

Parts & Service



Spray Star 1750D  
Diesel Model 17-500

SN: 175GD078

November 2008

Revised August 2009

**Product Support:**

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Accessories

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Thank you for purchasing a **SMITHCO** product.

Read this manual and all other manuals pertaining to the Spray Star 1750 carefully as they have safety, operating, assembly and maintenance instructions. Failure to do so could result in personal injury or equipment damage.

Keep manuals in a safe place after operator and maintenance personnel have read them. Right and left sides are from the operator's seat, facing forward.

All **SMITHCO** machines have a Serial Number and Model Number. Both numbers are needed when ordering parts. The serial number plate on the Spray Star 1750 is located on the left main frame, by front bumper. Refer to engine manual for placement of engine serial number.

For easy access record your Serial and Model numbers here.

<b>SMITHCO</b>			<b>CE</b>
<small>WAYNE, PENNSYLVANIA 19087 USA 610-688-4009 Fax 610-688-6069</small>			
SERIAL NO.	kW/hp	DATE OF MFG.	
<input type="text"/>	<input type="text"/>	<input type="text"/>	
MODEL NO.	lb/kg Empty	lb/kg Full	
<input type="text"/>	<input type="text"/>	<input type="text"/>	



Information needed when ordering replacement parts:

1. Model Number of machine
2. Serial Number of machine
3. Name and Part Number of part
4. Quantity of parts

## SAFE PRACTICES

1. It is your responsibility to read this manual and all publications associated with this machine.
2. Never allow anyone to operate or service the machine or its optional equipment without proper training and instructions. Never allow minors to operate any equipment.
3. Learn the proper use of the machine, the location and purpose of all the controls and gauges before you operate the equipment. Working with unfamiliar equipment can lead to accidents.
4. Wear all the necessary protective clothing and personal safety devices to protect your head, eyes, ears, hands and feet. Operate the machine only in daylight or in good artificial light.
5. Inspect the area where the equipment will be used. Pick up all debris you can find before operating. Beware of overhead obstructions and underground obstacles. Stay alert for hidden hazards.
6. Never operate equipment that is not in perfect working order or without decals, guards, shields, or other protective devices in place.
7. Never disconnect or bypass any switch.
8. Carbon monoxide in the exhaust fumes can be fatal when inhaled, never operate a machine without proper ventilation.
9. Fuel is highly flammable, handle with care.
10. Keep engine clean. Allow the engine to cool before storing and always remove the ignition key.
11. Disengage all drives and set park brake before starting the engine.
12. Never use your hands to search for oil leaks. Hydraulic fluid under pressure can penetrate the skin and cause serious injury.
13. This machine demands your attention. To prevent loss of control or tipping of the vehicle:
  - A. Use extra caution in backing up the vehicle. Ensure area is clear.
  - B. Do not stop or start suddenly on any slope.
  - C. Reduce speed on slopes and in sharp turns. Use caution when changing directions on slopes.
  - D. Stay alert for holes in the terrain and other hidden hazards.
14. Before leaving operator's position:
  - A. Disengage all drives.
  - B. Set park brake.
  - C. Shut engine off and remove the ignition key.
  - D. If engine has to run to perform any maintenance keep hands, feet, clothing and all other parts of body away from moving parts.
15. Keep hands, feet and clothing away from moving parts. Wait for all movement to stop before you clean, adjust or service the machine.
16. Keep the area of operation clear of all bystanders.
17. Never carry passengers.
18. Stop engine before making repairs/adjustments or checking/adding oil to the crankcase.
19. Use parts and materials supplied by **SMITHCO** only. Do not modify any function or part.
20. Use caution when booms are down as they extend out beyond the center line of the machine.
21. The tank is a confined space, take precaution.

***These machines are intended for professional maintenance on golf courses, sports turf, and any other area maintained turf and related trails, paths and lots. No guaranty as to the suitability for any task is expressed or implied.***



## SPECIFICATIONS SPRAY STAR 1750D

### WEIGHTS AND DIMENSIONS

Length	120" (305 cm)
Width	65" (165 cm)
Width With Boom Open	240" (610 cm)
Height w/ ROPS	77" (195 cm)
Height w/ Booms Folded	110" (279 cm)
Wheel Base	68" (173 cm)
Weight Empty	1750 lbs (794 kg)
Weight Full	3500 lbs (1588 kg)

### SOUND LEVEL (DB)

At ear level	96 dBA
At 3 ft (0.914 m)	89 dBA
At 30 ft (9.14 m)	85 dBA

### ENGINE

Make	Briggs & Stratton 954T Turbo Diesel
Model#	58A447
Type / Spec#	0302E2
Horsepower	34 hp (25 kW)
Fuel	No. 2 Diesel
Cooling System	Liquid Cooled
Lubrication System	Full Pressure
Alternator	40 Amp

### WHEELS & TIRE

Front: Two 20 x 10.00 x 10 NHS Multi-Rib; 20 psi (1.4 bar)  
Rear: Two 24 x 13.00 x 12 NHS Multi-Trac; 20 psi (1.4 bar)

### SPEED

Infinitely Variable 0-12 m.p.h. (0-20 kph)

### BATTERY

	Automotive type 24F - 12 volt
BCI Group	Size 24
Cold Cranking Amps	900 minimum
Ground Terminal Polarity	Negative (-)
Maximum Length	10.25" (26 cm)
Maximum Width	6.88" (17 cm)
Maximum Height	10" (25 cm)

### FLUID CAPACITY

Crankcase Oil	See Engine Manual
Fuel	7 gallon (26.5 liters)
Hydraulic Fluid	5 gallon (19 liters)
Grade of Hydraulic Fluid	SAE 10W-40 API Service SJ or higher

## OPTIONAL EQUIPMENT

15-618	Water Meter Kit (Liters)	14-515	Water Meter Kit (Gallons)
15-619	Chemical Cleanload	17-506	Clear water Wash Tank
15-622	Canopy	17-521	Electric Hose Reel
17-505	Foam Marker	17-507	Manual Hose Reel
15-493	18" Dry Boom	10-300	18' Spray Boom w/ Contour Wheels
17-503	20' Spray Boom	17-525	18.5' HD Super Boom
15-835	Tank Rinsing System	17-550	15' HD Super Boom
17-834	Hose Reel Mount Kit for Booms	15-833	Hose Reel mount Kit for HD Booms (17-525/17-550)
16-129	Manual Rewind Hose Reel, 200-foot/61-meter capacity		
16-906	Electric Rewind Hose Reel, 200-foot/61-meter capacity		



## MAINTENANCE



Before servicing or making adjustments to machine, stop engine and remove key from ignition.

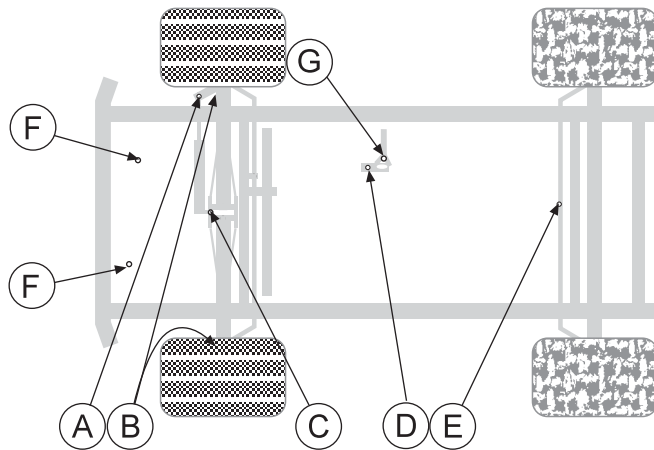
**NOTE:** Use all procedures and parts prescribed by the manufacturer's. Read the engine manual before operation.

### LUBRICATION

Use No. 2 General purpose lithium base grease and lubricate every 100 hours. The Spray Star 1750 has 9

grease fittings.

- A. One on the rod end of hydraulic cylinder.
- B. One on each the right and left spindles.
- C. One on the center front pivot.
- D. One on the idler arm.
- E. One on the brake relay.
- F. One on each of the pedal relays.
- G. One on the shift arm.



### ELECTRICAL CONNECTIONS

Use dielectric grease on all electrical connections.

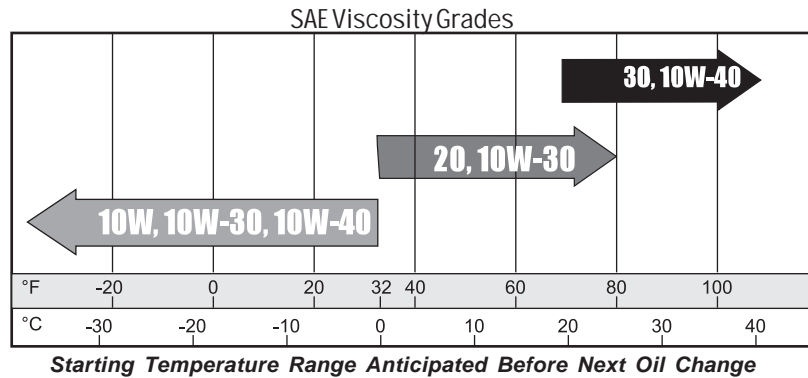
### AIR CLEANER ON ENGINE

1. Unclip the two clips, remove the cover and pull out the element.
2. To service, clean by tapping gently on flat surface. Do not oil. Replace if very dirty or damaged.
3. Clean out the inside of the body and cover.
4. Place the element into the body and put the cover back on..

**NOTE:** Do not use petroleum solvents, e.g., kerosene, which will cause cartridge to deteriorate. Do not use pressurized air to clean cartridge. Pressurized air can damage cartridge.

ENGINE OIL

Change and add oil according to chart below based on air temperature at the time of operation. Do not overfill. Use a high quality detergent oil classified "For Service SJ or higher" oil. Use no special additives with recommended oils. Do not mix oil with gasoline.



HYDRAULIC OIL

1. Use SAE 10W-40 API Service SJ or higher motor oil.
2. For proper warranty, change oil every 500 hours or annually, whichever is first.
3. Oil level should be 2-2½" (5-6.4cm) from top of the tank when fluid is cold. Do not overfill.
4. After changing oil, run the machine for a few minutes. Check oil level and for leaks.
5. Always use extreme caution when filling hydraulic oil tank or checking level to keep system free of contaminants. Check and service more frequently when operating in extremely cold, hot or dusty conditions.
6. If the natural color of the fluid has become black or smells burnt, it is possible that an overheating problem exists.
7. If fluid becomes milky, water contamination may be a problem.
8. If either of the above conditions happen, change oil immediately after fluid is cool and find the cause. Take fluid level readings when the system is cold.
9. In extreme temperatures you can use straight weight oil. We recommend SAE 30W API Service SG when hot (above 90°F (33°C)) and SAE 10W API Service SJ or higher when cold (below 32°F (0°C) ambient temperature. Use either motor oil or hydraulic oil, but do not mix.
10. Oil being added to the system must be the same as what is already in the tank. Mark the tank fill area as to which type you put in.

## MAINTENANCE

### TIRE PRESSURE

Caution must be used when inflating a low tire to recommended pressure. Over inflating can cause tires to explode. All tires should be 20 psi (1.4bar). Improper inflation will reduce tire life considerably.

### WHEEL MOUNTING PROCEDURE

1. Set park brake. Turn machine off and remove key.
2. Block wheel on opposite corner.
3. Loosen nuts slightly on wheel to be removed.
4. Jack up machine being careful not to damage underside of machine.
5. Place wheel on hub lining up bolt holes.
6. Torque to 64-74 ft/lb (87-100Nm) using a cross pattern. Retorque after first 10 hours and every 200 hours thereafter.
7. Lower machine to ground and remove blocks and jack.

### BATTERY

Batteries normally produce explosive gases which can cause personal injury. Do not allow flames, sparks or any ignited object to come near the battery. When charging or working near battery, always shield your eyes and always provide proper ventilation.

Battery cable should be disconnected before using "Fast Charge".

Charge battery at 15 amps for 10 minutes or 7 amps for 30 minutes. Do not exceed the recommended charging rate. If electrolyte starts boiling over, decrease charging.

Always remove grounded (-) battery clamp first and replace it last. Avoid hazards by:

1. Filling batteries in well-ventilated areas.
2. Wear eye protection and rubber gloves.
3. Avoid breathing fumes when electrolyte is added.
4. Avoid spilling or dripping electrolyte.



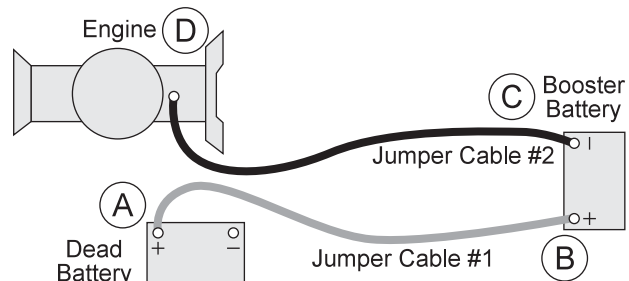
**Battery Electrolyte is an acidic solution and should be handled with care. If electrolyte is splashed on any part of your body, flush all contact areas immediately with liberal amounts of water. Get medical attention immediately.**



**Use of booster battery and jumper cables. Particular care should be used when connecting a booster battery. Use proper polarity in order to prevent sparks.**

### TO JUMP START (NEGATIVE GROUNDED BATTERY):

1. Shield eyes.
2. Connect ends of one cable to positive (+) terminals of each battery, first (A) then (B).
3. Connect one end of other cable to negative (-) terminal of "good" battery (C).
4. Connect other end of cable (D) to engine block on unit being started (NOT to negative (-) terminal of battery)



To prevent damage to other electrical components on unit being started, make certain that engine is at idle speed before disconnecting jumper cables.





Before servicing or making adjustments to the machine, stop engine, set park break, block wheels and remove key from ignition.



Follow all procedures and **ONLY** use parts prescribed by the manufacturer. Read the engine manual before maintenance.

The suggested maintenance checklist is not offered as a replacement for the manufacturer's engine manual but as a supplement. You must adhere to the guidelines established by the manufacturer for warranty coverage. In adverse conditions such as dirt, mud or extreme temperatures, maintenance should be more frequent.

Maintenance Service Interval	Maintenance Procedure
After the first 5 operating hours	Torque the wheel lug nuts. (64-74 ft/lb (87-100 Nm))
	Change the engine oil and filter.
After the first 20 operating hours	Replace hydraulic filter
Before each use daily	Check the engine oil.
	Check the hydraulic fluid level.
	Check the tire pressure.
	Check condition of hydraulic hoses and fittings.
	Inspect and clean the machine.
Every 25 hours	Inspect cooling system.
	Check the battery fluid level and cable connections.
Every 100 hours	Change oil when operating under heavy load or high
	Change the engine oil and filter.
	Change hydraulic filter
	Check engine for leaks or loose parts.
	Check air cleaner.
	Check tire pressure (20 psi (1.4 bar)).
	Torque the wheel lug nuts. (64-74 ft/lb (87-100 Nm))
Grease Machine.	
Every 200 Hours	Check belt tension (where needed)
	Torque the wheel lug nuts. (64-74 ft/lb (87-100 Nm))
Every 250 hours	Change oil filter
	Change hydraulic filter
	Clean battery terminals
Every 400 hours	Check spark plugs
Every 500 hours or yearly	Lubricate machine
	Visual inspection of machine and hydraulic hoses
	Change oil.
	Torque lug nuts.
	Check battery terminals and electrolyte level.
	Change all filters.

# END USER SERVICE CHART

Duplicate this page for routine use

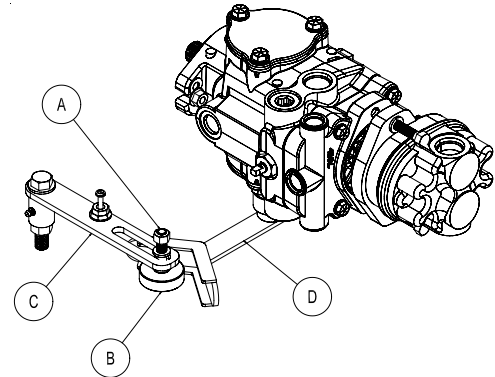
Service

Maintenance Check Item	For the week of:						
	Mon	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Check the Safety Seat Switch							
Check Steering Operation							
Check the fuel level							
Check the engine oil level.							
Check the condition of the air filter							
Clean the engine cooling fins.							
Check for unusual engine noises							
Check the hydraulic oil level							
Check hydraulic hoses and fittings for damage							
Check for fluid leaks.							
Check the tire pressure (5 psi)							
Check the Instrumentation							
Inspect electrical system for frayed wires							
Check park brake adjustment							
Change oil filter.							
Change oil.							
Lubricate Machine							
Ensure all warning decals are intact.							
Areas of Concern							
Inspection Performed by:							
Item	Date	Information					

## WHEEL CREEP

"Creep" is when the engine is running and hydrostatic transmission is in neutral, but due to inadequate alignment, wheels still move. Do the following procedure to stop this motion.

1. Lift up and support machine so rear wheels are off the ground and can turn freely.
2. In the engine compartment, the hydrostatic transmission is on the left side. The shift arm (D) is under the pump and comes out the side. The idler arm (B) has a bearing that runs in the notch of the shift arm. Loosen bolt (A).
3. With engine running, move bearing (B) so it centers on the shift arm (D) and 'wheel creep' stops.
4. Tighten all fasteners and test by using foot pedal linkage to see that 'creep' is removed.
5. Turn engine off and lower machine.



## SPRAY PUMP WITH ELECTRIC CLUTCH BELT

Located to the right of the engine. Should have approximately 1/2" (13mm) of deflection in the center of the top strand. Loosen and tighten the 5/16 -18 x 1 1/4 set screw located on the foot of the pump mount.

## PARK BRAKE

Turn knob clockwise on end of park brake to tighten. Turn it counter clockwise to loosen. If finer adjustment is needed turn clevis on brake cable to adjust length of cable.

## SPEED CALIBRATION NUMBERS

The speed calibration numbers for the Spray Star 1752 is 612.

# STORAGE

If the engine will be out of service for two or more months, use the following storage procedure.

1. Clean the exterior surfaces of the engine.
2. Change the oil and filter while the engine is still warm from operation.
3. The fuel system must be completely emptied, or the gasoline must be treated with a stabilizer to prevent deterioration.

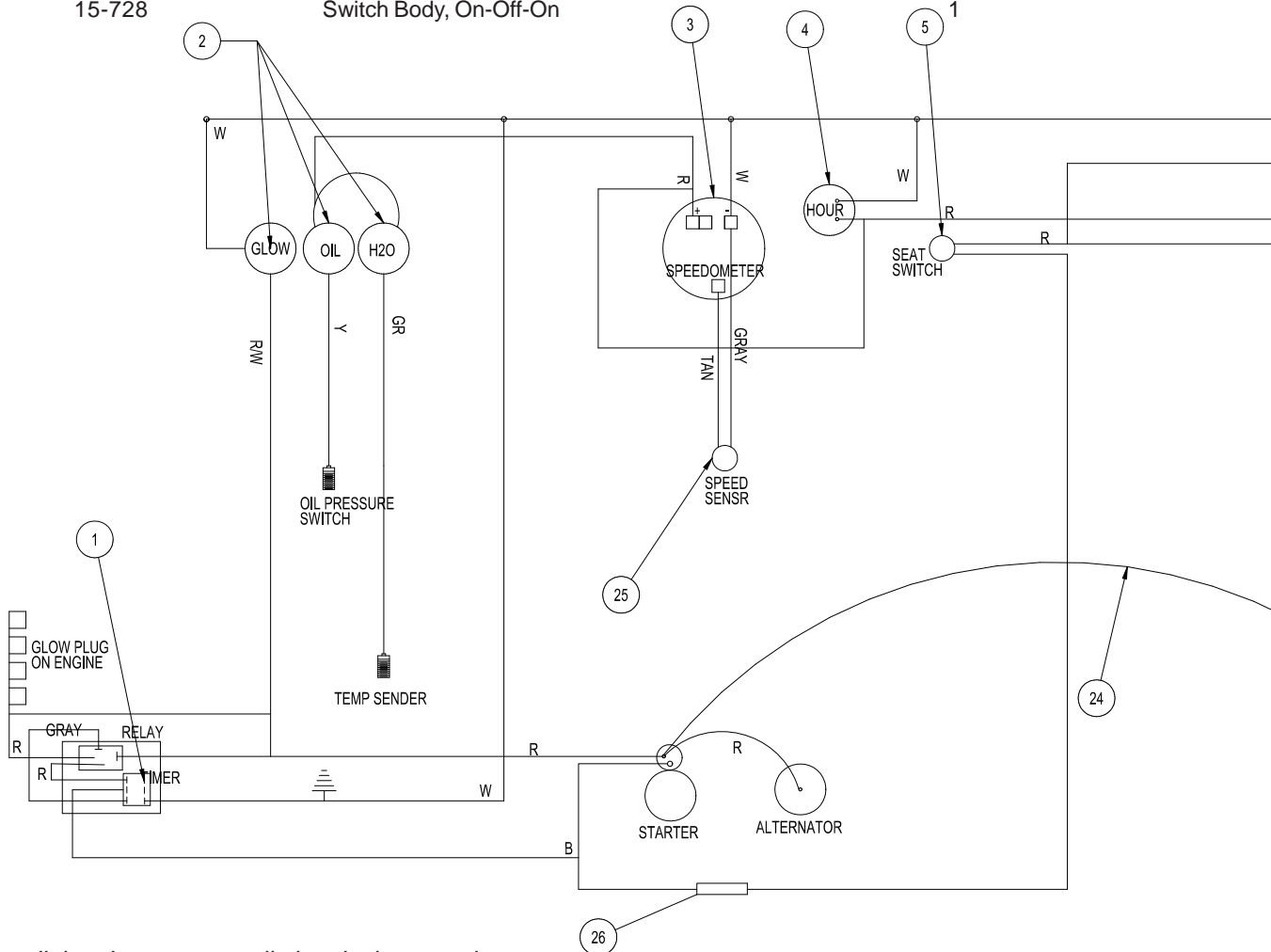
If you choose to use a stabilizer, follow manufacturers recommendations, and add the correct amount for the capacity of fuel system. Fill fuel tank with clean, fresh gasoline. Run engine for 2-3 minutes to get stabilized fuel into carburetor. Close fuel shut-off valve when unit is being stored or transported.

To empty the system, drain fuel tank and carburetor, or run engine until tank and system are empty.

4. Remove the spark plugs. Add one tablespoon of engine oil into each spark plug hole. Install plugs, but do not connect the plug leads. Crank the engine two or three revolutions.
5. Store machine in a clean, dry place.

# WIRING DIAGRAM

REF#	PART#	DESCRIPTION	QUANTITY
1	77-223	Timer	1
2	50-359	Warning Light	3
3	10-556	Speedometer	1
4	12-017	Hour Meter	1
5	14-292	Seat Switch	1
6	13-488	Ignition Switch	1
7	17-524	Lights	2
8	10-241	Wire Pigtail	1
	15-725	Mount Panel End	1
	15-727	Switch Actuator	1
9	15-782	Rocker Switch, Unlit	1
	15-729	Mount Panel Middle	1
	15-726	Switch Body, Light	1
10	15-732	Actuator, Green	1
	15-729	Mount Panel Middle	1
	15-726	Switch Body, Light	1
11	15-731	Actuator, Amber	1
	15-729	Mount Panel Middle	1
	15-727	Switch Actuator	1
12	15-728	Switch Body, On-Off-On	1
	15-725	Mount Panel End	1
	15-727	Switch Actuator	1
	15-728	Switch Body, On-Off-On	1

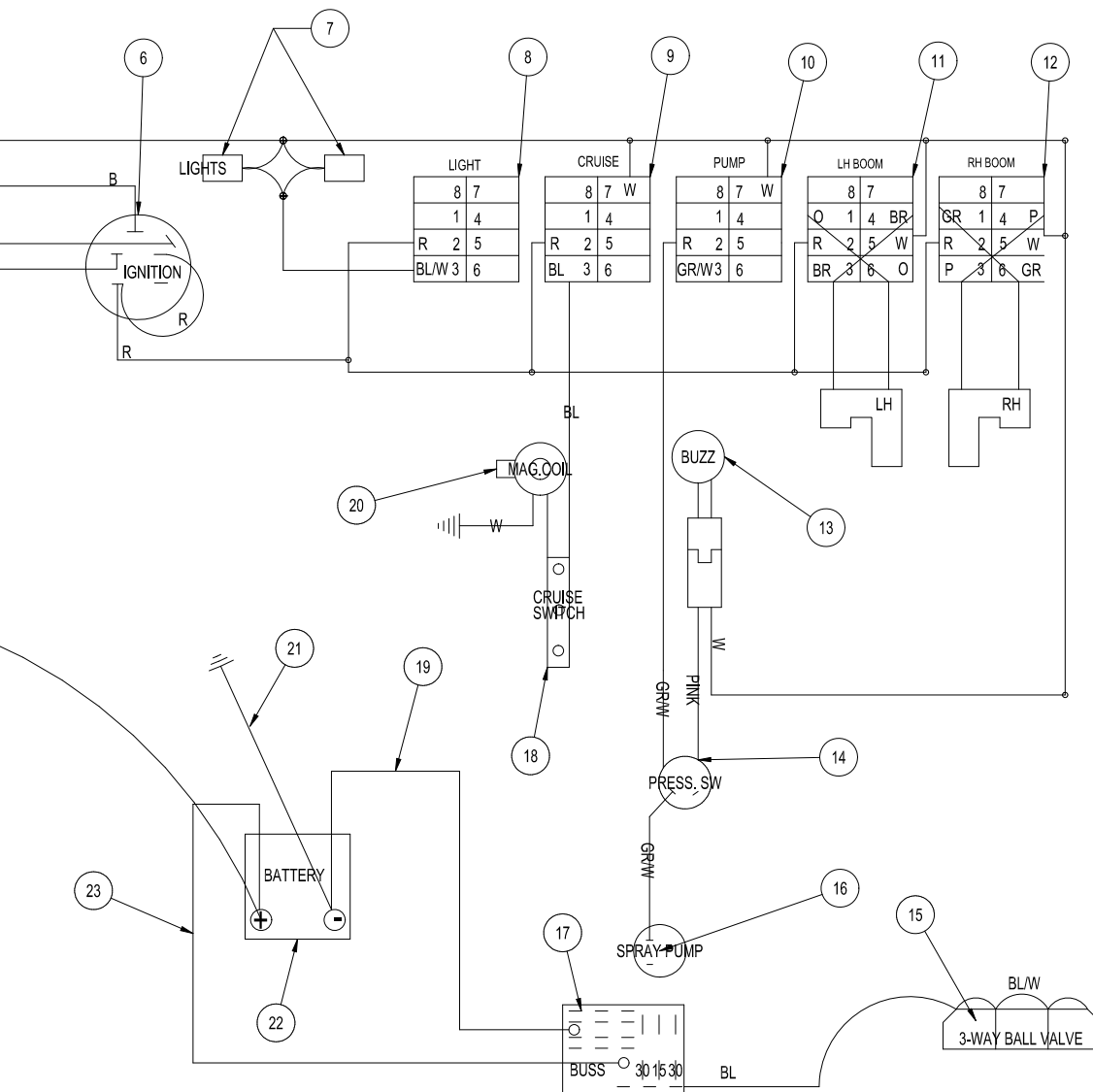


Use dielectric grease on all electrical connections.

To reset circuit breaker on ball valve, you must disconnect power to computer.

# WIRING DIAGRAM

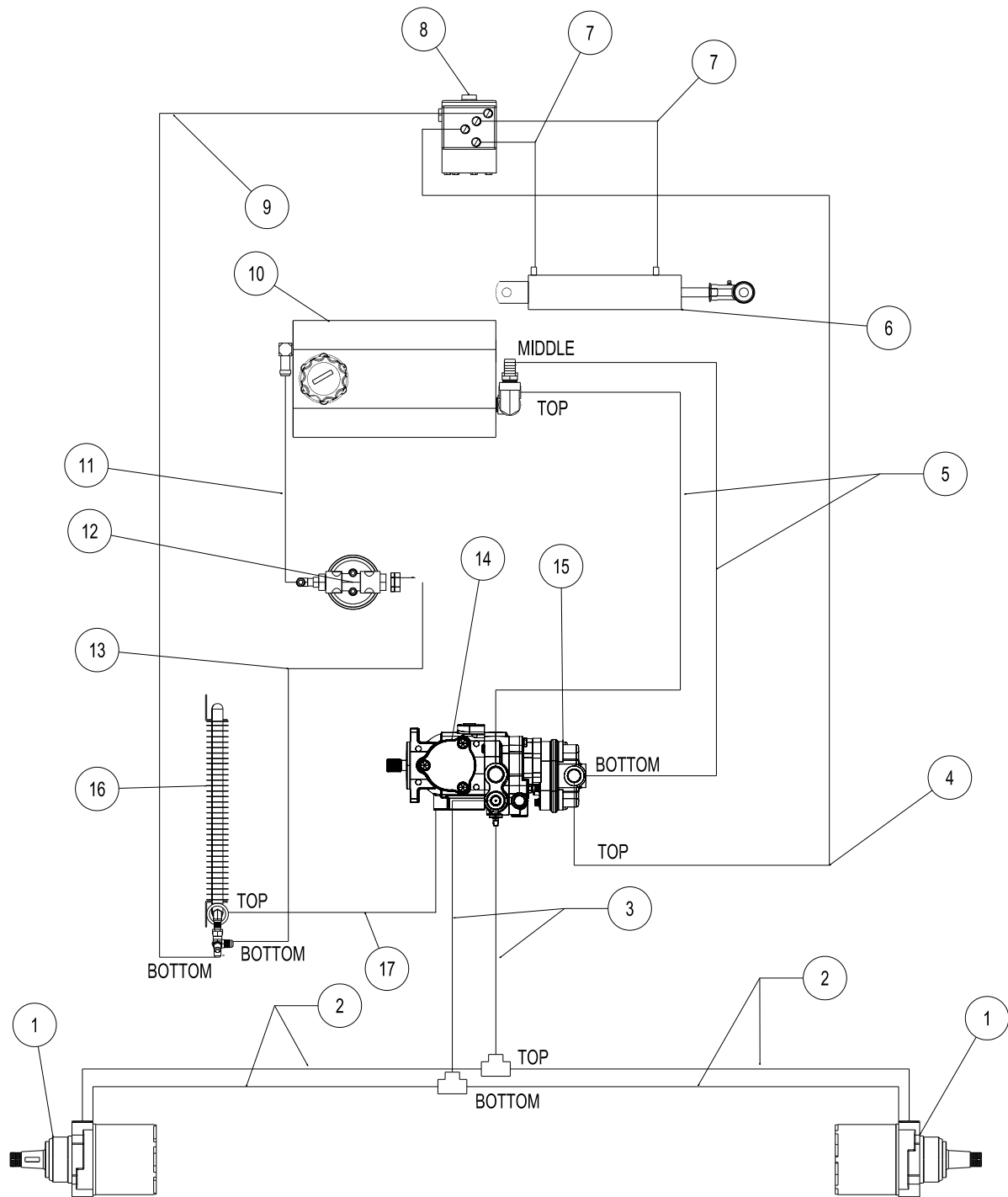
REF#	PART#	DESCRIPTION	QUANTITY
13	77-207	Buzzer	1
14	33-480	Pressure Switch	1
15	15-743	3-Way Ball Valve	1
16	16-998	Hypro Pump	1
17	33-271	Fuse Block	1
	33-272	Fuse, 15 AMP	1
	33-273	Fuse, 30 AMP	2
18	33-509	Cruise Foot Switch	1
19	30-107	Wire Harness Battery Ground to Fuse	1
20	33-084	Magnetic Coil	1
21	76-327	Ground Battery Cable	1
22	33-216	Battery	1
23	30-106	Wire Harness Battery to Fuse	1
24	48-157	Positive Battery Cable	1
25	16-883	Speed Sensor	1
26	77-261	Circuit Breaker 40 amp	1
	8977	Boot	1
NA	15-789	Main Wire Harness	1



Color Code Chart	
Bl	Blue
Br	Brown
Y	Yellow
G	Green
O	Orange
R	Red
B	Black
P	Purple
W	White

