MARATHON
A WARREN RUPP PUMP BRAND

REPAIR PARTS LIST and DRAWING
Model MP05D
Design Level 1

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
1	095-051-551	Body, Spool Valve	1
2	**031-083-000**	**Sleeve & Spool Set w/Pins**	**1**
3	**560-058-360**	**O-Ring**	**8**
5	**675-043-115**	**Ring, Retaining**	**2**
4	165-078-147	Cap, End	2
6	165-042-157	Cap, Valve Body	1
7	**360-056-360**	**Gasket**	**1**
8	**360-057-360**	**Gasket**	**1**
9	**360-058-360**	**Gasket**	**1**
10	**095-074-000**	**Assembly., Pilot Valve***	**1**
10-A	**095-071-551**	**Valve Body**	**1**
10-B	**755-025-000**	**Sleeve (without o-ring)**	**1**
10-C	**560-033-360**	**O-Ring (Sleeve)**	**4**
10-D	**775-014-000**	**Spool (without o-ring)**	**1**
10-E	**560-023-360**	**O-Ring (Spool)**	**4**
10-F	**675-037-080**	**Retaining Ring**	**1**
11	170-063-330	Capscrew, Hex Head	1
12	901-035-330	Washer, Flat	7
13	542-001-330	Nut, Square	1
14	170-033-330	Capscrew, Hex Head	4
15	901-005-330	Washer, Flat	4
16	170-043-330	Capscrew, Hex Head	6
	170-006-330	Capscrew, Hex Head	6
17	114-007-157	Bracket, Intermediate	1
18	196-042-157	Chamber, Inner	1
19	196-043-157	Chamber, Inner	1
20	**560-040-360**	**O-Ring**	**2**
21	**560-001-360**	**O-Ring**	**2**
22	**135-013-162**	**Bushlng**	**2**
23	**675-042-115**	**Ring, Retainer**	**2**
24	**620-007-114**	**Plunger, Actuator**	**2**
25	**196-135-156**	**Chamber, Driver**	**2**
	196-139-156	**Chamber, Driver (w/ PTFE overlay)**	**2**
26	**070-012-170**	**Bearing, Sleeve**	**2**
27	**720-010-375**	**Seal, U-Cup**	**2**
29	901-012-180	Washer, Sealing	2
30	807-048-330	Stud	2
31	**675-040-360**	**Ring, Sealing**	**2**
32	685-039-120	Rod, Diaphragm	1
33	**132-019-360**	**Bumper**	**2**
34	612-108-157	Plate, Outer Diaphragm	2
35	612-022-330	Plate, Inner Diaphragm	2

* Available in Kit Form. Order P/N 031-060-000 which also includes Items 7, 8, 9, 24, & 50.

Repair Parts shown in **bold face (darker)** type are more likely to need replacement after extended periods of normal use. They are readily available from most MARATHON distributors. The pump owner may prefer to maintain a limited inventory of these parts in his own stock to reduce repair downtime to a minimum.

IMPORTANT: When ordering repair parts always furnish pump model number, serial number and type number.

MATERIAL CODES
The Last 3 Digits of Part Number

000…Assembly, sub-assembly; and some purchased Items
010…Cast Iron
012…Powered Metal
015…Ductile Iron
020…Ferritic Malleable Iron
025…Music Wire
080…CarbonSteel AISI B-1112
100…Alloy 20
110…Alloy Type 316 Stainless Steel
111…Alloy Type 316 Stainless Steel (Electro Polished)
112…Alloy "C"
113…Alloy Type 316 Stainless Steel (Hand Polished)
114…303 Stainless Steel
115…302/304 Stainless Steel
117…440-C Stainless Steel (Martensitic)
120…416 Stainless Steel (Wrought Martensitic)
123…410 Stainless Steel (Wrought Martensitic)
148…Hardcoat Anodized Aluminum
149…2024-T4 Aluminum
150…6061-T6 Aluminum
151…6063-T6 Aluminum
152…2024-T4 Aluminum (2023-T351)
154…Almag 35 Aluminum
155 or 156…356-T6 Aluminum
157…Die Cast Aluminum Alloy #380
158…Aluminum Alloy SR-319
159…Anodized Aluminum
162…Brass, Yellow, Screw Machine Stock
165…Cast Bronze, 85-5-5-5
166…Bronze SAE 660
170…Bronze, Bearing Type, Oil Impregnated
180…Copper Alloy
310…Kynar Coated
330…Zinc Plated Steel
331…Chrome Plated Steel
332…Electroless Nickel Plated
335…Galvanized Steel
336…Zinc Plated Yellow Brass
337…Silver Plated Steel
340…Nickel Plated
342…Filled Nylon
354…Injection Molded #203-40 Santoprene - Duro 40D ± 5; Color: RED
355…Thermoplastic Elastomer
356…Hytrel
357…Rupplon (Urethane Rubber) Color coded:PURPLE
358…Rupplon (Urethane Rubber) Color coded:PURPLE (Some Applications, Compression Mold)
359…Urethane Rubber
360…Buna-N Rubber Color coded: RED
361…Buna-N
363…Viton (Fluorel) Color coded: YELLOW
364…E.P.D.M. Rubber Color coded: BLUE
365…Neoprene Rubber Color coded: GREEN
370…Butyl Rubber Color coded: BROWN
371…Philthane (Tuftane)

List continued next page

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
36	**286-008-365**	**Diaphragm**	**2**
	286-008-363	Diaphragm	2
	286-008-360	Diaphragm	2
	286-008-364	Diaphragm	2
	286-008-354	Diaphragm	2
37	**722-045-365**	**Seat, Valve**	**4**
	722-045-360	Seat, Valve	4
	722-045-600	Seat, Valve	4
38	**050-019-365**	**Ball, Check Valve**	**4**
	050-019-360	Ball, Check Valve	4
	050-024-600	Ball, Check Valve	4
39	518-122-156	Manifold, Suction	1
40	518-121-156	Manifold, Discharge	1
41	170-029-330	Capscrew. Hex Head	12
42	901-039-330	Washer, Flat	12
43	545-004-330	Nut, Hex	16
44	618-003-330	Pipe, Plug	1
45	618-003-330	Pipe Plug	2
46	196-057-156	Chamber, Outer	2
47	530-018-000	Muffler, Exhaust	1
48	312-044-555	45° Elbow	1
49	538-025-555	Nipple, Close	1
50	**132-022-360**	**Bumper**	**2**
51	286-066-365	Diaphragm	2
	286-066-360	Diaphragm	2
	286-066-363	Diaphragm	2
	286-066-364	Diaphragm	2
	286-066-354	Diaphragm	2
	286-040-604	Diaphragm	2
52	538-083-115	Nipple, Pipe	4
53	835-005-115	Tee, Pipe	4
54	618-003-110	Plug, Pipe	4
55	866-060-115	Fitting, Male	4
56	860-054-606	Tube, Sight	2
57	170-099-330	Capscrew, Hex Head	16
58	618-025-110	Boss Plug and O-Ring	2
59	286-015-604	Diaphragm, PTFE (Overlay)	2
69	132-028-552	Bumper, Spool	2
71	210-008-330	Clip, Safety	1
72	560-029-360	O-Ring	2

Not Shown:

031-111-000	Valve Body Assy. (Consists of items 1, 2, 3, 4, 5, 69, 71 & 72)	1

Repair Parts shown in **bold face (darker)** type are more likely to need replacement after extended periods of normal use. They are readily available from most MARATHON distributors. The pump owner may prefer to maintain a limited inventory of these parts in his own stock to reduce repair downtime to a minimum.

IMPORTANT: When ordering repair parts always furnish pump model number, serial number and type number.

MATERIAL CODES
The Last 3 Digits of Part Number

Continued from previous page

375…Fluorinated Nitrile
378…High density Polypropylene
405…Cellulose Fibre
408…Cork and Neoprene
425…Compressed Fibre
426…Blue Gard
440…Vegetable Fibre
465…Fibre
500…Delrin 500
501…Delrin 570
505…Acrylic Resin Plastic
520…Injection Molded PVDF Natural Color
540…Nylon
541…Nylon
542…Nylon
544…Nylon Injection Molded
550…Polyethylene
551…Polypropylene
552…Unfilled Polypropylene
553…Unfilled Polypropylene
555…Polyvinyl Chloride
570…Rulon II
580…Ryton
590…Valox
591…Nylatron G-S
592…Nylatron NSB
600…PTFE (virgin material) Tetrafluoroethylene (TFE)
601…PTFE (Bronze and moly filled)
602…Filled PTFE
603…Blue Gylon
604…PTFE
606…PTFE
610…PTFE Encapsulated Silicon
611…PTFE Encapsulated Viton

Delrin, PTFE, Viton and Hytrel are registered tradenames of E.I. DuPont.

Gylon is a registered tradename of Garlock. Inc.

