perte susceptible d'en résulter. Avant d'utiliser le produit avec des fluides autres que air comprimé, ou pour les applications non-industrielles, ou pour les systèmes d'entretien de la vie, demander l'autorisation écrite du fabricant.

ATTENTION : S'assurer que le bol est bien inséré dans le corps et tourné à fond pour le verrouiller avant de mettre le système sous pression. Quand le bol est bien positionné, les repères portés sur l'ensemble de bol/protège-bol et sur le corps sont alignés. Une mise en place défectueuse peut provoquer une éjection du bol sous la pression de l'air, ce qui risque de causer des blessures graves ou la mort.

INSTALLATION

1. Lire l'avertissement ci-haut avant l'installation.
2. Installer le dispositif aussi près du point d'utilisation que possible.
3. Ce dispositif doit être monté de manière à ce que le débit soit orienté dans la direction de la flèche placée sur l'enveloppe du corps, le bol étant vers le bas.
4. Éviter dans toute la mesure du possible d'utiliser des bagues, raccords ou autres dispositifs de réduction pour installer ce produit. Ils diminuent le débit d'air et risquent d'affecter le fonctionnement.
5. Installer le dispositif en positon verticale avec le bol orienté vers le bas.
6. Pression d'entrée et température maximales :
   Bol/protège-bol en plastique :
   150 psig (10,3 bar)
   51,7 °C (125 °F)
   Bol en métal avec jauge visuelle :
   250 psig (17,2 bar)
   79,4 °C (175 °F)
7. Ce dispositif est doté de deux orifices auxiliaires positionnés sur les faces avant et arrière du corps. Ces orifices peuvent servir d'orifices filtrés/régulés supplémentaires ou pour y raccorder des manomètres. Boucher l'orifice non utilisé avec le bouchon de tuyau fourni. S'assurer que le bouchon est hermétiquement fermé avant d'installer le régulateur.
8. Pour augmenter la pression régulée, tirer sur le bouton de réglage et le tourner dans le sens horaire. Pour réduire la pression, tourner le bouton dans le sens antihoraire. Pour verrouiller le bouton, peser dessus.
9. Pour monter ce dispositif sur tableau, tenir compte des exigences dimensionnelles suivantes :
   Modèle B18 : Diamètre du trou dans le panneau du tableau = 49,3 mm (1,94").
   Modèle B18 : Épaisseur du panneau du tableau = 4,8 mm (3/16") maximum.
   Modèle B28 : Diamètre du trou dans le panneau du tableau = 61,9 mm (2,44").
   Modèle B28 : Épaisseur du panneau du tableau = 4,8 mm (3/16") maximum.
10. Pour mettre en place une conduite de vidange, procéder comme suit :
    a. Sur les modèles à VIDANGE MANUELLE, raccorder un tuyau flexible de 4,8 mm (3/16") de diamètre intérieur au raccord de vidange.
    b. Sur les modèles à VIDANGE AUTOMATIQUE À FLOTTEUR, utiliser un raccord NPT de 1/8" et un tuyau flexible.

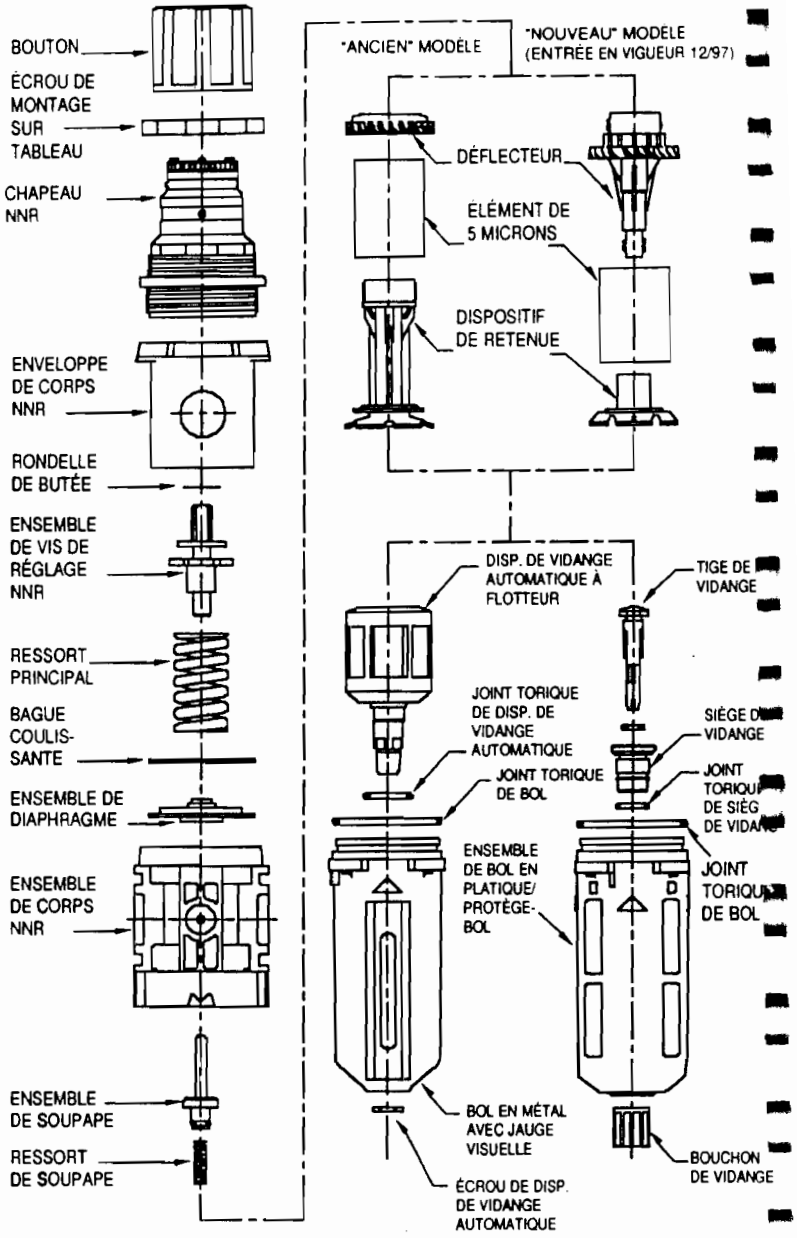
ENTRETIEN

METTRE LE SYSTÈME HORS PRESSION AVANT D'INTERVENIR !

L'ENTRETIEN DE CE DISPOSITIF PEUT S'EFFECTUER SANS LE DÉMONTER DE LA CONDUITE D'AIR COMPRIMÉ. EFFECTUER L'ENTRETIEN AU MOINS TOUS LES SIX MOIS.

NOTE : Les modèles B28 et B28A (série A) ont des pièces différentes et il faut donc utiliser pour leur réparation des trousses de réparation différentes. Le modèle B28A est de conception actuelle et sa production a commencé en décembre 1997. Pour permettre de l'identifier, le chapeau du régulateur porte la marque indélébile "28A" en deux endroits, sur l'épaulement situé au-dessus du filetage de montage. L'intérieur du chapeau porte également en relief la marque "28A". Ceci est visible une fois le diaphragme déposé. Les pièces des unités B28 et B28A NE SONT PAS interchangeables. On NE PEUT PAS utiliser les pièces des modèles B28 sur les modèles B28A, ni inversement les pièces des modèles B28A sur les modèles B28. Lors de la réparation des modèles B28 et B28A, identifier le modèle en vérifiant si le chapeau porte la marque "28A", puis choisir les numéros de pièces en conséquence, dans la liste des pièces figurant au verso de la présente fiche. Si vous n'êtes pas certain du modèle de régulateur que vous avez, adressez-vous à votre distributeur local Wilkerson ou téléphonez à la société Wilkerson.

1. Remplacement de l'élément filtrant :
   a. Mettre hors pression les côtés entrée et sortie du dispositif.
   b. Ôter l'ensemble de bol/protège-bol en poussant dessus vers le haut et en le tournant dans le sens horaire. Nettoyer l'intérieur du bol avec un chiffon sec et propre. Examiner le bol en plastique pour s'assurer qu'il n'est pas endommagé et le remplacer si nécessaire.
   c. Démonter l'ensemble d'élément filtrant en tournant le dispositif de retenue dans le sens horaire.
   d. Ôter le déflecteur et l'élément filtrant. Mettre l'élément filtrant au rebut. Faire attention de ne pas perdre le ressort de soupape et l'ensemble de soupape qui peuvent être démontés pendant cette opération.
   e. Installer un nouvel élément filtrant et procéder en sens inverse pour le remontage. Voir les valeurs du couple de serr[illegible]s le tableau au verso.



ENTRETIEN (suite)

2. Ensemble de soupape
   a. Mettre hors pression les côtés entrée et sortie du dispositif.
   b. Ôter l'ensemble de bol/protège-bol et l'ensemble de retenue de l'élément filtrant comme indiqué à l'étape 1 ci-haut. De plus, le déflecteur du modèle 28A doit être démonté. On veillera à ne pas perdre le ressort de soupape et l'ensemble de soupape, étant donné que ces pièces peuvent se démonter pendant cette opération.
   c. Ôter le ressort et l'ensemble de soupape si ce n'est pas déjà fait.
   d. Examiner tous les joints et les composants pour s'assurer qu'ils ne sont pas endommagés et les remplacer si nécessaire. Nettoyer les joints et les composants avec un détersif doux et de l'eau. Essuyer le siège de soupape avec un chiffon propre et sec pour éliminer tous les contaminants de l'intérieur du corps du régulateur.
   e. Lubrifier la tige de soupape et le joint torique inférieur de soupape en appliquant une fine couche lubrifiant.
   f. Procéder en sens inverse pour le remontage. Voir les valeurs du couple de serrage dans le tableau au verso.

*MARQUE 28A INDÉLÉBILE SUR LE CHAPEAU DU 28A
NNR = NORMALEMENT NON REMPLACÉ
(Voir au verso pour les trousses de réparation et les pièces de rechange.)

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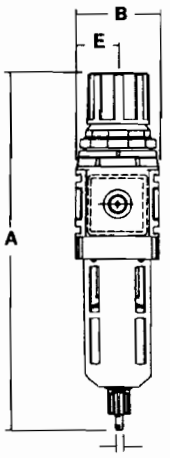
FRENCH CANADIAN

3. Ressort prin hragme
   a. Mettre hors ... ion les côtés entrée et sortie du dispositif.
   b. Tourner le bouton de réglage dans le sens antihoraire jusqu'à ce qu'il n'y ait plus
   de pression sur le ressort, puis ôter le chapeau.
   c. Ôter l'ensemble de vis de réglage, le ressort principal, la bague coulissante et l'ensemble de diaphragme.
   d. Examiner le diaphragme et le siège de décharge sur les modèles à autorégulateur pour s'assurer qu'ils ne sont pas endommagés ni contaminés. Remplacer l'ensemble de diaphragme si nécessaire. Nettoyer le siège de décharge avec un chiffon doux et sec. Procéder en sens inverse pour le remontage en s'assurant que la bague glissante est bien en place sur le diaphragme. Voir les valeurs du couple de serrage du chapeau dans le tableau ci-bas.
4. Le niveau de liquide dans le bol doit être maintenu en-dessous du repère. Il est recommandé de vidanger les régulateurs à vidange manuelle au moins une fois toutes les huit (8) heures. Pour cela, tourner le bouchon de vidange verrs la gauche d'un ou deux tours.*
5. Pour nettoyer le dispositif de vidange automatique à flotteur, dévisser l'écrou de vidange et le dispositif de vidange. NE PAS DÉMONTER CE DISPOSITIF. Le nettoyer dans de l'eau savonneuse chaude et le sécher au pistolet à air comprimé. (NE PAS SE SERVIR DE SOLVANTS !)
6. Avant de remettre le dispositif en service, vérifie. ...s joints ont bien été remis en place ou remplacés et que les composants exigeant un serrage à un couple donné ont été convenablement remontés. S'assurer également que le joint torique de bol et le bol ont bien été mis en place, et que le bol est en position verrouillée, avec le bouchon de vidange bien serré.

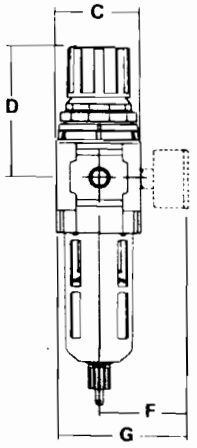
PROBLÈMES DE FUITES

1. Si la pression régulée commence à augmenter spontanément, cela provient vraisemblablement de la contamination du siège de la soupape. Se reporter à l'étape 2, Ensemble de soupape, pour y remédier.
2. Si le dispositif fuit par les trous d'aération du chapeau, cela peut provenir d'une contamination du siège du diaphragme de décharge, d'une détérioration du joint du siège du diaphragme ou d'un endommagement du diaphragme. Se reporter aux points 2 et 3
   ci-haut pour y remédier. Remplacer tout composant endommagé ou usé.

***NOTE: Au cas où l'on dévisse le bouchon de vidange jusqu'au point où il se sépare du tube de vidange, exercer une traction sur le bouchon et sur le tube de vidange simultanément en tournant le bouchon dans le sens horaire (vu de dessus) pour le ré-engager.**



VUE DE FACE



VUE DE CÔTÉ

Modèles	Dispositif de retenue	Couple de serrage du déflecteur Déflecteur	Chapeau	Dimensions POUCES millimètres A	B	C	D	E	F	G
B18	9-11 po-lb (1,0-1,2 N-m)	19-21 po-lb (2,1-2,4 N-m)	23-25 pi-lb (31,2-33,9 N-m)	10.0 254	2.36 60	2.26 60	3.66 93	1.2 30	2.57 65	3.74 95
B28	9-11 po-lb (1,0-1,2 N-m)	19-21 po-lb (2,1-2,4 N-m)	23-25 pi-lb (31,2-33,9 N-m)	11.4 291	2.9 73	2.9 73	4.1 149	1.44 37	2.83 72	4.27 108

TROUSSES DE RÉPARATION ET PIÈCES DE RECHANGE

Note : Les joints standard sont en nitrile.