# HYDRAULIC DIAGRAM

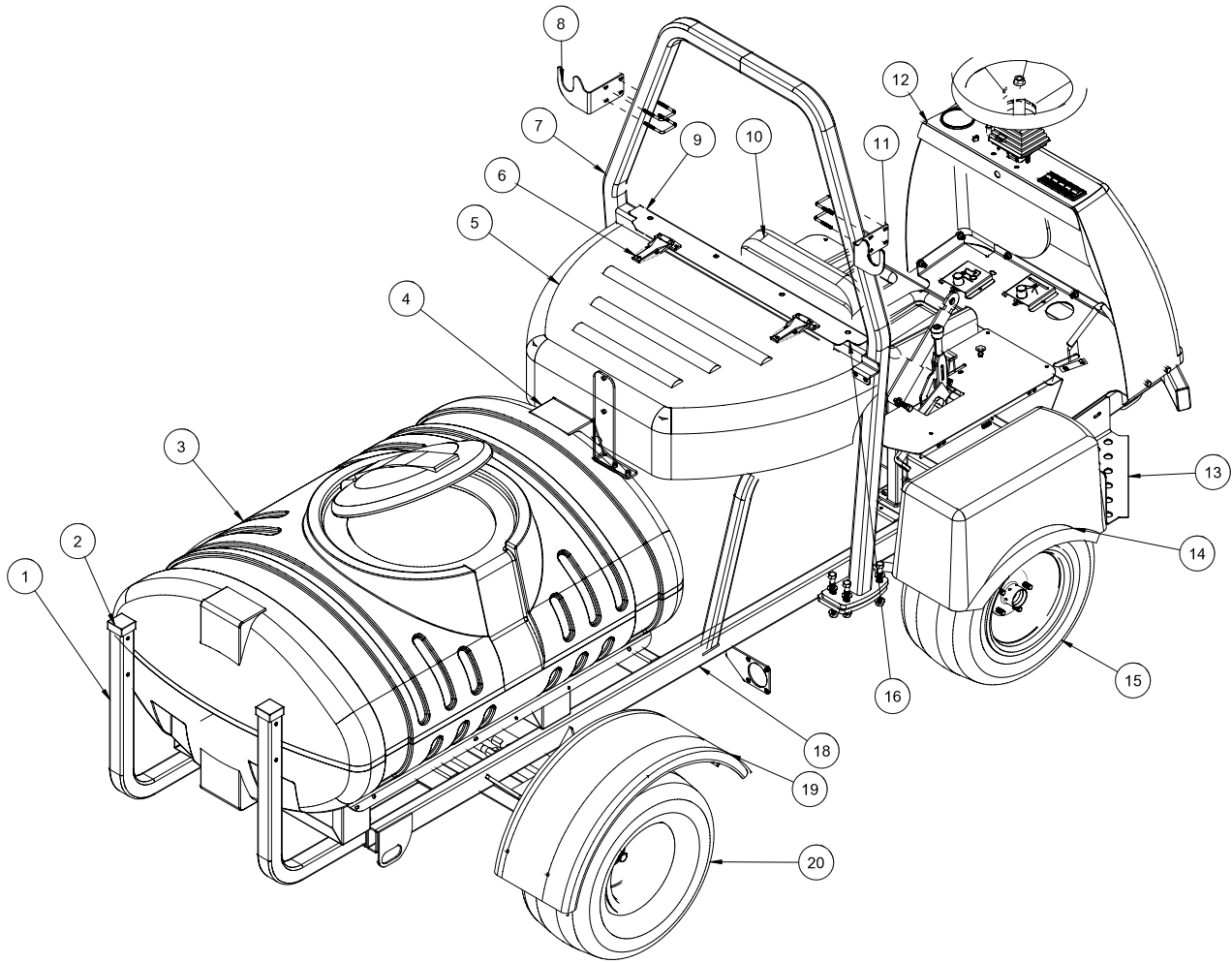
Diagrams



## HYDRAULIC DIAGRAM PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	76-238	Wheel Motor	2
2	15-681	Hydraulic Hose 23"	4
3	15-682	Hydraulic Hose 46 <sup>3</sup> / <sub>4</sub> "	2
4	15-685	Hydraulic Hose 101"	1
5	8832-33	<sup>3</sup> / <sub>4</sub> " Suction Hose	2
	18-040	Hose Clamp	4
6	75-714	Hydraulic Cylinder	1
7	15-687	Hydraulic Hose 75 <sup>1</sup> / <sub>2</sub> "	2
8	15-301	Orbitrol	1
9	15-686	Hydraulic Hose 107 <sup>1</sup> / <sub>2</sub> "	1
10	60-473	Hydraulic Oil tank	1
11	8917-26	<sup>3</sup> / <sub>8</sub> " Suction Hose	1
	18-040	Hose Clamp	2
12	26-016	Oil Filter	1
	23-031	Replacement Filter	1
13	42-045	Hydraulic Hose	1
14	77-239	Hydrostatic Pump	1
15	30-098	Gear Pump	1
16	15-624	Cooler	1
17	15-683	Hydraulic Hose	1

# BODY & FRAME DRAWING



Parts

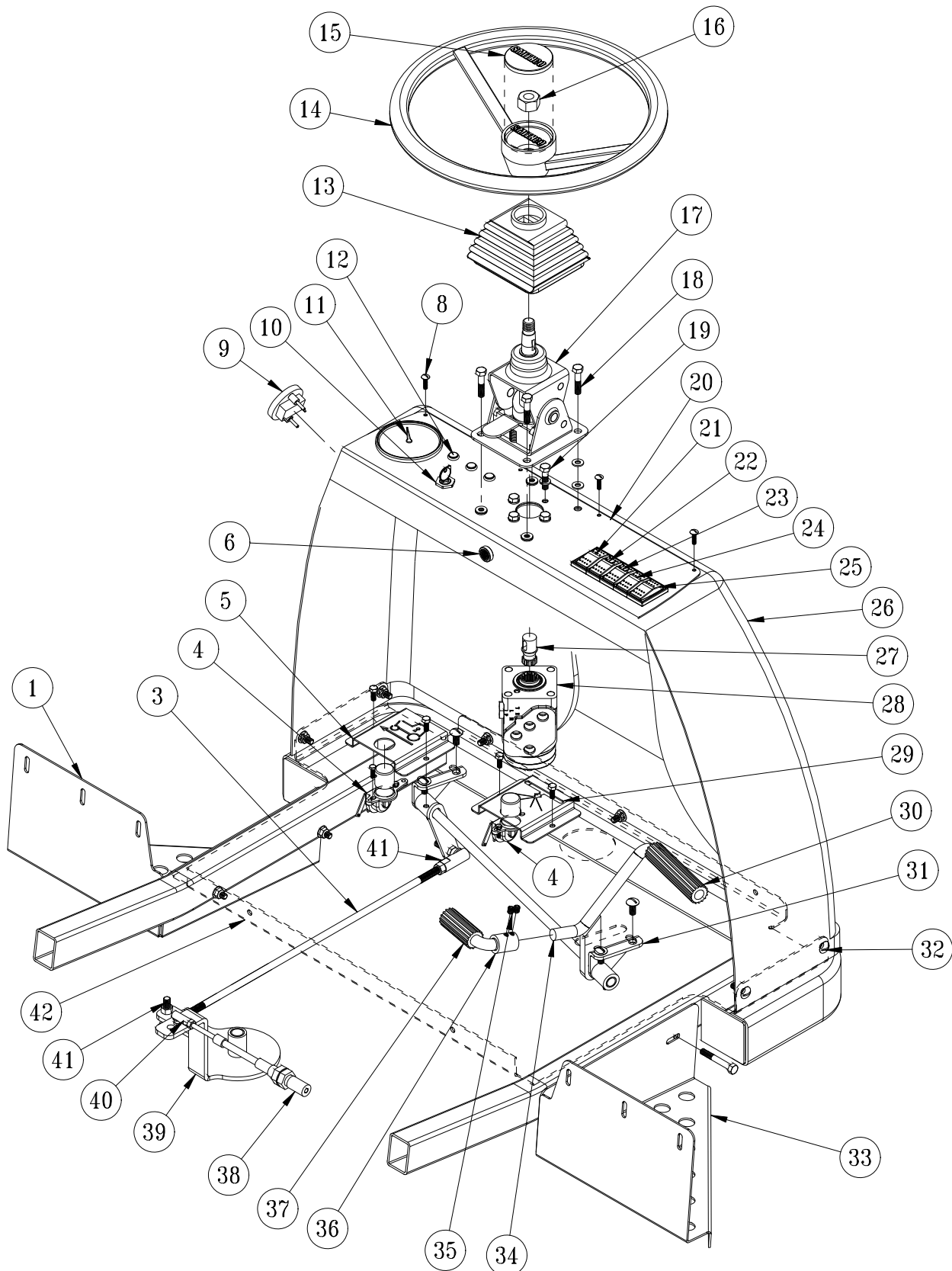


## BODY & FRAME PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-753	Boom Support Tube	2
2	16-557	Square Cap	2
3	14-451	Spray Tank	1
	14-532	Lid	1
	16-169	Strainer Basket	1
4	15-787	Hood Support	1
	50-081	Rubber Bumper	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	1
5	15-765	Read Hood (fiberglass)	1
6	27-055	Hinge	2
	HSM-10-32-063	Machine Screw #10 - 32 x $\frac{5}{8}$	6
	HSM-10-32-100	Machine Screw #10 - 32 x 1	6
	HNFL-10-32	Flange Lock Nut #10 - 32	12
7	15-762	Roll Bar	1
8	15-710	LH Boom Holder	1
9	15-756	Back Panel	1
10	14-519	Seat	1
11	15-709	RH Boom Holder	1
12	15-822	Nose Cone (fiberglass)	1
	17-524	Oval Lights	2
	10-421	Pigtail	1
13	15-751	RH Step	1
	15-752	LH Step	1
14	15-823	RH Front Fender	1
	15-767	LH Front Fender	1
15	16-857	Tire and Wheel	2
	16-857-01	Tire 20 x 10.00 - 10NHS 4 Ply	2
	16-857-02	Wheel	2
16	HB-12-13-200	Bolt $\frac{1}{2}$ - 13 x 2	8
	HW-12	Washer $\frac{1}{2}$	8
	HNFL-12-13	Flange Lock Nut $\frac{1}{2}$ - 13	8
18	15-701	Main Frame	1
19	10-168	Rear Fender	2
	10-154	Rear Fender Bracket	4
20	16-225	Tire and Wheel	2
	16-225-01	Tire 24 x 13.00 - 12NHS 4 Ply	2
	16-225-02	Wheel	2

# NOSE CONE DRAWING

Parts



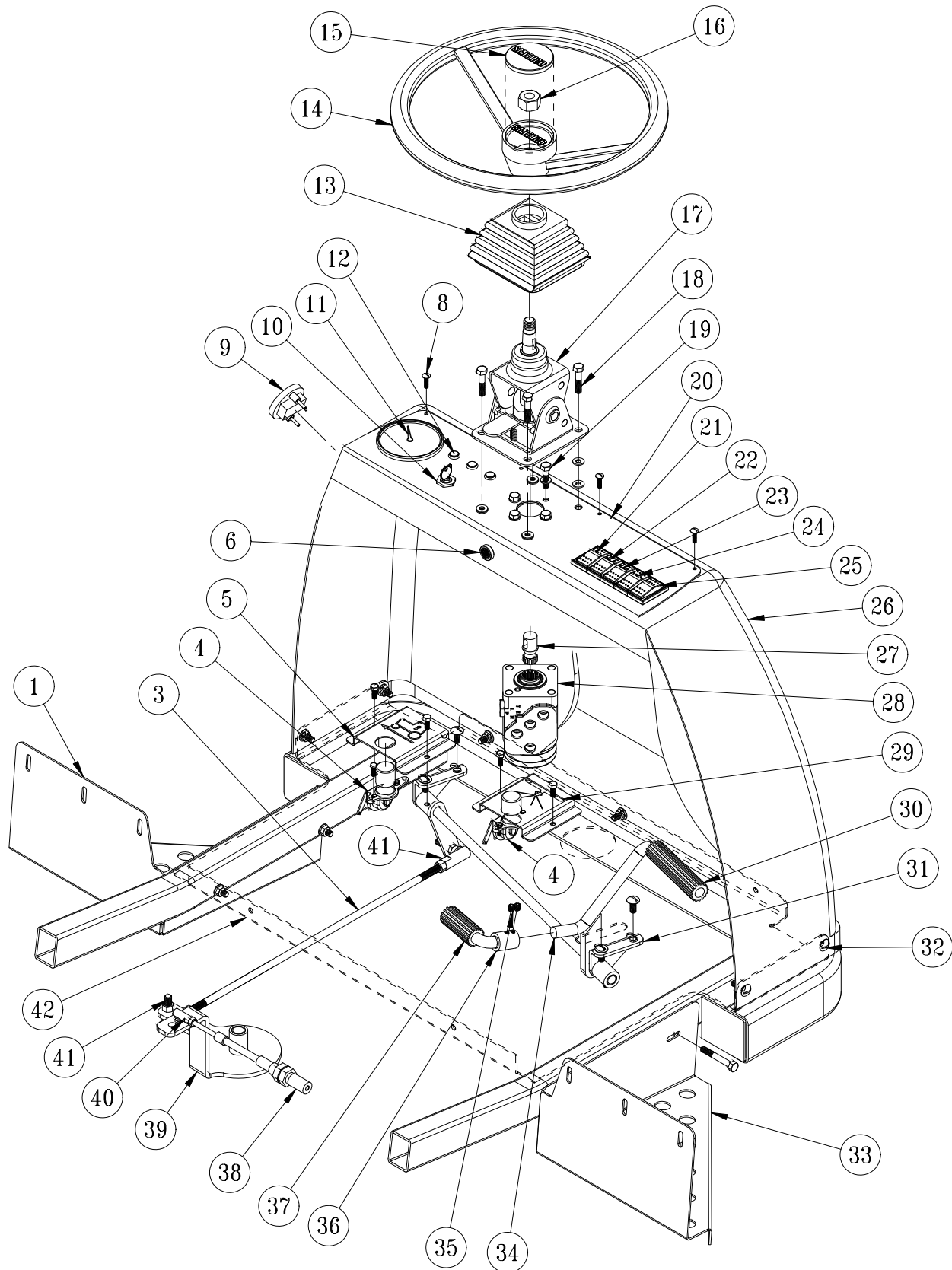
## NOSE CONE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-751	Right Step	1
3	15-761	Long foot Pedal Rod	1
4	33-509	Master Control Switch	2
	HSTP-14-20-075	Machine Screw $\frac{1}{4}$ - 20 x $\frac{3}{4}$	4
5	15-757	Cruise Switch Plate	1
	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HNFL-14-20	Flange Lock Nut $\frac{1}{4}$ - 20	2
6	77-207	Buzzer	1
8	HSM-10-32-100	Machine Screw 10 - 32 x 1	6
	HWLM-6	Lock Washer #6	6
	HNFL-10-32	Flange Lock Nut 10-32	6
9	12-017	Hour Meter	1
10	13-488	Key Switch	1
11	10-556	Speedometer	1
12	50-359	Warning Indicator Lights	3
13	76-364	Square Boot	1
14	13-718	Steering Wheel	1
15	13-726	Center Cap	1
16	HNJ-58-18	Jam Nut $\frac{5}{8}$ - 18	1
17	76-362	Tilt Steering Column	1
18	HB-516-18-125	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{4}$	4
	HW-14	Washer $\frac{1}{4}$	4
	HNFL-516-18	Flange Lock Nut $\frac{5}{16}$ - 18	4
19	HBM-6-1-16	Metric Bolt	4
	HWLM-6	Metric Lock Washer	4
20	15-754	Dash Panel	1
	30-017	Decal, Dashboard	1
21	Lights		
	15-725	Mount Panel End	1
	15-727	Switch Actuator	1
	15-782	Rocker Switch, Unlit	1
22	Cruise Control		
	15-729	Mount Panel Middle	1
	15-726	Switch Body, Light	1
	15-732	Actuator, Green	1
23	Spray Pump		
	15-729	Mount Panel Middle	1
	15-726	Switch Body, Light	1
	15-731	Actuator, Amber	1
24	Right Boom		
	15-729	Mount Panel Middle	1
	15-727	Switch Actuator	1
	15-728	Switch Body, On-Off-On	1
25	Left Boom		
	15-725	Mount Panel End	1
	15-727	Switch Actuator	1
	15-728	Switch Body, On-Off-On	1
26	15-822	Nose Cone (Fiberglass)	1
	50-400	Rubber Grommet	1
	17-824	Oval Lights	2
	10-421	Pigtail	1
27	48-187	Stub Shaft	1

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# NOSE CONE DRAWING

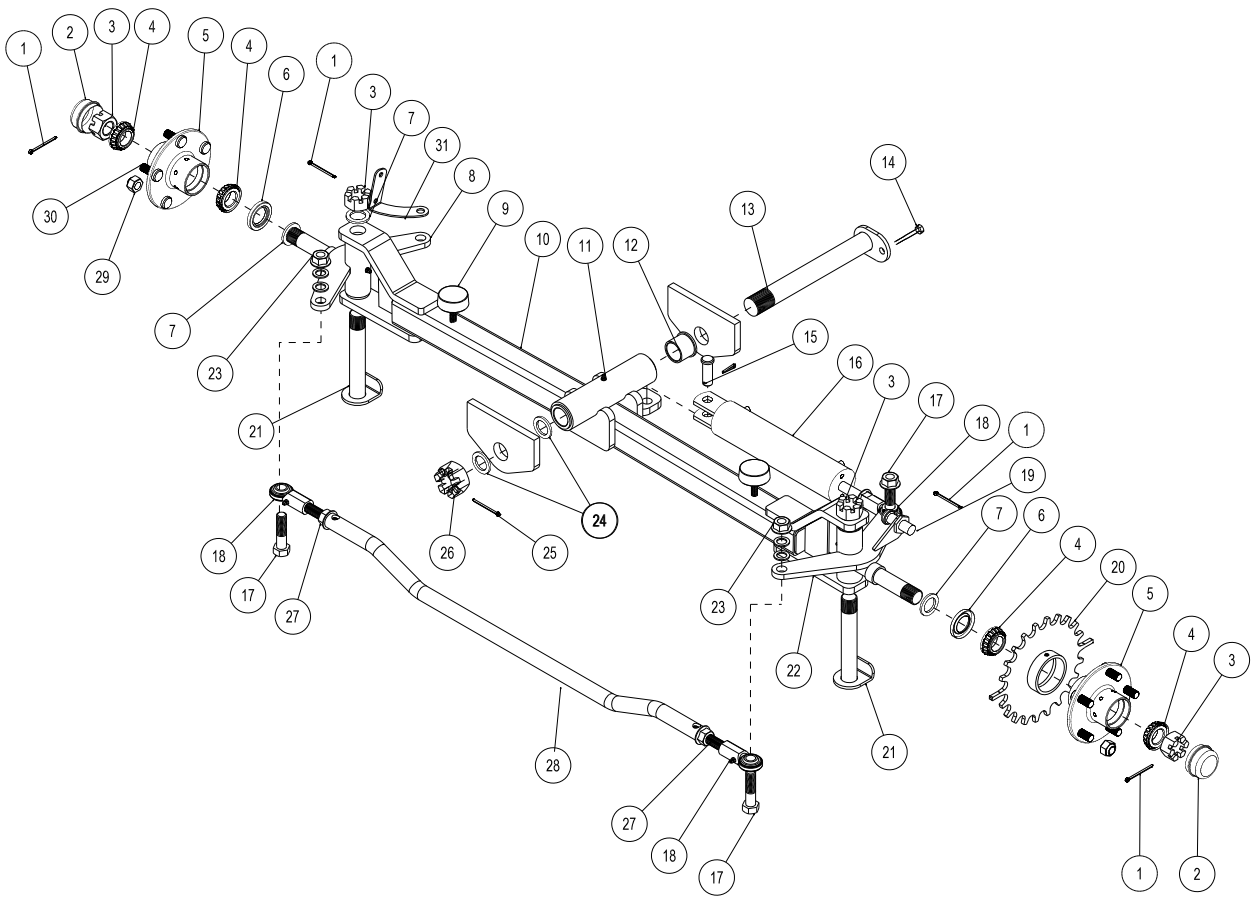


Parts

## NOSE CONE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
28	15-301	Orbitrol	1
	18-169	Adapter	4
29	15-758	Sprayer Switch Plate (part of 440 system)	1
	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HNFL-14-20	Flange Lock Nut $\frac{1}{4}$ - 20	2
30	76-299	Pedal Pad	1
31	76-296	Pedal Mount	2
	HSTP-516-18-075	Machine Screw $\frac{5}{16}$ - 18 x $\frac{3}{4}$	4
	HNFL-516-18	Flange Lock Nut $\frac{5}{16}$ - 18	4
32	HSTP-516-18-150	Machine Screw $\frac{5}{16}$ - 18 x $1\frac{1}{2}$	7
	HNFL-516-18	Flange Lock Nut $\frac{5}{16}$ - 18	7
33	15-752	Left Step	1
34	15-820	Foot Pedal Assembly	1
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	2
	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	5
35	HSSHS-5/16-18-038	Socket Head Set Screw, $\frac{5}{16}$ - 18	2
36	15-821	Reverse Pedal	1
37	76-332	Pedal Pad	1
38	15-760	Short Foot Pedal Rod	1
39	15-692	Pedal Relay	1
	33-084	Magnetic Coil	1
40	21-173	Ball Joint $\frac{3}{8}$ - 24	1
	HWL-38	Washer $\frac{3}{8}$	1
	HN-38-24	Nut $\frac{3}{8}$ - 24	2
41	21-173	Ball Joint $\frac{3}{8}$ - 24	2
	HWL-38	Washer $\frac{3}{8}$	2
	HN-38-24	Nut $\frac{3}{8}$ - 24	4
42	15-701	Main Frame	1

# FRONT AXLE DRAWING

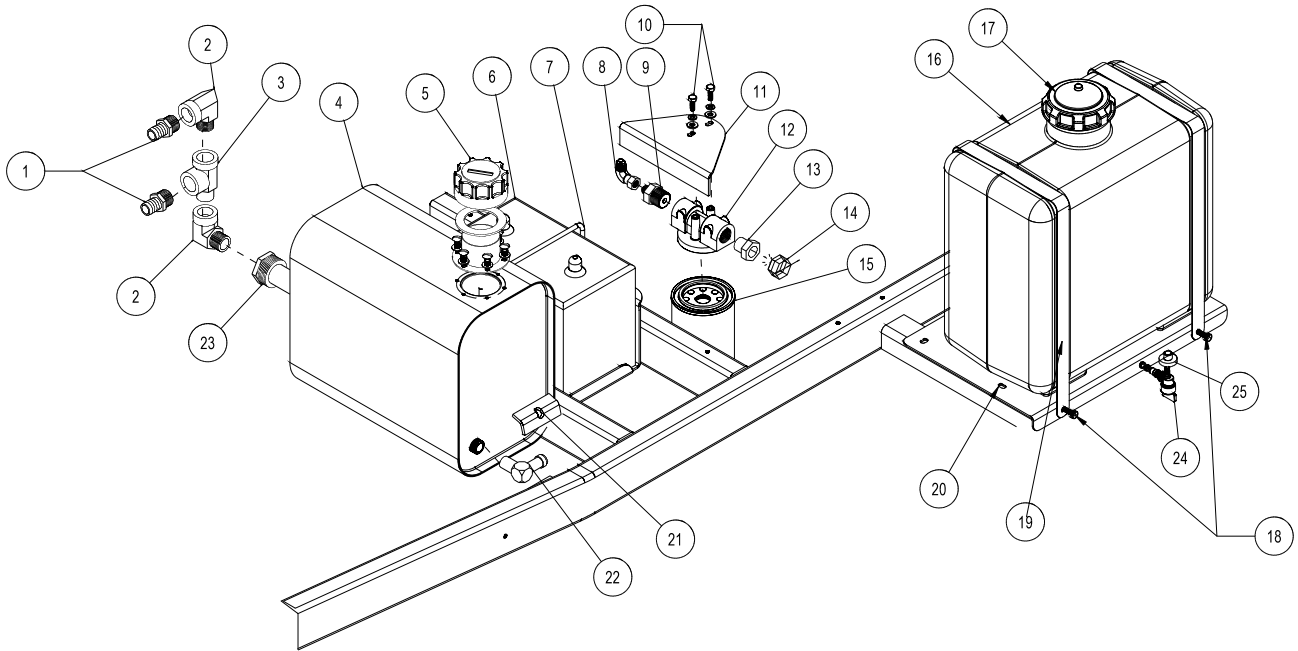


Parts

## FRONT AXLE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HP-18-150	Cotter Pin $\frac{1}{8}$ x $1\frac{1}{2}$	4
2	80-167*	Dust Cap	2
3	HNAR-100-14	Slotted Hex Jam Nut	4
4	11-043*	Bearing	4
5	80-019	Hub (includes all * items)	2
6	11-041*	Oil Seal	2
7	HMB-100-10	Machine Bushing 1 x 10GA	6
8	15-696	Spindle - LH	1
9	50-081	Rubber Insulators	2
10	15-699	Front Axle	1
11	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	1
12	18-153	Bushing (part of 15-699)	2
13	14-344	Axle Pin	1
14	HB-516-18-125	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{4}$	1
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	1
15	HCP-58-175	Clevis Pin $\frac{5}{8}$ x $1\frac{3}{4}$	1
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
16	75-714	Hydraulic Cylinder	1
	18-168	Elbow	2
	14-254	Seal Kit	
17	HB-58-11-250	Bolt $\frac{5}{8}$ - 11 x $2\frac{1}{2}$	3
18	18-154	Rod End	3
19	16-883	Magnetic Sensor	1
	HNJ-34-16	Jam Nut $\frac{3}{4}$ - 16	1
20	10-265	Hub with Sprocket	1
	HSSHS-516-18-038	Socket Head Set Screw $\frac{5}{16}$ -18 x $\frac{3}{8}$	2
21	16-076	King Pin	2
22	15-695	Spindle - RH	1
23	HNTL-58-11	Lock Nut $\frac{5}{8}$ - 18	3
	HMB-58-14	Machine Bushing $\frac{5}{8}$ x 14GA	6
24	HMB-114-10	Machine Bushing $1\frac{1}{4}$ x 10GA	2
25	HP-18-200	Cotter Pin $\frac{1}{8}$ x 2	1
26	HNA-114-12	Axle Nut $1\frac{1}{4}$ -12	1
27	HNJ-58-18	Jam Nut $\frac{5}{8}$ - 18	3
28	15-690	Tie Rod	1
29	HNL-12-220*	Lug Nut $\frac{1}{2}$ - 20	10
30	27-022-02*	Stud $\frac{1}{2}$ - 20	10
31	15-715	Sensor Bracket (1752D only)	1

# OIL AND FUEL TANK DRAWING



Parts

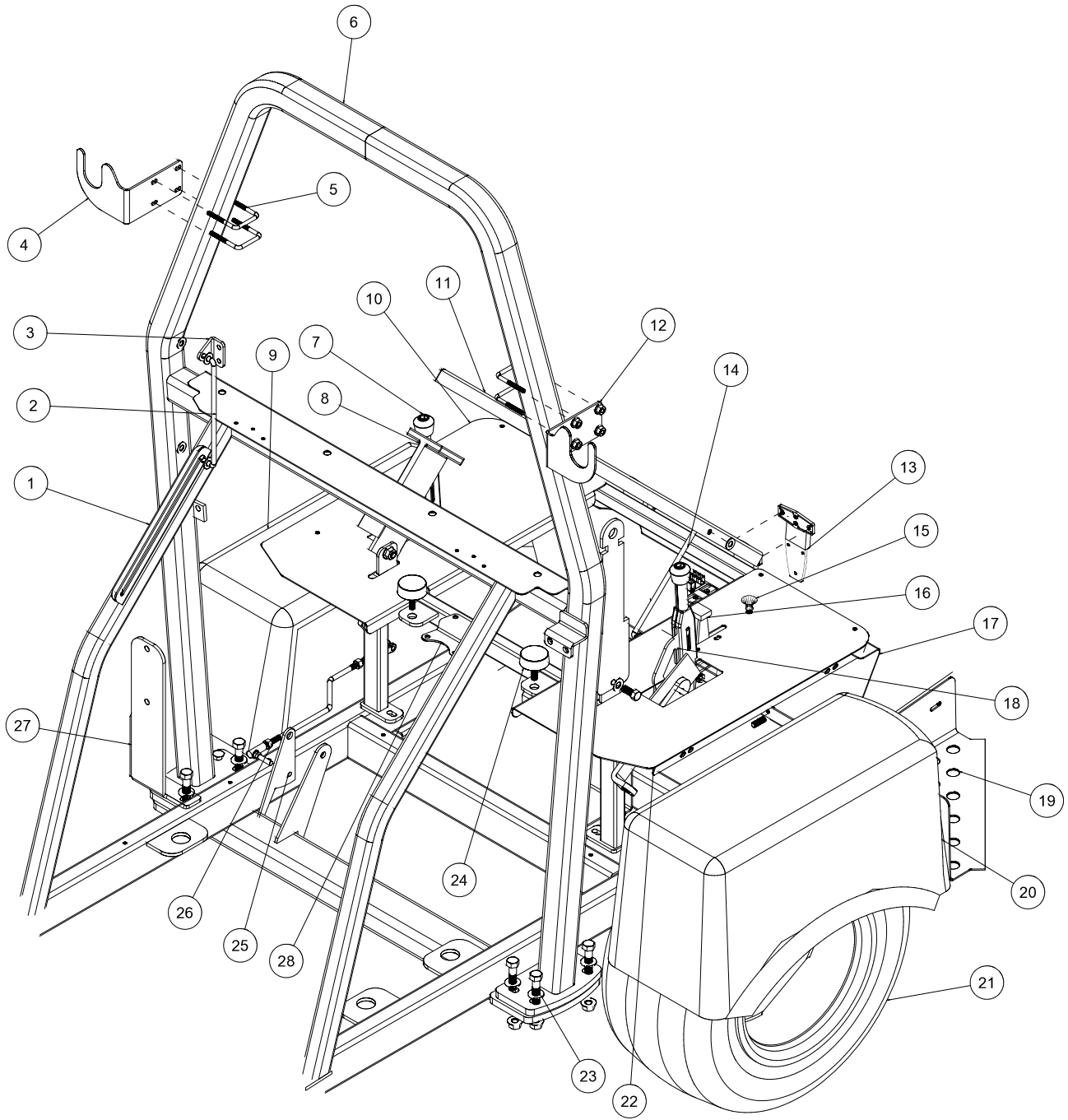


## OIL AND FUEL TANK PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	18-249	Barb Fitting	2
2	18-140	Street Elbow	2
3	18-093	Straight Tee	1
4	60-473	Oil Tank	1
5	13-747	Filler Breather	1
	15-586-03	Gas Tank Neck	1
	HSM-10-32-063	Machine Screw 10 -32 x 5/8	6
	HWL-10	Lock Washer #10	6
6	33-216	Battery	1
7	15-785	Battery Hold Down	1
	HNFL-14-20	Flange Lock Nut 1/4 - 20	2
8	18-202	Elbow	1
9	23-183	Male Connector	1
10	HB-14-20-075	Bolt 1/4 - 20 x 3/4	2
	HW-14	Washer 1/4	2
	HWL-14	Lock Washer	2
11		Part of Main Frame	
12	26-016	Oil Filter	1
13	18-008	Pipe Thread Reducer	1
14	23-143	Connector	1
15	23-031	Replacement Filter	1
16	73-049	7 Gallon Fuel Tank	1
17	73-050	Cap with Gauge	1
18	HB-14-20-125	Bolt 1/4 -20 x 3/4	2
	HNFL-14-20	Flange Loc Nut 1/4 -20	2
19	73-051	Gas TANK Strap	2
20	15-824	Tank Mount	1
21	75-792	Tank Hold Down	2
	HB-516-18-150	Bolt 5/16 - 18 x 1 1/2	2
	HW-516	Washer 5/16	4
	HNFL-516-18	Flange Nut 5/16 - 18	2
22	23-142	Connector	1
23	60-213	Strainer	1
24	26-055	Shut Off Valve	1
25	26-054	Bushing Insert	1