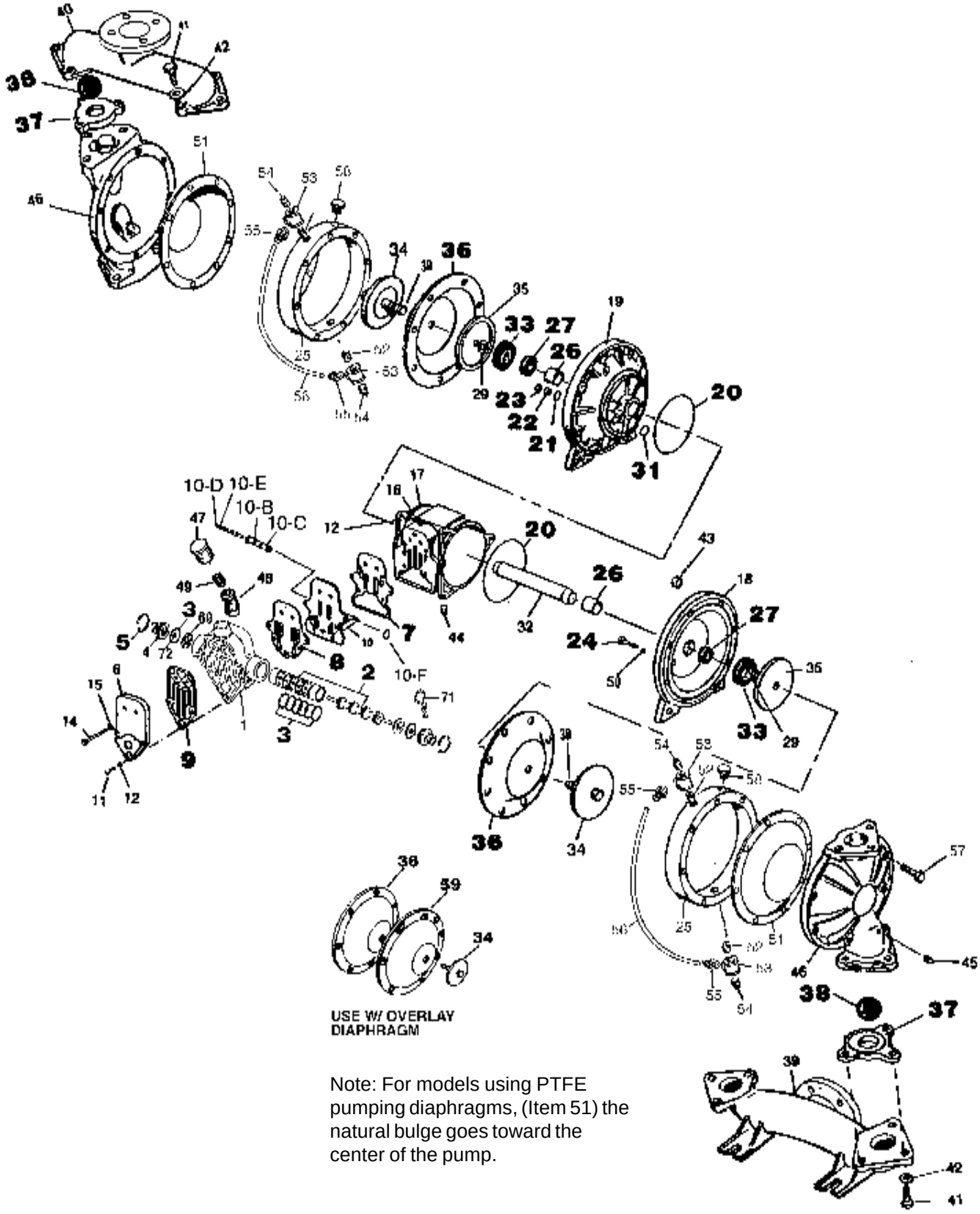
Nylatron is a registered tradename of Polymer Corp.

Rulon II is a registered tradename of Dixion Industries Corporation.

Hastelloy-C is a registered tradename of Cabot Corp.

Ryton is a registered tradename of Phillips Chemical Company.

Valox is a registered tradename of General Electric Company.



Note: For models using PTFE pumping diaphragms, (Item 51) the natural bulge goes toward the center of the pump.

REPAIR PARTS LIST and DRAWING

MARATHON
A WARREN RUPP PUMP BRAND

Model MP08D

Design Level 1

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
1	070-006-170	Bearing, Sleeve	2
2	114-002-156	Bracket, Intermediate	1
3	**720-004-360**	**Seal, U-Cup**	**2**
4	**135-008-000**	**Bushing, Threaded, with o-ring**	**2**
5	**620-004-114**	**Plunger, Actuator**	**2**
6	**095-073-000**	**Assembly, Pilot Valve***	**1**
6-A	**095-070-551**	**Valve Body**	**1**
6-B	**755-025-000**	**Sleeve (without o-ring)**	**1**
6-C	**560-033-360**	**O-Ring (Sleeve)**	**4**
6-D	**775-026-000**	**Spool (without o-ring)**	**1**
6-E	**560-023-360**	**O-Ring (Spool)**	**2**
6-F	**675-037-080**	**Retaining Ring**	**1**
7	**360-041-425**	**Gasket, Valve Body**	**1**
8	**560-001-360**	**O-Ring**	**2**
9	095-043-156	Body, Valve	1
10	**132-014-358**	**Bumper, Valve Spool**	**2**
11	165-066-010	Cap, End	2
12	**360-048-425**	**Gasket, Valve Body**	**1**
13	**360-010-425**	**Gasket, End Cap**	**2**
14	**560-020-360**	**O-Ring**	**6**
15	**031-066-000**	**Sleeve & Spool Set**	**1**
16	170-032-330	Capscrew, Hex Head	8
17	170-045-330	Capscrew, Hex Head	4
18	132-002-360	Bumper, Diaphragm	2
19	196-001-157	Chamber, Inner	2
20	**286-007-365**	**Diaphragm**	**2**
	286-007-363	Diaphragm	2
	286-007-360	Diaphragm	2
	286-007-366	Diaphragm	2
	286-007-364	Diaphragm	2
	286-007-356	Diaphragm	2
21	**560-022-360**	**O-Ring**	**2**
22	**685-007-120**	**Rod, Diaphragm**	**1**
23	170-100-330	Capscrew, Hex Head	16
24	170-024-330	Capscrew, Hex Head	8
25	618-003-330	Plug, Pipe	4
26	900-006-330	Washer, Lock	8
27	612-047-330	Plate, Diaphragm	2
28	612-039-157	Plate, Outer	2
29	807-026-330	Stud	2
30	901-022-330	Flat Washer	16
31	545-007-330	Nut, Hex	16
32	**722-040-365**	**Seat, Valve**	**4**
	722-040-363	Seat, Valve	4
	722-040-360	Seat, Valve	4
	722-040-364	Seat, Valve	4
	722-040-600	Seat, Valve	4
	722-040-110	Seat, Valve	4

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MATERIAL CODES
The Last 3 Digits of Part Number

000…Assembly, sub-assembly; and some purchased Items
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012…Powered Metal
015…Ductile Iron
020…Ferritic Malleable Iron
025…Music Wire
080…CarbonSteel AISI B-1112
100…Alloy 20
110…Alloy Type 316 Stainless Steel
111…Alloy Type 316 Stainless Steel (Electro Polished)
112…Alloy "C"
113…Alloy Type 316 Stainless Steel (Hand Polished)
114…303 Stainless Steel
115…302/304 Stainless Steel
117…440-C Stainless Steel (Martensitic)
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149…2024-T4 Aluminum
150…6061-T6 Aluminum
151…6063-T6 Aluminum
152…2024-T4 Aluminum (2023-T351)
154…Almag 35 Aluminum
155 or 156…356-T6 Aluminum
157…Die Cast Aluminum Alloy #380
158…Aluminum Alloy SR-319
159…Anodized Aluminum
162…Brass, Yellow, Screw Machine Stock
165…Cast Bronze, 85-5-5-5
166…Bronze SAE 660
170…Bronze, Bearing Type, Oil Impregnated
180…Copper Alloy
310…Kynar Coated
330…Zinc Plated Steel
331…Chrome Plated Steel
332…Electroless Nickel Plated
335…Galvanized Steel
336…Zinc Plated Yellow Brass
337…Silver Plated Steel
340…Nickel Plated
342…Filled Nylon
354…Injection Molded #203-40 Santoprene - Duro 40D ± 5; Color: RED
355…Thermoplastic Elastomer
356…Hytrel
357…Rupplon (Urethane Rubber) Color coded:PURPLE
358…Rupplon (Urethane Rubber) Color coded:PURPLE (Some Applications, Compression Mold)
359…Urethane Rubber
360…Buna-N Rubber Color coded: RED
361…Buna-N
363…Viton (Fluorel) Color coded: YELLOW
364…E.P.D.M. Rubber Color coded: BLUE
365…Neoprene Rubber Color coded: GREEN
370…Butyl Rubber Color coded: BROWN
371…Philthane (Tuftane)

