

Parts & Service



Spray Star 1000
10-100-C

SN: 100549

August 2013

Product Support:

Hwy 55 & Poplar Ave; Cameron WI 54822

1-800-891-9435 productsupport@smithco.com

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

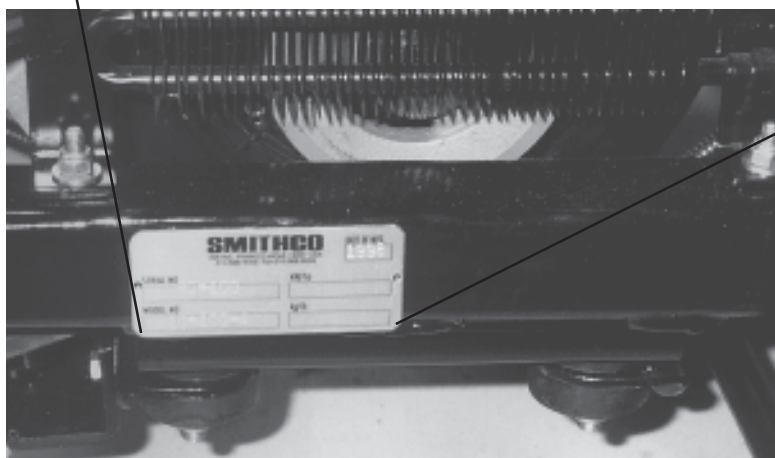
Read this manual and all other manuals pertaining to the Spray Star 1000 carefully as they have safety, operating, assembly and maintenance instructions. Failure to do so could result in personal injury or equipment damage.

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 1000 is located on the left side, in front of the front tire. Refer to engine manual for placement of engine serial number.

For easy access record your Serial and Model numbers here.

SMITHCO			CE
WAYNE, PENNSYLVANIA 19087 USA 610-688-4009 Fax 610-688-6069			
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

SMITHCO CUSTOMER SERVICE 1-800-891-9435

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 1000

WEIGHTS AND DIMENSIONS

Length	112" (285 cm)
Width	70" (178 cm)
Width With Boom Open	180" (457 m)
Height	48" (122 cm)
Wheel Base	53" (135 cm)
Weight Empty	1480lbs (675 kg)
Weight Full	2248 lbs (1025 kg)

SOUND LEVEL (DBA)

At ear level	88 dba
At 3 ft (0.914 m)	84 dba
At 30 ft (9.14 m)	72 dba

ENGINE

Make	Kohler Command
Model#	CH730
Type / Spec#	PA 68673
Horsepower	23.5HP (17.28 kw)
Fuel	Unleaded 87 Octane Gasoline Minimum
Cooling System	Air Cooled
Lubrication System	Full Pressure
Alternator	25 Amp

WHEELS & TIRE

Front: Two 20 x 10.00 x 10 NHS Multi-Rib; 20psi (1.4 bar)
Rear: Two 24 x 13.00 x 12 NHS Multi-Trac; 18 psi (1.3 bar)

PARK BRAKE

Hand Operated Lever, Discs on Rear Axle

SPEED

Forward Speed	0-8 mph (0-12.8 kph)
Reverse Speed	0-3 mph (0-4.8 kph)

BATTERY

	Automotive type 24F-12 Volt
BCI Group	Size 24
Cold Cranking Amps	575 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	6 gallon (22.7 liters)
Hydraulic Fluid	5 gallon (19 liters)
Grade of Hydraulic Fluid	SAE 10W-40 API Service SJ or higher Motor Oil

OPTIONAL EQUIPMENT

10-417	Chemical Cleanload Safe Fill System	1002	203 Spray System
10-419	Fresh Water Tank	1008	440 Spray System
17-601	15' Heavy Duty Boom	1010	3-Way Manual System
10-160	15' Stainless Steel Boom - manual	10-378	Foam Marker
17-585	18' Heavy Duty Boom	10-377	Hose Reel Mounting Kit f/ 10-160 Boom
15-835	Tank Rinsing System	15-622	Weather Canopy
10-365	Water Meter Kit (gallons)	33-541	Triple Nozzle Kit f/ 15ft/5m 9 nozzle Boom
10-370	Water Meter Kit (liters)	33-540	Triple Nozzle Kit f/ 18'/5.5m Boom
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.

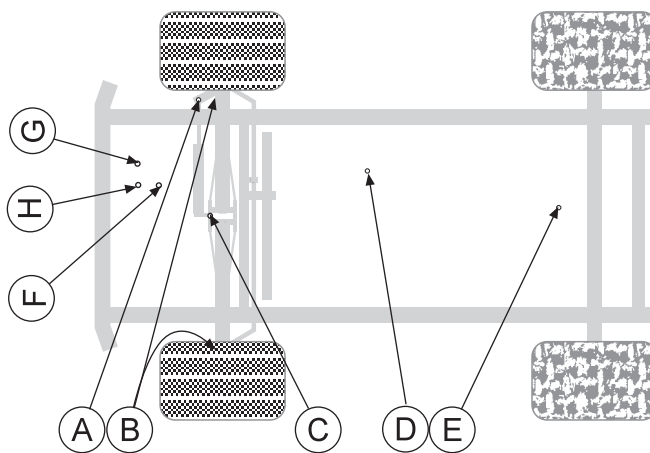
LUBRICATION

Use No. 2 General purpose lithium base grease and lubricate every 100 hours. The Spray Star 1000 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 pump pivot.
- E. One on the brake relay.
- F. One on the pedal relay.
- G. One on the reverse pedal.
- H. One on the forward pedal.

Every 500 hours of operation, separate the hydrostatic pump and the engine, clean the splined areas and lightly grease the male portion of the pump spline. Use either Dow Corning® G-N Metal Assembly Paste or #77 Assembly Paste (Kohler# 25 357 12-s).

As you mount the pump back onto the engine, be certain the mating surfaces are clean and free of any foreign material and that the pump is correctly aligned.



ELECTRICAL CONNECTIONS

Use dielectric grease on all electrical connections.

FLOW METER MAINTENANCE AND ADJUSTMENT (440 SYSTEM ONLY)

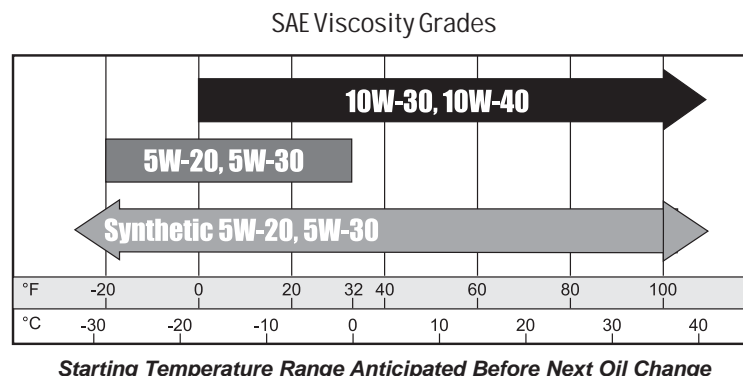
1. Remove Flowmeter from Sprayer, brush away any debris and flush with clean water to remove any foreign material.
2. Remove the retaining rings carefully. Remove the bearing hub, turbine hub, and turbine from inside flowmeter.
3. Clean the turbine and hubs of metal filings and any other foreign material. Use pressurized air to blow metal filings and debris out of both hub and turbine. Check blades for wear. Holding turbine and bearing in your hand, spin turbine. It should spin freely with very little drag.
4. If bearing hub stud is adjusted or replaced, verify the turbine fit before reassembling. Put turbine hub and retaining ring in place. Put bearing hub with turbine against turbine hub inside the flowmeter housing. Put the retaining ring into the groove, to lock bearing hub in place. Spin turbine by blowing on it. Tighten bearing hub stud until turbine stalls. Loosen the stud 1/3 turn. The turbine should spin freely.
5. Use a low pressure (5PSU) jet of air through flowmeter in the direction of flow and again in opposite direction to verify that the turbine spins freely. If there is drag, loosen the stud on the bearing hub 1/16 turn until the turbine spins freely.
6. If turbine spins freely and the cables have been checked, but the flowmeter is not totalizing properly, verify that the sensor assembly is threaded all the way into the flowmeter body and the orientation groove on top of the sensor is parallel with the flowmeter body. If flowmeter still does not totalize, replace sensor assembly.

AIR CLEANER

1. Loosen cover retaining knob and remove cover.
2. Remove pre-cleaner from paper element.
3. Check paper element. Replace element as necessary.
4. Wash pre-cleaner in warm water with detergent. Rinse pre-cleaner thoroughly until all traces of detergent are eliminated. Squeeze out excess water (do not wring). Allow pre-cleaner to air dry.
5. Saturate pre-cleaner with new engine oil. Squeeze out all excess oil.
6. Reinstall pre-cleaner over paper element.
7. Reinstall air cleaner cover. Secure cover with cover retaining knob.

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, which ever 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.

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.

MAINTENANCE

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.



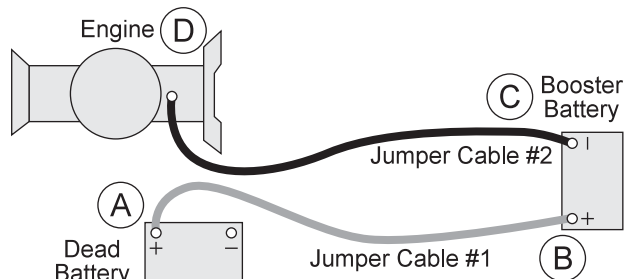
Battery Electrolyte is an acidic solution and should be handled with care. If electrolyte is splashed on any part of your body, flush all contact areas immediately with liberal amounts of water. Get medical attention immediately.



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.

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.



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.

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 fuel level Check condition of hydraulic hoses and fittings. Inspect and clean the machine. Flush spray system tank. Inspect cooling system.
Every 100 hours	Change the engine oil and filter. Check hydraulic filter Check engine for leaks or loose parts. Check spark plugs Check air cleaner. Check tire pressure (20 psi (1.4 bar)). Check the battery fluid level and cable connections. Torque the wheel lug nuts. (64-74 ft/lb (87-100 Nm)) Grease Machine. Check belt tension (where needed)
Every 200 Hours	Change oil filter Torque the wheel lug nuts. (64-74 ft/lb (87-100 Nm))
Every 250 hours	Check Idle Speed 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'S SERVICE CHART

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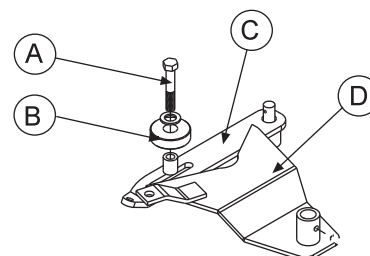
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Service

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 swash plate (D) is under the transmission and comes out forward. The idler arm (B) has a bearing that runs in the notch of the swash plate. Loosen bolt (A).
3. With engine running, move bearing (B) so it centers on the swash plate (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

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

SPEED CALIBRATION NUMBERS

The speed calibration numbers for Spray Star 1008 with GPS is 785. Metric is 205.

MASTER BOOM SWITCH (FOOT SWITCH FOR SPRAY STAR 1008)

The master boom switch, located on the left floorboard is used to override the master switch on the computer console of the spray systems. By pushing down it will turn on/off the booms. *For the 440 System* the Master Switch on the computer **must be off** for the master boom control switch to work.

TO ENGAGE:

1. Flip rocker switch 'On' (green light).
2. Obtain desired speed with foot pedal.
3. Step on foot switch to lock speed.
4. Push foot switch again to disengage.

SPRAY BOSS CONTROL HANDLE

This lever located on the left side of the seat engages and disengages the speed boss. Forward is engage and all the way back is disengage. When the lever is engaged it sets a stop for the accelerator. The accelerator pedal must be used to maintain this speed. To adjust speed use the knob on the end of the lever, counter clockwise increases speed and clockwise decreases speed. Disengage the lever and you will have full accelerator pedal range.

STORAGE

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

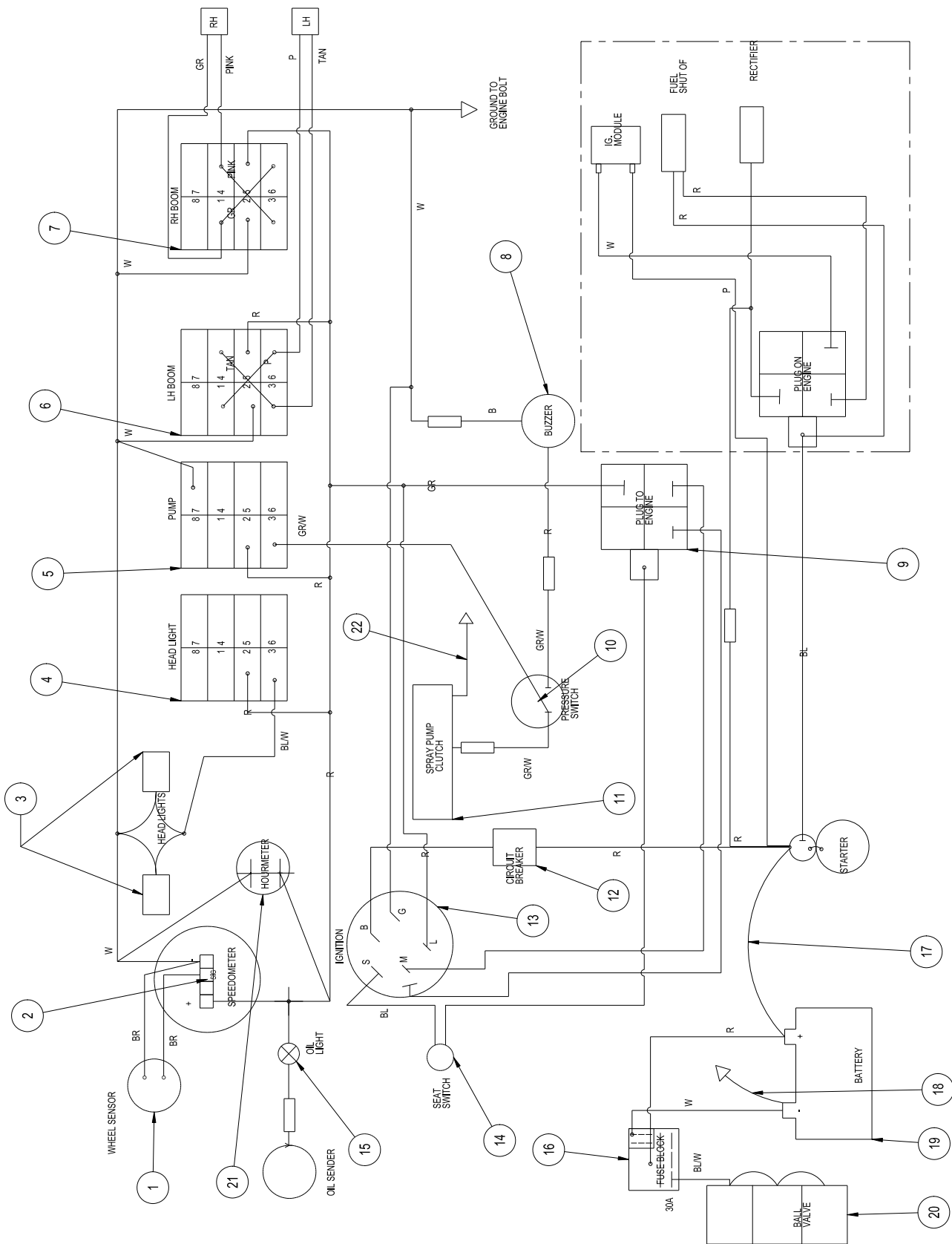
1. Clean the exterior surfaces of the engine.
2. Change the oil and filter while the engine is still warm from operation.
3. The fuel system must be completely emptied, or the gasoline must be treated with a stabilizer to prevent deterioration.

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



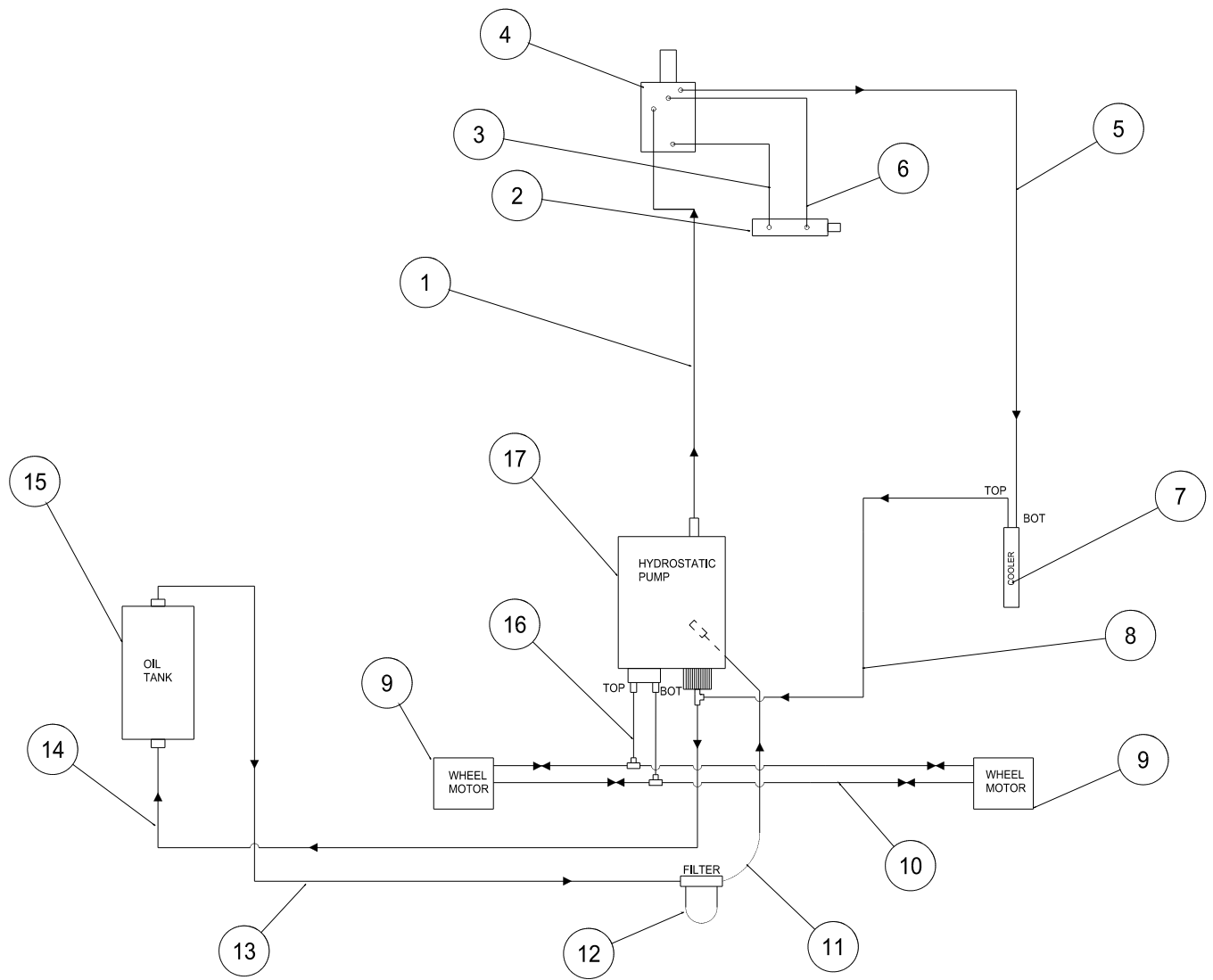
WIRING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-883	Wheel Sensor	1
2	10-556	Speedometer	1
	8854	Fork Terminal	2
	8963	Heat Shrink	2
3	17-524	Lights	2
	10-421	Pig tail	2
4	Head Lights		
	15-725	Mount Panel End	1
	15-727	Rocker, No Light	1
	15-782	Non-Lighted Switch	1
5	Pump		
	15-729	Mount Panel Middle	1
	15-726	Lighted Switch	1
	15-731	Rocker, Amber	1
6	Left Boom		
	15-729	Mount Panel Middle	1
	15-727	Rocker, No Light	1
	15-728	Centering Switch Momentary, On-Off-On	1
7	Right Boom		
	15-725	Mount Panel End	1
	15-727	Rocker, No Light	1
	15-728	Centering Switch Momentary, On-Off-On	1
8	77-207	Buzzer	1
	8875	Male Bullet	2
	8963	Heat Shrink	2
9		Plug to Engine	1
10	33-480	Pressure Switch	1
11	16-998	Hypro Pump With Electric Clutch	1
12	77-261	Circuit Breaker	1
	8977	Circuit Breaker Boot	1
13	13-488	Ignition Switch (Kohler 25 099 04)	1
14	14-292	Seat Switch	1
15	50-359	Oil Warning Light	1
	8853	Slide On Connector	2
	8963	Heat Shrink	2
16	33-271	Fuse Block	1
17	22-055	Red Battery Cable	1
18	48-147	Ground Battery Cable	1
19	33-216	Battery	1
20	15-743	Ball Valve	1
21	12-017	Hour Meter	1
22	10-470	Ground Wire - Engine to SPay Pump	1
	10-371	Wire Harness	1

Use dielectric grease on all electrical connections.

