

# Mi-T-M<sup>®</sup> CORPORATION

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## PARTS LIST FOR HSP-3504-1MGH/1MGV (After Serial #22654)

### ENGINE OIL GRADE:

HONDA:

SAE 10W-30

VANGUARD:

ABOVE 40°F=SAE30

BELOW 40°F=SAE10W-30

### ENGINE OIL CAPACITY:

HONDA:

37 OZ.

VANGUARD:

51 OZ.

### PUMP OIL GRADE:

Mi-T-M PUMP OIL #AW-4085-0016

### PUMP OIL CAPACITY:

23.7 OZ.

### FUEL NOZZLE:

1.75 60°B DELAVAN

### BTU INPUT:

294,000/HOUR

### PRESSURE NOZZLE SIZE:

3.5

This Parts Listing has been compiled for your benefit. You can be assured your Mi-T-M hot water pressure washer was constructed and designed with quality and performance in mind. Each component has been rigorously tested to insure the highest level of quality.

The contents of this Parts Listing are based on the latest product information available at the time of publication. Mi-T-M reserves the right to make changes in price, color, materials, equipment, specifications or models at any time without notice.

**WARNING**

THIS IS A PROFESSIONAL HIGH PRESSURE, HOT WATER PRESSURE WASHER. CAUTION SHOULD BE OBSERVED WHEN USING OR REPAIRING THIS UNIT! READ AND FOLLOW THE SAFETY WARNINGS LISTED BELOW BEFORE ATTEMPTING ANY REPAIRS ON THIS PRESSURE WASHER!

### SAFETY WARNINGS

1. NEVER alter or modify the equipment. Be sure any accessory items and system components being used will withstand the pressure developed. Use only genuine Mi-T-M parts for repair of your pressure washer. Failure to do so can cause hazardous operating conditions and will VOID warranty.
2. NEVER make adjustments on machinery while the unit is connected to the engine without first removing the ignition cable from the spark plug. Turning over the machinery by hand during adjustment or cleaning might start the engine and machinery with it, causing serious injury to the operator.
3. Know how to stop and bleed pressures quickly. Be thoroughly familiar with controls.
4. Before servicing the unit, turn unit off, relieve the water pressure and allow the unit to cool down. Do not make repairs while the unit is running. Service in a clean, dry, flat area. Block the wheels to prevent the unit from moving. Be especially careful to properly dispose of any flammable materials.
5. After testing the machine, DO NOT leave the pressurized unit unattended. Shut off the unit and release trapped pressure before leaving.

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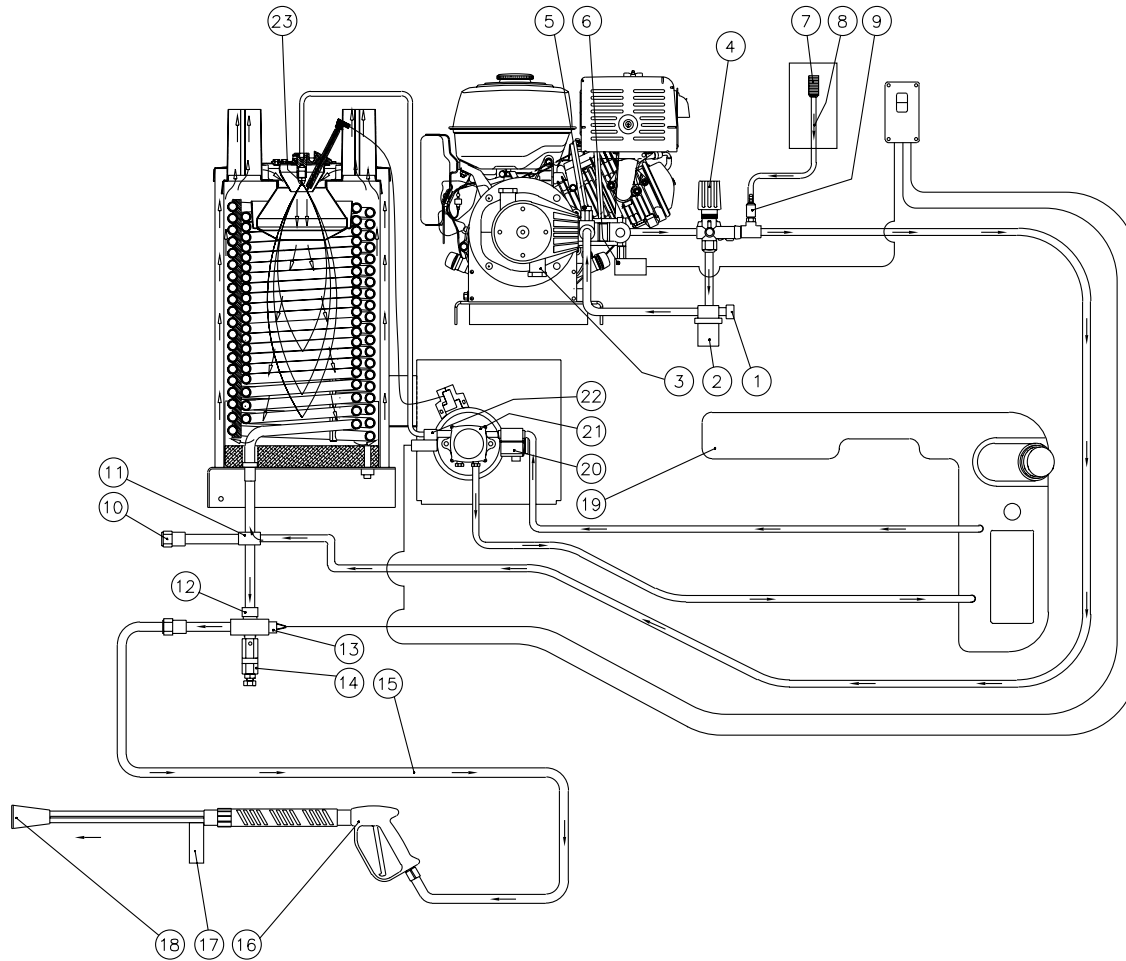
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# SPECIFICATIONS

HSP-3504-1MGH/GV

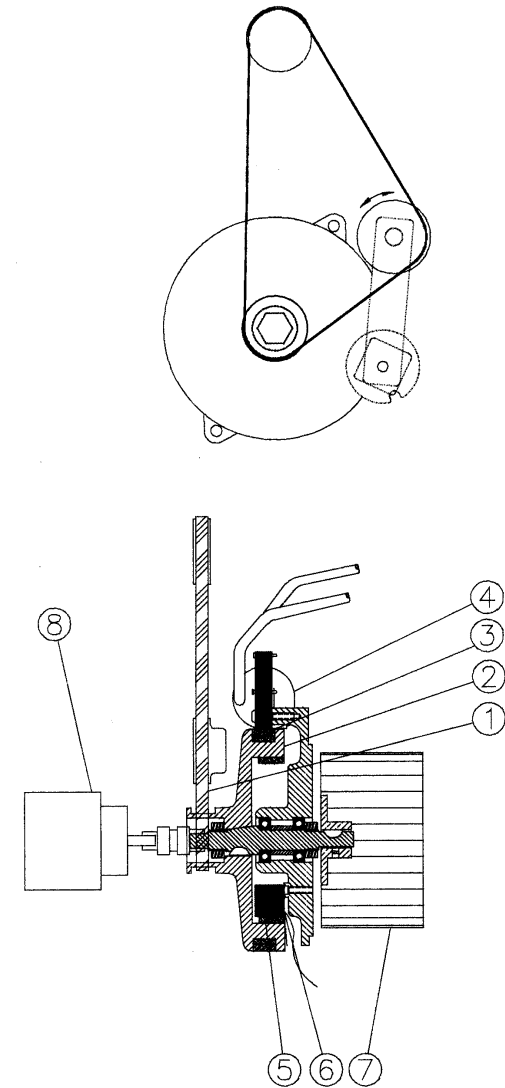
MODEL NUMBER	HSP-3504-1MGH	HSP-3504-1MGV
<b>Operating Pressure (PSI/Bar):</b>	3500/ 241 (+/- 5%)	
<b>Water Volume (GPM/lpm):</b>	3.3/12.5 (+/- 5%)	
<b>Outlet Water Temperature (F/C):</b>	140 F/ 78 C (+/- 20 F) rise above inlet ambient (210 F/ 99 C maximum)	
<b>Engine:</b>	Honda	Briggs & Stratton Vanguard
Horsepower	13	13
Engine Type	Four Stroke, Overhead Valve, Single Cylinder	
Oil Type	SAE10W-30	Above 40 F=SAE30/ Below 40 F=SAE 10W-30
Oil Capacity (oz./liter)	37/1.1	51/1.5
Low Oil Protection	Oil Alert™	Oil Guard™
Fuel Type	Unleaded Gasoline 86 Octane Minimum	
Fuel Capacity (gal./liter)	1.72/6.5	1.8/6.8
Starting	Recoil Rope	
Maximum No Load RPM	3600 (+/- 100)	
<b>High Pressure Pump:</b>	Direct Driven, Oil Bath, Triplex Piston	
Oil Type	Mi-T-M Pump Oil #AW-4085-0016	
Oil Capacity (oz./liters)	23.7/0.7	
Plungers	Ceramic	
Manifold	Forged Brass	
Valves	Stainless Steel	
Unloader	Preset	
Inlet Water Strainer	Removable Clear Bowl for inspection and cleaning of Stainless Steel Screen	
Heat Dump Valve	Relieves heated water during unloader bypass stage	
<b>Detergent Injector:</b>	Adjustable Low Pressure downstream from pump	
<b>Burner Fuel System:</b>		
Fuel Type	No.1 or No.2 Fuel Oil, Diesel or Kerosene	
Fuel Capacity (gal./liters)	5.5/21	
Fuel Filter/ Water Separator	Spin on (10 micron) filter/ E-Z water drain	
Fuel Pump	Two Line, Single Stage	
Fuel Pressure (PSI/ BAR)	145/10	
Fuel Nozzle	1.75 60 B Delavan	
Fuel Consumption (GPH/ LPH)	2.1 GPH Continuous Burning	
<b>Electro Magnetic Firing (EMF) System:</b>	Belt Driven (Patent Pending)	
Ignition	Transistorized Magneto	
Control Voltage	12 Volt DC	
Blower	Forced Air	
<b>Heat Exchanger:</b>	Vertical, Top fired, Dual Spiral Coil	
BTU Input	294,000	
Efficiency	86% with #2 Fuel Oil/ Diesel	
Smoke Density	0-3 per ASTM D2156	
<b>Controls:</b>		
On/ Off Switch	Industrial grade rocker switch	
Pressure Switch	Shuts off burner fuel supply upon trigger release	
High Limit Switch	Shuts off burner fuel supply when outlet water temp. exceeds 210 F/ 99 C	
<b>Fuel Solenoid:</b>	12 Volt	
<b>Safety Relief:</b>	Relieves excess system pressure	
<b>Unit Net Weight (Lbs/kg):</b>	428/194	430/195
<b>Unit Shipping Weight (Lbs/kg):</b>	551/250	553/251
<b>Unit Net Dimension (In/cm):</b>	43L x 30W x 41H/109L x 76W x 104H	
<b>Unit Shipping Dimension (In/cm):</b>	46.5L x 31.5W x 48.5H/118L x80W x123H	

## FLOW CHART



OMHSP045-042699-BAR

## EMF SYSTEM



OMHSP046-072996-BAR

## GENERAL THEORY OF OPERATION

**WATER FLOW:** Connect a pressurized water source to the INLET GARDEN HOSE CONNECTION (1) and turn on the water supply. The water will flow through a WATER STRAINER (2) which has a clear inspection bowl.

The water then travels into the TRIPLEX HIGH PRESSURE PUMP (3) which has an UNLOADER (4) that bypasses the water when the trigger gun is closed. To protect the pump from heated water during this bypass stage, a HEAT DUMP VALVE (5) will open at 140°F/60°C allowing the heated water to escape. The Heat Dump Valve automatically resets when the water cools. The PRES-SURE SWITCH (6) controls the fuel supply to the burner.

When using detergents, the solution passes through the DETERGENT STRAINER (7) located on the DETERGENT HOSE (8). The detergent solution then travels into the ADJUSTABLE LOW PRESSURE DETERGENT INJECTOR (9).

From there, the water may be allowed to flow out of the DRAIN PLUG (10) or through the HEAT EXCHANGER INLET (11) where it is heated when the burner is on. As the water exits the HEAT EXCHANGER OUTLET (12), it enters a safety system which protects the operator from danger. The safety system contains a HIGH TEMPERATURE LIMIT SWITCH (13) which senses the water temperature and shuts off the fuel supply to the burner if it gets too hot. If the unloader fails to by pass the water or the burner remains on when the trigger gun is closed, the SAFETY RELIEF (14) will relieve and allow water to exit safely.