List continued next page

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
33	**050-017-365**	**Ball, Check Valve**	**4**
	050-017-360	Ball, Check Valve	4
	050-017-364	Ball, Check Valve	4
	050-018-600	Ball. Check Valve	4
34	518-119-156	Manifold, Suction	1
35	518-120-156	Manifold, Discharge	1
36	**902-003-000**	**Stat-O-Seal**	**2**
37	170-066-330	Capscrew, Hex Head	8
38	900-003-330	Washer, Lock	8
39	545-008-330	Nut, Hex	8
41	196-047-156	Chamber, Outer	2
42	530-008-000	Muffler, Exhaust	1
43	196-083-156	Chamber, Driver	2
	196-140-156	Chamber, Driver (with PTFE overlay)	2
44	286-042-365	Diaphragm	2
	286-042-363	Diaphragm	2
	286-042-360	Diaphragm	2
	286-042-364	Diaphragm	2
	286-042-366	Diaphragm	2
	286-042-356	Diaphragm	2
	286-041-604	Diaphragm	2
45	538-083-115	Nipple, Pipe	4
46	286-020-604	Overlay Diaphragm	2
47	132-022-360	Bumper	2
48	618-003-110	Plug, Pipe	4
49	835-005-115	Tee, Pipe	4
50	426-041-000	Hose Assembly	2
51	866-059-115	Fitting, Male	4
52	618-025-110	Boss Plug and O-Ring	2
53	031-089-156	Main Air Valve Assembly (Inc. Items 9,10,11,13,14, 15, 16)	1
54	210-008-330	Clip, Safety	1
55	560-023-360	O-Ring, End Cap	2

* Item 6 is available in Kit Form. Order P/N 031-055-000 which also includes items 5, 7, 12 & 47.

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The Last 3 Digits of Part Number

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378…High density Polypropylene
405…Cellulose Fibre
408…Cork and Neoprene
425…Compressed Fibre
426…Blue Gard
440…Vegetable Fibre
465…Fibre
500…Delrin 500
501…Delrin 570
505…Acrylic Resin Plastic
520…Injection Molded PVDF Natural Color
540…Nylon
541…Nylon
542…Nylon
544…Nylon Injection Molded
550…Polyethylene
551…Polypropylene
552…Unfilled Polypropylene
553…Unfilled Polypropylene
555…Polyvinyl Chloride
570…Rulon II
580…Ryton
590…Valox
591…Nylatron G-S
592…Nylatron NSB
600…PTFE (virgin material) Tetrafluoroethylene (TFE)
601…PTFE (Bronze and moly filled)
602…Filled PTFE
603…Blue Gylon
604…PTFE
606…PTFE
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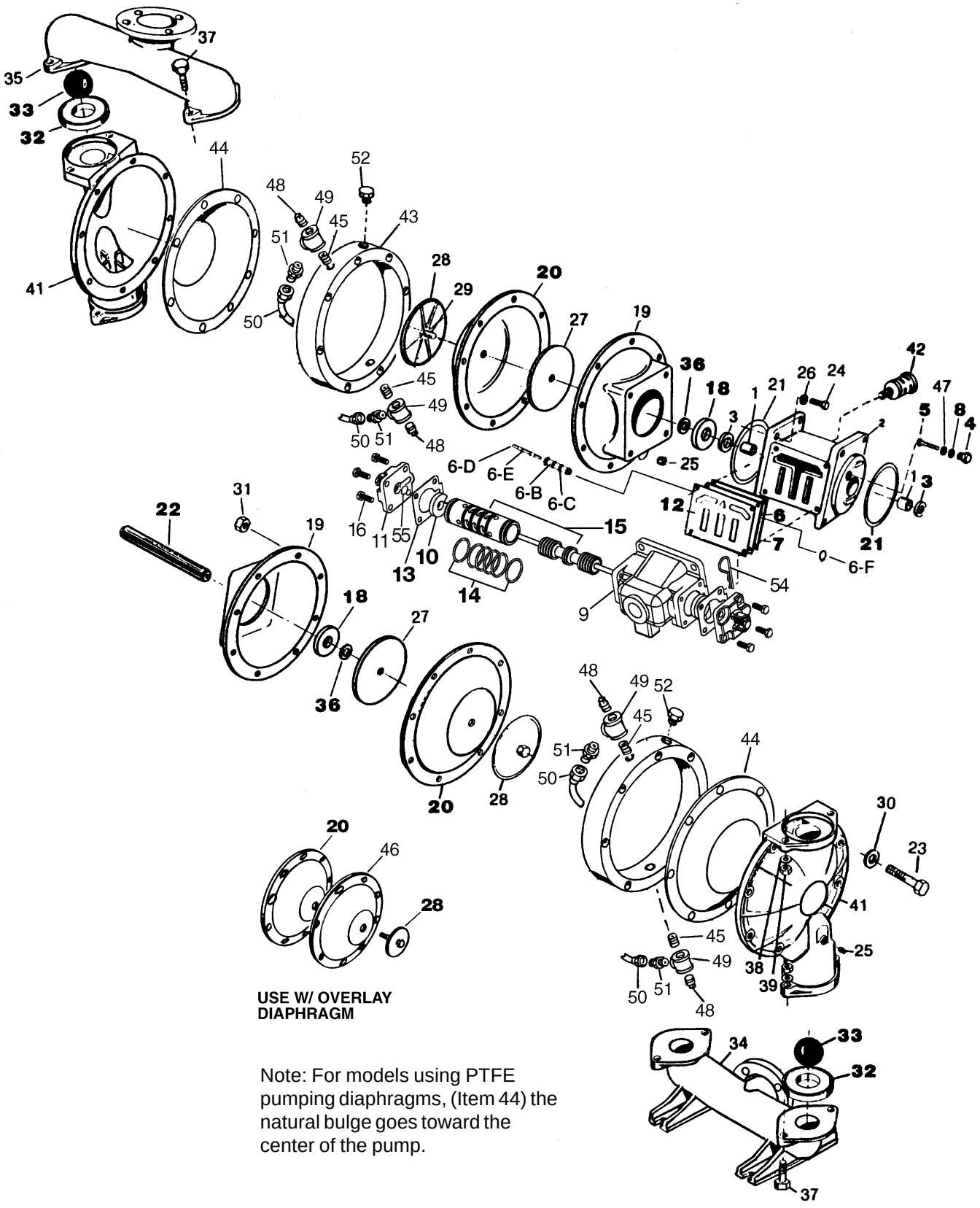

Note: For models using PTFE pumping diaphragms, (Item 44) the natural bulge goes toward the center of the pump.

Printed in U.S.A.

REPAIR PARTS LIST and DRAWING

MARATHON
A WARREN RUPP PUMP BRAND

Model MP12D

Design Level 1

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
1	070-006-170	Bearing, Sleeve	2
2	114-002-156	Bracket, Intermediate	1
3	**720-004-360**	**Seal, U-Cup**	**2**
4	**135-008-000**	**Bushing, Threaded, with O-Ring**	**2**
5	**620-004-114**	**Plunger, Actuator**	**2**
6	**095-073-000**	**Pilot Valve Body Assembly***	**1**
6-A	**095-070-551**	**Pilot Valve Body**	**1**
6-B	**755-025-000**	**Sleeve (with O-Ring)**	**1**
6-C	**560-033-360**	**O-Ring (Sleeve)**	**4**
6-D	**775-026-000**	**Spool (with O-Ring)**	**1**
6-E	**560-023-360**	**O-Ring (Spool)**	**2**
6-F	**675-037-080**	**Retaining Ring**	**1**
7	**360-041-425**	**Gasket, Valve Body**	**1**
8	**560-001-360**	**O-Ring**	**2**
9	095-043-156	Body, Valve	1
10	**132-014-358**	**Bumper, Valve Spool**	**2**
11	165-066-010	Cap, End	2
12	**360-048-425**	**Gasket, Valve Body**	**1**
13	**360-010-425**	**Gasket, End Cap**	**2**
14	**560-020-360**	**O-Ring**	**6**
15	**031-069-000**	**Sleeve & Spool Set**	**1**
16	170-032-330	Capscrew Hex Head	8
17	170-045-330	Capscrew, Hex Head	4
18	**132-002-360**	**Bumper, Diaphragm**	**2**
19	196-001-157	Chamber, Inner	2
20	**286-007-365**	**Diaphragm**	**2**
	286-007-363	Diaphragm	2
	286-007-360	Diaphragm	2
	286-007-354	Diaphragm	2
	286-007-356	Diaphragm	2
	286-007-364	Diaphragm	2
21	560-022-360	O-Ring	2
22	**685-007-120**	**Rod, Diaphragm**	**1**
23	170-024-330	Capscrew, Hex Head	8
24	618-003-330	Plug, Pipe	4
25	900-006 330	Washer, Lock	8
26	612-047-330	Plate, Diaphragm	2
27	**902-003-000**	**Stat-O-Seal**	**2**
28	530-008-000	Muffler, Exhaust	1
31	031-090-156	Main Air Valve Asembly (Includes Items 9, 10, 11, 13, 14, 15 & 16)	1
33	612-039-157	Plate, Outer Diaphragm Assembly (Includes Item 34)	2
34	807-026-330	Stud	2

*Item 6 is available in kit form. Order P/N 031-055-000 which also includes items 5, 7, 12 & 48.

