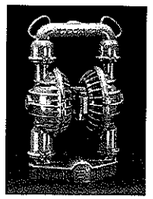
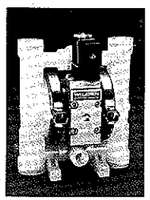
WILDEN'S SPECIALTY PUMPS

M8 STALLION



2" inlet. Solids clearance up to ⅞". Built to handle rough treatment: cast-in handles for easy portability, reinforced shaft and high impact polyurethane base.

SOLENOID-OPERATED

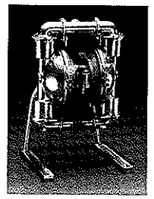


Each stroke of this pump is controlled by electrical impulses making it ideal for batching, metering, and other electrically controlled dispensing applications.

M1 ULTRAPURE III

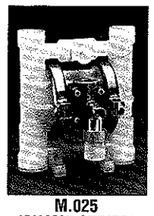
½" inlet. Teflon® PFA construction, temperatures to 300°F. Up to 14 GPM. Materials of construction have been selected to reduce contamination while providing a safer work environment.

FOOD PROCESSING



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)

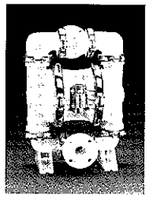
MODEL M.025

- ¼" Inlet
- 125 Max. PSIG
- Up To 4.5 GPM
- Max. Particle Size: 1/64"

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

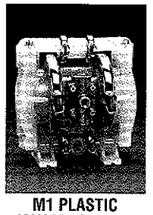
- 1½" Inlet
- 125 Max. PSIG
- Up To 73 GPM
- Max. Particle Size: 3/16"

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



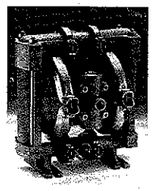
M1 PLASTIC (CHAMP SERIES)

MODEL M1

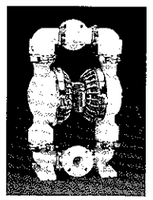
- ½" Inlet
- 110 Max. PSIG
- Up To 14 GPM
- Max. Particle Size: 1/16"

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)

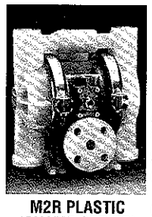
MODEL M8

- 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



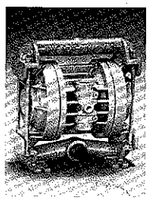
M2R PLASTIC (CHAMP SERIES)

MODEL M2

- 1" Inlet
- 125 Max. PSIG
- Up To 37 GPM
- Max. Particle Size: ⅛"

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

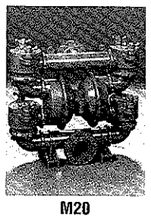
M15

MODEL M15

- 3" Inlet
- 125 Max. PSIG
- Up To 230 GPM
- Max. Particle Size: ⅜"

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: 1⅜"

Materials of Construction:
Cast Iron

Suction Lift:
Dry: 13'
Wet: 25'

For further information contact your local Wilden distributor:

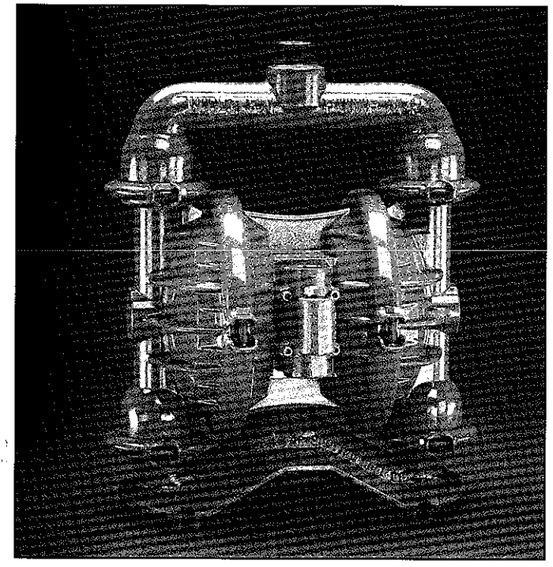
WILDEN PUMP & ENGINEERING COMPANY
22069 Van Buren St., Grand Terrace, CA 92313
(909) 422-1730 • FAX (909) 783-3440

WILDEN®

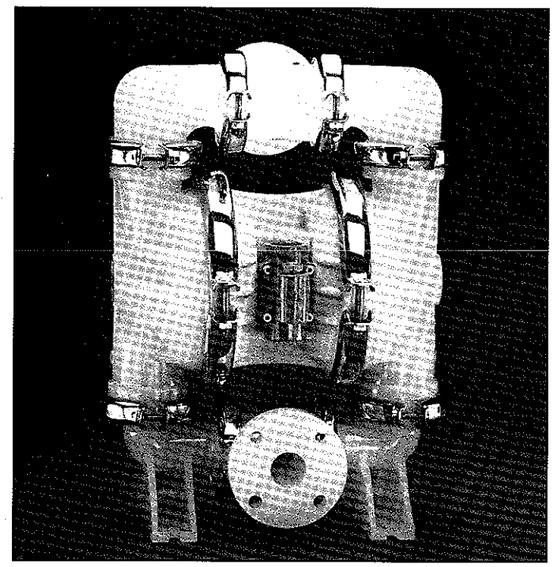
AIR OPERATED DOUBLE DIAPHRAGM PUMPS

M4 Engineering Operation and Maintenance

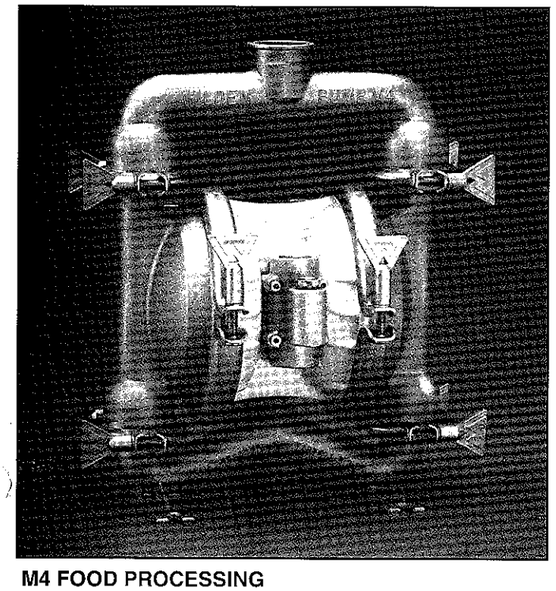
MODEL M4 METAL
MODEL M4 CHAMP
MODEL M4 FOOD PROCESSING
MODEL M4 ULTRAPURE



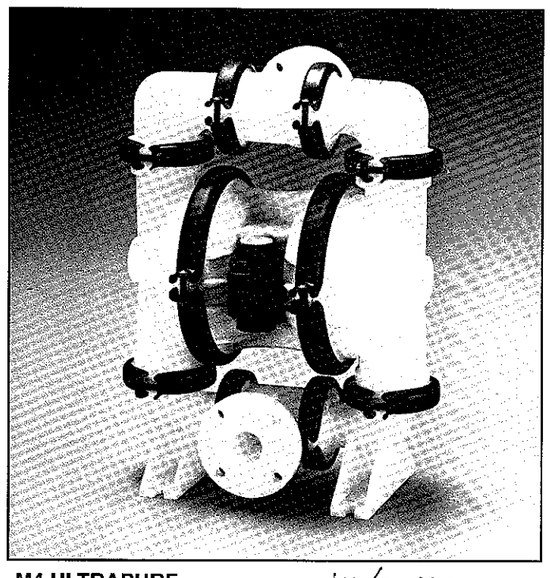
M4 METAL



M4 CHAMP



M4 FOOD PROCESSING



M4 ULTRAPURE

W/O NPS

RBG P/S-04 9/94
REPLACES 5/94

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.

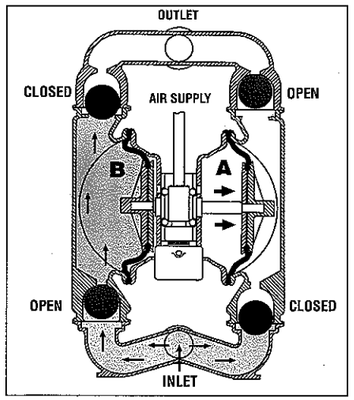


FIGURE 1 The air valve directs pressurized air to the back side of diaphragm A. The compressed air is applied directly to the liquid column separated by elastomer diaphragms. The diaphragm acts as a separation membrane between the compressed air and liquid, balancing the load and removing mechanical 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.

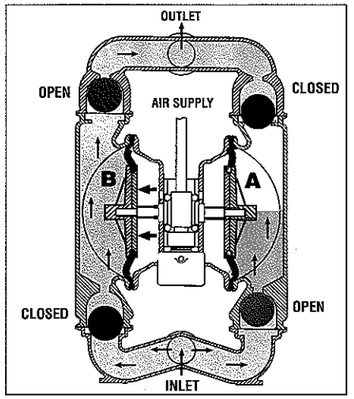


FIGURE 2 When the pressurized diaphragm, diaphragm A, reaches the limit of its discharge stroke, the air valve redirects pressurized air to the back side of diaphragm B. The pressurized air forces diaphragm B away from the center block while pulling diaphragm A to the center block. Diaphragm B is now 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.

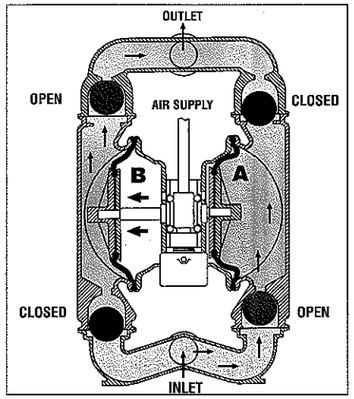


FIGURE 3 At completion of the stroke, the air valve again redirects air to the back side of diaphragm A, which starts diaphragm B on its exhaust stroke. As the pump reaches its original starting point, each diaphragm has gone through one exhaust and one discharge stroke. This constitutes one complete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

WILDEN PUMP DESIGNATION SYSTEM

XX / XX / XX / XX / XX
1 2 3 4 5 6

1 MODEL (SIZE)
2 WETTED CONSTRUCTION
3 NON-WETTED CONSTRUCTION
4 DIAPHRAGMS
5 VALVE BALLS
6 VALVE SEATS (O-RINGS)

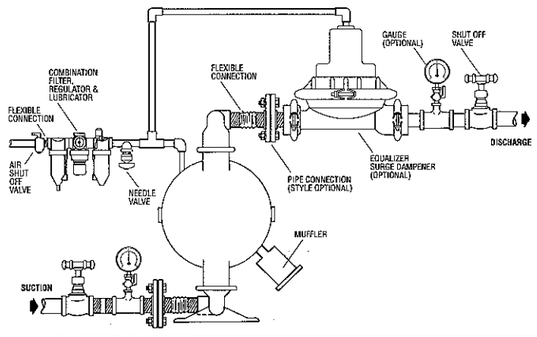
NOTE: UL-listed pumps must not exceed 50 psig air supply pressure.

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.

SUGGESTED INSTALLATION



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.