The heated water then flows through the HIGH PRESSURE HOSE (15) and to the TRIGGER GUN ASSEMBLY (16) which allows the operator to control the water spray. When the trigger gun is open, the water flows through the ADJUSTABLE PRESSURE DUAL LANCE (17) and exits the NOZZLE (18).

**FUEL FLOW:** The Fuel Pump draws fuel from the FUEL TANK (19) through a replaceable FUEL FILTER/WATER SEPARATOR (20) and into the FUEL PUMP (21). Fuel exits the fuel pump, into a FUEL SOLENOID VALVE (22) which controls fuel flow to the FUEL NOZZLE (23) where it ignites and burns in the heat exchanger.

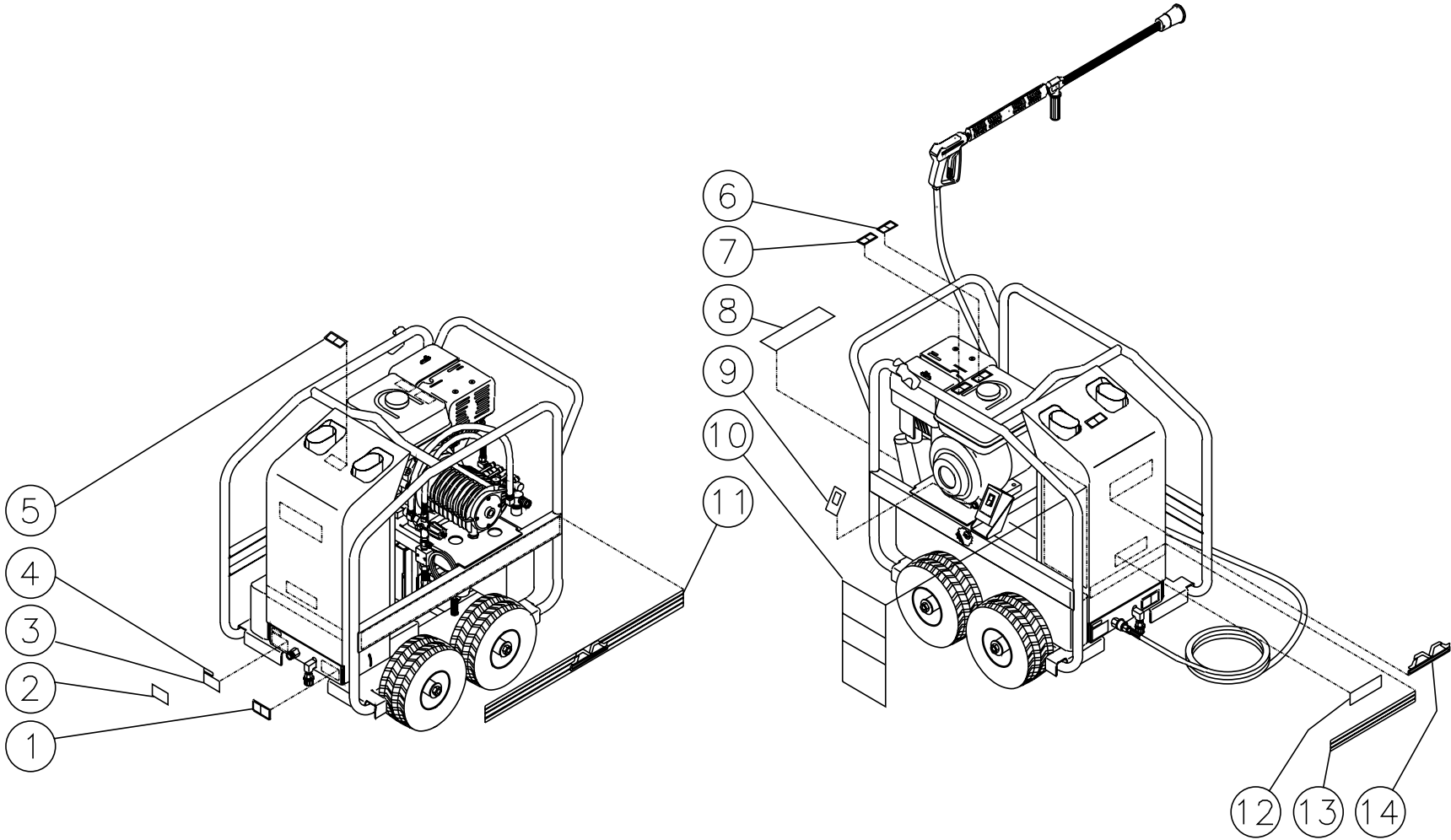
**EMF SYSTEM:** The patent pending Electro Magnetic Firing (EMF) System is an integrated system which gives all the requirements for combustion.

The BELT (1) from the power source turns the HUB (2) which has two EXTERIOR MAGNETS (3) attached. As these magnets spin past the IGNITION MODULE (4), a magnetic flux is created from which the ignition module produces a high voltage. This voltage arcs across the electrodes giving the spark that is needed for ignition.

This hub has an INTERNALLY MOUNTED MAGNET (5) which spins past a STATOR (6) that produces the voltage that controls the fuel supply to the heat exchanger. In addition to this, the hub also spins the BLOWER FAN (7) that forces the air into and through the heat exchanger.

The FUEL PUMP (8) is also connected the hub by means of a flexible coupler.

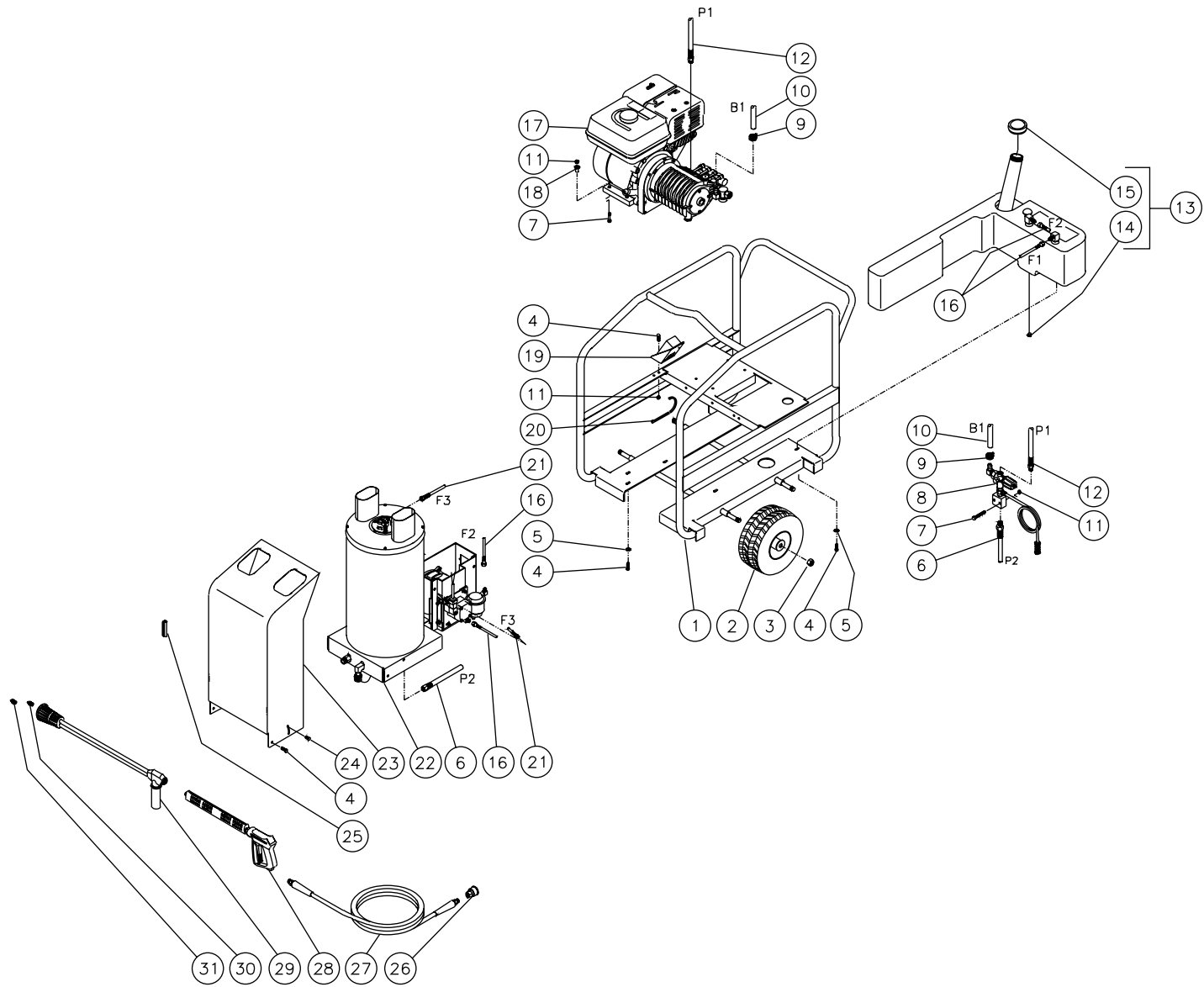
# DECAL PLACEMENT



HSP-3504-IMGH/GV-031799-BAR

DECAL PLACEMENT			
REF. #	DESCRIPTION	PART #	QTY.
1	Decal- Warning: Don't Modify Plumbing (E/S)	34-0807	1
2	Decal- Clear Laminate	N/A	1
3	Decal- Data Plate	N/A	1
4	Serial Number	N/A	1
5	Decal- Warning: Hot Coil Exhaust (E/S)	34-0808	1
6	Decal- Allow to Cool (E/S)	34-0599	1
7	Decal- Hot Surface (E/S)	34-0598	1
8	Decal- Risk of Fire (E/S)	34-0806	1
9	Decal- Burner On/Off (E/S)	34-0849	1
10	Decal- Warning/ Caution/ Operation (E/S)	34-0847	1
11	Decal- Stripe	34-0725	2
12	Decal-White Die Cut	34-0034	1
13	Decal- Stripe	34-0560	1
14	Plastic Mi-T-M Logo	62-0093	1

# FRAME



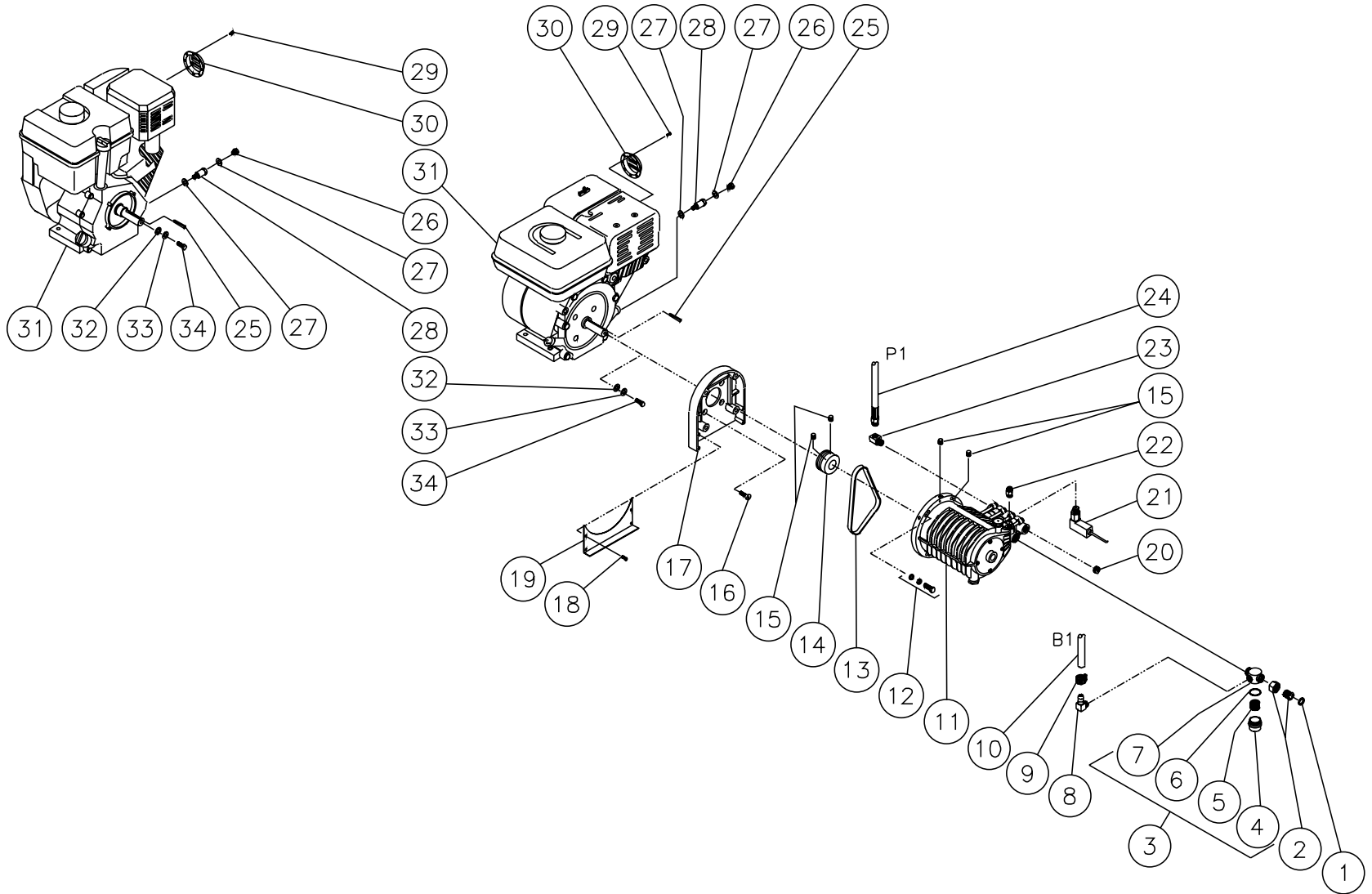
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## FRAME