Repair Parts shown in **bold face (darker)** type are more likely to need replacement after extended periods of normal use. They are readily available from most MARATHON distributors. The pump owner may prefer to maintain a limited inventory of these parts in his own stock to reduce repair downtime to a minimum.

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The Last 3 Digits of Part Number

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012…Powered Metal
015…Ductile Iron
020…Ferritic Malleable Iron
025…Music Wire
080…CarbonSteel AISI B-1112
100…Alloy 20
110…Alloy Type 316 Stainless Steel
111…Alloy Type 316 Stainless Steel (Electro Polished)
112…Alloy "C"
113…Alloy Type 316 Stainless Steel (Hand Polished)
114…303 Stainless Steel
115…302/304 Stainless Steel
117…440-C Stainless Steel (Martensitic)
120…416 Stainless Steel (Wrought Martensitic)
123…410 Stainless Steel (Wrought Martensitic)
148…Hardcoat Anodized Aluminum
149…2024-T4 Aluminum
150…6061-T6 Aluminum
151…6063-T6 Aluminum
152…2024-T4 Aluminum (2023-T351)
154…Almag 35 Aluminum
155 or 156…356-T6 Aluminum
157…Die Cast Aluminum Alloy #380
158…Aluminum Alloy SR-319
159…Anodized Aluminum
162…Brass, Yellow, Screw Machine Stock
165…Cast Bronze, 85-5-5-5
166…Bronze SAE 660
170…Bronze, Bearing Type, Oil Impregnated
180…Copper Alloy
310…Kynar Coated
330…Zinc Plated Steel
331…Chrome Plated Steel
332…Electroless Nickel Plated
335…Galvanized Steel
336…Zinc Plated Yellow Brass
337…Silver Plated Steel
340…Nickel Plated
342…Filled Nylon
354…Injection Molded #203-40 Santoprene - Duro 40D ± 5; Color: RED
355…Thermoplastic Elastomer
356…Hytrel
357…Rupplon (Urethane Rubber) Color coded:PURPLE
358…Rupplon (Urethane Rubber) Color coded:PURPLE (Some Applications, Compression Mold)
359…Urethane Rubber
360…Buna-N Rubber Color coded: RED
361…Buna-N
363…Viton (Fluorel) Color coded: YELLOW
364…E.P.D.M. Rubber Color coded: BLUE
365…Neoprene Rubber Color coded: GREEN
370…Butyl Rubber Color coded: BROWN
371…Philthane (Tuftane)

List continued next page

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
35	**722-041-365**	**Seat, Valve**	**4**
	722-041-360	Seat, Valve	4
	722-041-363	Seat, Valve	4
	722-041-364	Seat, Valve	4
	722-041-600	Seat, Valve	4
36	050-014-365	Ball, Check Valve	4
	050-014-364	Ball, Check Valve	4
	050-014-360	Ball, Check Valve	4
	050-015-600	Ball, Check Valve	4
37	518-123-156	Manifold, Suction	1
38	518-124-156	Manifold, Discharge	1
39	900-003-330	Washer, Lock	16
40	170-055-330	Capscrew, Hex Head.	12
41	170-034-330	Capscrew, Hex Head.	4
42	170-086-330	Capscrew, Hex Head. (tapped holes)	8
43	196-062-156	Chamber, Outer	2
44	326-002-080	Mounting, Food	2
45	286-020-604	Overlay Diaphragm	2
46	170-100-330	Capscrew, Hex Head.	8
47	545-007-330	Hex Nut	8
48	132-022-360	Bumper	2
49	196-083-156	Chamber, Driver	2
	196-140-156	Chamber, Driver (with PTFE overlay)	2
50	286-042-365	Diaphragm	2
	286-042-360	Diaphragm	2
	286-042-363	Diaphragm	2
	286-042-364	Diaphragm	2
	286-042-366	Diaphragm	2
	286-042-354	Diaphragm	2
	286-042-356	Diaphragm	2
	286-041-604	Diaphragm, Overlay	2
51	538-083-115	Nipple, Pipe	4
52	835-005-115	Tee, Pipe	4
53	618-003-110	Plug, Pipe	4
54	866-059-115	Fitting, Male	4
55	426-041-000	Hose Assembly	2
56	618-025-115	Boss Plug and O-Ring*	2
		*O-ring for Boss Plug is 560-070-611. If ordering Boss Plug, o-ring is included.	
57	210-008-330	Clip, Safety	1
58	560-023-360	O-Ring, End Cap	2

Repair Parts shown in **bold face (darker)** type are more likely to need replacement after extended periods of normal use. They are readily available from most MARATHON distributors. The pump owner may prefer to maintain a limited inventory of these parts in his own stock to reduce repair downtime to a minimum.

IMPORTANT: When ordering repair parts always furnish pump model number, serial number and type number.

MATERIAL CODES
The Last 3 Digits of Part Number

Continued from previous page

375…Fluorinated Nitrile
378…High density Polypropylene
405…Cellulose Fibre
408…Cork and Neoprene
425…Compressed Fibre
426…Blue Gard
440…Vegetable Fibre
465…Fibre
500…Delrin 500
501…Delrin 570
505…Acrylic Resin Plastic
520…Injection Molded PVDF Natural Color
540…Nylon
541…Nylon
542…Nylon
544…Nylon Injection Molded
550…Polyethylene
551…Polypropylene
552…Unfilled Polypropylene
553…Unfilled Polypropylene
555…Polyvinyl Chloride
570…Rulon II
580…Ryton
590…Valox
591…Nylatron G-S
592…Nylatron NSB
600…PTFE (virgin material) Tetrafluoroethylene (TFE)
601…PTFE (Bronze and moly filled)
602…Filled PTFE
603…Blue Gylon
604…PTFE
606…PTFE
610…PTFE Encapsulated Silicon
611…PTFE Encapsulated Viton

Delrin, PTFE, Viton and Hytrel are registered tradenames of E.I. DuPont.

Gylon is a registered tradename of Garlock. Inc.

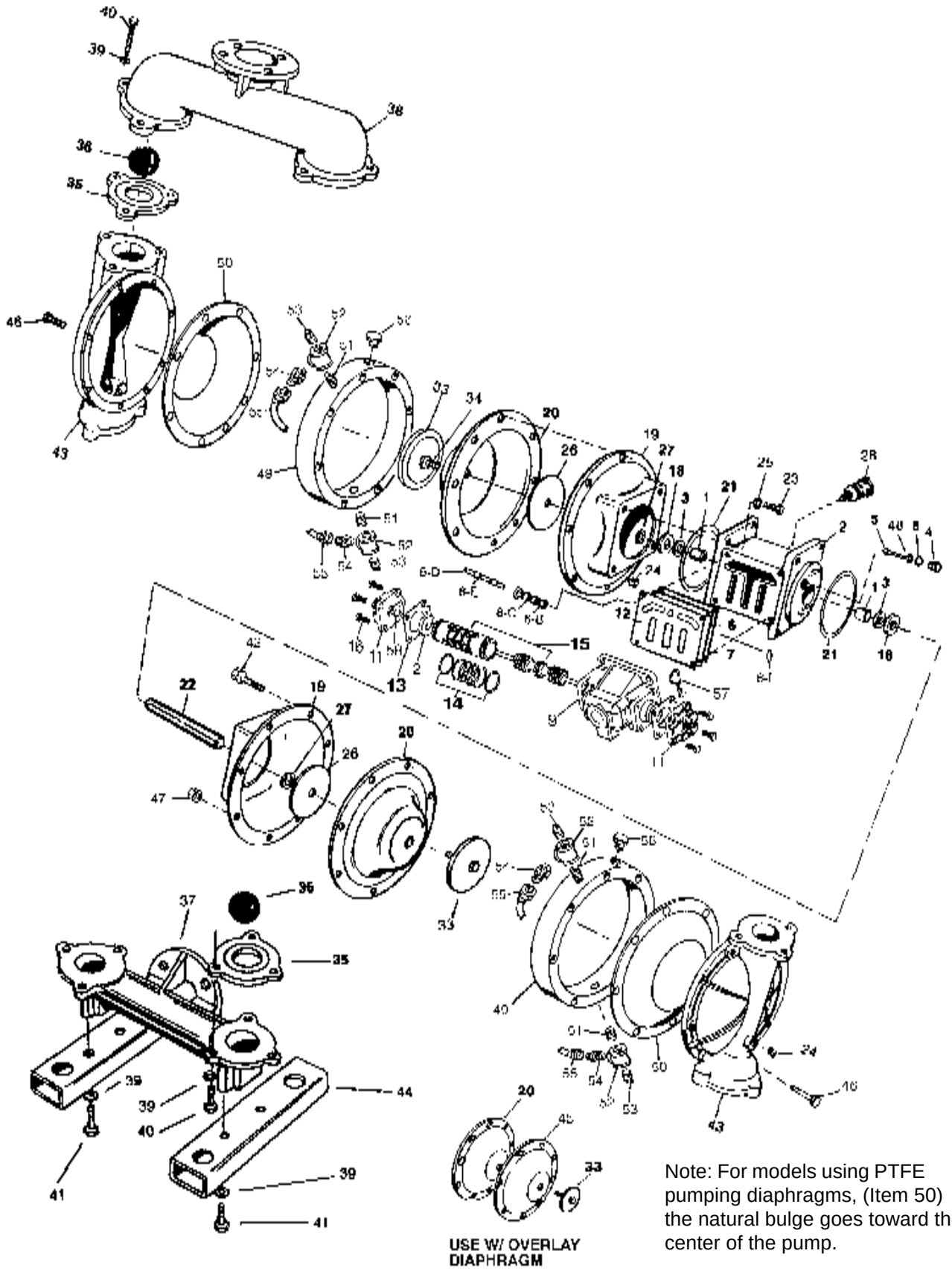
Nylatron is a registered tradename of Polymer Corp.