	Trousse d'inviolabilité	Écrou de montage sur tableau (aluminium)	Écrou de montage sur tableau (plastique)	Trousse de diaphragme autorégulateur	Trousse de diaphragme non régulateur	Ensemble de soupape (avec tige et ressort)	Ressorts de pression 0 - 25 psig (0-1,7 bar)	Ressorts de pression 0 - 60 psig (0-4,2 bar)	Ressorts de pression 0 - 125 psig (0-8,6 bar)	Ressorts de pression 0 - 250psig (0-17,3 bar)	Élément 5 microns	Trousse d'élément, disp. de retenue et déflecteur	Bouton de réglage
B18	RRP-96-671	RRP-96-673	RRP-96-675	RRP-96-656	RRP-96-657	RRP-96-658	RRP-96-659	RRP-96-660	RRP-96-661	RRP-96-662	FRP-96-639	FRP-96-641	RRP-16-340-000
B28	RRP-96-672	RRP-96-674	RRP-96-676	RRP-96-682	RRP-96-683	RRP-96-684	RRP-96-614[1]	RRP-96-615[1]	RRP-96-624[1]	RRP-96-625[1]	FRP-96-653	FRP-96-655[1]	RRP-16-341-000
B28A	RRP-96-672	RRP-96-674	RRP-96-676	RRP-96-986	RRP-96-987	RRP-96-049	RRP-96-163	RRP-96-164	RRP-96-165	RRP-96-166	FRP-96-653	FRP-96-283	RRP-16-341-000

[1] **Plus disponibles après décembre 1997; remplacés par les trousses 28A.**

ACCESSOIRES

Jeu de montage GPA-96-601
Support en T GPA-96-602
Support en T avec jeu de montage GPA-96-603
Support en L (B18) GPA-96-606
Support en L (B28) GPA-96-607
Manomètres :
0-30 psi RRP-96-663
0-60 psi RRP-96-664
0-160 psi RRP-96-665
0-160 psi RRP-96-666
0-2.0 bar RRP-96-667
0-4,2 bar RRP-96-668
0-11,2 bar RRP-96-669
0-21 bar RRP-96-670

DISPOSITIES DE VIDANGE

Dispositif de vidange manuelle GRP-96-685
Dispositif de vidange automatique mécanique (nitrile) - 1/8 NPT GRP-95-973
Dispositif de vidange à faible débit (nitrile) 1/8 NPT GRP-95-400
Dispositif de vidange automatique (fluorocarbone) - 1/8 NPT GRP-95-981
Dispositif de à faible débit (fluorocarbone) - 1/8 NPT GRP-96-500
Dispositif de vidange à faible débit (fluorocarbone) - 1/8 NPT GRP-96-200
Dispositif de vidange automatique m... ique (nitrile) - 1/8 BSP GRP-96-600
Dispositif de vidange automatique (... bone) - 1/8 BSP GRP-96-300
Dispositif de vidange à faible débit (fluorocarbone) - 1/8 BSP GRP-96-700

WILKERSON.
CORPORATION

INSTALLATION AND MAINTENANCE SHEET

Lubricator Model L18 and L28

⚠ WARNING ⚠

EXCEPT as otherwise specified by the manufacturer, this product is specifically designed for compressed air service, and use with any other fluid (liquid or gas) is a misapplication. For example, use with or injection of certain hazardous liquids or gases in the system (such as alcohol or liquid petroleum gas) could be harmful to the unit or result in a combustible condition or hazardous external leakage. Manufacturer's warranties are void in the event of misapplication, and manufacturer assumes no responsibility for any resulting loss. Before using with fluids other than compressed air, or for nonindustrial applications, or for life support systems consult manufacturer for written approval.

ATTENTION: Make sure bowl is fully inserted into body, and then fully turned to lock bowl in place before applying air pressure to unit. When bowl is properly installed, the alignment markings on the bowl/bowlguard assembly and the marks on the body will line up, indicating proper assembly. Failure to do so may cause air pressure to blow bowl off of unit, resulting in serious personal injury or death.

INSTALLATION

1. Refer to WARNING prior to installation.
2. Install as close to the point of use as possible.
3. Unit must be installed with the flow in the direction of the flow arrow on the body cover and with bowl down.
4. Avoid using reducing bushings, couplings, etc., whenever possible to install this product. These devices restrict air flow and can affect performance.

NOTE: CONTAMINATES REMOVED FROM THE COMPRESSED AIR SYSTEM MUST BE DISPOSED OF IN ACCORDANCE WITH LOCAL, STATE AND FEDERAL STANDARDS.

OPERATION

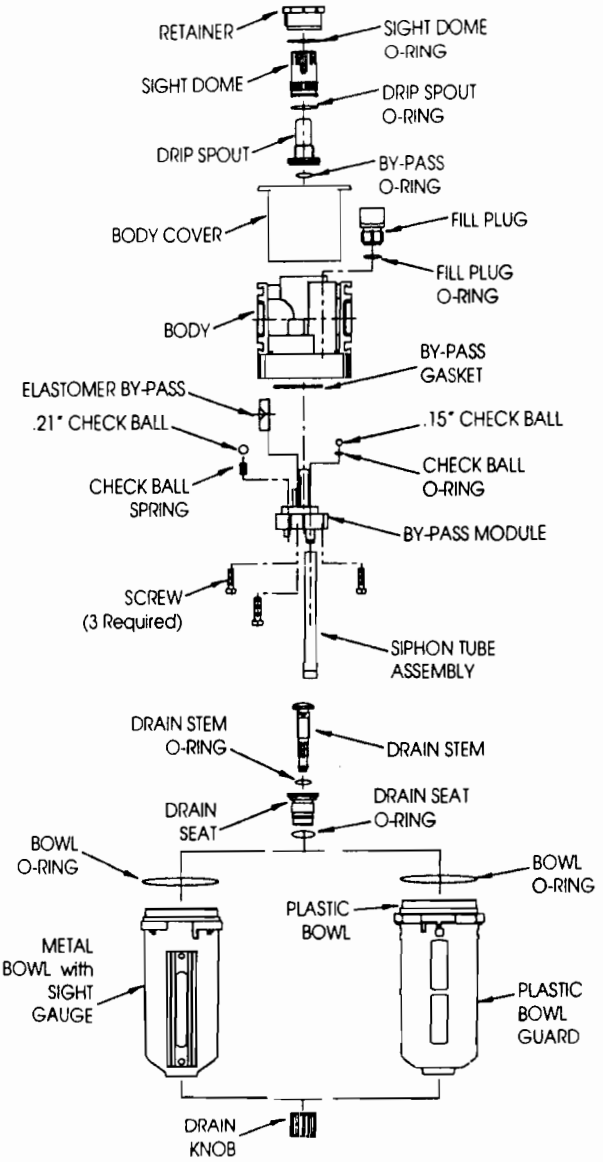
1. **NOTE: Maximum inlet pressure and temperatures are as follows:**
   a. **Plastic bowl/bowl guard assembly:**
      150 psig (10,3 bar)
      125°F (51,7°C)
   b. **Metal bowl with Sight Gauge:**
      250 psig (17,2 bar)
      175°F (79,4°C)
2. Use only clean, light machine oil, preferably SAE 10 or lighter. DO NOT USE PHOSPHATE ESTER OR DIESTOR BASED FLUIDS IN LUBRICATORS
3. This lubricator may be filled under pressure by opening the top fill port slowly, allowing the pressure in the bowl to slowly vent to atmosphere. After the pressure has bled off, the fill plug may be removed completely and oil poured into the fill port. When the fill plug is removed, a small amount of air will be venting from the fill port. This is to serve as an audible signal denoting that the unit is if fact under pressure. If faster filling is desired, slowly remove the fill plug to vent the bowl pressure to atmosphere. Then remove the bowl/bowl guard assembly by pushing up on the bowl and turning clockwise. Fill the bowl, reposition the bowl o-ring seal on the bowl and reinstall the bowl. To reinstall the bowl, insert the bowl into the body, push up and turn counterclockwise until you feel the locating stops engage. Pull down on the bowl and turn clockwise to insure the bowl has been properly installed and locked. Now reinstall the fill plug. The unit is ready for use.
4. To adjust and set oil delivery rate, the unit must be pressurized and air must be flowing through the unit. Turn the transparent SIGHT DOME, located on the top of the unit counterclockwise to initiate oil delivery. The rate of oil delivery depends on air flow rate. If flow increases or decreases, the oil delivery rate will increase or decrease proportionately. Turning the SIGHT DOME clockwise to limit stop will stop all oil delivery.

MAINTENANCE

THIS UNIT MAY BE SERVICED WITHOUT REMOVING THE UNIT FROM THE COMPRESSED AIR LINE.

1. To clean the bowl, slowly open and remove the fill plug located on the top of the lubricator to vent bowl pressure to atmosphere. Push up on bowl assembly and turn clockwise to remove. Use a clean, dry cloth to wipe inside of bowl. Inspect the filter located in the bottom of the siphon tube assembly. Clean or replace the siphon tube assembly as required. To reinstall the bowl, insure that the bowl seal o-ring is properly installed on the bowl, insert the bowl into the body and push up and turn counterclockwise until the locating stops engage. Pull down on the bowl and turn clockwise to insure the bowl has been properly installed and locked.
2. Before returning unit to service, insure that all seals have been reinstalled or replaced and bowl is locked in position with drain properly secured.

(For Repair Kits and Replacement Parts see reverse side.)



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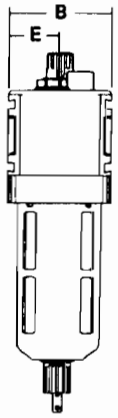
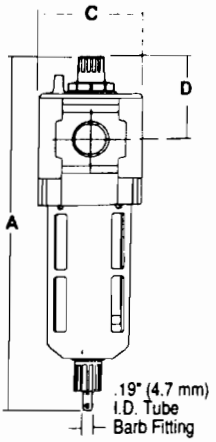


FRONT VIEW



SIDE VIEW

INCHES
millimeters

Dimensions

Models	A	B	C	D	E
→ **L18**	**8.25** 212	**2.36** 60	**2.36** 60	**2.0** 51	**1.0** 26
L28	**9.36** 238	**2.9** 73	**2.9** 73	**2.0** 51	**1.44** 37

REPAIR KITS AND REPLACEMENT PARTS

	Siphon Tube Assembly Kit	By-Pass Assembly Kit	Fill Plug and O-Ring	Tamper Resistant Cap	Plastic bowl/ bowl guard with Manual Drain	Metal bowl/ Sight gauge with Manual Drain
→ **L18**	**LRP-96-677**	**LRP-96-678**	**LRP-96-679**	**LRP-96-680**	**LRP-96-701**	**GRP-96-636**
L28	**LRP-96-681**	**LRP-96-678**	**LRP-96-679**	**LRP-96-680**	**LRP-96-702**	**GRP-96-644**

DRAINS

Manual Drain **GRP-96-685**

ACCESSORIES

Joiner set **GPA-96-601**
T-Bracket **GPA-96-602**
T-Bracket with Joiner set **GPA-96-603**
C-Bracket (18 Series) **GPA-96-604**
C-Bracket (28 Series) **GPA-96-605**
Force Fill Adapter **LRP-96-704**

WILKERSON.
CORPORATION

HOJA DE INSTALACION Y MANTENIMIENTO

Lubricador Modelo L18 y L28

⚠ ADVERTENCIA ⚠

SALVO que el fabricante especifique lo contrario, este producto está diseñado específicamente para el uso con aire comprimido, y su uso con cualquier otro fluido (líquido o gas) es una aplicación indebida. Por ejemplo, el uso o la inyección de ciertos líquidos o gases peligrosos en el sistema (tales como el alcohol o el gas de petróleo líquido) podría ser nocivo para la unidad o resultar en una condición de combustión o una fuga externa peligrosa. Las garantías del fabricante no tendrán validez en el caso de aplicación indebida y éste no asume ninguna responsabilidad por cualquier pérdida resultante. Antes de usar con otros fluidos que no sean el aire comprimido, o para aplicaciones no industriales, o para sistemas de mantenimiento de vida, consulte al fabricante para obtener su aprobación por escrito.

ATENCION: Asegúrese de que la taza esté totalmente insertada en el cuerpo y luego completamente girada para fijarla en posición antes de aplicar presión neumática a la unidad. Cuando la taza esté debidamente instalada, las marcas de alineación en la taza y el ensamble del protector de la taza y las marcas en el cuerpo coincidirán, lo cual indica que el ensamble es correcto. De no hacerse así, la presión del aire podrá causar que la taza se desprenda con fuerza de la unidad, lo cual resultará en graves lesiones personales o la muerte.

INSTALACION

1. Remítase a la ADVERTENCIA antes de proceder a la instalación.
2. Efectúe la instalación lo más cerca posible del punto de uso.
3. La unidad se debe instalar con el flujo en dirección de la flecha de flujo en la cubierta del cuerpo y con la taza hacia abajo.
4. Evite utilizar casquillos reductores, acopladores reductores, etc., siempre que sea posible al instalar este producto. Estos dispositivos restringen el flujo de aire y pueden afectar el rendimiento.

NOTA: SE DEBEN ELIMINAR LOS CONTAMINANTES DEL SISTEMA DE AIRE COMPRIMIDO DE CONFORMIDAD CON LAS NORMAS FEDERALES, ESTATALES Y LOCALES.