REF. #	DESCRIPTION	PART #	QTY.	REF. #	DESCRIPTION	PART #	QTY.
1	Frame Assembly	5-0120A01	1	17	Engine/Pump Assembly (See exploded drawing)	N/A Sep.	1
2	Wheel	14-0006	4	18	Shim	33-0169	4
3	Jam Nut	30-0117	4	19	Electric Box Assembly (See exploded drawing)	N/A Sep.	1
4	Bolt	27-9524	12	20	Wire Tie	33-0022	4
5	Flatwasher	28-0022	8	21	Fuel Hose Assembly	15-0165	1
6	High Pressure Hose Assembly	15-0202	1	22	Heat Exchanger/ EMF Assembly (See exploded drawing)	N/A Sep.	1
7	Bolt	27-9529	6	23	Hood Assembly	850-0194	1
8	Unloader/Manifold Assembly (See exploded drawing)	N/A Sep.	1	24	Hand Knob	62-0057	1
9	Hose Clamp	42-0011	2	25	Trim Lock *(One Foot Required)	33-0129	1
10	Hose	15-0007	2	26	Screw Connect	17-0035	1
11	Hex Nut	30-3023	8	27	Hose Assembly	15-0166	1
12	High Pressure Hose Assembly	15-0194	1	28	Gun/Lance Assembly	850-0181	1
13	Fuel Tank Assembly (Includes 14, 15)	850-0248	1	29	Dual Lance Assembly	850-0180	1
14	Hex Head Plug	23-0296	1	30	Nozzle- 1503.5	18-0254	1
15	Fuel Cap	12-0033	1	31	Nozzle- 4060	18-0110	1
16	Fuel Hose	15-0147	2	*Must Order in One Foot Lengths			

# ENGINE/PUMP ASSEMBLY



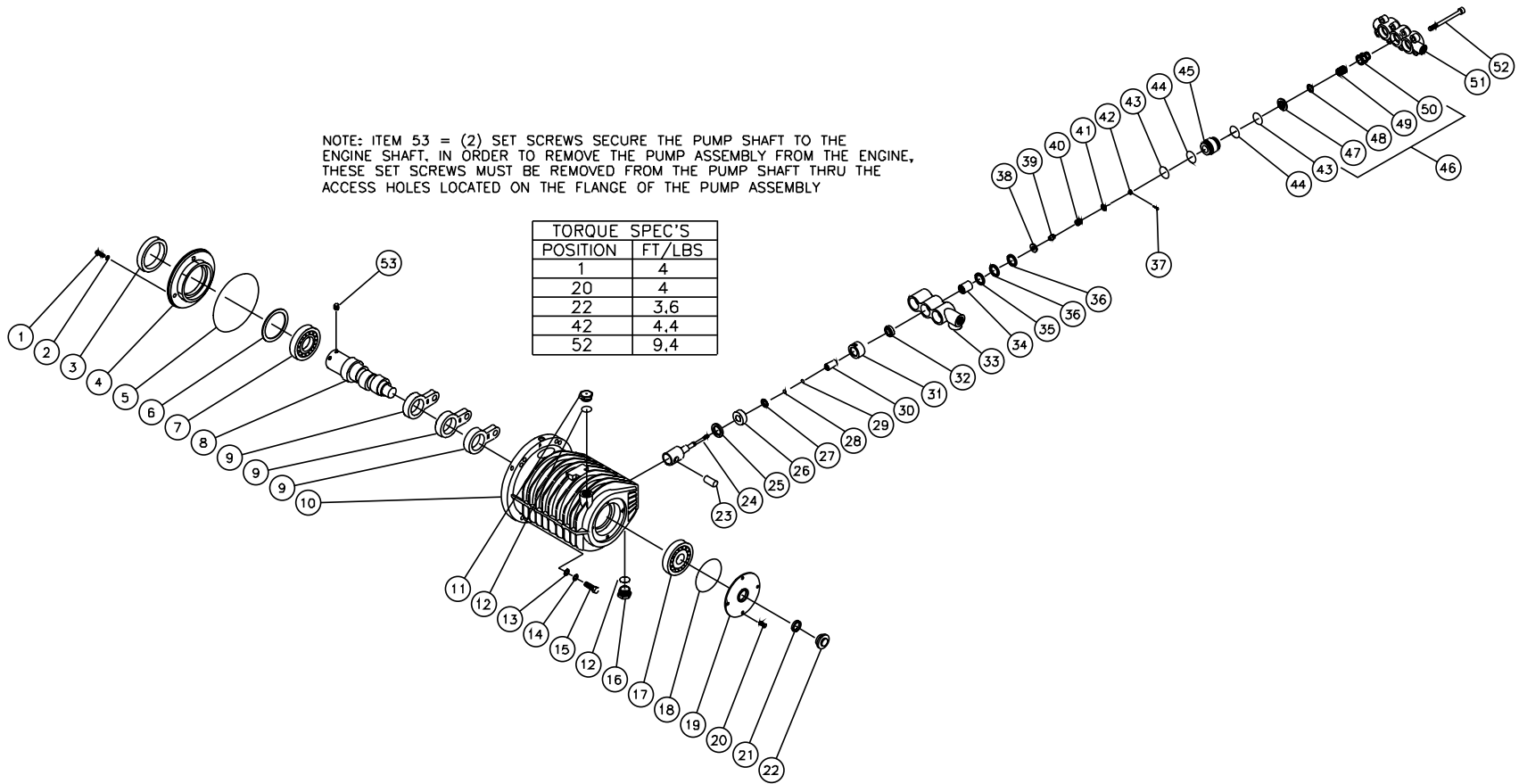
HPS106-031699-BAR

ENGINE/PUMP ASSEMBLY									
REF #	DESCRIPTION	PART #	QTY 1MGH	QTY 1MGV	REF #	DESCRIPTION	PART #	QTY 1MGH	QTY 1MGV
1	Hose Gasket	26-0001	1	1	23	Elbow	23-0242	1	1
2	Hose Swivel	23-0095	1	1	24	High Pressure Hose Assembly	15-0194	1	1
3	Strainer Complete (Includes 4-7)	19-0096	1	1	25	Key- Honda	43-0088	1	-
4	Strainer Bowl	19-0103	1	1	-	Key- Vanguard	43-0089	-	1
5	Stainless Steel Screen	19-0104	1	1	26	Oil Drain Plug w/Engine	N/A	1	1
6	Strainer Gasket	25-0056	1	1	27	Washer- Honda	28-0605	2	-
7	Strainer Body	19-0105	1	1	-	Washer- Vanguard	28-0606	-	2
8	Elbow	23-0119	1	1	28	Oil Drain Port- Honda	24-0143	1	-
9	Hose Clamp	42-0011	1	1	-	Oil Drain Port- Vanguard	24-0142	-	1
10	High Pressure Hose	15-0007	2	2	29	Screw- Honda	27-8880	3	-
11	Pump	3-0144	1	1	-	Screw- Vanguard	27-3093	-	3
12	Bolt Kit	70-0170	1	1	30	Muffler Deflector- Honda	45-0055	1	-
13	Belt	11-0037	1	1	-	Muffler Deflector- Vanguard	45-0054	-	1
14	Sheave	10-0077	1	1	31	Engine- 13 H.P. Honda	1-0086	1	-
15	Set Screw	27-8895	4	4	-	Engine- 13 H.P. Vanguard	1-0090	-	1
16	Bolt	27-0418	4	4	32	Washer- Honda	28-1029	1	-
17	Flange Pump	38-0049	1	1	-	Washer- Vanguard	28-0005	-	1
18	Bolt	27-9526	4	4	33	Lockwasher- Honda	29-0008	1	-
19	Beltguard	20-0384A01	1	1	-	Lockwasher- Vanguard	29-0009	-	1
20	Plug	23-0244	1	1	34	Bolt- Honda	27-0141	1	-
21	Pressure Switch	850-0173	1	1	-	Bolt- Vanguard	27-0190	-	1
22	Thermo Valve	22-0114	1	1					

# HIGH PRESSURE PUMP (3-0144)

NOTE: ITEM 53 = (2) SET SCREWS SECURE THE PUMP SHAFT TO THE ENGINE SHAFT. IN ORDER TO REMOVE THE PUMP ASSEMBLY FROM THE ENGINE, THESE SET SCREWS MUST BE REMOVED FROM THE PUMP SHAFT THRU THE ACCESS HOLES LOCATED ON THE FLANGE OF THE PUMP ASSEMBLY

TORQUE SPEC'S	
POSITION	FT/LBS
1	4
20	4
22	3,6
42	4,4
52	9,4



OMPMP024-051297-BAR

## HIGH PRESSURE PUMP (3-0144)

REF. #	DESCRIPTION	PART #	QTY.	REF. #	DESCRIPTION	PART #	QTY.	REF. #	DESCRIPTION	PART #	QTY.
1	Bolt	27-8380	4	20	Bolt	27-8381	4	39	Spacer (See 70-0173)	N/A Sep.	3
2	Washer	26-0159	4	21	Gasket	26-0139	1	40	Spring (See 70-0173)	N/A Sep.	3
3	Oil Seal	46-0538	1	22	Oil Sight Gauge	22-0123	1	41	Washer (See 70-0173)	N/A Sep.	3
4	Bearing Case	46-0498	1	23	Piston Pin	46-0502	3	42	Slotted Nut	46-0317	3
5	O-ring	25-0298	1	24	Piston Rod	46-0688	3	43	O-ring	25-0297	6
6	Washer	46-0499	1	25	Seal Washer	46-0484	3	44	Back-up Ring	25-0294	6
7	Bearing	46-0500	1	26	Oil Seal	46-0485	3	45	Spacer Adapter	46-0510	3
8	Crankshaft	46-0687	1	27	Washer	46-0689	3	46	Valve Assembly (Includes 47-50) (See 70-0174)	N/A Sep.	3
9	Connecting Rod	46-0521	3	28	Backup Ring	25-0378	3	47	Valve Seat (See 70-0174)	N/A Sep.	3
10	Crankcase	46-0497	1	29	Spacer Adapter	25-0377	3	48	Valve (See 70-0174)	N/A Sep.	3
11	Oil Fill Cap	46-0523	1	30	Sleeve	46-0690	3	49	Spring (See 70-0174)	N/A Sep.	3
12	O-ring	25-0199	2	31	Seal Retainer	46-0504	3	50	Valve Cage (See 70-0174)	N/A Sep.	3
13	Washer (See 70-0170)	N/A Sep.	4	32	Low Pressure Seal (See 70-0172)	N/A Sep.	3	51	Outlet Manifold	46-0511	1
14	Lockwasher (See 70-0170)	N/A Sep.	4	33	Inlet Manifold	46-0506	1	52	Cap Screw	46-0533	8
15	Bolt (See 70-0170)	N/A Sep.	4	34	Plunger	46-0528	3	53	Set Screw	27-8895	2
16	Oil Drain Plug	39-0057	1	35	Adapter- Female	46-0508	3		Bolt Mounting Kit (Includes 4 each 3-15)	70-0170	
17	Bearing	46-0501	1	36	V-packing (See 70-0172)	N/A Sep.	6		Seal Kit (Includes 3 each 32, 36-37, 43)	70-0172	
18	O-ring	25-0293	1	37	Cotterpin	43-0064	3		Inlet Valve Kit (Includes 3 each 37-41, 43)	70-0173	
19	Cover	46-0525	1	38	Inlet Valve (See 70-0173)	N/A Sep.	3		Valve Kit (Includes 3 each 43, 44, 47-50)	70-0174	

## PUMP SERVICE GUIDE

### DISASSEMBLY OF THE DISCHARGE VALVE ASSEMBLY

1. Disconnect all plumbing for ease in servicing.
2. Inspect oil for proper level, presence of water or discoloration and replace as needed.
3. With a standard M6 allen wrench remove the eight (8) socket head screws from the manifold. Remove the outer screws first, then the center screws.
4. With a soft mallet tap the back side of the Discharge Manifold from alternate sides to maintain alignment and avoid damage to the plungers (Fig. A).
5. Grasp the Discharge Manifold from the underside and gradually lift manifold while you pull away from the crankcase.
6. The Discharge Valve Spacers may stay with either the discharge or inlet manifold. By inserting two opposing screwdrivers between spacer and manifold you can easily pry them out of the discharge manifold (Fig. B). If they stay in the inlet manifold, gently work them up and down as you pull away from the inlet manifold (Fig. C).
7. The valve assemblies are in the discharge manifold ports and will fall out when manifold is turned over. A complete valve assembly includes: retainer, spring, valve and seat (Fig. D).