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

HYDRAULIC DIAGRAM



HYDRAULIC DIAGRAM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-276	Hydraulic Hose	2
2	10-554	Hydraulic Cylinder	1
3	10-277	Hydraulic Hose	1
4	15-301	Orbitrol Motor	1
5	10-279	Hydraulic Hose	1
6	10-278	Hydraulic Hose	1
7	42-265	Oil Cooler	1
8	10-373	Hydraulic Hose	1
9	10-116	Wheel Motor	2
10	10-273	Hydraulic Hose	4
11	10-376	Hydraulic Hose	1
12	15-626	Oil Filter	1
	15-626-01	Replacement Filter	
13	10-375	Hydraulic Hose	1
14	10-374	Hydraulic Hose	1
15	60-473	Oil Tank	1
16	10-274	Hydraulic Hose	2
17	10-117	Hydrostatic Pump	1

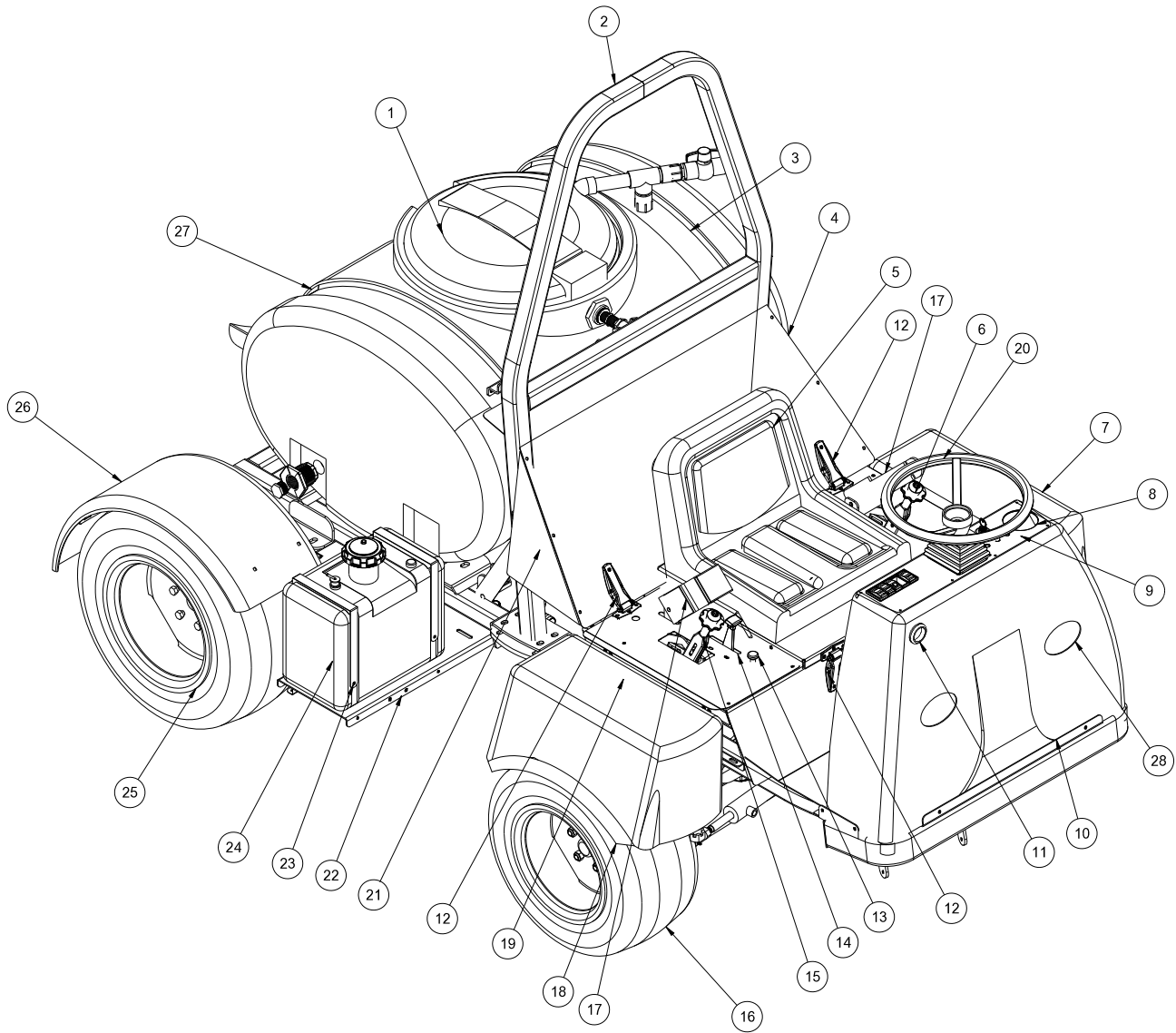
FITTING TORQUE CHARTS

SAE Straight Thread O-ring Plugs (Steel)					
Fitting Size	SAE Port Thread	Hollow Hex Head Plug (HP50N) Assembly Torque		Hex Head Plug (P50N) Assembly Torque	
		in. lbs.	ft. lbs.	in. lbs.	ft. lbs.
2	5/16 - 24	35 ± 5	3 ± .5	90 ± 5	7.5 ± .5
3	3/8 - 24	60 ± 5	5 ± .5	170 ± 10	14 ± 1
4	7/16 - 20	135 ± 10	11 ± 1	220 ± 15	18 ± 1
5	1/2 - 20	180 ± 10	15 ± 1	260 ± 15	22 ± 1
6	9/16 - 18	220 ± 10	18 ± 1	320 ± 20	27 ± 2
8	3/4 - 16	550 ± 20	46 ± 2	570 ± 25	48 ± 2
10	7/8 - 14	900 ± 50	75 ± 5	1060 ± 50	90 ± 5
12	1 1/16 - 12	1020 ± 50	85 ± 5	1300 ± 50	110 ± 5
14	1 3/16 - 12	1550 ± 75	130 ± 6	1750 ± 75	145 ± 6
16	1 5/16 - 12	1600 ± 75	135 ± 6	1920 ± 75	160 ± 6
20	1 5/8 - 12	2700 ± 150	225 ± 12	2700 ± 150	225 ± 12
24	1 7/8 - 12	3000 ± 150	250 ± 12	3000 ± 150	250 ± 12
32	2 1/2 - 12	3900 ± 200	325 ± 15	3900 ± 200	325 ± 15

Seal-Lok Straight and Adjustable Fitting (Steel)			
Fitting Size	SAE Port Thread Size	Assembly Torque (2)	
		in. lbs.	ft. lbs.
4	7/16 - 20	190 ± 10(1)	16 ± 1.0
6	9/16 - 18	420 ± 15	35 ± 1.0
8	3/4 - 16	720 ± 25	60 ± 2.0
10	7/8 - 14	1260 ± 50	105 ± 5.0
12	1 1/16 - 12	1680 ± 75	140 ± 6.0
16	1 5/16 - 12	2520 ± 100	210 ± 8.0
20	1 5/8 - 12	3100 ± 150	260 ± 12.0
24	1 7/8 - 12	3800 ± 150	315 ± 12.0

Over tightened fittings will result in crushing the cone which will create a leak.
Charts Developed by Parker Hennipin

BODY & FRAME DRAWING



BODY & FRAME PARTS LIST

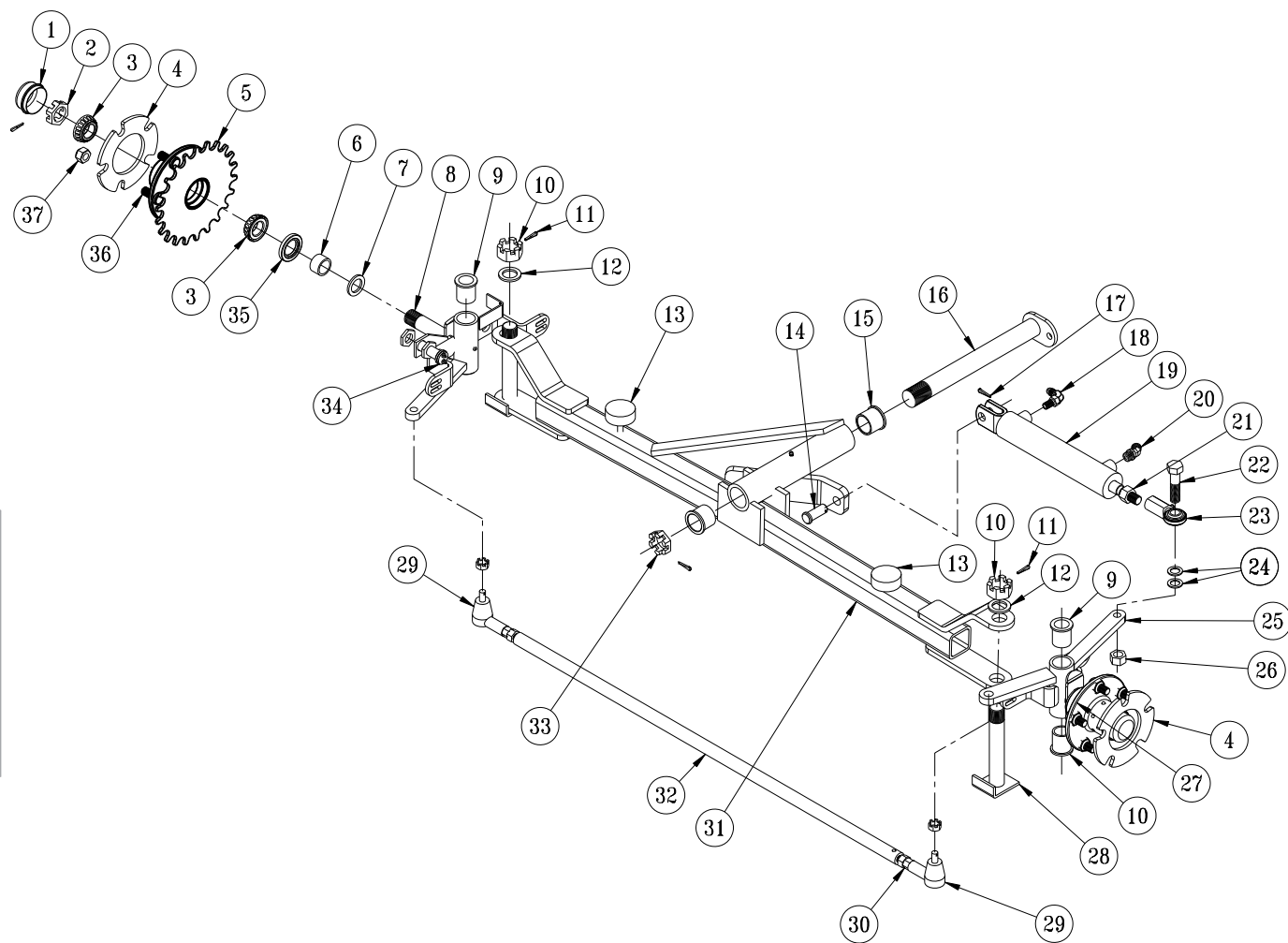
REF#	PART#	DESCRIPTION	QUANTITY
1	10-111	110 Gallon Poly Tank	1
	14-532	Lid	1
	16-169	Strainer Basket	1
2	10-404	Roll Bar	1
3	10-410	Left Tank Strap	1
4	10-437	Back Panel	1
	9023	Heat Reflective Matting (18 x 25.5)	1
5	14-270	Seat	1
	14-292	Seat Switch	1
	HB-516-18-125	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{4}$	4
	HW-516	Washer $\frac{5}{16}$	4
	HWL-516	Lock Washer $\frac{5}{16}$	4
	HN-516-18	Nut $\frac{5}{16}$ - 18	4
6	10-228	Spray Boss Handle	1
7	10-392	Left Front Fender	1
8	10-202	Speedometer	1
9	13-718	Steering Wheel	1
10	15-763	Nose Cone	1
11	50-400	Rubber Grommet	1
12	27-055	Seat Hinge	4
13	80-020	Choke	1
14	34-160	Throttle Control with Cable	1
15	60-106	Park Brake Handle	1
16	16-857	Tire and Wheel	2
	16-857-01	Tire 20 x 10 - 10NHS 4 Ply	2
	42-161-02	Wheel	2
17	76-198-03	Seat Belt	1
18	10-391	Right Front Fender	1
19	34-105	Oil Cooler	1
	10-395	Cooler Mount	1
	18-352	Female Swivel Fitting	2
20	15-781	Drink Cup Holder	1
21	10-438	Right Side Panel	1
	10-439	Left Side Panel	1
22	10-400	Gas Tank Bracket	1
23	78-456	Gas Tank Strap	2
24	15-838	Fuel Tank	1
25	78-221	Tire and Wheel	2
	78-221-01	Tire 24-13-12NHS	2
	78-221-02	Wheel	2
26	10-168	Rear Fender	2
	HBCL-516-18-100	Low Carriage Bolt $\frac{5}{16}$ - 18 x 1	8
	HNFL-516-18	Flange-Loc Nut $\frac{5}{16}$ - 18	8
27	22-528	Right Tank Strap	1
28	17-524	Oval Head Lights	2

NOSE CONE DRAWING

NOSE CONE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-844	Steering Shim	1
2	12-017	Hour Meter	1
3	10-459	Hose Guard	1
4	13-488	Key Switch	1
5	10-556	Speedometer	1
6	50-359	Oil Warning Indicator Light	1
7	HNJ-58-18	Jam Nut $\frac{5}{8}$ - 18	1
8	HWK-316-075	Woodruff Key $\frac{3}{16}$ - $\frac{3}{4}$	1
9	13-718	Steering Wheel	1
	13-726	Steering Wheel Cap	1
10	76-364	Black Boot	1
11	76-362	Mini Tilt Steering Mechanism	1
12	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	4
	HW-516	Washer $\frac{5}{16}$ - 18	8
	HNFL-516-18	Flange-Loc Nut $\frac{5}{16}$	4
13	15-725	Mount Panel End	1
	15-727	Rocker, No Light	1
	15-782	Non Lighted Switch	1
14	15-729	Mount Panel Middle	1
	15-730	Mount Panel Plug	1
15	15-729	Mount Panel Middle	1
	15-726	Lighted Switch	1
	15-731	Rocker, Amber	1
16	15-729	Mount Panel Middle	1
	15-727	Rocker, No Light	1
	15-728	Centering Switch Momentary, On-Off-On	1
17	15-725	Mount Panel End	1
	15-727	Rocker, No Light	1
	15-728	Centering Switch Momentary, On-Off-On	1
18	15-754	Dash Panel	1
	15-672	Decal, Dashboard	1
	HSM-10-32-100	Machine Screw #10 -32 x 1	4
	HW-14	Washer 1/4	4
	HNFL-10-32	Flange loc Nut #10 -32	4
19	50-400	Rubber Grommet	1
20	15-724	Headlights	2
21	48-132	Short Pedal Pad	1
22	10-164	Reverse Pedal	1
23	HSTP-516-18-100	Machine Screw $\frac{5}{16}$ - 18 x 1	4
	HNFL-516-18	Flange-Loc Nut $\frac{5}{16}$ - 18	4
24	48-066	Pedal Pad	1
25	10-163	Forward Foot Pedal	1
26	10-472	Main Frame	1
27	18-306	$\frac{11}{16}$ X $\frac{9}{16}$ Straight Thread Connector	4
28	10-458	Spray Switch Plate (440 System (1008))	1
29	33-509	Master Boom Switch (440 System (1008))	1
30	HBM-6-1-16	Metric Bolt #6 - 1 x 16	2
31	HSTP-516-18-100	Machine Screw $\frac{5}{16}$ - 18 x 1	7
	HNFL-516-18	Flange Loc Nut $\frac{5}{16}$ - 18	7
32	15-301	Orbitrol	1
33	48-187	Stub Shaft	1
34	77-207	Buzzer	1
35	18-309	Swivel Nut Elbow	1
36	15-763	Console	1

FRONT AXLE DRAWING



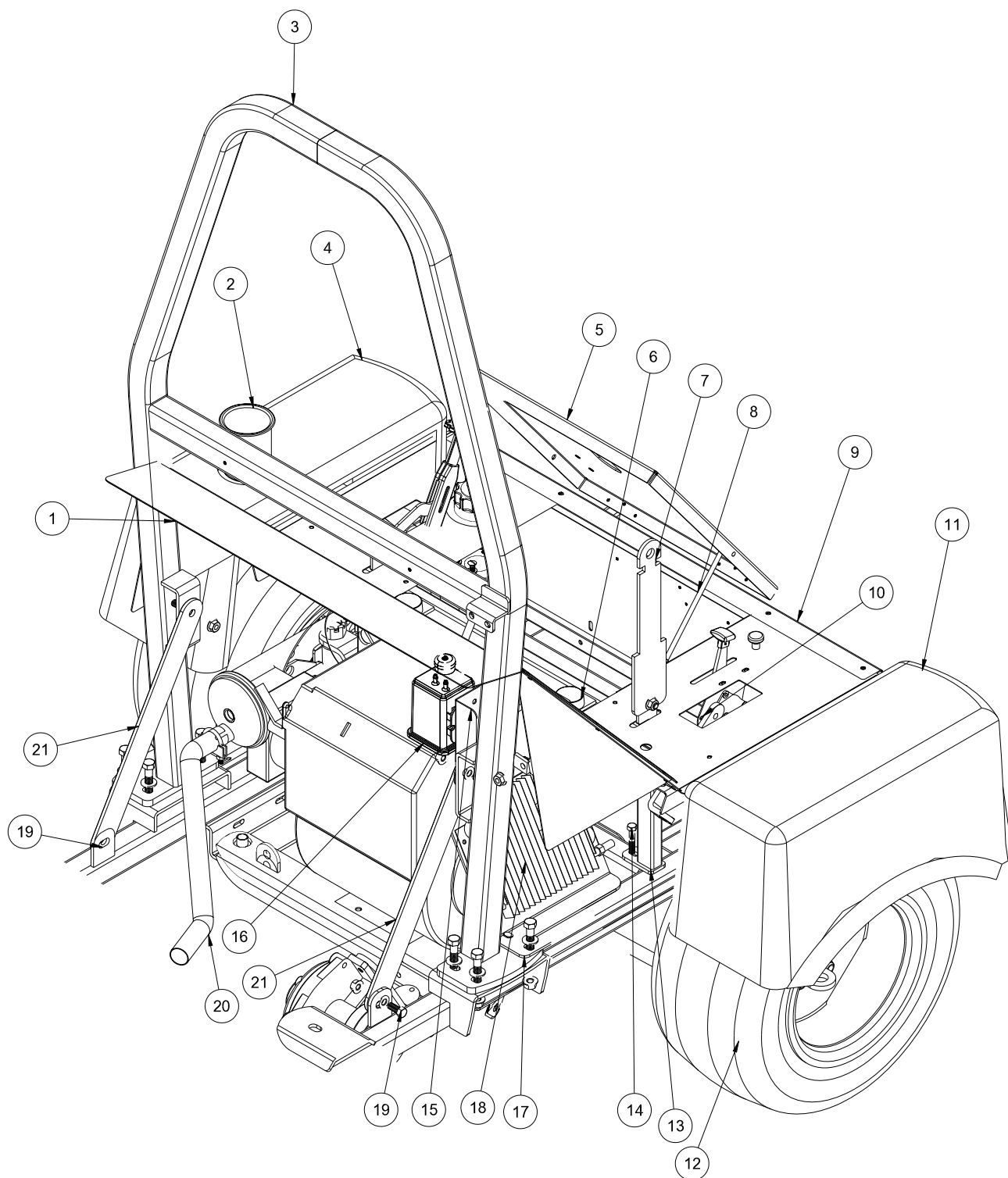
Parts

FRONT AXLE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	80-167	Dust Cap	2
2	HNAR-100-14	Slotted Jam Nut 1 - 14	2
3*	11-043	Bearing	4
4	10-327	Shim	2
5	10-561	Hub & Sprocket (includes * items Ref# 1,3,35,36 & 37)	1
6	11-042	Spacer	2
7	HMB-100-10	Machine Bushing 1 x 10GA	2
8	10-294	Left Spindle	1
	HG-14-28-180	Grease Fitting 1/4 - 28 x 180°	1
9	18-035	Bushing (part of 10-294 -and 10-295; 2 per)	4
10	HNA-100-14	Slotted Nut 1 - 14	2
11	HP-18-150	Cotter Pin 1/8 - 1 1/2	4
12	HMB-100-14	Machine Bushing 1 x 14GA	2
13	50-081	Rubber Insulator	2
14	HCP-58-175	Clevis Pin 5/8 - 1 3/4	1
15	18-153	Bushing (part of 10-131)	2
16	10-138	Axle Pin	1
17	HP-18-100	Cotter Pin 1/8 x 1	1
18	18-307	1 1/16 x 9/16 45° Straight Thread Elbow	1
19	10-554	Hydraulic Cylinder	1
	14-529	Seal Kit	1
20	18-171	1 1/16 x 9/16 90° Straight Thread Elbow	1
21	HNJ-58-18	Jam Nut 5/8 - 18	1
22	HB-58-11-250	Bolt 5/8 - 11 x 2 1/2	1
23	18-154	Rod End	1
24	HMB-58-14	Machine Bushing 5/8 x 14GA	2
25	10-295	Right Spindle	1
	HG-14-28-180	Grease Fitting 1/4 - 28 x 180°	1
26	HNTL-58-11	Lock Nut 5/8 - 11	1
27	80-019	Hub (includes * items Ref# 1,3,35,36 & 37)	2
28	16-076	King Pin	2
29	16-565	Rod End	2
30	HNM-12-1.25	Metric Nut M12 - 1.25	2
31	10-131	Front Axle	1
	HG-14-28-180	Grease Fitting 1/4 - 28 x 180°	1
32	10-139	Tie Rod	1
33	HNA-114-12	Slotted Nut 1 1/4 - 12	1
34	16-883	Magnetic Sensor	1
	HNJ-34-16	Jam Nut 3/4 - 16	1
35*	11-041	Oil Seal	2
36*	27-022-02	Stud 1/2 - 20	10
37*	HNL-12-20	Lug Nut 1/2 - 20	10