Rulon II is a registered tradename of Dixion Industries Corporation.

Hastelloy-C is a registered tradename of Cabot Corp.

Ryton is a registered tradename of Phillips Chemical Company.

Valox is a registered tradename of General Electric Company.



Note: For models using PTFE pumping diaphragms, (Item 50) the natural bulge goes toward the center of the pump.

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MARATHON
A WARREN RUPP PUMP BRAND

REPAIR PARTS LIST and DRAWING
Model MP14D
Design Level 1

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
1	070-006-170	Bearing, Sleeve	2
2	114-002-156	Bracket, Intermediate	1
	114-002-010	Bracket, Intermediate	2
3	**720-004-360**	**Seal, U-Cup**	**2**
4	**135-008-000**	**Bushing, Threaded, with O-Ring**	**2**
5	**620-004-114**	**Plunger, Actuator**	**2**
6	**095-073-000**	**Pilot Valve Body Assembly***	**1**
6-A	**095-070-551**	**Pilot Valve Body**	**1**
6-B	**755-025-000**	**Sleeve (with O-Ring)**	**1**
6-C	**560-033-360**	**O-Ring (Sleeve)**	**4**
6-D	**775-026-000**	**Spool (with O-Ring)**	**1**
6-E	**560-023-360**	**O-Ring (Spool)**	**2**
6-F	**675-037-080**	**Retaining Ring**	**1**
7	**360-041-425**	**Gasket, Valve Body**	**1**
8	**560-001-360**	**O-Ring**	**2**
9	095-043-156	Body, Valve (AL)	1
	095-043-010	Body, Valve (CI)	1
10	**132-014-358**	**Bumper, Valve Spool**	**2**
11	165-066-010	Cap, End	2
12	**360-048-425**	**Gasket, Valve Body**	**2**
13	**360-010-425**	**Gasket, End Cap**	**2**
14	**560-020-360**	**O-Ring**	**6**
15	**031-069-000**	**Sleeve & Spool Set**	**1**
16	170-032-330	Capscrew Hex Head	8
17	170-069-330	Capscrew, Hex Head	4
18	**132-002-360**	**Bumper, Diaphragm**	**2**
19	196-100-010	Chamber Inner	2
20	**132-022-360**	**Bumper**	**2**
21	**560-022-360**	**O-Ring**	**2**
22	**685-041-120**	**Rod, Diaphragm**	**1**
24	170-024-330	Capscrew Hex Head	8
25	530-008-000	Muffler, Exhaust	1
26	900-006 330	Washer, Lock	8
27	545-008-330	Nut, Hex	16
28	900-003-330	Washer, Lock	32
29	612-124-010	Plate, Inner Diaphragm	2
30	**286-098-354**	**Diaphragm**	**2**
	286-098-365	Diaphragm	2
	286-098-363	Diaphragm	2
	286-098-360	Diaphragm	2
	286-098-364	Diaphragm	2
31	722-041-365	Seat, Valve	4
	722-041-360	Seat, Valve	4
	722-041-363	Seat, Valve	4
	722-041-364	Seat, Valve	4
	722-041-600	Seat, Valve	4
32	**050-014-365**	**Ball, Check Valve**	**4**
	050-014-364	Ball, Check Valve	4

Repair Parts shown in **bold face (darker)** type are more likely to need replacement after extended periods of normal use. They are readily available from most MARATHON distributors. The pump owner may prefer to maintain a limited inventory of these parts in his own stock to reduce repair downtime to a minimum.

IMPORTANT: When ordering repair parts always furnish pump model number, serial number and type number.

MATERIAL CODES
The Last 3 Digits of Part Number

000…Assembly, sub-assembly; and some purchased Items
010…Cast Iron
012…Powered Metal
015…Ductile Iron
020…Ferritic Malleable Iron
025…Music Wire
080…CarbonSteel AISI B-1112
100…Alloy 20
110…Alloy Type 316 Stainless Steel
111…Alloy Type 316 Stainless Steel (Electro Polished)
112…Alloy "C"
113…Alloy Type 316 Stainless Steel (Hand Polished)
114…303 Stainless Steel
115…302/304 Stainless Steel
117…440-C Stainless Steel (Martensitic)
120…416 Stainless Steel (Wrought Martensitic)
123…410 Stainless Steel (Wrought Martensitic)
148…Hardcoat Anodized Aluminum
149…2024-T4 Aluminum
150…6061-T6 Aluminum
151…6063-T6 Aluminum
152…2024-T4 Aluminum (2023-T351)
154…Almag 35 Aluminum
155 or 156…356-T6 Aluminum
157…Die Cast Aluminum Alloy #380
158…Aluminum Alloy SR-319
159…Anodized Aluminum
162…Brass, Yellow, Screw Machine Stock
165…Cast Bronze, 85-5-5-5
166…Bronze SAE 660
170…Bronze, Bearing Type, Oil Impregnated
180…Copper Alloy
310…Kynar Coated
330…Zinc Plated Steel
331…Chrome Plated Steel
332…Electroless Nickel Plated
335…Galvanized Steel
336…Zinc Plated Yellow Brass
337…Silver Plated Steel
340…Nickel Plated
342…Filled Nylon
354…Injection Molded #203-40 Santoprene - Duro 40D ± 5; Color: RED
355…Thermoplastic Elastomer
356…Hytrel
357…Rupplon (Urethane Rubber) Color coded:PURPLE
358…Rupplon (Urethane Rubber) Color coded:PURPLE (Some Applications, Compression Mold)
359…Urethane Rubber
360…Buna-N Rubber Color coded: RED
361…Buna-N
363…Viton (Fluorel) Color coded: YELLOW
364…E.P.D.M. Rubber Color coded: BLUE
365…Neoprene Rubber Color coded: GREEN
370…Butyl Rubber Color coded: BROWN
371…Philthane (Tuftane)

List continued next page

ITEM NO.	PART NUMBER	DESCRIPTION	TOTAL RQD.
	050-014-360	Ball, Check Valve	4
	050-015-600	Ball, Check Valve	4
36	518-123-156	Manifold, Suction (AL)	1
	518-123-110	Manifold, Suction (SS)	1
37	518-124-156	Manifold, Discharge (AL)	1
	518-124-110	Manifold, Discharge (SS)	1
38	170-055-330	Capscrew, Hex Head	12
39	326-002-080	Mounting Foot	2
40	286-067-354	Diaphragm	2
	286-067-365	Diaphragm	2
	286-067-360	Diaphragm	2
	286-067-363	Diaphragm	2
	286-067-364	Diaphragm	2
	286-068-604	Diaphragm	2
41	170-034-330	Capscrew, Hex Head	12
42	807-046-330	Stud	2
43	196-052-156	Chamber, Outer (AL)	2
	196-052-110	Chamber, Outer (SS)	2
44	612-090-156	Plate, Outer Diaphragm Assembly	2
52	170-102-330	Capscrew, Hex Head (AL only)	16
	170-102-115	Capscrew, Hex Head (SS only)	12
53	196-136-156	Chamber, Driver	2
	196-141-156	Chamber, Driver (AL,w/PTFE overlay)	2
	196-141-110	Chamber, Driver (SS,w/PTFE overlay)	2
54	426-042-000	Hose Assembly	2
55	866-059-115	Fitting, Male	4
56	618-003-110	Plug, Pipe	4
57	835-005-115	Tee, Pipe	4
58	538-083-115	Nipple, Pipe	4
60	618-025-115	Boss Plug and O-Ring	2
61	210-008-330	Clip, Safety	1
62	866-060-110	Connector (SS only)	4
63	860-047-606	Tube, Sight	2
64	807-042-115	Stud	8
65	560-023-360	O-Ring, End Cap	2
66	612-139-010	Plate, Spacer	1
Not Shown:			
	031-090-156	Main Air Valve Assembly (AL) (Includes Items 9, 10, 11, 13, 14, 15, 16 & 61)	1
	031-090-010	Main Air Valve Assembly (SS) (Includes Items 9, 10, 11, 13, 14, 15, 16 & 61)	1

* Item 6 is available in kit form. Order P/N 031-055-000 which also includes Items 5, 7, 12, & 20.