### DISASSEMBLY OF THE SEAL ASSEMBLY

1. Next remove the Inlet Valve Assembly from the exposed plunger rod ends. Including: cotterpin, nut, washer, spring, spacer and inlet valve (Fig. E).
2. Grasp the Inlet Manifold from the front and underside and pull to remove from plunger rods (Fig. F).
3. Carefully examine back side of Lo-Pressure Seal before removing from manifold as it will be damaged during removal. If worn, insert screwdriver into I.D. of seal and pry out. Exercise caution to avoid damage to the inlet manifold (Fig. G).
4. Next press the ceramic Plunger with a thumb or soft tool from the **back side of inlet manifold**. The V-Packing and adapters may stay with the plungers or remain in the inlet manifold. If on the plungers, slide off by hand. If in the manifold, use a reverse pliers to remove.
5. Then remove Seal Retainers from crankcase by grasping tab with pliers and pulling out the high and low pressure sections (Fig. H).
6. Examine crankcase oil seal to determine if crankcase servicing is needed.

Fig. A

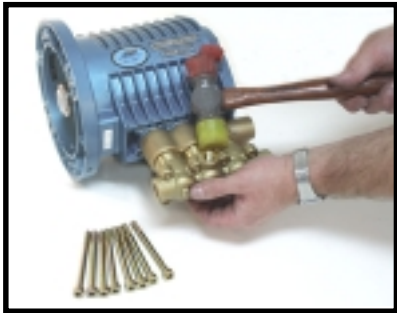


Fig. B

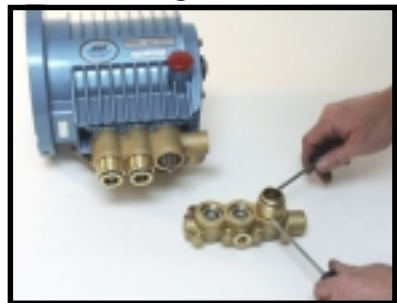


Fig. C



Fig. D



Fig. E



Fig. F



Fig. G

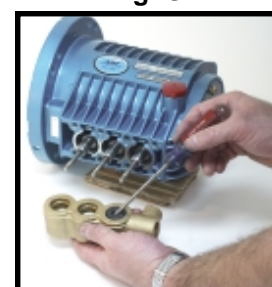


Fig. H



Fig. I



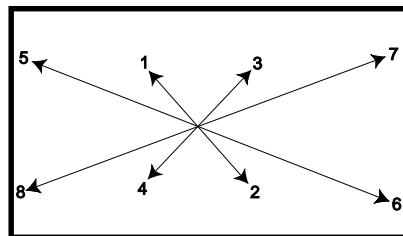
Fig. J



Fig. K



Fig. L



## REASSEMBLY OF SEAL ASSEMBLY

1. Examine Seal Retainers and replace if worn or damaged. Install on Plunger Rod and press into crankcase with **tab out**.
2. Place Inlet Manifold on work surface with **small I.D. ports up**.
3. Lubricate new Lo-Pressure Seal and press into position with **garter spring down**. Be certain the seal is seated squarely on the shoulder on the inlet manifold chamber (Fig. I).
4. Place Inlet Manifold on work surface with **larger I.D. ports up**.
5. Place new Female Adapter into inlet manifold chamber with **v-groove facing up**.
6. Carefully examine the plungers for scoring or cracks and replace if worn.
7. Lubricate ceramic Plungers and new V-Packings. Press the plunger into the V-Packings and position seal in middle of plunger (Fig. J).

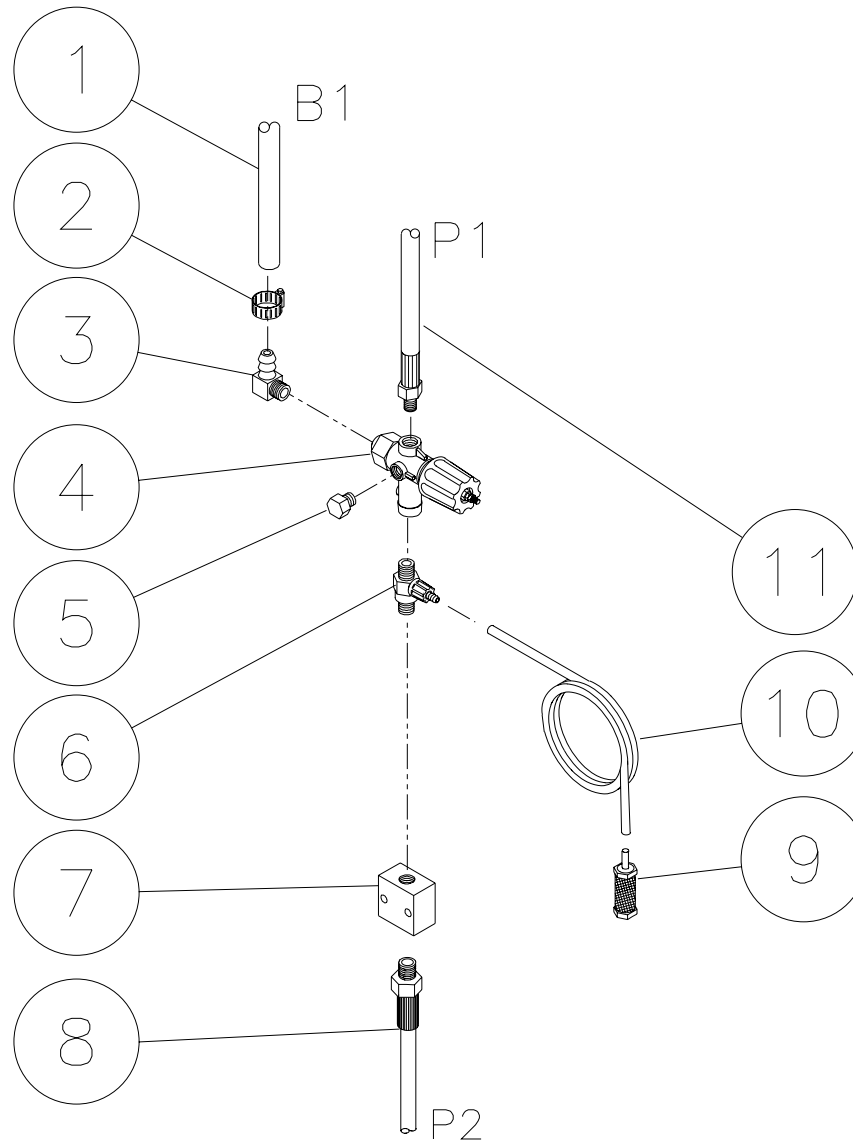
**NOTE:** The **deeper recessed end of the plunger** should face the **same direction as the v-groove on the V-Packing** (Fig. K).

8. Insert the Plungers into the manifold ports with **v-groove facing up**. Press into position using the **larger I.D. end of Discharge Valve Spacer**.
9. Carefully install Inlet Manifold over Plunger Rod ends and slowly press into crankcase.
10. Examine Inlet Valve and replace if worn. Inlet Valve cannot be lapped or reversed if worn. Install nylon Inlet Valve with **ridged side towards the discharge**. Stainless steel valves with **square edges towards the plungers** (round edges towards the discharge).
11. Examine Spacers for wear and replace as needed. Install Spacer on each plunger rod with **smaller O.D. towards inlet valve**.
12. Examine Springs for damage or fatigue and replace as needed. Place on plunger rods.
13. Install washer next with **concave side towards inlet manifold**.
14. Next install nuts and torque to 4.4 Ft/lbs (53 in/lbs).
15. **Always install new cotterpins** and turn ends to secure in position.

## REASSEMBLY OF THE DISCHARGE VALVE ASSEMBLY

1. Examine Discharge Valve Spacer O-rings and replace if worn. Lubricate and install o-rings and back-up rings **on both front and rear of Discharge Valve Spacer**.
2. Install Valve Retainers into each Discharge Manifold port with tab down.
3. Replace worn or damaged Springs and place into Retainers.
4. Examine Valve and Seats for pitting, grooves or wear and replace as needed.
5. Place Valves over Springs with **concave side down**.
6. Place Valve Seats on Valves with **smaller I.D. down**.
7. Lubricate O.D. of Discharge Valve Spacer and **insert smaller I.D. into discharge manifold ports**. Snap into position.
8. Carefully guide Discharge Manifold with Spacer over Plunger Rod ends and press into Inlet Manifold.
9. Replace cap screws and torque to 9.4 Ft/lbs (113 in/lbs). Torque diagonally in order shown (Fig. L).
10. If oil was not changed, be certain oil is to mark on oil gauge before resuming operation.

# UNLOADER/MANIFOLD ASSEMBLY



OMHSP080-120498-BAR

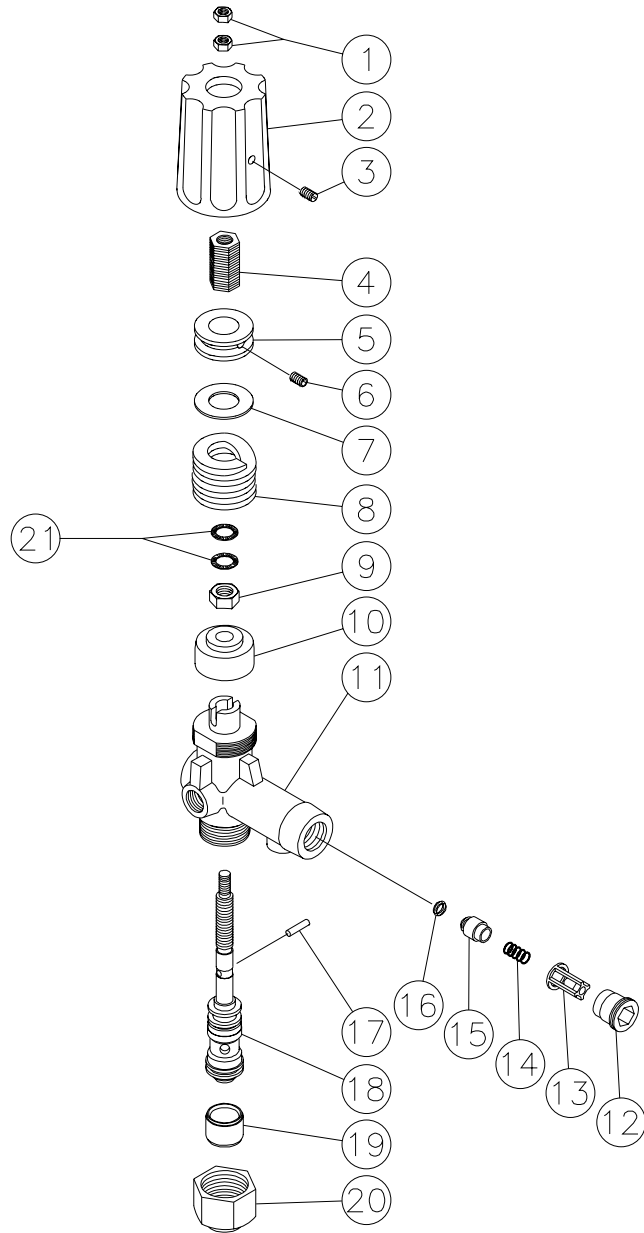


OMHSP080-120498-BAR

UNLOADER/MANIFOLD ASSEMBLY			
REF. #	DESCRIPTION	PART #	QTY.
1	Hose *(Two Feet Required)	15-0007	1
2	Hose Clamp	42-0011	1
3	Elbow	23-0119	1
4	Unloader Assembly	850-0252	1
5	Plug	23-0238	1
6	Detergent Injector	50-0052	1
7	Manifold Block	51-0026	1
8	High Pressure Hose Assembly	15-0202	1
9	Detergent Strainer	19-0050	1
10	Detergent Hose *(Six feet Required)	15-0021	1
11	High Pressure Hose Assembly	15-0194	1
*Must Order in One Foot Lengths			