Torque Specifications for Model M4 (Metal and Plastic)

Item #	Description of Part	Maximum Torque	
		Metal	Plastic
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]	—

For Models M4/TO/BT/HT/ST/WT/SN/SNR

M4 TEFLON®-FITTED

Item	Description	Qty. Per Pump	M4/TO P/N	M4/BT P/N	M4/HT P/N	M4/ST P/N	M4/WT P/N	M4/SN P/N	M4/SNR P/N
1	Air Valve	1	60A	60A	60A	60A	60A	SG60A	SG60A
2	Air Valve Screen	1	60E	60E	60E	60E	60E	60E	60E
3	Air Valve Cap w/Guide (Top)	1	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23
4	Air Valve Cap w/o Guide (Bottom)	1	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23
5	Snap Ring	2	S60T	S60T	S60T	S60T	S60T	S60T	S60T
6	Air Valve Cap O-Ring	2	60U	60U	60U	60U	60U	60U	60U
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.[1] (optional)	1	60C	60C	60C	60C	60C	60C	60C
9	Lubricator Oil Bottle[1] (optional)	1	60D	60D	60D	60D	60D	60D	60D
10	Center Block	1	P60HA	P60HA	P60HA	P60HA	P60HA	SG60H	P60HA
11	O-Ring	7	20JH	20JH	20JH	20JH	20JH	20JH	20JH
12	Check Body	1	N/R	N/R	N/R	N/R	N/R	SG20K8	N/R
13	Nipple	1	N/R	N/R	N/R	N/R	N/R	20FS	N/R
14	Check Ball	1	N/R	N/R	N/R	N/R	N/R	20M	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	T61A	T61A	T61A	T61A	T61A	T61A	T61A
17	Shaft Stud	2	T61F	T61F	T61F	T61F	T61F	T61F	T61F
18	Piston, Outer	2	T61B	T61B	HT61B	ST61B	ST61B	ST61B	ST61B
19	Piston, Inner	2	TB61C	TB61C	TB61C	TB61C	TB61C	TB61C	TB61C
20	Air Chamber	2	N/R	N/R	N/R	N/R	N/R	SG62	N/R
21	Water Chamber	2	65	65	H65	S65	W65	S65	S65
22	Clamp Band (Large)	2	MPS64	MPS64	MPS64	MPS64	MPS64	SG64	SGMPS64
23	Clamp Band (Small)	4	S69	S69	S69	S69	S69	SG69	SG69
24	Discharge Manifold	1	66	B66	H66	S66	W66	SG66	SG66
25	Inlet Housing	1	67	B67	H67	S67	W67	SG67	SG67
26	Reducer Bushing	1	60AP	70AP	70AP	70AP	70AP	S60AP	S60AP
27	Air Valve Cap Screw	4	P70AS	P70AS	P70AS	P70AS	P70AS	P70AS	P70AS
28	Hex Head Cap Screw	3	N/R	N/R	N/R	N/R	N/R	62B	N/R
29	Hex Head Nut	3	N/R	N/R	N/R	N/R	N/R	62C	N/R
30	Diaphragm	2	TF63	TF63	TF63	TF63	TF63	TF63	TF63
31	Valve Ball	4	TF71	TF71	TF71	TF71	TF71	TF71	TF71
32	Valve Seat	4	A70	A70	H70	S70	CS70	S70	S70
33	Large Clamp Band Bolt	4	S64C	S64C	S64C	S64C	S64C	S64C	S64C
34	Large Hex Nut	4	S39C	S39C	S39C	S39C	S39C	SP39WN	SP39WN
35	Small Clamp Band Bolt	8	S69B	S69B	S69B	S69B	S69B	S69B	S69B
36	Small Hex Nut	8	S62C	S62C	S62C	S62C	S62C	SP69WN	SP69WN
37	Muffler Plate	1	P60M	P60M	P60M	P60M	P60M	N/R	P60M
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	4	S62C	S62C	S62C	S62C	S62C	N/R	S62C
40	Valve Seat O-Ring (not shown)	4	70T	70T	70T	70T	70T	70T	70T
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

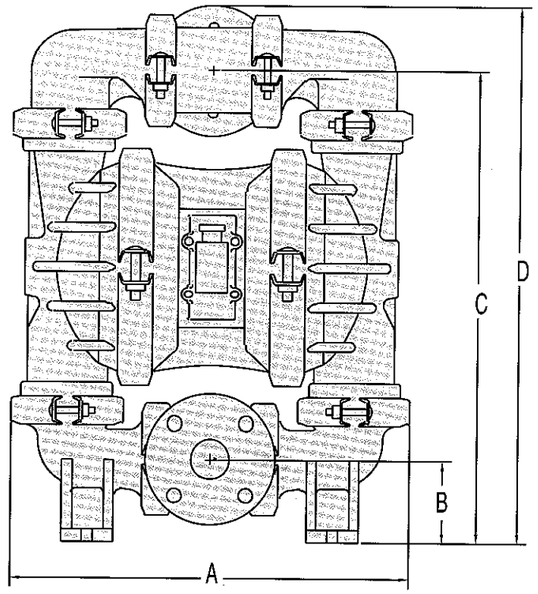
1 — Not required on current models.
*NOTE — Muffler (P/N 70E) (not shown) is standard on all pumps.

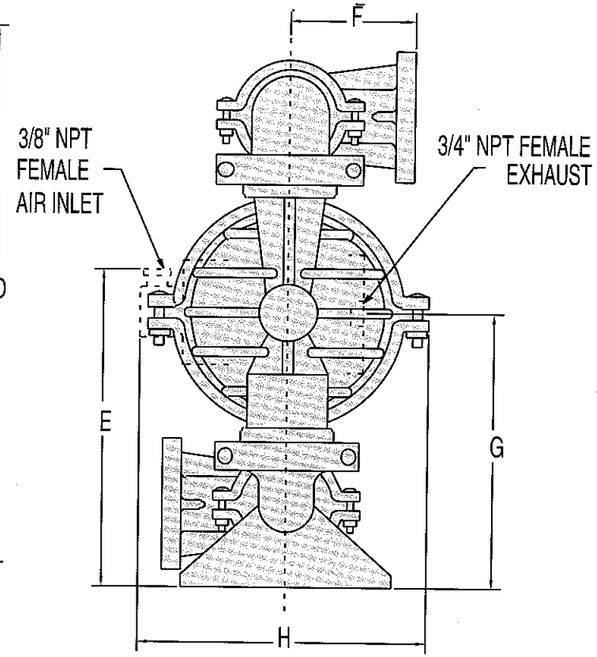
M4 Metal Elastomer Options

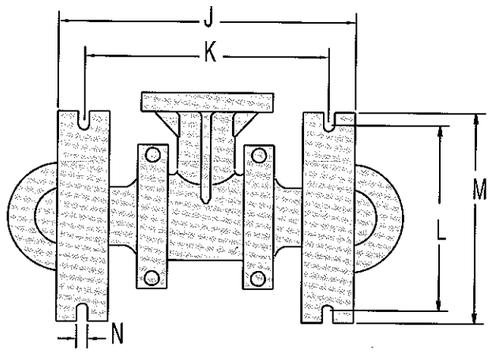
Material	Item #30 Diaphragms (2)	Item #31 Valve Balls (4)	Item #32 Valve Seats (4)	Item #40 Valve Seat O-Rings (4)
Neoprene	63	71	70	NA
Polyurethane	PU63	04-1080-50	04-1120-50	NA
Buna N	BN63	BN71	BN70	NA
Wil-flex™	04-1010-58	04-1080-58	04-1120-58	NA
Saniflex™	FG63	FG71	FB70	NA
Nordel	ND63	ND71	ND70	NA
Viton	VT63	VT71	VT70	NA
Teflon® PTFE	TF63	TF71	NA	70T
Aluminum	NA	NA	A70	NA
Carbon Steel	NA	NA	CS70	NA
Stainless Steel	NA	NA	S70	NA
Hastelloy	NA	NA	H70	NA

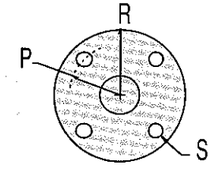
** Back-up Diaphragm for Teflon®-fitted pump: P/N 04-1060-56. Neoprene Back-up Diaphragm, P/N TF63B, is available upon request for Teflon®-fitted pumps. Please consult your local distributor.

DIMENSIONAL DRAWING
MODEL M4 CHAMP AND ULTRAPURE PUMP





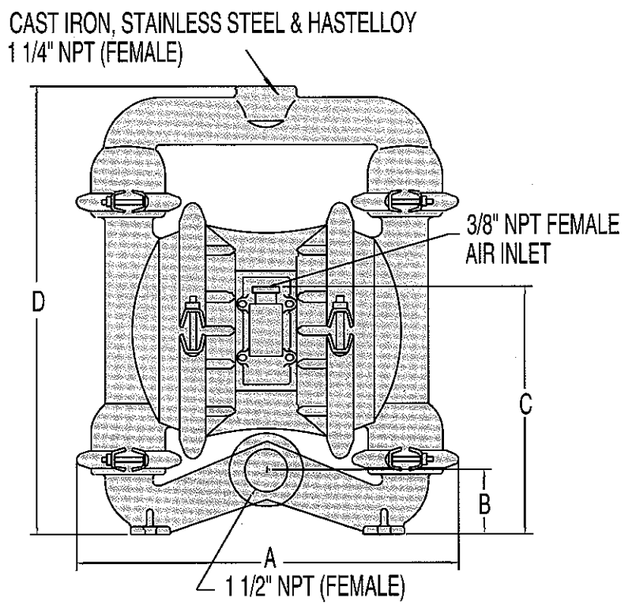


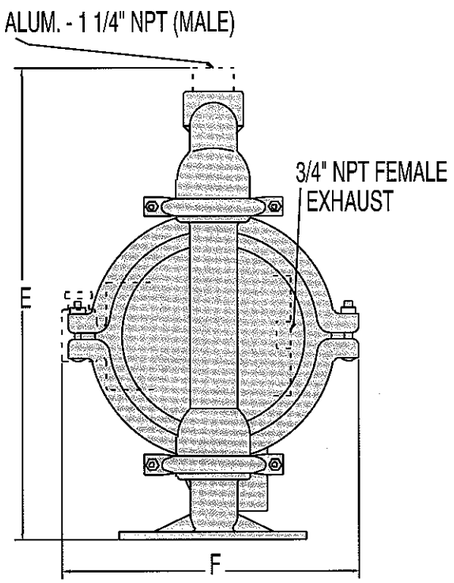


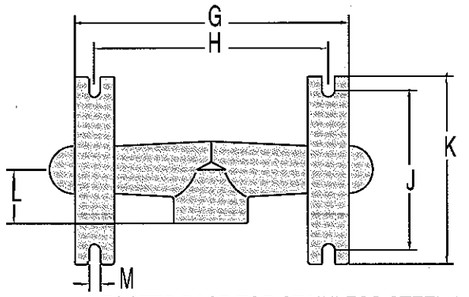
ANSI PIPE FLANGE
150 POUND CLASS
1 1/2" I.D.

DIMENSIONS – M4 (PLASTIC)		
ITEM	STANDARD (inch)	METRIC (mm)
A	15 1/2	393.7
B	3 7/32	81.8
C	18 1/4	463.6
D	20 3/4	527.1
E	12	304.8
F	4 7/8	123.8
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.	54.4 RAD.
R	2 1/2 RAD.	75.2 RAD.
S	9/16 DIA.	18.0 DIA.