OPERACION

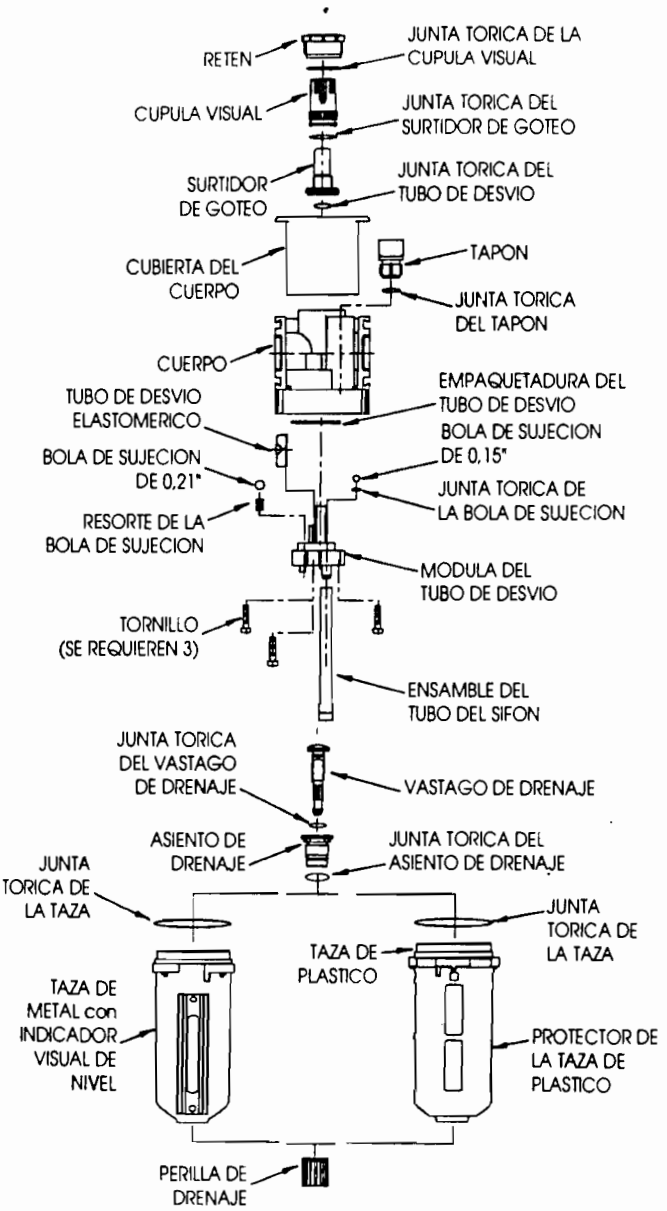
1. NOTA: La presión de entrada y temperaturas máximas son las siguientes:
   a. Taza de plástico/ensamble del protector de la taza:
      150 psig (10,3 barias) 125° F (51,7° C)
   b. Taza de metal con indicador visual de nivel: 250 psig (17,2 barias)
      175° F (79,4° C)
2. Utilice sólo aceite de máquina limpio y liviano, preferentemente SAE o más liviano. NO USE LIQUIDOS A BASE DE ESTER FOSFATO O DIESTOR EN LOS LUBRICADORES.
3. Este lubricador puede llenarse bajo presión abriendo la abertura de llenado superior lentamente, permitiendo que la presión de la taza se difunda lentamente en la atmósfera. Después de que la presión se ha disipado, se puede retirar completamente el tapón y verter aceite en la abertura de llenado. Al quitar el tapón, una pequeña cantidad de aire saldrá de la abertura de llenado. Esto sirve como señal audible que indica que la unidad se encuentra en realidad bajo presión. Si se desea un llenado más rápido, retire lentamente el tapón para disipar la presión de la taza en la atmósfera. Luego retire la taza y el ensamble del protector de la taza tirando de la taza hacia arriba y girándola en el sentido de las manecillas del reloj. Llene la taza, vuelva a colocar la junta tórica de la taza en la taza y vuelva a instalar la taza. Para hacerlo, inserte la taza en el cuerpo, presione hacia arriba y gírela en sentido contrario al de las manecillas del reloj hasta que sienta que los dispositivos de fijación se enganchen. Presione la taza hacia abajo y gírela en el sentido de las manecillas del reloj para asegurar que ésta esté debidamente instalada y fijada. Ahora vuelva a instalar el tapón. La unidad estará lista para usar.
4. Para ajustar y fijar la velocidad de suministro de aceite, se debe presurizar la unidad y el aire deberá circular por la unidad. Gire la CUPULA VISUAL, localizada en la parte superior de la unidad, en sentido contrario al de las manecillas del reloj a fin de iniciar el suministro de aceite. La velocidad del suministro de aceite depende de la velocidad del flujo de aire. Si el flujo aumenta o disminuye, la velocidad del suministro de aceite aumentará o disminuirá en forma proporcional. Al girar la CUPULA VISUAL en el sentido de las manecillas del reloj se detendrá todo el suministro de aceite.

MANTENIMIENTO

SE PUEDE DAR SERVICIO A ESTA UNIDAD SIN RETIRARLA DEL CONDUCTO DE AIRE COMPRIMIDO.

1. Para limpiar la taza, abra y retire lentamente el tapón ubicado en la parte superior del lubricador para difundir la presión de aire en la atmósfera. Presione el ensamble de la taza hacia arriba y gírela en el sentido de las manecillas del reloj para retirarla. Use un paño limpio y seco para limpiar el interior de la taza. Revise el filtro ubicado en la parte inferior del ensamble del tubo del sifón. Limpie o cambie el ensamble del tubo del sifón según se requiera. Para volver a instalar la taza, asegúrese de que la junta tórica de la taza esté debidamente instalada en la taza, inserte la taza en el cuerpo, presionela hacia arriba y gírela en sentido contrario al de las manecillas del reloj hasta que se enganchen los dispositivos de fijación. Presione la taza hacia abajo y gírela en el sentido de las manecillas del reloj para asegurar que la taza esté debidamente instalada y fijada.
2. Antes de regresar la unidad al servicio, asegúrese de que se hayan reinstalado o cambiado debidamente todas las juntas y que se haya fijado la taza en posición con el drenaje debidamente asegurado.

(Para los juegos de reparación y repuestos, véase al dorso.)



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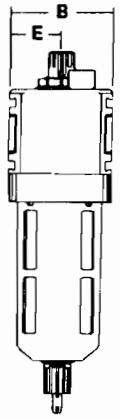
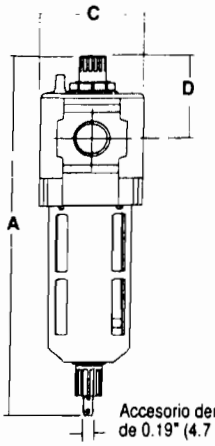
SPANISH



VISTA DELANTERA



VISTA LATERAL

PULGADAS
milímetros

Dimensiones

Modelos	A	B	C	D	E
L18	**8.25**	**2.36**	**2.36**	**2.0**	**1.0**
	212	60	60	51	26
L28	**9.36**	**2.9**	**2.9**	**2.0**	**1.44**
	238	73	73	51	37

JEGOS DE REPARACION Y REPUESTOS

	Juego de ensamble del tubo del sifón	Juego de ensamble del tubo de desvío	Tapón y junta tórica	Tapa a prueba de manipulaciones indebidas	Taza de plástico/ protector de la taza con drenaje manual	Taza de metal/ indicador visual de nivel con drenaje manual
L18	**LRP-96-677**	**LRP-96-678**	**LRP-96-679**	**LRP-96-680**	**LRP-96-701**	**GRP-96-636**
L28	**LRP-96-681**	**LRP-96-678**	**LRP-96-679**	**LRP-96-680**	**LRP-96-702**	**GRP-96-644**

DRENAJES

Drenaje manual **GRP-96-685**

ACCESORIOS

Juego **GPA-96-601**
Ménsula en forma de T **GPA-96-602**
Ménsula en forma de T con juego de ensamble **GPA-96-603**
Ménsula en forma de C (serie 18) **GPA-96-604**
Ménsula en forma de C (serie 28) **GPA-96-605**
Adaptador de llenado de fuerza **LRP-96-704**

Torque Chart

Part Name	Torque Value In Inch–Pounds	Torque Value In Newton–Meters
solenoid base sub–assembly	175 ± 25	19,8± 2,8
valve bonnet (3/4" bonnet construction)	90 ± 10	10,2 ± 1,1
bonnet screw (3/8" or 1/2" NPT pipe size)	25	2,8
bonnet screw (3/4" NPT pipe size)	40	4,5

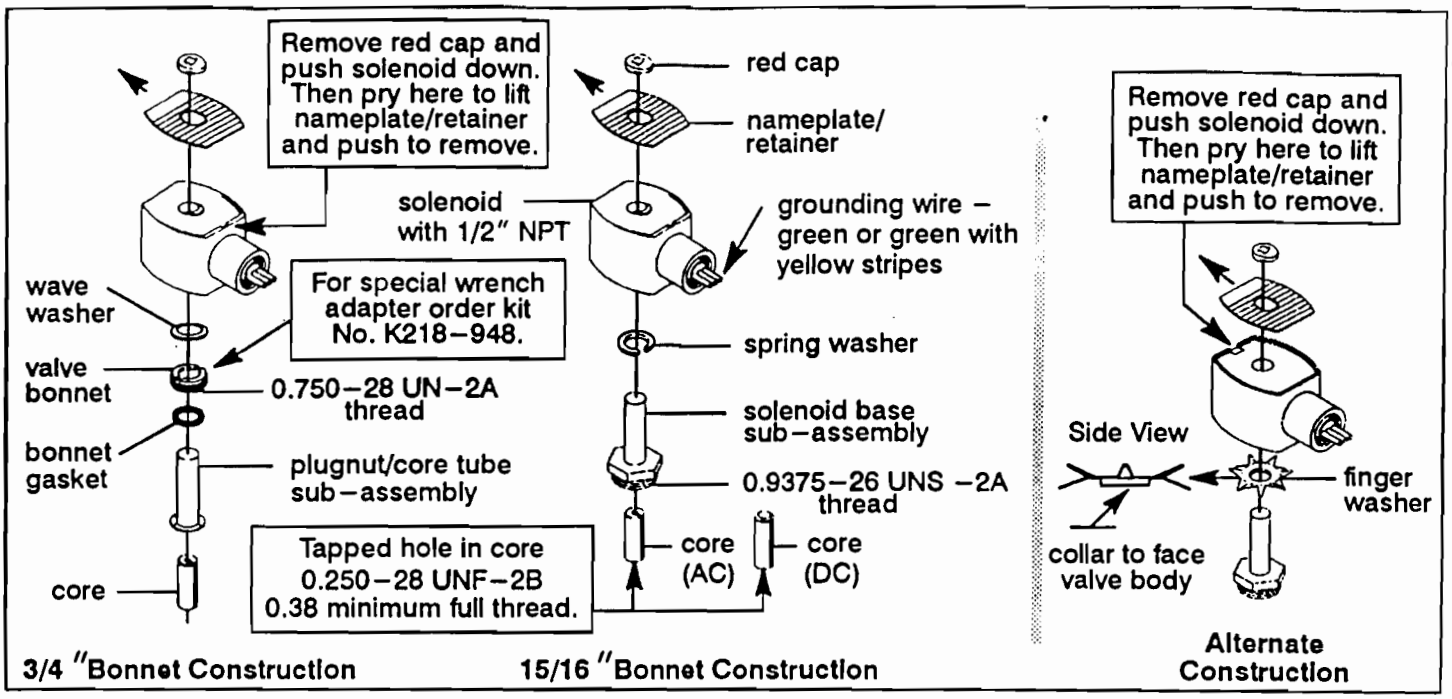


Figure 1. Series 8016G solenoids

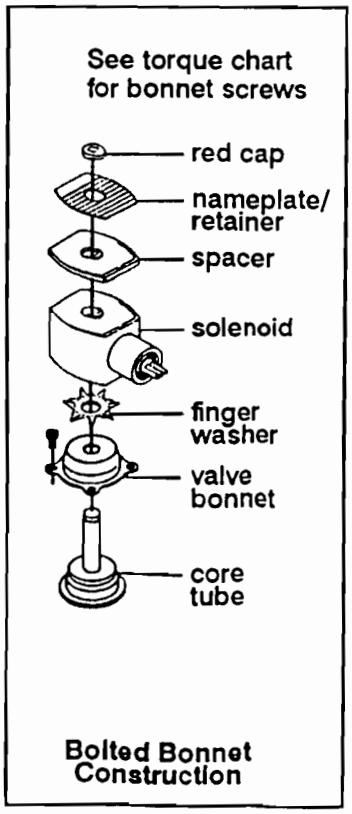


Figure 2. Series 8016G solenoid

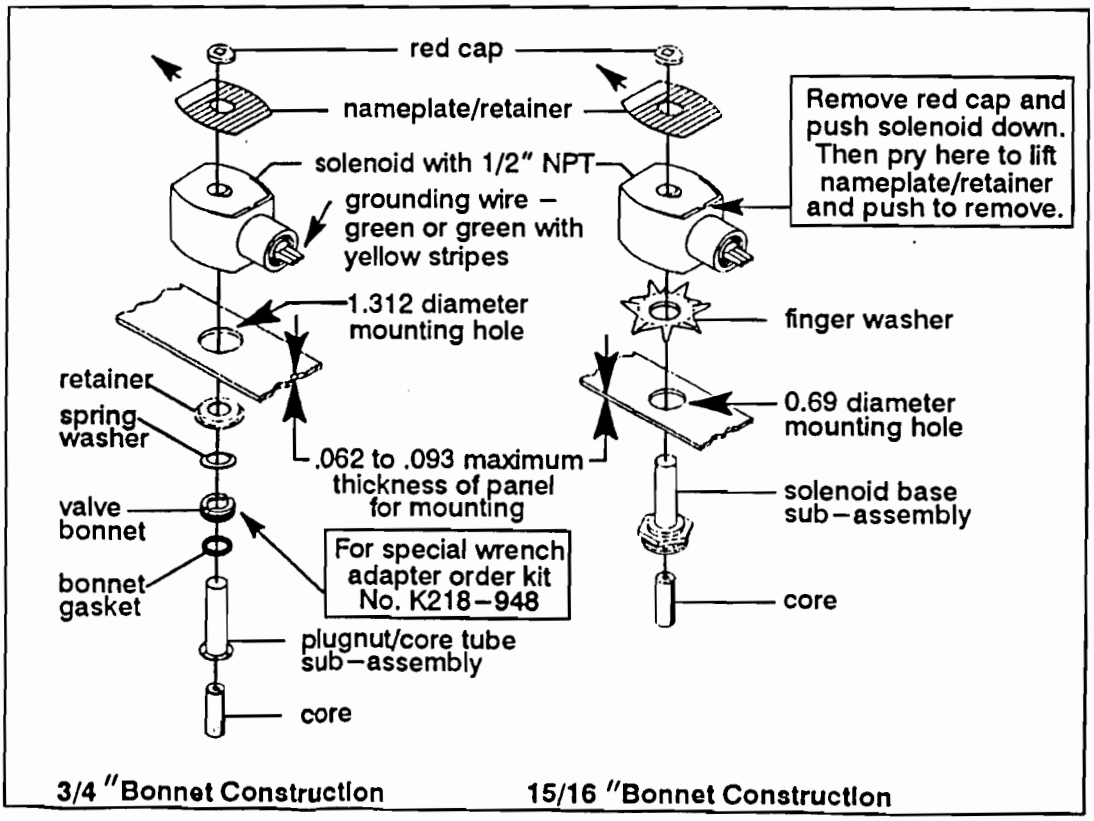


Figure 3. Series 8016G panel mounted solenoids

Torque Chart

Part Name	Torque Value in Inch–Pounds	Torque Value in Newton–Meters
terminal block screws	10 ± 2	1,1 ± 0,2
socket head screw	15 – 20	1,7 – 2,3
center screw	5 ± 1	0,6 ± 0,1