# UNLOADER (850-0252)

OMGEN163-101298-BAR



UNLOADER (850-0252)			
REF. #	DESCRIPTION	PART #	QTY.
1	Hex Nut	8-0362	2
2	Cover	7-0098	1
3	Set Screw	27-4280	1
4	Adjusting Insert- Brass	8-0363	1
5	Adjustment Nut	8-0364	1
6	Set Screw	8-0365	1
7	Glide Ring	8-0366	1
8	Spring	49-0104	1
9	Hex Nut	8-0367	1
10	Bushing	8-0368	1
11	Unloader Body	8-0369	1
12	Retainer	8-0269	1
13	Valve Housing	8-0104	1
14	Spring	49-0023	1
15	Valve	8-0105	1
16	O-ring	25-0036	1
17	Cylinder Pin	8-0372	1
18	Piston Repair Kit	70-0243	1
19	Spacer	8-0371	1
20	Stop Nut	8-0157	1
21	Washer	29-0154	2
	Check Valve Repair Kit (Includes 13-16)	70-0244	
	Unloader Complete	850-0252	

OMGEN163-101298-BAR

## PRESSURE SETTING & TROUBLESHOOTING THE UNLOADER

### TOOLS NEEDED:

5000 PSI gauge  
2.5mm Allen Wrench  
Small Flathead Screw Driver  
Adjustable Wrench

### TO SET MAXIMUM SPRAY PRESSURE AND BYPASS PRESSURE:

Refer to Parts Listing on pg.18. Install the test gauge in the auxiliary port on unloader or in discharge line after the unloader valve. With the pump operating but the trigger gun off, loosen the SET SCREW (3) and remove the COVER (2). Remove both HEX NUTS (1) and set aside. Using the 2.5 mm Allen wrench, loosen the SET SCREW (6) and turn the ADJUSTING NUT (5) with adjustable wrench **counterclockwise** so that it is flush with top of the ADJUSTING INSERT (4). Tighten the SET SCREW (6). With adjustable wrench, turn the ADJUSTING NUT (5) **clockwise** until the ADJUSTING INSERT (4) bottoms out against the HEX NUT (9). Loosen the SET SCREW (6) with 2.5 mm Allen wrench, so that the ADJUSTING NUT (5) turns freely but does not turn the ADJUSTING INSERT (4). With proper nozzle installed in spray gun, squeeze trigger and turn ADJUSTING NUT (5) **clockwise** to desired maximum spray pressure. Then tighten the SET SCREW (6) securely and release the trigger on the trigger gun. Squeeze and release trigger several times to verify consistency of spray pressure setting. Turn the ADJUSTMENT NUT (5) **counterclockwise** two full turns and then **clockwise** again until tight. Squeeze trigger and verify desired pressure setting. Spray pressure should fall within 5% of original setting. Bypass pressure (the reading on the gauge when the trigger is released) should exceed the spray pressure by approximately 15-20%. If valve fails to repeat within specifications, repeat the steps above and assure all final settings are tight. Install one HEX NUT (1) and tighten against the ADJUSTING INSERT (4). Install the second HEX NUT (1) and tighten securely against the first. Insert the COVER (2) and tighten the SET SCREW (3).

### TROUBLESHOOTING:

#### SYSTEM WILL NOT COME UP TO FULL DESIGNATED PRESSURE:

- \* Spray nozzle worn or nozzle orifice is too large in relation to pump flow rate.
- \* Adjusted improperly. Refer to pressure adjustment section for proper procedures.
- \* Bypass valve (within unloader) is obstructed or leaking. Remove and clean bypass cartridge or replace. Replace with #850-0252.
- \* Flow rate of pump inadequate. Assure designated flow rate of pump is adequate in relation to spray nozzle size.

#### PRESSURE SPIKES IN DISCHARGE LINE DURING BYPASS MODE:

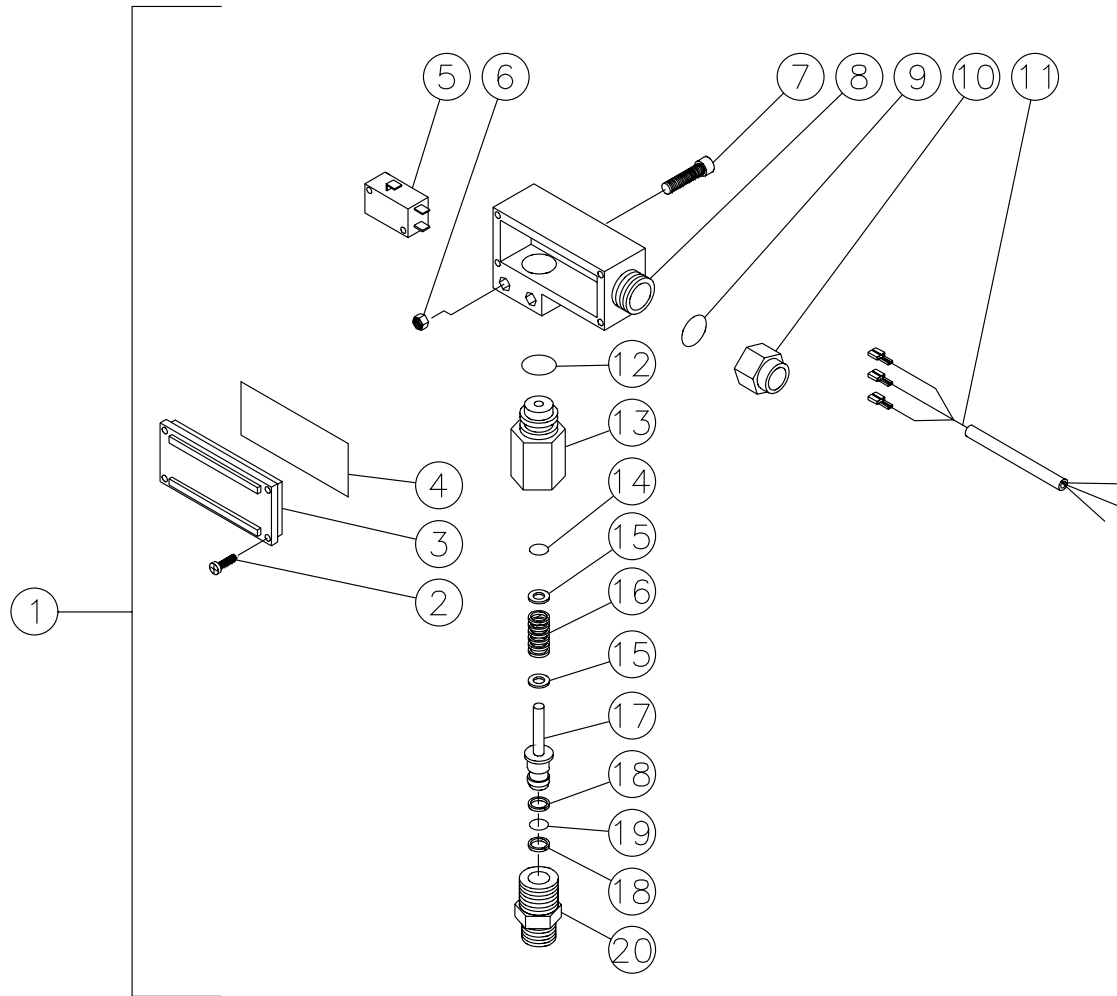
- \* Pressure adjustment too tight. Refer to pressure adjustment section for proper adjustment procedures.

#### UNLOADER CYCLES WHILE IN BYPASS MODE:

- \* External leak on unloader or in downstream fittings. Inspect all high pressure lines (including gun and hose) for any signs of leakage and repair as necessary.
- \* Non-return valve. (within the unloader) damaged, obstructed or worn. Inspect and replace as necessary. Replace with #70-0244.

# PRESSURE SWITCH (850-0173)

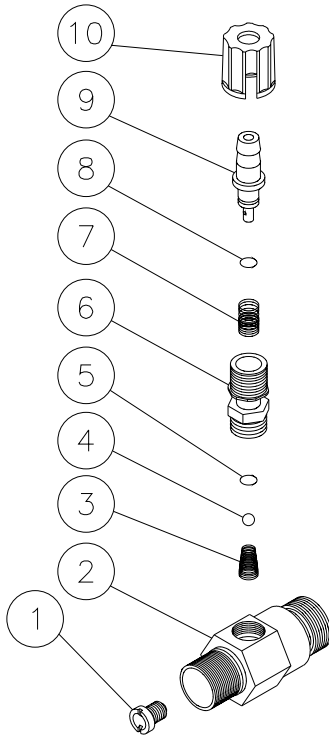
850-0173-051497-BAR



PRESSURE SWITCH (850-0173)			
REF #	DESCRIPTION	PART #	QTY
1	Pressure Switch Complete (Inc. 2-20)	850-0173	1
2	Screw	N/A	4
3	Cover	N/A	1
4	O-ring	N/A	1
5	Micro Switch	N/A	1
6	Hex Nut	N/A	2
7	Screw	N/A	2
8	Housing	N/A	1
9	O-ring	N/A	1
10	Bushing Nut	N/A	1
11	Wire Assembly	N/A	1
12	O-ring	N/A	1
13	Spring Housing	N/A	1
14	O-ring (See 70-0007)	N/A Sep.	1
15	Washer Spacer	28-0218	2
16	Spring	49-0107	1
17	Piston	N/A	1
18	Back-up Ring (See 70-0007)	N/A Sep.	2
19	O-ring (See 70-0007)	N/A Sep.	1
20	Hex Nipple	N/A	1
	O-ring Kit (1 each 14, 18-19)	70-0007	

850-0173-051497-BAR

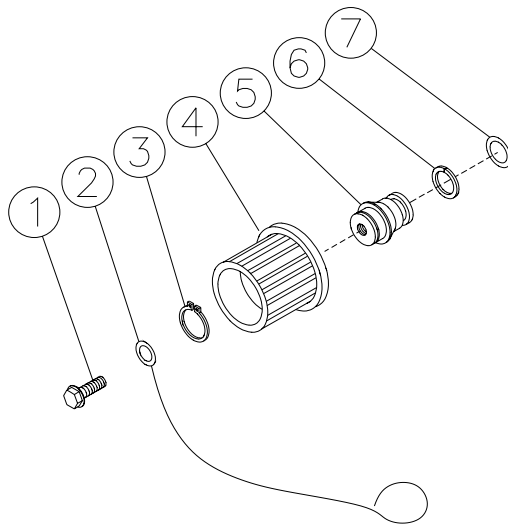
## DETERGENT INJECTOR (50-0052)



OMGEN284-052898-DCE

DETERGENT INJECTOR (50-0052)			
REF. #	DESCRIPTION	PART #	QTY.
1	Orifice (2.1mm)	50-0057	1
2	Injector Body	N/A	1
3	Spring (See 852-0056)	N/A Sep.	1
4	Ball (See 852-0056)	N/A Sep.	1
5	O-ring (See 852-0056)	N/A Sep.	1
6	Piston Retainer	50-0156	1
7	Spring	49-0056	1
8	O-ring (See 852-0056)	N/A Sep.	1
9	Adjustable Shutter Barb	50-0157	1
10	Adjustment Knob	50-0158	1
	Injector Repair Kit (Includes 3-5, 8)	852-0056	