DIMENSIONAL DRAWING
MODEL M4 METAL PUMP

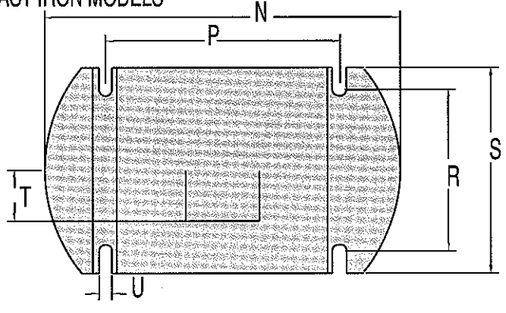






FOOTED BASE FOR STAINLESS STEEL & HASTELLOY MODELS

BASE FOR ALUMINUM & CAST IRON MODELS



DIMENSIONS – M4 (METAL)		
ITEM	STANDARD (inch)	METRIC (mm)
A	14 17/32	369.1
B	2 11/32	59.5
C	9 9/32	235.6
D	16 7/8	428.6
E	17 7/8	454.0
F	11 5/16	287.4
G	10 1/4	260.4
H	8 3/4	222.5
J	6	152.4
K	7	177.8
L	2	50.8
M	7/16	11.1
N	13 7/32	335.8
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	7/16	11.1

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

For Metal Models M4/OO/OA/BO/OB/HO/SO/SJ/WO/WS/SG/SGR

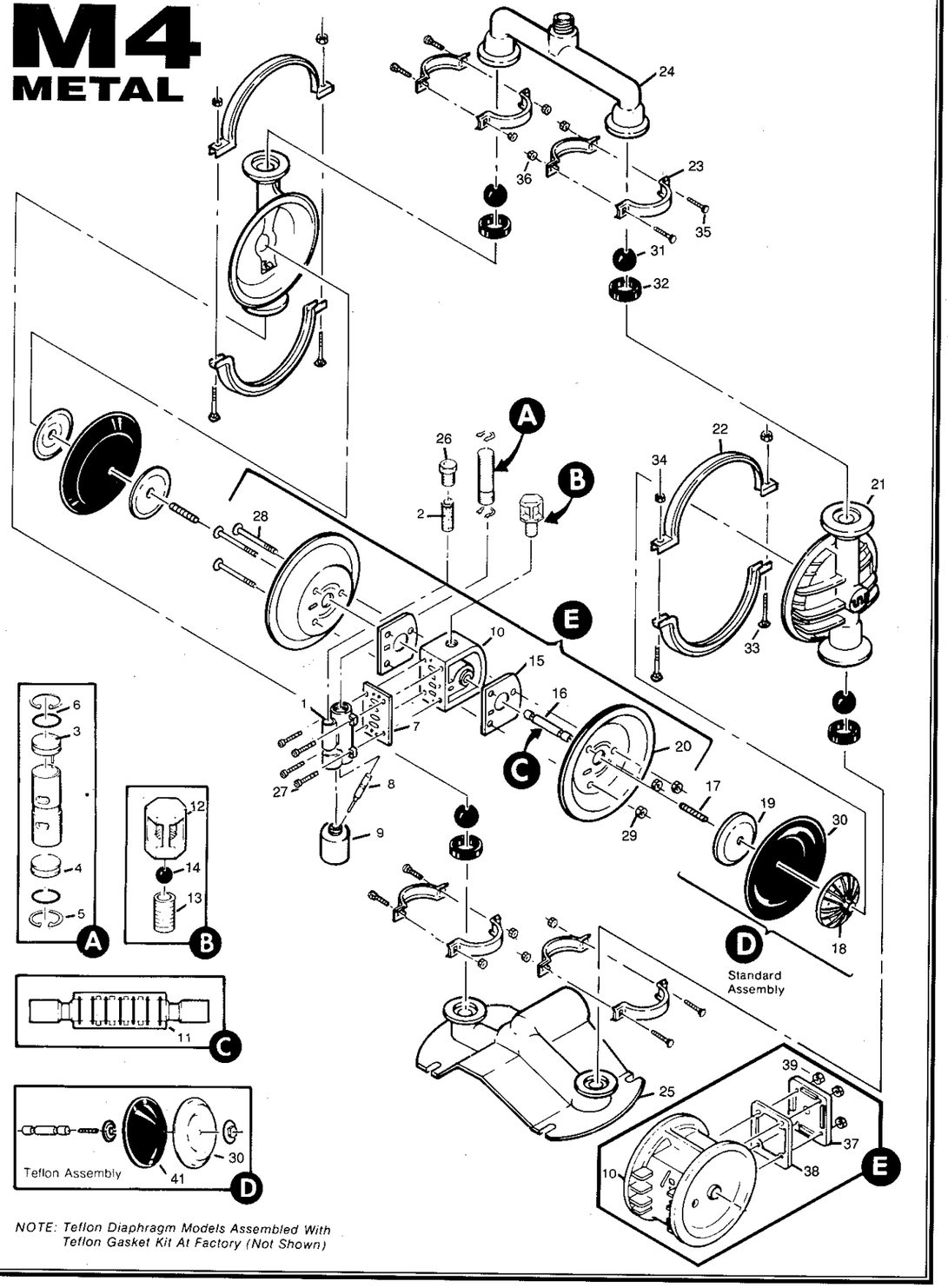
M4 RUBBER/TPE-FITTED

Item	Description	Qty. Per Pump	M4/OA P/N	M4/OO P/N	M4/OB P/N	M4/BO P/N	M4/HO P/N	M4/SO P/N	M4/SJ P/N	M4/WO P/N	M4/WS P/N	M4/SG P/N	M4/SGR P/N
1	Air Valve	1	60A	60A	60A	60A	60A	60A	SG60A	60A	60A	SG60A	SG60A
2	Air Valve Screen	1	60E	60E	60E	60E	60E	60E	60E	60E	60E	60E	60E
3	Air Valve Cap w/Guide (Top)	1	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23
4	Air Valve Cap w/o Guide (Bottom)	1	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23
5	Snap Ring	2	S60T	S60T	S60T	S60T	S60T	S60T	S60T	S60T	S60T	S60T	S60T
6	Air Valve Cap O-Ring	2	60U	60U	60U	60U	60U	60U	60U	60U	60U	60U	60U
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	60C	60C	60C	60C	60C	60C	60C	60C	60C	60C	60C
9	Lubricator Oil Bottle (optional)	1	60D	60D	60D	60D	60D	60D	60D	60D	60D	60D	60D
10	Center Section/Block	1	60HP	P60HA	60HP	P60HA	P60HA	P60HA	SG60H	P60HA	P60HA	SG60H	P60HA
11	O-Ring	7	20JH	20JH	20JH	20JH	20JH	20JH	20JH	20JH	20JH	20JH	20JH
12	Check Body	1	20K8	N/R	20K8	N/R	N/R	N/R	SG20K8	N/R	N/R	SG20K8	N/R
13	Nipple	1	20F	N/R	20FS	N/R	N/R	N/R	20FS	N/R	N/R	20FS	N/R
14	Check Ball	1	20M	N/R	20M	N/R	N/R	N/R	20M	N/R	N/R	20M	N/R
15	Block Gasket — Buna	2	04-3520-52	N/R	04-3520-52	N/R	N/R	NR	04-3520-52	N/R	N/R	04-3520-52	N/R
16	Shaft	1	61A	61A	61A	61A	61A	61A	61A	61A	61A	61A	61A
17	Shaft Stud (M4/WO & WS: Bolt)	2	NA	NA	NA	NA	T61F	T61F	T61F	61AN	61AN	T61F	T61F
18	Piston, Outer	2	04-4550-01	04-4550-01	04-4550-01	04-4550-01	H61B	S61B	S61B	61B	61B	S61B	S61B
19	Piston, Inner	2	61C	61C	61C	61C	61C	61C	61C	61C	61C	61C	61C
20	Air Chamber	2	62	N/R	62	N/R	N/R	N/R	SG62	N/R	N/R	SG62	N/R
21	Water Chamber	2	65	65	65	65	H65	S65	S65	W65	W65	S65	S65
22	Clamp Band (Large)	2	64	MP64	S64	MPS64	MPS64	MPS64	S64	MP64	MPS64	SG64	SGMPS64
23	Clamp Band (Small)	4	69	69	S69	S69	S69	S69	S69	69	S69	SG69	SG69
24	Discharge Manifold	1	66	66	B66	B66	H66	S66	S66	W66	W66	SG66	SG66
25	Inlet Housing	1	67	67	B67	B67	H67	S67	S67	W67	W67	SG67	SG67
26	Reducer Bushing	1	70AP	70AP	70AP	70AP	70AP	70AP	S60AP	70AP	70AP	S60AP	S60AP
27	Air Valve Cap Screw	4	60AS	P70AS	70AS	P70AS	P70AS	P70AS	70AS	P70AS	P70AS	70AS	P70AS
28	Hex Head Cap Screw (Air Chamber)	3	62B	N/R	62B	N/R	N/R	N/R	62B	N/R	N/R	62B	N/R
29	Hex Head Nut (Air Chamber)	3	62C	N/R	62C	N/R	N/R	N/R	62C	N/R	N/R	62C	N/R
30	Diaphragm*	2	*	*	*	*	*	*	*	*	*	FG63	FG63
31	Valve Ball*	4	*	*	*	*	*	*	*	*	*	FG71	FG71
32	Valve Seat*	4	*	*	*	*	*	*	*	*	*	FB70	FB70
33	Large Clamp Band Bolt	4	64C	64C	S64C	S64C	S64C	S64C	S64C	64C	S64C	S64C	S64C
34	Large Hex Nut	4	64D	64D	S39C	S39C	S39C	S39C	S39C	64D	S39C	SP39WN	SP39WN
35	Small Clamp Band Bolt	8	69B	69B	S69B	S69B	S69B	S69B	S69B	69B	S69B	S69B	S69B
36	Small Hex Nut	8	62C	62C	S62C	S62C	S62C	S62C	S62C	62C	S62C	SP69WN	SP69WN
37	Muffler Plate	1	N/R	P60M	N/R	P60M	P60M	P60M	N/R	P60M	P60M	N/R	P60M
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	4	N/R	S62C	N/R	S62C	S62C	S62C	N/R	S62C	S62C	N/R	S62C

* — For optional M4 Metal Pump elastomers, see page 29.
*NOTE — Muffler (P/N 70E) (not shown) is standard on all M4 pumps. (Comes equipped with P/N 70AB,¾" 45 degree street elbow for metal center section only.)
•NOTE — Muffler (P/N 70A) (not shown) is available upon request. (Comes equipped with P/N 70AB,¾" 45 degree street elbow.)

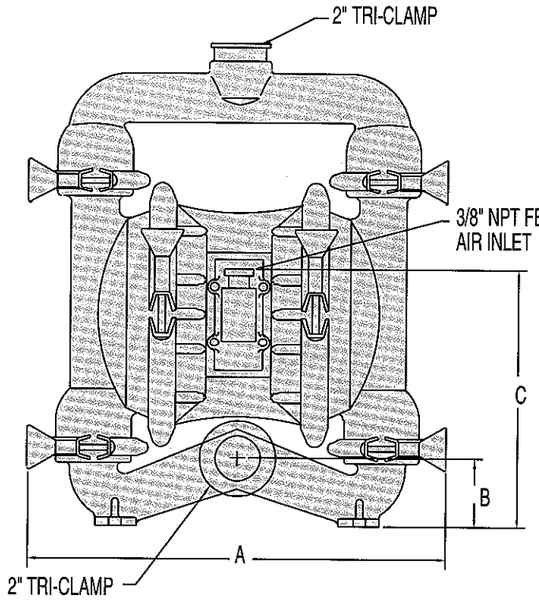
For Teflon®-fitted models, see next page.

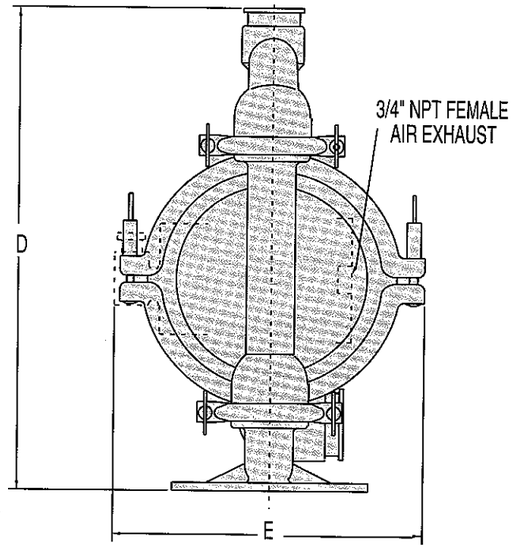
M4
METAL

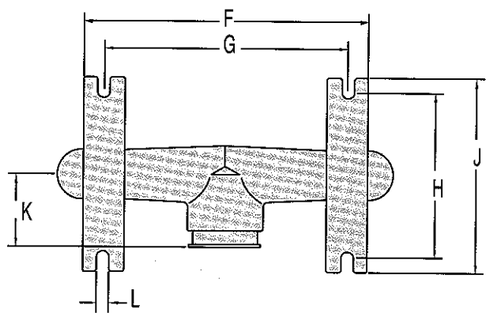


NOTE: Teflon Diaphragm Models Assembled With Teflon Gasket Kit At Factory (Not Shown)

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 3/4	222.2
H	6	152.4
J	7	177.8
K	2 9/16	65.1
L	7/16	11.1

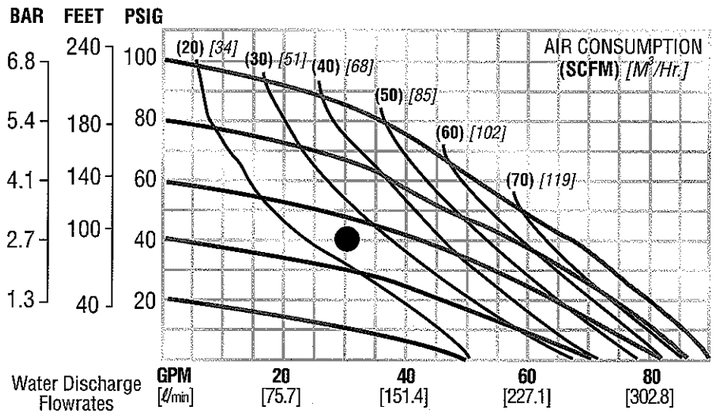
MODEL M4 CHAMP (Rubber/TPE-Fitted) Pump Performance Curve

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 17' 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.