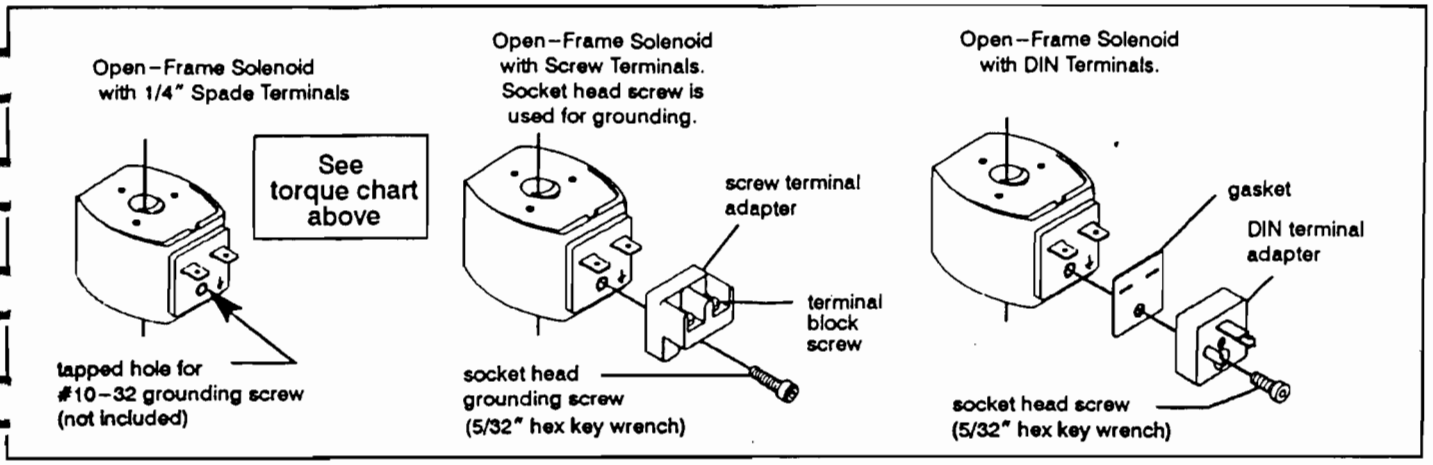


Figure 4. Open–frame solenoids

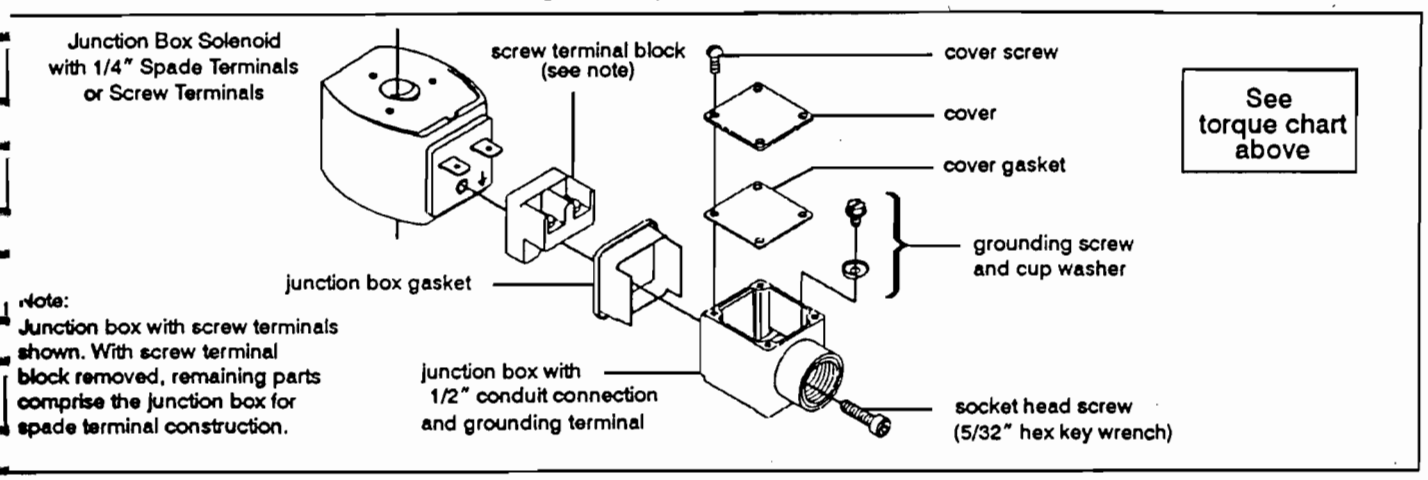


Figure 5. Junction box (optional feature)

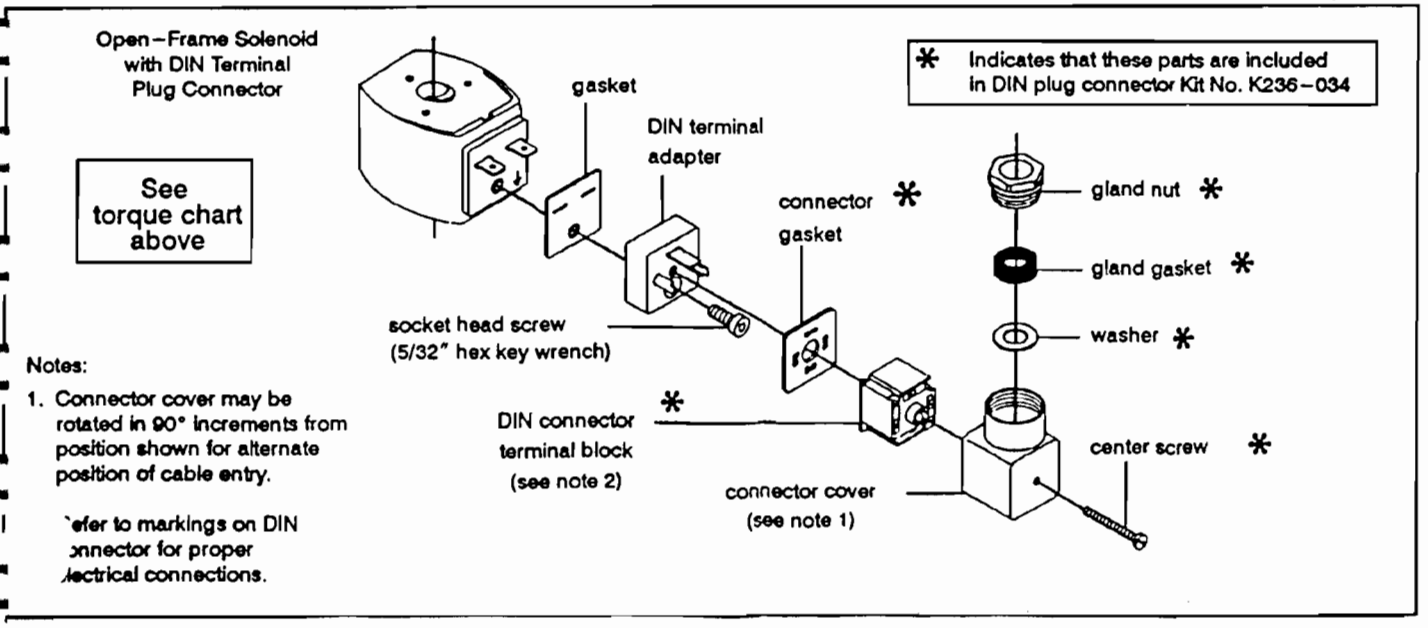


Figure 6. DIN plug connector kit No. K236–034 (optional feature)

ASCO Valves Automatic Switch Co. 50–60 Hanover Road, Florham Park, New Jersey 07932

ASCO
JOUCOMATIC
Form No. V6950R2

GB CE

GENERAL INSTALLATION AND MAINTENANCE INSTRUCTIONS

Note: These General Installation and Maintenance Instructions must be read in conjunction with the Instruction Sheet for the specific product.

INSTALLATION

ASCO/JOUCOMATIC components are intended to be used only within the technical characteristics as specified on the nameplate. Changes to the equipment are only allowed after consulting the manufacturer or its representative. Before installation depressurize the piping system and clean internally.
The equipment may be mounted in any position if not otherwise indicated on the product by means of an arrow.
The flow direction and pipe connection of valves are indicated on the body.

The pipe connections have to be in accordance with the size indicated on the nameplate and fitted accordingly.
Caution:
- Reducing the connections may cause improper operation or malfunctioning.
- For the protection of the equipment install a strainer or filter suitable for the service involved in the inlet side as close to the product as possible.
- If tape, paste, spray or a similar lubricant is used when tightening, avoid particles entering the system.
- Use proper tools and locate wrenches as close as possible to the connection point.
- To avoid damage to the equipment, DO NOT OVERTIGHTEN pipe connections.
- Do not use valve or solenoid as a lever.
- The pipe connections should not apply any force, torque or strain to the product.

ELECTRICAL CONNECTION

In case of electrical connections, they are only to be made by trained personnel and have to be in accordance with the local regulations and standards.
Caution:
- Turn off electrical power supply and de-energize the electrical circuit and voltage carrying parts before starting work.
- All electrical screw terminals must be properly tightened according to the standards before putting into service.
  Dependent upon the voltage electrical components must be provided with an earth connection and satisfy local regulations and standards

The equipment can have one of the following electrical terminals:
- Spade plug connections according to ISO-4400 or 3 x DIN-46244 (when correctly installed this connection provides IP-65 protection).
- Embedded screw terminals in metal enclosure with "Pg" cable gland.
- Spade terminals (AMP type).
- Flying leads or cables.

PUTTING INTO SERVICE

Before pressurizing the system, first carry-out an electrical test. In case of solenoid valves, energize the coil a few times and notice a metal click signifying the solenoid operation.

SERVICE

Most of the solenoid valves are equipped with coils for continuous duty service. To prevent the possibility of personal or property damage do not touch the solenoid which can become hot under normal operation conditions.

SOUND EMISSION

The emission of sound depends on the application, medium and nature of the equipment used. The exact determination of the sound level can only be carried out by the user having the valve installed in his system.

MAINTENANCE

Maintenance of ASCO/JOUCOMATIC products is dependent on service conditions. Periodic cleaning is recommended, the timing of which will depend on the media and service conditions. During servicing, components should be examined for excessive wear. A complete set of internal parts is available as a spare parts or rebuild kit. If a problem occurs during installation/maintenance or in case of doubt please contact ASCO/JOUCOMATIC or authorised representatives.

A separate Declaration of Incorporation relating to EEC-Directive 89/392/EEC Annex II B is available on request. Please provide product identification number and serial numbers of products concerned.
e product complies with the essential requirements of the
C Directive 89/336/EEC and amendments and the Low
tage directives 73/23/EEC and 93/68/EEC. A separate Dec-
ration of Conformity is available on request. Please provide product identification number and serial numbers of the products concerned.

FR CE

INSTRUCTIONS GÉNÉRALES D'INSTALLATION ET D'ENTRETIEN

Note : Ces instructions générales d'installation et d'entretien complètent la notice spécifique du produit.

MONTAGE

Les composants ASCO/JOUCOMATIC sont conçus pour les domaines de fonctionnement indiqués sur la plaque signalétique ou la documentation. Aucune modification ne peut être réalisée sur le matériel sans l'accord préalable du fabricant ou de son représentant. Avant de procéder au montage, dépressuriser les canalisations et effectuer un nettoyage interne.
A moins qu'une flèche ou la notice n'indique un sens de montage spécifique de la tête magnétique, le produit peut être monté dans n'importe quelle position.
Le sens de circulation du fluide est indiqué par repères sur le corps et dans la documentation.

La dimension des tuyauteries doit correspondre au raccordement indiqué sur le corps, l'étiquette ou la notice.
Attention :
- Une restriction des tuyauteries peut entraîner des dysfonctionnements.
- Afin de protéger le matériel, installer une crépine ou un filtre adéquat en amont, aussi près que possible du produit.
- En cas d'utilisation de ruban, pâte, aérosol ou autre lubrifiant lors du serrage, veiller à ce qu'aucun corps étranger ne pénètre dans le circuit.
- Utiliser un outillage approprié et placer les clés aussi près que possible du point de raccordement.
- Afin d'éviter toute détérioration, NE PAS TROP SERRER les raccords des tuyauteries.
- Ne pas se servir de la vanne ou de la tête magnétique comme d'un levier.
- Les tubes de raccordement ne devront exercer aucun effort, couple ou contrainte sur le produit.

RACCORDEMENT ÉLECTRIQUE

Le raccordement électrique doit être réalisé par un personnel qualifié et selon les normes et règlements locaux.
Attention :
- Avant toute intervention, couper l'alimentation électrique pour mettre hors tension les composants.
- Toutes les bornes à vis doivent être serrées correctement avant la mise en service.
- Selon la tension, les composants électriques doivent être mis à la terre conformément aux normes et règlements locaux.

Selon les cas, le raccordement électrique s'effectue par :
- Connecteur débrochable ISO4400 ou 3 x DIN46244 avec degré de protection IP65 lorsque le raccordement est correctement effectué.
- Bornes à vis solidaires du bobinage, sous boîtier métallique avec presse-étoupe "Pg - -".
- Cosses (type AMP).
- Fils ou câbles solidaires de la bobine.

MISE EN SERVICE

Avant de mettre le circuit sous pression, effectuer un essai électrique. Dans le cas d'une électrovanne, mettre la bobine sous tension plusieurs fois et écouter le "clic" métallique qui signale le fonctionnement de la tête magnétique.

FONCTIONNEMENT

La plupart des électrovannes comportent des bobinages prévus pour mise sous tension permanente. Pour éviter toute brûlure, ne pas toucher la tête magnétique qui, en fonctionnement normal et en permanence sous tension, peut atteindre une température élevée.

BRUIT DE FONCTIONNEMENT

Le bruit de fonctionnement varie selon l'utilisation, le fluide et le type de matériel employé. L'utilisateur ne pourra déterminer avec précision le niveau sonore émis qu'après avoir monté le composant sur l'installation.

ENTRETIEN

L'entretien nécessaire aux produits ASCO/JOUCOMATIC varie avec leurs conditions d'utilisation. Il est souhaitable de procéder à un nettoyage périodique dont l'intervalle varie suivant la nature du fluide, les conditions de fonctionnement et le milieu ambiant. Lors de l'intervention, les composants doivent être examinés pour détecter toute usure excessive. Un ensemble de pièces internes est proposé en pièces de rechange pour procéder à la réfection. En cas de problème lors du montage/entretien ou en cas de doute, veuillez contacter ASCO/JOUCOMATIC ou ses représentants officiels.

Conformément à la directive CEE 89/392/CEE Annexe II B, une Déclaration d'Incorporation peut être fournie sur demande. Veuillez nous indiquer le numéro d'accusé de réception (AR) et les références ou codes des produits concernés.
Ce produit est conforme aux prescriptions les plus importantes de la directive CEM 89/336/CEE et amendements et aux directives basse tension 73/23/CEE et 93/68/CEE. Une déclaration de conformité peut être fournie sur simple demande. Veuillez nous indiquer le numéro d'accusé de réception (AR) ainsi que les numéros de série des produits concernés.

DE CE

ALLGEMEINE BETRIEBSANLEITUNG

ACHTUNG:Diese Allgemeine Betriebsanleitung gilt in Zusammenhang mit der jeweiligen Betriebsanleitung für die speziellen Produkte.