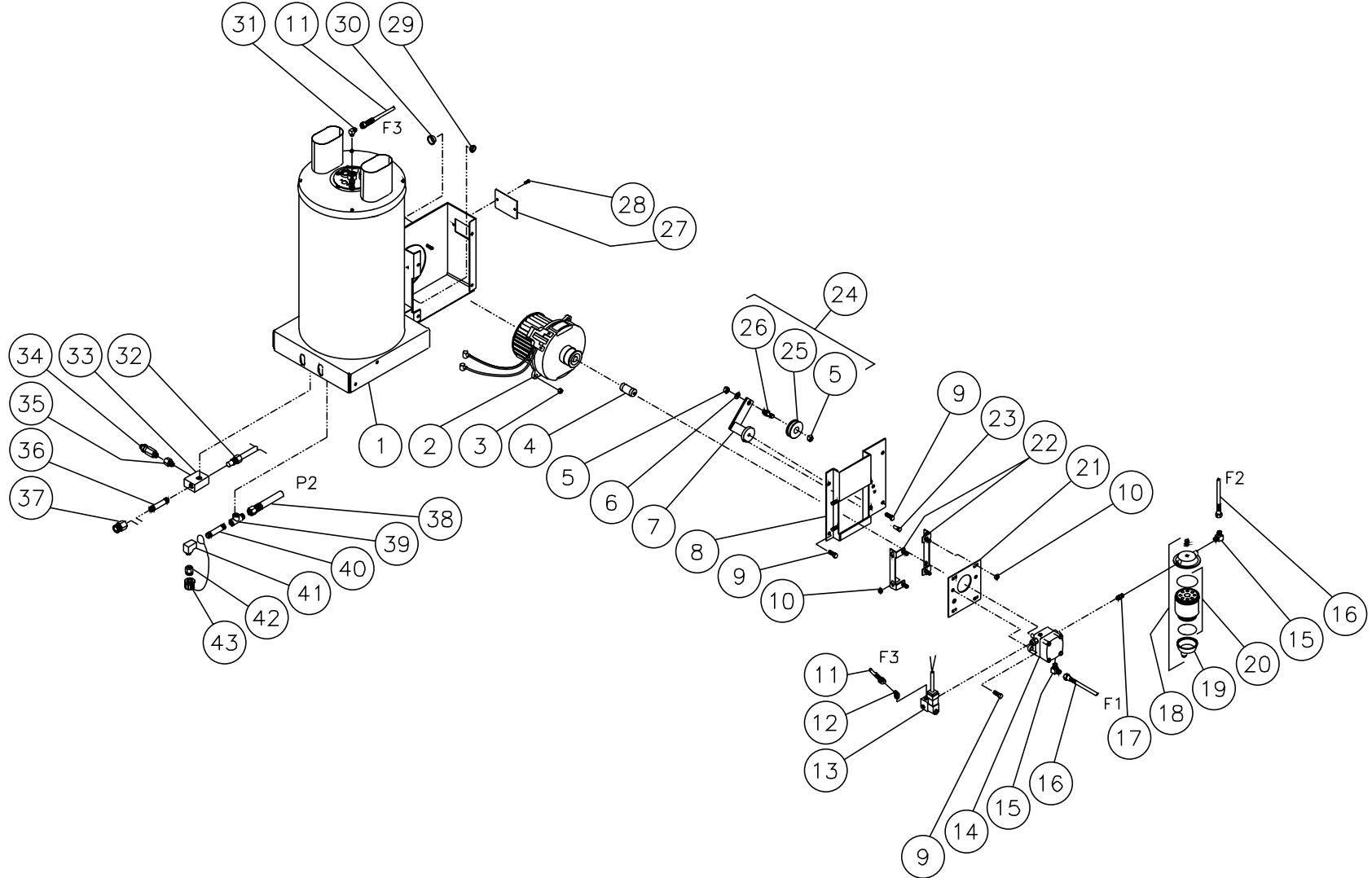
## COIL DRAIN PLUG (850-0218)



850-0218-041597-BAR

COIL DRAIN PLUG (850-0218)			
REF. #	DESCRIPTION	PART #	QTY.
1	Bolt	27-9526	1
2	Retaining Cable	33-0260	1
3	Snap Ring	33-0261	1
4	Hand Wheel	16-0239	1
5	Plug	24-0147	1
6	Back-up Ring	25-0424	1
7	O-ring	25-0423	1

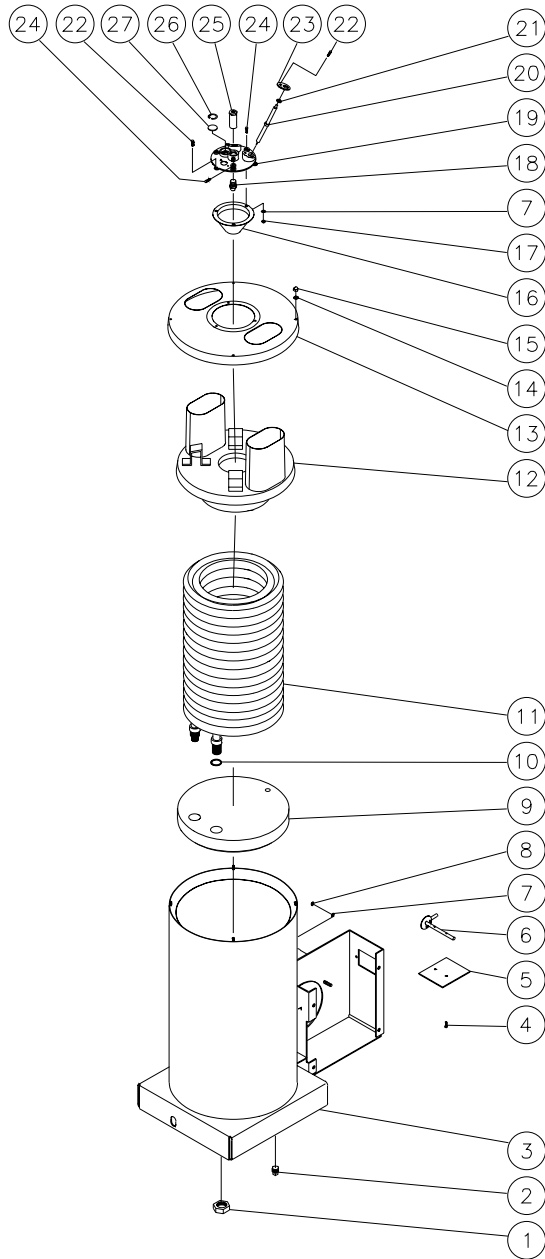
# HEAT EXCHANGER/EMF SYSTEM



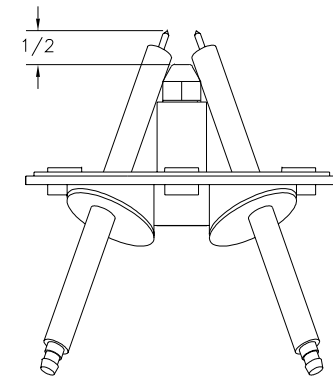
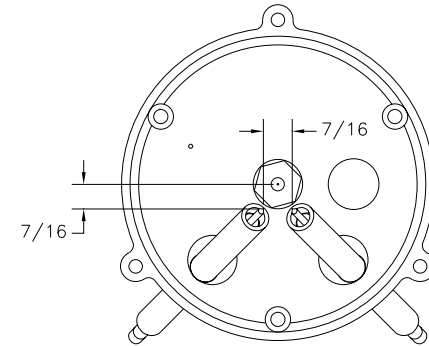
HSP083-120498-BAR

HEAT EXCHANGER/EMF SYSTEM								
REF. #	DESCRIPTION	PART #	QTY.		REF. #	DESCRIPTION	PART #	QTY.
1	Boiler Assembly Complete	850-0226	1		23	Pin	33-0211	1
2	EMF Assembly	850-0257	1		24	Tensioner Sheave Shaft Assembly (Inc. 5, 25, 26)	850-0166	1
3	Hex Nut	30-3022	2		25	Sheave Assembly	850-0177	1
4	Fuel Pump Coupler	33-0225	1		26	Shaft	33-0212	1
5	Nut	30-0159	2		27	Access Panel- Black	20-0386A01	1
6	Flatwasher	28-0022	1		28	Bolt	27-9526	2
7	Tensioner Base	10-0071	1		29	Grommet	32-0426	1
8	Fuel Pump Bracket- Black	20-0381A01	1		30	Grommet	32-0427	1
9	Bolt	27-9524	7		31	Elbow	23-0287	1
10	Hex Nut	30-3023	8		32	High Limit Switch	32-0423	1
11	Fuel Hose Assembly	15-0165	1		33	Outlet Connector Block	24-0138	1
12	Elbow	23-0288	1		34	Pressure Relief Valve	22-0273	1
13	Fuel Solenoid- 12 Volt	44-0100	1		35	Adapter	23-0369	1
14	Fuel Pump	3-0020	1		36	Nipple	24-0141	1
15	Elbow	23-0237	2		37	Hex Reducer	23-0197	1
16	Fuel Hose	15-0147	2		38	High Pressure Hose Assembly	15-0202	1
17	Hex Nipple	24-0145	1		39	Street Tee	23-0058	1
18	Filter Fuel Water Seperator	19-0070	1		40	Nipple	24-0165	1
19	Fuel Water Seperator Replacement Bowl	19-0071	1		41	Elbow	23-0306	1
20	Fuel Water Seperator Replacement Filter	19-0053	1		42	Adapter	23-0279	1
21	Plate- Black	20-0363A01	1		43	Drain Plug Assembly	850-0218	1
22	Bracket- Black	20-0360A01	2					

# BOILER ASSEMBLY (850-0226)



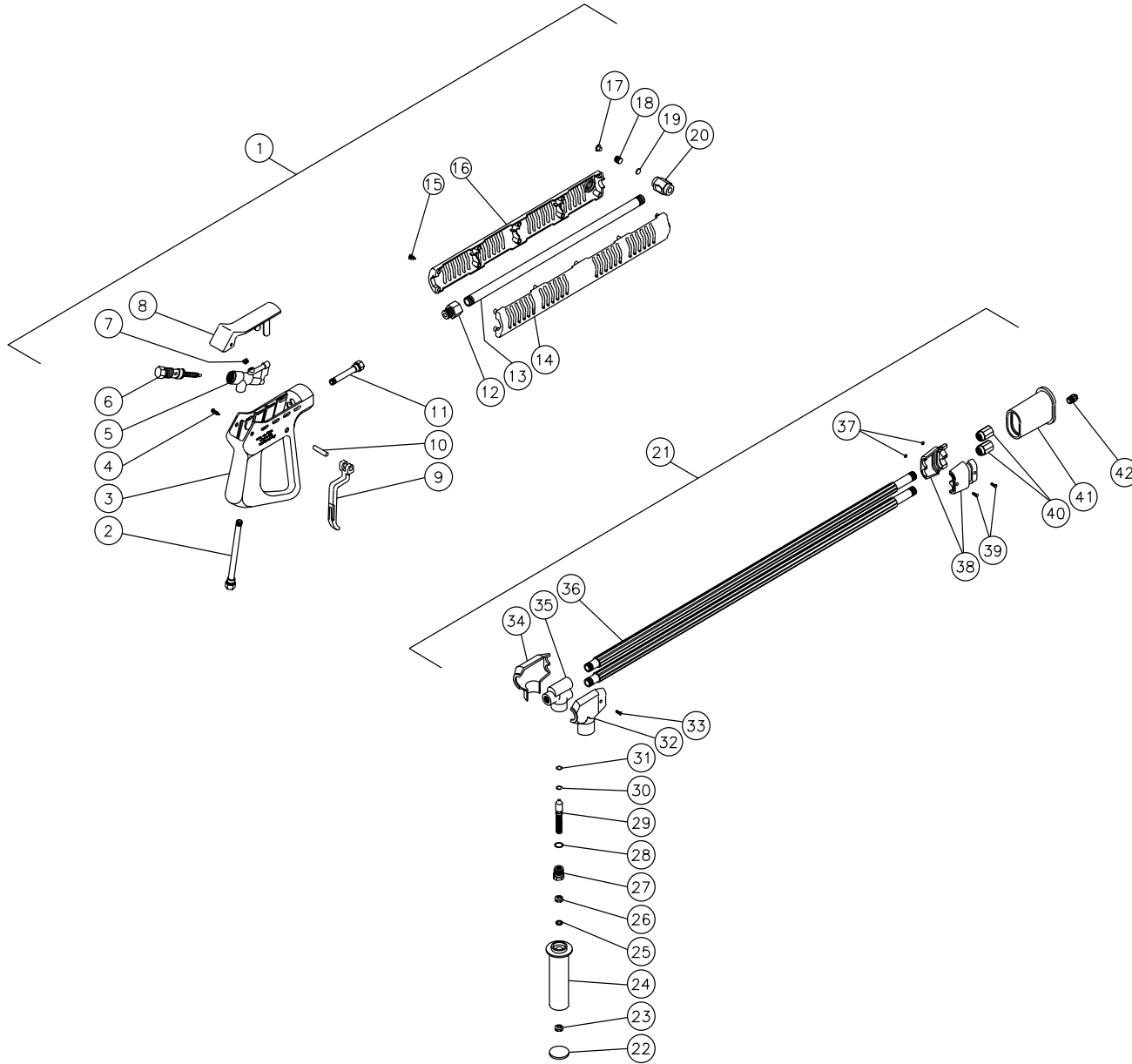
## ELECTRODE GAP SETTINGS





BOILER ASSEMBLY (850-0226)								
REF. #	DESCRIPTION	PART #	QTY.		REF. #	DESCRIPTION	PART #	QTY.
1	Hex Nut	30-0121	2		15	Acorn Nut	30-6002	4
2	Plug	24-0034	1		16	Cone	20-0373	1
3	Heat Exchanger Outer Wrap- Black	20-0376A01	1		17	Nut	30-6001	3
4	Bolt	27-8879	2		18	Fuel Nozzle	18-0308	1
5	Air Diverter Plate- Black	20-0378A01	1		19	Electrode Plate	38-0046	1
6	Air Diverter Stem Assembly- Black	20-0377A01	1		20	Electrode	32-0420	2
7	Lockwasher	28-1009	4		21	O-ring	25-0171	2
8	Hex Nut	30-0137	1		22	Bolt	27-9526	5
9	Bottom Insulation	33-0250	1		23	Electrode Mounting Clip- Black	20-0383A01	2
10	Washer	28-0521	2		24	Bolt	27-8878	4
11	Heat Exchanger Coil Assembly	66-0011	1		25	Nozzle Holder	23-0292	1
12	Inner Pan Assembly	20-0372	1		26	Snap Ring	33-0254	1
13	Top Pan Assembly- Black	20-0371A01	1		27	Sight Glass	33-0252	1
14	Lockwasher	28-1028	4					