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

MODEL M4 CHAMP (Teflon®-Fitted) Pump Performance Curve

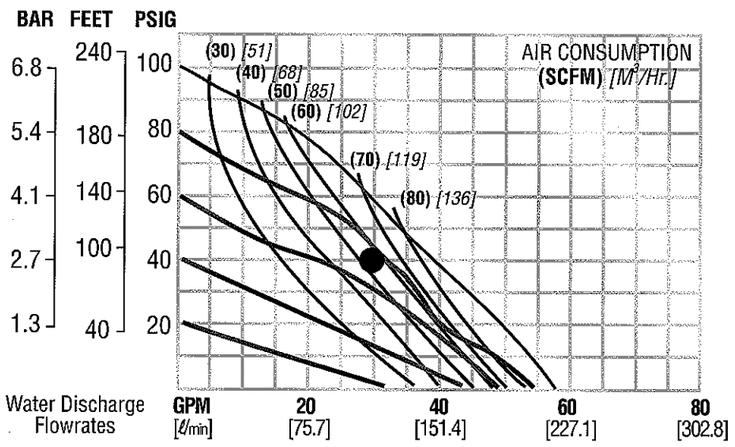
Height.....20¾"
Width.....15½"
Depth.....11⅜"
Ship Weight.....Polypropylene 39 lbs.
PVDF 49 lbs.
Teflon® 52 lbs.
Air Inlet.....⅜" NPT
Inlet.....1½" Fl.
Outlet.....1½" Fl.
Suction Lift.....7' Dry
25' Wet
Displacement per Stroke.... .126 gal.[1]
Max. Size Solids.....⅜" Dia.

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.

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



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

Small nicks can usually be dressed out and the piston returned to service. Inspect the cylinder end caps (P/N 04-2340-23 has the piston guide pin and P/N 04-2350-23 does not.) Make sure that the guide pin is straight and smooth or the piston will not move freely in the cylinder. New O-rings (P/N 60U) should be installed on the end caps. Lubricate the O-rings with an 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 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 (P/N 60H):

The pump's center block (P/N 60H) 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 P60HA) 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 must be used.

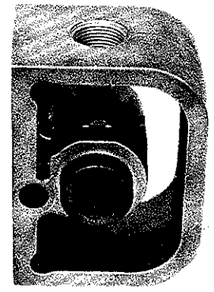


Figure F (Side View)

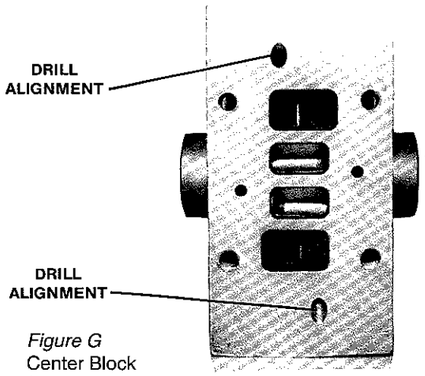


Figure G
Center Block
(Front View)

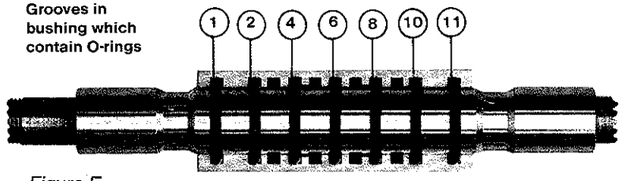


Figure E

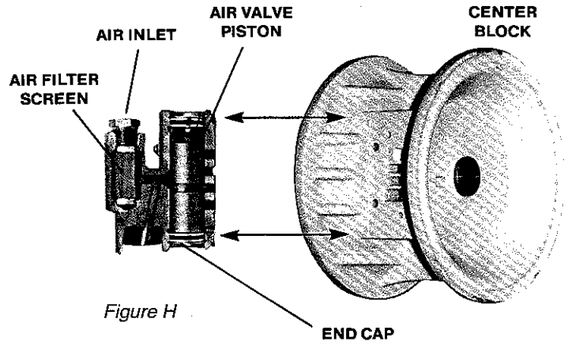


Figure H

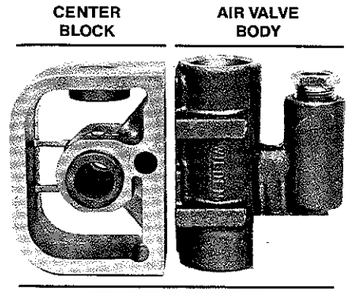
*Refer to page 29 for torque specifications.

SECTION VI
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 60A) 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.



AIR VALVE ASSEMBLY

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 60E). 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.

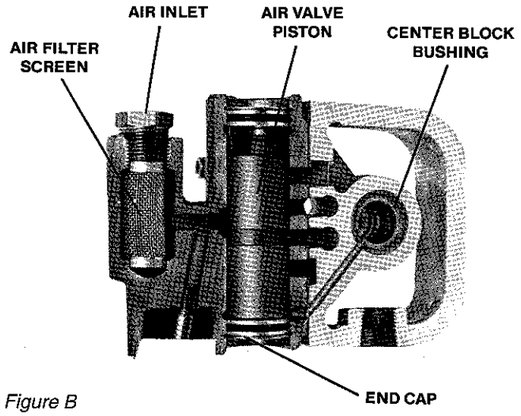


Figure B

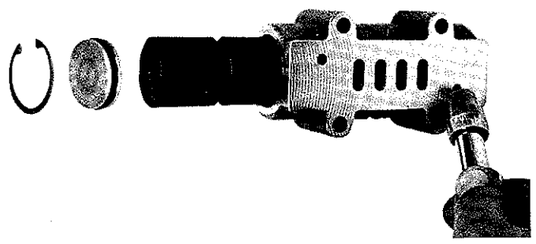


Figure C

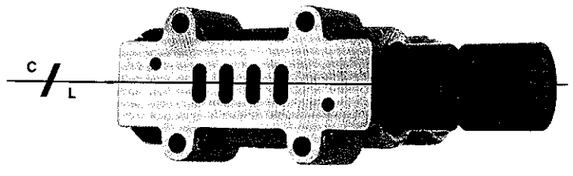


Figure D

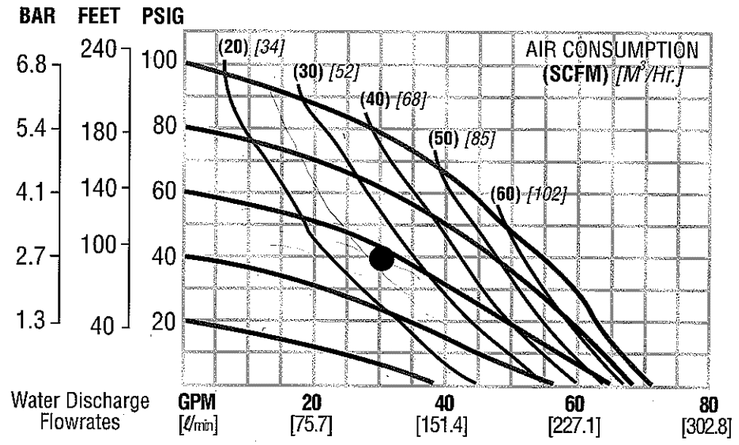
MODEL M4 METAL (Rubber/TPE-Fitted) Pump Performance Curve

Height .....16⅞"
Width .....14¹⁷⁄₃₂"
Depth .....11⅝"
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 .....⅜" 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.



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

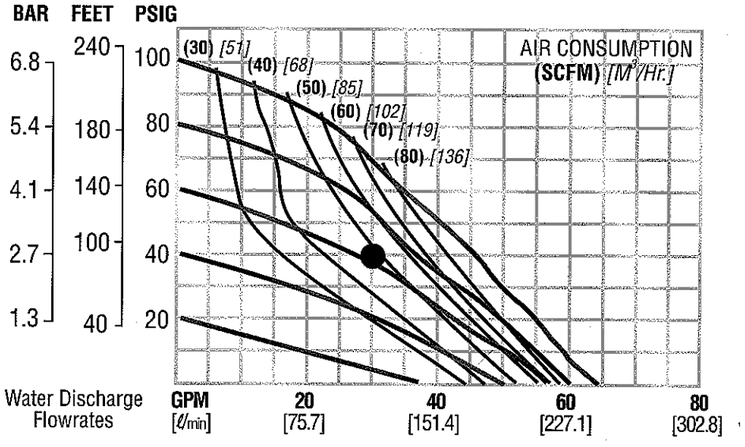
MODEL M4 METAL (Teflon®-Fitted) Pump Performance Curve

Height .....16⅞"
Width .....14¹⁷⁄₃₂"
Depth .....11⅝"
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 .....⅜" 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.



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

SECTION I
INSTALLATION

The Model M4 has a 1½" inlet 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, 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. Please consult Wilden distributor's 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 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.

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

SECTION II
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 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.

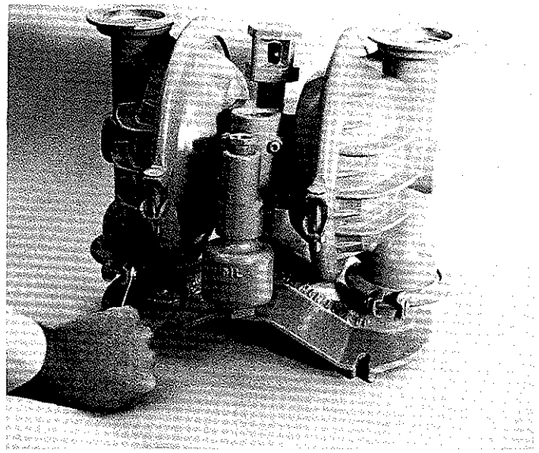


Figure 4F

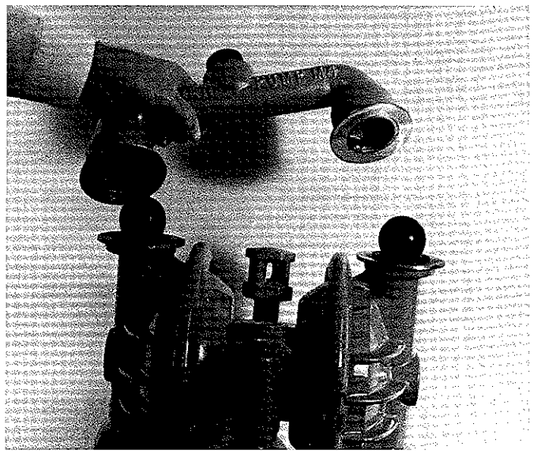


Figure 4G

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 specifications* (Item #3).

*Refer to page 29 for torque specifications.