SEAT CONSOLE AND ROPS DRAWING

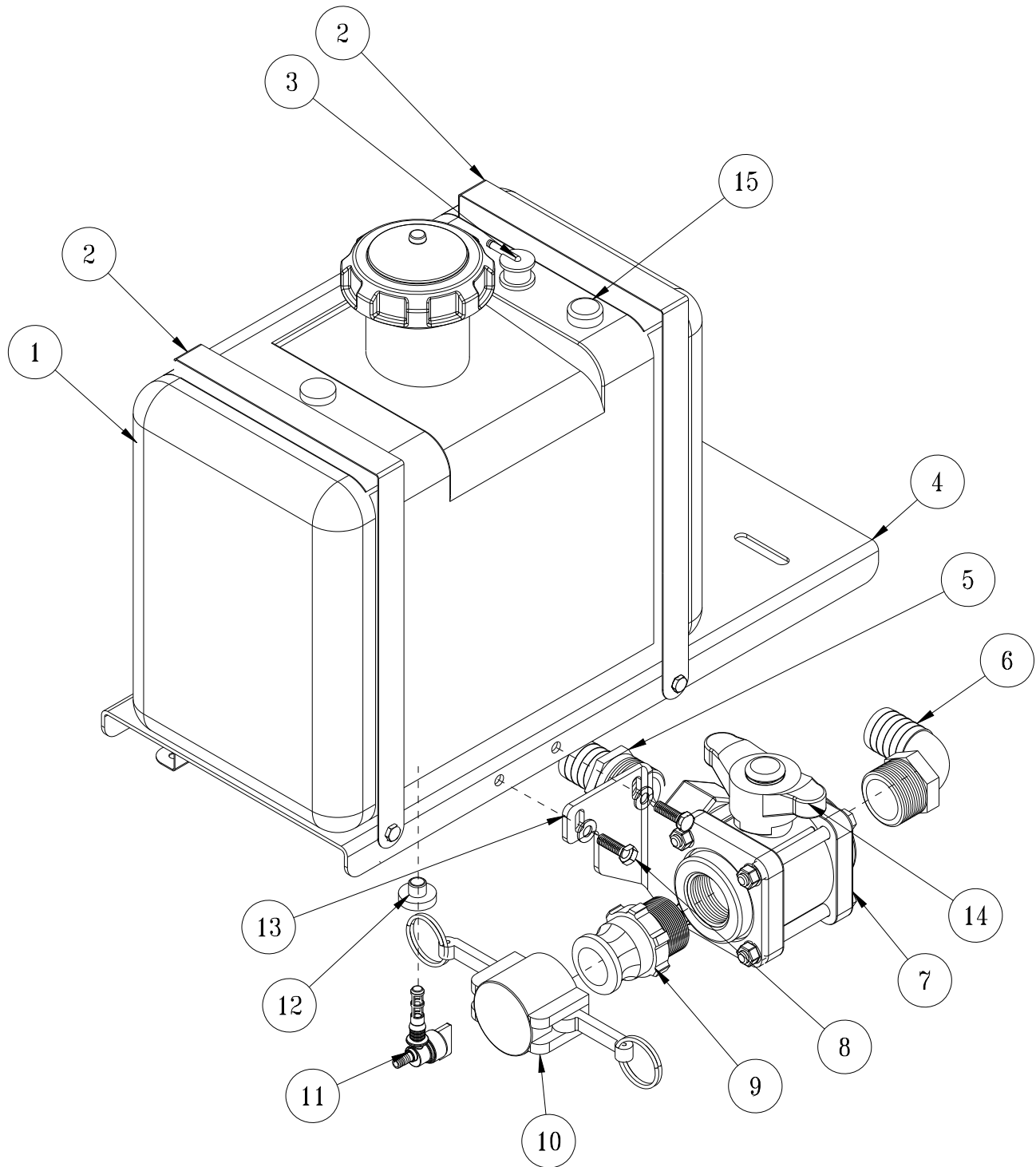
Parts



SEAT CONSOLE AND ROPS PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-382	Back Panel	1
	9023	Heat Reflective Matting (18 x 25.5)	1
2	15-781	Cup Holder	1
3	10-404	Roll Bar	1
4	10-392	Left Front Fender	1
5	10-388	Seat Panel	1
6	50-081	Rubber Bumper	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
7	76-198-03	Seat Belt	1
8	15-786	Hood Rod	1
	HW-38	Washer $\frac{3}{8}$	4
	HP-18-075	Cotter Pin $\frac{1}{8}$ x $\frac{3}{4}$	2
9	10-385	Front Panel	1
10	42-766	Throttle Bracket	1
11	10-391	Right Front Fender	1
12	16-857	Front Tire and Wheel	2
13	10-338	Seat Panel	1
14	HB-38-16-300	Bolt $\frac{3}{8}$ - 16 x 3	2
	HNFL-38-16	Flange-Loc Nut $\frac{3}{8}$ - 16	2
15	10-462	Canister Mount Bracket	1
16	8-688	Canister Mount	1
	8-689	Carb Canister	1
	8-693	Hose Connector	1
17	10-395	Cooler Mount	1
18	34-105	Oil Cooler	1
	18-352	Female Swivel Fitting	2
19	HB-12-13-150	Bolt $\frac{1}{2}$ - 1 3 x $1\frac{1}{2}$	4
	HNTL-12-13	Loc Nut $\frac{1}{2}$ - 13	4
20	10-380	Tailpipe	1
21	10-398	Roll Bar Brace	2

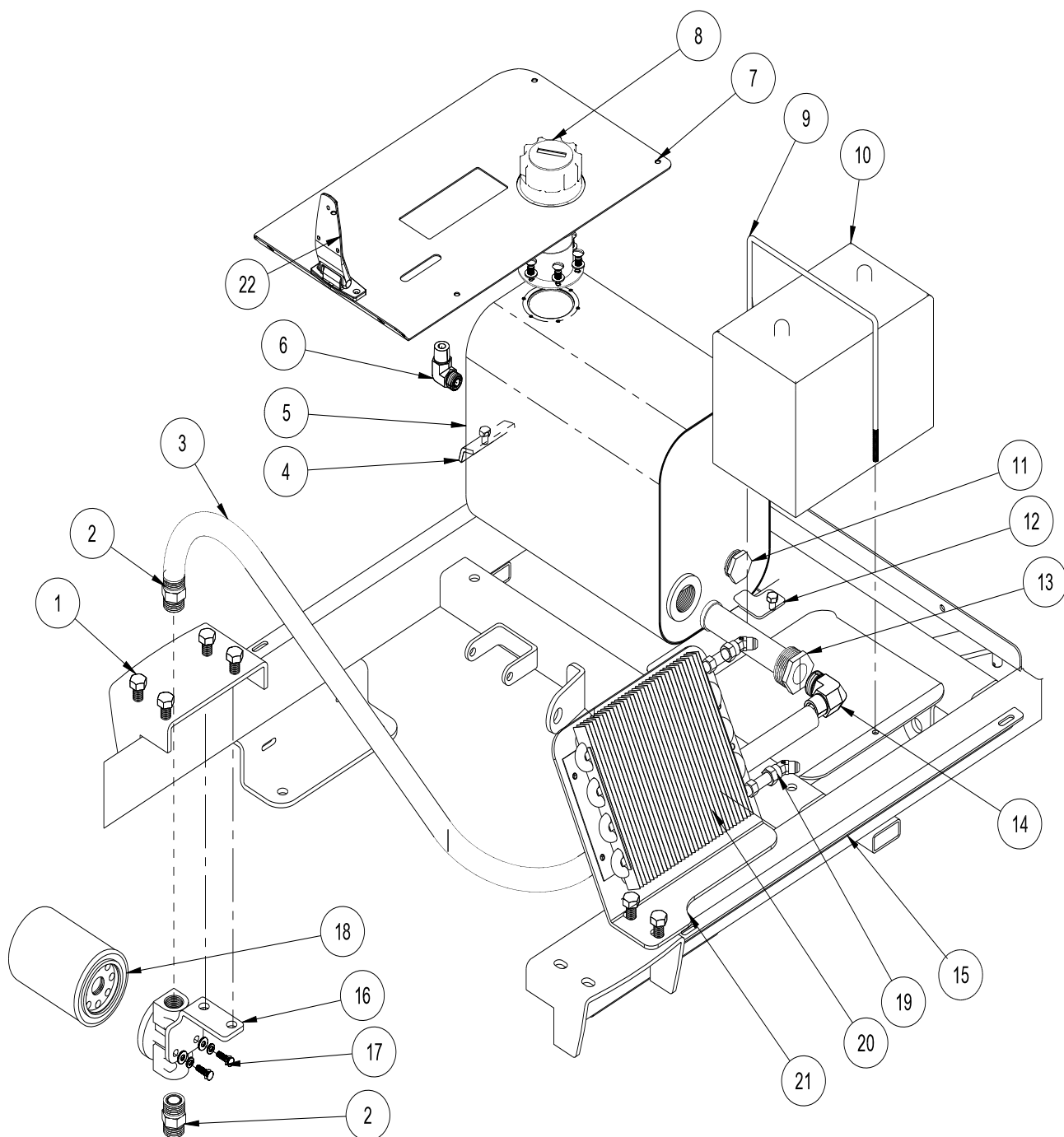
FUEL TANK DRAWING



FUEL TANK PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-838	CARB Gas Tank (includes all * items)	1
	*	Neck Vent Port	1
	8800-48	Fuel Hose (tank to carb canister)	1
	18-186	Hose Clamp	2
	73-050	Vented Cap with Gauge (replacement)	1
2	78-456	Tank Strap	2
	HB-14-20-100	Bolt $\frac{1}{4}$ - 20 x 1	2
	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	4
3	*	Top Draw	1
	8800-46	Fuel Hose (tank to engine)	1
	18-186	Hose Clamp	2
4	10-400	Gas Tank Bracket	1
5	16-161	Fitting $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	1
6	16-156	Elbow $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	1
7	18-372	3-Way Ball Valve	1
8	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	2
	HW-516	Washer $\frac{5}{16}$	2
	HNTL -516-18	Lock Nut $\frac{5}{16}$ - 18	2
9	16-180	Quick Coupler, $1\frac{1}{4}$ Male	1
10	16-935	Quick Coupler Cap	1
11	26-055	Shut -Off Valve	1
12	26-054	Bushing Insert	1
13	10-396	Valve Mount	1
14	18-372-01	T-Handle	1
15	*15-838-01	Dial Fuel Level Gage	1

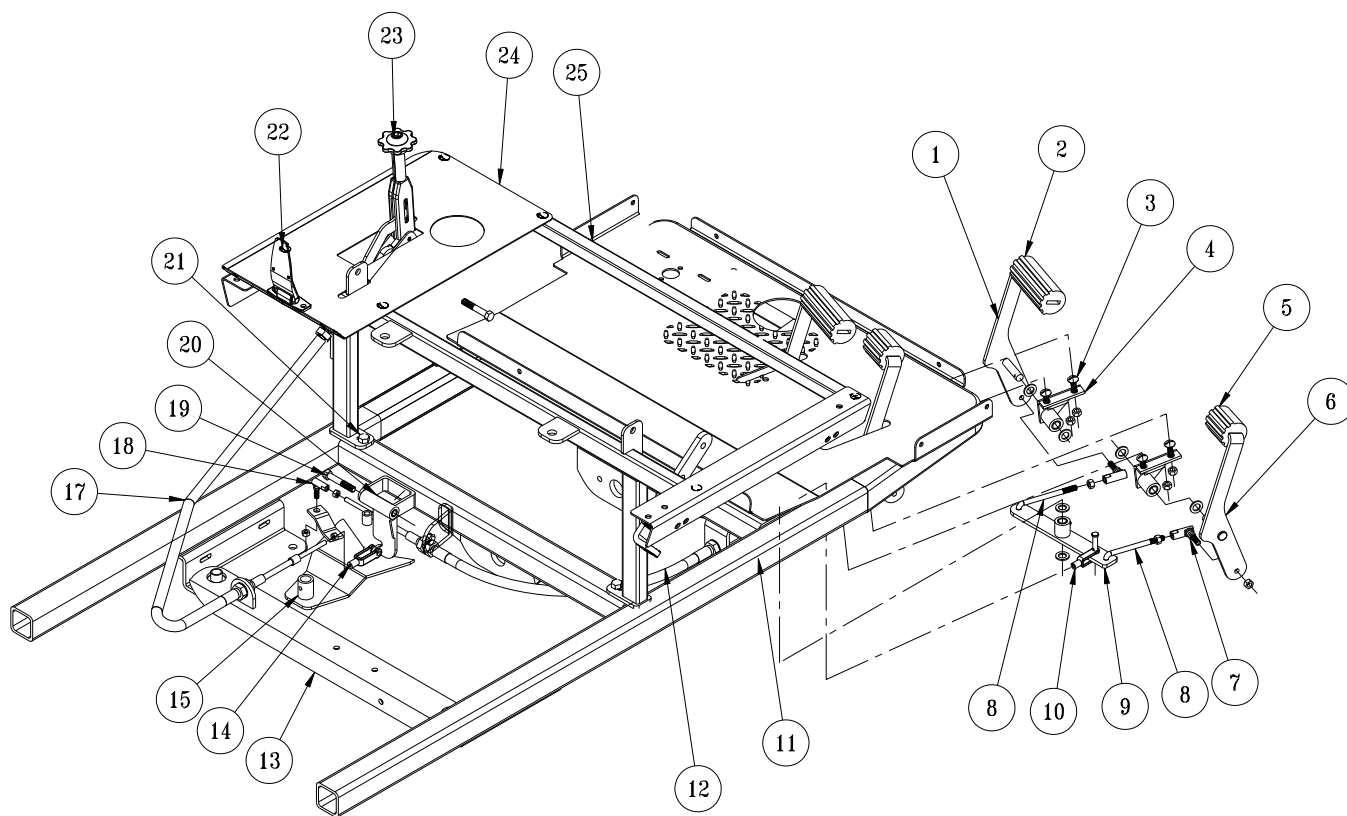
OIL TANK -OIL FILTER-OIL COOLER DRAWING



OIL TANK-OIL FILTER-OIL COOLER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HB--12-13-175	Bolt $\frac{1}{2}$ - 13 x $\frac{3}{4}$	8
	HW-12	Washer $\frac{1}{2}$	8
	HNTL-12-13	Lock Nut $\frac{1}{4}$ - 13	8
2	18-311	Straight Thread Connector	2
3	10-375	Hydraulic Hose	1
4	76-792	Tank Hold-down	1
	HB-516-18-150	Bolt $\frac{5}{16}$ - 18 x 1- $\frac{1}{2}$	1
	HW-516	Washer $\frac{5}{16}$	1
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	1
5	60-473	Hydraulic Oil Tank	1
	18-118	$\frac{1}{8}$ " Pipe Plug	1
6	18-413	90° Male Elbow	1
7	10-461	Left Side Panel	1
8	13-747	Filler Breather	1
	13-586-03	Neck	1
	13-586-01	Cap Gasket	1
	13-586-02	Bottom Gasket	1
	HSM-10-32-063	Machine Screw 10- 32 x $\frac{5}{8}$	6
	HWL-10	Lock washer #10	6
9	10-393	Battery Hold Down	1
10	33-216	Battery	1
11	18-069	$\frac{1}{2}$ " Pipe Plug	1
12	10-394	Tank Hold-down	1
13	60-213	Strainer	1
14	18-412	90° Male Elbow	1
15	10-472	Main Frame	1
16	10-402	Oil Filter Bracket	1
17	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HW-14	Washer $\frac{1}{4}$	2
	HWL-14	Lockwasher $\frac{1}{4}$	2
18	15-626	Oil Filter	1
	15-626-01	Replacement Filter	
19	18-352	37° Female Swivel	2
20	42-265	Oil Cooler	1
21	10-395	Cooler Mount	1
22	27-055	Hinge	1
	HSMFCS-10-32-050	Machine Screw #10-32- $\frac{1}{2}$	3
	HNFL-10-32	Flange Lock Nut #10-32	3