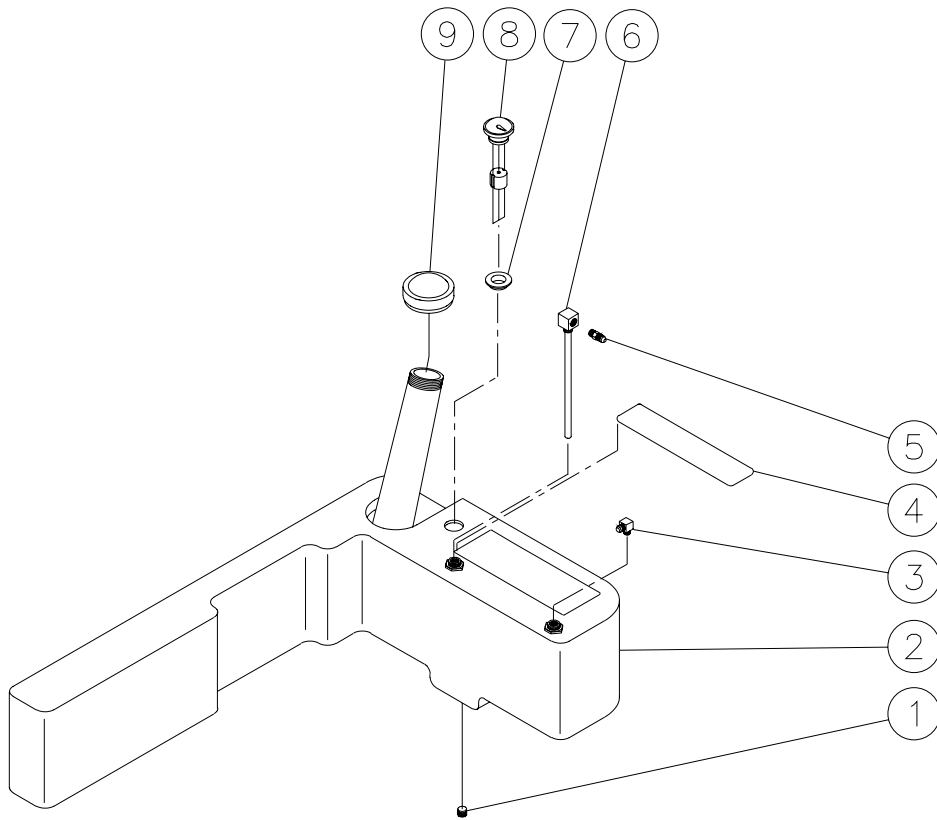
# GUN (850-0181) & ADJUSTABLE PRESSURE DUAL LANCE (850-0180)



HSP051-051597-JTR

GUN (850-0181) & ADJUSTABLE PRESSURE DUAL LANCE (850-0180)							
REF. #	DESCRIPTION	PART #	QTY.	REF. #	DESCRIPTION	PART #	QTY.
1	Gun/Lance Assembly (Includes 2-20)	850-0181	1	24	Handle	16-0313	1
2	Pipe Assembly	16-0016	1	25	Washer	28-1021	1
3	Plastic Housing	16-0008	1	26	Nut	30-3010	1
4	Screw	27-3230	2	27	Adaptor	23-0271	1
5	Housing	16-0012	1	28	O-ring	25-0351	1
6	Gun Repair Kit	70-0055	1	29	Piston	16-0314	1
7	Plug	39-0024	1	30	Back-up Ring	25-0352	1
8	Cover	16-0009	1	31	O-ring	25-0353	1
9	Trigger Safety Lock-off	16-0010	1	32	Upper Protector	16-0315	1
10	Trigger Pin	16-0063	1	33	Screw	27-8862	1
11	Pipe Assembly	16-0013	1	34	Lower Protector	16-0316	1
12	Adaptor	16-0283	1	35	Body	23-0272	1
13	Pipe	16-0277	1	36	Lance w/Protective Cover	16-0317	2
14	Guard Lance (Right Side)	16-0320	1	37	Nut	30-3060	2
15	Screw	27-8382	6	38	Pipe Clamp	16-0318	2
16	Guard Lance (Left Side)	16-0321	1	39	Screw	27-8861	2
17	Plug	39-0076	1	40	Nipple	24-0127	2
18	Screw	49-0103	1	41	Nozzle Protector	16-0319	1
19	Spacer	16-0282	1	42	Nozzle-6540	18-0110	1
20	Lance Holder (See 16-0306)	N/A Sep.	1		Gun Assembly ( Includes 12-20)	16-0001	
21	Dual Lance Assembly (Includes 22-42)	850-0180	1		Lance Assembly (Includes 13-21)	16-0306	
22	Handle Plug	16-0312	1		O-ring Kit (Includes 28, 30, 31)	70-0143	
23	Nut	30-3002	1				

## FUEL TANK (850-0248)

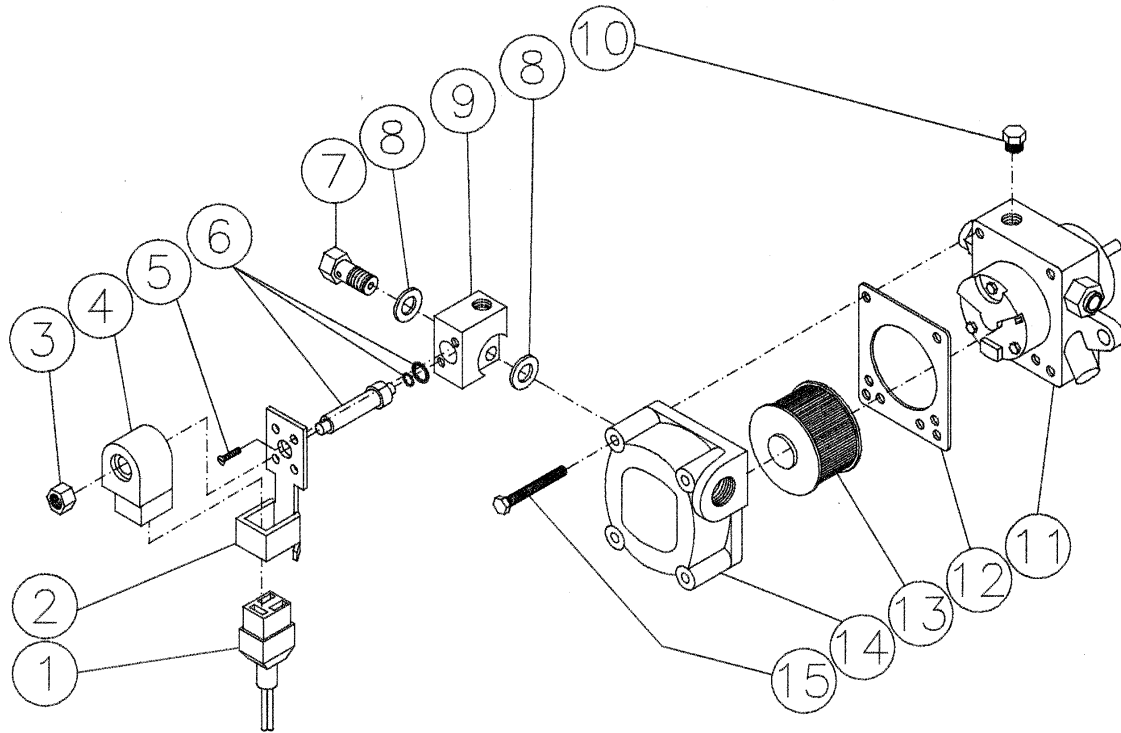


850-0193A-012098-BAR

FUEL TANK (850-0248)			
REF. #	DESCRIPTION	PART #	QTY.
1	Plug	23-0296	1
2	Fuel Tank (See 850-0193)	N/A Sep.	1
3	Elbow	23-0237	1
4	Decal-Warning: Risk of Fire (E/S)	34-0806	1
5	Flare	23-0247	1
6	Fuel Pick-up Line	33-0270	1
7	Bushing	33-0255	1
8	Fuel Indicator Gauge	22-0215	1
9	Fuel Cap-Vented	12-0033	1

850-0193-012098-BAR

## FUEL PUMP (3-0020) & FUEL SOLENOID (44-0100)



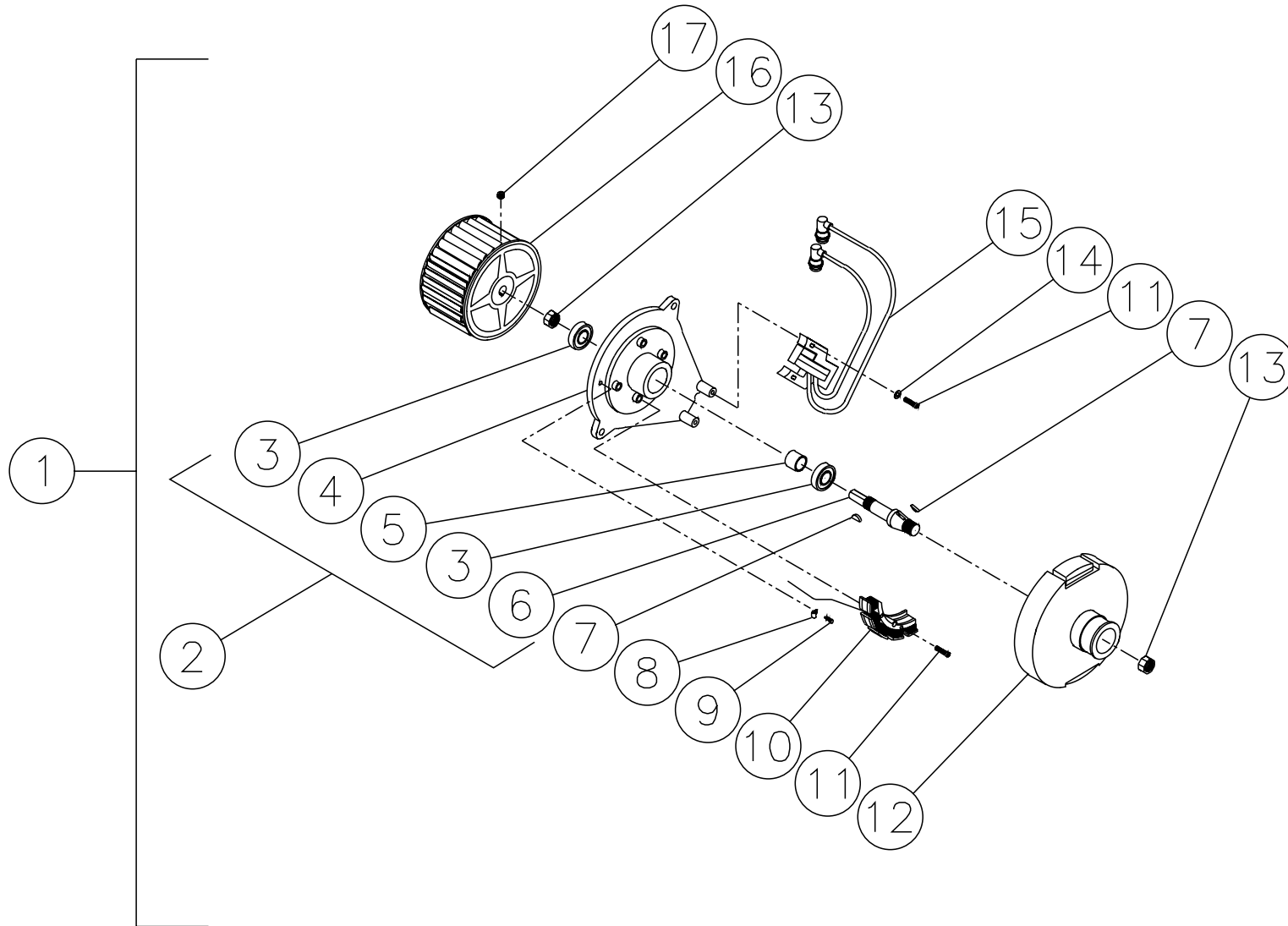
0MHSP049/071796/BAR

**FUEL PUMP (3-0020) & FUEL SOLENOID (44-0100)**

REF. #	DESCRIPTION	PART #	QTY.
1	Cord-Din Connector	46-1017	1
2	Base Plate	46-1014	1
3	Nut	46-1016	1
4	Solenoid Coil- 12 Volt	46-1015	1
5	Screw	N/A	2
6	Piston	46-1012	1
7	Bolt	46-1009	1
8	Washer	26-0150	2
9	Solenoid Body	N/A	1
10	Plug	24-0082	1
11	Fuel Pump Body	N/A	1
12	Cover Gasket	26-0109	1
13	Fuel Oil Strainer	19-0034	1
14	Fuel Pump Cover	46-1005	1
15	Fuel Pump Cover Screw	46-1006	4