EINBAU

Die ASCO/JOUCOMATIC-Komponenten dürfen nur innerhalb der auf den Typenschildern angegebenen Daten eingesetzt werden.Veränderungen an den Produkten sind nur nach Rücksprache mit ASCO/JOUCOMATIC zulässig.
Vor dem Einbau der Ventile muß das Rohrleitungssystem drucklos geschaltet und innen gereinigt werden.
Die Einbaulage der Produkte ist generell beliebig. Ausnahme: Die mit einem Pfeil gekennzeichneten Produkte müssen entsprechend der Pfeilrichtung montiert werden.
Die Durchflußrichtung und der Eingang von Ventilen sind gekennzeichnet.

Die Rohranschlüsse sollten entsprechend den Größenangaben auf den Typenschildern mit handelsüblichen Verschraubungen durchgeführt werden. Dabei ist folgendes zu beachten:
- Eine Reduzierung der Anschlüsse kann zu Leistungs- und Funktionsminderungen führen.
- Zum Schutz der Ventile sollten Schmutzfänger oder Filter so dicht wie möglich in den Ventileingang integriert werden.
- Bei Abdichtung am Gewinde ist darauf zu achten, daß kein Dichtungsmaterial in die Rohrleitung oder das Ventil gelangt.
- Zur Montage darf nur geeignetes Werkzeug verwendet werden.
- Konische Verschraubungen sind sorgfältig anzuziehen. Es ist darauf zu achten, daß beim Anziehen das Gehäuse nicht beschädigt wird.
- Spule und Führungsrohr von Ventilen dürfen nicht als Gegenhalter benutzt werden.
- Die Rohrleitungsanschlüsse sollen fluchten und dürfen keine Spannungen auf das Ventil übertragen.

ELEKTRISCHER ANSCHLUß

Der elektrische Anschluß ist von Fachpersonal entsprechend den geltenden VDE- und CEE-Richtlinien auszuführen. Es ist besonders auf folgendes zu achten:
- Vor Beginn der Arbeiten ist sicherzustellen, daß alle elektrischen Laitungen und Netzteile spannungslos geschaltet sind.
- Alle Anschlußklemmen sind nach Beendigung der Arbeiten vorschriftsmäßig entsprechend den geltenden Regeln anzuziehen.
- Je nach Spannungsbereich muß das Ventil nach den geltenden Regeln einen Schutzleiteranschluß erhalten.

Der Magnetantrieb kann je nach Bauart folgende Anschlüsse haben:
- Anschluß für Gerätesteckdose nach DIN 43650 Form A/ISO 4400 oder 3x DIN 46244 (durch ordnungsgemäße Montage der Gerätesteckdose wird Schutzklasse IP 65 erreicht).
- Anschlüsse innerhalb eines Blechgehäuses mittels Schraubklemmen. Kabeleinführung ins Gehäuse mit PG-Verschraubung.
- Offene Spulen mit Flachsteckem (AMP-Fahnen) oder mit eingegossenen Kabelenden.

INBETRIEBNAHME

Vor Druckbeaufschlagung des Produktes sollte eine elektrische Funktionsprüfung erfolgen:
Bei Ventilen Spannung an der Magnetspule mehrmals ein- und ausschalten. Es muß ein Klicken zu hören sein.

BETRIEB

Die meisten Ventile sind mit Spulen für Dauerbetrieb ausgerüstet. Zur Vermeidung von Personen- und Sachschäden sollte jede Berührung mit dem Ventil vermieden werden, da die Magnetspule bei längerem Betrieb sehr heiß werden kann.

GERÄUSCHEMISSION

Diese hängt sehr stark vom Anwendungsfall, den Betriebsdaten und dem Medium, mit denen das Produkt beaufschlagt wird, ab. Eine Aussage über die Geräuschemission des Produktes muß deshalb von demjenigen getroffen werden, der das Produkt innerhalb einer Maschine in Betrieb nimmt.

WARTUNG

Die Wartung hängt von den Einsatzbedingungen ab. In entsprechenden Zeitabständen muß das Produkt geöffnet und gereinigt werden. Für die Überholung der ASCO/JOUCOMATIC-Produkte können Ersatzteilesätze geliefert werden. Treten Schwierigkeiten bei Einbau, Betrieb oder Wartung auf, sowie bei Unklarheiten, ist mit ASCO/JOUCOMATIC Rücksprache zu halten.

(ASCO/JOUCOMATIC Produkte sind entsprechend der EG-Richtlinie 89/392/EWG gefertigt.

Eine separate Herstellererklärung im Sinne der Richtlinie 89/392/EWG Anhang IIB ist auf Anfrage erhältlich. Geben Sie bitte für die Produkte die Nummer der Auftragsbestätigung und die Seriennummer an.

Dieses Produkt entspricht den grundlegenden Bestimmungen der EMV-Richtlinie 89/336/EWG, einschl. Nachträge, sowie den Niederspannungsrichtlinien 73/23/EWG u. 93/68/EWG. Bitte geben Sie die Auftragsbestätigungsnummer und die Seriennummern der betreffenden Produkte an.

AUTOMATIC SWITCH CO.
50-60 Hanover Road
Florham Park, New Jersey 07932
Tel. (973) 966-2000
Fax (973) 966-2628

AUTOMATIC SWITCH CO.
1561 Columbia Highway
Aiken, South Carolina 29801
Tel. (803) 641-9200
Fax (803) 641-9290

ANGAR SCIENTIFIC
52 Horsehill Road
Cedar Knolls, New Jersey 07927
Tel. (973) 538-9700
Fax (973) 538-5937

ASCO
JOUCOMATIC
Form No. V6950R2

ES

INSTRUCCIONES GENERALES DE INSTALACION Y MANTENIMIENTO

Nota: Estas Instrucciones Generales de Instalación y Mantenimiento deben considerarse en conjunción con la Hoja de Instrucciones de cada producto.

INSTALACION

Los componentes ASCO/JOUCOMATIC sólo deben utilizarse dentro de las especificaciones técnicas que se especifican en su placa de características o catálogo. Los cambios en el equipo sólo estarán permitidos después de consultar al fabricante o a su representante. Antes de la instalación despresurice el sistema de tuberías y limpie internamente.
El equipo puede utilizarse en cualquier posición si no estuviera indicado lo contrario sobre el mismo mediante una flecha o en el catálogo.
En el cuerpo o en el catálogo se indican el sentido del fluido y la conexión de las válvulas a la tubería.

Las conexiones a la tubería deben corresponder al tamaño indicado en la placa de características la etiqueta o el catálogo y ajustarse adecuadamente.
Precaución:
- La reducción de las conexiones puede causar operaciones incorrectas o defectos de funcionamiento.
- Para la protección del equipo se debe instalar, en la parte de la entrada y tan cerca como sea posible del producto, un filtro adecuado.
- Si se utilizara cinta, pasta, spray u otros lubricantes en el ajuste, se debe evitar que entren partículas en el producto.
- Se debe utilizar las herramientas adecuadas y colocar llaves inglesas lo mas cerca posible del punto de conexión.
- Para evitar daños al equipo, NO FORZAR las conexiones a la tubería.
- No utilizar la válvula o el solenoide como palanca.
- Las conexiones a la tubería no producirán ninguna fuerza, par o tensión sobre el producto.

CONEXION ELECTRICA

Las conexiones eléctricas serán realizadas por personal cualificado y deberán adaptarse a las normas y regulaciones locales.
Precaución:
- Antes de comenzar el trabajo, desconecte el suministro de energía eléctrica y desenergice el circuito eléctrico y los elementos portadores de tensión.
- Todos los terminales eléctricos deben estar apretados adecuadamente según normas antes de su puesta en servicio.
- Según el voltaje, los componentes eléctricos deben disponer de una conexión a tierra y satisfacer las normas y regulaciones locales.

El equipo puede tener uno de los siguientes terminales eléctricos:
- Conexiones desenchufables segun ISO 4400 o 3 x DIN-46244 (cuando se instala correctamente esta conexión proporciona una protección IP-65).
- Terminales de tornillo con carcasa metálica con entrada de cable de conexión roscada "PG".
- Conector desenchufable (tipo AMP).
- Salida de cables.

PUESTA EN MARCHA

Se debe efectuar una prueba eléctrica antes de someter a presión el sistema. En el caso de las válvulas solenoides, se debe energizar varias veces la bobina y comprobar que se produce un sonido metálico que indica el funcionamiento del solenoide.

SERVICIO

La mayor parte de las válvulas solenoides se suministran con bobinas para un servicio continuo. Con el fin de evitar la posibilidad de daños personales o materiales no se debe tocar el solenoide, ya que puede haberse calentado en condiciones normales de trabajo.

EMISION DE RUIDOS

La emisión de ruidos depende de la aplicación, medio y naturaleza del equipo utilizado. Una determinación exacta del nivel de ruido sólamente se puede llevar a cabo por el usuario que disponga la válvula instalada en su sistema.

MANTENIMIENTO

El mantenimiento de los productos ASCO/JOUCOMATIC depende de las condiciones de servicio. Se recomienda una limpieza periódica, dependiendo de las condiciones del medio y del servicio. Durante el servicio, los componentes deben ser examinados por el hubieran desgastes excesivos. Se dispone de un juego completo de partes internas como recambio o kit de montaje. Si ocurriera un problema durante la instalación/mantenimiento o en caso de duda contactar con ASCO/JOUCOMATIC o representantes autorizados.

Se dispone, por separado y bajo demanda, de una Declaración de Incorporación conforme a la Directiva CEE 89/392/EEC Anexo II B. Rogamos que nos faciliten los códigos y números de acepta-ción de pedido correspondientes.
Este producto es conforme a las principales prescripciones de la directiva CEM 89/336/CEE y a las enmiendas y directivas baja tension 73/23/CEE y 93/68/CEE. Si lo desea, podemos facilitarle una Declaración de Conformidad por separado. Rogamos faciliten el número de confirmación de pedido y los números de serie de los respectivos productos.

IT

ISTRUZIONI DI INSTALLAZIONE E DI MANUTENZIONE GENERALE

Nota: Queste istruzioni devono essere lette in congiunzione con il manuale specifico del prodotto.

INSTALLAZIONE

Le elettrovalvole devono essere utilizzate esclusivamente rispettando le caratteristiche tecniche specificate sulla targhetta. Variazioni sulle valvole o sui piloti sono possibili solo dopo aver consultato il costruttore o i suoi rappresentanti. Prima dell'installazione depressurizzare i tubi e pulire internamente.
Le elettrovalvole possono essere montate in tutte le posizioni. Diversamente, una freccia posta sulla valvola indica che deve essere montata in posizione verticale e diritta.
La direzione del flusso e' indicata sul corpo della valvola per mezzo di una freccia oppure con l'etichetta "IN", "1", "A", o "P".

I raccordi devono essere conformi alla misura indicata sulla targhette apposta.
Attenzione:
- Ridurre i raccordi puo' causare operazioni sbagliate o malfunzionamento.
- Per proteggere il componente installare,il più vicino possibile al lato ingresso, un filtro adatto al servizio.
- Se si usano nastro, pasta, spray o lubrificanti simili durante il serraggio, evitare che delle particelle entrino nel corpo della valvola.
- Usare un'attrezzatura appropriate e utilizzare la chiavi solo sul corpo della valvola.
- Per evitare danni al corpo della valvola, NON SERRARE ECCESSIVAMENTE i tubi.
- Non usare la valvola o il pilota come una leva.
- I raccordi non devono esercitare pressione, torsione o sollecitazione sull'elettrovalvola.

ALLACCIAMENTO ELETTRICO

L'allacciamento elettrico deve essere effetuato esclusivamente dal personale specializzato e deve essere conforme alle Norme locali.
Attensione:
- Prima di mettere in funzione togliere l'alimentazione elettrica, diseccitare il circuito elettrico e le parti sotto tensione.
- I morsetti elettrici devono essere correttamente avvitati, secondo le Norme, prima della messa in servizio.
- Le elettrovalvole devone essere provviste di morsetti di terra a seconda della tensione e delle Norme di sicurezza locali.

I piloti possono avere una delle seguenti caratteristiche elettrice:
- Connettore ISO-4400 o 3 x DIN-46244 (se installato correttamente e' IP-65).
- Morsetteria racchiusa in custodia metallica. Entrata cavi con pressacavi tipo "PG".
- Bobina con attacchi FASTON (tipo AMP).
- Bobine con fili o cavo.

MESSA IN FUNZIONE

Prima di dare pressione alla valvola, eseguire un test elettrico. Eccitare la bobina diverse volte fino a notare uno scatto metallico che dimostra il funzionamento del pilota.

SERVIZIO

Molte elettrovalvole sono provviste di bobine per funzionamento continuo. Per prevenire la possibilita' di danneggiare cose o persone, non toccare il pilota.
La custodia della bobina o del pilota puo' scaldarsi anche in normali condizioni di funzionamento.

EMISSIONE SUONI

L'emissione di suoni dipende dall'applicazione e dal tipo di elettrovalvola. L'utente puo' stabilire esattamente il livello del suono solo dopo aver installato la valvola sul suo impianto.

MANUTENZIONE

Generalmente questi componenti non necessitano spesso di manutenzione. Comunque, in alcuni casi e' necessario fare attenzione a depositi o ad eccessiva usura. Questi componenti devono essere puliti periodicamente, il tempo che intercorre tra una pulizia e l'altra varia a seconda delle condizioni di funzionamento. Il ciclo di durata dei componenti dipende dalle condizioni di funzionamento. Incaso di usura e' disponibile un set completo di parti interne per per la revisione.
Se si incontrano problemi durante l'installazione o la manutenzione o se si hanno dei dubbi, consultare ASCO/JOUCOMATIC o i suoi rappresentanti.

L'utente puo'richiedere al costruttore una dichiarazione seperate riguardante le Direttive EEC 89/392/EEC e 91/368/EEC (vedere allegato II B) fornendo il numero di serie e il riferimento dell'ordine relativo.
Questo prodotto soddisfa i requisiti essenziali della direttiva CEM 89/336/CEE nonche' gli emendamenti e le direttive sulla bassa tensione 73/23/CEE e 93/68/CEE. Una Dichiarazione di Conformità separata può essere ottenuta su richiesta. Si prega di fornire il numero della conferma dell'ordinativo ed i numeri di serie dei relativi prodotti.

NL

ALGEMENE INSTALLATIE- EN ONDERHOUDSINSTRUKTIES

N.B.: Deze algemene instrukties t.a.v. installatie en onderhoud moeten in echt worden genomen tezamen met de specifieke voorschriften van het produkt.