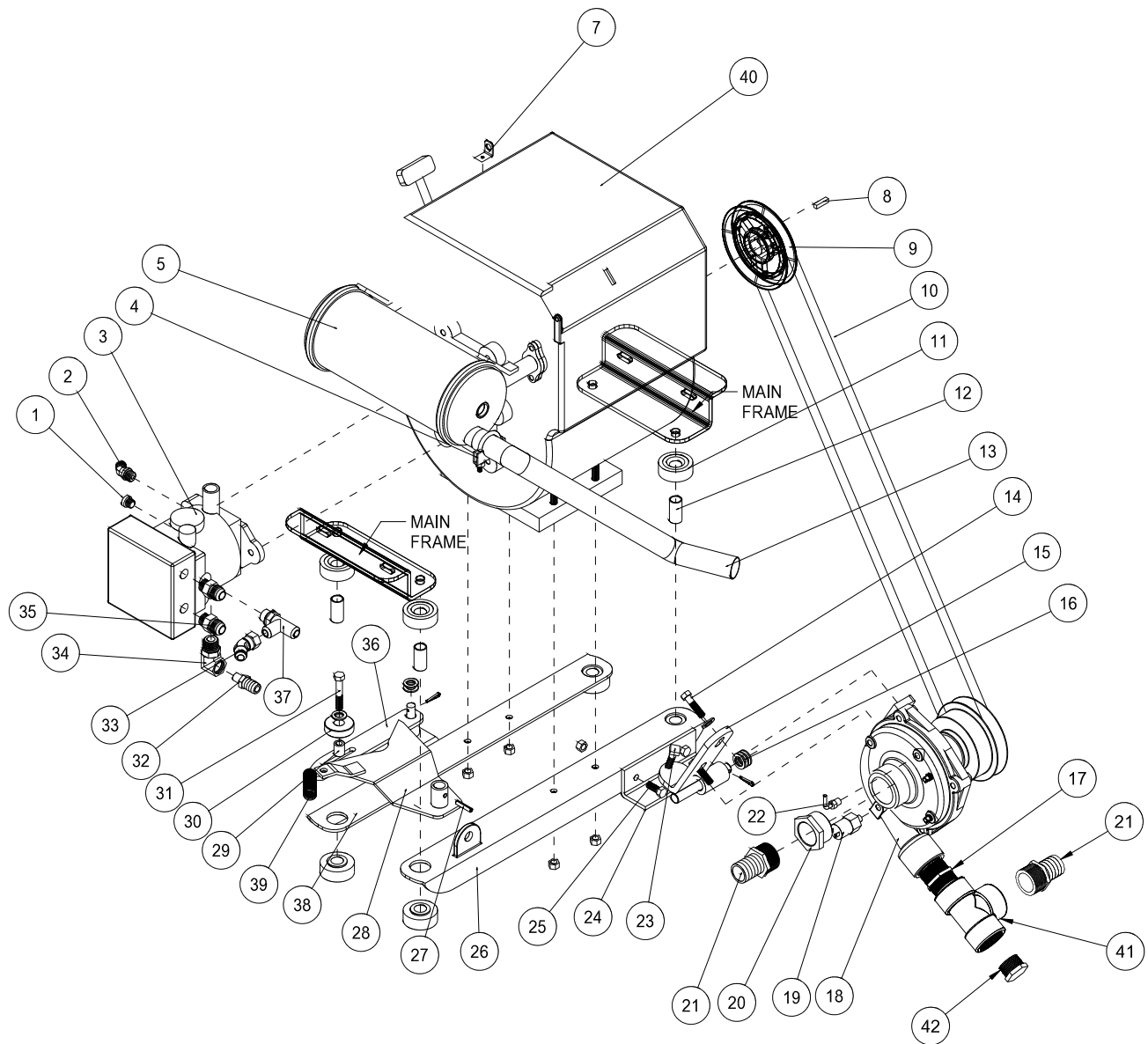
FOOT PEDAL LINKAGE DRAWING



Parts

FOOT PEDAL LINKAGE PARTS LIST

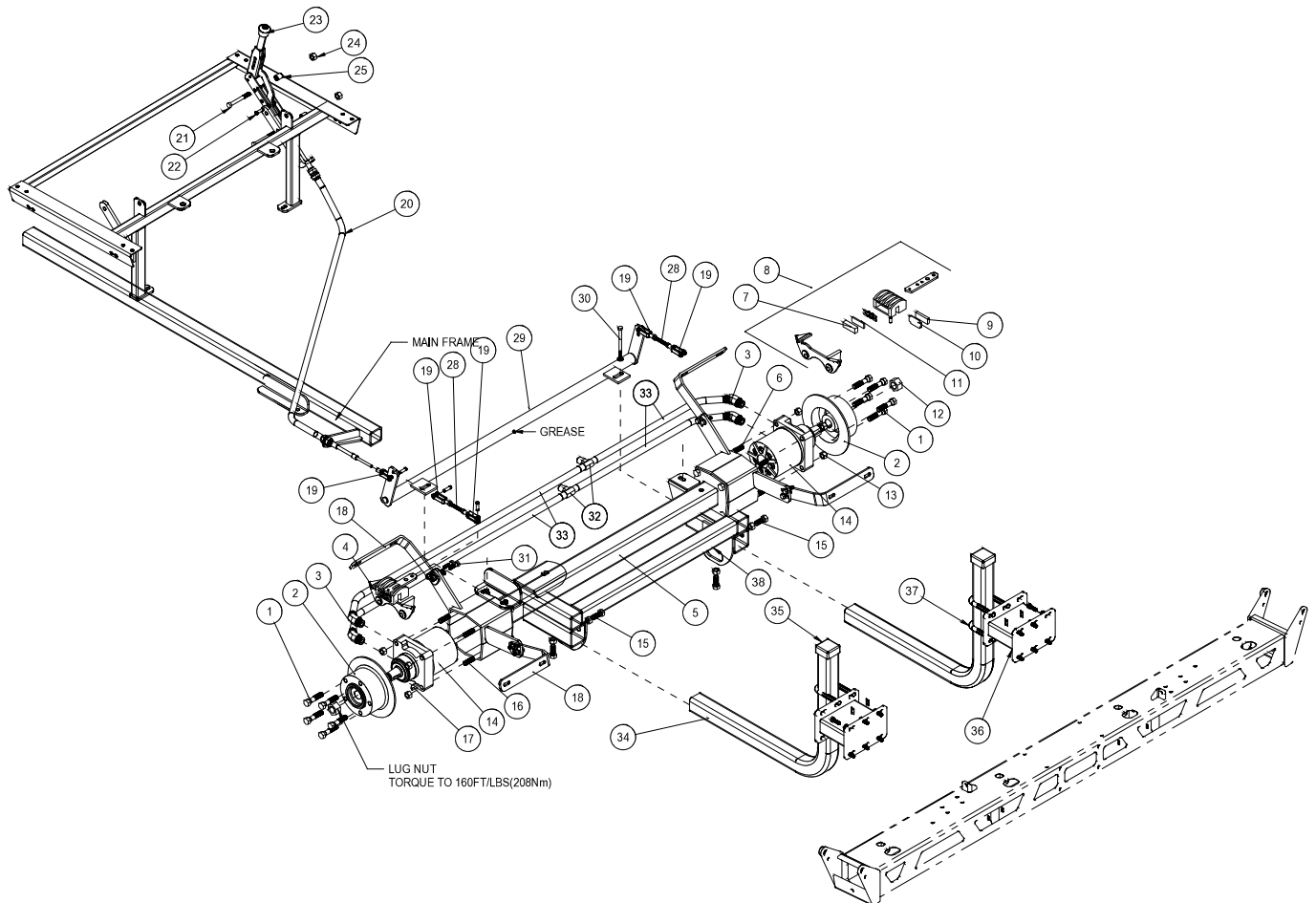
REF#	PART#	DESCRIPTION	QUANTITY
1	10-163	Forward Foot Pedal	1
	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	2
2	48-066	Pedal Pad	1
3	HSTP-516-18-100	Truss Head Screw $\frac{5}{16}$ - 18 x 1	4
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
4	76-296	Pedal Mount	2
	18-234	Bushing (part of 76-296)	4
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180° (part of 76-296)	2
5	48-132	Short Pedal Pad	1
6	10-164	Reverse Foot Pedal	1
	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	2
7	21-462	Ball Joint	2
	HN-516-24	Nut $\frac{5}{16}$ - 24	2
8	10-149	Forward/Reverse Linkage	2
	HN-516-24	Nut $\frac{5}{16}$ - 24	2
9	10-178	Relay	1
	18-234	Bushing (part of 10-178)	2
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180° (part of 10-178)	1
	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	2
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
10	11-103	Linkage yoke $\frac{1}{4}$ NF	2
	HCP-14-075	Clevis Pin $\frac{1}{4}$ x $\frac{3}{4}$	2
	HP-332-100	Cotter Pin $\frac{3}{32}$ x 1	2
11	10-472	Main Frame	1
12	42-063	Cable with nuts	1
13	10-166	Rear Engine Mount	1
14	11-100	Yoke $\frac{5}{16}$	2
	HN-516-24	Nut $\frac{5}{16}$ - 24	2
	HCP-516-100	Clevis Pin $\frac{5}{16}$ x 1	2
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	2
15	10-151	Swash Plate	1
17	10-190	Cable, Spray Boss Control	1
18	18-115	Ball Joint, $\frac{1}{4}$ NF	1
	HWL-14	Lockwasher $\frac{1}{4}$	1
	HN-14-28	Nut $\frac{1}{4}$ - 28	2
19	HB-38-16-350	Bolt $\frac{3}{8}$ - 16 x 3 $\frac{1}{2}$	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	1
20	10-189	Speed Boss	1
	18-289	Bushing (part of 10-189)	2
21	HB-38-16-300	Bolt $\frac{3}{8}$ - 16 x 3	2
	HNFL-38-16	Flange-Loc Nut $\frac{3}{8}$ - 16	2
22	27-055	Hinge	1
	SMFCS-10-32-050	Machine Screw #10-32- $\frac{1}{2}$	3
	HNFL-10-32	Flange Lock Nut #10-32	3
23	10-228	Spray Boss Control	1
	10-134	Spacer	2
24	10-461	Left Side Panel	1
25	10-401	Seat Frame	1



ENGINE, PUMPS AND EXHAUST PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	23-126	O-Ring Plug	1
2	18-307	45° Straight Thread Elbow $1^{1/16} \times 9^{9/16}$	1
3	10-117	Hydrostatic Pump	1
	HSSH-12-13-175	Socket Screw $1/2 - 13 \times 1^{3/4}$	2
4	18-220	Muffler Clamp $1^{1/4}$	1
5	10-118-01	Muffler (Kohler 24 786 11)	1
7	34-163	Cable Bracket	1
8	HKSQ-14-100	Machine Key $1/4 \times 1/4 \times 1$	1
9	10-212	Pulley BK57	1
10	10-179	Belt	1
11	60-107	Rubber Bushing	8
12	60-168	Spacer	4
13	10-380	Tailpipe	1
14	HB-38-16-175	Bolt $3/8 - 16 \times 1^{3/4}$	2
	HW-38	Washer $3/8$	2
	HNTL-38-16	Lock Nut $3/8 - 16$	2
15	10-338	Pump Mount	1
16	HMB-58-14	Machine Bushing $5/8 \times 14GA$	3
	HHP-18-100	Bridge Pin $1/8 \times 1$	1
17	16-880	Poly Close Nipple	1
18	16-998	Hypro® Pump	1
19	33-480	Pressure Switch	1
20	16-825	Stainless Steel Reducer Bushing $1^{1/2} \times 1^{1/4}$	1
21	16-161	Fitting $1^{1/4} MPT \times 1^{1/4} HB$	2
22	33-494	Male Elbow	1
23	HSSQ-38-16-150	Adjustment Screw $3/8 - 16 \times 1^{1/2}$	1
	HN-38-16	Nut $3/8 - 16$	1
24	10-133	Pivot	1
	HG-14-28-180	Grease Fitting $1/4 - 28 \times 180^\circ$ (part of 10-133)	1
	18-268	Bushing (part of 10-133)	2
25	HB-38-16-100	Bolt $3/8 - 16 \times 1$	2
	HNTL-38-16	Lock Nut $3/8 - 16$	2
26	10-166	Rear Engine Mount	1
27	HRP-14-100	Roll Pin $1/4 \times 1$	1
28	10-151	Swash Plate	1
29	10-134	Spacer	1
30	14-266	Ball Bearing $1^{3/4} OD \times 5/8 ID$	1
	18-270	Oilite Bushing $5/8 OD \times 3/8 ID$	1
31	HB-38-16-225	Bolt $3/8 - 16 \times 2^{1/4}$	1
	HNTL-38-16	Lock Nut $3/8 - 16$	1
34	18-313	90° Straight Thread Elbow $1^{3/16} \times 3/4$	1
35	18-303	Straight Thread Connector $1 \times 3/4$	2
36	10-136	Idler Arm	1
	18-234	Oilite Bushing (part of 10-136)	2
	HG-14-28-180	Grease Fitting $1/4 - 28 \times 180^\circ$ (part of 10-136)	1
	HMB-12-14	Machine Bushing $1/2 - 14GA$	2
	HP-18-100	Cotter Pin $1/8 \times 1$	1
37	18-304	Union Tee $1^{3/16} \times 3/4 \times 1^{3/16}$	1
38	10-177	Front Engine Mount	1
39	21-212	Spring	1
40	10-118	Engine Kohler 23.5 hp	1
	76-324-03	Crankshaft Splined Insert (part of engine)	1
41	18-390	$1^{1/4}$ Pipe Tee	1
42	10-389	$1^{1/4}$ Plug	1

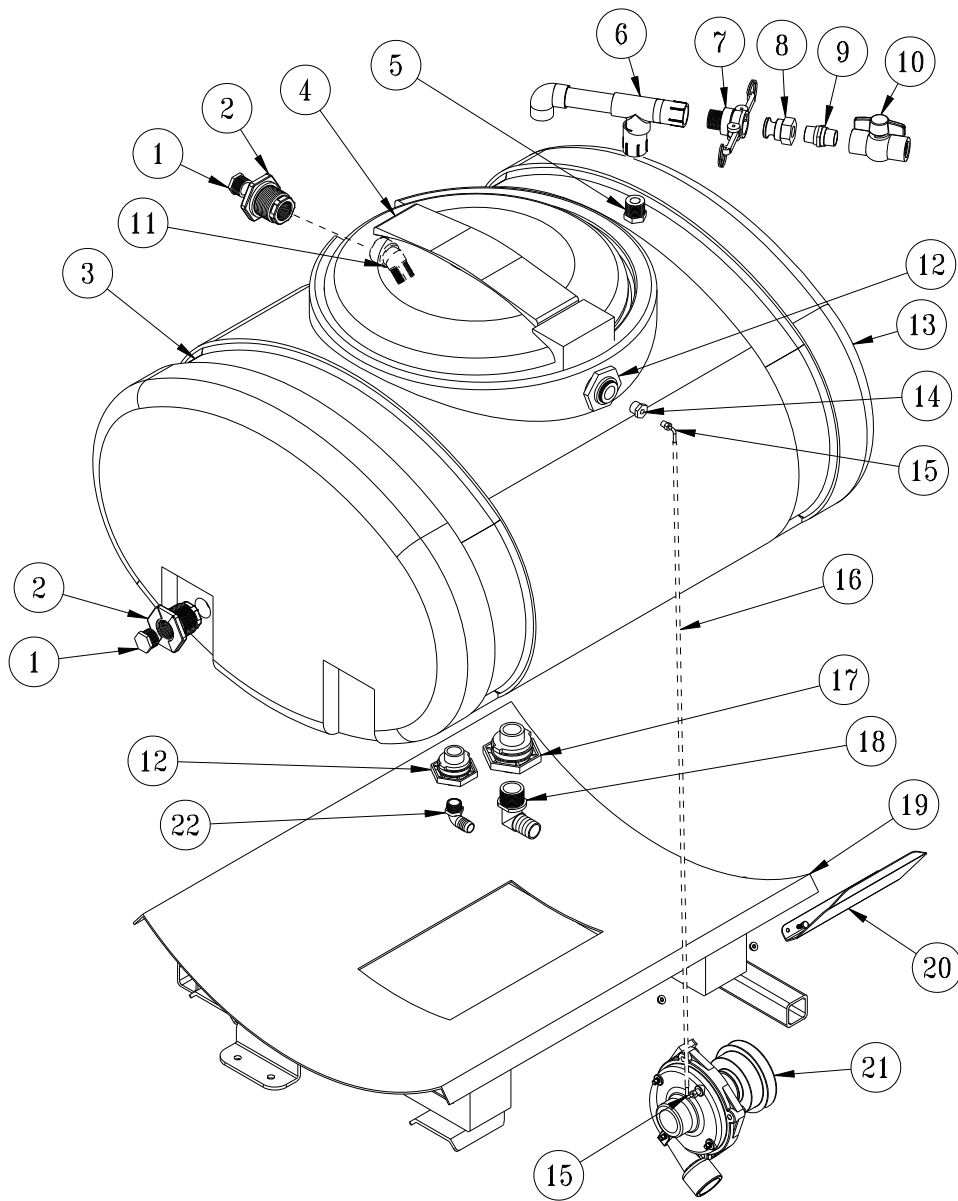
PARK BRAKE AND REAR AXLE DRAWING



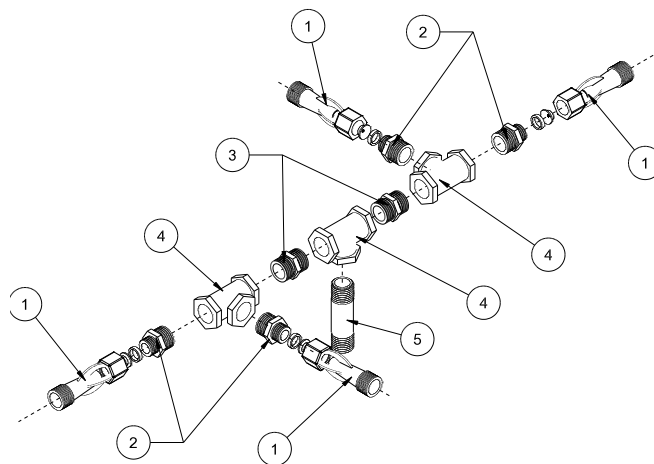
PARK BRAKE AND REAR AXLE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	60-268	Lug Bolt $\frac{1}{2}$ - 20 x $\frac{5}{16}$	10
2	76-239	8" Brake Disk (5 hole)	2
3	18-301	45° Straight Thread Elbow 1" x $\frac{7}{8}$	4
4	76-240	Left Caliper (CCW)	1
5	10-473	Rear Axle	1
6	HB-12-13-800	Bolt $\frac{1}{2}$ - 13 x 8	4
7*		Cam Side Pad	1
8	76-241	Right Caliper (CW)	1
9*		Carrier Side Pad	1
10*		Carrier Side Pad Support	1
11*		Cam Side Pad Support	1
12	14-265	Nut 1 - 20 (included with Ref# 14)	2
13	HNFL-12-13	Flange Loc Nut $\frac{1}{2}$ - 13	8
14	10-116	Wheel Motor (includes Ref# 12 & 17)	2
15	HB-12-13-125	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{4}$	4
	HN-12-13	Nut $\frac{1}{2}$ - 13	4
16	HB-12-13-750	Bolt $\frac{1}{2}$ - 13 x $7\frac{1}{2}$	4
17	HWK-516-100	Woodruff Key $\frac{5}{16}$ x 1 (included with Ref# 14)	2
18	10-466	Fender Brackets	4
19	11-100	Linkage Yokes $\frac{5}{16}$	6
	HN-516-24	Nut $\frac{5}{16}$ - 24	12
	HCP-516-100	Clevis Pin $\frac{5}{16}$ x 1	5
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	5
20	76-225	Brake Cable w/ Nuts	1
21	HB-516-18-200	Bolt $\frac{5}{16}$ - 18 x 2	2
22	HCP-516-138	Clevis Pin $\frac{5}{16}$ x $1\frac{3}{8}$	1
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
23	60-106	Park Brake Handle	1
24	HNFL-516-18	Flange-Loc Nut $\frac{5}{16}$ - 16	2
25	10-134	Spacer	2
28	10-126	Brake Rod $\frac{5}{16}$ - 24	2
29	10-125	Brake Relay	1
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	1
30	HB-12-13-150	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{2}$	2
	HW-12	Washer $\frac{1}{2}$	4
	HNFL-12-13	Lock Nut $\frac{1}{2}$ - 13	2
31	HB-516-18-125	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{4}$	8
	HW-516	Washer $\frac{5}{16}$	16
	HNFL-516-18	Lock Nut $\frac{5}{16}$ - 18	8
32	18-302	Union Tee 1"	2
33	10-273	Hydraulic Hose	4
34	17-615	Boom Carrier	2
35	16-557	Square Cap	2
36	17-614	Boom Spacer	2
	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	12
	HW-516	Washer Bolt $\frac{5}{16}$	12
	HNFL-516-18	Flange Lock Bolt Bolt $\frac{5}{16}$ - 18	12
37	20-555	U-bolt	4
	HNFL-12-13	Flange Lock Nut	8
38	10-472	Main Frame	1
*	34-101-02	Pad Kit with 2 Pads and Steel Backing Plates	2 Kits Req'd/Axle

TANK DRAWING



TURBO-QUADAGITATOR DRAWING



TANK PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-162	1" Plug	2
2	16-945	Double Head Fitting	2
3	22-528	Right Tank Strap	1
	HB-38-16-400	Bolt $\frac{3}{8}$ - 16 x 4	1
	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
4*	16-953	16" Hinged Lid/Well with Gasket	1
	16-953-01	Gasket for 16-953	1
	16-169	Strainer Basket 16"	1
5	10-410	Left Tank Strap	1
	HB-38-16-400	Bolt $\frac{3}{8}$ - 16 x 4	1
	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
6	10-254	Air Gap Filler	1
7	16-962	Aluminum Coupler 1" Male Thread	1
8	16-961	Aluminum Adapter 1" Female Thread	1
9	16-851	1" Nipple	1
10	18-448	1" Ball Valve	1
11	16-971	45° Elbow (inside tank)	1
12*		Double Threaded Fitting $\frac{3}{4}$	2
13*	10-111	110 Gallon Poly Tank	1
15	33-494	Male Elbow	2
14	10-390	Reducer	1
16	8954-30	Clear Hose $\frac{3}{16}$ ID	1
	18-116	Hose Clamp	2
17*	16-194	Anti-Vortex Fitting 1 $\frac{1}{4}$	1
18	16-156	Elbow 1 $\frac{1}{4}$ MPT x 1 $\frac{1}{4}$ HB	1
19	10-112	Tank Carrier	1
20	10-474	Heat Shield	1
	HB-14-20-075	Hex Bolt, $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HNFL-14-20	Flange Lock Nut, $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
21	16-998	Hypro Pump	1
22	16-155	Elbow, $\frac{3}{4}$ MPT x 1 HB	1

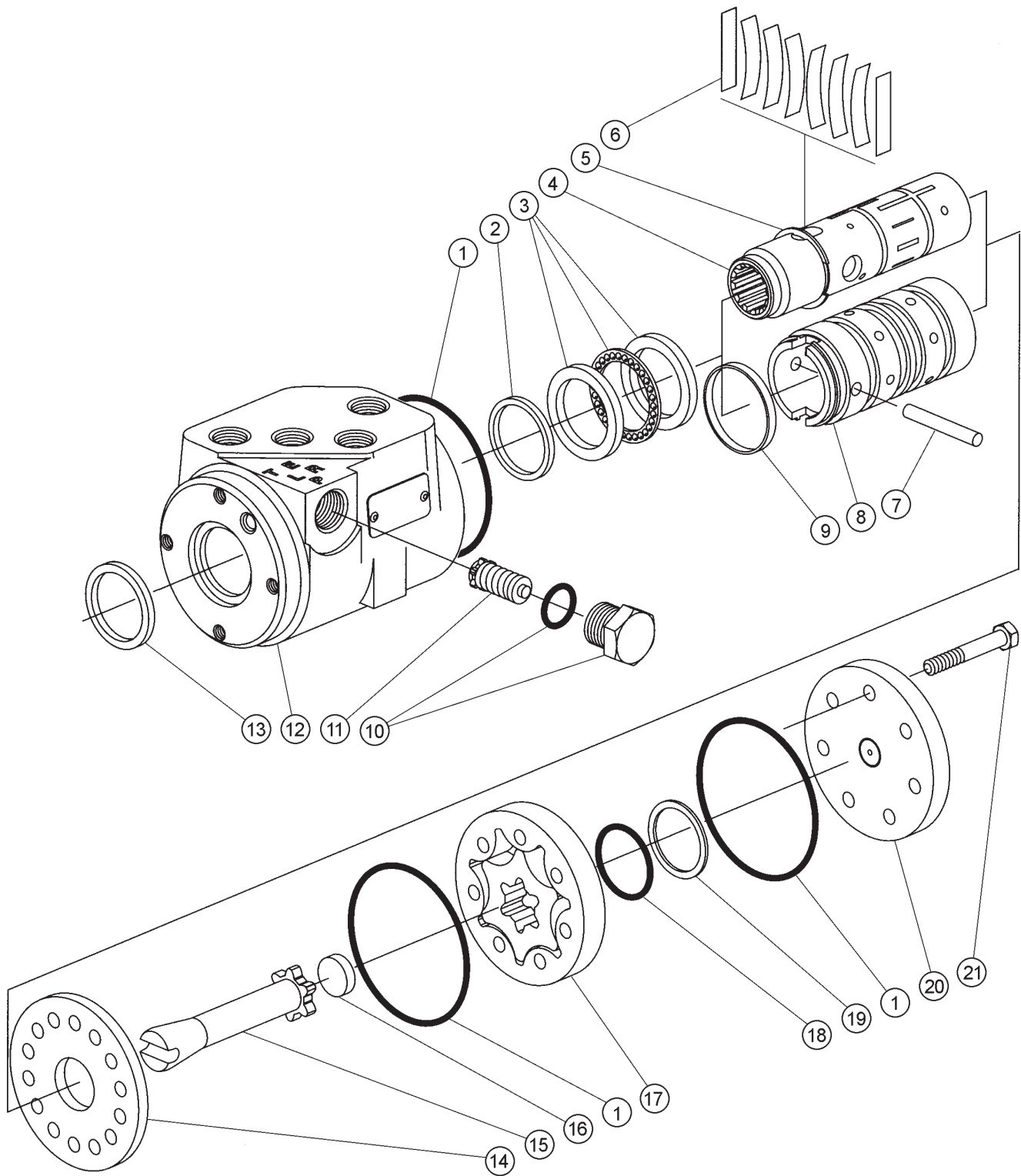
* Comes with 110 Gallon Poly Tank (only one 16-150 Double Threaded Fitting in bottom of tank)