# SEAT PANEL DRAWING

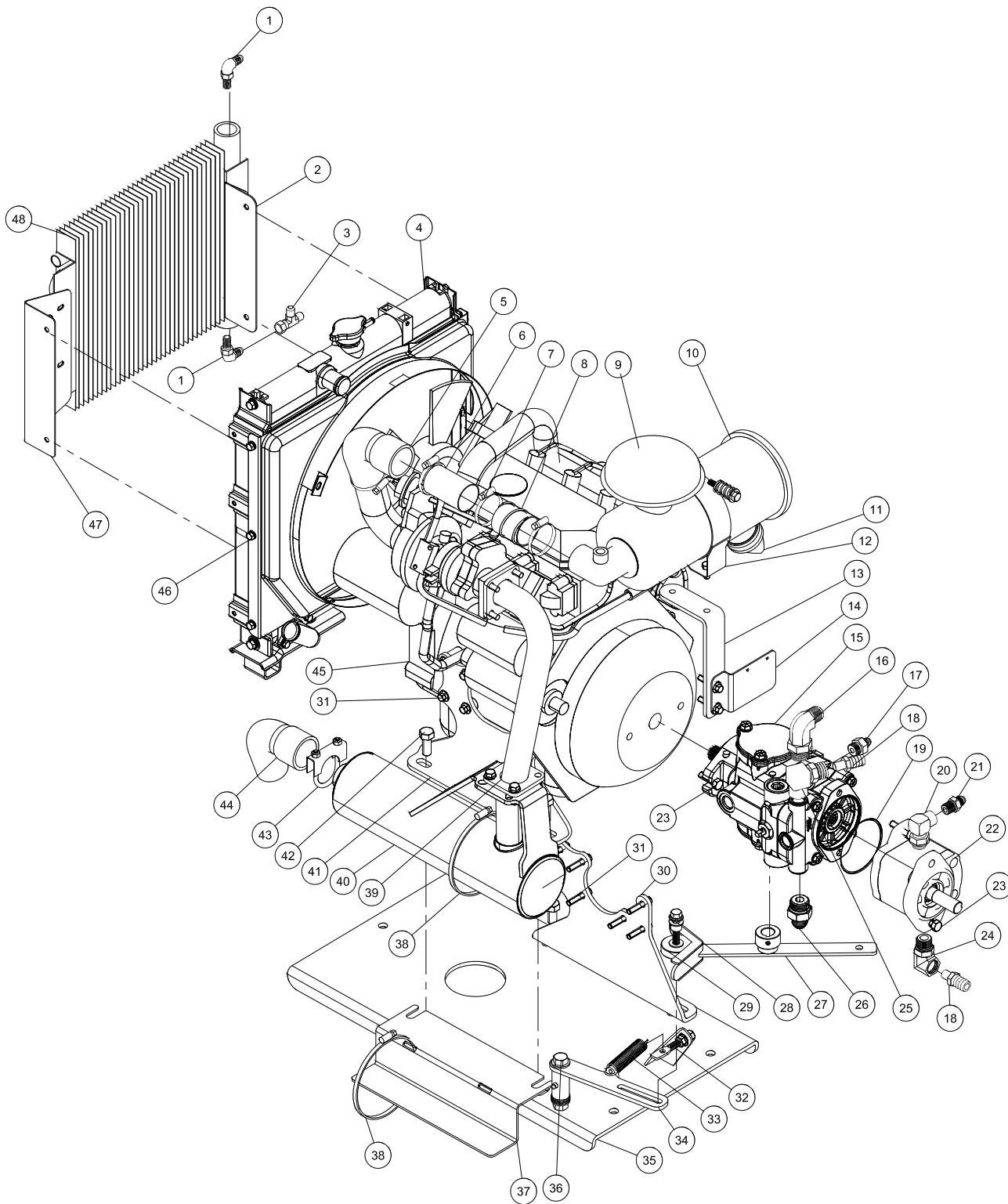
Parts



## SEAT PANEL PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-723	Hood Latch	1
2	15-786	Hood Rod	1
	HW-38	Washer <sup>3</sup> / <sub>8</sub>	4
	HP-18-075	Cotter Pin <sup>1</sup> / <sub>8</sub> x <sup>3</sup> / <sub>4</sub>	2
3	10-211	Hood Rod Mount	1
4	15-710	Boom Holder - LH	1
5	10-194	U-Bolt	4
	HW-14	Washer <sup>1</sup> / <sub>4</sub>	8
	HN-14-20	Nut <sup>1</sup> / <sub>4</sub> - 20	8
6	15-762	Roll Bar	1
7	60-106	Speed Boss Lever	1
8	76-198-03	Seat Belt	1
	HB-716-14-100	Bolt <sup>7</sup> / <sub>16</sub> -14 x 1	2
	HW-716	Washer <sup>7</sup> / <sub>16</sub>	2
	HNTL-716-14	Lock Nut <sup>7</sup> / <sub>16</sub> -14	2
9	15-767	Front Fender - LH	1
	15-781	Plastic Cup Holder	1
10	15-713	Side Panel - LH	1
11	15-714	Seat Panel	1
12	15-709	Boom Holder - RH	1
13	27-055	Hinge	2
	HSM-10-32-063	Machine Screw #10-32 x <sup>5</sup> / <sub>8</sub>	12
	HN-10-32	Nut #10 - 32	12
14	15-786	Hood Rod	1
	HW-38	Washer <sup>3</sup> / <sub>8</sub>	4
	HP-18-075	Cotter Pin <sup>1</sup> / <sub>8</sub> x <sup>3</sup> / <sub>4</sub>	2
15	80-020	Choke Cable	1
16	34-160	Throttle Cable	1
	34-160-01	Inner Cable	1
17	15-711	Front Panel	1
	HBFL-516-18-075	Flange Bolt <sup>5</sup> / <sub>16</sub> - 18 x <sup>3</sup> / <sub>4</sub>	2
	HNFL-516-18	Flange Nut <sup>5</sup> / <sub>16</sub> -18	2
18	60-106	Park Brake	1
19	15-751	Step - RH	1
	15-752	Step - LH	1
20	15-823	Front Fender - RH	1
21	16-857	Tire and Wheel	2
	16-857-01	Tire 20 x 10.00 - 10NHS 4 Ply	2
	16-857-02	Wheel	2
22	15-712	Side Panel - RH	1
23	HB-12-13-200	Bolt <sup>1</sup> / <sub>2</sub> - 13 x 2	8
	HW-12	Washer <sup>1</sup> / <sub>2</sub>	8
	HNFL-12-13	Flange Lock Nut <sup>1</sup> / <sub>2</sub> - 13	8
24	50-081	Rubber Insulator	2
	HNTL-38-16	Lock Nut <sup>3</sup> / <sub>8</sub> - 16	2
25	15-706	Speed Boss Arm	1
26	15-707	Spray Boss Linkage	1
	11-100	Linkage Yolk	1
	21-462	Ball Joint	1
27	15-708	Valve Mount	1
28	15-794	Fuel Filter Bracket	1

# ENGINE, PUMPS AND EXHAUST DRAWING



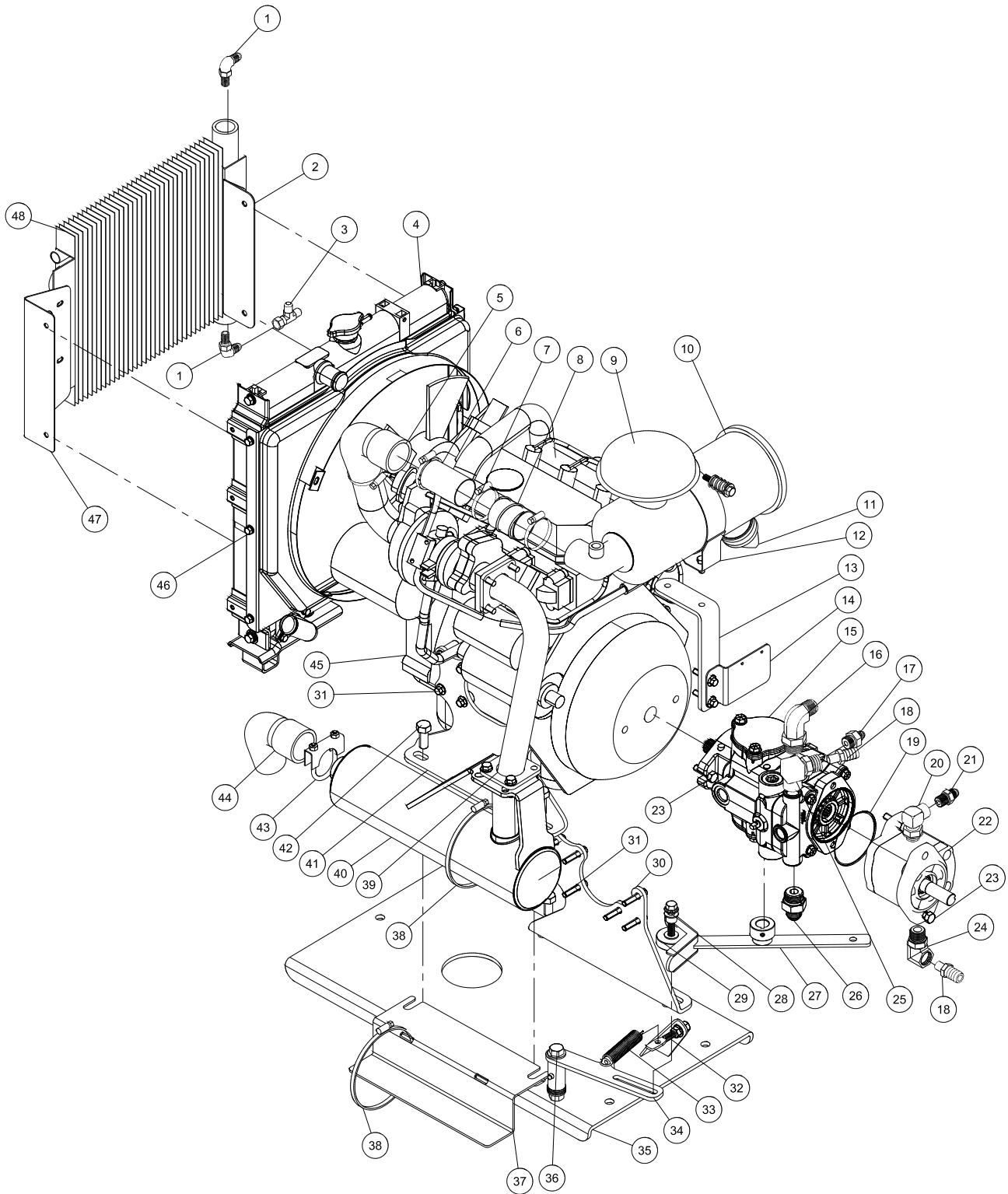
Parts

## ENGINE, PUMPS AND EXHAUST PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	18-168	Elbow $\frac{3}{8}$ Straight Thread	2
2	15-801	Front Cooler Bracket	1
3	18-190	Tee	1
4		Radiator	1
5	27-113	Rubber Elbow	1
6	15-803	Tube	1
7	18-116	Hose Clamp	4
8	8959-2	Flex Hose	1
9	42-076-02	Air Cleaner Cap	1
10	76-395-04	Air Cleaner	1
11	42-076-03	Air Cleaner Cartridge	1
12		Band	1
13	15-796	Air Cleaner Mount	1
14	15-795	Timer Mount	1
	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	2
15	77-239	Pump	1
16	18-204	Elbow	1
17	18-241	Straight Thread Connector	1
18	18-133	Barb Fitting $\frac{1}{2}$ MPT x $\frac{3}{4}$ HB	2
19	23-145	O-Ring	1
20	23-129	Elbow	1
21	23-188	Male Connector $\frac{3}{8}$	1
22	30-098	Gear Pump	1
23	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HW-38	Washer $\frac{3}{8}$	4
	HWL-38	Lock Washer $\frac{3}{8}$	4
24	23-127	Adjustable Elbow	1
25	23-130	Elbow	1
26	15-702	Adapter	1
27	15-693	Shift Arm	1
	HSSH-14-20-031	Socket Head Set SCrew $\frac{1}{4}$ - 20 x $\frac{5}{16}$	1
28	HB-38-16-200	Bolt $\frac{3}{8}$ - 16 x 2	1
	HW-38	Washer $\frac{3}{8}$	5
	HWL-38	Lock Washer $\frac{3}{8}$	1
	HN-38-16	Nut $\frac{3}{8}$ - 16	1
29	14-266	Ball Bearing	1
	42-183	Spacer	1
	18-270	Oilite Bushing	1
30	15-804	Front Engine Mount	1
	HB-12-13-125	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{4}$	2
	HW-12	Washer $\frac{1}{2}$	2
	HNFL-12-13	Flange Whiz Lock Nut $\frac{1}{2}$ - 13	2
31	HBM-8-1.25-25	Metric Bolt M8-1.25 - 25	14
	HW-516	Washer $\frac{5}{16}$	14
	HWLM-8	Metric Lock Washer M8	14
32	42-604	Spade Bolt	1
	HNFL-38-16	Flange Lock Nut $\frac{3}{8}$ - 18	2
33	21-212	Spring	1
34	15-807	Idler Arm	1
35	15-793	Engine Plate	1

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# ENGINE, PUMPS AND EXHAUST DRAWING

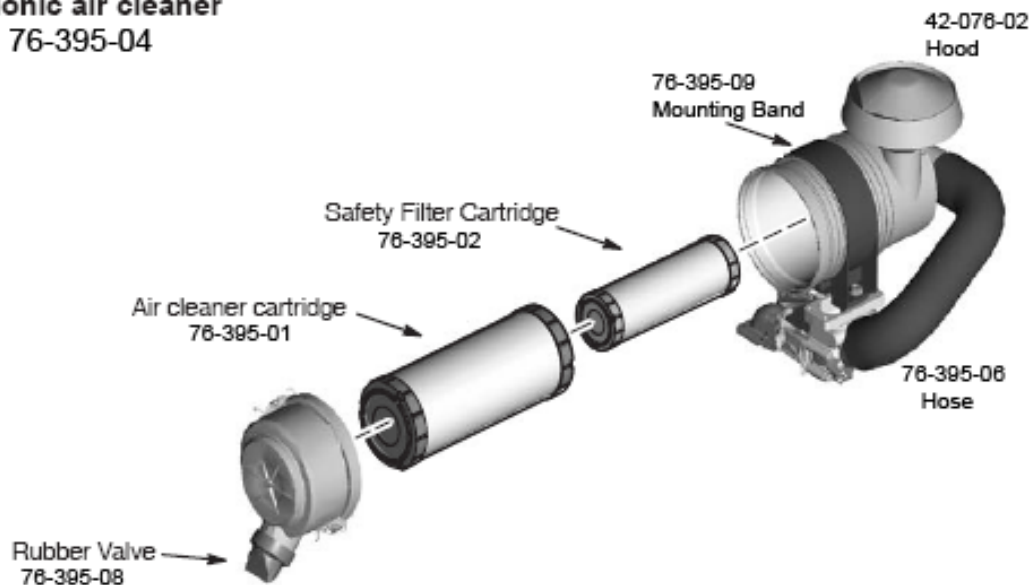


Parts

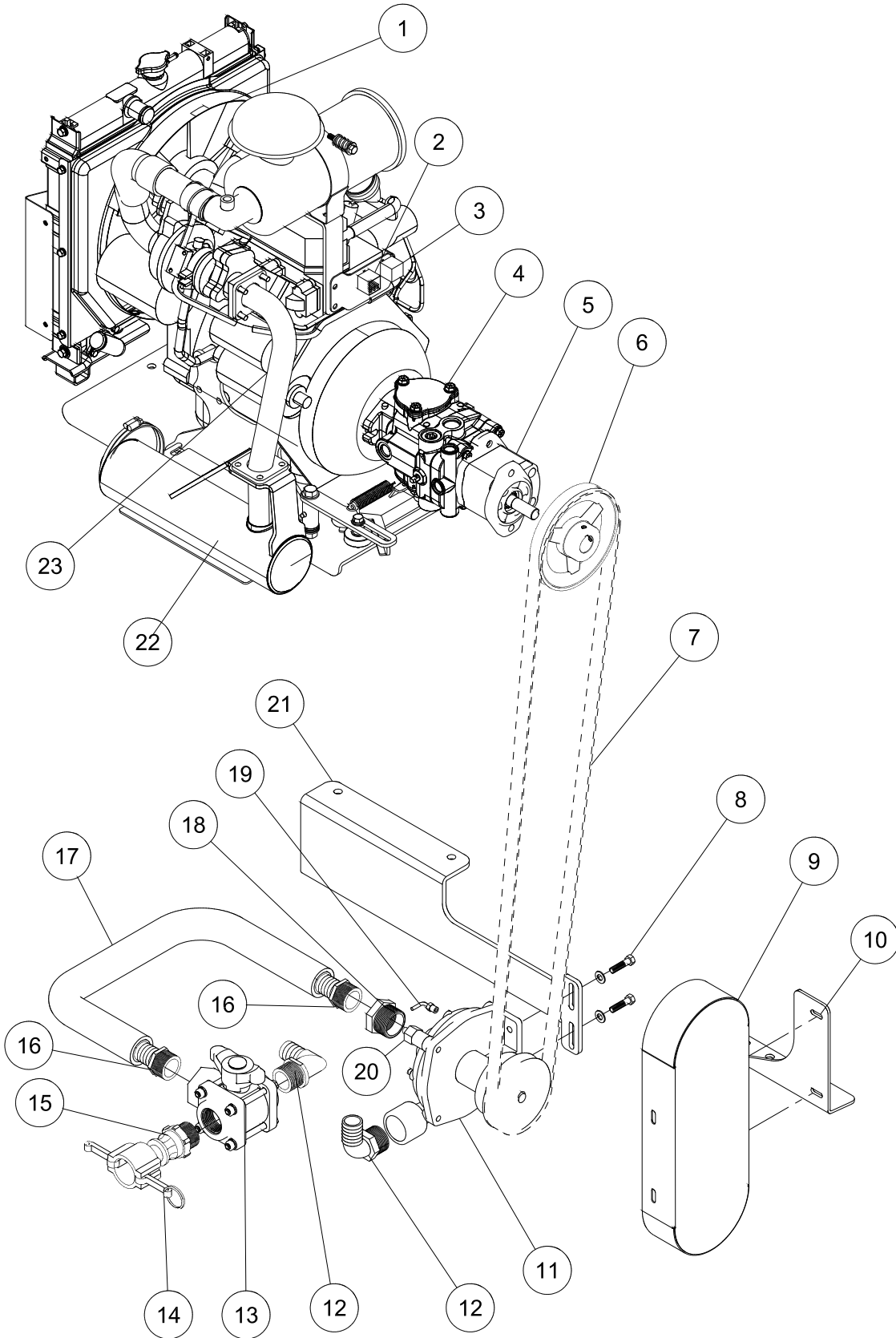
## ENGINE, PUMPS AND EXHAUST PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
36	HB-12-13-350	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{2}$	1
	HMB-12-14	Machine Bushing $\frac{1}{2}$ - 14GA	2
	HN-12-13	Nut $\frac{1}{2}$ - 13	1
37	15-799	Muffler Support	1
38	15-819	Hose Clamp	2
39	15-806	Tailpipe Assembly	1
	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	4
	HBFL-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	4
	HNFL-516-18	Flange Whiz Lock Nut $\frac{5}{16}$ - 18	8
40	43-122	Muffler	1
41	15-805	Rear Engine Plate	1
42	HB-12-13-150	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{2}$	2
	HW-12	Washer $\frac{1}{2}$	2
	HNFL-12-13	Flange Whiz Lock Nut $\frac{1}{2}$ - 13	2
43	50-111	Muffler Clamp	1
44	15-809	Exhaust Elbow	1
45	15-791	Engine B&S 954T Turbo Diesel	1
	21-161	Wire Block	1
46	HBM-6-1-16	Metric Hex Bolt M6 -1 x 16	4
	HWLM-6	Metric Lockwasher	4
47	15-802	Rear Cooler Bracket	1
48	15-624	Oil Cooler	1

### Cyclonic air cleaner 76-395-04



# SPRAY PUMP DRAWING



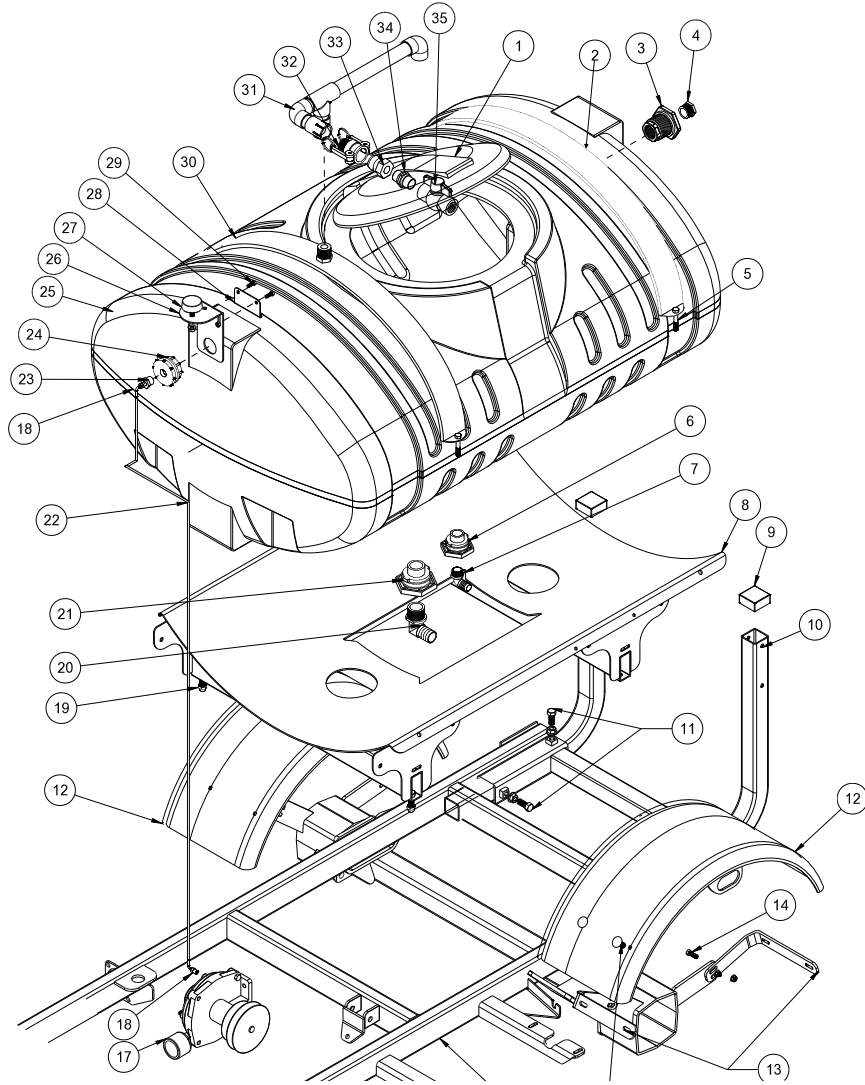
Parts



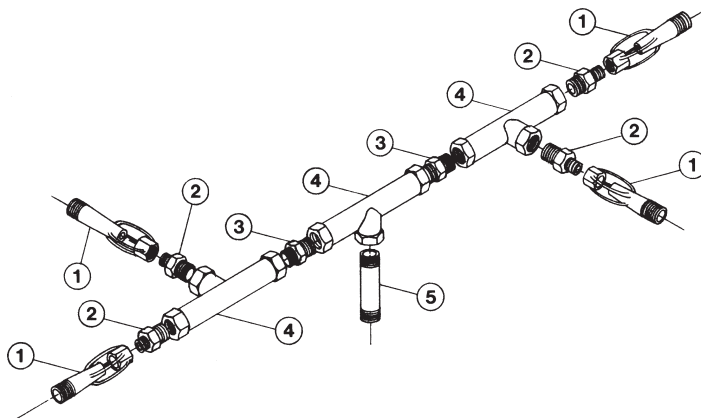
## SPRAY PUMP PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-791	Engine B&S 954T Turbo Diesel	1
	21-161	Wire Block	1
2	77-223	Timer	1
3		Relay	1
4	77-239	Pump	1
5	30-098	Gear Pump	1
6	17-522	Pulley	1
	30-123	Hub	1
7	15-790	Belt	1
8	HBFL-38-16-075	Flange Bolt 3/8 - 16 x 3/4	2
	HW-38	Washer 3/8	2
	HNL-38-16	Finage Lock Nut 3/8 -16	2
9	15-800	Belt Guard	1
10	15-798	Belt Guard Mount	1
11	16-998	Spray Pump	1
12	16-156	Elbow	1
13	18-372	3-Way Valve	1
	18-372-01	T-Handle	1
14	16-935	Quick Coupler Cap	1
15	16-180	Quick Coupler Male	1
16	16-161	Fitting	2
17	8897-19	Discharge Hose 1 1/4" x 19"	1
	18-222	Hose Clamp	2
18	16-825	Hex Bushing	1
19	33-494	Male Elbow	1
20	33-480	Pressure Switch	1
21	15-797	Pump Mount	1
22	43-122	Muffler	1
23	15-806	Tailpipe Assembly	1

# TANK DRAWING



# TURBO-QUADAGITATOR DRAWING



## TANK PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	14-532	16" Hinged Lid Well with Gasket	1
	14-532-01	Gasket (for Lid)	1
2	14-322	Tank Strap	1
3	16-945	1" Double Thread Fitting	1
4	16-162	1" Hex Plug	1
5	HB-38-16-400	Bolt $\frac{3}{8}$ - 16 x 4	2
	HB-38-16-350	Bolt $\frac{3}{8}$ - 16 x $3\frac{1}{2}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
6	16-150	$\frac{1}{2}$ " Double Thread Fitting (part of tank)	1
7	16-155	Elbow	1
8	15-733	Tank Carrier	1
9	16-557	Square Cap	2
10	15-753	Boom Support Tube	2
11	HB-12-13-150	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{2}$	4
	HNJ-12-13	Jam Nut $\frac{1}{2}$ - 13	4
12	10-168	Rear Fender	2
13	10-154	Rear Fender Brackets	4
14	HBFL-516-18-075	Flange Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	8
	HNFL-516 - 18	Flange Nut $\frac{5}{16}$ - 18	8
15	HBC-516-18-100	Carriage Bolt $\frac{5}{16}$ - 18 x 1	8
	HNFL-516-18	Flange Lock Nut $\frac{5}{16}$ - 18	8
16	15-701	Main Frame	1
17	16-998	Hypro Pump	1
18	33-494	Male Elbow	2
19	HB-12-13-125	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{4}$	4
	HNFL-12-13	Flange Nut $\frac{1}{2}$ - 13	4
20	16-156	Elbow	1
21	16-194	$1\frac{1}{4}$ Anti Vortex Fitting (part of tank)	1
22	8954-30	Clear Hose $\frac{3}{16}$	1
23	33-496	Reducer Bushing $\frac{1}{2}$ to $\frac{1}{8}$	1
24	33-495	Bulkhead Fitting	1
25	14-451	Spray Tank	1
	16-169	Strainer Basket	1
26	15-787	Hood Support	1
27	50-081	Rubber Bumper	1
	HNFL-38-16	Flange Nut $\frac{3}{8}$ - 16	1
28	15-788	Stop Adjustment	1
29	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HNFL-14-20	Flange Nut $\frac{1}{4}$ - 20	2
30	14-327	Front Tank Strap	1
31	14-365	Air Gap Filler	1
32	16-962	1" Coupler	1
	16-962-01	Buna-N Gasket (for 16-962)	1
33	16-961	1" Adapter	1

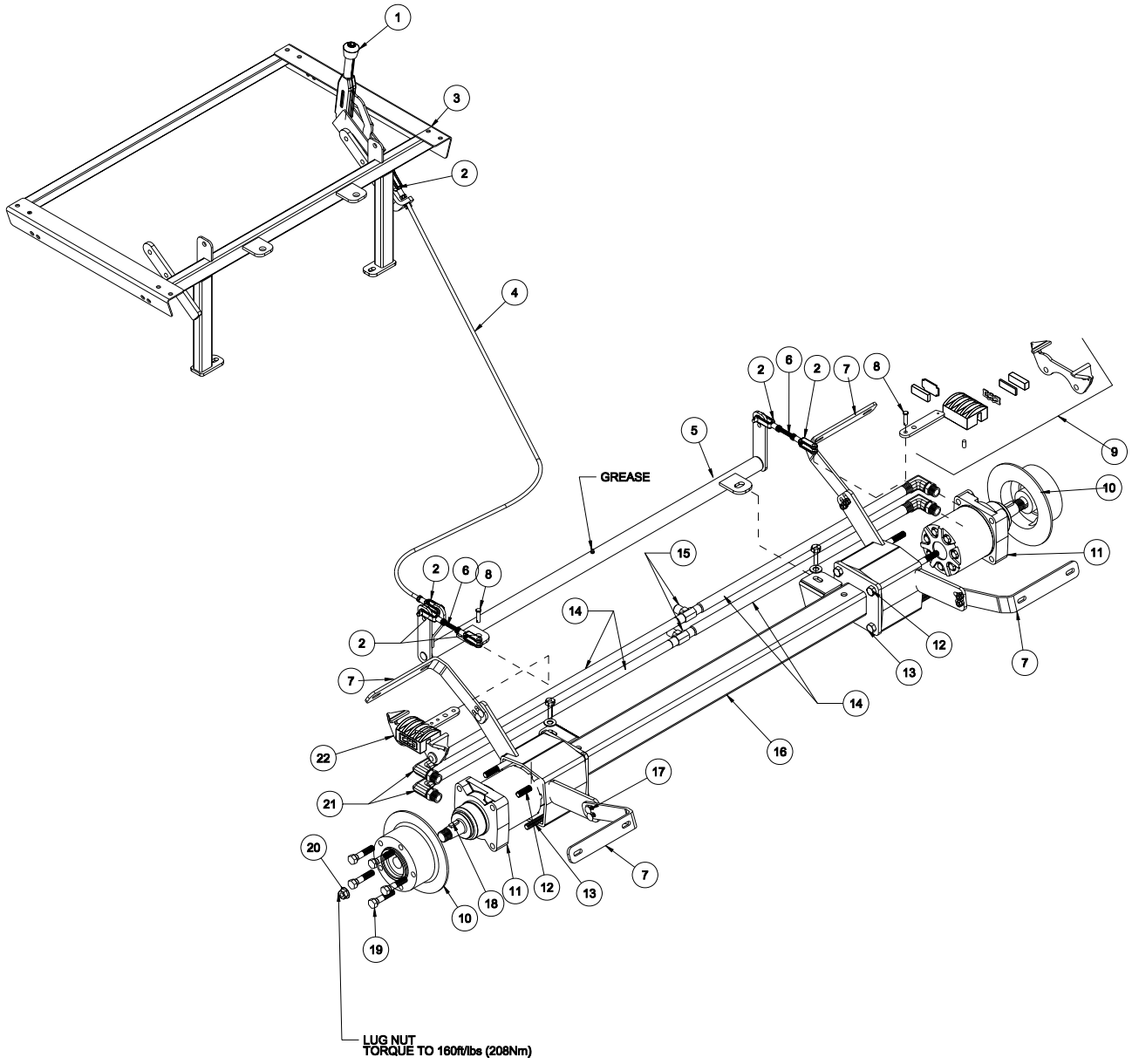
## TURBO-QUAD AGITATOR PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-036	Agitator Jet (Includes one each $\frac{1}{8}$ ", $\frac{5}{32}$ ", and $\frac{3}{16}$ " orifices)	4
2	16-173	Reducer $\frac{3}{4}$ x $\frac{1}{2}$	4
3	16-158	Close Nipple $\frac{3}{4}$ x $\frac{3}{4}$	2
4	16-157	Female Pipe Thread Tee $\frac{3}{4}$ x $\frac{3}{4}$ x $\frac{3}{4}$	3
5	16-172	Nylon Nipple $\frac{3}{4}$ NPT x $3\frac{1}{2}$	1



# PARK BRAKE AND REAR AXLE DRAWING

Parts

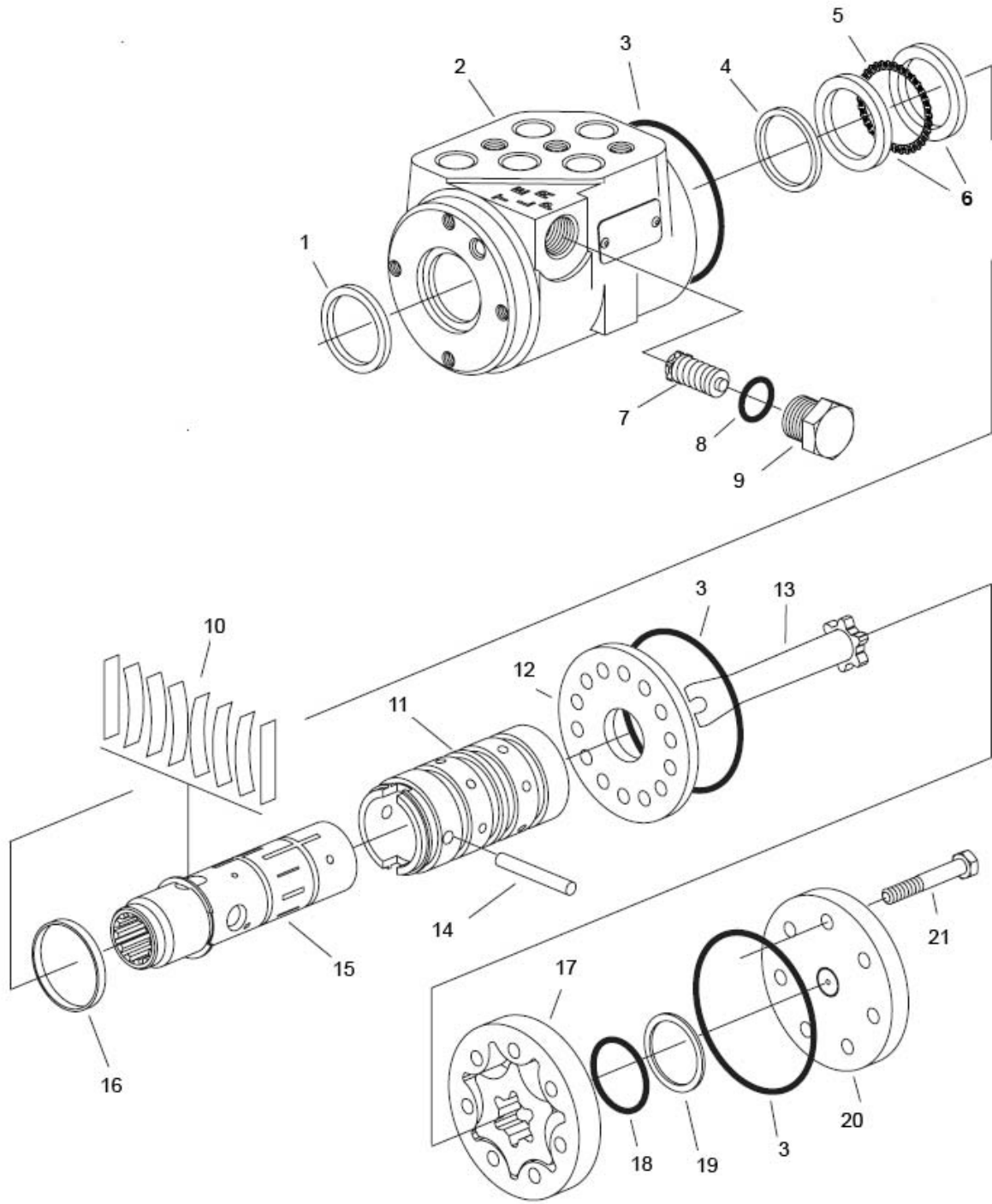


## PARK BRAKE AND REAR AXLE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	60-106	Park Brake Lever Kit	1
2	11-100	Linkage Yoke $\frac{5}{16}$ "	6
	HN-516-24	Nut $\frac{5}{16}$ - 24	6
3	15-722	Seat Frame	1
4	60-347	Brake Cable	1
5	15-691	Brake Relay	1
6	34-021	Short Rod	2
	HN-516-24	Nut $\frac{5}{16}$ -24	4
7	10-154	Rear Fender Bracket	4
8	HCP-516-100	Clevis Pin $\frac{5}{16}$ x 1	5
	HP-18-075	Cotter Pin $\frac{1}{8}$ x $\frac{3}{4}$	5
9	76-241	Right Caliper CW	1
	34-101-02	Pad Kit	1
10	76-239	Brake Disc 5-hole	2
11	76-238	Wheel Motor	2
	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	4
12	HB-12-13-800	Bolt $\frac{1}{2}$ - 13 x 8	4
	HNFL-12-13	Flange Lock Nut $\frac{1}{2}$ - 13	4
13	HB-12-13-750	Bolt $\frac{1}{2}$ - 13 x $7\frac{1}{2}$	4
	HNFL-12-13	Flange Lock Nut $\frac{1}{2}$ -13	4
14	15-681	Hydraulic Hose	4
15	34-057	Tee	2
16	15-700	Rear Axle	1
17	HBFL-516-18-075	Flange Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	8
	HNFL-516 - 18	Flange Nut $\frac{5}{16}$ - 18	8
18	HWK-516-100	Woodruff Key $\frac{5}{16}$ x 1 (comes with wheel motor)	2
19	60-268	Lug Bolt $\frac{1}{2}$ - 20 x $1\frac{5}{16}$	10
20	14-265	Lug Nut (comes with wheel motor)	2
21	34-122	Short Elbow	4
22	76-240	Left Caliper CCW	1
	34-101-02	Pad Kit	1