Notes

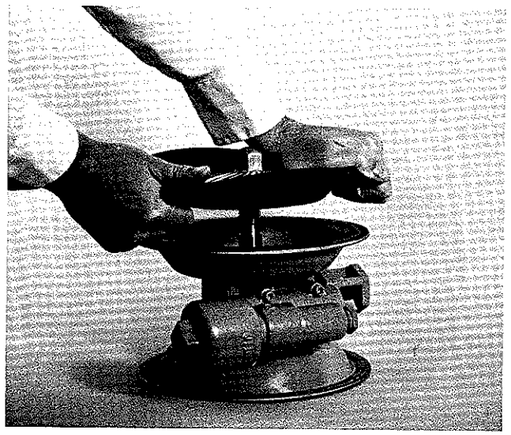


Figure 4A

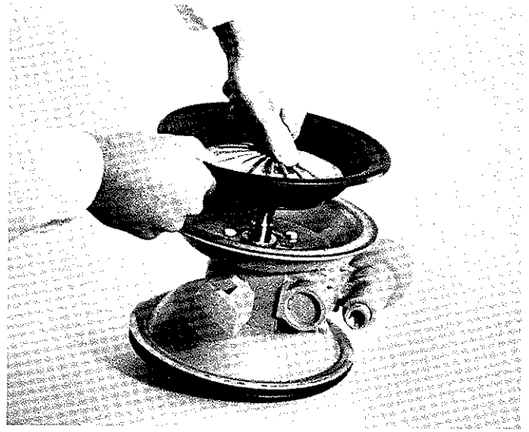


Figure 4B

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 specifications* (Item #2). (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 bead of the diaphragm rests within this groove. Tighten outer piston per the torque specifications* (Item #2). (See *Figure 4C.)* The outer clamp band can now be installed and tightened per the torque specifications* (Item #4 or #5). 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 page 29 for torque specifications.

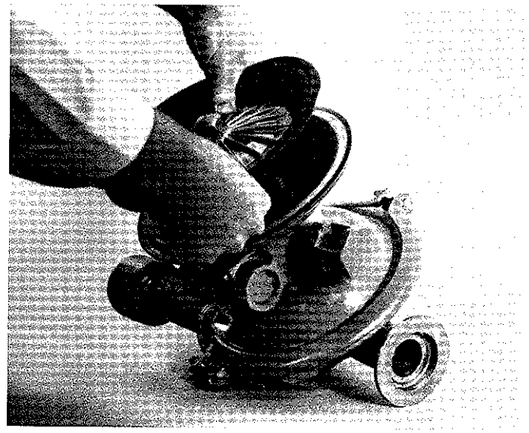


Figure 4C

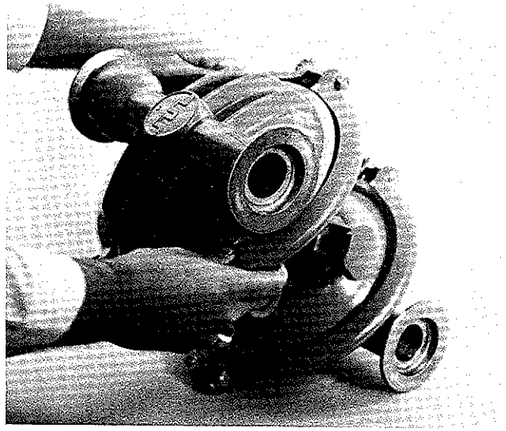


Figure 4D

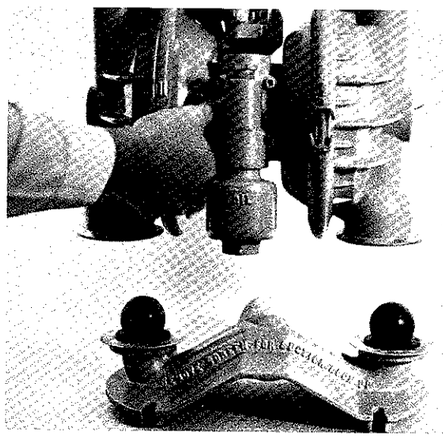


Figure 4E

Pump discharge rate can be controlled by limiting the volume and/or pressure of the air supply to the pump (preferred method). 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 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 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 pump that are poorly suited to their applications.

SECTION III
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 rebuilt by Wilden or 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-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 seal with proper elastomers.
3. Check to make sure all suction connections are air tight, especially clamp bands around intake balls.

Pump air valves 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.

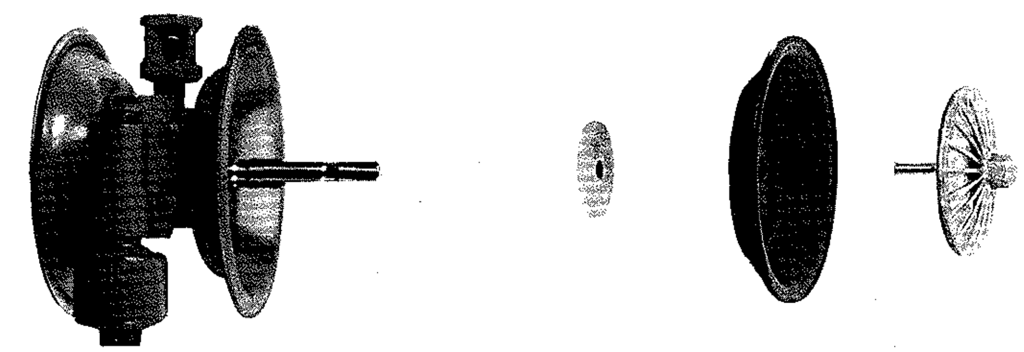
Product comes out air exhaust.

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

MAINTENANCE RECORD

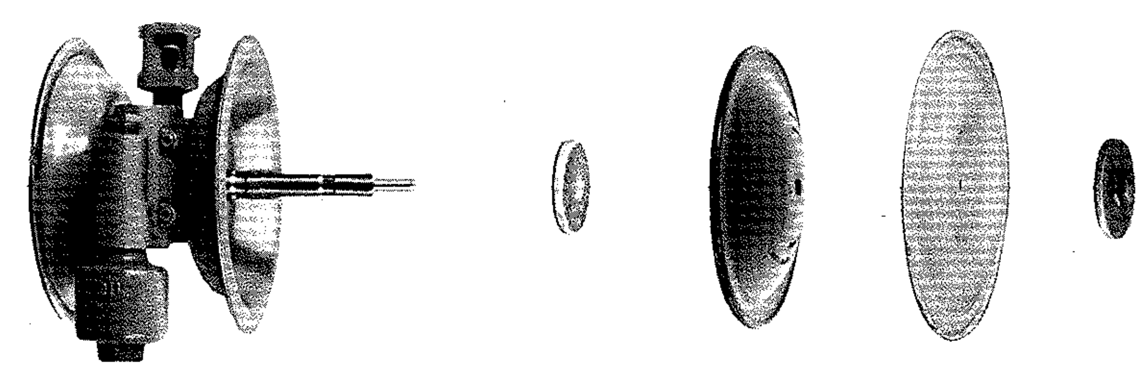
DATE	SERVICE RENDERED	SERVICED BY

ASSEMBLY



Exploded View *Figure 3A*

Step 1 (Rubber/TPE Diaphragms)



Exploded View *Figure 3B*

(Teflon® Diaphragms)

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).*

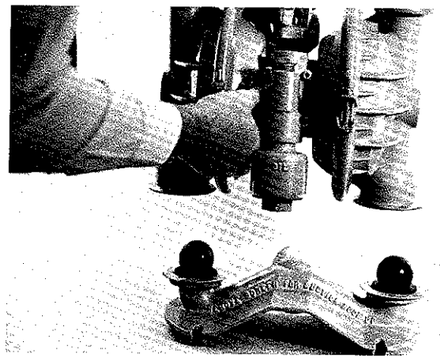


Figure 2A

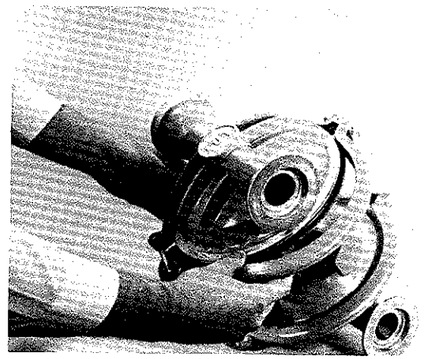


Figure 2B

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.)*

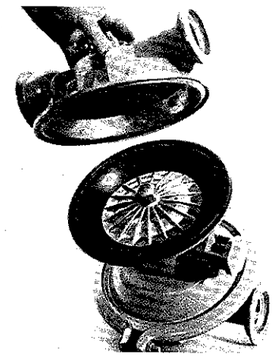


Figure 2C

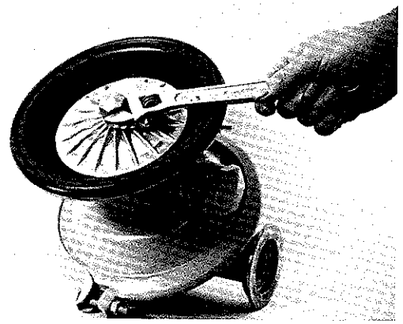


Figure 2D

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.

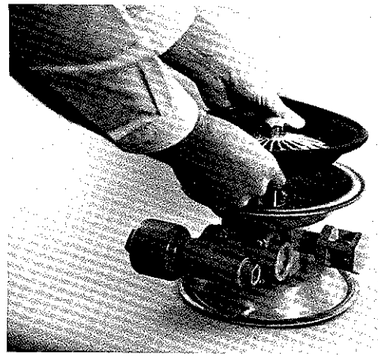


Figure 2E

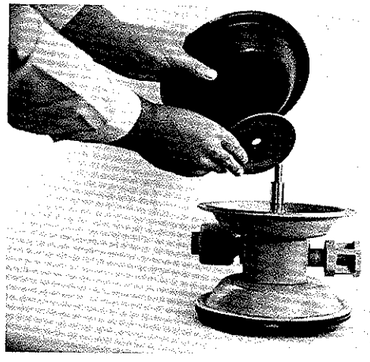


Figure 2F

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

SECTION IV

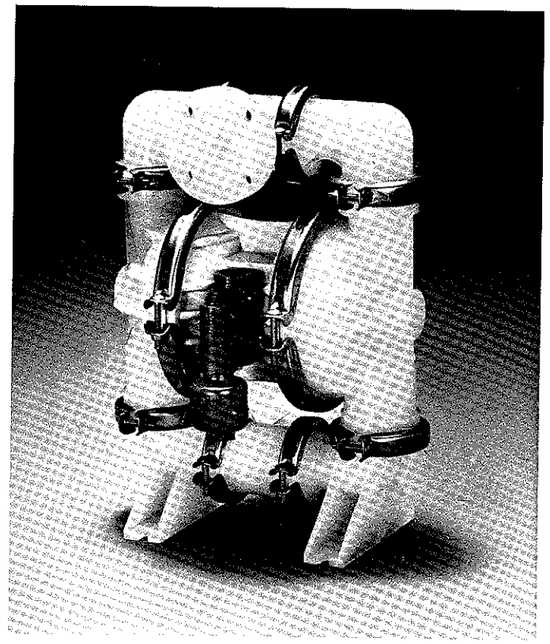
MODEL M4 CHAMP (PLASTIC)

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.