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

15-301 ORBITROL DRAWING

Parts



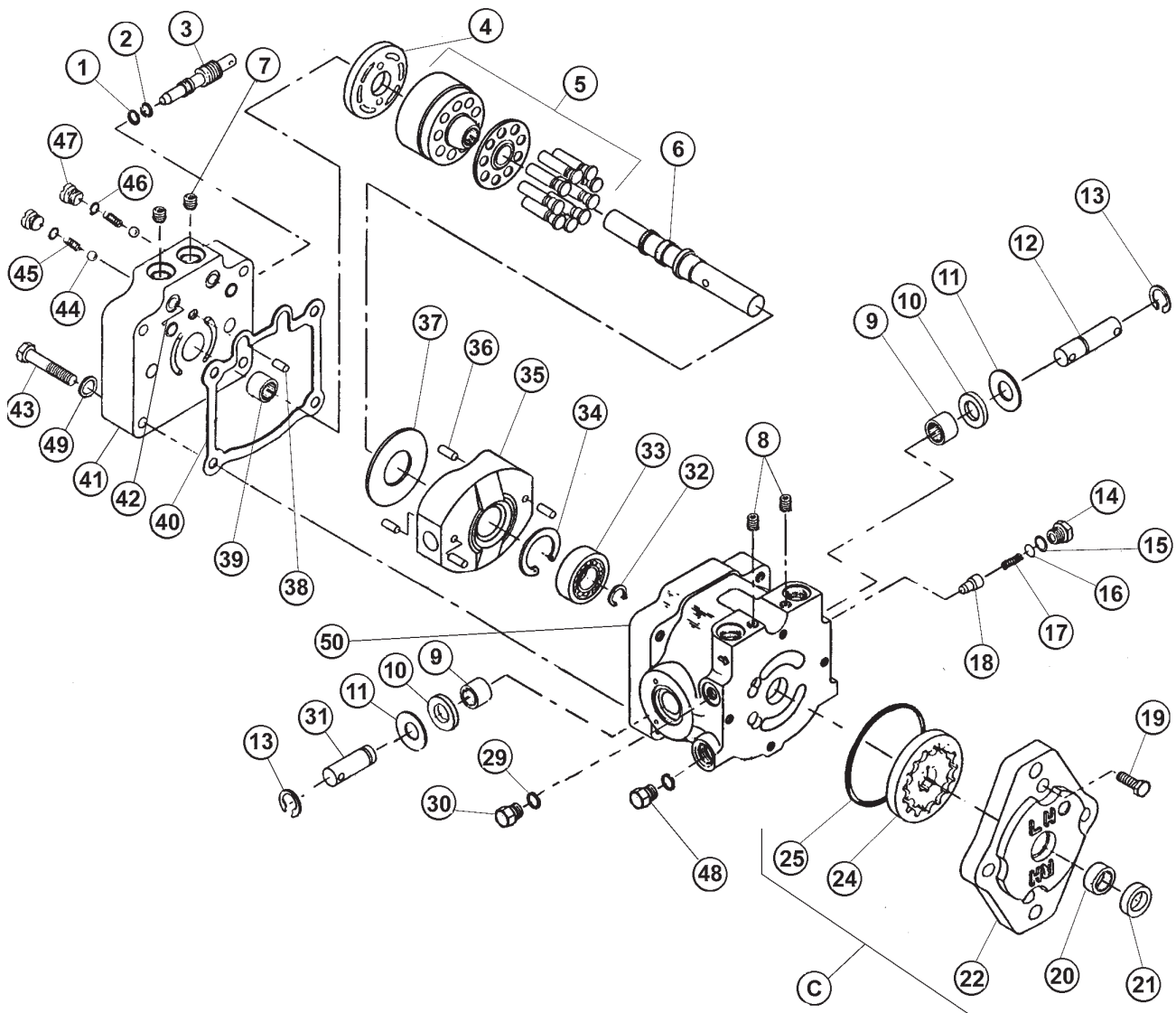
15-301 ORBITROL PARTS LIST

REF #	PART #	DESCRIPTION	QUANTITY
1*		O-Ring Seal	3
2*		Quad Seal	1
3	15-301-14	Bearing Kit	1
		Bearing Race	2
		Bearing	1
4		Spool	1
5	15-301-13	External Retaining Ring	1
6	15-301-15	Spring Centering Kit (Includes Ref# 9)	1
		Spring Spacer	2
		Centering Spring	6
		Spring Retaining Ring	1
7	15-301-08	Pin	1
8		Sleeve	1
9		Retainer	1
10	15-301-11	Plug and O-ring	1
*		O-Ring Seal	1
		Plug	1
11	15-301-12	Relief Valve/Check (1015 psi (70 bar))	1
12		Housing	1
13*		Dust Seal	1
14	15-301-06	Wear Plate	1
15	15-301-07	Drive	1
16	15-301-05	Spacer	1
17	15-301-04	Gerotor	1
18*		O-Ring	1
19*		Seal	1
20	15-301-03	End Cap	1
21	15-301-02	Cap Screw	7
*	15-301-01	Seal Kit	

15-301 ORBITOR SPECIFICATIONS

Maximum System Pressure	1015 psi (70 bar)
Maximum Back Pressure	150 psi (10 bar)
Maximum System Operating Temperature.	200°F (93°C)
Maximum Flow	4 gpm (15 lpm)
Maximum Temperature Differential between Steering Unit and System.	50°F (28°C)
Input Torque Powered	15-25 lb/in @ 100 psi tank pressure (2-3 Nm @ 7 bar)
Input Torque Maximum Non-powered	60 lb/ft (81 Nm)
Rotation Limits	None
Fluid	SAE 10W-40 API Service SJ or higher Motor Oil
Check Valve for Manual Steering	Yes
Relief Valve Setting	1015 psi (70 bar)
Ports	9/16 - 18 SAE O-Ring 4 Ports
Displacement	61 cu. in/ R (100 cu cm/R)

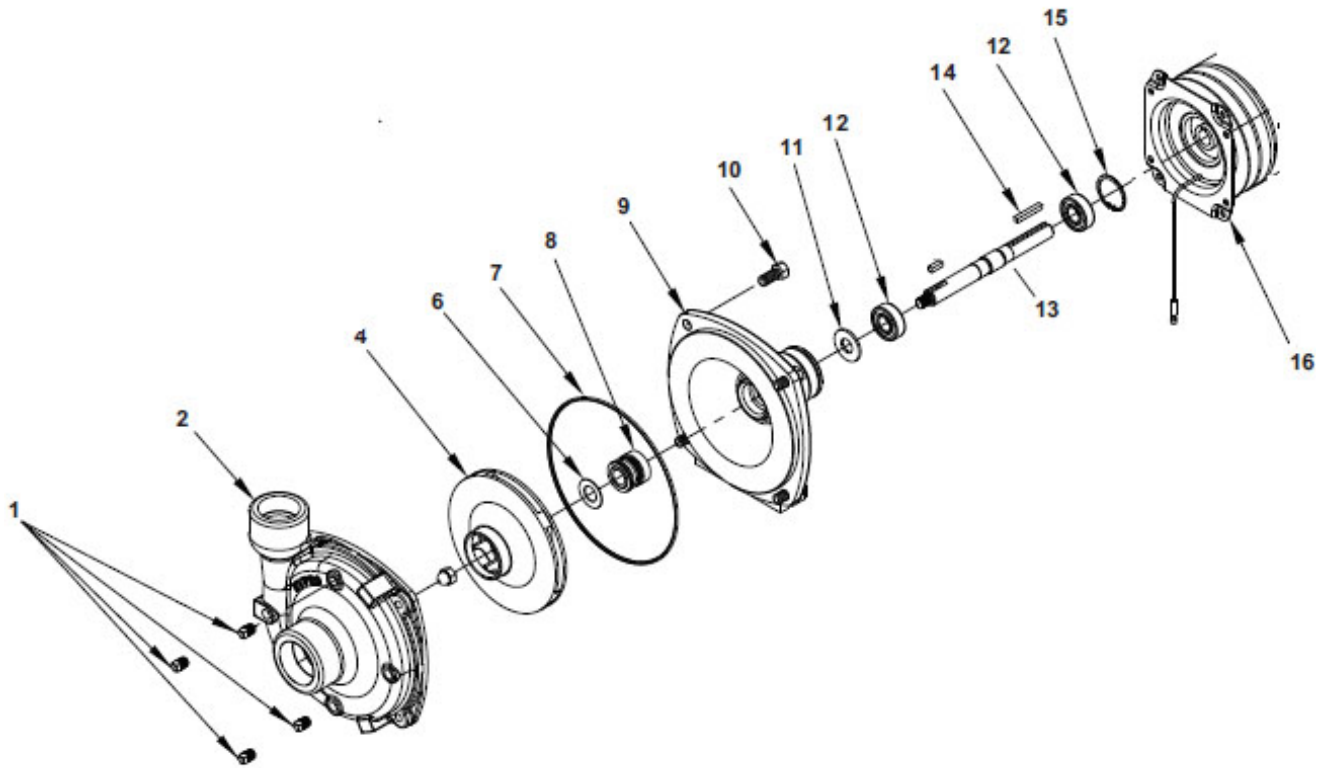
10-117 HYDRAULIC PUMP DRAWING



10-117 HYDRAULIC PUMP PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	42-003-01	O-Ring	1
2	14-130	Ring	1
3	13-110-01	By-Pass Valve	1
4	14-115	Valve Plate	1
5	42-003-16	Cylinder Block Kit	1
6	42-003-02	Pump Shaft	1
7	42-003-03	Plug	2
8	13-110-05	Pipe Plug	2
9	14-069	Needle Bearing	2
10*	42-003-04	Lip Seal	2
11	42-003-05	Washer	2
12	14-220	Truncated Shaft (long 2 holes)	1
13	14-105	Retaining Ring	2
14	13-110-10	Plug	1
15*		O-Ring	1
16	10-117-02	Shim Pack Kit	1
17	14-234	Release Valve Spring	1
18	14-235	Release Valve Cone	1
19C	13-110-14	Hex Head Screw	4
20C	42-003-07	Needle Bearing	1
21*C	14-054	Lip Seal	1
22C	13-110-13	Charge Pump Housing	1
24C	42-003-08	Geroter	1
25*C		O-Ring	1
29*		O-Ring	1
30	13-110-10	Plug	1
31	14-212	Truncated Shaft (short 1 hole)	1
32	42-003-09	Retaining Ring	1
33	42-003-10	Ball Bearing	1
34	14-132	Retaining Ring	1
35	14-221	Variable Swash Plate	1
36	14-216	Spring Pin	4
37	14-114	Thrust Plate	1
38	14-215	Pin	1
39	14-217	Roller Bearing	1
40*	14-107	Gasket	1
41	10-117-01	Pump End Cap	1
42*		O-Ring	2
43	42-003-11	Hex Head Screw	4
44	10-117-04	Valve	2
45	10-117-05	Relief Valve Spring	2
46*		O-Ring	2
47	10-117-03	Relief Valve Plug	2
48	42-003-12	Plug	2
49	42-003-13	Washer	1
50	42-003-17	Housing Assembly (includes #9 & 10)	1
*	14-098	Seal Kit	1
C	42-003-14	Charge Pump	1

16-998 HYPRO PUMP DRAWING



16-998 HYPRO® PUMP PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-998-01	Drain Plug	4
2	16-998-02	Pump Casing	1
4	16-966-16	Impeller	1
6	16-998-10	Gasket	1
7*	16-998-04	O-Ring	1
8*	16-998-05	Mechanical Seal (Silicon Carbide)	1
9	16-998-06	Mounting Flange	1
10	16-998-07	Bolt	
11	16-966-06	Slinger Ring	1
12	16-966-10	Ball Bearing	2
13	16-998-09	Pump Shaft	1
14	16-822-20	Key	1
15	16-966-13	Bearing Retainer	1
16	16-994-01	Clutch	1
	16-998-12	Pump Only	
*	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.

10-116 WHEEL MOTOR (14.0 CI) DRAWING



Match Set

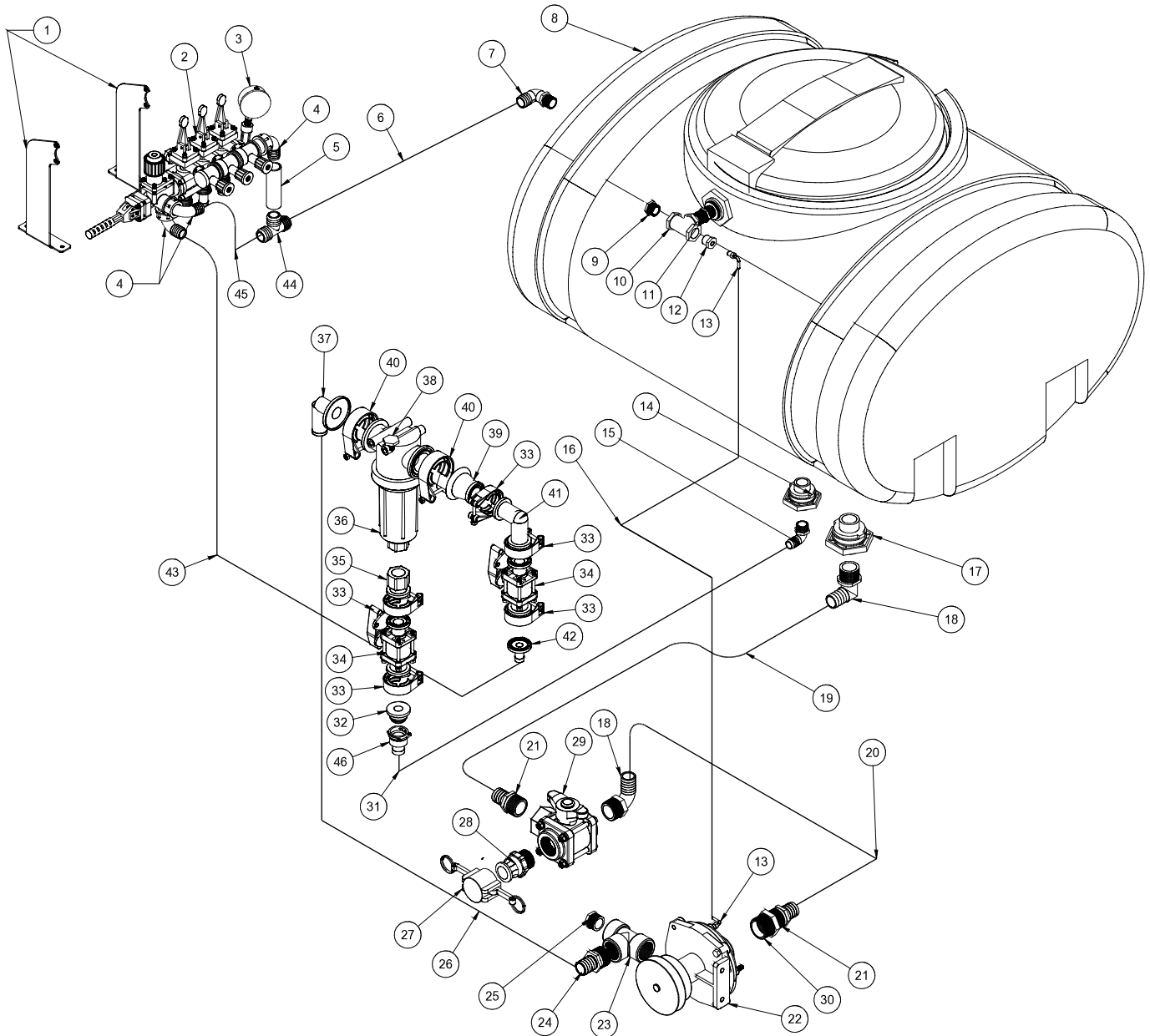
10-116 WHEEL MOTOR (14.0 CI) PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1*		Water & Dirt Seal	1
2	10-116-01	Service Housing Assembly (Includes Ref 4, 5, 17 (2req'd) and 20)	1
3*		Inner Seal	1
4	10-116-02	Thrust Bearing	1
5	13-032-38	Outer Bearing	1
6*		Backup Washer	1
7	10-116-05	Drive Link	1
8*		Ring Seal	5
9	42-002-05	Manifold	1
10	10-116-06	Commutator Assembly (matched set)	1
11	10-116-07	End Cover	1
12	10-116-08	Bolt	7
13*		Commutator Seal (matches with Ref 10)	1
14	10-116-09	Rotor Set (matched set)	1
15	42-002-10	Plate Wear	1
16	10-116-10	Coupling Shaft	1
	HWK-516-100	Woodruff Key $\frac{5}{16}$ x 1	1
	14-265	Nut 1 - 20	1
17	10-116-11	Thrust Washer	2
18*		Backup Washer	1
*	10-116-13	Seal Kit	1

1010 PLUMBING DRAWING (3-WAY MANUAL)

15-817 O-ring for 50 Series Clamp

15-818 O-ring for 75 Series Clamp



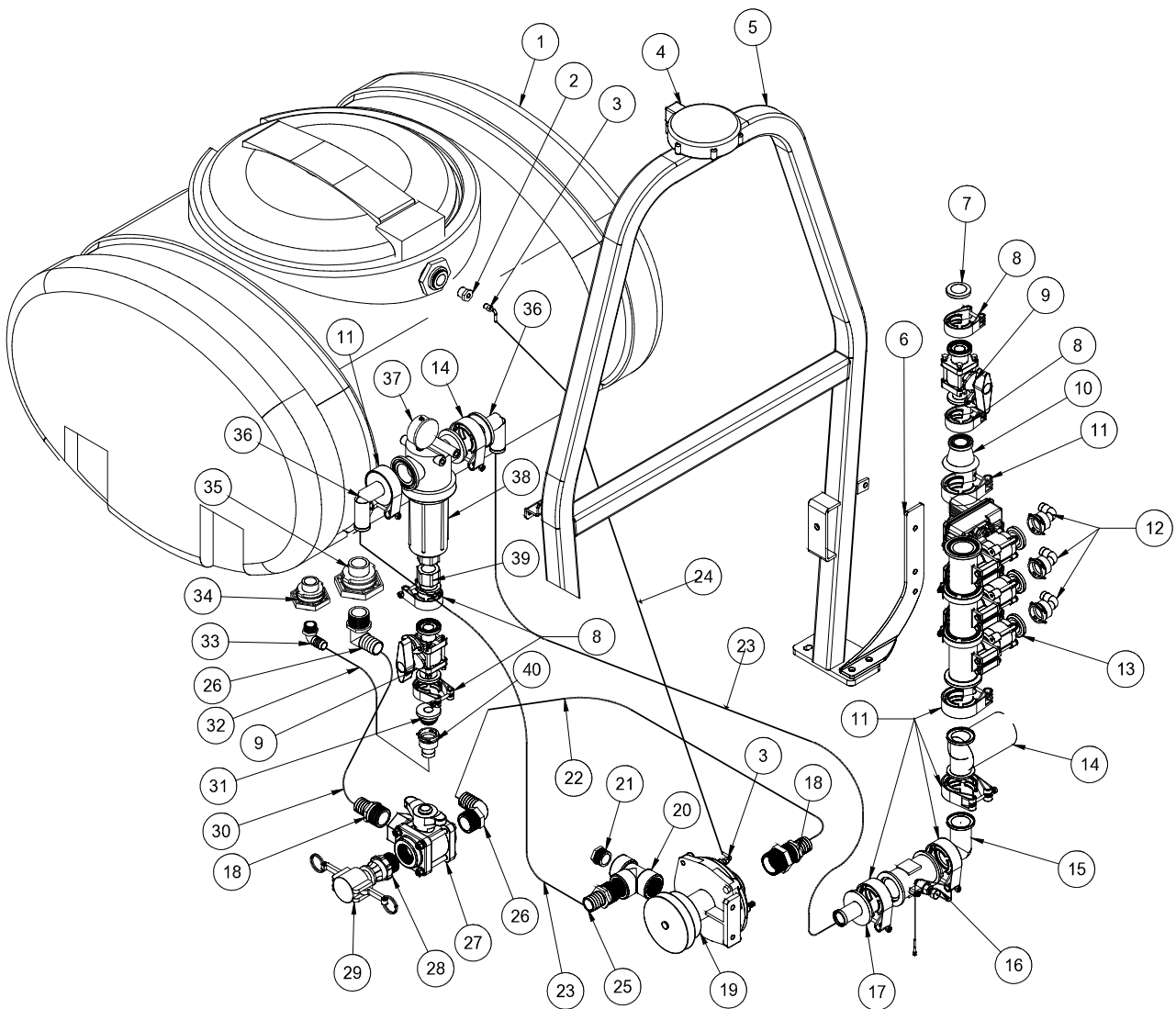
1010 PLUMBING PARTS LIST (3-WAY MANUAL)