# 15-301 ORBITROL DRAWING

Parts



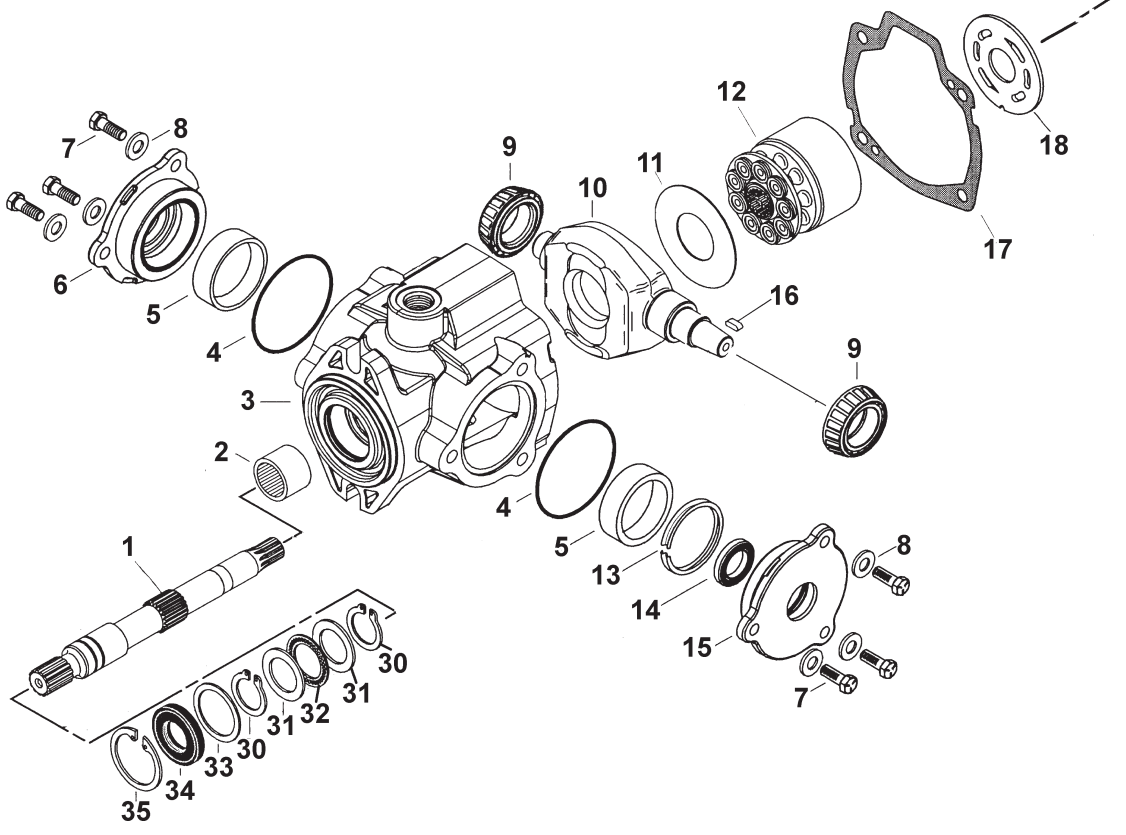
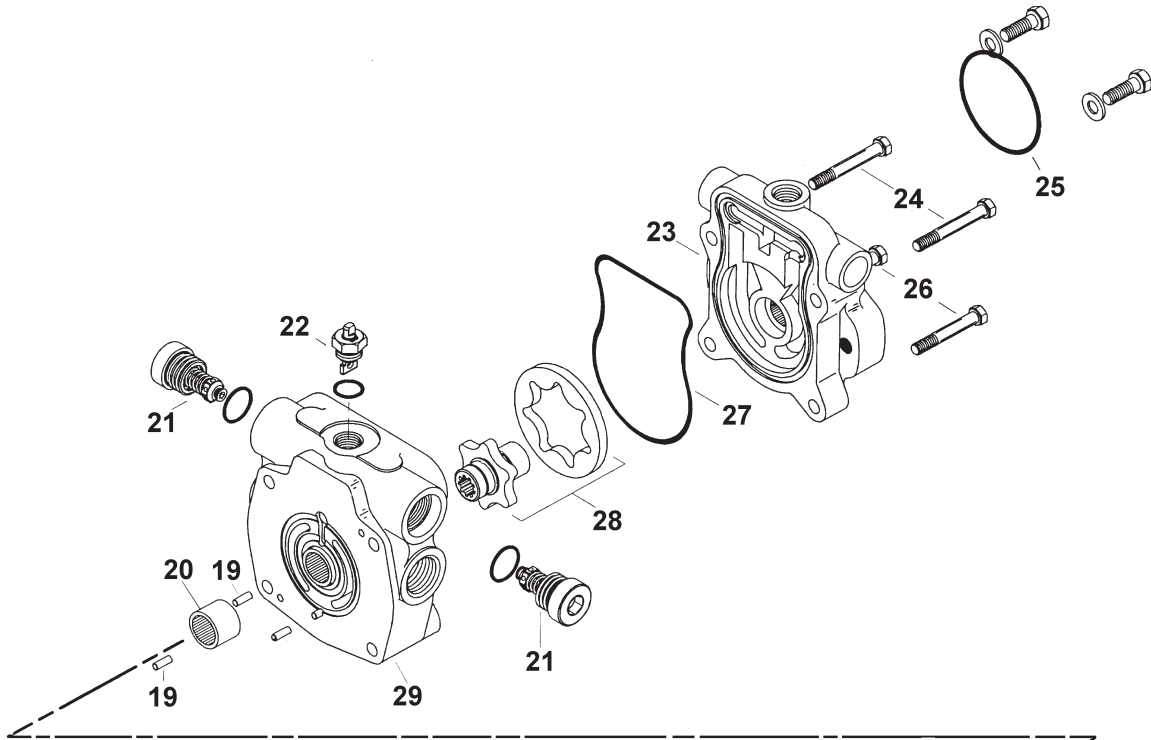
## 15-301 ORBITROL PARTS LIST

REF #	PART #	DESCRIPTION	QUANTITY
1	10-576-04	Dust Seal	1
2		Housing	1
3**		O-Ring Seal	3
4**		Quad Seal	1
5	10-576-03	Thrust Bearing	1
6	10-576-02	Bearing Race	2
7		Manual Steering Relief Valve	1
8**		O-ring	1
9		Plug	1
10‡		Standard Torque Centering Springs	1
11		Sleeve	1
12	15-301-06	Wear Plate	1
13	10-576-01	Drive	1
14	15-301-08	Drive Pin	1
15		Spool	1
16‡		Spring Retaining Ring	1
17	10-576-05	Gerotor	1
18**		O-Ring	1
19**		Seal Ring	1
20	15-301-03	End Cap	1
21	10-576-06	Cap Screw	7
**	15-301-01	Seal Kit	1
‡	15-301-15	Centering Spring Kit	1

### 15-301 ORBITROL SPECIFICATIONS

Inlet Relief Valve Setting	1020 psi (70 bar)
Nominal Flow	3 gpm (11 lpm)
Displacement	4.50 cu. in/ R (73.8 cu cm/R)
Check Valve for Manual Steering	Yes
Inlet Pressure Rating	2030 psi (140 bar)
Return Pressure Rating	145 psi (10 bar) Maximum
Fluid	SAE 10W-40 API Service SJ or higher Motor Oil
Ports	9/16 - 18 SAE O-Ring 4 Ports

# 77-239 EATON HYDROSTATIC PUMP DRAWING (DIESEL)



Parts

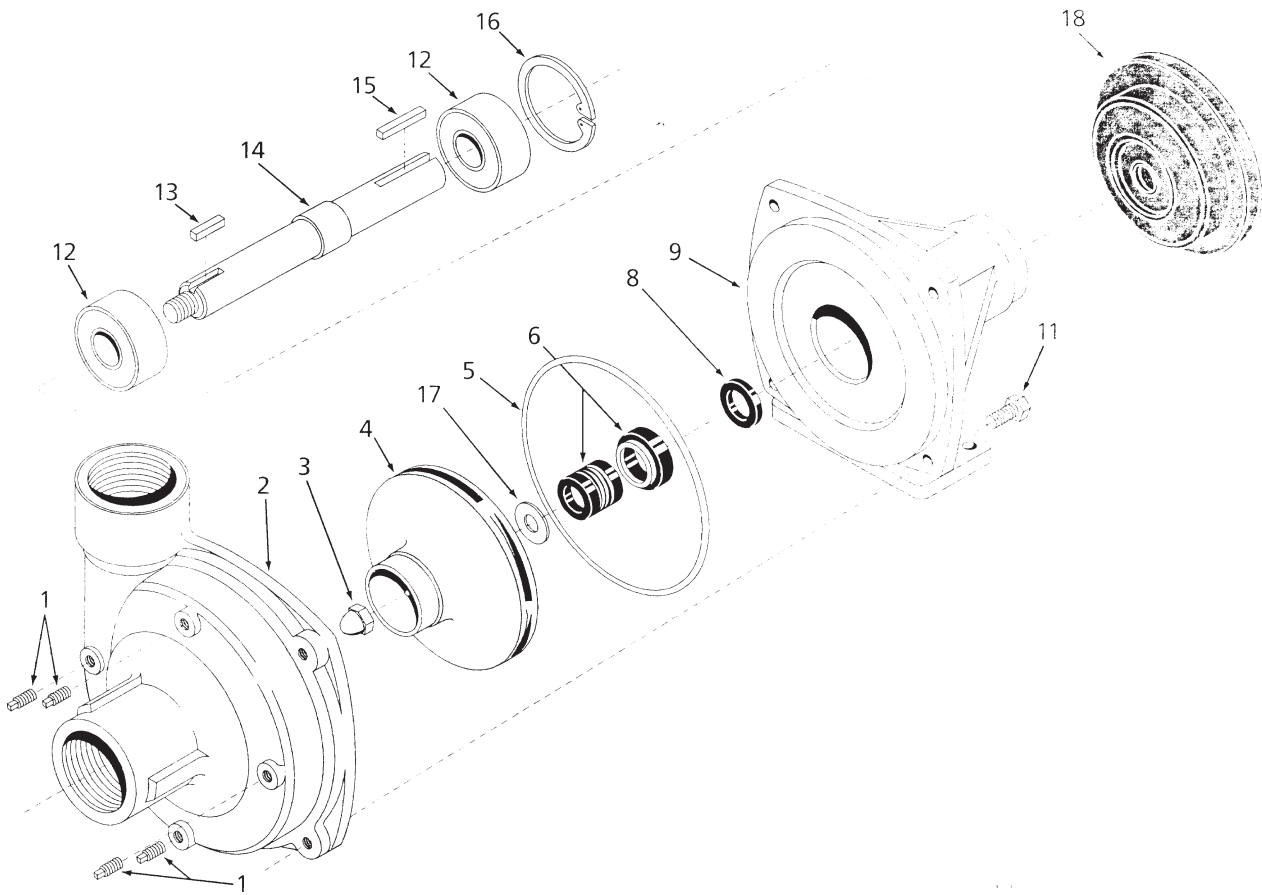


## 77-239 EATON HYDROSTATIC PUMP PARTS LIST (DIESEL)

REF#	PART#	DESCRIPTION	QUANTITY
1	60-343-52	Drive Shaft (splined)	1
2	60-343-08	Needle Bearing (with housing)	1
3	77-239-01	Housing	1
4	77-239-02	O-Ring	1
5	77-239-03	Thrust Bearing	2
6	77-239-04	Trunnion Cover	1
7	77-239-05	Pan Head Screw	2
8	77-239-06	Washer	6
9	77-239-07	Cone Bearing	2
10	77-239-08	Cam Plate	1
11	77-239-09	Swash Plate Insert	1
12	60-343-21	Rotating Kit	1
13	77-239-10	Crush Ring	1
14*	60-343-12	Shaft Seal	1
15	77-239-11	Seal Cover	1
16	77-239-12	Key	1
17*	77-239-13	Gasket	1
18	77-239-14	Back Plate	1
19	33-058-27	Dowel Pin	2
20	60-343-23	Bearing	1
21	77-239-15	Relief Valve (4000 psi)	2
22	77-239-16	Tow Valve Assembly	1
23	76-160	Charge Pump Adaptor	1
24	77-239-17	Cap Screw	2
25*	77-130	O-Ring (mounting kit)	1
26	77-239-18	Cap Screw	2
27*	77-239-19	O-Ring	1
28	60-343-43	Gerotor and Coupler	1
29	77-239-20	Endcover Assembly	1
30*	77-239-21	Retaining Ring	2
31	60-343-05	Bearing Race	1
32	60-343-06	Thrust Bearing	1
33	60-343-03	Washer	2
34*	60-343-02	Shaft Seal	1
35*	60-343-01	Retaining Ring	1

\* 77-239-22 Seal Kit

# 16-998 HYPRO PUMP DRAWING



Parts

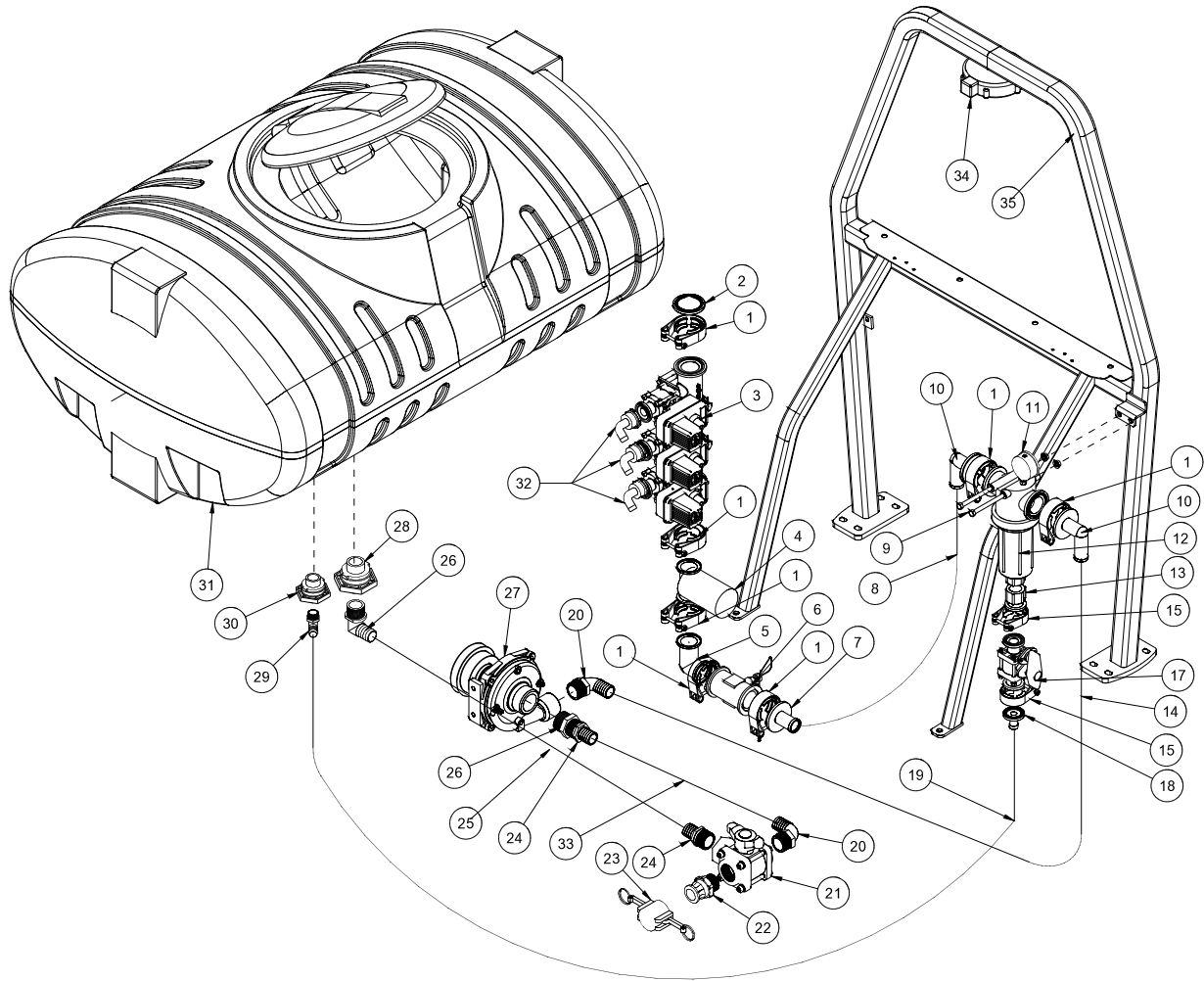
## 16-998 HYPRO® PUMP PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-998-01	Drain Plug	4
2	16-998-02	Pump Casing	1
3	16-998-03	Impeller Nut	1
4	16-966-16	Impeller	1
5*	16-998-04	O-Ring	1
6*	16-998-05	Mechanical Seal (Silicon Carbide)	1
8*	16-966-06	Slinger Ring	1
9	16-998-06	Mounting Flange	1
11	16-998-07	Bolt	4
12	16-966-10	Ball Bearing	2
13	16-998-08	Key	1
14	16-998-09	Pump Shaft	1
15	16-822-20	Key	1
16	16-966-13	Bearing Retainer	1
17*	16-998-10	Gasket	1
18	16-994-01	Clutch	1
*	16-967	Silicone - Carbon Seal Kit	

**NOTE:**

When servicing the spray pump or filter, all control valves must be shut off if there is liquid in the tank.

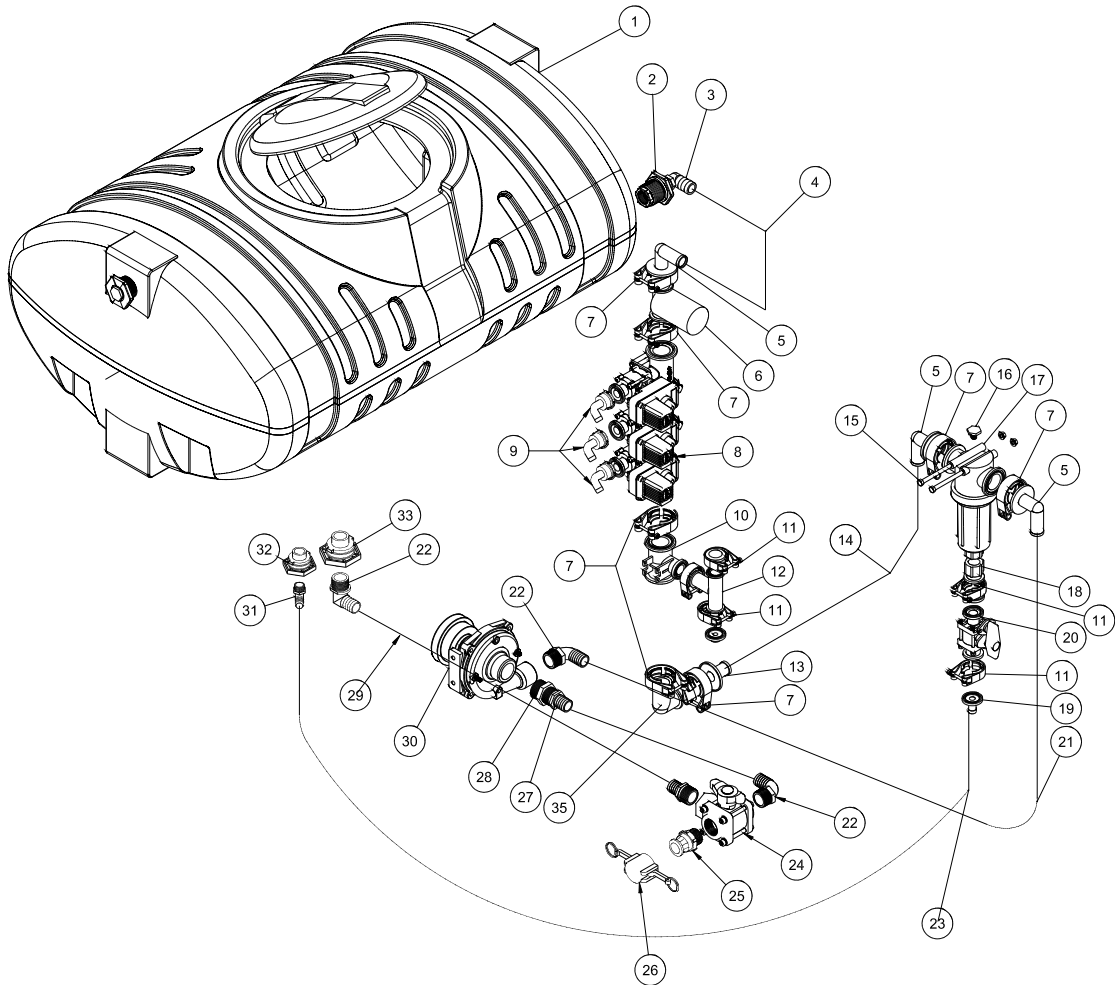
# 1752D PLUMBING DRAWING (RAVEN 440)



## 1752D PLUMBING PARTS LIST (RAVEN 440)

REF#	PART#	DESCRIPTION	QUANTITY
1	15-741	75 Series Clamp	7
2	15-742	#75 Inlet Cover	1
3	15-743	Manifold Ball Valve	1
4	16-524	Motorized Control Valve	1
5	15-734	#75 Elbow Coupling	1
6	18-373	Flow Meter	1
7	15-744	#75 Hose Barb	1
8	8897-56	1 <sup>1</sup> / <sub>4</sub> Discharge Hose 56"	1
	18-116	Hose Clamp	2
9	HB-38-16-500	Bolt <sup>3</sup> / <sub>8</sub> - 16 x 5	2
	HNFL-38-16	Flange Nut <sup>5</sup> / <sub>16</sub> - 18	2
10	15-739	#75 90° Hose Barb	2
11	16-281	Liquid Filled Gauge	1
12	15-737	Flanged Strainer	1
13	15-735	#50 x 1" FPT Fitting	1
14	8897-67	1 <sup>1</sup> / <sub>4</sub> Discharge Hose 67"	1
	18-116	Hose Clamp	2
15	15-740	50 Series Clamp	2
17	15-738	Flanged Ball Valve	1
18	15-808	Flange Hose Barb, Straight	1
19	8896-55	1 Suction Hose 55"	1
	18-116	Hose Clamp	1
	18-040	Hose Clamp	1
20	16-156	Elbow	3
21	18-372	3-Way Valve	1
	18-372-01	T-Handle	1
22	16-180	Quick Coupler Male	1
23	16-935	Quick Coupler Cap	1
24	16-161	Fitting	2
25	8897-38	1 <sup>1</sup> / <sub>4</sub> Discharge Hose 38"	1
	18-116	Hose Clamp	2
26	16-825	Hex Bushing	1
27	16-998	Pump	1
28	16-194	1 <sup>1</sup> / <sub>4</sub> Anti Vortex Fitting (comes with tank)	1
29	16-155	Elbow	1
30	16-150	1/2" Double Threaded Fitting (comes with tank)	1
31	14-451	Spray tank	1
32	15-553	3/4-90° Hose Barb	3
	8887-120	3/4" Orange PVC Hose x 120"	3
	18-040	Hose Clamp	3
33	8897-19	1 <sup>1</sup> / <sub>4</sub> Discharge Hose 19"	1
	18-116	Hose Clamp	2
34	10-408-01	Phoenix 10 GPS	1
35	15-762	ROPs	1
NS	15-818	#75 Fitting Oring	
	15-817	#50 Fitting Oring	

# 1754D PLUMBING DRAWING (RAVEN 203)

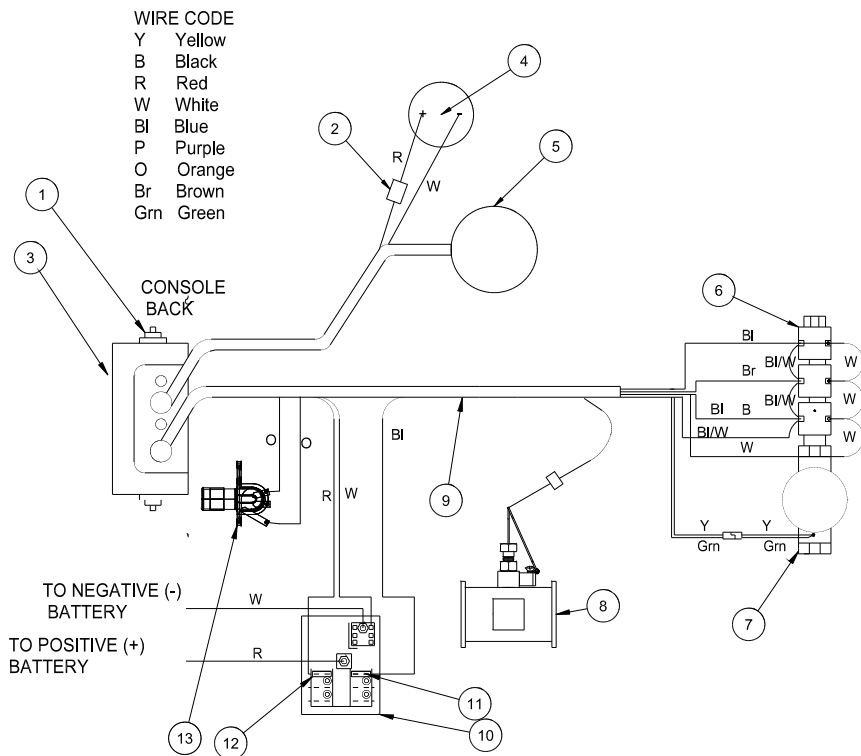


Accessories

## 1754D PLUMBING PARTS LIST (RAVEN 203)

REF#	PART#	DESCRIPTION	QUANTITY
1	14-451	Spray Tank	1
2	16-945	Double Thread Fitting (inside tank)	1
3	15-779	Hose Barb	1
4	8889-27	1 <sup>1</sup> / <sub>4</sub> Suction Hose 27"	1
	18-116	Hose Clamp	2
5	15-739	#75 90° Hose Barb	3
6	16-524	Motorized Control Valve	1
7	15-741	70 Series Clamp	7
8	15-743	Manifold Ball Valve	1
9	15-553	3 <sup>3</sup> / <sub>4</sub> -90° Hose Barb	3
	8887-120	3 <sup>3</sup> / <sub>4</sub> " Orange PVC Hose x 120"	3
	18-040	Hose Clamp	3
10	15-775	Reducer Tee	1
11	15-740	50 Series Clamp	6
12	15-776	#50 Tee	1
13	15-744	#75 Hose Barb	1
14	8897-60	1 <sup>1</sup> / <sub>4</sub> Discharge Hose 60"	1
	18-116	Hose Clamp	2
15	HB-38-16-500	Bolt 3 <sup>3</sup> / <sub>8</sub> - 16 x 5	2
	HNFL-38-16	Flange Nut 3 <sup>3</sup> / <sub>8</sub> - 16	2
16	15-780	Poly Hex Plug	1
17	15-737	Flanged Strainer	1
18	15-735	#50 1" FTP Fitting	1
19	15-808	Flanged Hose Barb Straight	1
20	15-738	Flanged Ball Valve	1
21	8897-70	1 <sup>1</sup> / <sub>4</sub> Discharge Hose 70"	1
	18-116	Hose Clamp	2
22	16-156	Elbow	3
23	8896-55	1" Suction Hose 55"	1
	18-116	Hose Clamp	1
	18-040	Hose Clamp	1
24	18-372	3-Way Valve	1
	18-372-01	T-Handle	1
25	16-180	Quick Coupler Male	1
26	16-935	Quick Coupler Cap	1
27	16-161	Fitting	2
28	16-825	Hex Bushing	1
29	8897-38	1 <sup>1</sup> / <sub>4</sub> Discharge Hose 38"	1
	18-116	Hose Clamp	2
30	16-998	Pump	1
31	16-155	Elbow	1
32	16-150	1 <sup>1</sup> / <sub>2</sub> " Double Threaded Fitting (comes with tank)	1
33	16-194	1 <sup>1</sup> / <sub>4</sub> Anti Vortex Fitting (comes with tank)	1
34	8897-19	1 <sup>1</sup> / <sub>4</sub> Discharge Hose 19"	1
	18-222	Hose Clamp	2
35	15-734	#75 Elbow Coupling	1
37	15-746	#50 90° Hose Barb	1
NS	15-818	#75 Fitting Oring	
	15-817	#50 Fitting Oring	

# CONTROLS 1752D SYSTEM (RAVEN 440)



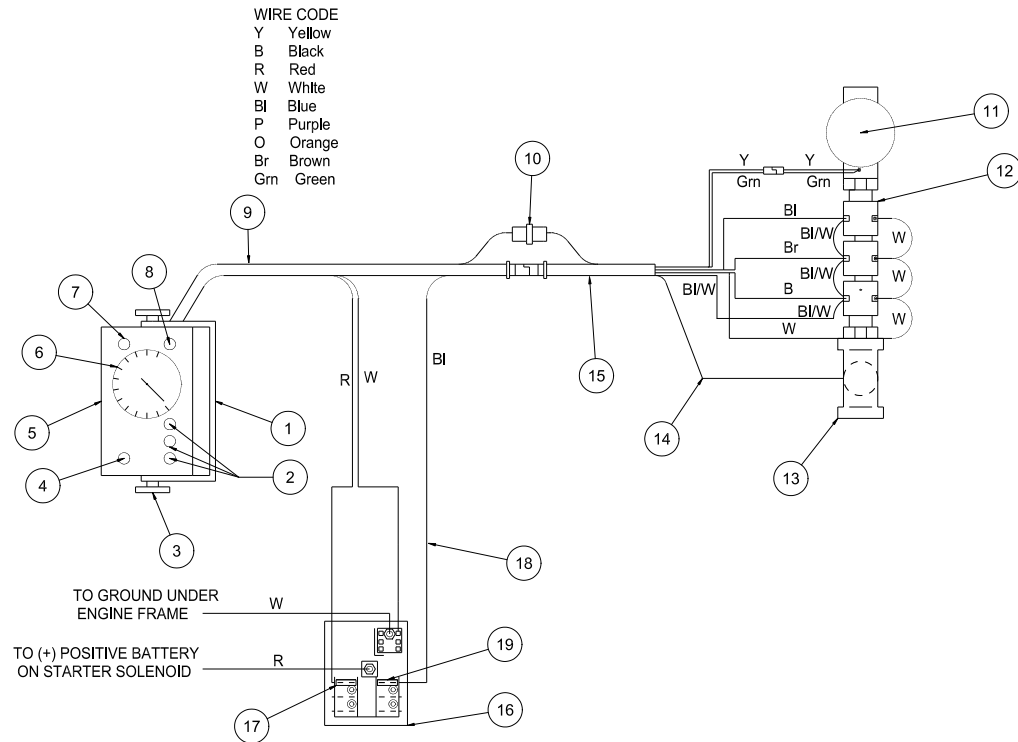
REF#	PART#	DESCRIPTION	QUANTITY
1	16-558	Mounting Knob	2
2		5 Amp Fuse	1
3	16-525	Console (only)	1
	16-234	Console Cover	1
	10-237	Mount	1
4	10-202	Speedometer	1
5	10-408-01	Phoenix 10 GPS	1
6	15-743	Manifold Ball Valve	1
7	16-524	Motorized Control Valve	1
8	18-373	Flow Meter	1
9	15-369	Console Control Cable	1
10	33-271	Fuse Block	1
11	33-273	Auto Blade Type Fuse 30 amp	1
12	33-508	Auto Blade Type Fuse 15 amp	1
13	33-509	Master boom Switch	1
	15-758	Floor Plate	1

Accessories

Use Dielectric Grease On All Electrical Connections

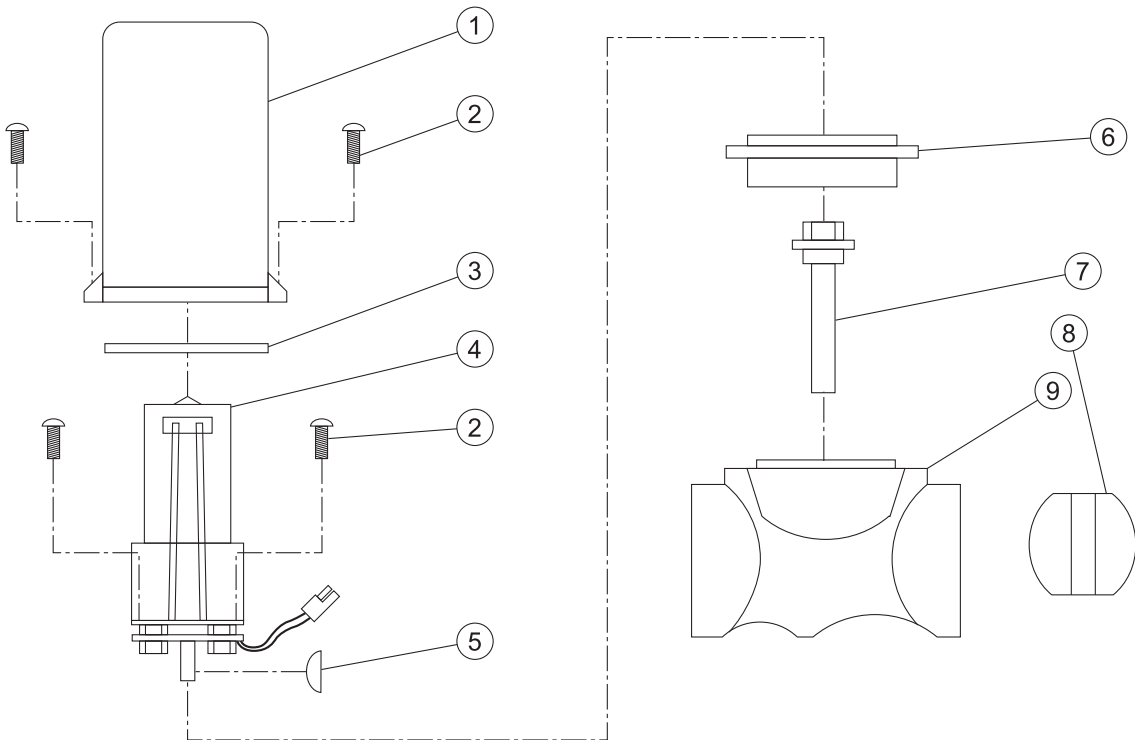


# CONTROLS 1754D SYSTEM (RAVEN 203)



REF#	PART#	DESCRIPTION	QUANTITY
1	16-958-01	Mounting Bracket	1
2	16-898	Boom Switch	3
3	16-900	Mounting Knob	2
4	16-899	Master Switch	1
5	18-418	Console with Liquid Filled Pressure Gauge	1
6	33-090-02	Liquid Filled Pressure Gauge	1
7	16-958-02	Fuse Holder	1
	16-525-03	Fuse 15 AMP	1
8	16-895	Pressure Switch	1
9	16-902	Cable Assembly 6ft Enclosure Hook-Up	1
10	16-958-05	Union Fitting	1
11	16-524	Motorized Control Valve	1
12	15-743	Manifold Valve	1
13	15-775	Tee	1
14	16-955	Tubing	1
15	16-902	Cable Assembly 72" Solenoid Hook-Up	1
16	33-271	Fuse Block	1
17	33-508	Auto Blade Type Fuse 15 amp	1
18	10-225	Wire Harness (fuse block to electric valve)	1
19	33-273	Auto Blade Type Fuse 30 Amp	1

# 16-524 MOTORIZED CONTROL VALVE DRAWING



REF#	PART#	DESCRIPTION	QUANTITY
1	16-870	Valve Cover	1
2*	16-524-01	#6 Self Tapping Screw 3/4" Long	6
3	16-897	Seal Tetraseal	1
4	16-875	Motor Assembly	1
5*	16-957	Woodruff Key	1
6*	16-524-04	Isolation Flange Assembly	1
7*	16-524-02	Coupler Shaft	1
8*	16-956	Butterfly	1
9*	16-524-03	Valve Body Assembly	1
*	16-524-05	1" Valve ISO-Body Kit	

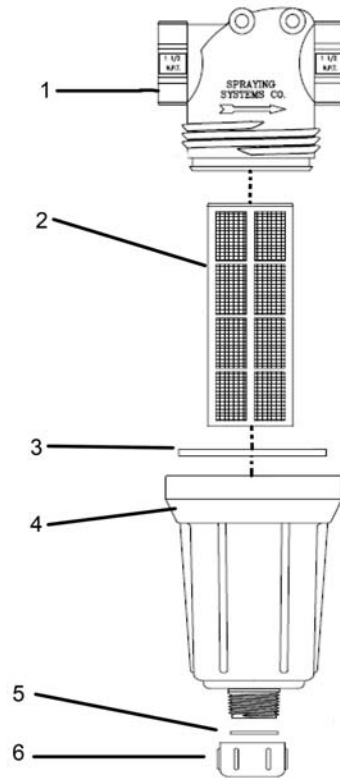
## WHEN SERVICING VALVE:

Replace valve body with ISO-Body Kit if valve has been leaking internally.