INSTALLATIE

ASCO/JOUCOMATIC produkten mogen uitsluitend toegepast worden binnen de op de naamplaat aangegeven specificaties. Wijzigingen, zowel elektrisch als mechanisch, zijn alleen toegestaan na overleg met de fabrikant of haar vertegenwoordiger. Voor het inbouwen dient het leidingssysteem drukloos gemaakt te worden en inwendig gereinigd.
De positie van de afsluiter is naar keuze te bepalen, behalve in die gevallen waarbij het tegendeel door pijlen wordt aangegeven.
De doorstroomrichting wordt bij afsluiters aangegeven op het afsluiterhuis.

De pijpaansluiting moet overeenkomstig de naamplaatgegevens plaatsvinden.
Hierbij moet men letten op:
- Een reductie van de aansluitingen kan tot prestatie- en funktiestoornis leiden.
- Ter bescherming van de interne delen wordt een filter in het leidingnet aanbevolen.
- Bij het gebruik van draadafdichtingspasta of tape mogen er geen deeltjes in het leidingwerk geraken.
- Men dient uitsluitend geschikt gereedschap voor de montage te gebruiken.
- Bij konische/tapse koppelingen moet met een zodanig koppel worden gewerkt dat het produkt niet wordt beschadigd.
- Het produkt, de behuizing of de spoel mag niet als hefboom worden gebruikt.
- De pijpaansluitingen mogen geen krachten of momenten op het produkt overdragen.

ELEKTRISCHE AANSLUITING

In geval van elektrische aansluiting dient dit door vakkundig personeel te worden uitgevoerd volgens de door de plaatselijke overheid bepaalde richtlijnen.
Men dient in het bijzonder te letten op:
- Voordat men aan het werk begint moeten alle spanningsvoerende delen spanningsloos worden gemaakt.
- Alle aansluitklemmen moeten na het beëindigen van het werk volgens de juiste normen worden aangedraaid.
- Al naar gelang het spanningsbereik, moet het produkt volgens de geldende normen van een aarding worden voorzien.

Het produkt kan de volgende aansluitingen hebben:
- Stekeraansluiting volgens ISO-4400 of 3x DIN-46244 (bij juiste montage wordt de dichtheidsklasse IP-65 verkregen).
- Aansluiting binnen in het metalen huis d.m.v. schroefaansluiting. De kabeldoorvoer heeft een "PG" aansluiting.
- Spoelen met platte stekar (AMP type).
- Losse of aangegoten kabels

IN GEBRUIK STELLEN

Voordat de druk aangesloten wordt dient een elektrische test te worden uitgevoerd. Ingeval van magneetafsluiters, legt men meerdere malen spanning op de spoel aan waarbij een duidelijk "klikken" hoorbaar moet zijn bij juist funktioneren.

GEBRUIK

De meeste magneetafsluiters zijn uitgevoerd met spoelen voor continu gebruik. Omdat persoonlijke of zakelijke schade kan ontstaan bij aanraking dient men dit te vermijden, daar bij langdurige inschakeling de spoel of het spoelhuis heet kan worden.

GELUIDSEMISSIE

Dit hangt sterk af van de toepassing en het gebruikte medium. De bepaling van het geluidsniveau kan pas uitgevoerd worden nadat het ventiel is ingebouwd.

ONDERHOUD

Het onderhoud aan de afsluiters is afhankelijk van de bedrijfsomstandigheden.
In bepaalde gevallen moet men bedacht zijn op media welke sterke vervuiling binnen in het produkt kunnen veroorzaken.
Men dient dan regelmatig inspecties uit te voeren door de afsluiter te openen en te reinigen. Indien ongewone slijtage optreedt dan zijn reserve onderdelensets beschikbaar om een inwendige revisie uit te voeren.
Ingeval problemen of onduidelijkheden tijdens montage, gebruik of onderhoud optreden dan dient men zich tot ASCO of haar vertegenwoordiger te wenden.

Een aparte fabrikanten verklaring van inbouw, in de zin van EU-richtlijn 89/392/EEG aanhangsel IIB kan door de afnemer na opgave van orderbevestigingsnummer en serienummer verkregen worden.
Dit product voldoet aan de essentiele vereisten van de EMC Richtlijn 89/336/EEG en amendementen, net als aan de richtlijnen 73/23/EEG en 93/68/EEG inzake laagspanning. Een afzonderlijke verklaring van overeenstemming is op verzoek verkrijgbaar. Vermeld a.u.b. het nummer van de opdrachtbevestiging en de serienummers van de betreffende producten.

ASCO PNEUMATIC CONTROLS
460 Greenway Industrial Drive
Suite J
Fort Mill, South Carolina 29715
Tel. (803) 548-1300 Fax (803) 548-1440

ASCOMATICA S.A. de C.V.
Bosques de Duraznos No. 65-1003A
Fraccionamiento Bosques de las Lomas
Delegacion Miguel Hildago
Mexico, D.F. CP11700

ASCOLECTRIC LTD.
PO. Box 160 (Airport Road)
Brantford, Ontario N3T 6M8
Tel. (519) 758-2700
Fax (519) 758-5540

ULTRA-FLEX

Unique design characteristics enable Wilden pumps to excel in a wide variety of applications where other pump types fail. Patent-pending Ultra-Flex diaphragm technology further increases Wilden pump effectiveness by increasing parts life.

The majority of diaphragm pump maintenance cost is attributed to the primary wear part: *the diaphragm.* At Wilden, we understand that increased diaphragm life will decrease down time, reduce maintenance cost, and maximize return on investment. To this end, Wilden engineered the longest-lasting diaphragm design in the industry making the Wilden pump *your* only choice.

PERFORMANCE DATA (STANDARD)

	M4		M8		M15
	METAL	PLASTIC	METAL	PLASTIC	
Max. Flow Rate (GPM)*:	70	70	140	140	206
Suction Lift (Ft. Dry):	15	10	14	11	19
Suction Lift (Ft. Wet):	29	26	30	30	30
Displacement per Stroke (Gal.):	.18	.18	.47	.47	1.12
Max. Size Solids (Inches):	3/16"	3/16"	1/4"	1/4"	3/8"

PERFORMANCE DATA (METRIC)

	METAL	PLASTIC	METAL	PLASTIC	
Max. Flow Rate (LPM)*:	265	265	530	530	780
Suction Lift (Meters Dry):	4.7	3	4.2	3.4	5.8
Suction Lift (Meters Wet):	8.8	7.9	9.1	9.1	9.1
Displacement per Stroke (Liter):	.68	.68	1.78	1.78	4.24
Max. Size Solids (mm):	4.76	4.76	6.35	6.35	9.52

*Approx. 8% flow rate reduction as compared to standard Wilden diaphragms

TEMPERATURE LIMITS

Neoprene	0 (–17.8) to +200 (93.3) F° (C°)
Buna-N	+10 (–12.2) to +180 (82.2) F° (C°)
Nordel	–60 (–51.1) to +280 (137.8) F° (C°)
Viton	–40 (–40.0) to +350 (176.7) F° (C°)

ISO 9001 1955 QUALITY SYSTEM

WILDEN®

AIR OPERATED DOUBLE DIAPHRAGM PUMPS

22069 Van Buren St., Grand Terrace, CA 92313-5651
Telephone (909) 422-1730 • Fax (909) 783-3440
Internet http://www.wildenpump.com

M4 ULTRA-FLEX® ASSEMBLY INSTRUCTIONS

view the M4 maintenance manual (RBG PS-04) in its entirety or to performing retrofit procedure or pump maintenance.

STEP 1: Remove inlet and discharge manifolds as per RBG PS-04.

STEP 2: Remove liquid chambers (2) as per RBG PS-04.

STEP 3: Remove outer pistons (2) as per RBG PS-04.

STEP 4: Remove diaphragm, inner piston, and shaft as per RBG PS-04.

STEP 5: Replace center section seals (not included in retrofit kit) as per RBG PS-04. This step is not mandatory, but is strongly suggested to assure air distribution system reliability.

STEP 6: Insert shaft into center section bushing as per RBG PS-04. Apply a small amount of ISO 15-5 wt. oil to the shaft prior to insertion.

STEP 7: Assemble as per the drawing below.

STEP 8: Torque outer pistons as per the torque matrix.

STEP 9: Reassemble liquid chambers and manifolds as per RBG PS-04.

STEP 10: Test pump with water prior to installing in application.

M4 ULTRA-FLEX DIAPHRAGMS

MATERIAL	QTY.	PART NUMBER
Neoprene	2	04-1020-51
Buna-N	2	04-1020-52
Viton	2	04-1020-53
Nordel	2	04-1020-54

M4 SHAFT

MATERIAL	QTY.	PART NUMBER
Chromed Steel	1	04-3830-09-07

M4 SPACER

MATERIAL	QTY.	PART NUMBER
Mild Steel	2	04-3860-08

M4 OUTER PISTONS

MATERIAL	QTY.	PART NUMBER
Aluminum	2	04-4560-01
Cast Iron	2	04-4560-02
316 S.S.	2	02-4550-03
Hastelloy	2	02-4550-04
PVDF	2	04-4560-21

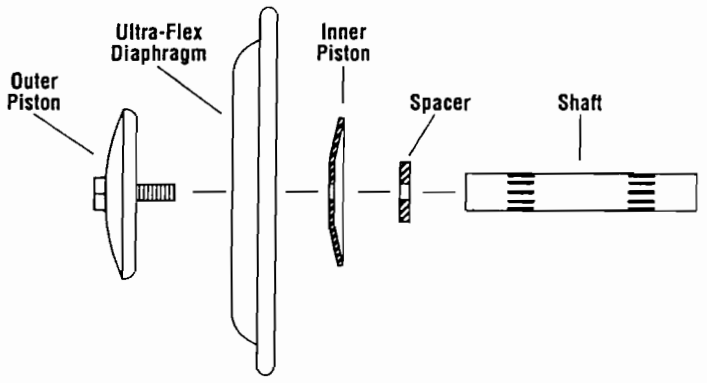
M4 INNER PISTON

MATERIAL	QTY.	PART NUMBER
Mild Steel	2	04-3760-08

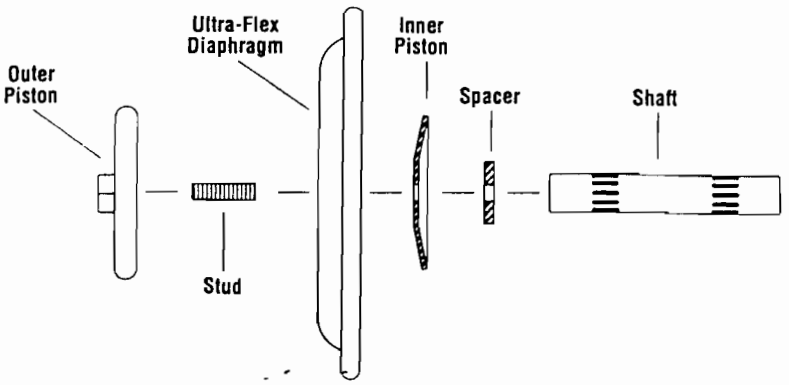
M4 SHAFT STUD

MATERIAL	QTY.	PART NUMBER
Mild Steel	2	04-6152-08

Assembly drawing for the following outer piston materials: Aluminum, PVDF



Assembly drawing for the following outer piston materials: Cast Iron, 316 S.S., Hastelloy



M8 ULTRA-FLEX® ASSEMBLY INSTRUCTIONS

Review the M8 maintenance manual (RBG PS-08) in its entirety prior to performing retrofit procedure or pump maintenance.

STEP 1: Remove inlet and discharge manifolds as per RBG PS-08.

STEP 2: Remove liquid chambers (2) as per RBG PS-08.

STEP 3: Remove outer pistons (2) as per RBG PS-08.

STEP 4: Remove diaphragm, inner piston, and shaft as per RBG PS-08.

STEP 5: Replace center section seals (not included in retrofit kit) as per RBG PS-08. This step is not mandatory, but is strongly suggested to assure air distribution system reliability.

STEP 6: Insert shaft into center section bushing as per RBG PS-08. Apply a small amount of ISO 15-5 wt. oil to the shaft prior to insertion.

STEP 7: Assemble as per the drawing below.

STEP 8: Torque outer pistons as per the torque matrix.

STEP 9: Reassemble liquid chambers and manifolds as per RBG PS-08.

STEP 10: Test pump with water prior to installing in application.

M8 ULTRA-FLEX DIAPHRAGMS

MATERIAL	QTY.	PART NUMBER
Neoprene	2	08-1020-51
Buna-N	2	08-1020-52
Viton	2	08-1020-53
Nordel	2	08-1020-54

M8 SHAFT

MATERIAL	QTY.	PART NUMBER
Chromed Steel	1	08-3820-09-07

M8 SPACER

MATERIAL	QTY.	PART NUMBER
Mild Steel	2	08-3860-08

M8 OUTER PISTONS

MATERIAL	QTY.	PART NUMBER
Aluminum	2	08-4560-01
Cast Iron	2	08-4560-02
316 S.S.	2	04-4550-03
Hastelloy	2	04-4550-04
PVDF	2	08-4560-21

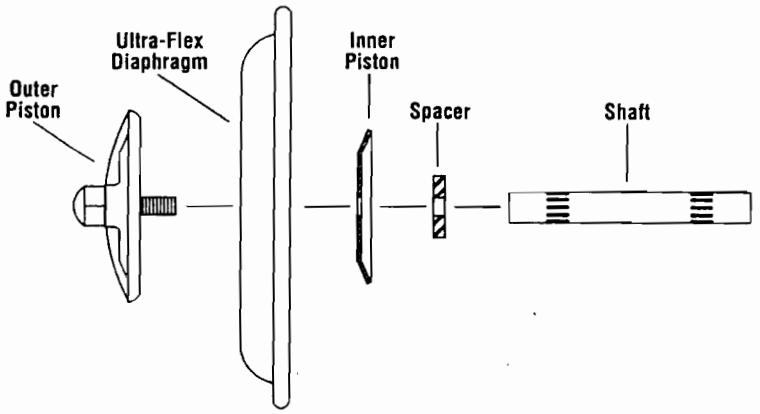
M8 INNER PISTON

MATERIAL	QTY.	PART NUMBER
Mild Steel	2	04-3700-08

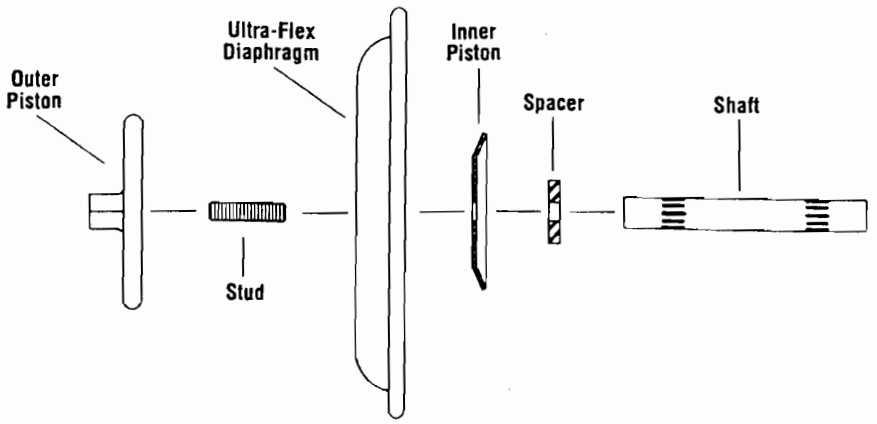
M8 SHAFT STUD

MATERIAL	QTY.	PART NUMBER
Mild Steel	2	08-6152-08

Assembly drawing for the following outer piston materials: Aluminum, PVDF



Assembly drawing for the following outer piston materials: Cast Iron, 316 S.S., Hastelloy



M15/M20 ULTRA-FLEX® ASSEMBLY INSTRUCTIONS

Review the M15 maintenance manual (RBG PS-05) in its entirety prior to performing retrofit procedure or pump maintenance.