REF#	PART#	DESCRIPTION	QUANTITY
1	10-399	Ball Valve Mount	2
	HB-14-20-100	Bolt 1/4 - 20 x 1	4
	HNTL-14-20	Lock Nut 1/4 - 20	4
2	10-268	Valve 3-Way	1
3	16-281	Liquid Filled Gauge	1
4	10-268-13	90° Elbow (comes with 10-268)	3
5	8896-4	Discharge Hose 1"	1
	18-222	Hose Clamp	2
6	8896-48	Discharge Hose 1"	1
	18-222	Hose Clamp	2
7	16-164	Elbow 1 MPT x 1 HB	1
8†	10-111	110 Gallon Poly Tank (includes † items)	1
	14-532	16" Hinged Lid/Well with Gasket	1
	16-953-01	Gasket	1
	16-169	Strainer Basket 16"	1
9	16-166	Hex Plug. 3/4	1
10	16-157	Tee, 3/4 x 3/4 3/4	1
11	16-158	Close Nipple 3/4 x 3/4	1
12	10-390	Reducer	1
13	33-494	Male Elbow	2
14†		Double Thread Fitting	1
15	16-155	Elbow 3/4" MPT x 1" HB	1
16	8954-30	3/16 Clear hose	1
	18-116	Hose Clamp, HS-24	2
17†	16-194	Anti-Vortex Fitting 1 1/4	1
18	16-156	Elbow 1 1/4 MPT x 1 1/4 HB	2
19	8897-38	Discharge Hose 1 1/4"	1
	18-040	Hose Clamp	2
20	8889-26	Suction Hose 1 1/4 x 26"	1
	18-116	Hose Clamp	2
21	16-161	Fitting 1 1/4 NPT x 1 1/4 HB	2
22	16-998	Hypro® Pump	1
23	18-390	Pipe Tee 1 1/4	1
24	16-161	Fitting 1 1/4 NPT x 1 1/4 HB	1
25	10-389	Plug 1 1/4	1
26	8897-50	Discharge Hose 1 1/4"	1
	18-116	Hose Clamp, HS-24	2
27	16-935	Quick Coupler 1 1/4 Cap	1
28	16-180	Quick Coupler 1 1/4 Male	1
29	18-372	3-Way Ball Valve	1
	18-372-01	T-Handle	1
30	16-825	Reducer	1
31	8896-55	Discharge Hose 1"	1
	18-040	Hose Clamp	2
32	15-825	#50 Male Quick Coupler	1
33	15-740	50 Series Clamp	5
34	15-738	Flanged Ball Valve	2
35	15-735	50 Series 1 FPT	1
36	15-737	Flanged Strainer	1
37	15-739	75 Series 90° x 1 1/2 Hose Barb	1
38	15-780	1/4" Poly Plug	1
39	15-748	Reducer Coupling	1
40	15-741	75 Series Clamp	2
41	15-736	50 Series Elbow Coupling	1
42	15-808	Hose Barb Flange	1
43	8897-40	Discharge Hose 1 1/4"	1
	18-040	Hose Clamp	2
44	10-269	Plastic Tee	1
45	8896-12	Discharge Hose 1" x 12"	1
	18-222	Hose Clamp	2
46	15-869	1" Hose Barb Outlet	1
	15-553-01	Clip	1
	15-553-02	O-ring	1

1008 PLUMBING DRAWING (RAVEN 440)

15-817 O-ring for 50 Series Clamp

15-818 O-ring for 75 Series Clamp



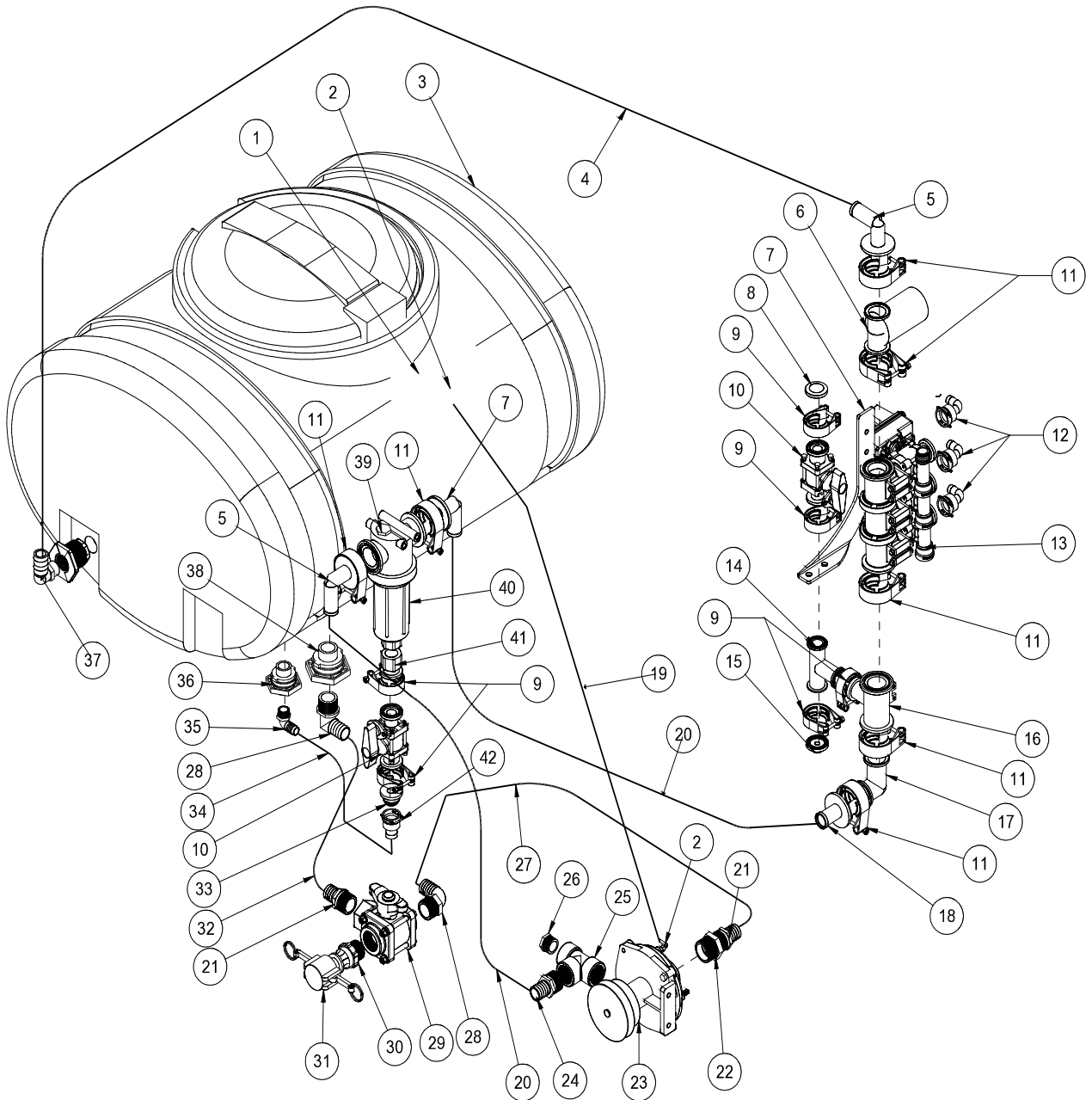
1008 PLUMBING PARTS LIST (RAVEN 440)

REF#	PART#	DESCRIPTION	QUANTITY
1†	10-111	110 Gallon Poly Tank (includes † items)	1
	16-953	16" Hinged Lid/Well with Gasket	1
	16-953-01	Gasket	1
	16-169	Strainer Basket 16"	1
2	10-390	Reducer	1
3	33-494	Male Elbow	2
4	10-408	Phoenix 10 GPS	1
5	10-404	ROPS	1
6	10-397	Valve Mount	1
7	15-778	Blank Gauge Port Flange	1
8	15-740	50 Series Clamp	4
9	15-738	Flanged Ball Valve	2
10	15-748	Reducer Coupling	1
11	15-741	75 Series Clamp	7
12	15-553	3/4 -90° Hose Barb	3
	15-553-01	Clip	3
	15-553-02	O-Ring	3
	8887-80	Orange PVC Hose 3/4"	1
	8887-100	Orange PVC Hose 3/4"	2
	18-040	Hose Clamp, HS-12	3
13	15-743	Manifold Valve	1
14	16-524	Motorized Control Valve	1
15	15-734	75 Series Elbow Coupling	1
16	18-373	Flow Meter	1
	18-373-01	Sensor	1
17	15-744	Series 75 1 1/4 Hose Barb	1
18	16-161	Fitting 1 1/4 MPT x 1 1/4 HB	2
19	16-998	Hypro® Pump	1
20	18-390	Pipe Tee 1 1/4	1
21	10-389	Plug 1 1/4	1
22	8897-52	Discharge Hose 1 1/4"	1
	18-040	Hose Clamp, HS-12	2
23	8897-50	Discharge Hose 1 1/4"	2
	18-116	Hose Clamp, HS-24	4
24	8954-30	3/16 Clear hose	1
	18-116	Hose Clamp, HS-24	2
25	16-161	Fitting 1 1/4 MPT x 1 1/4 HB	1
26	16-156	Elbow 1 1/4 MPT x 1 1/4 HB	2
27	18-372	3-Way Valve	1
	18-372-01	T-handle	1
28	16-180	Quick Coupler 1 1/4 Male	1
29	16-935	Quick Coupler 1 1/4 Cap	1
30	8897-38	Discharge Hose 1 1/4"	1
	18-040	Hose Clamp, HS-12	2
31	15-825	#50 Male Quick Coupler	1
32	8896-40	Discharge Hose 1"	1
	18-222	Hose Clamp, 13/16 to 1 1/2	2
33	16-155	Elbow 3/4" MPT x 1" HB	1
34†		Double Thread Fitting 3/4" (part of tank)	1
35†	16-194	Anti Vortex Fitting (part of tank)	1
36	15-739	75 Series 90° x 1 1/2 Hose Barb	2
37	16-281	Liquid Filled Gauge	1
38	15-737	Flanged Strainer	1
39	15-735	50 Series 1" FPT	1
40	15-869	1" Hose Barb Outlet	1
	15-553-01	Clip	1
	15-553-02	O-ring	1

1002 PLUMBING DRAWING (RAVEN 203)

15-817 O-ring for 50 Series Clamp

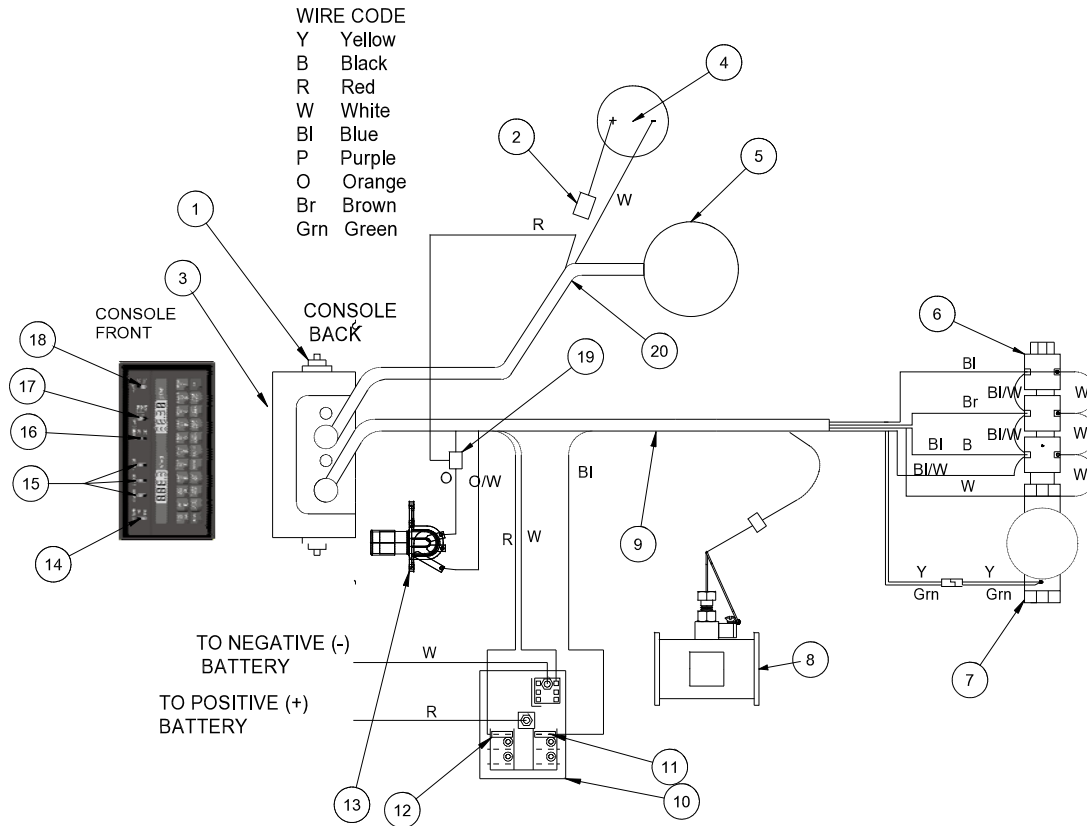
15-818 O-ring for 75 Series Clamp



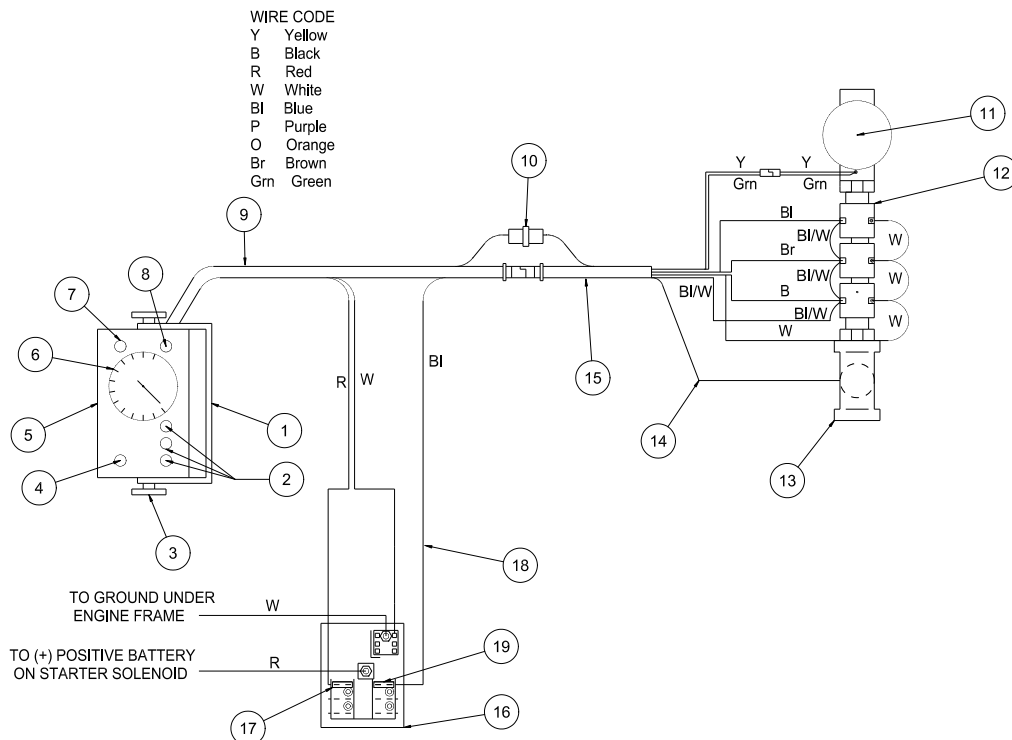
1002 PLUMBING PARTS LIST (RAVEN 203)

REF#	PART#	DESCRIPTION	QUANTITY
1	10-390	Reducer	1
2	33-494	Male Elbow	2
3†	10-111	110 Gallon Poly Tank	1
	14-532	16" Hinged Lid/Well with Gasket	1
	16-953-01	Gasket	1
	16-169	Strainer Basket 16"	1
4	8897-92	Discharge Hose 1 1/4"	1
	18-040	Hose Clamp, HS-12	2
5	15-739	75 Series 90° x 1 1/2 Hose Barb	3
6	16-524	Motorized Control Valve	1
7	10-397	Valve Mount	1
8	15-778	Blank Gauge Port Flange	1
9	15-740	50 Series Clamp	6
10	15-738	Flanged Ball Valve	2
11	15-741	75 Series Clamp	7
12	15-553	3/4 -90° Hose Barb	3
	15-553-01	Clip	3
	15-553-02	O-Ring	3
	8887-80	Orange PVC Hose 3/4"	1
	8887-100	Orange PVC Hose 3/4"	2
	18-040	Hose Clamp, HS-12	3
13	15-743	Manifold Valve	1
14	15-776	50 Series Tee	1
15	15-777	Gauge Port Flange	1
16	15-775	Reducer Tee	1
17	15-734	75 Series Elbow Coupling	1
18	15-744	Series 75 1 1/4 Hose Barb	1
19	8954-30	3/16 Clear hose	1
	18-116	Hose Clamp, HS-24	2
20	8897-50	Discharge Hose 1 1/4"	2
	18-116	Hose Clamp, HS-24	4
21	16-161	Fitting 1 1/4 MPT x 1 1/4 HB	2
22	16-825	Stainless Steel Reducer Bushing 1 1/2 x 1 1/4	1
23	16-998	Hypro® Pump	1
24	16-161	Fitting 1 1/4 MPT x 1 1/4 HB	1
25	18-390	Pipe Tee 1 1/4	1
26	10-389	Plug 1 1/4	1
27	8897-52	Discharge Hose 1 1/4"	1
	18-040	Hose Clamp, HS-12	2
28	16-156	Elbow 1 1/4 MPT x 1 1/4 HB	2
29	18-372	3-Way Valve	1
	18-372-01	T-Handle	1
30	16-180	Quick Coupler 1 1/4 Male	1
31	16-935	Quick Coupler 1 1/4 Cap	1
32	8897-38	Discharge Hose 1 1/4"	1
	18-040	Hose Clamp, HS-12	2
33	15-825	#50 Male Quick Coupler	1
34	8896-40	Discharge Hose 1"	1
	18-222	Hose Clamp, 13/16 to 1 1/2	2
35	16-155	Elbow 3/4" MPT x 1" HB	1
36†		Double Thread Fitting 3/4" (part of tank)	1
37	15-779	Hose Barb	1
38†	16-194	Anti Vortex Fitting (part of tank)	1
39	15-780	1/4 Poly Plug	1
40	15-737	Flanged Strainer	1
41	15-735	50 Series 1" FPT	1
42	15-869	1" Hose Barb Outlet	1
	15-553-01	Clip	1
	15-553-02	O-ring	1

1008 CONTROL SYSTEM DRAWING (RAVEN 440)



CONTROL 1002 SYSTEM DRAWING (RAVEN 203)



1008 CONTROL SYSTEM PARTS LIST (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 Bracket	1
4	10-202	Speedometer	1
5	10-408-01	Phoenix 1 0GPS	1
6	15-743	Manifold 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	33-562	Auto Blade Type Fuse 40 amp	1
12	33-508	Auto Blade Type Fuse 15 amp	1
13	33-509	Master Boom Floor Switch	1
14	16-697	Master Switch	1
15	16-141	Boom Switch	3
16	16-873	Adjustment Switch	1
17	16-525-01	Rate1/Rate2 Manual Switch	1
18	16-140	Power Switch	1
19	9027	Terminal T-tap	1
	8958	Male Slide on Connector	1
20	10-408-02	Cable	1

Use Dielectric Grease On All Electrical Connections

CONTROL 1002 SYSTEM PARTS LIST (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	16-958-04	Cable Assembly 8ft 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	19038	Tubing	by the foot
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	33-562	Auto Blade Type Fuse 40 Amp	1