Replace motor assembly if the motor will not run or if the printed circuit board is corroded.

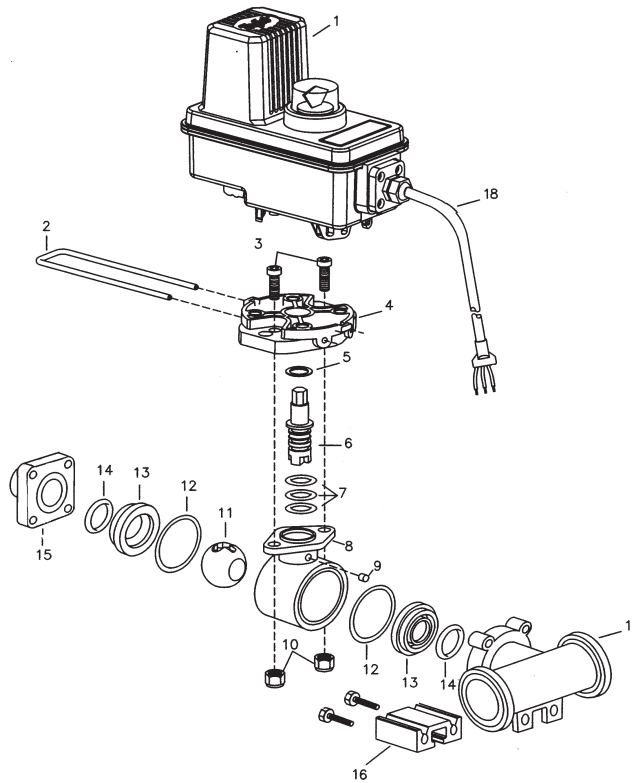
Before reassembling valve, remove the coupler shaft from the valve body. Apply Loctite to coupler shaft and woodruff key. Place the coupler shaft (Ref 7) and the woodruff key (Ref 5) onto the motor shaft. Plug motor into the valve connector coming from Sprayer Control Console. Check that the motor rotates in both directions. Motor must stop when coupler CAM releases printed circuit board switch button.

When reassembling valve, grease both sealing surfaces of coupler shaft. Insert coupler shaft into Iso-flange and be sure seal properly seats on shaft. Install on valve body and apply RTV 738 to mounting holes. Reassemble remaining items as shown in parts diagram on opposite side.



REF#	PART#	DESCRIPTION	QUANTITY
1	15-737-01	Strainer Head 75 Series	1
2	16-968-03	50 Mesh Strainer	1
3	14-521-02	EPDM Gasket	1
4	14-521-03	Bowl 1" NPT	1
5	14-521-04	EPDM Rubber gasket	1
6	14-521-05	Cap	1

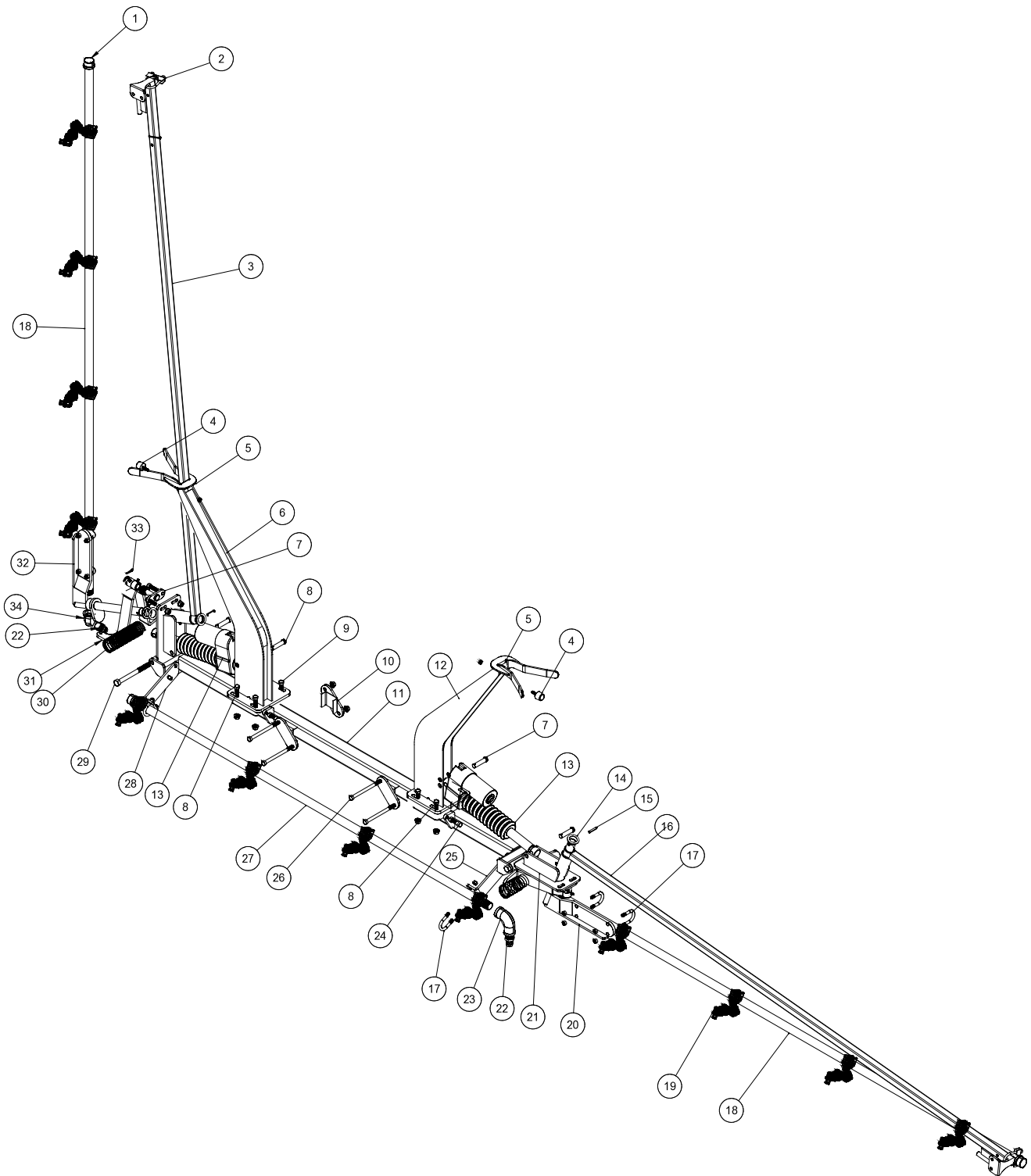
# 15-743 MSANIFOLD VALVE DRAWING



REF#	PART#	DESCRIPTION	QUANTITY
1	15-552-23	Motor	
2	15-552-24	Retaining Clip	1
3	15-552-25	Socket Head Cap Screw, Stainless Steel	2
4	15-552-26	Motor Adapter, Polypropylene	1
5*	15-517-11	Thrust Washer, Teflon	1
6	15-552-27	Stem, Stainless Steel	1
7*	15-552-05	O-ring, Viton	3
8	15-517-16	Body, Nylon	1
9*	15-517-17	Dust Plug, Felt	1
10		Lock Nut, Stainless Steel	2
11	15-743-04	Ball, Polypropylene	1
12*	15-552-13	Gasket, Viton	2
13*	15-517-19	Seal, teflon	2
14*	15-517-20	O-ring, Viton	2
15	15-743-01	End Cap	1
16	15-743-03	Mounting Rail aluminum	1
17	15-743-02	#75 Tee Body	1
*	15-552-10	Spare Parts Kit (includes all * items)	



# 17-503 20' SPRAY BOOM DRAWING



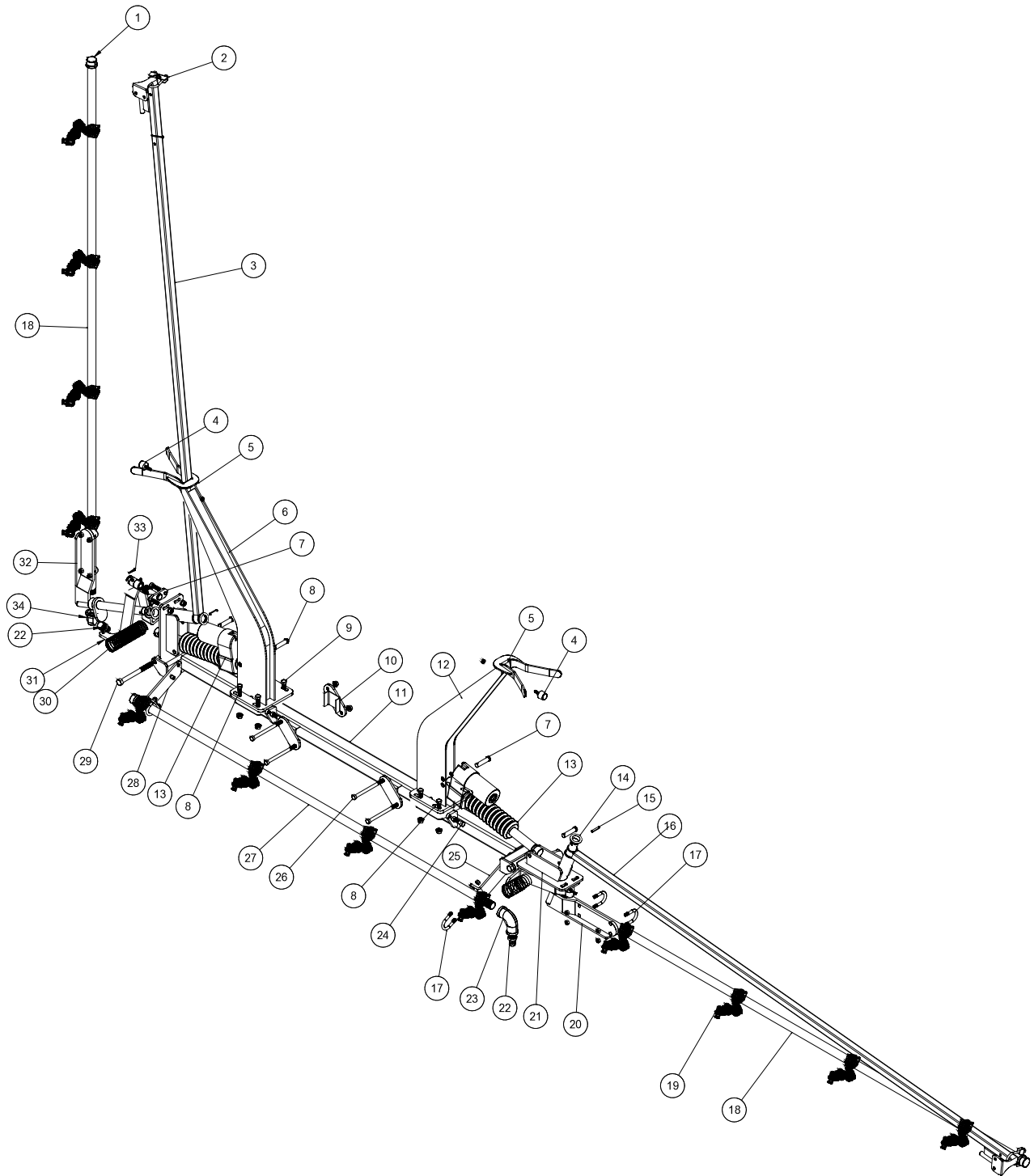
Accessories

## 17-503 20' SPRAY BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-926	Stainless Steel Cap <sup>3</sup> / <sub>4</sub>	3
2	13-498	U-Bolt Kit 1 <sup>1</sup> / <sub>8</sub>	2
3	33-333	Left Brush Guard	1
4	15-013	Rubber Bumper	2
	HNFL-14-20	Flange Lock Nut <sup>1</sup> / <sub>4</sub> - 20	2
5	10-418	Grip Pad	4
6	10-416	LH Boom Holder	1
7	15-810	Pivot	2
	HMB-58-14	Machine Bushing <sup>5</sup> / <sub>8</sub> - 14	8
	HBS-38-16-125	Stainless Steel Bolt <sup>3</sup> / <sub>8</sub> - 16 x 1 <sup>1</sup> / <sub>4</sub>	4
	HWS-38	Stainless Steel Washer <sup>3</sup> / <sub>8</sub>	4
	HNTL-38-16	Lock Nut <sup>3</sup> / <sub>8</sub> - 16	4
8	HCPS-12-225	Stainless Steel Clevis Pin <sup>1</sup> / <sub>2</sub> x 2 <sup>1</sup> / <sub>4</sub>	4
	HPS-18-100	Stainless Steel Cotter Pin <sup>1</sup> / <sub>8</sub> x 1	4
9	HB-38-16-225	Bolt <sup>3</sup> / <sub>8</sub> - 16 x 2 <sup>1</sup> / <sub>4</sub>	8
	HNTL-38-16	Lock Nut <sup>3</sup> / <sub>8</sub> - 16	8
10	16-761	Boom Brackets	4
11	17-512	Center Mount	1
12	10-415	RH Boom Holder	1
13	11-180	Right-hand Linear Actuator with 4" Stroke	1
14	HMB-100-14	Machine Bushing 1 x 14GA	4
15	HRPS-14-150	Stainless Steel Roll Pin <sup>1</sup> / <sub>4</sub> x 1 <sup>1</sup> / <sub>2</sub>	4
16	33-332	Right Brush Guard	1
17	16-024	U-Bolt <sup>5</sup> / <sub>16</sub> - 24	6
	HWLS-516	Stainless Steel Lockwasher <sup>5</sup> / <sub>16</sub>	12
	HNS-516-24	Stainless Steel Nut <sup>5</sup> / <sub>16</sub> - 24	12
18	16-928	Right and Left Tube	2
19	16-996	Nozzle Bodies	12
20	33-301	Right Pivot Bracket	1
21	15-813	Pivot Bracket	2
	15-494	Nylon Flange Bushing (part of 15-813)	4
	18-036	Oilite Bushing (part of 15-813)	4
	HSSQS-38-16-150	Stainless Steel Set Screw <sup>3</sup> / <sub>8</sub> - 16 x 1 <sup>1</sup> / <sub>2</sub>	2
	HN-38-16	Nut <sup>3</sup> / <sub>8</sub> - 16	2
22	18-249	Barb Fitting	3
23	16-925	Stainless Steel Pipe Elbow <sup>3</sup> / <sub>4</sub> x 90°	1
24	HSSQS-38-16-150	Stainless Steel Set Screw <sup>3</sup> / <sub>8</sub> - 16 x 1 <sup>1</sup> / <sub>2</sub> (part of 17-512)	2
	HN-38-16	Nut <sup>3</sup> / <sub>8</sub> - 16 (part of 17-512)	2
25	33-308	Right Center Tube Bracket	1
	HBS-38-16-125	Stainless Steel Bolt <sup>3</sup> / <sub>8</sub> - 16 x 1 <sup>1</sup> / <sub>4</sub>	2
	HWS-38	Stainless Steel Washer <sup>3</sup> / <sub>8</sub>	2
	HNTL-38-16	Lock Nut <sup>3</sup> / <sub>8</sub> - 16	2
26	HBS-38-16-550	Stainless Steel Bolt <sup>3</sup> / <sub>8</sub> - 16 x 5 <sup>1</sup> / <sub>2</sub>	4
	HNTL-38-16	Lock Nut <sup>3</sup> / <sub>8</sub> - 16	4
27	17-511	Center Tube	1
28	33-309	Left Center Tube Bracket	1
	HBS-38-16-125	Stainless Steel Bolt <sup>3</sup> / <sub>8</sub> - 16 x 1 <sup>1</sup> / <sub>4</sub>	2
	HWS-38	Stainless Steel Washer <sup>3</sup> / <sub>8</sub>	2
	HNTL-38-16	Lock Nut <sup>3</sup> / <sub>8</sub> - 16	2

(Continued on next page)

# 17-503 20' SPRAY BOOM DRAWING



Accessories

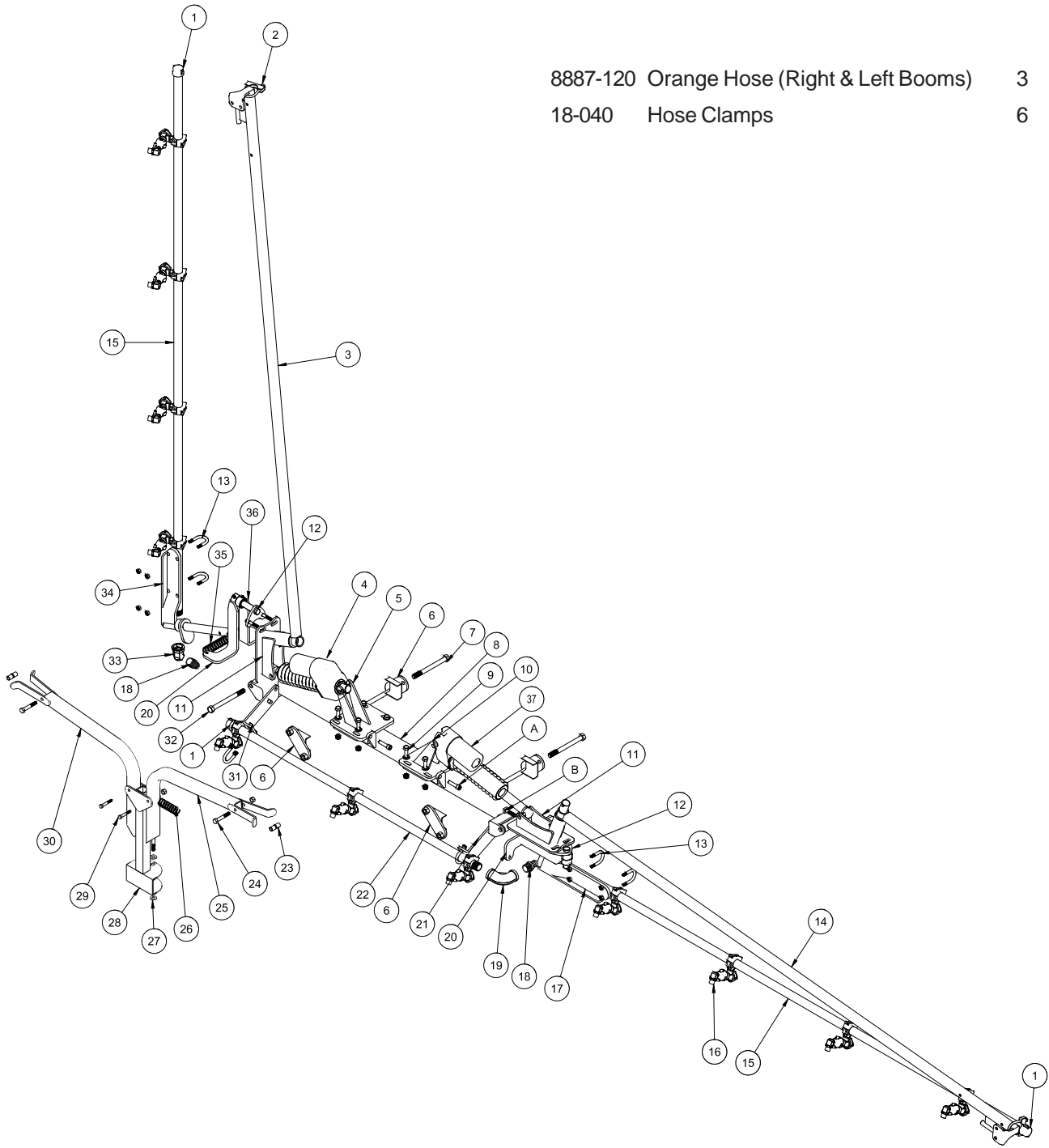


## 17-503 20' SPRAY BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
29	HBS-12-13-550	Stainless Steel Bolt $\frac{1}{2}$ - 13 x $5\frac{1}{2}$	2
	HNCL-12-13	Center Lock Nut $\frac{1}{2}$ - 13	2
30	15-495	Extension Spring	2
31	15-812	Right Cam Stop (must also order 15-811)	2
	15-811	Left Cam Stop (must also order 15-812)	2
	18-268	Oilite Bushing	2
	HMB-100-10	Machine Bushing 1 x 10GA	2
32	33-302	Left Pivot Bracket	1
33	HPS-18-100	Cotter Pin $\frac{3}{8}$ x 1	2
34	18-411	Stainless Steel Pipe Elbow $\frac{3}{4}$ x 45°	2
35	11-180	Right-hand Linear Actuator with 4" Stroke	1

# 15-493 STAINLESS STEEL 18' AUTO BOOM DRAWING

- 8887-120 Orange Hose (Right & Left Booms) 3
- 18-040 Hose Clamps 6



Accessories

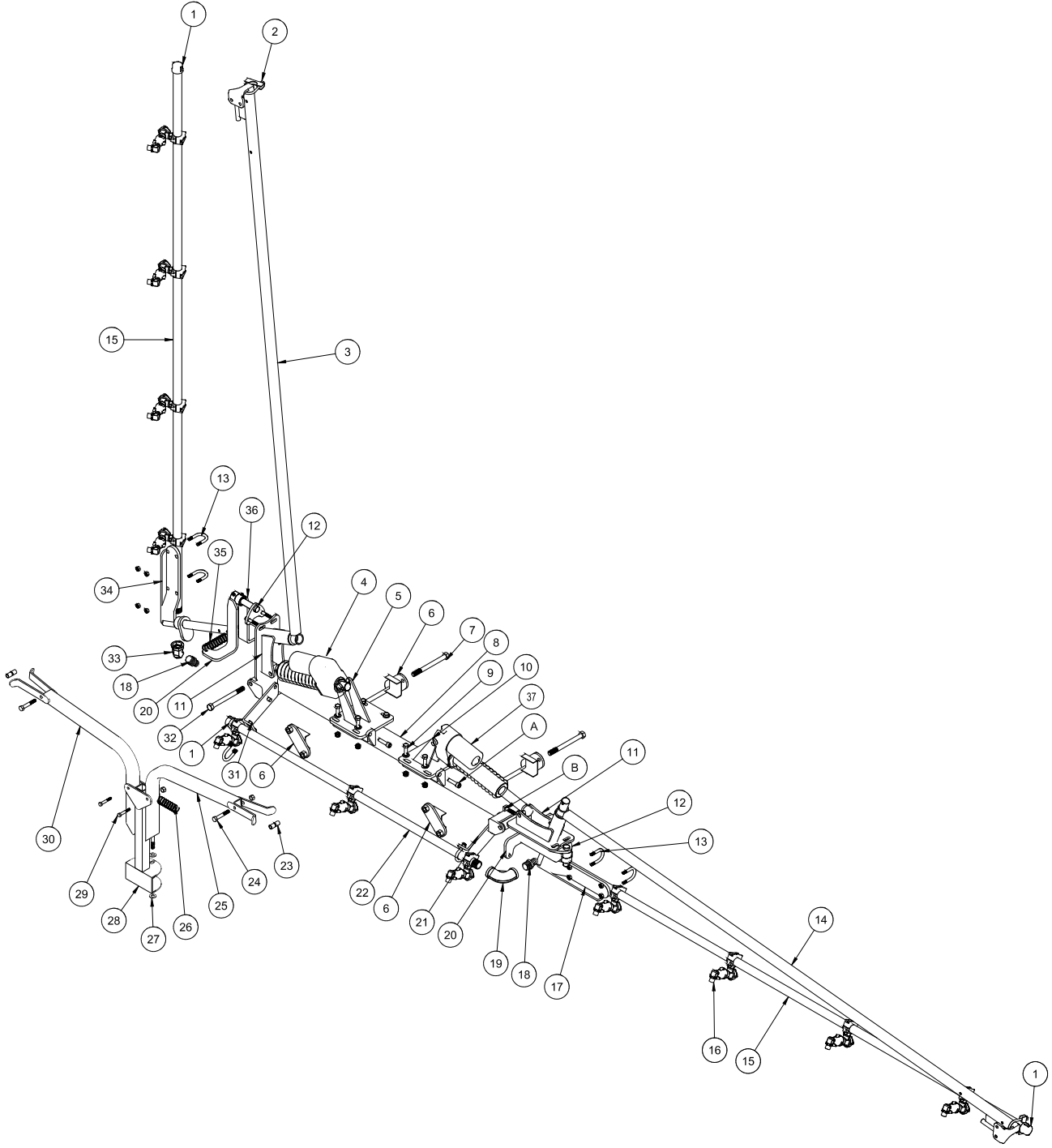
# 15-493 STAINLESS STEEL 18' AUTO BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-926	Stainless Steel Cap <sup>3</sup> / <sub>4</sub>	3
2	13-498	U-Bolt Kit 1 <sup>1</sup> / <sub>8</sub>	2
3	33-333	Left Brush Guard	1
4	11-180	Right-hand Linear Actuator with 4" Stroke	1
	HCPS-12-225	Stainless Steel Clevis Pin <sup>1</sup> / <sub>2</sub> x 2 <sup>1</sup> / <sub>4</sub>	2
	HPS-18-100	Stainless Steel Cotter Pin <sup>1</sup> / <sub>8</sub> x 1	2
5	33-331	Left Actuator Bracket	1
6	16-761	Boom Brackets	4
7	HBS-38-16-550	Stainless Steel Bolt <sup>3</sup> / <sub>8</sub> - 16 x 5 <sup>1</sup> / <sub>2</sub>	4
	HNTL-38-16	Lock Nut <sup>3</sup> / <sub>8</sub> - 16	4
8	33-329	Center Mount	1
9	HBS-38-16-125	Stainless Steel Bolt <sup>3</sup> / <sub>8</sub> - 16 x 1 <sup>1</sup> / <sub>4</sub>	8
	HWS-38	Stainless Steel Washer <sup>3</sup> / <sub>8</sub>	8
	HNTL-38-16	Lock Nut <sup>3</sup> / <sub>8</sub> - 16	8
10	33-330	Right Actuator Bracket	1
11	15-813	Pivot Bracket	2
	18-223	Flange Bushing (part of 15-813)	4
	18-036	Oilite Bushing (part of 15-813)	4
12	15-810	Pivot	2
	HMB-58-14	Machine Bushing <sup>5</sup> / <sub>8</sub> - 14	8
	HPS-18-100	Stainless Steel Cotter Pin <sup>1</sup> / <sub>8</sub> x 1	2
	HBS-38-16-125	Stainless Steel Bolt <sup>3</sup> / <sub>8</sub> - 16 x 1 <sup>1</sup> / <sub>4</sub>	4
	HWS-38	Stainless Steel Washer <sup>3</sup> / <sub>8</sub>	4
	HNTL-38-16	Lock Nut <sup>3</sup> / <sub>8</sub> - 16	4
13	16-024	U-Bolt <sup>5</sup> / <sub>16</sub> - 24	6
	HWLS-516	Stainless Steel Lockwasher <sup>5</sup> / <sub>16</sub>	12
	HNS-516-24	Stainless Steel Nut <sup>5</sup> / <sub>16</sub> - 24	12
14	33-332	Right Brush Guard	1
15	16-928	Right and Left Tube	1
16	16-966	Nozzle Bodies	11
17	33-301	Right Pivot Bracket	1
	HMB-100-14	Machine Bushing 1 x 14GA	2
	HMB-100-10	Machine Bushing 1 x 10GA	1
	HRPS-14-150	Stainless Steel Roll Pin <sup>1</sup> / <sub>4</sub> x 1 <sup>1</sup> / <sub>2</sub>	2
18	18-249	Barb Fitting	3
19	16-925	Stainless Steel Pipe Elbow <sup>3</sup> / <sub>4</sub> x 90°	1
20	15-812	Right Cam Stop (must also order 15-811)	2
21	33-308	Right Center Tube Bracket	1
	HBS-38-16-125	Stainless Steel Bolt <sup>3</sup> / <sub>8</sub> - 16 x 1 <sup>1</sup> / <sub>4</sub>	2
	HWS-38	Stainless Steel Washer <sup>3</sup> / <sub>8</sub>	2
	HNTL-38-16	Lock Nut <sup>3</sup> / <sub>8</sub> - 16	2
22	16-927	Center Tube	1
23	18-289	Bushing <sup>3</sup> / <sub>8</sub> ID - <sup>1</sup> / <sub>2</sub> OD x <sup>5</sup> / <sub>8</sub>	4
24	HB-38-16-225	Bolt <sup>3</sup> / <sub>8</sub> - 16 x 2 <sup>1</sup> / <sub>4</sub>	2
	HNTL-38-16	Lock Nut <sup>3</sup> / <sub>8</sub> - 16	2
25	10-247	Right Boom Stabilizer	1
	15-020	Hand Grip	2
26	21-212	Extension Spring	1
27	HB-38-16-300	Bolt <sup>3</sup> / <sub>8</sub> - 16 x 3	1
	HW-38	Washer <sup>3</sup> / <sub>8</sub>	2
	HNTL-38-16	Lock Nut <sup>3</sup> / <sub>8</sub> - 16	1
28	10-162	Boom Support	1
29	HB-516-18-225	Bolt <sup>5</sup> / <sub>16</sub> - 18 x 2 <sup>1</sup> / <sub>4</sub>	2
	HNTL-516-18	Lock Nut <sup>5</sup> / <sub>16</sub> - 18	2

(Continued on next page)



# 15-493 STAINLESS STEEL 18' AUTO BOOM DRAWING

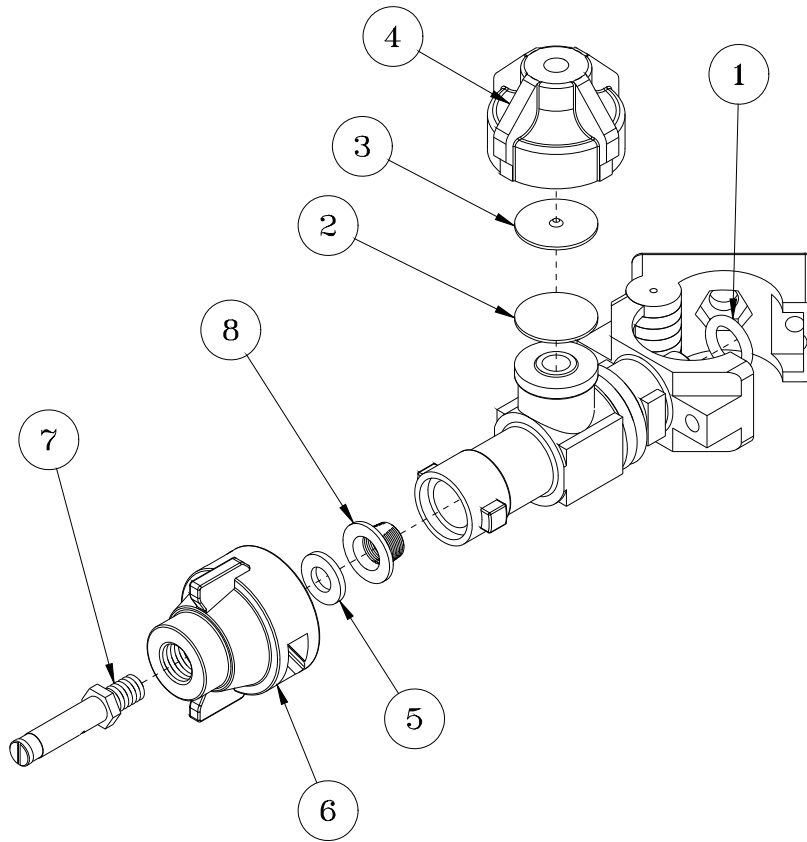


Accessories

## 15-493 STAINLESS STEEL 18' AUTO BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
30	10-246	Left Boom Stabilizer	1
	15-020	Hand Grip	2
31	33-309	Left Center Tube Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
32	HBS-12-13-550	Stainless Steel Bolt $\frac{1}{2}$ - 13 x $5\frac{1}{2}$	2
	HNCL-12-13	Center Lock Nut $\frac{1}{2}$ - 13	2
33	18-411	Stainless Steel Pipe Elbow $\frac{3}{4}$ x $45^\circ$	2
34	33-302	Left Pivot Bracket	1
	HMB-100-14	Machine Bushing 1 x 14GA	2
	HMB-100-10	Machine Bushing 1 x 10GA	1
	HRPS-14-150	Stainless Steel Roll Pin $\frac{1}{4}$ x $1\frac{1}{2}$	2
35	15-495	Extension Spring	2
36	15-811	Left Cam Stop (must also order 15-812)	2
	18-268	Oilite Bushing (part of 15-811)	2
37	11-158	Left-hand Linear Actuator with 4" Stroke	1
	HCPS-12-225	Stainless Steel Clevis Pin $\frac{1}{2}$ x $2\frac{1}{4}$	2
	HPS-18-100	Stainless Steel Cotter Pin $\frac{1}{8}$ x 1	2
A	HSSQS-38-16-150	Stainless Steel Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$ (part of 33-329)	2
	HN-38-16	Nut $\frac{3}{8}$ - 16 (part of 33-329)	2
B	HSSQS-38-16-150	Stainless Steel Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2

# NOZZLE ASSEMBLY DRAWING



## NOZZLE ASSEMBLY PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	16-920-03	O-Ring	1
2*	16-920-05	Diaphragm Teflon (Optional)	1
3*	16-920-06	Diaphragm EPDM Rubber (Standard)	1
4*	16-798	Chemsaver End Cap	1
5	16-800	Gasket Viton	1
6	16-921	Cap	1
7	15-588	Turbo Turf Jet Tip #8	1
8	16-802	Strainer	
	*	16-996	Body 1

**NOTE:**

When the 16-920-05 Teflon Diaphragm is used, it is placed in the assembly in front of the 16-920-06 EPDM Rubber Diaphragm. Nozzles are located 20" (51 cm) apart on the right, left, and center tubes. There are predrilled holes in all tubes. The Nozzle should be at a 45° angle to the ground for proper application.