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The Last 3 Digits of Part Number

Continued from previous page

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465…Fibre
500…Delrin 500
501…Delrin 570
505…Acrylic Resin Plastic
520…Injection Molded PVDF Natural Color
540…Nylon
541…Nylon
542…Nylon
544…Nylon Injection Molded
550…Polyethylene
551…Polypropylene
552…Unfilled Polypropylene
553…Unfilled Polypropylene
555…Polyvinyl Chloride
570…Rulon II
580…Ryton
590…Valox
591…Nylatron G-S
592…Nylatron NSB
600…PTFE (virgin material) Tetrafluoroethylene (TFE)
601…PTFE (Bronze and moly filled)
602…Filled PTFE
603…Blue Gylon
604…PTFE
606…PTFE
610…PTFE Encapsulated Silicon
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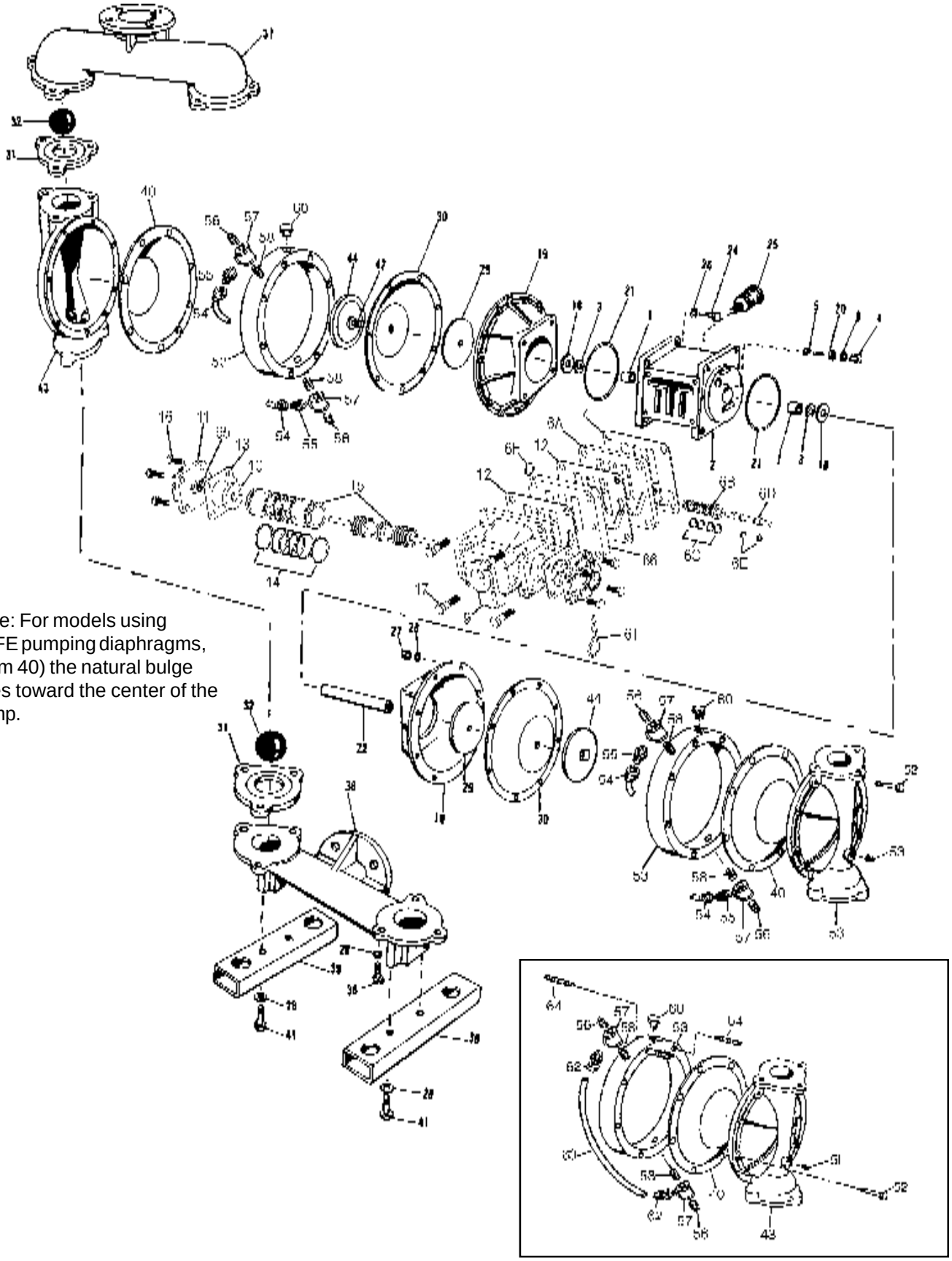

Note: For models using PTFE pumping diaphragms, (Item 40) the natural bulge goes toward the center of the pump.

SS Configuration

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SERVICE AND OPERATING MANUAL

MARATHON *A WARREN RUPP PUMP BRAND*

MP05D • MP08D • MP12D • MP14D

Design Level 1

PRINCIPLE OF OPERATION

All SandPIPER pumps, including these spill containment models, operate on the same basic principle. They are powered by compressed air which alternately pressurizes the inner sides of the two diaphragm chambers while simultaneously exhausting the opposite inner chambers causing the diaphragms, which are connected by a shaft, to move endwise. Since air pressure is applied over the entire surface of the diaphragm which is forcing liquid to be discharged by its other side, the diaphragm is operating under a balanced condition during the discharge stroke. This allows the unit to be operated at discharge heads over 200 feet (61 meters) of water head.

Alternate pressurizing and exhausting of the diaphragm chamber is performed by an externally mounted, pilot operated, four way, spool type air distribution valve. When the spool is at one end of the valve body, inlet air pressure is connected to one diaphragm chamber and the other diaphragm chamber is connected to the exhaust. When the spool is removed to the opposite end of the valve body, the porting of chambers is reversed. The air distribution valve spool is moved from one end position to the other in the valve body by means of an internal pilot valve which alternately pressurizes the ends of the air distribution valve spool while simultaneously exhausting the other ends. The pilot valve is positively shifted at each end of the diaphragm stroke by the diaphragm plate's coming in contact with the end of the pilot valve spool and pushing it into position for shifting of the air distribution valve. The chambers are manifolded together with a suction and discharge check valve for each chamber to maintain flow in one direction through the pump.

The spill containment pumps differ from standard models in that they utilize four diaphragms instead of two, the two rod-connected diaphragms being the driver diaphragms, and the other two (outermost) diaphragms being the actual pumping diaphragms. Each driver diaphragm (of Neoprene or other elastomer), and the pumping diaphragm, Teflon or elastomeric, are separated by a spill containment chamber filled with liquid (typically ethylene glycol, green in color),which transmits the reciprocating motion of the driver diaphragm to the pumping diaphragm. The pumping diaphragms, in turn, create the alternating suction and discharge action to each outer diaphragm chamber. In normal operation the pumping diaphragms are the only ones in contact with the liquid being pumped.

INSTALLATION PROCEDURES

Position the pump as close as possible to the source of the liquid to be pumped. Avoid long or undersize suction lines and use the minimum number of fittings. High vacuums reduce flow rate capability and shorten driver diaphragm service life.

For permanent installations involving rigid piping, install short flexible sections of hose between the pump and piping. This reduces strains and permits easier removal of the pump for service when required. **At time of installation, inspect all external gasketed fasteners for looseness caused by gasket creep. Tighten loose fittings securely to prevent leakage.**

AIR VALVE LUBRICATION

The pump's pilot valve and main air valve assemblies are designed to operate WITHOUT lubrication. This is the preferred mode of operation. There may be instances of personal preference, or poor quality air supplies when lubrication of the compressed air supply is required. The pump air system will operate with properly lubricated compressed air supplies. Proper lubrication of the compressed air supply would entail the use of an air line lubricator (available from MARATHON) set to deliver one drop of 10 weight, non-detergent oil for every 20 SCFM of air the pump consumed at its point of operation. Consult the pump's published Performance Curve to determine this.

⚠ IMPORTANT ⚠

Read these instructions completely, before installation and start-up. It is the responsibility of the purchaser to retain this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pump, and void factory warranty.

⚠ WARNING ⚠

Take action to prevent static sparking. Fire or explosion can result, especially when handling flammable liquids. The pump, piping, valves, containers or other miscellaneous equipment must be grounded.

⚠ HAZARD WARNING ⚠

POSSIBLE EXPLOSION HAZARD can result if 1, 1, 1,-Trichloroethane, Methylene Chloride or other Halogenated Hydrocarbon solvents are used in pressurized fluid systems having Aluminum or Galvanized wetted parts. Death, serious bodily injury and/or property damage could result. Consult with the factory if you have questions concerning Halogenated Hydrocarbon solvents.

⚠ CAUTION ⚠

The spill containment models should not be applied in pumping applications where the driver liquid coming in contact with the pumped liquid would create a hazardous condition. This could happen in case of a pumping diaphragm failure since this diaphragm normally separates the two liquids. Also note that care must be taken to guard against the operation of this unit if it has been subjected to freezing temperatures. Because of the driver liquid used, possible diaphragm failure may result.

It is important to remember to inspect the sleeve and spool set routinely. It should move back and forth freely. This is most important when the air supply is lubricated. If a lubricator is used, oil accumulation will, over time, collect any debris from the compressed air. This can prevent the pump from operating properly.