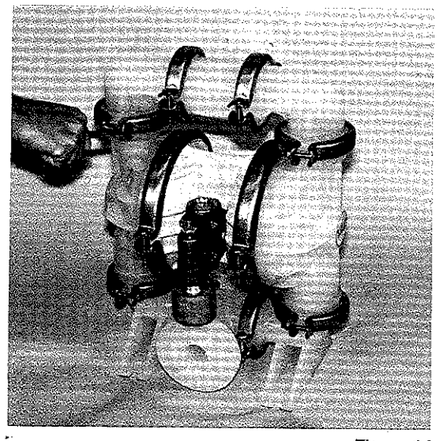


Figure 1A

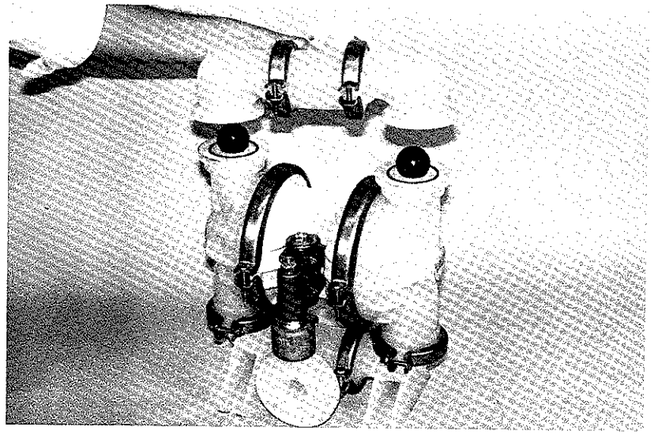


Figure 1B

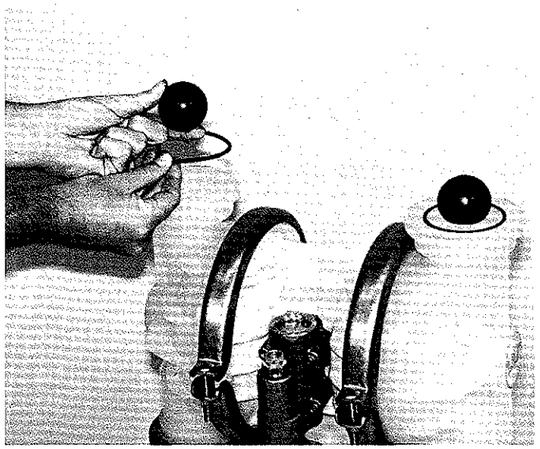


Figure 2A

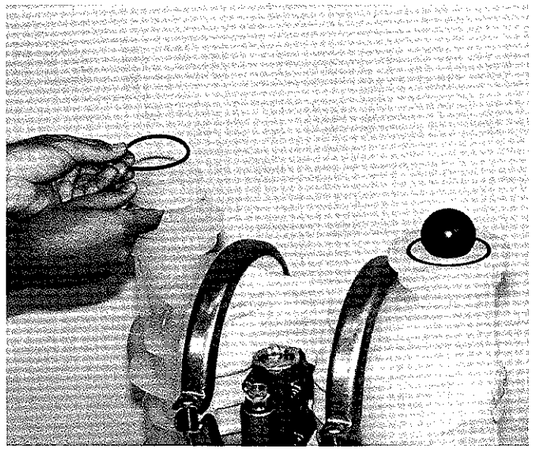


Figure 2B

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.

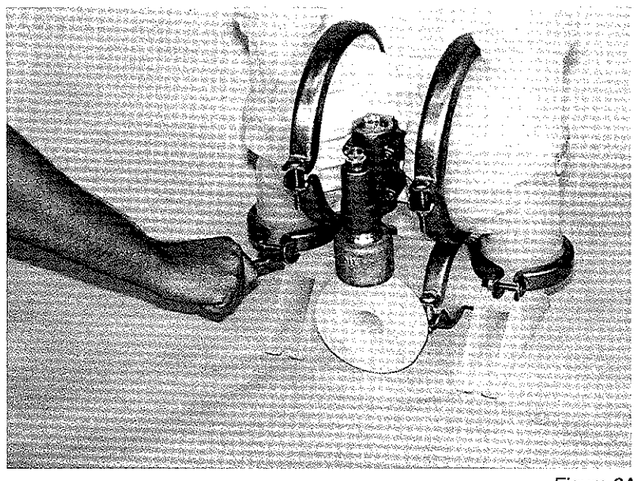


Figure 3A

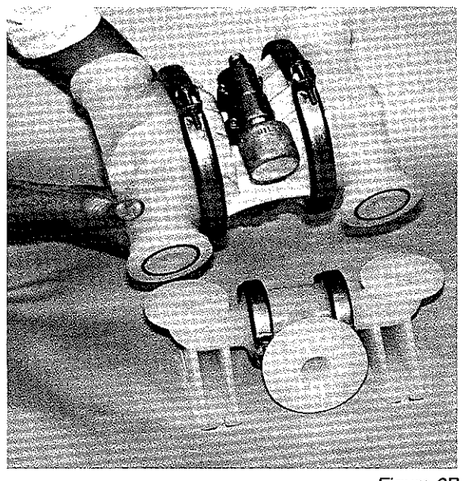


Figure 3B

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.

SECTION V

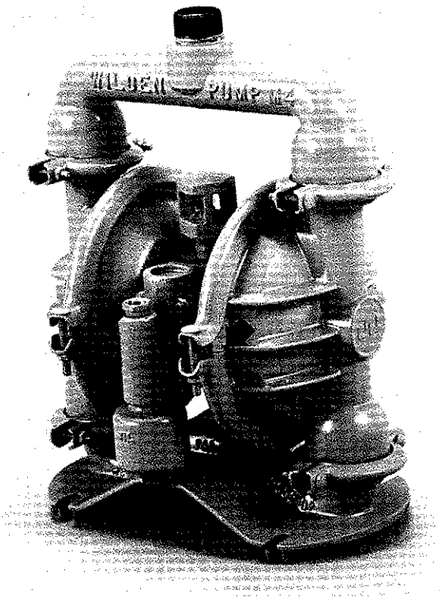
MODEL M4 METAL

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:

Step 1.

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.

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

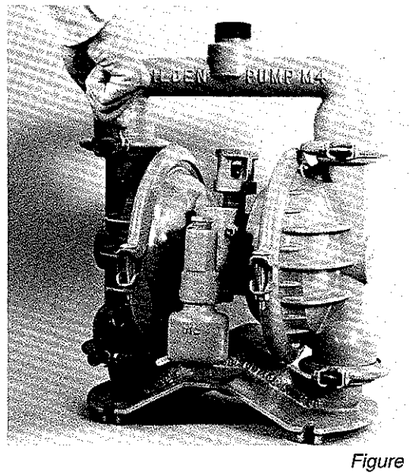


Figure 1A

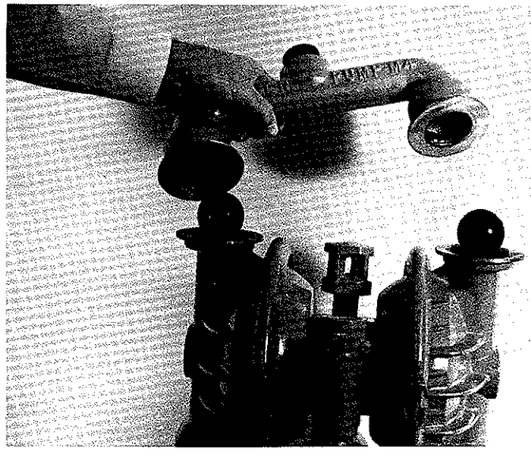


Figure 1B

NOTES

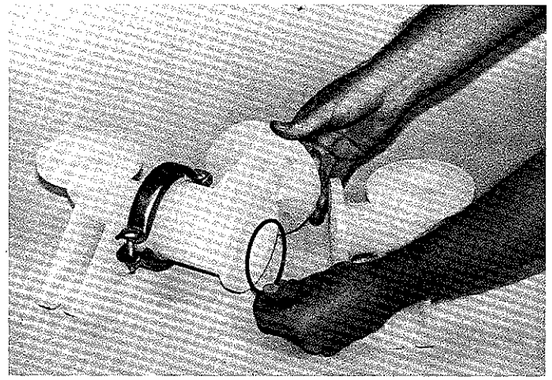


Figure 4A

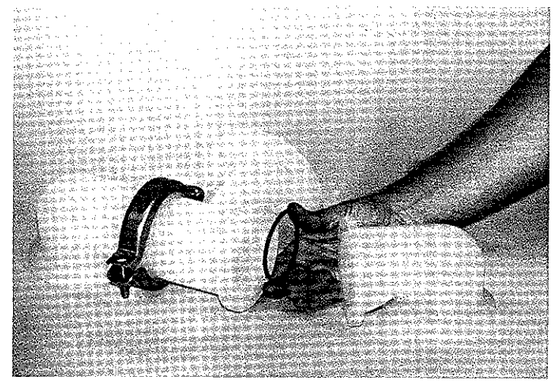


Figure 4B

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.

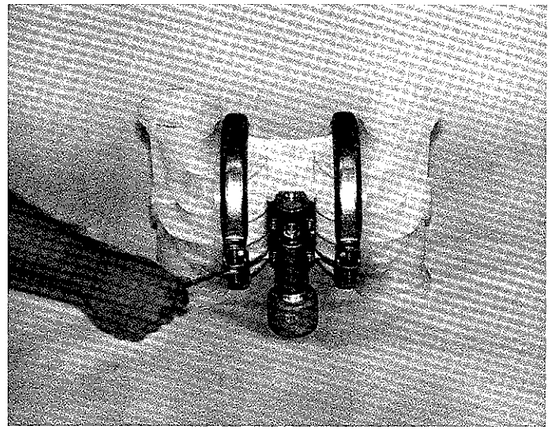


Figure 5A

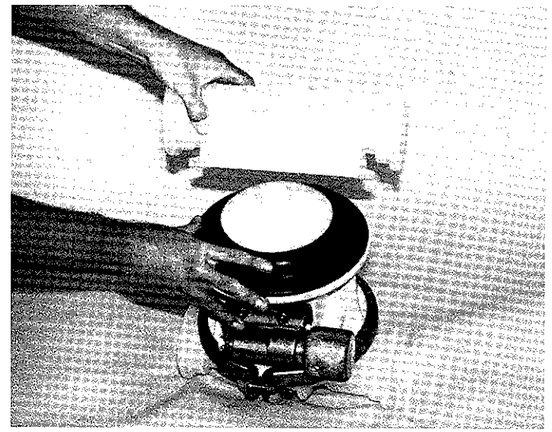


Figure 5B

Step 5.

Remove only one liquid chamber (P/N P65) 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. 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 III.

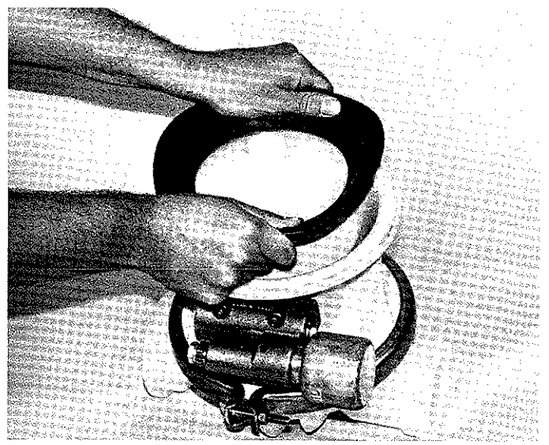
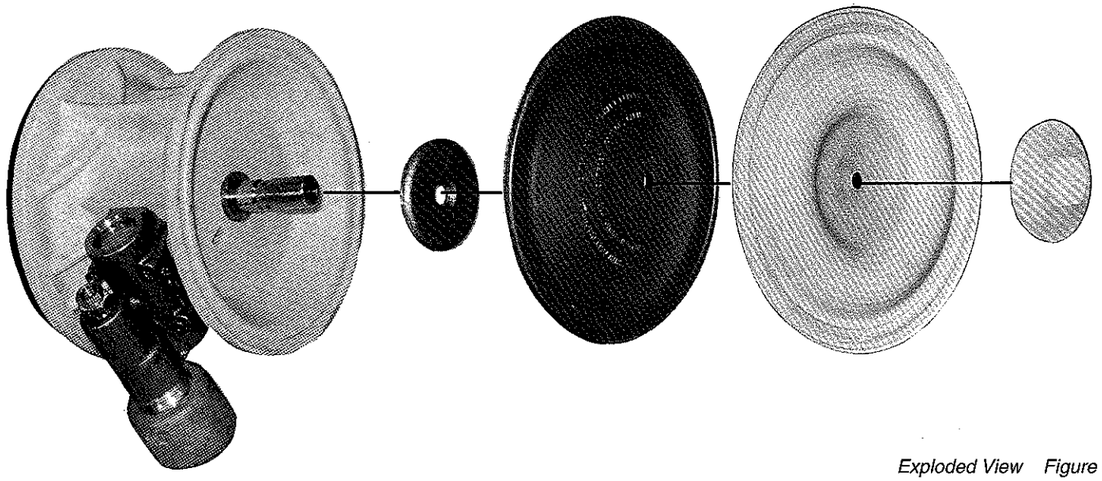