**NOTE:**

For all 18' Booms: The eleven 16-996 bodies are installed on the boom sections. The eleven 16-800 viton gasket, 16-802 strainer, 15-588 Turbo Turf Jet Tip #8 and 16-921 cap are in the small parts bag.

## TURBO TURFJET TIPS

This is a wide-angle (110°), hollow-cone, drift-reduction nozzle. Replaces conventional flooding nozzles in broadcast applications.

### FEATURES:

- Color-coding makes it easy to match nozzle flow rates for easy identification.
- Color-coding is available in sizes 1/4 TTJ02-VS through 1/4 TTJ15-VS.
- Uniform spray distribution.
- A large orifice opening and passages minimize clogging.
- The Turbo TurfJet nozzle's patented design element, a secondary swirl chamber in the nozzle cap, alters the swirling action of the liquid so that the fewer driftable lines are discharged from the secondary orifice.
- Spraying Pressure 25-75 PSI (1.5-5 bar).

### NOZZLE TILT

Delavan's extensive research on spray patterns has proven that a tilt of about 45° for flood Nozzles or tips will significantly improve the spray pattern uniformity.

The nozzle tilt reduces the effect of boom height variation and allows the spray nozzle to maintain a more fully developed pattern even when the nozzle outlet is below the recommended height for the best spray pattern uniformity.

### RECOMMENDED OVERLAP AND NOZZLE HEIGHT

Adjust spray height in the field to overlap a minimum of 30% of each edge of pattern. Adjust nozzle height until this is achieved. If a decision to tilt the nozzle is made, do it before measuring the width of the spray on the ground and adjusting nozzle height. See example below.

### DRIFTABLE FINES PRODUCED

(0.5 gpm at 40 psi)

Nozzle (.5 gpm Output)	Percent of Spray Volume less than 200 microns
Turbo TurfJet	< 1%

## XR TEEJET TIPS

This is an extended range flat spray tip. It is excellent for Contact Pesticides and Growth Regulators and good for Systemic Pesticides.

**Contact Pesticides and Growth Regulators** - At medium pressures (20-30 psi) provides medium size droplets for good surface coverage and less drift. At higher pressures (30-60 psi) produces smaller droplets for better coverage. Wide angle 110° tips produce slightly smaller droplets than 80° tips at equal pressures.

**Systemic Pesticides** - At lower pressures (15-20 psi) produces larger spray droplets and reduces drift while still providing uniform coverage along the boom.

### FEATURES:

- Excellent spray distribution over a wide range of pressures (15-60 psi).
- Ideal for rigs equipped with sprayer controllers.
- Reduces drift at lower pressures, better coverage at higher pressures.
- Available in stainless steel and hardened stainless steel in 80° and 110° tip spray angles with VisiFlo color coding.

### RECOMMENDED OVERLAP

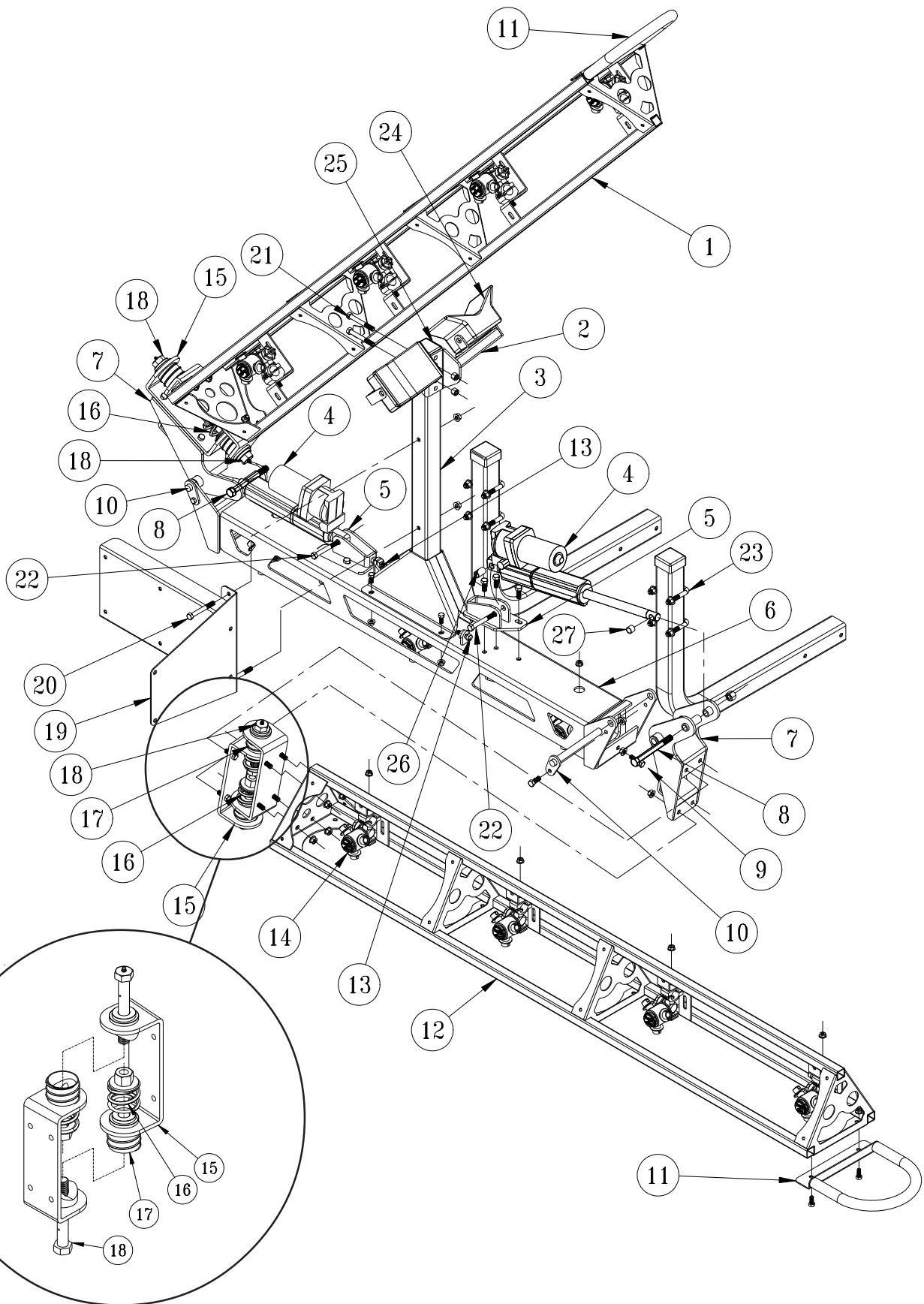
Adjust nozzle spray height to overlap 30% of each edge of pattern.

### NOZZLE HEIGHT

Suggested spray nozzle height with 20" spacing, tip spray angle of 80° should be 17-19", tip spray angle of 110° should be 12-14".



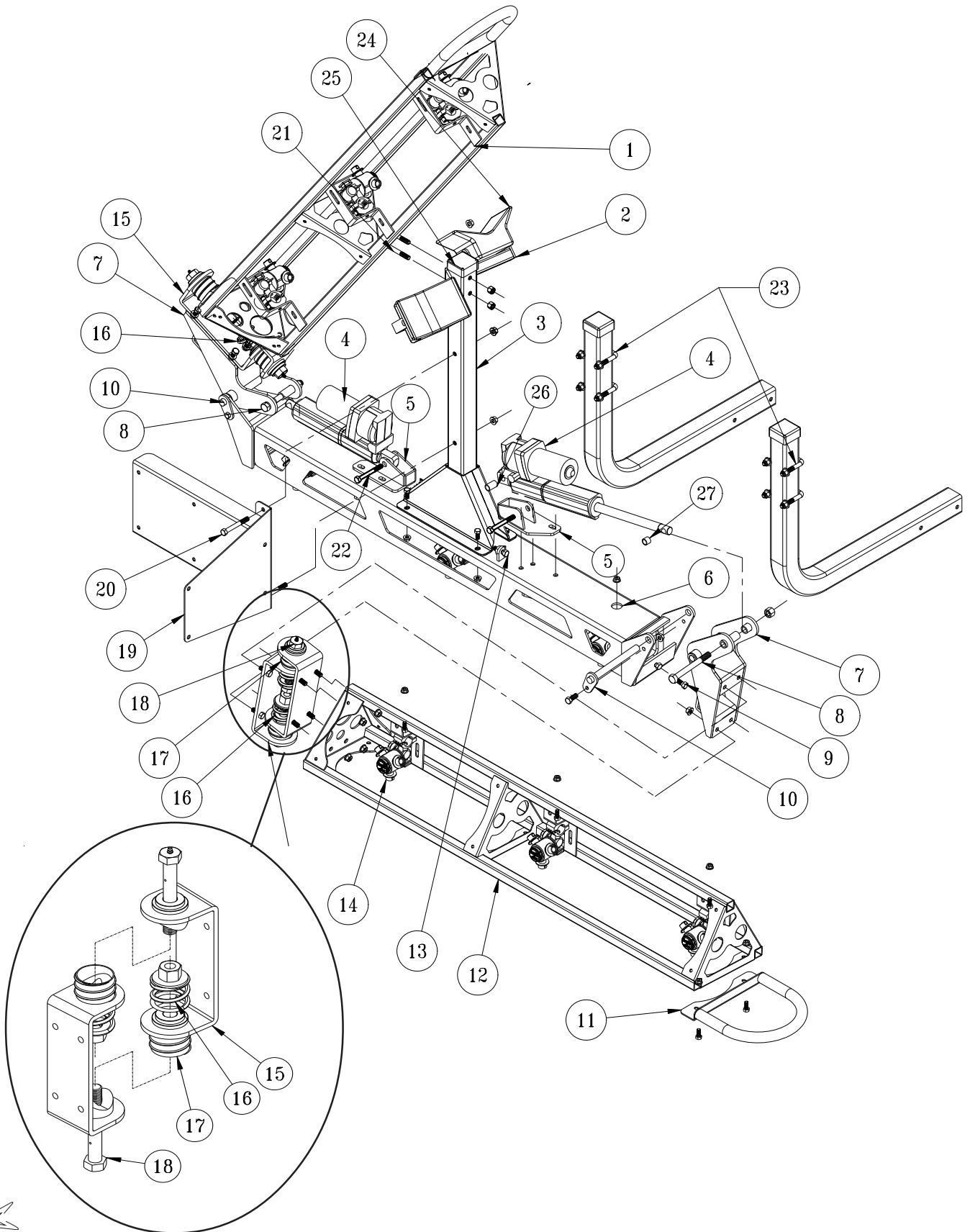
# 17-525 HEAVY BOOM





REF#	PART#	DESCRIPTION	QUANTITY
1	17-531	Left Boom Arm	1
2	17-544	Nest Plate	1
3	17-533	Boom Nest post	1
	HBFL-516-18-075	Bolt, $5/16$ - 18 x $3/4$	4
	HNFL-516-18	Flange Lock Nut, $5/16$ - 18	4
4	17-553	8" Elelctric Hydraulic Actuator	2
5	17-545	Ram Mount	2
	HB-38-16-100	Bolt, $3/8$ - 16 x 1	6
	HW-516	Washer, $5/16$	6
	HNFL-38-16	Flange Lock Nut, $3/8$ -16	6
6	17-528	Boom Center	1
7	17-529	Arm Pivot Hinge	2
8	HB-12-13-500	Bolt, $1/2$ - 13 x 5	2
	HNTL-12-13	Lock Nut, $1/2$ - 13	2
9	HB-38-16-250	Bolt, $3/8$ - 16 x $2^{1/2}$	2
	HNTL-38-16	Lock Nut, $3/8$ - 16	2
10	17-530	Hinge Pin	2
	HB-516-18-075	Bolt, $5/16$ - 18 x $3/4$	2
11	17-541	Boom End Guard	2
	HBFL-516-18-075	Bolt, $5/16$ - 18 x $3/4$	4
	HNFL-516-18	Flange Lock Nut, $5/16$ - 18	4
12	17-532	Right Boom Arm	1
13	HSSQS-38-16-150	Square Head Set SCrew , $3/8$ -16 x $1^{1/2}$	2
14	33-506	Body (see nozzle drawing)	11
	HB-516-18-075	Bolt, $5/16$ -18 x $3/4$	11
	HNFL-516-18	Flange Lock Nut, $5/16$ -18	11
15	17-527	Boom Hinge	4
	HB-38-16-100	Bolt, $3/8$ - 16 x 1	16
	HNFL-38-16	Lock Nut, $3/8$ - 16	16
16	17-539	Compression Spring	4
17	9026-2	Rubber Duct Hose x 2"	4
18	17-540	Tapped Bolt	4
	HW-34	Washer, $3/4$	4
	HNTL-34-10	Lock Nut, $3/4$ -10	4
	HG-14-28-180	Grease Fitting, $1/4$ - 28 x 180°	4
19	17-535	Clean Load Mount	1
20	HB-38-16-300	Bolt, $3/8$ - 16 x 3	2
	HNTL-38-16	Lock Nut, $3/8$ - 16	2
21	HB-38-16-300	Bolt, $3/8$ - 16 x 3	2
	HW-38	Washer, $3/8$	2
	HNTL-38-16	Lock Nut, $3/8$ - 16	2
22	HCP-12-200	Clevis Pin, $1/2$ - 2	2
	HHP-18	Bridge Pin, $1/8$	2
23	17-537	Square U-bolt with Nut	4
24	17-543	Y -bow Stop	2
	HB-12-13-500	Bolt, $1/2$ - 13 x 5	2
	HNTI-12-13	Lock Nut, $1/2$ - 13	2
25	16-557	Rubber Cap	1
26	18-234	1" Bushing (part of 17-553)	2
27	18-036	$1/2$ " Bushing (part of 17-553)	2

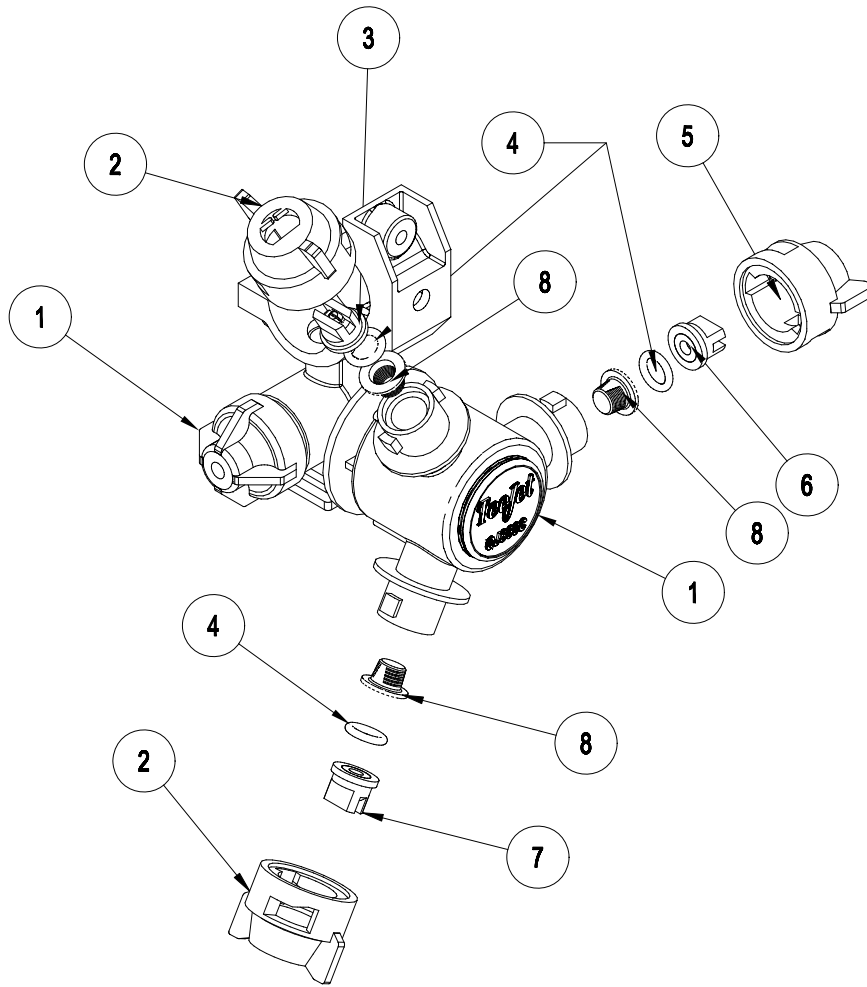
# 17-550 15' SMITHCO SUPER BOOM



Accessories

REF#	PART#	DESCRIPTION	QUANTITY
1	17-551	Left Boom Arm	1
2	17-544	Nest Plate	1
3	17-533	Boom Nest post	1
	HBFL-516-18-075	Bolt, <sup>5</sup> / <sub>16</sub> - 18 x <sup>3</sup> / <sub>4</sub>	4
	HNFL-516-18	Flange Lock Nut, <sup>5</sup> / <sub>16</sub> - 18	4
4	17-553	8" Electric Actuator	2
5	17-545	Actuator Mount	2
	HB-38-16-100	Bolt, <sup>3</sup> / <sub>8</sub> - 16 x 1	6
	HW-516	Washer, <sup>5</sup> / <sub>16</sub>	6
	HNFL-38-16	Flange Lock Nut, <sup>3</sup> / <sub>8</sub> -16	6
6	17-528	Boom Center	1
7	17-529	Arm Pivot Hinge	2
8	HB-12-13-500	Bolt, <sup>1</sup> / <sub>2</sub> - 13 x 5	2
	HNTL-12-13	Lock Nut, <sup>1</sup> / <sub>2</sub> - 13	2
9	HB-38-16-250	Bolt, <sup>3</sup> / <sub>8</sub> - 16 x 2 <sup>1</sup> / <sub>2</sub>	2
	HNFL-38-16	Flange Lock Nut, <sup>3</sup> / <sub>8</sub> -16	2
10	17-530	Hinge Pin	2
	HB-516-18-075	Bolt, <sup>5</sup> / <sub>16</sub> - 18 x <sup>3</sup> / <sub>4</sub>	2
11	17-541	Boom End Guard	2
	HBFL-516-18-075	Bolt, <sup>5</sup> / <sub>16</sub> - 18 x <sup>3</sup> / <sub>4</sub>	4
	HNFL-516-18	Flange Lock Nut, <sup>5</sup> / <sub>16</sub> - 18	4
12	17-552	Right Boom Arm	1
13	HSSQS-38-16-150	Square Head Set Screw , <sup>3</sup> / <sub>8</sub> -16 x 1 <sup>1</sup> / <sub>2</sub>	2
14	33-506	Body (see nozzle drawing)	9
	HB-516-18-075	Bolt, <sup>5</sup> / <sub>16</sub> -18 x <sup>3</sup> / <sub>4</sub>	9
	HNFL-516-18	Flange Lock Nut, <sup>5</sup> / <sub>16</sub> -18	9
15	17-527	Boom Hinge	4
	HB-38-16-100	Bolt, <sup>3</sup> / <sub>8</sub> - 16 x 1	16
	HNFL-38-16	Lock Nut, <sup>3</sup> / <sub>8</sub> - 16	16
16	17-539	Compression Spring	4
17	9026-2	Rubber Duct Hose x 2"	4
18	17-540	Tapped Bolt	4
	HW-34	Washer, <sup>3</sup> / <sub>4</sub>	4
	HNTL-34-10	Lock Nut, <sup>3</sup> / <sub>4</sub> -10	4
	HG-14-28-180	Grease Fitting, <sup>1</sup> / <sub>4</sub> - 28 x 180°	4
19	17-535	Clean Load Mount	1
20	HB-38-16-300	Bolt, <sup>3</sup> / <sub>8</sub> - 16 x 3	2
	HNTL-38-16	Lock Nut, <sup>3</sup> / <sub>8</sub> - 16	2
21	HB-38-16-300	Bolt, <sup>3</sup> / <sub>8</sub> - 16 x 3	2
	HW-38	Washer, <sup>3</sup> / <sub>8</sub>	2
	HNTL-38-16	Lock Nut, <sup>3</sup> / <sub>8</sub> - 16	2
22	HCP-12-200	Clevis Pin, <sup>1</sup> / <sub>2</sub> - 2	2
	HHP-18	Bridge Pin, <sup>1</sup> / <sub>8</sub>	2
23	17-537	Square U-bolt with Nut	4
24	17-543	Y -bow Stop	2
	HB-12-13-500	Bolt, <sup>1</sup> / <sub>2</sub> - 13 x 5	2
	HNTL-12-13	Lock Nut, <sup>1</sup> / <sub>2</sub> - 13	2
25	16-557	Square Rubber Cap	1
26	18-036	1" Bushing (part of 15-553)	2
27	18-234	<sup>1</sup> / <sub>2</sub> " Bushing (part of 15-553)	2

# TRIPLE NOZZLE ASSEMBLY DRAWING



REF#	PART#	DESCRIPTION	QUANTITY
1	33-506	Body	1
2	33-538	Cap - Gray	2
3	33-553	Nozzle -Gray (XR11006-VS)	1
4	16-800	Viton Gasket	3
5	33-537	Cap - Red	1
6	33-552	Nozzle - Red (XR11004-VS)	1
7	33-554	Nozzle - White (XR11008-VS)	1
8	16-802	Strainer	1

Quantity is per nozzle body. For 18' booms multiply quantity by 11.

Quantity is per nozzle body. For 15' booms multiply quantity by 9.

Nozzles are located 20" (51 cm) apart on the right, left, and center tubes. There are predrilled holes in all tubes. The Nozzle should be at a 45° angle to the ground for proper application.

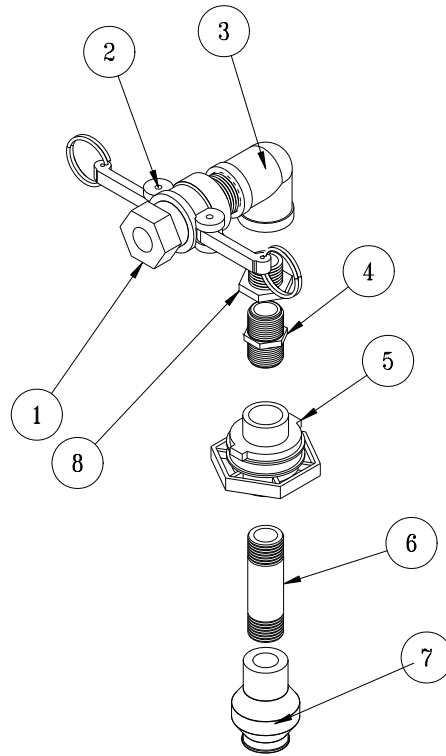
For re-ordering Nozzle Kits the following numbers apply

33-540 Triple Nozzle Kit for 18' Booms

33-541 Triple Nozzle Kit for 15' Booms



# 15-835 TANK RINSING SYSTEM



REF#PART#	DESCRIPTION	QUANTITY	
1	16-961	1" Adapter	1
2	16-962	1" Coupler	1
3	16-864	1" FTP Elbow	1
4	16-158	Close Nipple	1
5	16-150	Double Thread Fitting	1
6	16-172	4" Nipple	1
7	15-834	Tank Rinsing Nozzle	1
8	16-163	Reducer Bushing	1

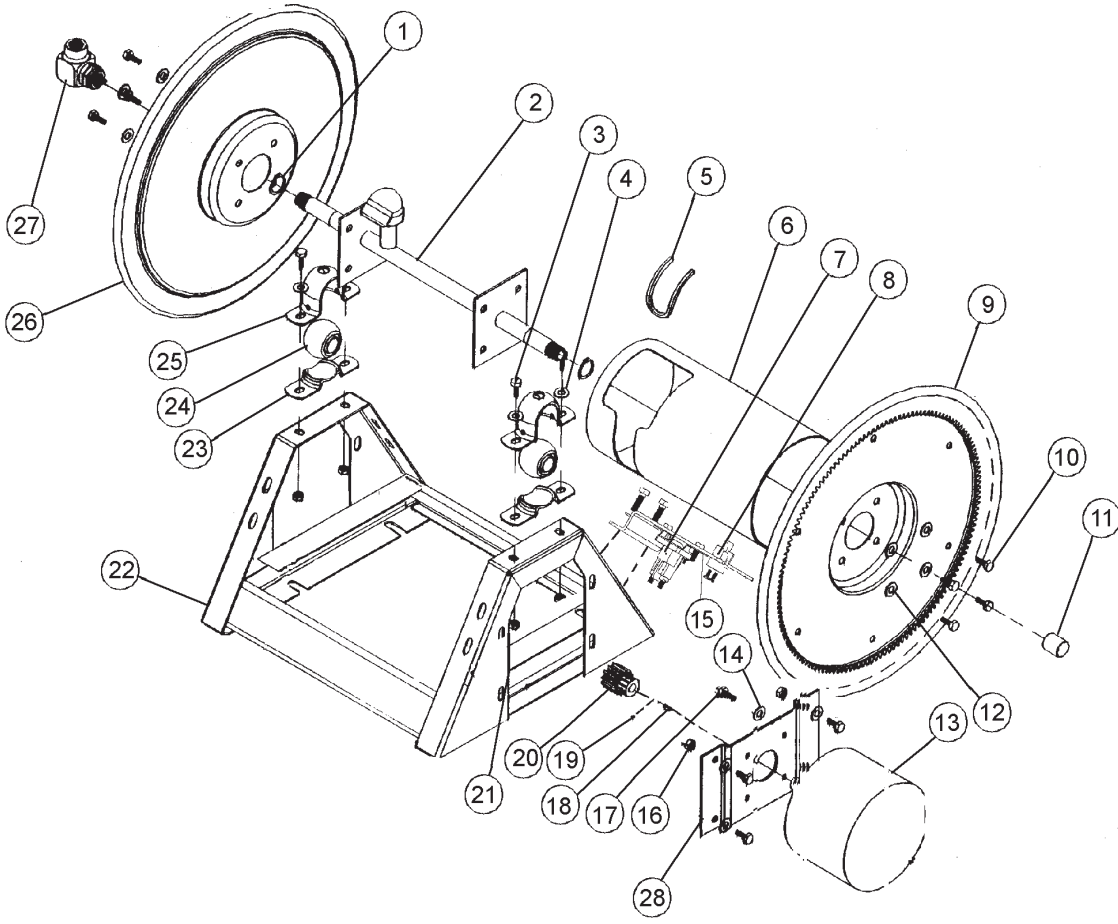
Drill 1-3/4" hole 5" from outside edge of cover.

Install Tank Rinsing kit as shown, with the Double Thread Fitting (Ref 5) going into the cover.

Basket Must be removed During Use.



# 16-906 ELECTRIC HOSE REEL DRAWING



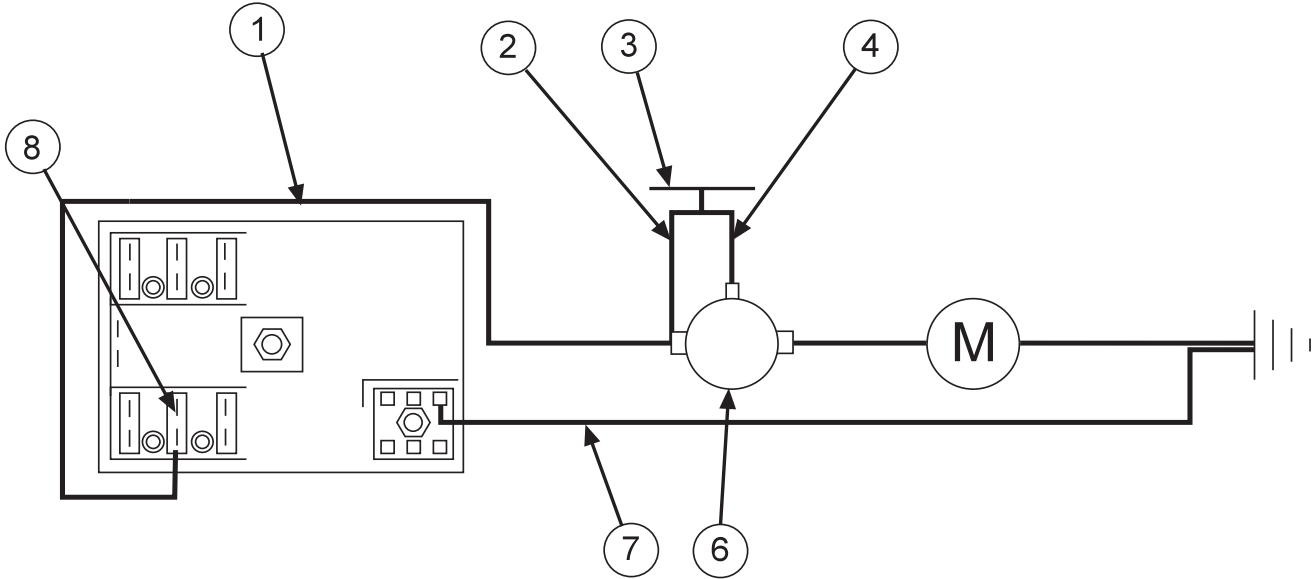
Accessories

## 16-906ELECTRIC HOSE REEL PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-906-25	Retaining Ring	2
2	16-906-22	Axle Assembly	1
3	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	4
4	HW-38	Washer $\frac{3}{8}$	4
5	16-906-27	Trim, Drum Edge	1
6	16-906-21	Drum Center	1
7	13-750	Solenoid	1
	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HWL-14	Lockwasher $\frac{1}{4}$	2
	HN-14-20	Nut $\frac{1}{4}$ - 20	2
8	33-251	Switch	1
9	16-906-19	Disc and Gear Assembly	1
10	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	8
11	16-906-26	Pipe Cap $\frac{3}{4}$	1
12	HWL-516	Lockwasher $\frac{5}{16}$	8
13		Motor 12VDC	1
14	HW-516	Washer $\frac{5}{16}$	4
15	33-252	Switch and Solenoid Brkt	1
	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	2
	HW-516	Washer $\frac{5}{16}$	2
	HWL-516	Lockwasher $\frac{5}{16}$	2
	HN-516-18	Nut $\frac{5}{16}$ - 18	2
16	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
17	HB-516-18-100	Bolt $\frac{5}{16}$ -18 x 1	4
18	16-906-17	Key	1
19		Set Screw	2
20	16-906-29	Pinion	1
21	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
22	16-906-18	Frame Assembly	1
23	16-906-08	Mounting Pillow Block (Bottom)	2
24	16-906-24	Bearing	2
25	16-906-07	Mounting Pillow Block (Top)	2
26	16-906-20	Disc 17 $\frac{1}{2}$	1
27	16-906-23	Swivel Assembly $\frac{3}{4}$	1
	16-906-30	Seal Kit (For 16-906-23)	1
28	16-906-28	Bracket 12VDC	1
29	16-980	Mount Bracket	2
	HB-516-18-175	Bolt $\frac{5}{16}$ - 18 x 1 $\frac{3}{4}$	4
	HW-516	Washer $\frac{5}{16}$	4
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
	16-982	Electric Hose Reel (only)	1



# ELECTRIC HOSE REEL WIRING DIAGRAM



REF#	PART#	DESCRIPTION	QUANTITY
	8843-132	Flexguard <sup>3</sup> / <sub>8</sub> ID	1
1	8919-144	10GA Red Wire 144"	1
	8901	Slide-On Connector	1
2	16-979	Wire, Switch to Solenoid Hot Terminal	1
3	33-251	Push Button Switch	1
4	16-978	Wire, Switch to Solenoid Start Terminal	1
6	13-750	Solenoid	1
<b>SOLENOID TERMINALS</b>			
	HN -516-24	<sup>5</sup> / <sub>16</sub> - 24 Hex Nut	2
	HN -10-32	10 - 32 Hex Nut	1
7	8931-144	10GA White Wire 144"	1
	8901	Slide-On Connector	1
8	33-273	Auto Blade Type Fuse 30Amp	1

### CONNECTION INSTRUCTIONS

Route wire harness along side of tank and over to fuse block taking care to stay clear of moving parts or hot engine components. Cut off excess wire and strip back <sup>3</sup>/<sub>8</sub>". Place one 8963 heat shrink (<sup>1</sup>/<sub>4</sub> x 1<sup>1</sup>/<sub>4</sub>) on each wire before crimping 8901 slide on connectors to the red and white wires. Connect the two wires to the fuse block first the red to the (+) positive and the white to the (-) negative. Put the 33-273 auto blade type fuse (30 amp) into fuse block.