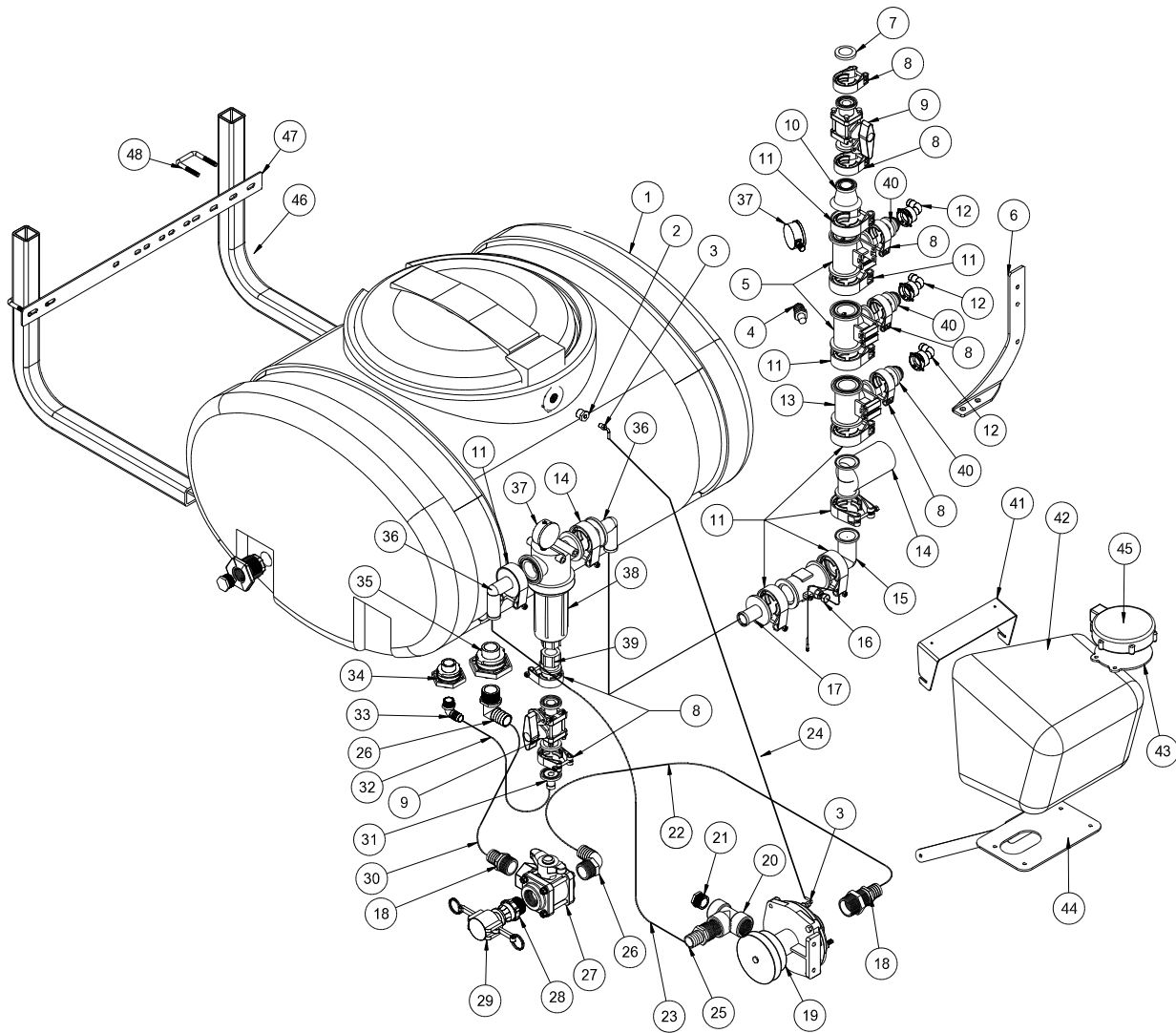
Use Dielectric Grease On All Electrical Connections



1011 PLUMBING DRAWING (RAVEN 440 + SHARPSHOOTER F/ 15' BOOM)

15-817 O-ring for 50 Series Clamp

15-818 O-ring for 75 Series Clamp



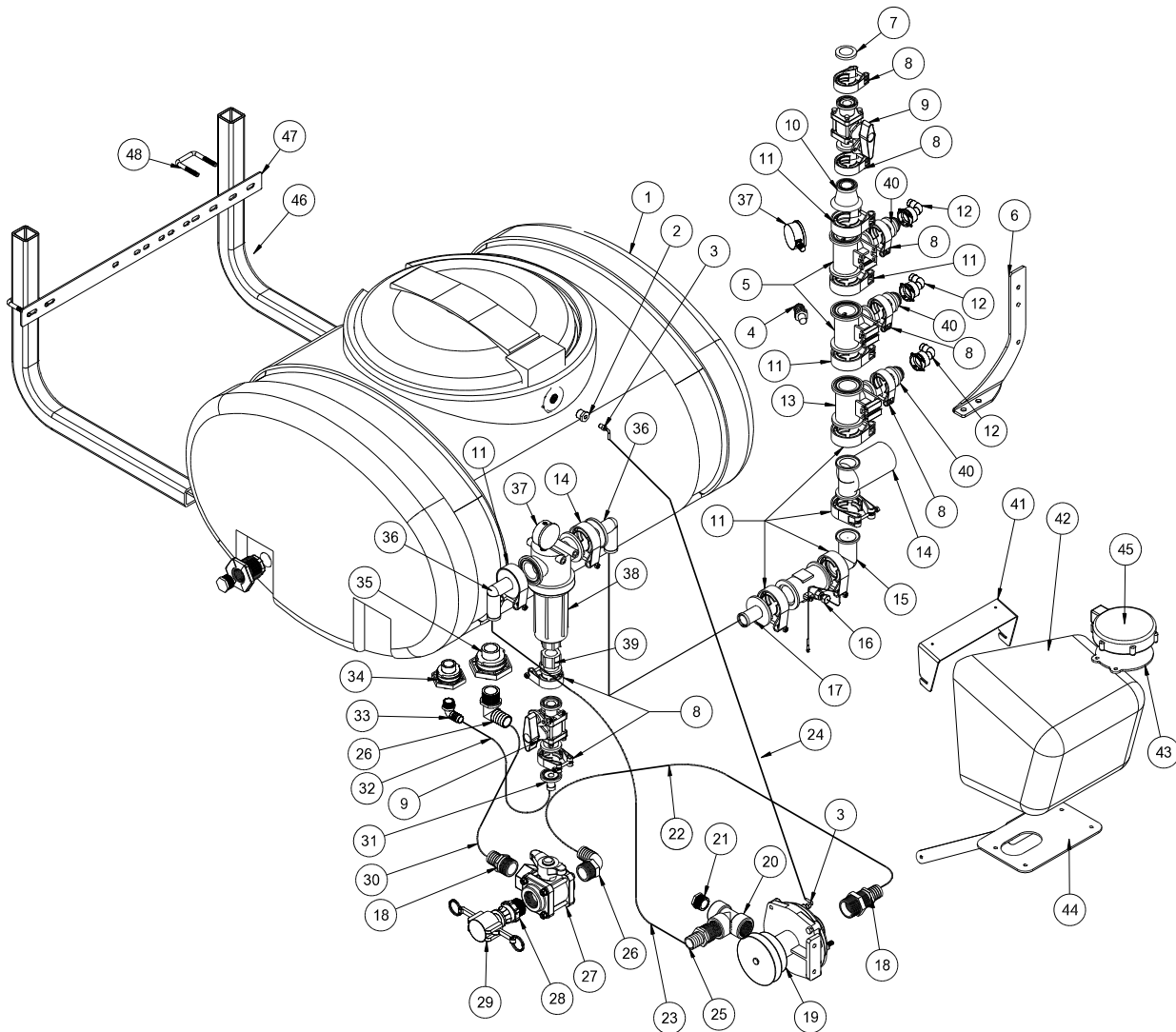
1011 PLUMBING PARTS LIST (RAVEN 440 + SHARPSHOOTER F/ 15' BOOM)

REF#	PART#	DESCRIPTION	QUANTITY
1†	10-111	110 Gallon Poly Tank (includes † items)	1
	14-532	16" Hinged Lid/Well with Gasket	1
	16-953-01	Gasket	1
	16-169	Strainer Basket 16"	1
2	10-390	Reducer	1
3	33-494	Male Elbow	2
4	30-168-04	SharpShooter PressureSensor	1
5	30-164	Tapped Reducer Tee	2
	15-743-03	Alum Mount Rail	2
	15-743-06	SS Screws	8
6	10-397	Valve Mount	1
7	15-778	Blank Gauge Port Flange	1
8	15-740	50 Series Clamp	7
9	15-738	Flanged Ball Valve	2
10	15-748	Reducer Coupling	1
11	15-741	75 Series Clamp	7
12	15-553	3/4-90° Hose Barb	3
	15-553-01	Clip	3
	15-553-02	O-Ring	3
	8887-90	Orange PVC Hose 3/4"	1
	8887-130	Orange PVC Hose 3/4"	1
	8887-132	Orange PVC Hose 3/4"	1
	18-040	Hose Clamp, HS-12	3
13	15-775	Reducer Tee	1
14	16-524	Motorized Control Valve	1
15	15-734	75 Series Elbow Coupling	1
16	18-373	Flow Meter	1
	18-373-01	Sensor	1
17	15-744	Series 75 1 1/4 Hose Barb	1
18	16-161	Fitting 1 1/4 MPT x 1 1/4 HB	2
19	16-998	Hypro® Pump	1
20	18-390	Pipe Tee 1 1/4	1
21	10-389	Plug 1 1/4	1
22	8897-52	Discharge Hose 1 1/4"	1
	18-040	Hose Clamp, HS-12	2
23	8897-50	Discharge Hose 1 1/4"	2
	18-116	Hose Clamp, HS-24	4
24	8954-30	3/16 Clear hose	1
	18-116	Hose Clamp, HS-24	2
25	16-161	Fitting 1 1/4 MPT x 1 1/4 HB	1
26	16-156	Elbow 1 1/4 MPT x 1 1/4 HB	2
27	18-372	3-Way Valve	1
	18-372-01	T-handle	1
28	16-180	Quick Coupler 1 1/4 Male	1
29	16-935	Quick Coupler 1 1/4 Cap	1
30	8897-38	Discharge Hose 1 1/4"	1
	18-040	Hose Clamp, HS-12	2
31	15-869	1" Hose Barb Outlet	1
	15-553-01	Clip	1
	15-553-02	O-ring	1
32	8896-40	Discharge Hose 1"	1
	18-222	Hose Clamp, 13/16 to 1 1/2	2

1011 PLUMBING DRAWING (RAVEN 440 + SHARPSHOOTER F/ 15' BOOM)

15-817 O-ring for 50 Series Clamp

15-818 O-ring for 75 Series Clamp

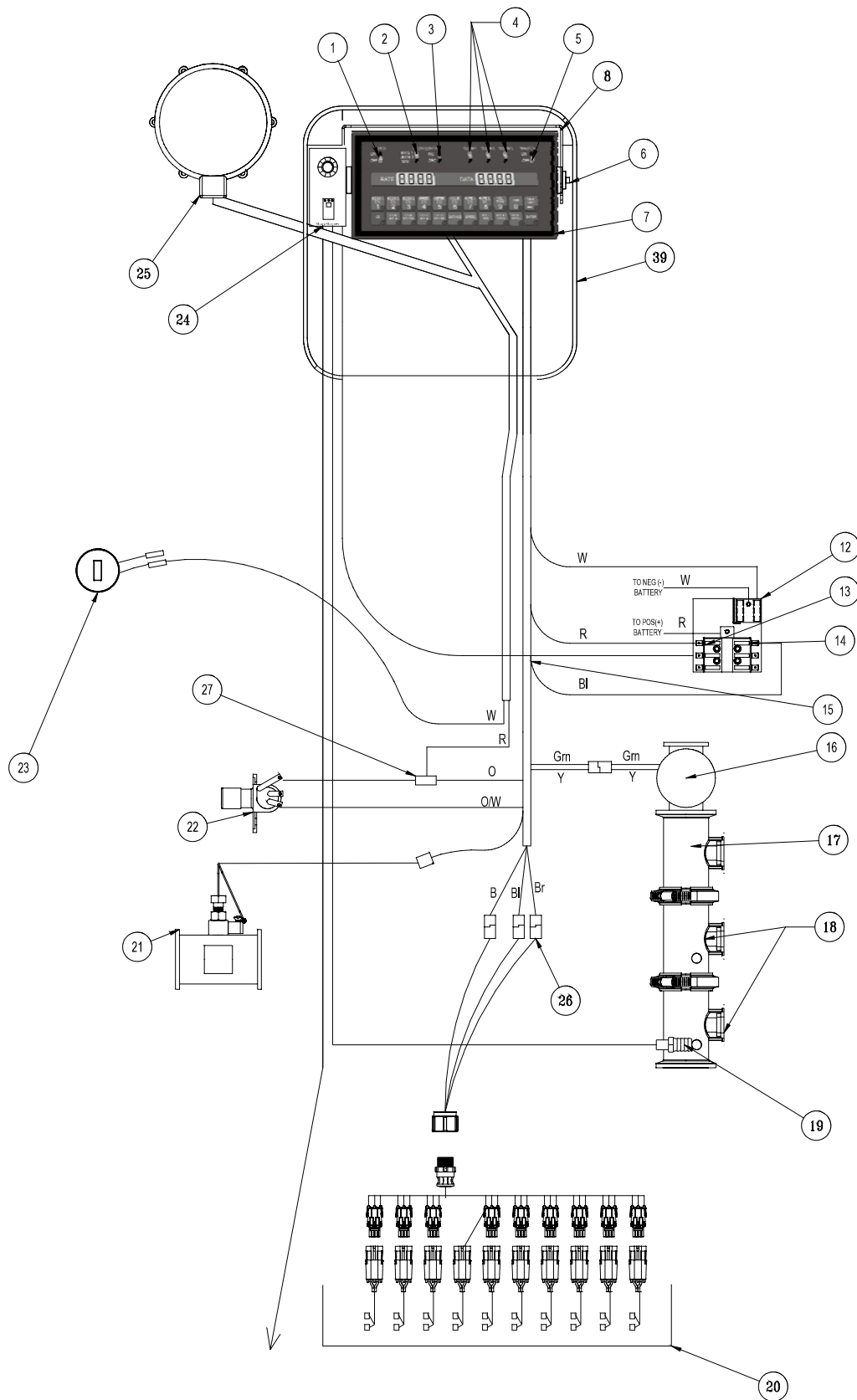


1011 PLUMBING PARTS LIST (RAVEN 440 + SHARPSHOOTER F/ 15' BOOM)

REF#	PART#	DESCRIPTION	QUANTITY
33	16-155	Elbow $\frac{3}{4}$ " MPT x 1" HB	1
34†		Double Thread Fitting $\frac{3}{4}$ " (part of tank)	1
35†	16-194	Anti Vortex Fitting (part of tank)	1
36	15-739	75 Series 90° x $1\frac{1}{2}$ " Hose Barb	2
37	16-281	Liquid Filled Gauge	1
38	15-737	Flanged Strainer	1
	16-968-05	Screen (80 mesh)	1
39	15-735	50 Series 1" FPT	1
40	15-825	QC Flange Adapter	4
41	20-601	440 Conole Mount	1
	16-525	440 Computer	1
42	30-172	Fiberglass Cover	1
	18-134	Grommet	1
	8803-48	Black Trim 48"	1
43	30-173	GPS Palte	1
44	30-196	Console Mount	1
45	10-408-01	Phoenix 10 GPS	1
46	17-615	Boom Mounts	2
47	10-467	Boom Strap	1
48	17-537	Square U-Bolt	2

† Part of Tank

WIRING 1011 SYSTEM (RAVEN 440 + SHARPSHOOTER F/ 15' BOOM)

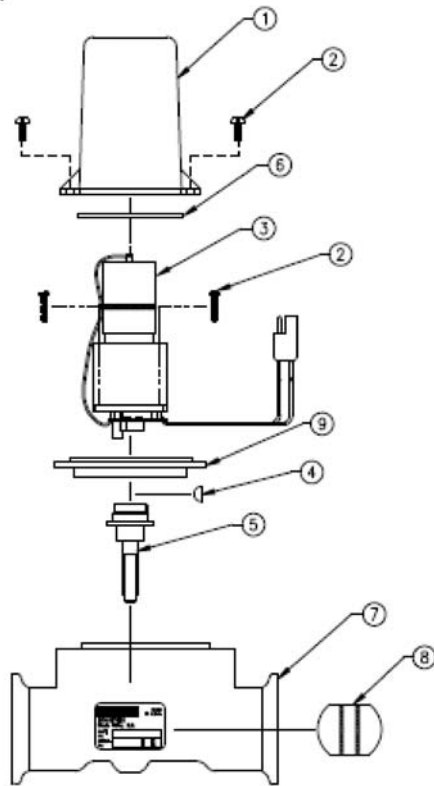


WIRING 1011 SYSTEM (RAVEN 440 + SHARPSHOOTER F/ 15' BOOM)

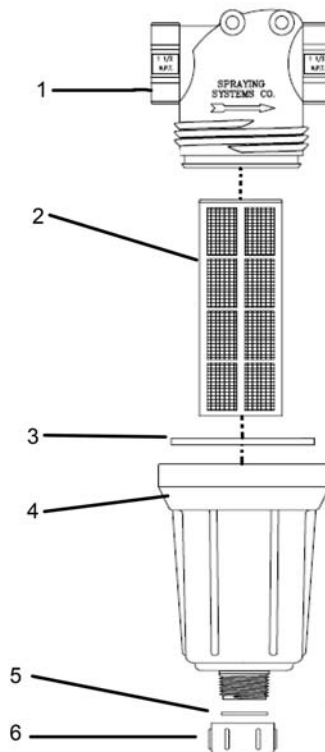
REF#	PART#	DESCRIPTION	QUANTITY
1	16-140	Power Switch	1
2	16-525-01	Rate1/Rate2 Manual Switch	1
3	16-873	Adjustment Switch	1
4	16-141	Boom Switch	3
5	16-697	Master Switch	1
6	16-558	Mounting Knob	2
7	16-525	Console (only)	1
8	20-601	440 Console Mount	1
9	30-172	Fiberglass Cover	1
	8803-48	Trim-48"	1
	18-134	Grommet ⁵ / ₈	1
12	33-271	Fuse Block	1
	9035	Blade Fuse 1amp	1
13	33-508	Auto Blade Type Fuse 15 amp	2
14	33-273	Auto Blade Type Fuse 30 amp	1
15	15-369	Console Control Cable	1
16	16-524	Motorized Control Valve	1
17	15-775	Reducer Tee	1
18	30-164	Tapped Reducer	2
19	30-168-04	SharpShooter Pressure Sensor	1
20	30-212	SharpShooter 9-Nozzle Turf System for 15' Boom	1
21	18-373	Flow Meter	1
22	33-509	Master Boom Floor Switch	1
23	12-017	Hour Meter	1
24	30-168-01	SharpShooter Power Hub	1
25	10-408-01	Phoenix 10 GPS	1
	30-173	GPS Mount Plate	1
26	30-179	440 Harness Extension	1
27	9027	Terminal T-tap	1
	8958	Male Slids on Connector	1

Use Dielectric Grease On All Electrical Connections

16-524 MOTORIZED CONTROL VALVE DRAWING



15-737 STRAINER



16-524 / 16-995 MOTORIZED CONTROL VALVE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-870	Valve Cover	1
2*	16-524-01	#6 Self Tapping Screw 3/4" Long	6
3	16-875	Motor Assembly	1
4*	16-957	Woodruff Key	1
5*	16-524-02	Coupler Shaft	1
6*	16-897	Seal Tetraseal	1
7*	16-524-06	Valve Body Assembly 1"	1
8*	16-956	Butterfly	1
9*	16-524-04	Isolation Flange 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.

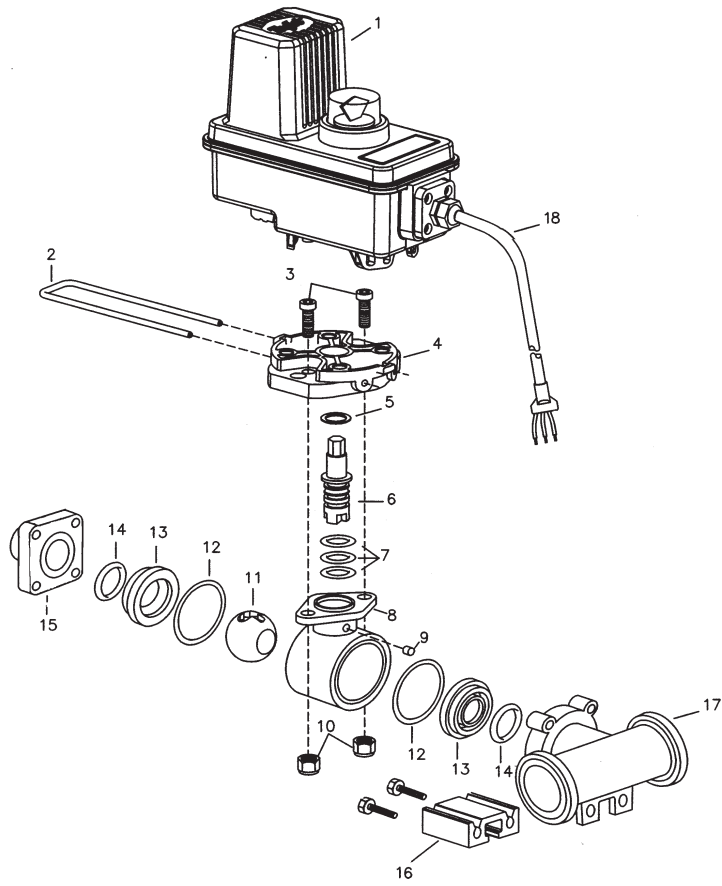
Before reassembling valve, remove the coupler shaft from the valve body. Apply Loctite to coupler shaft and woodruff key. Place the coupler shaft (Ref 5) and the woodruff key (Ref 4) onto the motor shaft. Plug motor into the valve connector coming from Sprayer Control Console. Check that the motor rotates in both directions. Motor must stop when coupler shaft CAM releases printed circuit board 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 motor on valve body and apply silicon sealant to mounting holes. Reassemble remaining items as shown in parts diagram.