Water in the compressed air supply can create problems such as icing or freezing of the exhaust air causing the pump to cycle erratically, or stop operating. This can be addressed by using a point of use air dryer to supplement a plant's air drying equipment. This device will remove excess water from the compressed air supply and alleviate the icing or freezing problem.

Externally Serviceable Air Distribution System

Please refer to the exploded view drawing and parts list in the Service Manual supplied with your pump. If you need replacement or additional copies, contact your local MARATHON Distributor, or the MARATHON factory Literature Department at the number shown below. To receive the correct manual, you must specify the MODEL and TYPE information found on the name plate of the pump.

Models with 1" suction/discharge or larger and METAL center sections

The main air valve sleeve and spool set is located in the valve body mounted on the pump with four hex head capscrews. The valve body assembly is removed from the pump by removing these four hex head capscrews.

With the valve body assembly off the pump, access to the sleeve and spool set is made by removing four hex head capscrews (each end) on the end caps of the valve body assembly. With the end caps removed, slide the spool back and forth in the sleeve. The spool is closely sized to the sleeve and must move freely to allow for proper pump operation. An accumulation of oil, dirt or other contaminants from the pump's air supply, or from a failed diaphragm, may prevent the spool from moving freely. This can cause the spool to stick in a position that prevents the pump from operating. If this is the case, the sleeve and spool set should be removed from the valve body for cleaning and further inspection.

Remove the spool from the sleeve. Using an arbor press or bench vise (with an improvised mandrel), press the sleeve from the valve body. Take care not to damage the sleeve. At this point, inspect the o-rings on the sleeve for nicks, tears or abrasions. Damage of this sort could happen during assembly or servicing. A sheared or cut o-ring can allow the pump's compressed air supply to leak or bypass within the air valve assembly, causing the pump to leak compressed air from the pump air exhaust or not cycle properly. This is most noticeable at pump dead head or high discharge pressure conditions. Replace any of these o-rings as required or set up a routine, preventive maintenance schedule to do so on a regular basis. This practice should include cleaning the spool and sleeve components with a safety solvent or equivalent, inspecting for signs of wear or damage, and replacing worn components.

To re-install the sleeve and spool set, lightly lubricate the o-rings on the sleeve with an o-ring assembly lubricant or lightweight oil (such as 10 wt. air line lubricant). Re-install one end cap, gasket and bumper on the valve body. Using the arbor press or bench vise that was used in disassembly, carefully press the sleeve back into the valve body, without shearing the o-rings. You may have to clean the surfaces of the valve body where the end caps mount. Material may remain from the old gasket. Old material not cleaned from this area may cause air leakage after reassembly. Take care that the bumper stays in place allowing the sleeve to press in all the way. Reinstall the spool, opposite end cap, gasket and bumper on the valve body. After inspecting and cleaning the gasket surfaces on the valve body and intermediate, reinstall the valve body on the pump using new gaskets. Tighten the four hex head capscrews evenly and in an alternating cross pattern.

Models with 1" suction/discharge or larger and NON-METAL center sections

The main air valve sleeve and spool set is located in the valve body mounted on the pump with four hex head capscrews. The valve body assembly is removed from the pump by removing these four hex head capscrews.

With the valve body assembly off the pump, access to the sleeve and spool set is made by removing a retaining ring (each end) securing the end cap on the valve body assembly. With the end caps removed, slide the spool back and forth in the sleeve. The spool is closely sized to the sleeve and must move freely to allow for proper

⚠ CAUTION ⚠

If a diaphragm fails the pumped product or fumes can enter the air side of the pump. This side is exhausted through the exhaust port (muffler).

When the product is a hazardous or toxic material, the exhaust should be piped to an appropriate area for safe disposition.

When the product source is at a higher level than the pump (flooded suction), the exhaust should be piped to a higher level than the product to prevent spills caused by siphoning. (Both pumping diaphragms and driver diaphragms must fail for this to occur.)

⚠ CAUTION ⚠

Before maintenance or repair, shut off the compressed air line, bleed the pressure, and disconnect the air line from the pump. The discharge line may be pressurized and must be bled of its pressure. When the pump is used for toxic or aggressive fluids, it should be flushed clean prior to disassembly.

pump operation. An accumulation of oil, dirt or other contaminants from the pump's air supply, or from a failed diaphragm, may prevent the spool from moving freely. This can cause the spool to stick in a position that prevents the pump from operating. If this is the case, the sleeve and spool set should be removed from the valve body for cleaning and further inspection.

Remove the spool from the sleeve. Using an arbor press or bench vise (with an improvised mandrel), press the sleeve from the valve body. Take care not to damage the sleeve. At this point, inspect the o-rings on the sleeve for nicks, tears or abrasions. Damage of this sort could happen during assembly or servicing . A sheared or cut o-ring can allow the pump's compressed air supply to leak or bypass within the air valve assembly, causing the pump to leak compressed air from the pump air exhaust or not cycle properly. This is most noticeable at pump dead head or high discharge pressure conditions. Replace any of these o-rings as required or set up a routine, preventive maintenance schedule to do so on a regular basis. This practice should include cleaning the spool and sleeve components with a safety solvent or equivalent, inspecting for signs of wear or damage, and replacing worn components.

To re-install the sleeve and spool set, lightly lubricate the o-rings on the sleeve with an o-ring assembly lubricant or lightweight oil (such as 10 wt. air line lubricant). Re-install one end cap, and retaining ring on the valve body. Using the arbor press or bench vise that was used in disassembly, carefully press the sleeve back into the valve body, without shearing the o-rings. Re-install the spool, opposite end cap and retaining ring on the valve body. After inspecting and cleaning the gasket surfaces on the valve body and intermediate, reinstall the valve body on the pump using new gaskets. Tighten the four hex head capscrews evenly and in an alternating cross pattern, at 150 in./lbs. (16.94 Newton meters).

AIR SUPPLY

Do not connect the unit to an air supply in excess of 125 PSI (8.61 bars). Install a shutoff valve in the air supply line to permit removal of the unit for servicing. When connecting an air supply of rigid piping, mount a section of flexible line to the pump to eliminate piping strain. In permanent installations, an air line filter is recommended.

OPERATION

This pump has been tested prior to shipment and is ready for use as received. It is completely self priming and no initial filling with fluid is required.

If the unit is to be totally submerged, the air exhaust must be piped above the liquid level to prevent the liquid and foreign material from entering the air distribution valve mechanism.

Open the inlet air valve at least one turn to allow sufficient cycling rate for the pump to prime (30 to 60 cycles per minute). After pumping starts, adjust the inlet air valve for the desired pumping capacity. When further opening of the inlet air valve increases cycling rate without increasing the flow rate, the pump is being starved of liquid due to suction limitations. Further opening of the air inlet valve will waste compressed air. Set the inlet air valve for lowest cycling rate that does not decrease flow rate for most efficient operation.

LEAK DETECTION

Visual leak detection is standard on the MP05D, MP08D, MP12D and MP14D. If the pumping diaphragm fails, pumped liquid enters the spill containment chamber, displacing driver fluid. The exchange of pumpage and driver fluid displays a color change in the sight tube. Driver fluid should be chemically compatible with the pumped fluid, with an obvious difference in color. If a leak occurs, pumpage is contained in the spill chamber. The pump will continue to work, and in many cases, repairs can be done when the batch is completed. The air valve and work environment are protected.

AIR EXHAUST

This pump can be submerged if the materials of construction are compatible with the liquid and the exhaust is piped above the liquid level. Piping used for the exhaust should not be smaller than 1" pipe size. Reduced pipe size can restrict the exhausted air and reduce pump performance.

⚠ BEFORE OPERATION ⚠

Before pump operation, inspect all gasketed fasteners for looseness caused by gasket creep. Retorque loose fasteners to prevent leakage. Follow recommended torques stated in this manual

FILLING PROCEDURE

Insert safety clip (p/n 210-008-330) on one side of the main air valve body before applying air pressure. Cycle the pump at 5 to 10 psi. As you face the pump, the side with the pin should be the first driver fluid reservoir to be filled. The driver diaphragm will be on a suction stroke. Pour the correct amount of liquid into the reservoir. Fill volume amounts differ for each model, and are listed below. The fluid level will not come completely to the top. Loosely install the pipe plug, with pipe dope, Teflon tape or o-ring (depending on pump model) placed on threads. Release all air pressure to the pump and remove the safety clip. The diaphragm will relax and will come to center. Watch the loose pipe plug closely as air escapes and the driver fluid level rises. Insert the safety clip on the opposite side and add a small amount of air pressure. When you see liquid weeping out between the loose pipe plug and fill hole, tighten the pipe plug. Repeat the procedure for the unfilled chamber.

If you have a problem getting the driver fluid to come to the top, a blunt instrument can be inserted into the chamber port of the pump and pressure can manually be applied to the pumping diaphragm to cause the liquid to come to the top. DO THIS CAREFULLY. A needle valve for precision stroking control is recommended at the air inlet for this procedure. Please be aware that air left in the chambers will result in faulty operation of the pump and will cause premature pumping diaphragm failure.