**Make certain you are connecting positive (+) to positive; negative (-) to negative while attaching power leads. If you do not observe polarity, damage will result to electrical components.**

Accessories

*Use Dielectric Grease On All Electrical Connections*



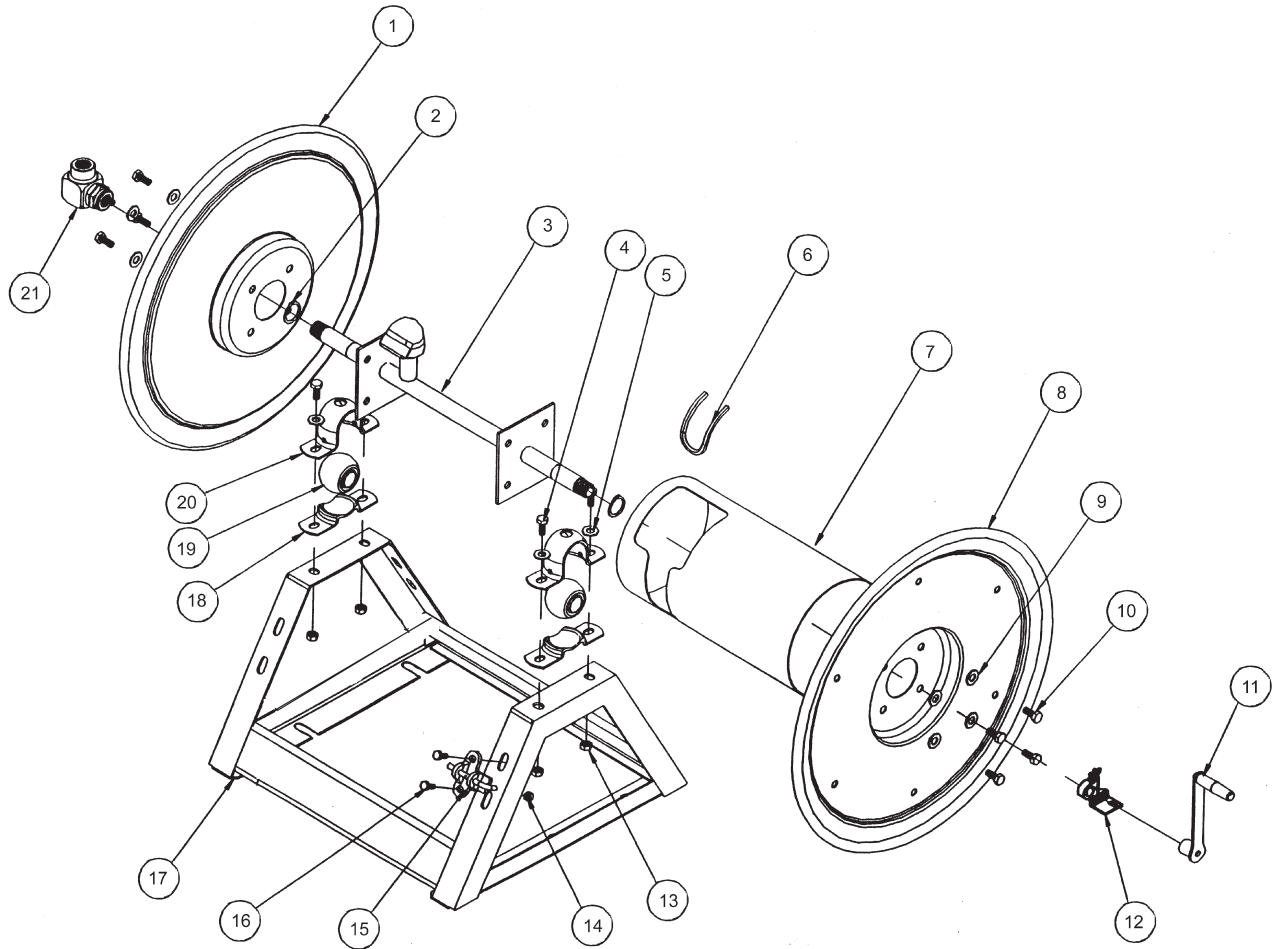
### OPERATIONAL CHECK:

1. Pull hose off drum at least one full revolution. A clicking noise should be heard from locking mechanism.
2. Let the hose retract.
3. Pull the hose off until the first click is heard. Drum should lock when the hose tension is removed.
4. Continue pulling the hose, no more than one revolution, until no clicking is heard. Hose should rewind when tension is removed.

### HOSE REPLACEMENT PROCEDURE:

1. Facing swivel, turn the hose drum clockwise until all of the hose is removed from the drum and the drum is held by locking mechanism. Make sure spring is locked.
2. Remove hose clamps and disconnect hose from swivel. Remove old hose.
3. Insert new hose through roller guide, connect to swivel and reinstall hose clamps. Use spring guard over hose to protect the hose from being cut by the drum.
4. Remove check ball from old hose and install on replacement hose.
5. Carefully, keeping the tension on the hose, pull the hose to release the locking mechanism. Let the hose wind on the drum.

# 16-129 MANUAL HOSE REEL DRAWING

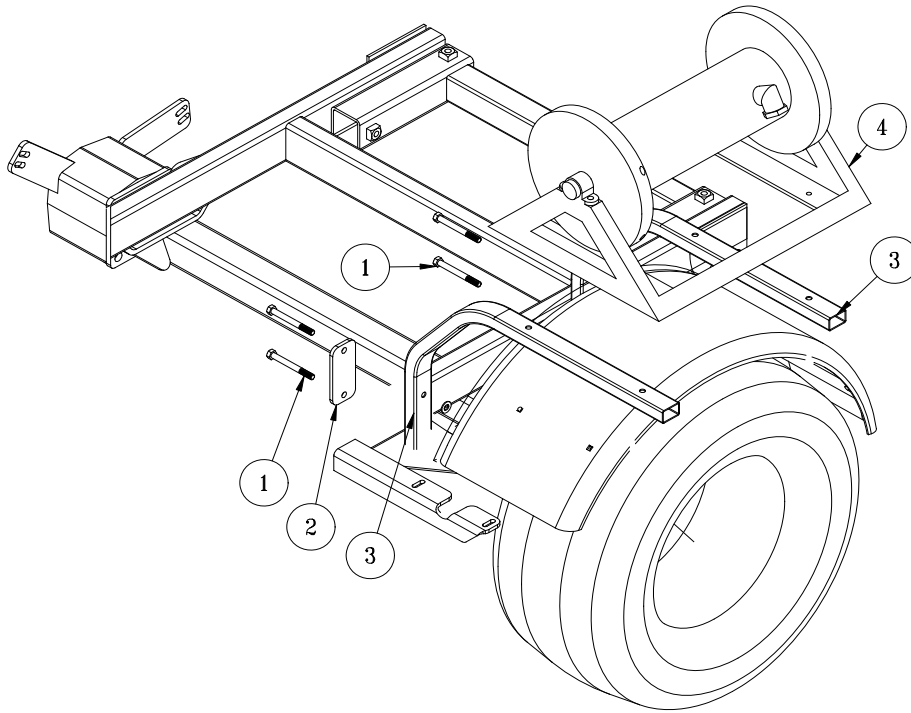


Accessories

REF#	PART#	DESCRIPTION	QUANTITY
1	16-129-11	Disc 17 <sup>1/2</sup>	1
2	16-906-25	Retaining Ring	2
3	16-906-22	Axle Assembly <sup>3/4</sup>	1
4	HB-38-16-100	Bolt <sup>3/8</sup> - 16 x 1	4
5	HW-38	Washer <sup>3/8</sup>	4
6	16-906-27	Trim, Drum Edge	1
7	16-906-21	Drum Center	1
8	16-906-20	Disc 17 <sup>1/2</sup> , Crank Side	1
9	HWL-516	Lockwasher <sup>5/16</sup>	8
10	HB-516-18-075	Bolt <sup>5/16</sup> - 18 x <sup>3/4</sup>	8
11	16-129-09	Crank Assembly <sup>3/4</sup>	1
12	16-129-10	Brake Assembly <sup>3/4</sup>	1
13	HNTL-38-16	Lock Nut <sup>3/8</sup> - 16	4
14	HNTL-516-18	Lock Nut <sup>5/16</sup> - 18	2
15	16-129-08	Lock Pin Assembly	1
16	HB-516-18-075	Bolt <sup>5/16</sup> - 18 x <sup>3/4</sup>	2
	HW-516	Washer <sup>5/16</sup>	2
17	16-129-07	Frame Assembly	1
18	16-906-08	Mounting Pillow Block (Bottom)	2
19	16-906-24	Bearing	2
20	16-906-07	Mounting Pillow Block (Top)	2
21	16-906-23	Swivel Assembly <sup>3/4</sup>	1
	16-906-30	Seal Kit ( For 16-906-23 )	1
22	16-980	Mount Bracket	2
	HB-516-18-175	Bolt <sup>5/16</sup> - 18 x 1 <sup>3/4</sup>	4
	HW-516	Washer <sup>5/16</sup>	4
	HNTL-516-18	Lock Nut <sup>5/16</sup> - 18	4

# 15-833 HOSE REEL MOUNT DRAWING

For 17-525 Boom  
17-550 Boom

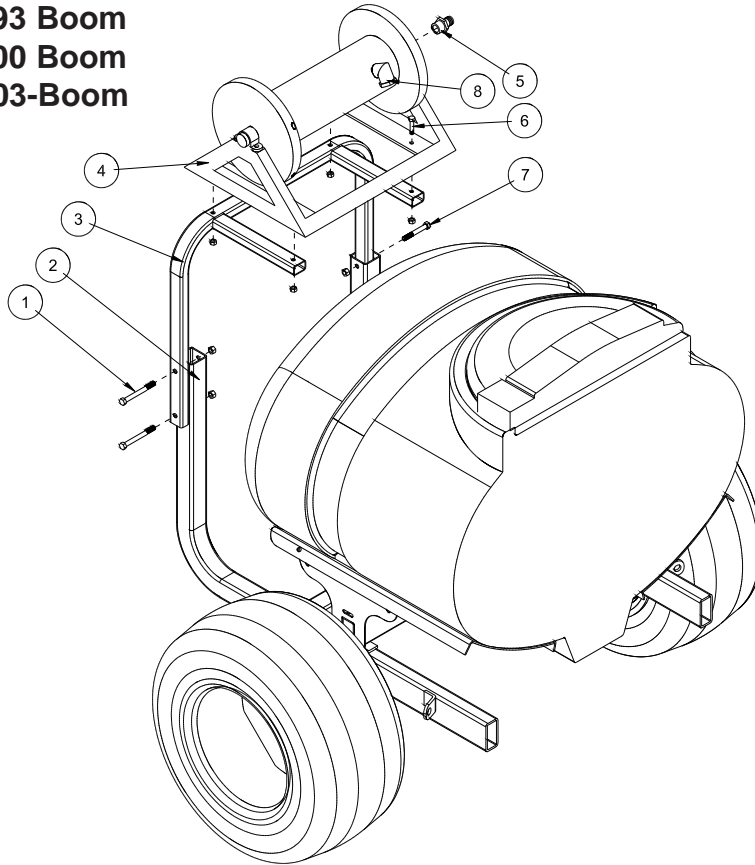


REF#	PART#	DESCRIPTION	QUANTITY
1	HB-38-16-350	Bolt $\frac{3}{8}$ - 16 x $3\frac{1}{2}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
2	15-831	Hose Reel Clamp	2
3	15-832	Hose Reel Mount Bracket	2
4	16-906	Electric Hose Reel	1
	16-129	Manual Hose Reel	1
	18-249	Brass Fitting $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1

1. Wear protective clothing when draining the tank and taking apart the lines.
2. Drain tank and spray system in a safe and approved method insuring that no chemical or water remain in tank as you will be taking apart lines.
3. Remove key from ignition, set park brake and block wheels.
4. Install hose reel mount on the left side of the machine over the rear wheel.
5. Use the clamps and bolts to secure the mount to the machine.
6. Put hose reel on hose reel bracket with fitting to the rear of machine. Use four bolts  $\frac{5}{16}$  - 18 x  $1\frac{1}{2}$  and four  $\frac{5}{16}$  - 18 lock nuts to hold in place. Tighten bolts.
7. Put 18-249 barb fitting into hose reel.

# 17-834 HOSE REEL MOUNT DRAWING

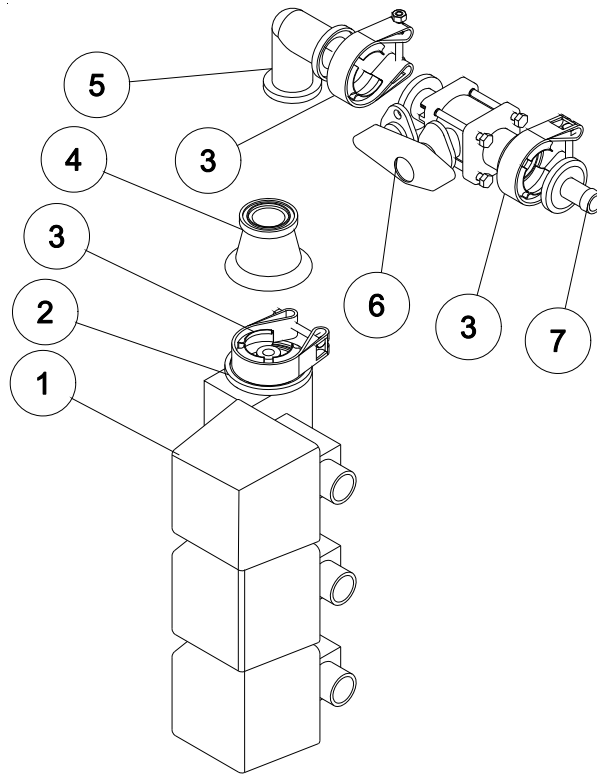
For **15-493 Boom**  
**10-300 Boom**  
**17-503-Boom**



REF#	PART#	DESCRIPTION	QUANTITY
1	HB-38-16-350	Bolt $\frac{3}{8}$ - 16 x $3\frac{1}{2}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
2	14-325	Boom Carrier (part of machine)	2
3	10-221	Hose Reel Mount	1
4	16-906	Electric Hose Reel	1
	16-129	Manual Hose Reel	1
5	18-249	Brass Fitting $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
6	HB-516-18-150	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{2}$	4
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
7	HB-38-16-250	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{2}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
8	16-295	Hose Fitting	1

1. Wear protective clothing when draining the tank and taking apart the lines.
2. Drain tank and spray system in a safe and approved method insuring that no chemical or water remain in tank as you will be taking apart lines.
3. Remove key from ignition, set park brake and block wheels.
4. Remove square rubber covers on boom carriers.
5. Place hose reel bracket inside the boom carrier tube on left side and outside on right side with arms pointing toward front of machine.
6. Lower bracket until top hole in bracket lines up with hole in upright. Bolt as shown.
7. Put hose reel on hose reel bracket with fitting on left side of machine. Use four bolts  $\frac{5}{16}$  - 18 x  $1\frac{1}{2}$  and four  $\frac{5}{16}$  - 18 lock nuts to hold in place. Tighten bolts.
8. Put 18-249 barb fitting into hose reel.

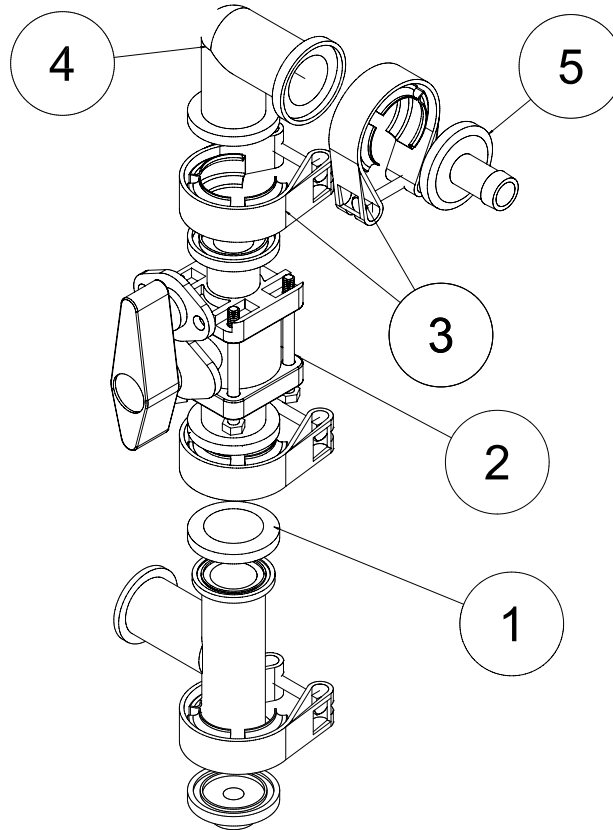
## 1752 (RAVEN 440) HOSE REEL PLUMBING



REF#	PART#	DESCRIPTION	QUANTITY
1	15-743	Electric ball Valve	1
2	15-742	Inlet Cover	1
3	15-740	50 Series Clamp	3
4	15-748	Reducer Coupling	1
5	15-736	#50 Elbow Coupling	1
6	15-738	Flanged Ball Valve	1
7	15-749	Hose Barb	1

### INSTALLATION INSTRUCTIONS

1. On the top of the Electric Spray Control Valve (Ref 1) you will find a cover. Remove clamp, o-ring and cover. Install a 15-748 reducer (Ref 4) in place of the cover you just removed. Reinstall clamp and o-ring and tighten. The cap will not be used again.
2. Install a 15-736 Elbow onto the top of the reducer with a 15-740 clamp (Ref 3) and O-ring. Rotate it 90° so it points to the rear of the machine, then tighten clamp.
3. Install the 15-738 ball valve (Ref 6) onto the elbow using a 15-740 clamp and O-ring. Tighten with the handle on the top or side.
4. Install the 15-749 Hose Barb (Ref 7) onto the open end of the ball valve with a 15-740 clamp and o-ring. Tighten.
5. Route the orange  $\frac{3}{4}$ " hose from the hose barb to the hose barb on the hose reel and secure with a 18-040 Hose clamp.
6. Secure the orange hose to the machine with a nylon tie strap.

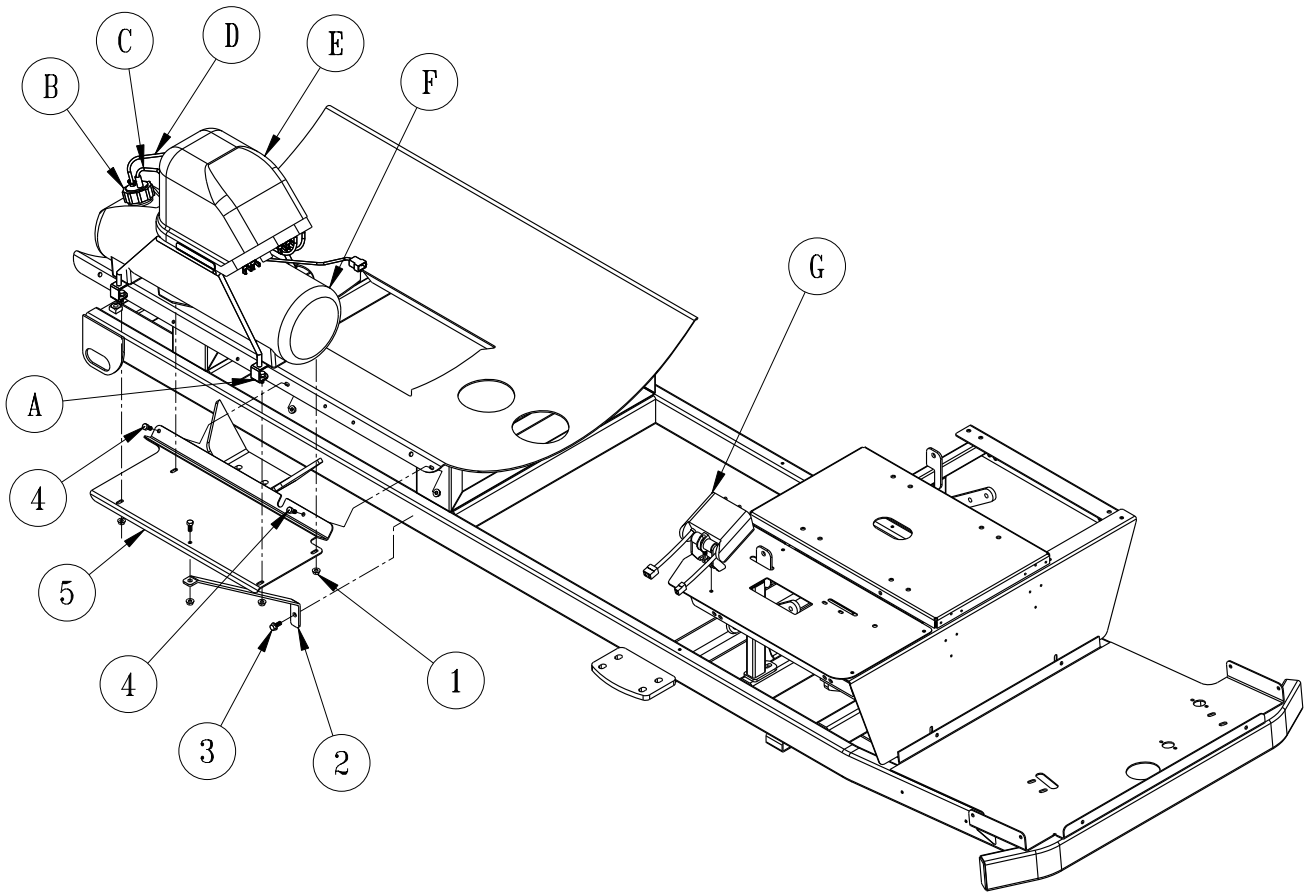


REF#	PART#	DESCRIPTION	QUANTITY
1	15-778	Blank Guage Port	1
2	15-738	Flanged Ball Valve	1
3	15-740	50 Series Clamp	2
4	15-736	#50 Elbow Coupling	1
5	15-749	Hose Barb	1

## INSTALLATION INSTRUCTIONS

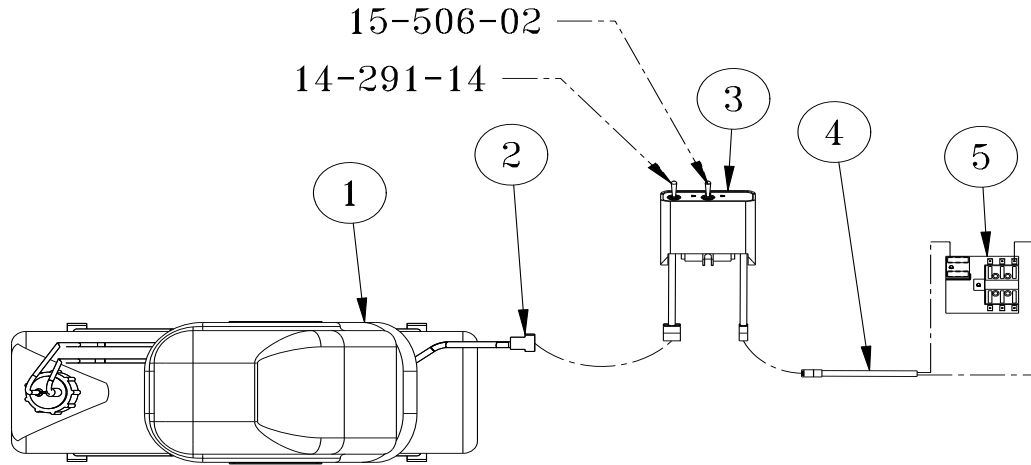
1. Between the boom control valves and the fuel tank you will find a tee fitting with a black cap on top of it. Remove the clamp and the cap.
2. Install the 15-738 ball valve (Ref 2) onto the top of the tee using the clamp and o-ring you removed in step 1. The Handle can be positioned so it clears the other hoses by rotating it before the clamp is tightened. Tighten clamp when ball valve is in the position you wanted.
3. Install the 15-736 Elbow (Ref 4) on top of the ball valve pointing to the back of the machine and secure with 15-740 clamp(Ref 3) and O-ring. Tighten.
4. Install the 15-749 flanged hose barb (Ref 5) on to the open end of the elbow with a 15-740 clamp and O-ring. Tighten.
5. Route the orange  $\frac{3}{4}$ " hose from the hose barb you just installed to the hose barb on the hose reel. Secure with an 18-40 hose clamp. Secure orange hose to machine with 22-075 nylon ties.
6. You will have a reducer coupling, clamp and cap left over that you will not need.

# 17-505 FOAM MARKER FOR 1750 DRAWING



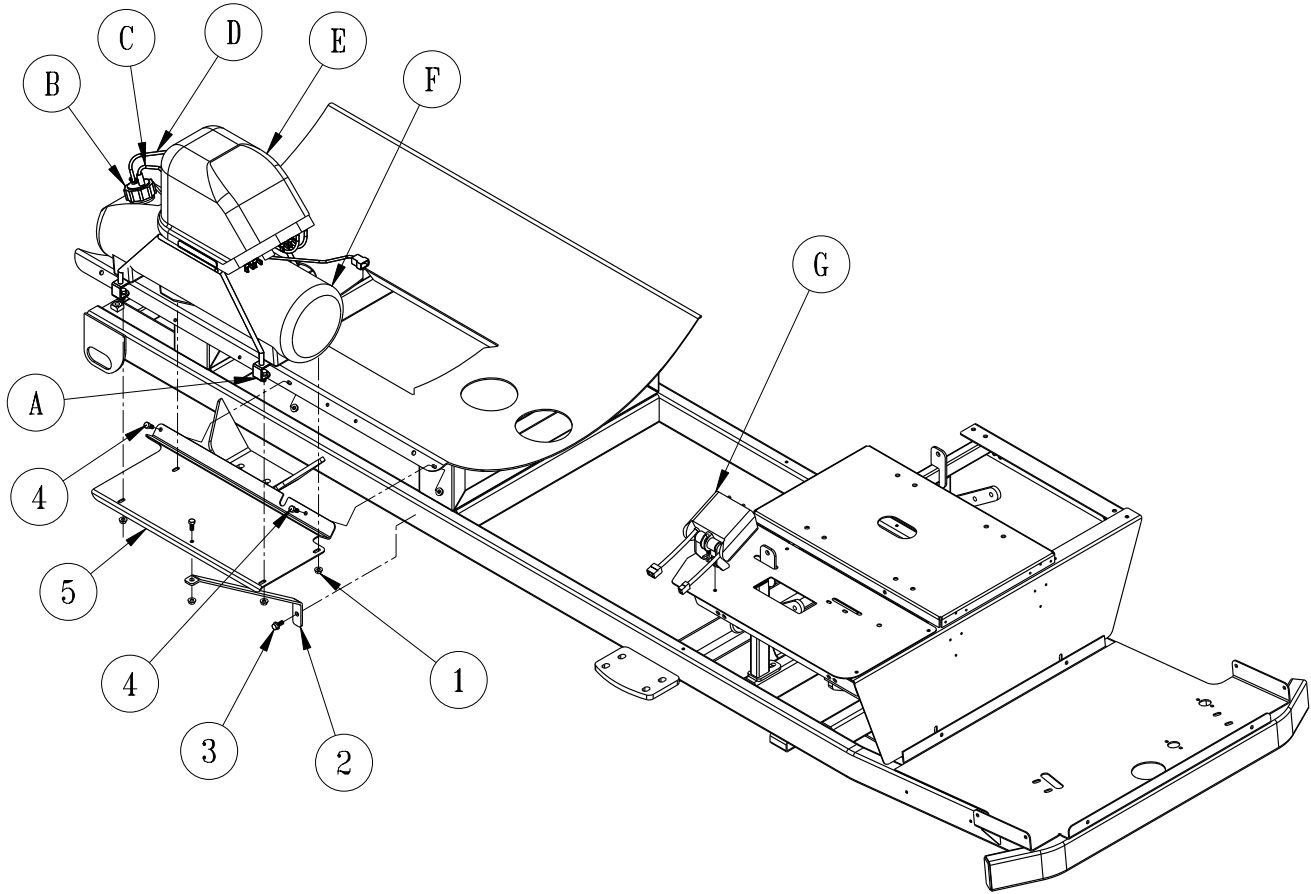
REF#	PART#	DESCRIPTION	QUANTITY
1	HBFL-516-18-075	Flange Bolt, $\frac{5}{16}$ -18 x $\frac{3}{4}$	7
	HNFL-516-18	Flange Lock Nut, $\frac{5}{16}$ - 18	7
2	15-689	Foamer Bottom Brace	1
3	HBFL-516-18-075	Flange Bolt, $\frac{5}{16}$ -18 x $\frac{3}{4}$	1
4	HN-14-20-075	Hex Bolt, $\frac{1}{4}$ -20 x $\frac{3}{4}$	2
	HBFL-14-20	Flange Lock Nut, $\frac{1}{4}$ -20	2
5	15-755	Mount Plate	1
A	14-291-04	Tank Bracket	2
B	14-284-02	Cap Assembly	1
C		Blue Tube	1
D		Clear Tube	1
E	14-291-03	Compressor Only	1
	14-291-01	Black Cover	1
F	14-291-02	Foamer Tank	1
G	14-291-05	Double Switch Box	1
	15-506-01	Fuse (F10A 250)	1
	15-506-02	Switch	1
A-G	14-291	Foamer (includes parts A-G)	1





REF#	PART#	DESCRIPTION	QUANTITY
1	14-291-03	Compressor	1
2	15-504-04	Wiring Harness	1
3	14-291-05	Switch Box	1
	15-506-01	Fuse (F10A 250V)	1
	15-506-02	Switch	1
4	15-509	Power Cable	1
5	33-271	Fuse Block (part of machine)	1
	33-507	Auto Blade Type Fuse 10 amp	1

17-505 FOAM MARKER FOR 1750 DRAWING



Accessories

**Safety: Before working on machine stop engine, set park brake, remove key from ignition and block wheels. Disconnect negative (-) battery terminal.**

1. Mount the switch box to the panel to the right of the operator's seat. Remove the drill screw on the right hand rear side and mount the Switch Box (Ref. G) using this screw. The switch box must be mounted facing towards the operator's seat.

## WIRING

Use dielectric grease on all electrical connections. Connect power cable (15-509) to the switch box. Turn the switch off. Route the power wire to the fuse block (on the inside of the engine cover) out of the way of any heat or moving parts. Use nylon ties as needed. Cut the power wire with enough length to connect the fuse block. Put the slide on terminal with heat shrink onto the wire ends and connect to fuse block. Red to positive(+), black to negative(-). Insert 10 amp fuse into slot which has red wire attached to it.

## MOUNTING THE FOAMER UNIT

1. Position the Mount Plate (Ref. 5) as illustrated and mount to the Tank Carrier using two  $\frac{1}{4}$ -20 x  $\frac{3}{4}$  Flange Bolts and  $\frac{1}{4}$ -20 Flange Lock Nuts. Leave loose.
2. Connect Brace (Ref. 2) to the Mount Plate using one  $\frac{5}{16}$ -18 x  $\frac{3}{4}$  Flange Bolt and  $\frac{5}{16}$ -18 Flange Lock Nut. Tighten. Bolt Brace (Ref. 2) to the tapped hole in the mainframe using one  $\frac{5}{16}$ -18 x  $\frac{3}{4}$  Flange Bolt. Tighten.
3. Tighten hardware connecting Mount Plate (Ref. 5) to the Tank Carrier.
4. Place Foamer unit (Refs. A-G) on the Mount Plate (Ref. 5) and bolt in place with four  $\frac{5}{16}$ -18 x  $\frac{3}{4}$  Flange Bolts and  $\frac{5}{16}$ -18 Flange Lock nuts (Ref. 1). Foamer must be placed with the Cap Assembly (Ref. B) facing to the **rear** of the machine.
5. Tighten hardware.