Figure 5C

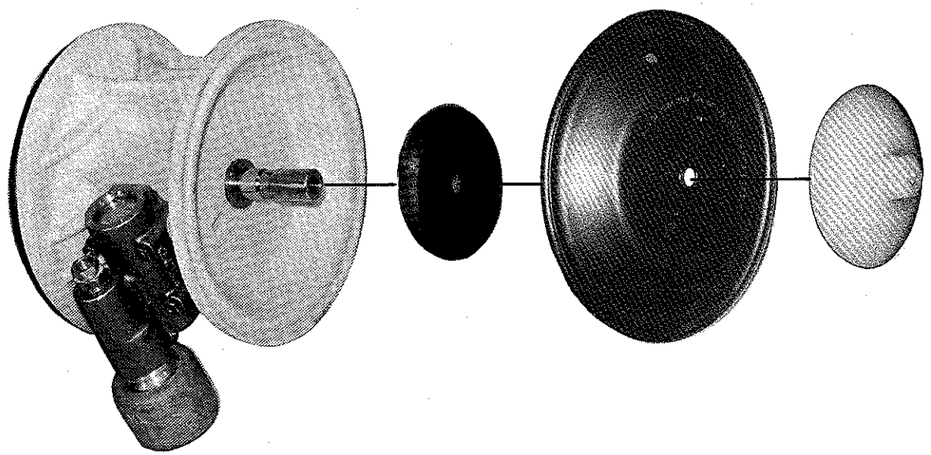
ASSEMBLY



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)

Wilden Model M4 "Champ"

										Ultrapure			
	Part Description	Qty. per Pump	M4/PO Part No.	M4/PT Part No.	M4/KO Part No.	M4/KT Part No.	M4/PC Part No.	M4/PP Part No.	M4/KC Part No.	M4/KK Part No.	M4/UO Part No.	M4/UP Part No.	M4/UH Part No.	M4/UC Part No.
1	Air Valve Assembly	1	60A	60A	60A	60A	PC60A	PC60A	PC60A	PC60A	60A	PC60A	60A	PC60A
2	Air Valve Bushing	1	70AP	70AP	70AP	70AP	PC60AP	PC60AP	PC60AP	PC60AP	S60AP	PC60AP	S60AP	PC60AP
3	Air Valve Screen	1	60E	60E	60E	60E	60E	60E	60E	60E	60E	60E	60E	60E
4	Air Valve with Guide (Top)	1	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23	04-2340-23
5	Air Valve Cap without End Guide (Bottom)	1	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23	04-2350-23
6	End Cap Cover (Not Shown)	2	N/A	N/A	N/A	N/A	P60C	P60C	P60C	P60C	N/R	P60C	N/R	P60C
7	Air Valve Snap Ring	2	S60T	S60T	S60T	S60T	S60T	S60T	S60T	S60T	S60T	S60T	S60T	S60T
8	Air Valve Cap O-Ring	2	60U	60U	60U	60U	60U	60U	60U	60U	60U	60U	60U	60U
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	TF60B	TF60B	TF60B	TF60B
10	Air Valve Cap Screw	4	P70AS	P70AS	P70AS	P70AS	PCP70AS	PCP70AS	PCP70AS	PCP70AS	P70AS	PCP70AS	P70AS	PCP70AS
11	Air Valve Hex Nut	4	S62C	S62C	S62C	S62C	PCP62C	PCP62C	PCP62C	PCP62C	S62C	PCS62C	S62C	PCS62C
12	Muffler Plate	1	P60M	P60M	P60M	P60M	P60M	P60M	P60M	P60M	P60M	P60M	P60M	P60M
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	TF60MG	TF60MG	TF60MG	TF60MG
14	Center Section	1	P60HA	P60HA	P60HA	P60HA	P60HA	P60HA	P60HA	P60HA	P60HA	P60HA	P60HA	P60HA
15	Center Section O-Ring	7	20JH	20JH	20JH	20JH	20JH	20JH	20JH	20JH	20JH	20JH	20JH	20JH
16	Shaft	1	61A	T61A	61A	T61A	61A	T61A	61A	T61A	T61A	T61A	T61A	T61A
17	Piston, Outer	2	P61B	PT61B	K61B	KT61B	P61B	PT61B	K61B	KT61B	PT61B	PT61B	PT61B	PT61B
18	Piston, Inner	2	61C	TB61C	61C	TB61C	61C	TB61C	61C	TB61C	TB61C	TB61C	TB61C	TB61B
19	Water Chamber	2	P65	P65	K65	K65	P65	P65	K65	K65	PF65	PF65	PF65	PF65
20	Large Clamp Band	2	P64	P64	P64	P64	PC64	PC64	PC64	PC64	P64	PC64	P64	PC64
21	Large Carriage Bolt	4	S64C	S64C	S64C	S64C	PCS64C	PCS64C	PCS64C	PCS64C	S64C	PCS64C	S64C	PCS64C
22	Hext Nut	4	S39C	S39C	S39C	S39C	PCS39C	PCS39C	PCS39C	PCS39C	S39C	PCS39	S39C	PCS39C
23	Small Clamp Band	8	P69	P69	P69	P69	PC69	PC69	PC69	PC69	P69	PC69	P69	PC69
24	Small Carriage Bolt	16	S32B	S32B	S32B	S32B	PCS32B	PCS32B	PCS32B	PCS32B	S32B	PCS32B	S32B	PCS32B
25	Hex Nut	16	S39C	S39C	S39C	S39C	PCS39C	PCS39	PCS39C	PCS39C	S39C	PCS39	S39C	PCS39C
26	Discharge Elbow	2	P66	P66	K66	K66	P66	P66	K66	K66	PF66	PF66	PF66	PF66
27	Inlet Elbow	2	P67	P67	K67	K67	P67	P67	K67	K67	PF67	PF67	PF67	PF67
28	Manifold Tee Section[2]	2	P68	P68	K68	K68	P68	P68	K68	K68	PF68	PF68	PFT68	PFT68
29	Tee-Section O-Ring	4	*	TFE68B	*	TFE68BV	*	TFE68B	*	TFE68BV	TFE68BV	TFE68BV	TFE68BV	TFE68BV
30	Muffler (Consult Factory)	1	70E	70E	70E	70E	70E	70E	70E	70E	70E	70E	70E	70E
31	Valve Seat O-Ring	4	*	TFE70B	*	TFE70BV	*	TFE70B	*	TFE70BV	TFE70BV	TFE70BV	TFE70BV	TFE70BV
32	Back-up Diaphragm**	2	N/R	04-1060-56	N/R	04-1060-56	N/R	04-1060-56	N/R	04-1060-56	04-1060-56	04-1060-56	04-1060-56	04-1060-56
33	Diaphragm	2	*	TF63	*	TF63	*	TF63	*	TF63	TF63	TF63	TF63	TF63
34	Valve Ball	4	*	TF71	*	TF71	*	TF71	*	TF71	TF71	TF71	TF71	TF71
35	Valve Seat	4	P70	P70	K70	K70	P70	P70	K70	K70	PF70	PF70	PF70	PF70
36	Teflon® Gasket Kit (Not Shown)	1	N/R	TF4/8GK	N/R	TF4/8GK	N/R	TF4/8GK	N/R	TF4/8GK	TF4/8GK	TF4/8GK	TF4/8GK	TF4/8GK

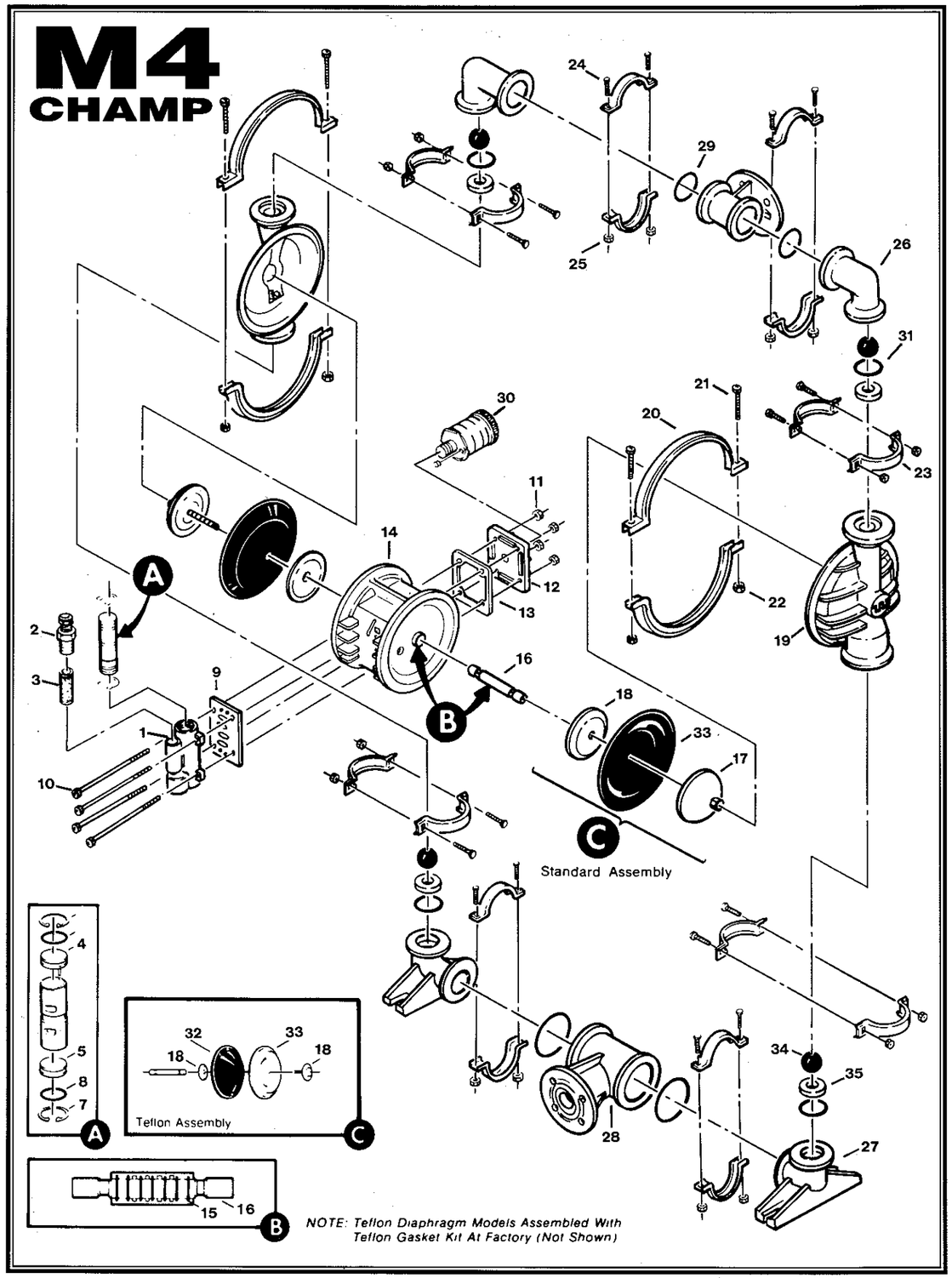
*Refer to M4 "Champ" Elastomer Chart below.
[1]Air Valve Assembly includes parts 60A through 60U.
[2]DIN Flange: Polypropylene = 04-6200-20 PVDF = 04-6200-21

NOTE: Models M4/UH and M4/UC incorporate 1" male non-threaded inlet/discharge bondable connections.