STEP 1: Remove inlet and discharge manifolds as per RBG PS-05.

STEP 2: Remove liquid chambers (2) as per RBG PS-05.

STEP 3: Remove outer pistons (2) as per RBG PS-05.

STEP 4: Remove diaphragm, inner piston, and shaft as per RBG PS-05.

STEP 5: Replace center section seals (not included in retrofit kit) as per RBG PS-05. This step is not mandatory, but is strongly suggested to assure air distribution system reliability.

STEP 6: Insert shaft into center section bushing as per RBG PS-05. Apply a small amount of ISO 15-5 wt. oil to the shaft prior to insertion.

STEP 7: Assemble as per the drawing below.

STEP 8: Torque outer pistons as per the torque matrix.

STEP 9: Reassemble liquid chambers and manifolds as per RBG PS-05.

STEP 10: Test pump with water prior to installing in application.

M15/M20 ULTRA-FLEX DIAPHRAGMS

MATERIAL	QTY.	PART NUMBER
Neoprene	2	15-1020-51
Buna-N	2	15-1020-52
Viton	2	15-1020-53
Nordel	2	15-1020-54

M15/M20 SHAFT

MATERIAL	QTY.	PART NUMBER
Chromed Steel (M15)	1	15-3800-09-07
Chromed Steel (M20)	1	20-3800-09-07

M15/M20 SPACER

MATERIAL	QTY.	PART NUMBER
Mild Steel	2	15-6850-08

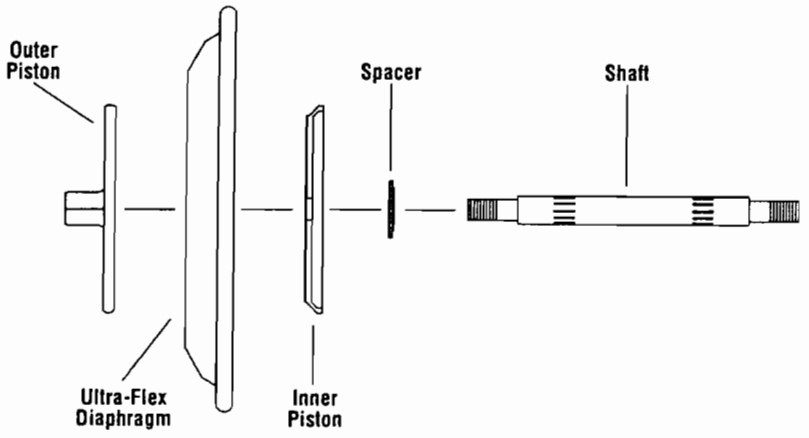
M15/M20 OUTER PISTONS

MATERIAL	QTY.	PART NUMBER
Aluminum	2	15-4560-01
Cast Iron	2	15-4560-02
316 S.S.	2	15-4560-03
Hastelloy	2	15-4560-04

M15/M20 INNER PISTON

MATERIAL	QTY.	PART NUMBER
Mild Steel	2	15-3760-08

Assembly drawing for all outer piston materials



ULTRA-FLEX® RETROFIT KIT PART NUMBERS

DIAPHRAGM / OUTER PISTON	M4	M8	M15
Neoprene / Aluminum	04-9240-99	08-9240-99	15-9240-99
Neoprene / Cast Iron	04-9241-99	08-9241-99	15-9241-99
Neoprene / 316 S.S.	04-9242-99	08-9242-99	15-9242-99
Neoprene / Hastelloy	04-9243-99	08-9243-99	15-9243-99
Neoprene / PVDF	04-9244-99	08-9244-99	NA
Buna-N / Aluminum	04-9250-99	08-9250-99	15-9250-99
Buna-N / Cast Iron	04-9251-99	08-9251-99	15-9251-99
Buna-N / 316 S.S.	04-9252-99	08-9252-99	15-9252-99
Buna-N / Hastelloy	04-9253-99	08-9253-99	15-9253-99
Buna-N / PVDF	04-9254-99	08-9254-99	NA
Nordel / Aluminum	04-9260-99	08-9260-99	15-9260-99
Nordel / Cast Iron	04-9261-99	08-9261-99	15-9261-99
Nordel / 316 S.S.	04-9262-99	08-9262-99	15-9262-99
Nordel / Hastelloy	04-9263-99	08-9263-99	15-9263-99
Nordel / PVDF	04-9264-99	08-9264-99	NA
Viton / Aluminum	04-9270-99	08-9270-99	15-9270-99
Viton / Cast Iron	04-9271-99	08-9271-99	15-9271-99
Viton / 316 S.S.	04-9272-99	08-9272-99	15-9272-99
Viton / Hastelloy	04-9273-99	08-9273-99	15-9273-99
Viton / PVDF	04-9274-99	08-9274-99	NA

M20 Retrofit Kits are not available. Parts are sold separately.
M8 Stallion models utilize the same retrofit kits as standard M8 pump models.

Ultra-Flex retrofit kits include all the parts necessary to retrofit your existing rubber or Teflon®-fitted Wilden pump to Ultra-Flex technology. The kit includes the following items:

- Qty. 2 Ultra-Flex diaphragms (material is specified in the part description)
- Qty. 2 Outer pistons (material is specified in the part description)
- Qty. 2 Mild steel inner pistons
- Qty. 2 Mild steel spacers
- Qty. 1 Diaphragm connecting shaft
- Qty. 2 Shaft studs (where applicable)

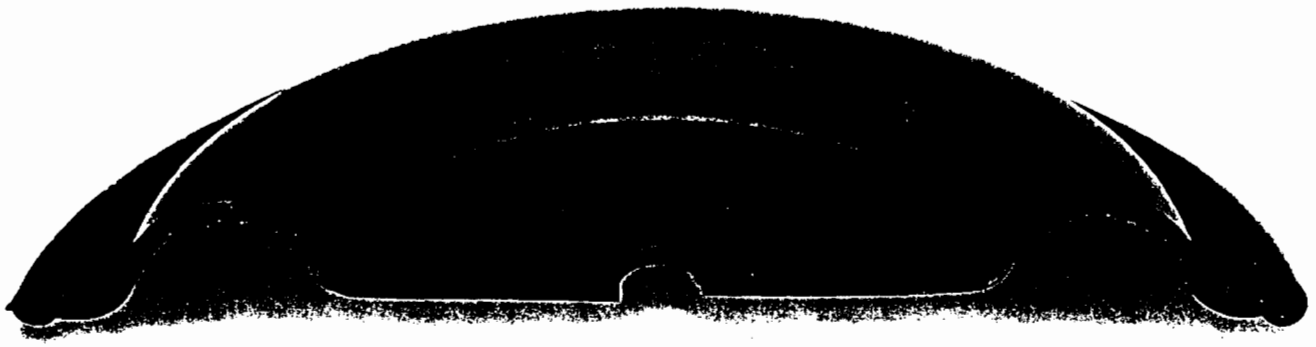
MAXIMUM TORQUE SPECIFICATIONS

	METAL CONSTRUCTION	PLASTIC CONSTRUCTION
M4 Outer Piston	38 ft-lbs	25 ft-lbs
M8 Outer Piston	60 ft-lbs	38 ft-lbs
M15 Outer Piston	95 ft-lbs	N/A

NOTE: M20 torque specifications are the same as the M15.
The M15 pump model is not available in plastic construction.

LONGER LIFE GUARANTEE

All Ultra-Flex® diaphragms are guaranteed to deliver longer life than your existing Wilden diaphragms. If less flex life is realized, Wilden will send you a new set of Ultra-Flex® diaphragms free of charge. This comparison must be conducted in the same pump, utilizing the same diaphragm material on the same application. Failures due to misapplication, as well as, consequential damage to other pump components and/or associated equipment are not covered by this guarantee.



ULTRA-FLEX®

PROGRESSIVE DIAPHRAGM TECHNOLOGY

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AIR OPERATED DOUBLE DIAPHRAGM PUMPS

22069 Van Buren St., Grand Terrace, CA 92313-5651
Telephone (909) 422-1730 • Fax (909) 783-3440
Internet http://www.wildenpump.com

YOUR LOCAL DISTRIBUTOR IS:

RBG PSUF 10/96

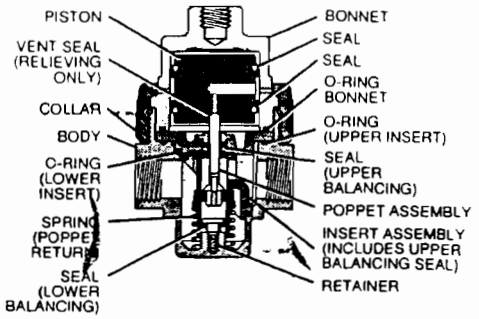
Schrader Bellows®

Pneumatic Division North America
Richland, Michigan 49083

Installation and Service Instructions: 2R200SB

1/4", 3/8" & 1/2" 11R
3/8", 1/2" & 3/4" 12R
Pilot Controlled Regulator

ISSUED: February, 1995
NPR# 6450



Installation

1. The regulator should be installed with reasonable accessibility for service whenever possible – repair service kits are available. Keep pipe or tubing lengths to a minimum with inside clean and free of dirt and chips. Pipe joint compound should be used sparingly and applied only to the male pipe – never into the female port. Do not use Teflon† tape to seal pipe joints – pieces have a tendency to break off and lodge inside the unit, possibly causing malfunction.
2. Install regulator so that air flow is in the direction of arrow. Installation must be upstream from devices it is to service (lubricator, valve, cylinder or tool), and mounted closely to these devices. Mounting may be in any position.
3. Gauge ports are located on both sides of the regulator body for your convenience. It is necessary to install a gauge or socket pipe plug into each port during installation.
4. For protection against rust, pipe scale and other foreign matter, install a filter on the upstream (high pressure) side as closely to the regulator as possible.

⚠ WARNING

To avoid unpredictable system behavior that can cause personal injury and property damage:

- **Disconnect air supply and depressurize all air lines connected to this product before installation, servicing, or conversion.**
- **Operate within the manufacturer's specified pressure, temperature, and other conditions listed in these instructions.**
- **Medium must be moisture-free if ambient temperature is below freezing.**
- **Service according to procedures listed in these instructions.**
- **Installation, service, and conversion of these products must be performed by knowledgeable personnel who understand how pneumatic products are to be applied.**
- **After installation, servicing, or conversion, air supply should be connected and the product tested for proper function and leakage. If audible leakage is present, or the product does not operate properly, do not put into use.**
- **Warnings and specifications on the product should not be covered by paint, etc. If masking is not possible, contact your local representative for replacement labels.**

Application Limits

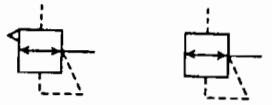
These products are intended for use in general purpose compressed air systems only.

Operating Pressure:	psig	bar	kPa
Maximum Inlet Pressure	250	17	1700

Operating Temperature:

Maximum Temperature	+175°F (+80°C)
Minimum Temperature	+32°F (0°C)

ANSI Symbols



Relieving | Non-Relieving

† Trademark E.I. Du Pont de Nemours & Co.

Operation and Service

1. Before turning on the air supply, turn the adjusting knob on the master regulator until compression is released from the pressure control spring. Turn on air supply to the master regulator and the pilot controlled regulator. Adjust the downstream pressure by turning adjusting knob on the master regulator until the desired downstream pressure is obtained.
2. To decrease regulated pressure setting, always reset from a pressure lower than the final setting required. Example, lowering the secondary pressure from 80 PSIG to 60 PSIG is best accomplished by dropping the secondary pressure to 50 PSIG, then adjusting upward to 60 PSIG.
3. To service the regulator piston, poppet assembly and seat insert:
   A. Shut off air supply and depressurize the unit. Turn the adjusting knob on the master regulator until pilot pressure is relieved on the pilot controlled regulator.
   B. Unscrew the threaded collar and remove the bonnet assembly.
   C. Disassemble, clean and carefully inspect parts for wear or damage. If replacement is necessary, use parts from the service kits.
   D. Lubricate poppet bore, poppet stem, lower balancing seal, and all O-rings with grease found in kit.
   E. Lubricate bonnet bore with grease found in kit. Carefully install piston seals as shown in assembly drawing. The V side of each seal must be installed facing the end of the piston. Install vent seal if repairing a relieving regulator. Do not grease the outside of the vent seal. Install piston assembly into bonnet.
   F. Install poppet return spring, poppet assembly, O-rings, and seat insert.
   G. Assemble bonnet assembly to body and tighten threaded collar hand tight plus 1/4 turn.
4. Turn on air pressure and check regulator for leakage. If leakage occurs, DO NOT OPERATE — conduct repairs again.

MAINTENANCE SERVICE KITS	06R 1/4", 3/8" & 1/2"	07R 3/8", 1/2" & 3/4"
Relieving Regulator Repair Kit	PS749SB	PS849SB
Non-Relieving Regulator Repair Kit	PS747SB	PS847SB
Seat Insert Repair Kit	PS713SB	PS813SB

WILKERSON CORPORATION

INSTALLATION AND MAINTENANCE SHEET

Regulator Model B18 and B28, B28A

⚠ WARNING ⚠

EXCEPT as otherwise specified by the manufacturer, this product is specifically designed for compressed air service, and use with any other fluid (liquid or gas) is a misapplication. For example, use with or injection of certain hazardous liquids or gases in the system (such as alcohol or liquid petroleum gas) could be harmful to the unit or result in a combustible condition or hazardous external leakage. Manufacturer's warranties are void in the event of misapplication, and manufacturer assumes no responsibility for any resulting loss. Before using with fluids other than compressed air, or for nonindustrial applications, or for life support systems consult manufacturer for written approval.