0MHSP049-071796-BAR

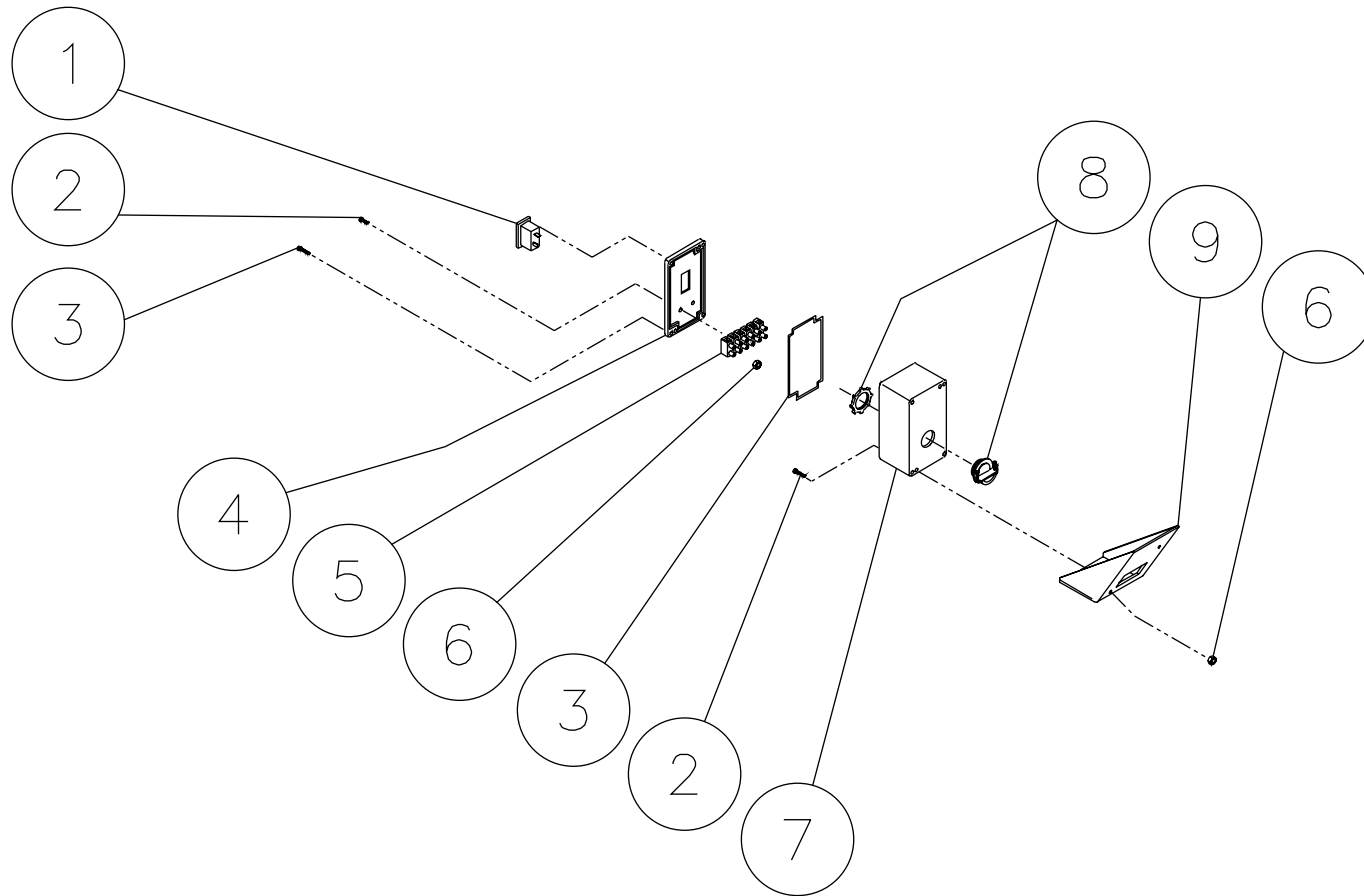
# EMF SYSTEM (850-0257)



OMHSP072-102698-BAR

<b>EMF SYSTEM (850-0257)</b>			
<b>REF. #</b>	<b>DESCRIPTION</b>	<b>PART #</b>	<b>QTY.</b>
1	EMF Assembly (Includes 2-17)	850-0257	1
2	Blower Flange Assembly (Includes 3-6)	850-0258	1
3	Bearing	48-0041	2
4	Flange Blower	38-0040	1
5	Spacer	33-0206	1
6	Shaft- Blower	20-0347	1
7	Woodruff Key	43-0080	2
8	Cable Clamp	32-0403	1
9	Screw	27-2070	1
10	Stator Coil	850-0201	1
11	Screw	27-0740	4
12	Flange Magnet Hub	38-0041	1
13	Hex Nut	30-0177	2
14	Flatwasher	28-0010	2
15	Ignition Coil Assembly	850-0191	1
16	Blower Fan	44-0099	1
17	Screw Set w/ Fan	30-3021	1

# ELECTRIC BOX

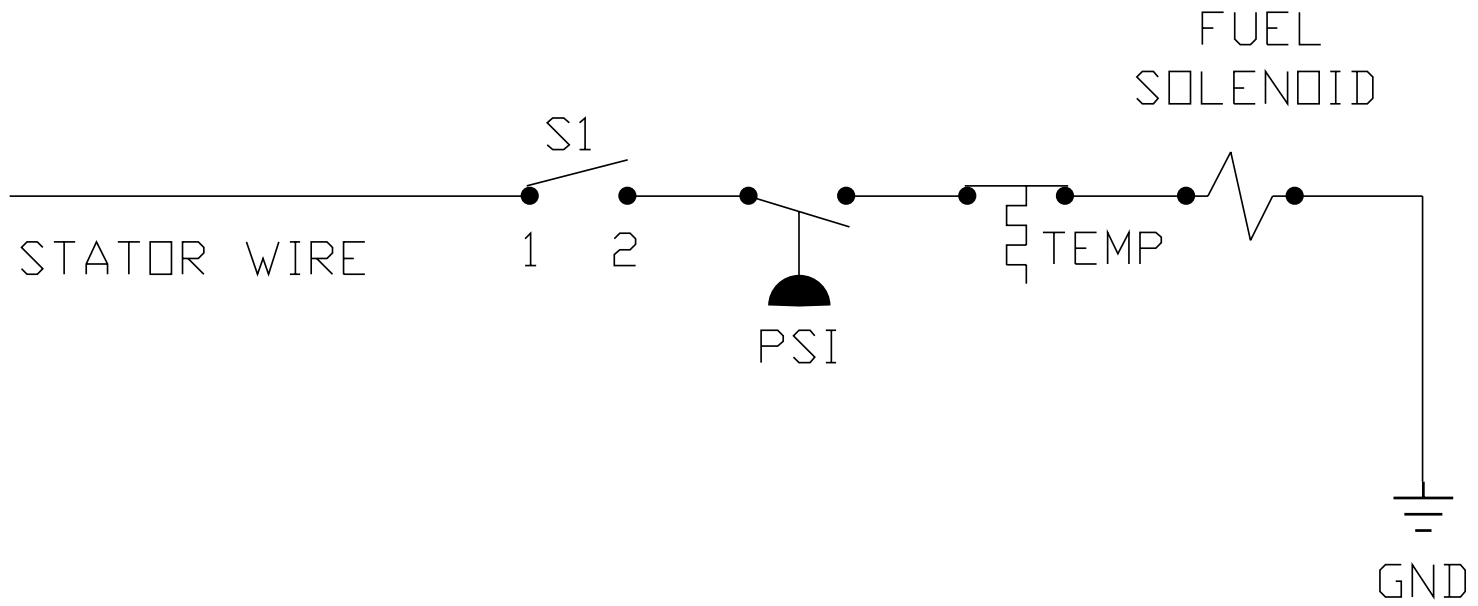




OMHSP082-120498-BAR

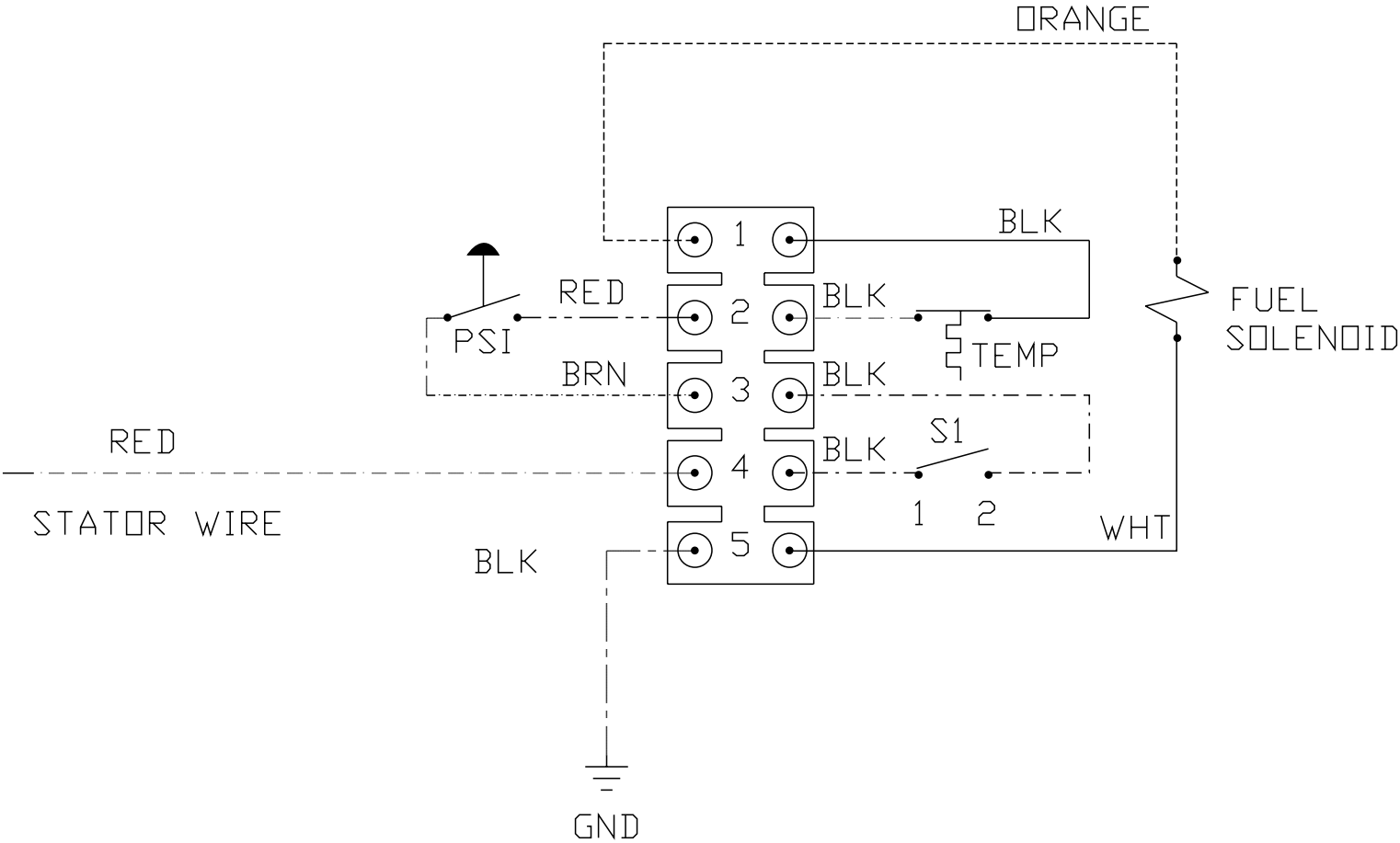
ELECTRIC BOX			
REF. #	DESCRIPTION	PART #	QTY.
1	Switch/ Rocker	32-0422	1
2	Bolt	27-8881	4
3	Bolt and Gasket Kit	70-0169	1
4	Electric Box Lid- Black	32-0430A01	1
5	Terminal Strip	32-0394	1
6	Hex Nut	30-0152	4
7	Electric Box- Black	32-0429A01	1
8	Electrical Connector	32-0085	1
9	Electric Box Bracket- Black	20-0380A01	1

# WIRING SCHEMATIC



OMHSP050A-051697-BAR

# WIRING DIAGRAM



OMHSP050B-051697-BAR