M4 "Champ" Elastomer Options

Material	Item #33 Diaphragms (2)	Item #34 Valve Balls (4)	Item #35 Valve Seats (4)	Item #31 Valve Seat O-Rings (4)	Item #29 Tee-Section O-Rings (4)
Neoprene	63	71	NA	NA	NA
Polyurethane	PU63	04-1080-50	NA	04-1120-50	NA
Buna N	BN63	BN71	NA	P70B	P68B
Wil-flex™	04-1010-58	04-1080-58	NA	NA	NA
Saniflex™	FG63	FG71	NA	NA	NA
Nordel	ND63	ND71	NA	NA	NA
Viton	VT63	VT71	NA	NA	NA
Teflon® PTFE	TF63	TF71	NA	NA	NA
Teflon® PFA	NA	NA	PF70	NA	NA
Teflon® Encap. (Viton)	NA	NA	NA	TFE70BV	TFE68BV
Teflon® Encap. (Silicon)	NA	NA	NA	TFE70B	TFE68B
Polypropylene	NA	NA	P70	NA	NA
PVDF	NA	NA	K70	NA	NA

**Back-up Diaphragm for Teflon®-fitted pump: P/N 04-1060-56. Neoprene Back-up Diaphragm, P/N TF63B, is available upon request for Teflon®-fitted pumps. Please consult your local distributor.



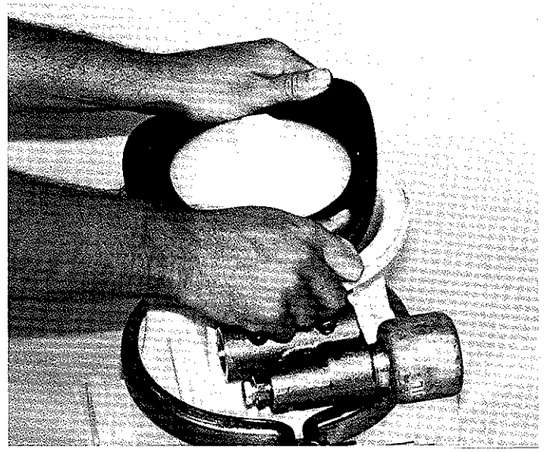


Figure 7A

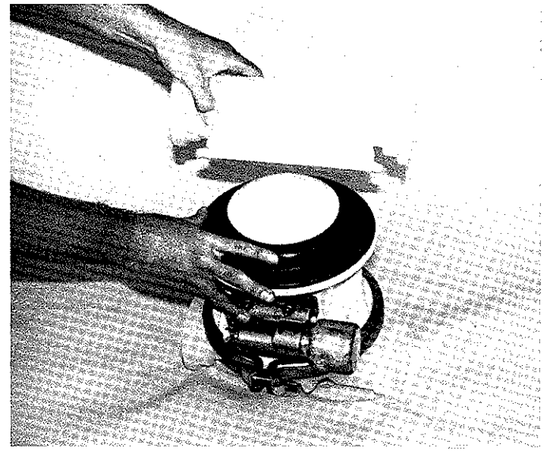


Figure 7B

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). 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 specifications* (Item #4 or #5). *(Figures 7B and 7C.)*

*Refer to page 29 for torque specifications.

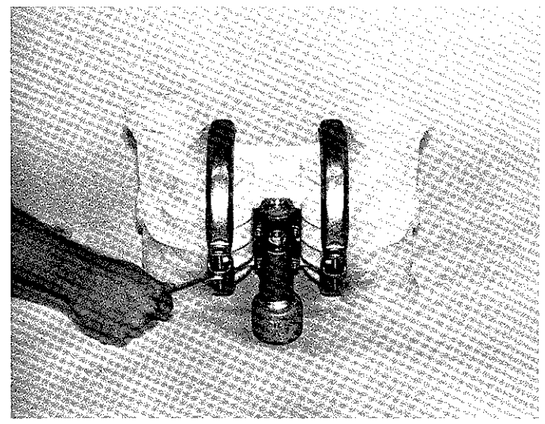


Figure 7C

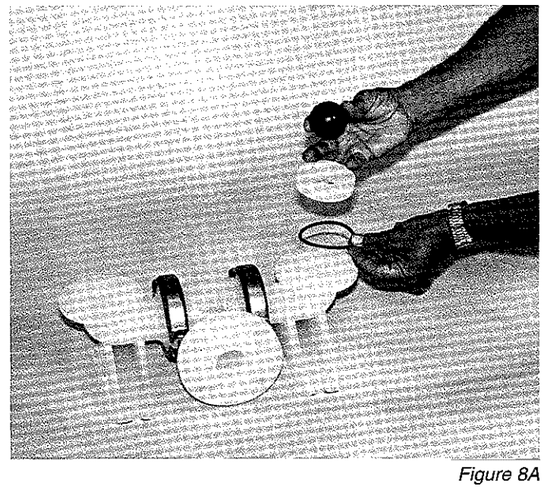


Figure 8A

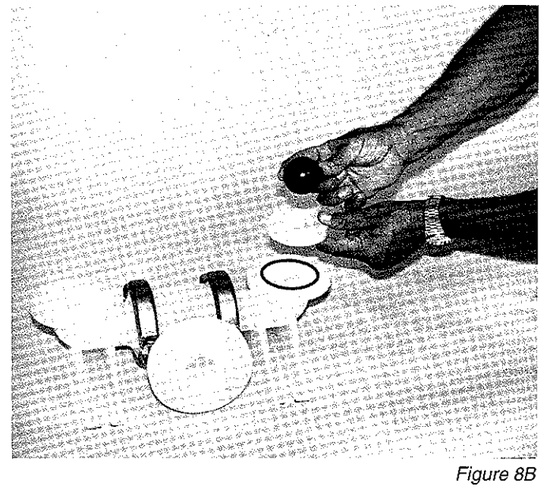


Figure 8B

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 TF4/8GK). 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.

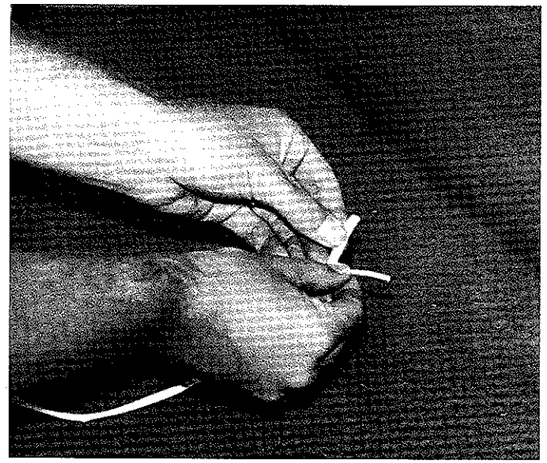


Figure 9A

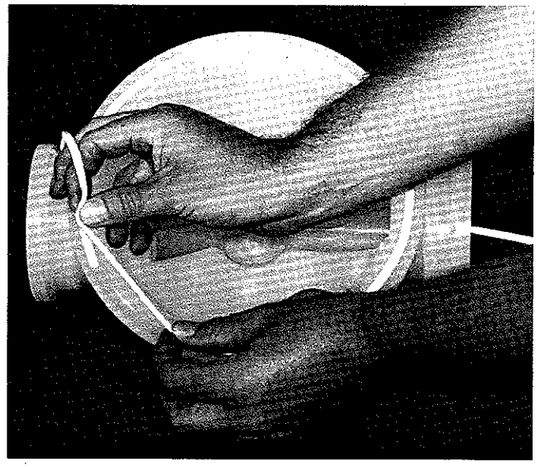


Figure 9B

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 P65) 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.

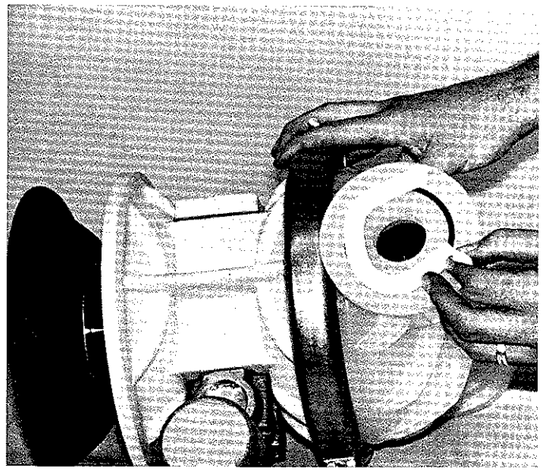


Figure 9C

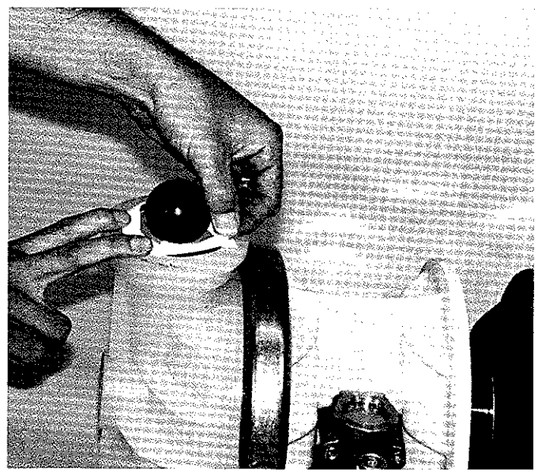


Figure 9D

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.

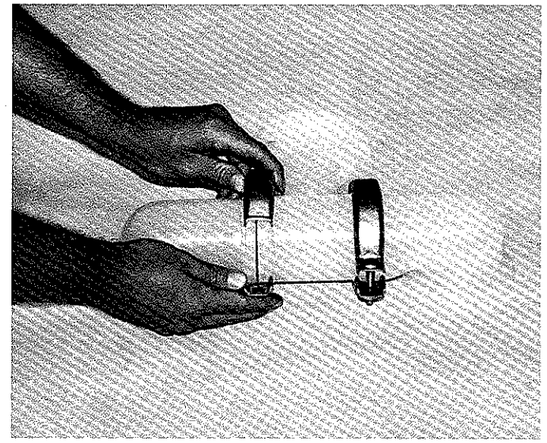


Figure 10A

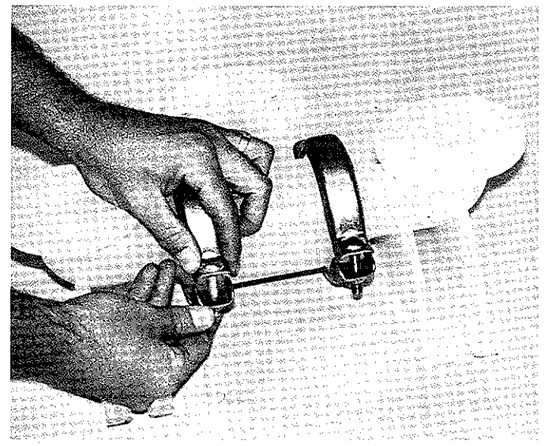


Figure 10B

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 specifications* (Item #3). **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 page 29 for torque specifications.

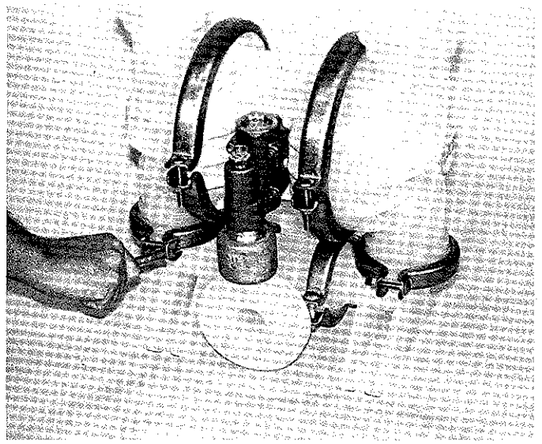


Figure 10C

Step 6.

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

NOTE: AIR VALVE AND CENTER SECTION DISASSEMBLY/ REASSEMBLY IS SHOWN ON PAGES 24 & 25.

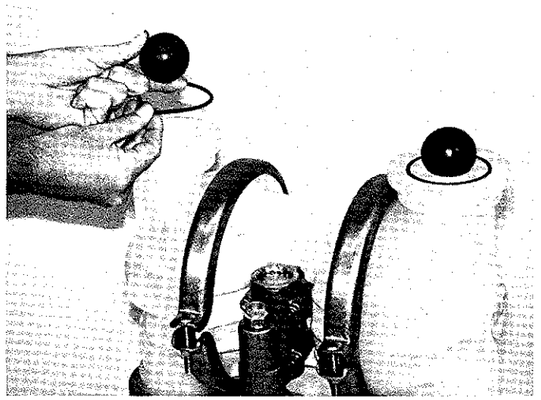


Figure 11