ATTENTION: Make sure bowl is fully inserted into body, and then fully turned to lock bowl in place before applying air pressure to unit. When bowl is properly installed, the alignment markings on the bowl/bowlguard assembly and the marks on the body will line up, indicating proper assembly. Failure to do so may cause air pressure to blow bowl off of unit, resulting in serious personal injury or death.

INSTALLATION

1. Refer to WARNING prior to installation.
2. Install as close to the point of use as possible.
3. Unit must be installed with the flow in the direction of the flow arrow on the body cover and with bowl down.
4. Avoid using reducing bushings, couplings, etc., whenever possible to install this product. These devices restrict air flow and can affect performance.
5. Install filter/regulator in a vertical position with bowl side down.
6. Maximum inlet pressure and temperatures are as follows:
   —Plastic bowl/bowl guard assembly:
   —150 psig (10,3 bar)
   —125°F (51,7°C)
   —Metal bowl with sight gauge:
   —250 psig (17,2 bar)
   —175°F (79,4°C)
7. This product is supplied with two auxiliary ports located on the front and rear faces of the body. These ports may be used as additional filtered/regulated ports or for pressure gauges. A pipe plug is supplied to block the unused port. Make sure pipe plug is sealed before installation.
8. To increase regulated pressure, pull adjusting knob up and turn clockwise. To reduce pressure, turn knob counterclockwise. To lock knob, push down.
9. To panel mount this unit the following applies:
   —Model B18: Panel clearance hole diameter = 1.94" (49,3 mm).
   —Model B18: Panel thickness 3/16" (4,8 mm) Max.
   —Model B28: Panel clearance hole diameter = 2.44" (61,9 mm).
   —Model B28: Panel thickness 3/16" (4,8 mm) to drain stem.
10. To install a drain line, use the following procedure:
    —On units with the MANUAL DRAIN, attach flexible tubing having an I.D. of 3/16" (4,8 mm) to drain stem.
    —On units with the AUTOMATIC FLOAT DRAIN, install using a 1/4 NPT fitting and flexible tubing.

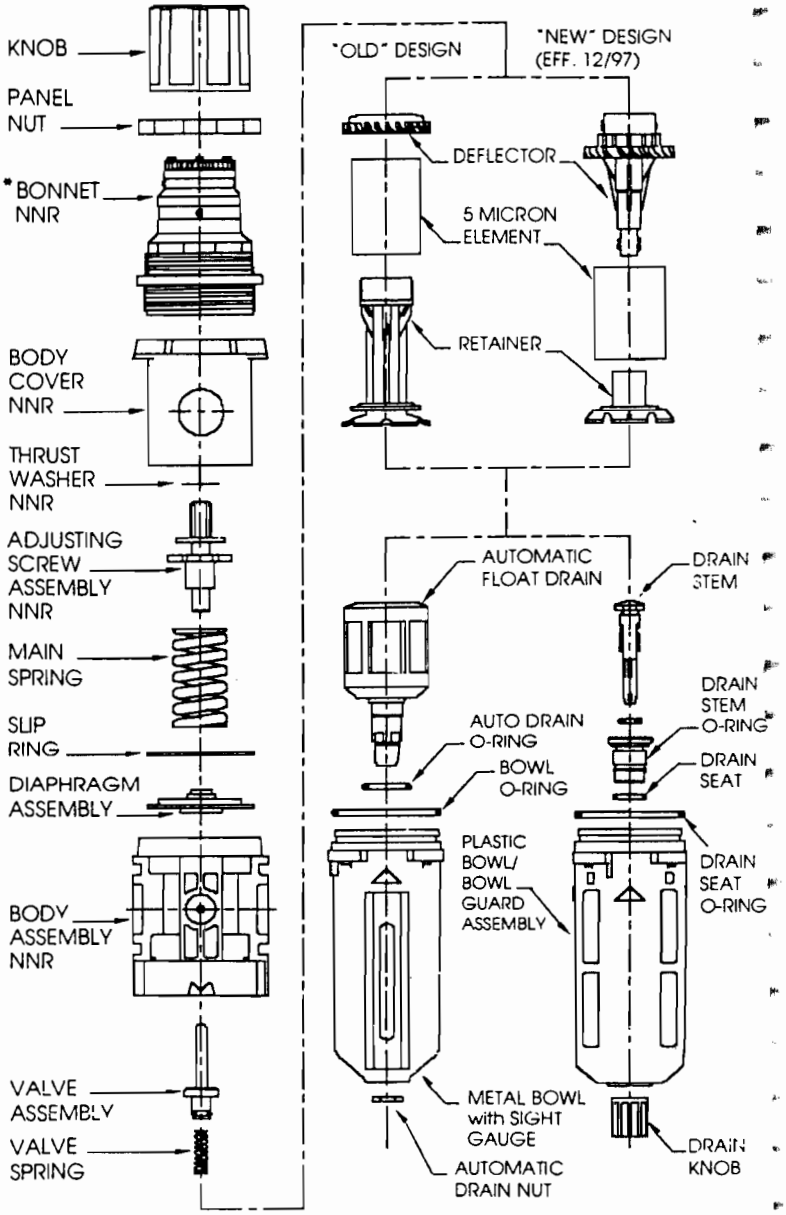
MAINTENANCE

⚠ **DEPRESSURIZE SYSTEM BEFORE ATTEMPTING SERVICE!**

THIS UNIT MAY BE SERVICED WITHOUT REMOVING THE UNIT FROM THE COMPRESSED AIR LINE. UNIT SHOULD BE SERVICED AT LEAST EVERY SIX MONTHS.

NOTE: The B28 and B28A (series A) have different internal parts and require the use of different repair kits. The B28A is current design and production began in December 1997. For identification purposes, the Bonnet of the B28 has "28A" permanently marked in two places on the shoulder above the panel nut threads. Also, internally the body has raised characters "28A." Once the diaphragm is removed, this can be seen. Parts from B28 and B28A units are NOT interchangeable. You can NOT use B28 unit parts in B28A units; nor can you use B28A parts in B28 units. When repairing the B28 and the B28A units, make your identification by looking for the identifying "28A" mark on the bonnet, and then select the repair part numbers accordingly from the parts listed on the back of this sheet. If you are unsure of which regulator you have, contact your local Wilkerson distributor or call Wilkerson.

1. Filter element replacement:
   a. DEPRESSURIZE both upstream and downstream pressure.
   b. Remove bowl/bowl guard assembly by pushing up on bowl assembly and turning counter-clockwise (viewed from below). Clean inside of bowl using a clean, dry cloth. Inspect plastic bowl for damage and replace if necessary.
   c. Remove filter element by turning retainer counter-clockwise.
   d. Remove old element and discard. On series B28, care must be taken at this step not to lose or misplace the valve spring and valve assembly, as these components may be removed during this procedure.
   e. Install a new filter element and reassemble in reverse order. See table on reverse side for torque values.
2. Valve assembly:
   a. Depressurize both upstream and downstream pressure.
   b. Remove bowl/bowl guard assembly and element retainer assembly as outlined in maintenance Step #1. Additionally, the 28A deflector needs to be removed. Care must be taken at this step not to lose or misplace the valve spring and valve assembly, as these components may be removed during this procedure.



MAINTENANCE (cont.)

   c. Remove the valve spring and valve assembly, if not already done.
   d. Inspect all seals and components for damage and replace as required. Clean seals and components with mild detergent and water (No Solvents!). Use a clean, dry cloth to wipe any contamination from the valve seat inside the body.
   e. Lubricate valve stem and lower valve o-ring seal with a light coat of Parker O-Lube™ lubricant, or equivalent.
   f. Reassemble in reverse order. See table on reverse side for torque values.
3. ⚠ Main Spring and Diaphragm:
   a. Depressurize unit, both upstream and downstream.
   b. Turn adjusting knob counterclockwise to remove all spring force, then remove bonnet by turning counter-clockwise.
   c. Remove adjusting screw assembly, main spring, slip ring and diaphragm assembly.

* 28A PERMANENTLY MARKED ON 28A BONNET

NNR = Not Normally Replaced

(Repair Kits and Replacement Parts see reverse side.)

84-014 000 1/98
Printed in U.S.A.

MAINTENANCE (cont.)

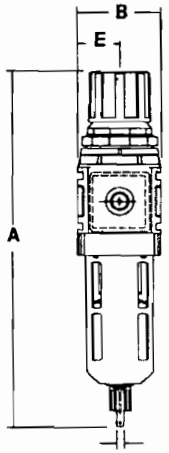
d. Inspect diaphragm and the relief seat, on relieving models, for damage or contamination. Replace diaphragm assembly if necessary. Clean relief seat with a soft, dry cloth. Reassemble in the reverse order making sure slip ring is properly positioned on top of the diaphragm. Bonnet torque values are shown in the table below.

4. Liquid level in the bowl must be kept below the level indicator line as marked. It is recommended practice to drain a unit equipped with the manual drain at least once during an eight (8) hour period. To do so, rotate the drain knob to the left one or two turns.*
5. To clean the AUTOMATIC FLOAT DRAIN, remove the drain nut and drain. DO NOT DISASSEMBLE THIS DRAIN! Clean the drain in warm soapy water and blow dry with compressed air. (NO SOLVENTS!)
6. Before returning unit to service, insure that all seals have been properly reinstalled or replaced and components requiring torque have been properly tightened. Also, insure that bowl seal o-ring and bowl have been installed properly and that the bowl is in the locked position and the drain is properly secured.

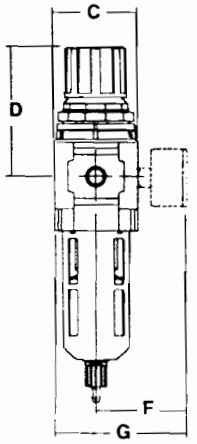
TROUBLE-SHOOTING LEAKS

1. If regulated pressure begins to creep, an uncontrolled rise in regulated pressure, it will most likely be caused by contamination on the valve seat. Refer to Maintenance Step #2, Valve Assembly to remedy the condition.
2. If the unit leaks from the vent holes in the bonnet, it may be caused by contamination on the diaphragm relief seat, seal deterioration of relief seat or diaphragm damage. Refer to Steps #2 and #3 under maintenance to remedy the condition. Replace all damaged or worn components.

***NOTE: In the event the drain knob is over-rotated, it may become disengaged from the drain stem. In such a case, pull down on both the knob and the stem while rotating clockwise to re-engage. (viewed from below.)**



FRONT VIEW



SIDE VIEW

DIMENSIONS

INCHES
(millimeters)

Torque Specifications

Models	Retainer	Deflector	Bonnet	A	B	C	D	E	F	G
B18	**9-11 in. - lbs.** (1,0-1,2 N-m)	**19-21 in. lbs.** (2,1-2,4 N-m)	**23-25 ft. - lbs.** (31,2-33,9 N-m)	**10.0** (254)	**2.36** (60)	**2.26** (60)	**3.66** (93)	**1.2** (30)	**2.57** (65)	**3.74** (95)
B28, B28A	**9-11 in. - lbs.** (1,0-1,2 N-m)	**19-21 in. lbs.** (2,1-2,4 N-m)	**23-25 ft. - lbs.** (31,2-33,9 N-m)	**11.4** (291)	**2.9** (73)	**2.9** (73)	**4.1** (149)	**1.44** (37)	**2.83** (72)	**4.27** (108)

REPAIR KITS AND REPLACEMENT PARTS

Note: Standard seal material is Nitrile.

	Tamper Resistant Kit	Aluminum Panel Nut	Plastic Panel Nut	Self-Relieving Diaphragm Kit	Nonrelieving Diaphragm Kit	Valve Assembly (Valve stem-valve spring)	Pressure Springs 0-30 PSIG (0-2,1 bar)	Pressure Springs 0-60 PSIG (0-4,1 bar)	Pressure Springs 0-125 PSIG (0-8,6 bar)	Pressure Springs 0-250 PSIG (0-17,2 bar)	Element, 5 Micron	Element, Retainer & Deflector Kit	Adjusting Knob
B18	**RRP-96-671**	**RRP-96-673**	**RRP-96-675**	**RRP-96-656**	**RRP-96-657**	**RRP-96-658**	**RRP-96-659**	**RRP-96-660**	**RRP-96-661**	**RRP-96-662**	**FRP-96-639**	**FRP-96-641**	**RRP-16-340-000**
B28	**RRP-96-672**	**RRP-96-674**	**RRP-96-676**	**RRP-96-682**	**RRP-96-683**	**RRP-96-684**	**RRP-96-614**[1]	**RRP-96-615**[1]	**RRP-96-624**[1]	**RRP-96-625**[1]	**FRP-96-653**	**FRP-96-655**[1]	**RRP-16-341-000**
B28A	**RRP-96-672**	**RRP-96-674**	**RRP-96-676**	**RRP-96-986**	**RRP-96-987**	**RRP-96-049**	**RRP-96-163**	**RRP-96-164**	**RRP-96-165**	**RRP-96-166**	**FRP-96-653**	**FRP-96-283**	**RRP-16-341-000**

[1] No longer available after December 1997. Replaced with 28A kits.

ACCESSORIES

Joiner set.....**GPA-96-601**
T-Bracket.....**GPA-96-602**
T-Bracket with Joiner set.....**GPA-96-603**
L-Bracket (R18).....**GPA-96-606**
L-Bracket (R28).....**GPA-96-607**
Pressure Gauges:
0-30 PSI.....**RRP-96-663**
0-60 PSI.....**RRP-96-664**
0-160 PSI.....**RRP-96-665**
0-300 PSI.....**RRP-96-666**
0-2,0 bar.....**RRP-96-667**
0-4,2 bar.....**RRP-96-668**
0-11,2 bar.....**RRP-96-669**
0-21 bar.....**RRP-96-670**

DRAINS

Manual Drain.....**GRP-96-685**
Automatic Mechanical Drain (Nitrile)-1/8 NPT.....**GRP-95-973**
Low Flow Drain (Nitrile)-1/8 NPT.....**GRP-95-400**
Automatic Drain (Fluorocarbon)-1/8 NPT.....**GRP-95-981**
Low Flow Drain (Fluorocarbon)-1/8 NPT.....**GRP-96-500**

Automatic Mechanical Drain (Nitrile)-1/8 BSP.....**GRP-96-200**
Low Flow Drain (Nitrile)-1/8 BSP.....**GRP-96-600**
Automatic Drain (Fluorocarbon)-1/8 BSP.....**GRP-96-300**
Low Flow Drain (Fluorocarbon)-1/8 BSP.....**GRP-96-700**