MP05D Volume for Teflon overlay =540 ML/18.26 fl. oz.
Volume for non-overlay =600 ML/20.29 fl. oz.
Use Teflon tape on pipe plugs. Tilt pump to bring tee on sight tube assembly to highest point when displacing air from containment chambers.

MP08D Volume for non-overlay =2640 ML/89.27 fl. oz.
Use Teflon tape on pipe plugs. Tilt pump to bring tee on sight tube assembly to highest point when displacing air from containment chambers.

MP14D Volume for non-overlay =5340 ML/180.59 fl. oz.
Tilt pump to bring tee on sight tube assembly to highest point when displacing air from containment chambers.

MP12D Volume for non-overlay =2640 ML/89.27 fl. oz.
Tilt pump to bring tee on sight tube assembly to highest point when displacing air from containment chambers.

MAINTENANCE AFTER USE

When the pump is used for materials that tend to settle out or transform from liquid to solid form, care must be taken after each use or during idle time to remove them and flush the pump as required to prevent damage.

In freezing temperatures the pump must be completely drained when idle. Tilting the pump will allow the liquid from the chambers to run out of the discharge port.

TROUBLE SHOOTING

1. Pump will not cycle

A. Check to make sure the unit has enough pressure to operate and that the air inlet valve is open.

B. Check the discharge line to insure that the discharge line is neither closed nor blocked.

C. If the spool in the air distribution valve is not shifting check the main spool. It must slide freely.

D. Excessive air leakage in the pump can prevent cycling. This condition will be evident. Air leakage into the discharge line indicates a ruptured diaphragm. Air leakage from the exhaust port indicates leakage in the air distribution valve. See further service instructions.

E. Blockage in the liquid chamber can impede movement of diaphragm.

F. Plugged or dirty exhaust muffler.

2. Pump cycles but will not pump

A. Suction side of pump pulling in air. Check the suction line for air leaks and be sure that the end of the suction line is submerged. Check flange bolting. Check valve flanges and manifold to chamber flange Joints.

B. Make certain the suction line or strainer is not plugged. Restriction at the

⚠ DANGER ⚠

Before doing any maintenance on the pump, be certain all pressure is completely vented from the pump, suction, discharge, piping, and all other openings and connections. Be certain the air supply is locked out or made non-operational, so that it cannot be started while work is being done on the pump. Be certain that approved eye protection and protective clothing are worn all times in the vicinity of the pump. Failure to follow these recommendations may result in serious injury or death.

⚠ CAUTION ⚠

In the event of diaphragm rupture, pumped material may enter the air end of the pump, and be discharged into the atmosphere. If pumping a product which is hazardous or toxic, the air exhaust must be piped to an appropriate area for safe disposition.

⚠ IMPORTANT ⚠

This pump is pressurized internally with air pressure during operation. Always make certain that all bolting is in good condition and that all of the correct bolting is reinstalled during assembly.

⚠ CAUTION ⚠

Before maintenance or repair, shut off the compressed air line, bleed the pressure, and disconnect the air line from the pump. The discharge line may be pressurized and must be bled of its pressure. When used for toxic or aggressive fluids, the pump should always be flushed clean prior to disassembly.

suction is indicated by a high vacuum reading when a vacuum gauge is installed in the suction line.

C. Check valves may not be seating properly. To check, remove the suction line and cover the suction port with your hand. If the unit does not pull a good suction (vacuum), the check valves should be inspected for proper seating.

D. Static suction lift may be too high. Priming can be improved by elevating the suction and discharge lines higher than the check valves and pouring liquid into the unit through the suction inlet. When priming at high suction lifts or with long suction lines operate the pump at maximum cycle rate.

3. Low performance

A. Capacity is reduced as the discharge pressure increases, as indicated on the performance curve. Performance capability varies with available inlet air supply. Check air pressure at the pump inlet when the pump is operating to make certain that adequate air supply is maintained. Low flow rate as discharge pressure increases can also be a sign of too little or no driver liquid in the spill containment chamber.

B. Check the vacuum at the pump suction. Capacity is reduced as vacuum increases. Reduced flow rate due to starved suction will be evident when the cycle rate can be varied without change in capacity. This condition will be more prevalent when pumping viscous liquids. When pumping thick, heavy materials the suction line must be kept as large in diameter and as short as possible, to keep suction loss minimal.

C. Low flow rate and slow, cycling rate indicate restricted flow through the discharge line. Low flow rate and fast cycling rate indicate restriction in the suction line or air leakage into suction.

D. Unstable cycling indicates improper check valve seating on one chamber. This condition is confirmed when unstable cycling repeats consistently on alternate exhausts. Cycling that is not consistently unstable may indicate partial exhaust restriction due to freezing and thawing of exhaust air.

CHECK VALVE SERVICING:

Need for inspection or service is usually indicated by poor priming, unstable cycling, reduced performance or the pump's cycling but not pumping.

DIAPHRAGM SERVICING:

1. Driver Diaphragms:

Drain the driver diaphragm chamber by removing the boss plug on the underside of the driver chamber and/or pipe plug at the leak detection tee. Remove bolts securing the two manifolds to the chambers. Remove eight bolts securing the diaphragm chamber. This permits inspection of the pumping diaphragm and the driver diaphragm. Loosen the plate which secures the diaphragm and plate to the rod by keeping the diaphragm engaged with the inner diaphragm chamber by inserting two or three capscrews through the bolt holes so that the diaphragm cannot rotate when loosening. The diaphragm plates, diaphragm and bumper will now come off the assembly. Repeat all actions if the other diaphragm needs to be inspected or replaced.

NOTE: See "Filling of Spill Containment Chamber with Liquid" for the correct procedure to recharge the pump for operation.

⚠ CAUTION ⚠

Do not use a wrench on the diaphragm rod. Flaws on the surface may damage bearings and seals.

Procedures for reassembling the diaphragms are the reverse of the above. The driver diaphragms must be installed with their natural bulge to the outside, toward the outer diaphragm plate. Install the inner plate with the flat face against the diaphragm.

After all components are in position in a vise and hand, tight, tighten with a wrench.

Initial Torque requirements

MP05D ..... no torque required

MP08D ..... 40 ft. lbs. (54.23 Newton meters)

MP12D ..... 40 ft. lbs. (54.23 Newton meters)

MP14D ..... 50 ft. lbs. (67.79 Newton meters)

After both diaphragm assemblies have been assembled, thread one assembly into the shaft (hold the shaft near the middle in a vise with soft jaws, to protect the

finish). Install this subassembly into the pump and secure by placing the outer chamber on the end with the diaphragm. This holds the assembly in place while the opposite side is installed. Torque the diaphragm assembly into the rod.

Final Torque requirements

MP05D ..... 30 ft. lbs. (40.67 Newton meters)
MP08D ..... 30 ft. lbs. (40.67 Newton meters)
MP12D ..... 30 ft. lbs. (40.67 Newton meters)
MP14D ..... 40 ft. lbs. (54.23 Newton meters)

This final torquing will lock the diaphragm assemblies together. Place the remaining outer chamber on the open end and loosely tighten the bolts. Replace the manifold assemblies to square the flanges before final tightening of the remaining bolts, alternating for progressive tightening, the eight capscrews that secure outer chamber to inner chamber.

IMPORTANT

This pump is pressurized internally with air pressure during operation—always make certain all bolting is in good condition and that all of correct bolting is reinstalled during assembly.

WARRANTY

This unit is guaranteed for a period of five years against defective material and workmanship.

⚠ IMPORTANT ⚠

BEFORE PUMP OPERATION all external gasketed fasteners must be inspected for looseness caused by gasket creep after leaving the factory. Retorque loose fasteners to insure against leakage. Follow recommended torques where called out. (A card is attached to each new pump stating this fact.)

NOTE: When electronic leak detector is used with this model pump, the probes must be fitted into special boss plugs. Order one kit 475-098-000 for each pump.

RECOMMENDED MARATHON ACCESSORIES TO MAXIMIZE PUMP PERFORMANCE:

- **Surge Suppressor. For nearly pulse-free flow.**
- **Filter/Regulator. For modular installation and service convenience.**
- **Speed Control. For manual or programmable process control. Manual adjustment or 4-20mA reception.**

For more detailed information on these accessories, contact your local MARATHON Factory-Authorized Distributor, or MARATHON corporate headquarters.

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Declaration of Conformity

WARREN RUPP®

IDEX CORPORATION

Declaration of Conformity

Model: _____

Serial Number: _____

Warren Rupp, Inc., 800 North Main Street, Mansfield, Ohio, certifies that Air-Operated Double Diaphragm Metallic Pumps Series: HDB, HDF, M Non-Metallic, S Non-Metallic, M Metallic, S Metallic, Containment Duty, Gas, UL, High Pressure, W, Submersible and Tranquilizers comply with the European Community Directive 98/37/EC, Safety of Machinery. This product has used EN 809, Pumps and Pump Units for Liquids - Common Safety Requirements harmonized standard to verify conformance.

David Roseberry

Signature of authorized person

October 20, 2005

Date of issue

David Roseberry

Printed name of authorized person

Engineering Manager

Title

CE

Declaration of Conformity