## CONNECTING THE CAP ASSEMBLY

Connect the blue tube to the tank cap connector which is also connected to the large blue tube which hangs below the cap. This is the soap outlet tube. Connect the clear tube to the other connector on the tank cap. This is the air input tube. Tighten connectors hand tight, assembly tank cap onto tank.

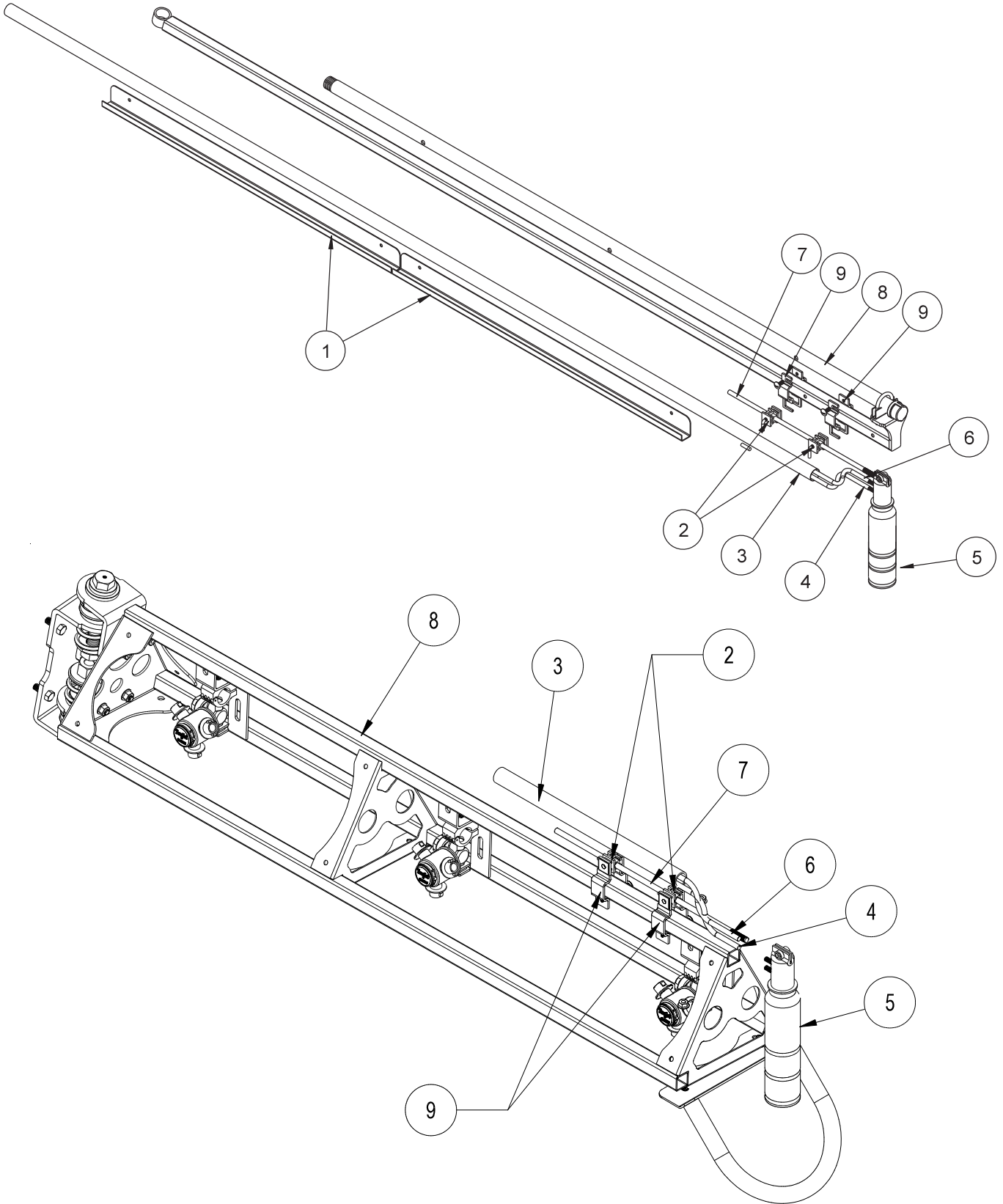
## HOSES

Being careful not to cut the tubing, cut the oversleeve back approximately 2" (5 cm) to expose blue and clear tubing. Remove blue wing nut from top connector of foam nozzle and slide it on the blue tube with the threads facing toward end of tube. Slide blue tube all the way over the top of the small tube on foam nozzle. Slide wing nut back to the threads and hand tighten. Follow the same steps for the clear tube and tube nut.

Route the tubing along underside of main frame using tie downs as necessary.

Install opposite ends of air-liquid tubes to compressor, again cutting back the oversleeve approximately 2" (5 cm) and inserting blue and clear tubes for the left boom section into the tubing connectors on the right side of compressor as far as possible. Follow the same steps for the right boom tubing. Notice the right boom is inserted into left side of compressor. To release tubing from compressor, hold black ring around tubing, and pull tube out.

# FOAMER NOZZLE MOUNT & HOSE GUARD MOUNT DRAWING



Accessories

## 17-505 FOAM MARKER PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-537	Foamer Hose Guard 31"	4
	HSDPS-14-075	Stainless Steel Pan Head Drill Screw $\frac{1}{4} \times \frac{3}{4}$	8
2	16-987	Foam Nozzle Mounting Kit	1 per boom
3	15-507	Foamer Tubing	2
4		Clear Tubing	
5	15-511	Foam Nozzle	2
6		Blue Tubing	
7	15-510-01	Nozzle Mounting Rod	2
8		Boom	
9	16-795	Square Clamp	4

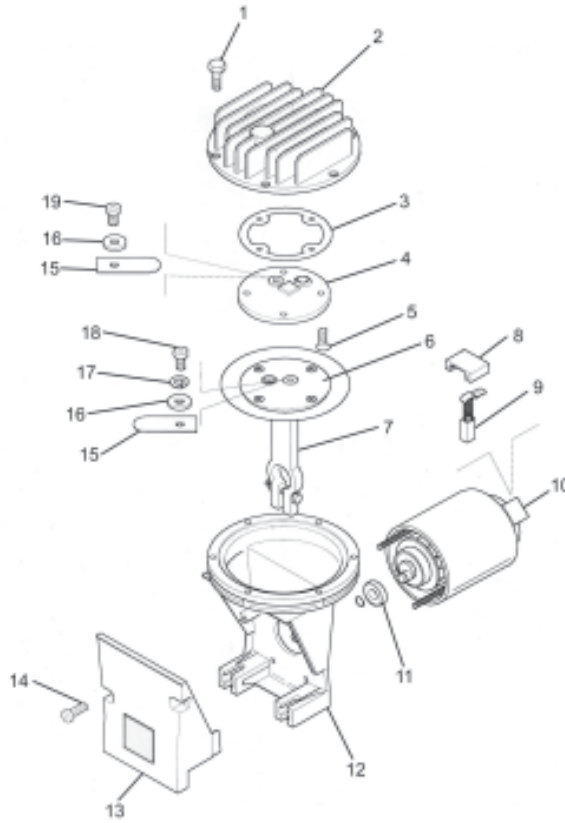
- Slide hose clamp onto drop tube of foam nozzle and attach restrictor bell.
- Place splined end of Nozzle mounting rod (Ref 7) into top of foam nozzle (Ref 5). Tighten screw.
- Slide two foam nozzle mounts (Ref 2) onto the rod. Place square clamps (Ref 9) on foam nozzle mounts and mount the square clamps to the boom (Ref 8). Adjust foam nozzle mounts and clamps so nozzle assembly will clear end of boom. Tighten foam nozzle mounts and square clamps to prevent side to side movement. Do the same to the other side.
- Being careful not to cut the tubing (Ref 3), cut the oversleeve back approximately 2" (5 cm) to expose blue (Ref 6) and clear tubing (Ref 4).
- Remove blue wing nut from top connector of foam nozzle and slide it on the blue tube with the threads facing toward end of tube. Slide blue tube all the way over the top of the small tube on foam nozzle. Slide wing nut back to the threads and hand tighten. Follow the same steps for the clear tube and tube nut.
- Route the tubing along underside of main frame using tie downs as necessary.
- Install opposite ends of air-liquid tubes to compressor, again cutting back the oversleeve approximately 2" (5 cm) and inserting blue and clear tubes for the left boom section into the tubing connectors (Ref A) on the right side of compressor as far as possible.
- Follow the same steps for the right boom tubing. Notice the right boom is inserted into left side of compressor. To release tubing from compressor, hold black ring around tubing, and pull tube out.
- Hose's must be routed on bottom of the boom square tubing.
- Mark 6 inches in from inside edge of foamer nozzle mounting bracket on square boom tubing.
- Place hose guard (Ref 1) flush with top of square tubing with edge on previous mark. The channel covers hoses on the bottom of the square tubing.
- Install hose guard using 2 drill screws (you may want to drill a  $\frac{3}{16}$  pilot hole first).
- Place another hose guard against first and install in same manner.
- Repeat process for other boom side.
- Connect small plastic electrical plug under compressor to electrical extension cable.
- Cut cable and strip casing, allowing enough length to connect to fuse block.
- Strip and connect slide on connectors to each wire and use the heat shrink.
- Connect black negative (-) wire to the ground and connect red wire to the positive (+).
- Insert 10 amp fuse into slot which red wire was attached to.

# FOAM MARKER



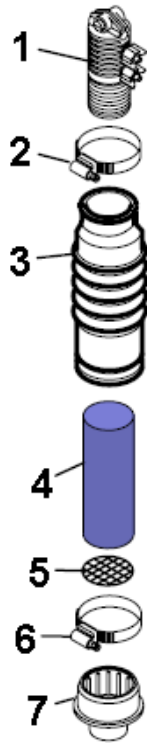
REF#	PART#	DESCRIPTION	QUANTITY
1	15-507	Foamer Tubing	2
2	14-291-02	Tank	1
3	14-291-01	Black Cover	1
	14-291-03	Compressor	1
4	14-284-02	Cap Assembly	1
5	14-291-04	Tank Bracket	1
6	14-291-05	Double Switch Box	1
7	15-511	Foam Nozzle	1
8	15-510-01	Nozzle Mounting Rod	1
9	16-987	Foam Nozzle Mounting Kit	1

# 15-505 MOTOR SUB ASSEMBLY DRAWING



REF#	PART#	DESCRIPTION	QUANTITY
1†		Bolt	6
2		Head	1
3	15-505-01	Exhaust Manifold Gasket	1
4		Exhaust Manifold	1
5†		Manifold Screw	8
6†	15-505-03	Diaphragm	1
7†		Piston	1
8		Brush Retainer	2
9	15-505-06	Brush	2
10	15-505-07	12 Volt Electric Motor	1
11	15-505-05	Stainless Steel Bearing	1
12		Block	1
13		Cover	1
14		Cover Screw	2
15*		Exhaust Reed Valve	1
16*†		Washer	2
17*†		Split Lockwasher	1
18*†		Intake Valve Screw	1
19*		Exhaust Valve Screw	1
*	15-505-02	Intake Exhaust Valve Sub Assembly	
†	15-505-04	Intake Piston Sub Assembly	

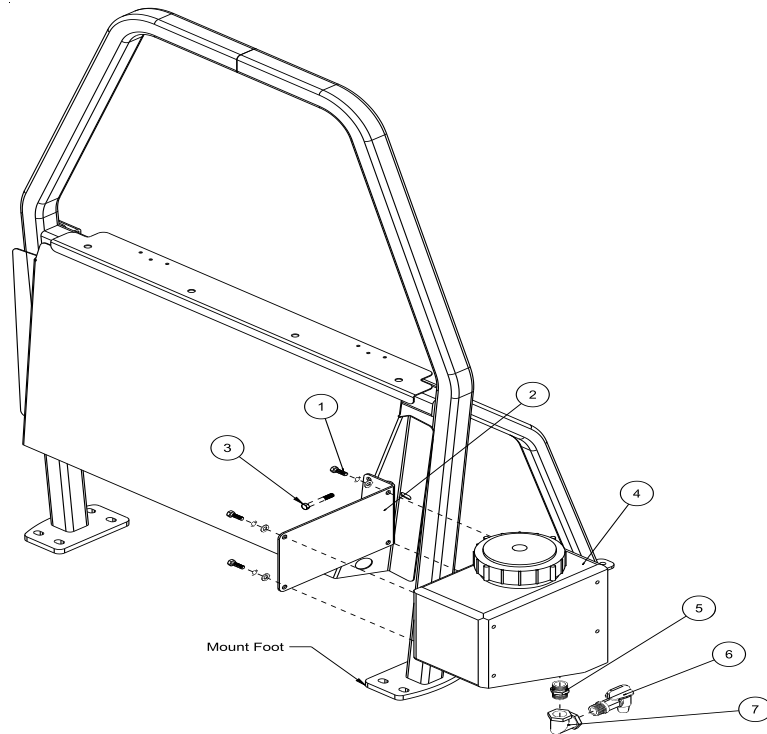
# 15-511 FOAM NOZZLE SUB ASSEMBLY DRAWING



REF#	PART#	DESCRIPTION	QUANTITY
1*	15-511-01	Foam Nozzle Inlet Body	1
	15-510-01	Nozzle Mounting Rods	2
2*		Hose Clamp	1
3*		Drop Tube	1
4	15-511-08	Foam Sponge	1
5	15-511-09	Stainless Steel Screen	1
6		Hose Clamp	1
7	14-284-09	Foam Nozzle Reducer	1
*	15-511-07	Foam Nozzle Sub Assembly	

Accessories





REF#	PART#	DESCRIPTION	QUANTITY
1	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	4
	HW-516	Washer $\frac{5}{16}$	4
	HWL-516	Lock Washer $\frac{5}{16}$	4
2	15-750	Tank Mount Bracket	1
3	HB-38-16-275	Bolt $\frac{3}{8}$ - 16 x $2\frac{3}{4}$	2
	HNFL-38-16	Flange Lock Nut $\frac{3}{8}$ - 16	2
4	10-234	3 Gallon Rectangular Tank	1
5	16-158	Close Nipple $\frac{3}{4}$ x $\frac{3}{4}$	1
6	16-960	Spigot $\frac{3}{4}$ NPT	1
7	16-151	Elbow FPT $\frac{3}{4}$ x $\frac{3}{4}$	1

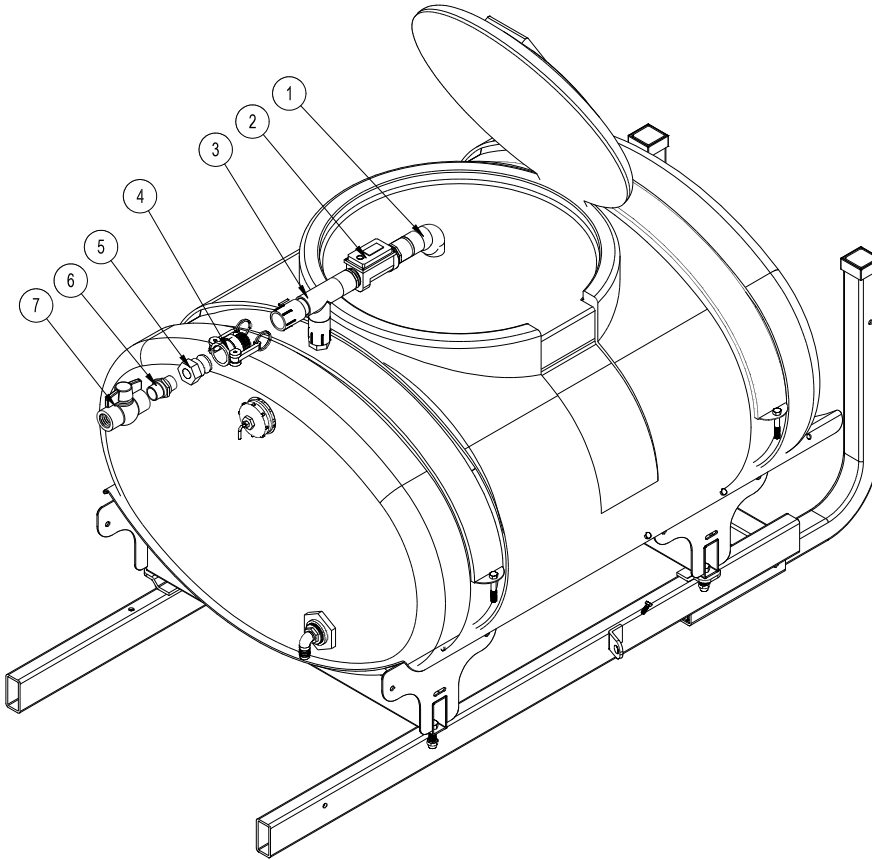
1. Fresh Water Wash Tank mounts on the left side of the Roll Bar just above the sprayer control valve.
2. Clamp the mount bracket to the roll bar post approximately 19" up from the mount foot and then mark the holes onto the tube with a center punch. Drill the two holes using a  $\frac{3}{8}$  drill bit.
3. Secure the bracket to the post with two  $\frac{3}{8}$  x  $2\frac{3}{4}$  bolts and flange lock nuts. Then tighten.
4. Install the nipple (Ref 5), elbow (Ref 7) and spigot (Ref 6) into the bottom of wash tank (Ref 4). Use thread tape on all threads.
5. Mount the tank onto the mount bracket (Ref 2) using four  $\frac{5}{16}$  x  $\frac{3}{4}$  bolts, washers and lockwashers. Tighten.
6. Rinse tank with clear water and check for leaks around fittings.



**This tank is for fresh clear water ONLY. Do not put chemicals in this tank.**

## 14-515 WATER METER KIT (GALLONS)

## 15-618 WATER METER KIT (LITERS)



REF #	PART #	DESCRIPTION	QUANTITY
1	14-524	Filler Outlet	1
2	14-514	Water Meter (Gallons)	1
	14-527	Water Meter (Liters)	1
3	14-525	Filler Inlet	1
4	16-962	1" Quick Coupler (already on machine)	1
5	16-961	1" Adapter Quick Coupler (already on machine)	1

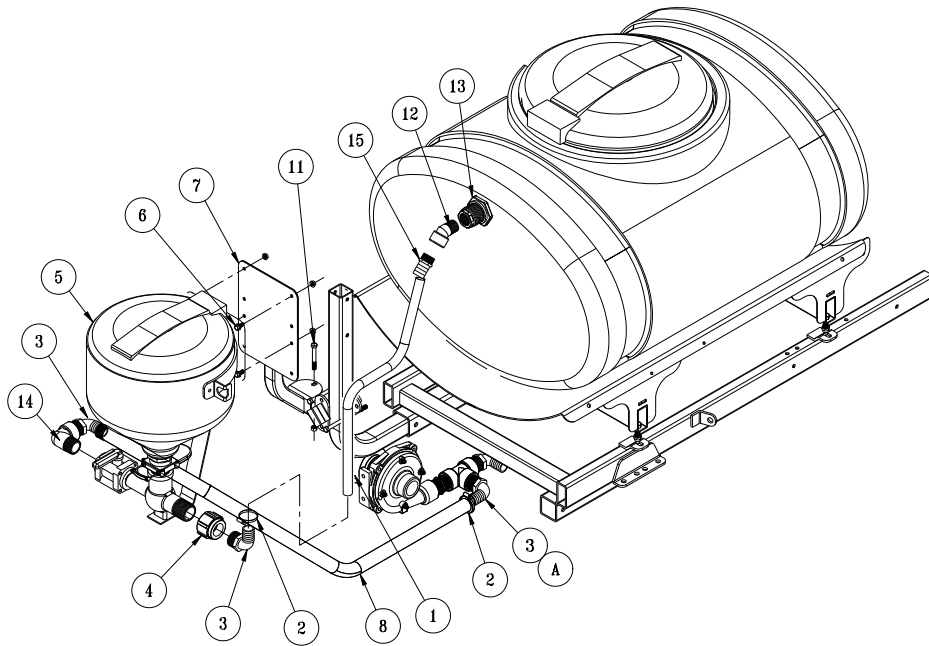
1. Thoroughly flush the service line upstream of the meter to remove dirt and debris.
2. The DLJ Meter is for use **only** with **COLD WATER** up to 122°F (50°C)
3. Slowly open any upstream valves to prevent damage to the meter.

### Gallons to Cubic feet Conversion :

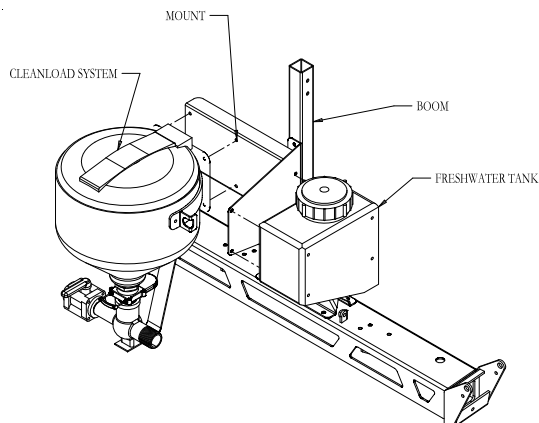
Multiply gallons reading by 0.1337 to get cubic feet.

There are 7.48052 gallon per cubic foot.

# 15-619 CHEMICAL CLEANLOAD SAFE FILL SYSTEM



REF#	PART #	DESCRIPTION	QUANTITY
1	8897-25	1 1/4" Discharge Hose 25"	1
2	18-116	Hose Clamp	4
3	16-156	90° Hose Barb	3
4	18-391	Coupling	1
5	15-620	Cleanload Assembly	1
6	HBFL-516-18-075	Flange Bolt, 5/16 - 18 x 3/4	4
	HNFL-516-18	Flange Lock Nut, 5/16 - 18	4
7	15-816	Mixer Mount	1
8	8897-88	1 1/4" Discharge Hose 88"	1
9	16-880	Close Nipple	1
10	18-390	Pipe tee	1
11	HB-38-16-300	Hex Bolt, 3/8 - 16 x 3	1
	HNTL-38-16	Lock Nut, 3/8 - 16	1
12	15-971	Fitting 45°	1
13	16-945	Fitting (part of tank)	1
14	16-972	Street Elbow	1
15	16-159	Hose barb	1



When placing a 17-525/17-550 Heavy Boom on the Sprayer you will have to relocate the Chemical Cleanload System and the Fresh Water tank. There is a mount provided for you, please see in the illustration.

## 15-619 CHEMICAL CLEANLOAD INSTALLATION INSTRUCTIONS

1. Make sure sprayer tank is empty and flush all chemical residue from sprayer. Always wear protective clothing, goggles and gloves.
2. Disconnect outlet hose from the spray pump then the 90° fitting from the pump.
3. Install the close nipple, tee, elbow and the 90° elbow that was removed from the pump. Always use thread sealant on all fittings. Tighten all Fittings. One of the 90° fittings should point towards the right side of the machine and the other one needs to point to the back of the machine.
4. Reinstall the outlet hose onto the spray pump and tighten hose clamp.
5. Install 88" of 1 1/4" suction hose onto the elbow on the pump that points back and tighten hose clamp.
6. Route the 88" hose to the back of the sprayer so it connects over the top of the left boom support tube.
7. Install Mixer Mount (Ref 7) onto the left hand side of the center boom section. The Mount will slide over the 2" tube under the actuator. Secure Mixer Mount with 3/8 x 3 bolt and lock nut. Tighten.
8. Mount Cleanload Assembly onto mixer mount using 5/16 x 3/4 flange bolts and flange nuts. Tighten.
9. Install 18-391 reducer coupling (Ref 4) onto outlet side. Then a 16-156 90° elbow (Ref 3) into the coupling pointing up and one into valve with yellow handle. Tighten fittings so that the elbow in the valve is pointing up and forward. The outlet fitting should be pointing up.
10. Remove the plug from the top back of the spray tank and install 16-159 hose barb (Ref 12) and tighten. Now the 25" hose can be installed from the tank to the outlet fitting and tighten with clamps.
11. The hose from the spray pump can be connected to the inlet fitting and tightened with clamps.
12. Make sure all hardware, fittings and clamps are tight. Add about 25 gallons of water to the spray tank. Start sprayer and circulate water through system to check for leaks.
13. Be sure to read start up, loading and shutdown instructions for Cleanload Assembly before using with chemicals. When working with chemicals **Always** wear protective clothing, goggles and gloves.

## TROUBLE SHOOTING

Symptom	Corrective Action
Low education rate	Check pump pressure and flow. Cleanload Eductor performance is based on flow and pressure to the system. Note requirements for high education rates.
	Increase outlet hose size back to tank.
Plugged or clogged bottle rinse nozzle	Disassemble rotary portion of nozzle from lower valve assembly and back flush until nozzle ports are clear of debris.
Plugged or clogged tank rinse nozzle	Disassemble rotary portion of nozzle from NPT hose barb and back flush until nozzle ports are clear of debris. Remove screen and flush with water to clear away foreign material.
Fitting leaks	Check for cracks in fitting. Replace fitting if necessary. Disassemble and add more joint seal in compound if leak occurs on threads.

## STARTUP

1. All Cleanload valves must be closed prior to starting: inlet ball valve, knife valve and hopper rinse ball valve.
2. Open lid to check for foreign objects which may hinder performance or contaminate the system.
3. Close and lock lid by turning cover clockwise.
4. Divert pump flow to Cleanload inlet line. A pressure of 30 PSI minimum and 150 PSI maximum must be used. Highest pressures increase eduction rate and available wand suction.
5. Turn inlet ball valve on (yellow handle).
6. Open knife valve, located on the bottom of hopper, by pushing handle in (red handle).
7. Unlock and open lid slowly by turning cover counterclockwise.

## LOADING LIQUID OR POWDERED CHEMICAL INTO HOPPER

8. Pour required amount of chemical into hopper. Avoid splashing liquids or powdered chemicals outside of hopper.
9. Rinse empty chemical containers if applicable. Place container opening over container rinse valve and press down. This will activate the rinse valve and rinse container.
10. Rinse Cleanload hopper. Close and lock lid by turning cover clockwise. Release the safety locking band on the hopper rinse ball valve and turn on for 20 seconds. Close ball valve and return locking band to locked position.
11. Open lid and inspect for chemical residue. Repeat step 10 as necessary.
12. Close knife valve by pulling red handle out towards you. Turn inlet (yellow handle) off.

## LOADING LIQUID AND/OR POWDERED CHEMICAL WITH SUCTION LANCE

**Note: Lance suction is dependent upon eductor pressure and flow. For best results, use highest pressure available up to 150 PSI maximum.**

8. Insert lance body with o-ring into eductor until the o-ring is sealed.
9. Use the free end of the lance to pierce bag or container to vacuum powdered or liquid chemical.
10. Rinse lance. Place lance end into a clean container of water to rinse lance assembly.
11. Remove lance body from eductor and drain any remaining fluid into hopper.
12. Close knife valve (red handle). Turn inlet valve (yellow handle) off.

## SHUTDOWN

1. Ensure that:
  - All valves are closed. Be sure to close knife valve first. (Close by pulling red handle out towards you.)
  - Chemical residue has been cleaned.
  - Hopper lid is closed and locked by turning cover clockwise.
2. Divert pump flow back to normal operation.



This is a list of decals located on the Spray Star 1750. Part number, description and location will help in reordering decals.

14-510	Decal, Tank Volume	Side of Spray Tank
14-520	Decal, Tank Volume 1750 Top	Lifd Well of Tank
14-511	Decal, Rear tank Volume	Rear of Tank
15-463	Decal, Spray Pump	Left Seat Panel
15-636	Decal, Spray Star 1750	Tank Sides
15-637	Decal, Control Panel	Right Control Panel
15-672	Decal, Dash	Dashboard
15-719	Decal, Speed Control	Left Control Panel
16-228	Decal, Towing	Front Seat Panel
25-279	Decal, Hot and Moving Parts	Cooler Mount
25-307	Decal, Gas	Cooler Mount
25-286	Decal, Pinch Point	Left and Right Side Panel
25-298	Decal, Warning Hot	Back Seat Panel
25-356	Decal, Tire Pressure	All 4 Tires
25-373	Decal, Smithco	Front Nose Cone
25-381	Decal, 96 dBA	Panel Behind Seat
27-077	Decal, Smithco - Round	Steering Wheel
27-093	Decal, Hydraulic Oil	On Oil Reservoir
25-277	Decal, Battery	Battery Plate
34-147	Decal, Smithco	Nosecone

## QUICK REFERENCE REPLACEMENT PARTS

### REPLACEMENT FILTERS

23-031	Hydraulic Oil Filter
13-531	Oil Filter
42-076-03	Air Cleaner Cartridge
13-488	Key Switch
76-310	Key Set

### REPLACEMENT BELTS

15-704	Spray Pump Belt
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### SEAL KITS

15-301	Power Steering Orbital Motor
15-301-01	Seal Kit
75-714	Hydraulic Cylinder
14-254	Seal Kit
11-158	Linear Actuators
11-158-01	Seal Kit
76-238	Wheel Motors
14-080	Seal Kit
76-398	Hydrostatic Pump
77-239-22	Seal Kit
76-197	Gear Pump
76-197-08	Seal Kit

### FLUIDS

Engine Oil	SAE 10W-40 API Service SJ or higher Motor Oil
Hydraulic Fluid	SAE 10W-40 API Service SJ or higher Motor Oil

### OTHER PARTS

14-532	Hinged Cover On Tank with Gasket
14-532-01	Gasket For Cover
15-818	#75 Fitting Oring
15-817	#50 Fitting Oring
	Spark Plugs
	Champion type RC12YC (Gap 0.040 inch (1.02mm))



# The Smithco Commercial Products Two-Year Limited Warranty

Smithco, Inc. (Smithco) warrants your 2007 or newer Smithco Commercial Product ("Product") purchased after January 1, 2007, to be free from defects in materials or workmanship for the period of time listed below. Where a warrantable condition exists, Smithco will repair the Product at no cost to you including diagnosis, labor (at the Smithco standard labor rate, subject to the Smithco flat rate schedule), and parts.

## Warranty Duration is:

- (1) Two years, 1500 operational hours\* from the date of delivery to the original purchaser or three years from the date of original manufacturer of the product, whichever occurs first. (\*Products equipped with hour meter).
- (2) Products used in rental situations are covered for 90 days from date of delivery to original user/ renter.

## Owner Responsibilities:

As the Product owner, you are responsible for required maintenance and adjustments stated in your Owner's Manual. Failure to perform required maintenance and adjustments can be grounds for disallowing a warranty claim. **You are particularly responsible to train all present and future operators of this product on the safe operation of this product at your location.**

## Instructions for Obtaining Warranty Service:

You are responsible for notifying the Authorized Smithco Products Distributor from whom you purchased the Product as soon as you believe a warrantable condition exists and not later than 30 days from discovery of the condition.

If you need help locating an Authorized Smithco Distributor, or if you have questions regarding your warranty rights or responsibilities, you may contact us at:

Smithco Product Support Department  
200 W Poplar PO Box 487  
Cameron, Wisconsin 54822

Telephone: 1-800-891-9435      E-Mail: [ProductSupport@smithco.com](mailto:ProductSupport@smithco.com)

## Maintenance Parts:

Parts scheduled for replacement as required maintenance ("Maintenance Parts"), are warranted for the period of time up to the scheduled replacement time for that part.

### Items/Conditions Not Covered:



Not all product failures or malfunctions that occur during the warranty period are defects in materials or workmanship. The items/conditions listed below are not covered by this warranty:



Product failures which result from the use of non-Smithco replacement parts, or from installation and use of add-on, modified, or unapproved accessories are not covered.



Product failures which result from failure to perform required maintenance and/or adjustments are not covered.



Product failures that result from operating the Product in an abusive, negligent or reckless manner are not covered.



This warranty does not apply to parts subject to consumption through use, unless found to be defective. Examples of parts which are consumed, or used up, during normal Product operation include, but are not limited to: blades, tines, teeth, scarifiers, rakes, plates, wear plates, castor wheels, tires, batteries, filters, belts, nozzles, etc.



This warranty does not apply to failures caused by out-side influence. Items considered to be outside influence include, but are not limited to, weather, storage practices, contamination, use of unapproved coolants, lubricants, additives, or chemicals, etc.



This warranty does not apply to normal “wear and tear” items. Normal “Wear and Tear” includes, but is not limited to, damage to seats due to wear or abrasion, worn painted surfaces, scratched decals or windows, etc.



Smithco may require the return of failed parts or components in order to determine the validity of any warranty claim.



Smithco will not be obligated to replace components of other manufacturers if inspection by the original component manufacturer indicates that failure was due to normal wear and tear, expected consumption through use or improper care or service.

#### **Other Legal Disclaimers:**

The above remedy for product defects through repair or replacement by an authorized Smithco distributor or dealer is the purchaser’s sole remedy for any defect. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

**THERE ARE NO OTHER EXPRESS WARRANTIES OTHER THAN THOSE SET FORTH ABOVE. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE ARE LIMITED TO THE DURATION OF THE LIMITED WARRANTIES CONTAINED HEREIN.**

Some states may not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

**THE SMITHCO COMPANY IS NOT LIABLE FOR INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE USE OF THE PRODUCT, INCLUDING ANY COST OR EXPENSE OF PROVIDING A SUBSTITUTE PRODUCT OR SERVICE DURING PERIODS OF MALFUNCTION OR NON-USE.**

Some states may not allow the exclusion of indirect, incidental or consequential damages, so the above exclusion may not apply to you.

**Smithco neither assumes, nor authorizes any person to assume for it, any other liability in connection with the sale or use of this product.**

**SMITHCO, INC.**

**Wayne, PA 19087**