15-737 STRAINER

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

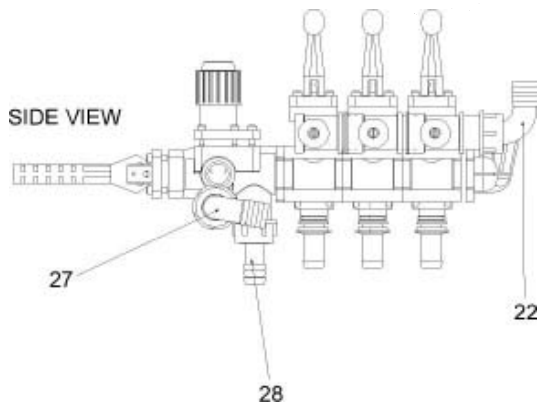
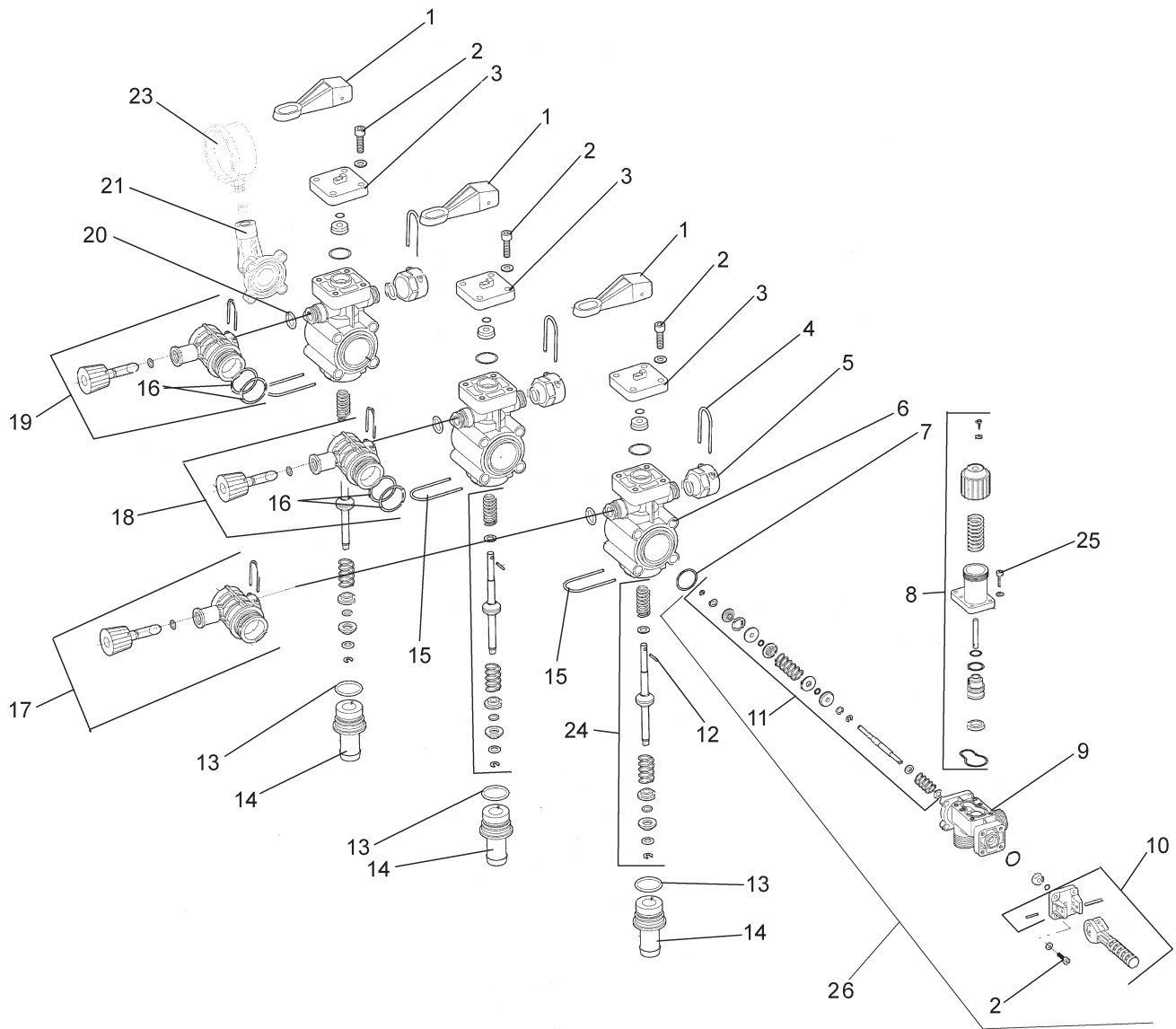
15-743 MANIFOLD VALVE DRAWING



15-743 MANIFOLD VALVE PARTSLIST

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
18	15-878	Cable	1
*	15-552-10	Spare Parts Kit (includes all * items)	
	15-743-05	Single Ball Valve (Shown)	

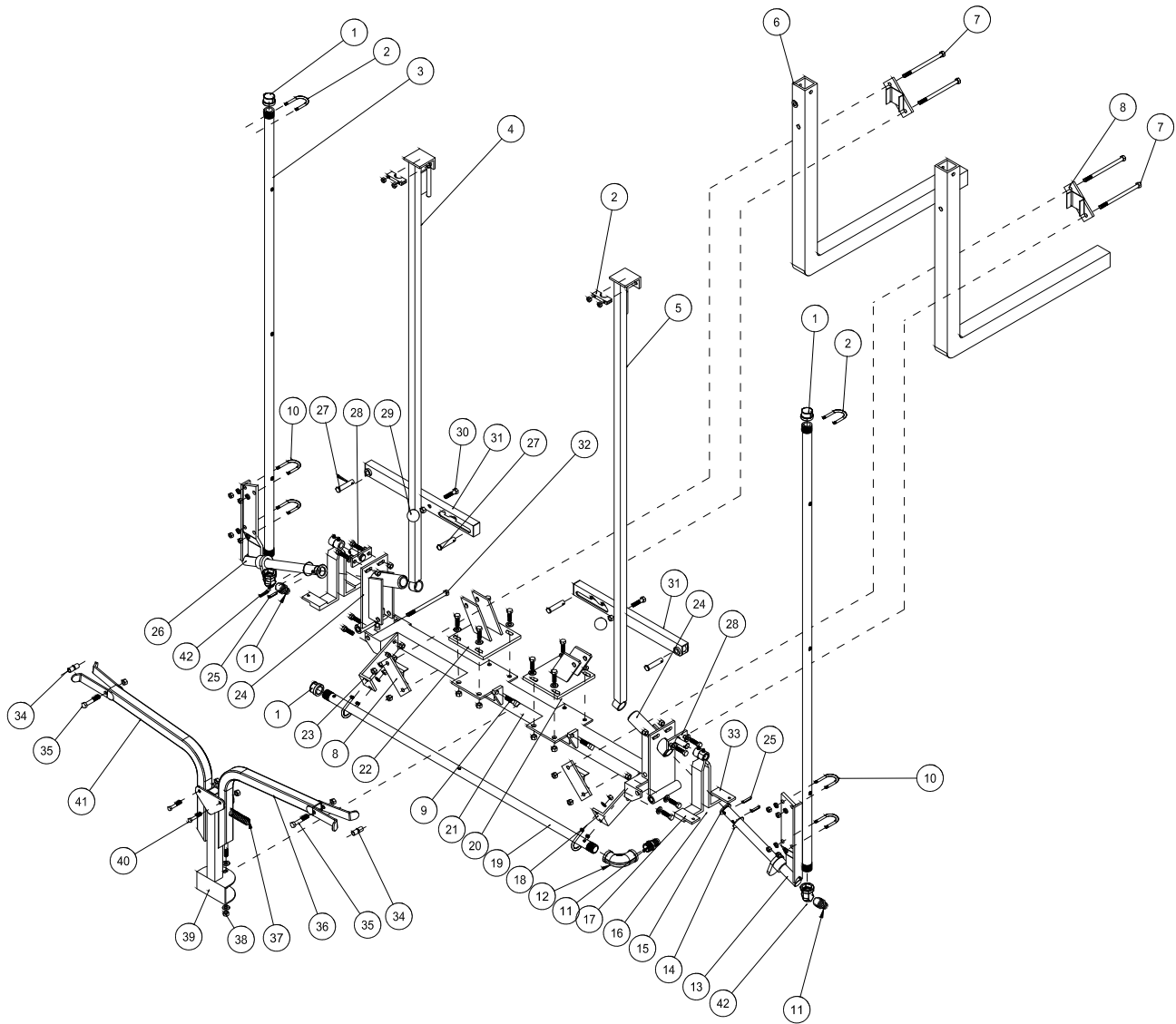
10-268 3-WAY MANUAL VALVE DRAWING



10-268 3-WAY MANUAL VALVE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-268-07	Boom Lever	3
2	10-268-28	Bolt and Washer	18
3	10-268-17	Boom Lever Plate	3
4	10-268-06	Spring Clip $\frac{5}{8}$	6
5	10-268-05	Cap	3
	10-268-21	O-Ring (included with 10-268-19 Seal Kit)	3
6	10-268-02	Main Body	3
	10-268-19	Seal Kit	1 per body
7	10-268-24	O-Ring for Main Body	3
8	10-268-27	Main Pressure Adjust	1
9	10-268-29	Pressure Adjust Body	1
10	10-268-09	Main Boom Lever	1
11	10-268-30	Master Boom Lever Guts	1
12	10-268-25	Boom Lever Pin	3
13	10-268-22	O-Ring (included with 10-268-19 Seal Kit)	3
14	10-268-03	Hose Barb $\frac{3}{4}$	3
15	10-268-04	Spring Clip $\frac{7}{8}$	3
16	10-268-23	O-Ring (included with 10-268-12 and 10-268-14)	4
17	10-268-11	Boom Pressure Adjust (threaded end)	1
18	10-268-12	Boom Pressure Adjust (middle)	1
19	10-268-14	Boom Pressure Adjust (capped)	1
20	10-268-21	O-Ring	3
21	10-268-01	Gage Elbow	1
22	10-268-13	Elbow 90° 1" Hose Barb with Nut	3
23	16-281	Liquid Filled Gauge (not part of 10-268)	1
24	10-268-26	Plunger Assembly	3
25	10-268-28	Bolt & Washer	6
26	10-168-31	Manual Control Valve	1
27	10-268-32	1" Elbow	1
	10-268-33	Clip	1
28		1" Hose Barb	1
Not Shown	10-268-15	Tie Rod with Nuts and Washer	4

10-160 STAINLESS STEEL 15' MANUAL BOOM DRAWING



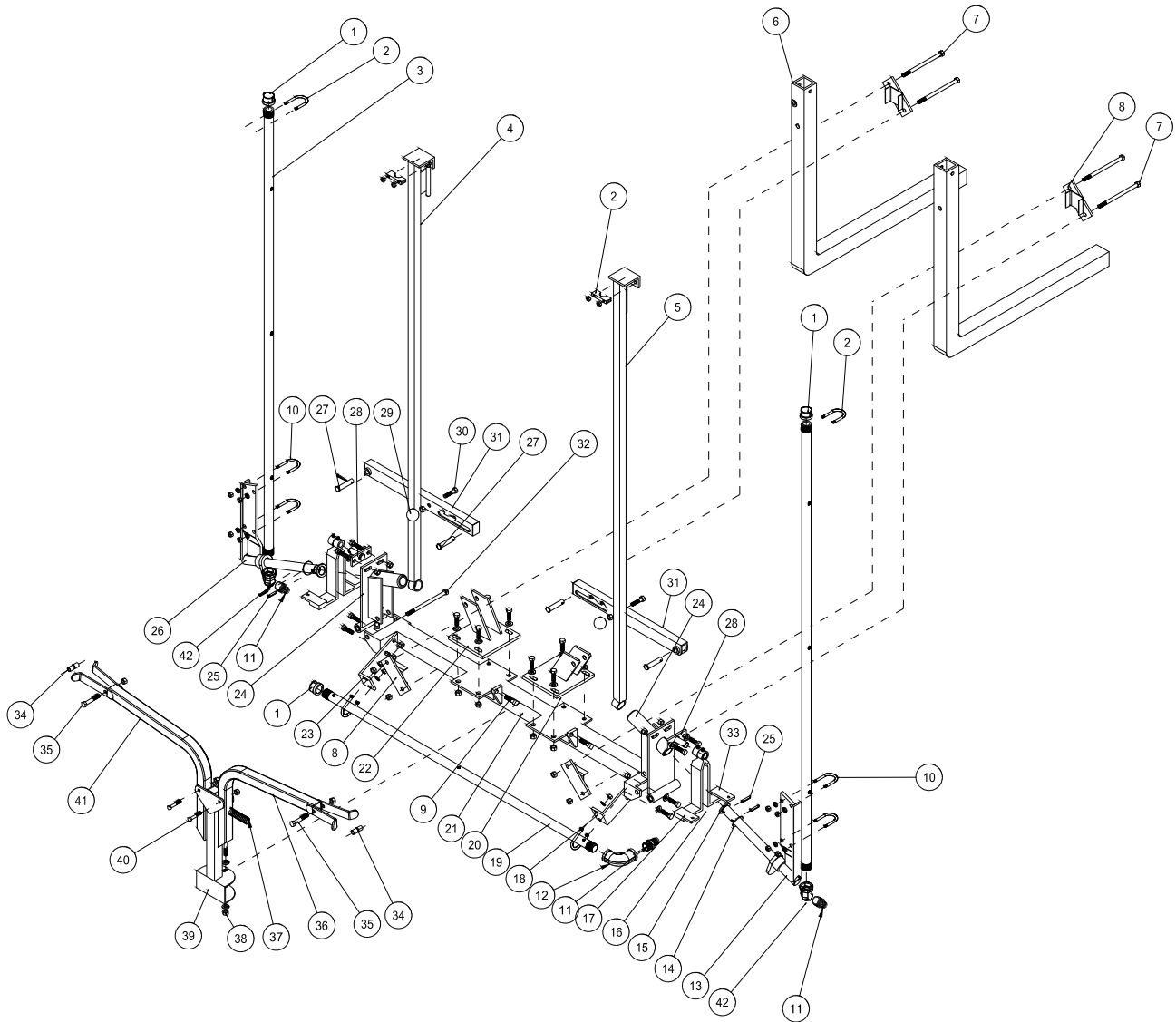
Accessories

10-160 STAINLESS STEEL 15' MANUAL BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-926	Stainless Steel Cap $\frac{3}{4}$	3
2	13-498	U-Bolt Kit $1\frac{1}{8}$	2
3	15-562	Right and Left Boom Tube	2
4	15-565	Left Brush Guard	1
5	15-564	Right Brush Guard	1
6		Boom Carrier (part of the truck)	
7	HBS-38-16-550	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $5\frac{1}{2}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
8	16-761	Boom Brackets	4
10	16-024	U-Bolt $\frac{5}{16}$ - 24	6
	HWS-516	Stainless Steel Washer $\frac{5}{16}$	12
	HNS-516-24	Stainless Steel Nut $\frac{5}{16}$ - 24	12
11	18-249	Barb Fitting	3
	18-040	Hose Clamp	3
12	16-925	Stainless Steel Pipe Elbow $\frac{3}{4}$ x 90°	1
13	33-301	Right Pivot Bracket	1
14	HMB-100-14	Machine Bushing 1 x 14GA	4
15	HMB-100-10	Machine Bushing 1 x 10GA	2
16	15-495	Extension Spring	2
17	15-812	Right Cam Stop (must also order 15-811)	2
	18-268	Oilite Bushing	2
18	33-308	Right, 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
19	16-927	Center Tube	1
20	33-330	Right Actuator Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
21	33-329	Center Mount	1
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
22	33-331	Left Actuator Bracket	1
	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HW-38	Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
23	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
24	15-813	Pivot Bracket	2
	15-494	Nylon Flange Bushing	4
	18-036	Oilite Bushing	4
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
25	HRPS-14-150	Stainless Steel Roll Pin $\frac{1}{4}$ x $1\frac{1}{2}$	4
26	33-302	Left Pivot Bracket	1
27	HCPS-12-225	Stainless Steel Clevis Pin $\frac{1}{2}$ x $2\frac{1}{4}$	4
	HPS-18-100	Stainless Steel Cotter Pin $\frac{1}{8}$ x 1	4
28	15-810	Pivot	2
	HMB-58-14	Machine Bushing $\frac{5}{8}$ x 14GA	8
	HPS-18-100	Cotter Pin $\frac{1}{8}$ x 1	2
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4

(Continued on next page)

10-160 STAINLESS STEEL 15' MANUAL BOOM DRAWING (CONTINUED)



Accessories

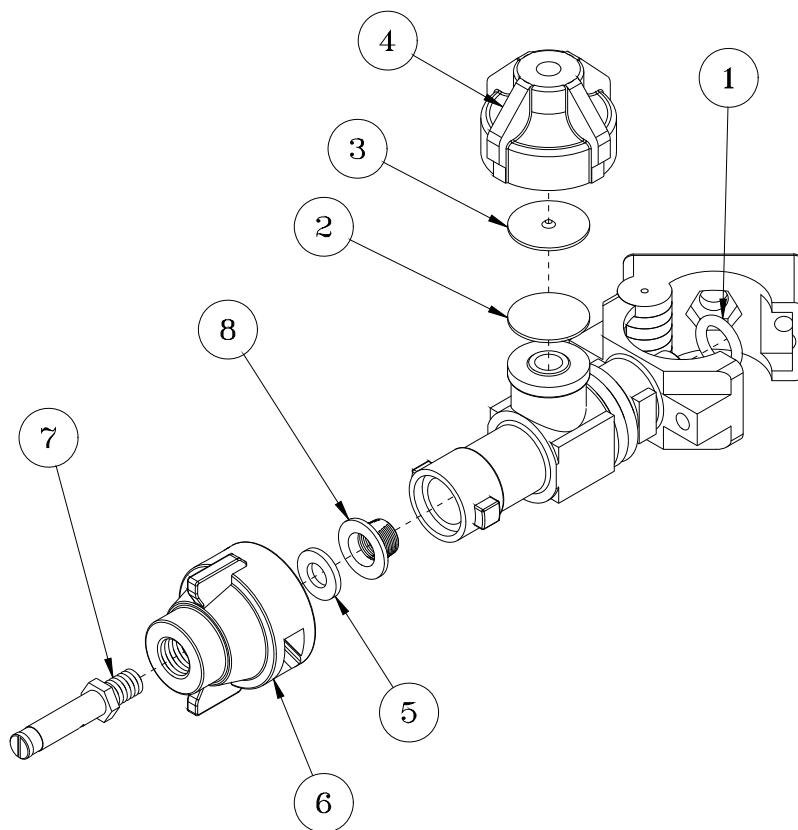
10-160 STAINLESS STEEL 15' MANUAL BOOM PARTS LIST (CONTINUED)

REF#	PART#	DESCRIPTION	QUANTITY
29	15-014	Shift Knob	2
30	HB-38-16-175	Bolt $\frac{3}{8}$ - 16 x $1\frac{3}{4}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2
31	15-561	Boom Lift	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	15-811	Left Cam Stop (must also order 15-812)	1
	18-268	Oilite Bushing	2
34	18-289	Bushing $\frac{3}{8}$ ID - $\frac{1}{2}$ OD x $\frac{5}{8}$	4
35	HB-38-16-225	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{4}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
36	10-247	Right Boom Stabilizer	1
	15-020	Hand Grip	2
37	21-212	Extension Spring	1
38	HB-38-16-300	Bolt $\frac{3}{8}$ - 16 x 3	1
	HW-38	Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	1
39	10-162	Boom Support	1
40	HB-516-18-225	Bolt $\frac{5}{16}$ - 18 x $2\frac{1}{4}$	2
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	2
41	10-246	Left Boom Stabilizer	1
	15-020	Hand Grip	2
42	18-411	Stainless Steel Pipe Elbow $\frac{3}{4}$ x 45°	2

For best result use Teflon® tape on all fittings.

- The three boom assemblies are not on the packing list but are in the carton. The long boom assemblies are the right and left booms. The labels are located on the pivot brackets (Ref 13 and 26). The small boom assembly is the center boom. You can NOT order these boom assemblies as one unit. Please refer to parts drawing for individual parts.
- Mount small boom assembly to the boom carriers on sprayer using four boom brackets (Ref 8), four bolts, $\frac{3}{8}$ - 16 x $5\frac{1}{2}$ and four lock nuts, $\frac{3}{8}$ - 16 (Ref 7). One boom bracket should go on boom assembly and one on boom carrier. Do the same for right and left side. Place boom at desired level (approximately 20" (51 cm) nozzle height) and center. Tighten bolts.
- Put the actuator brackets (Ref 20 and 22) on the center mount (Ref 21) using $\frac{3}{8}$ - 16 x $1\frac{1}{4}$ bolts, washers and lock nuts, with washers next to the slots. Snug up the bolts so that you can adjust actuator brackets with the set screws (Ref A) on the center mount after booms have been mounted.
- Take right boom and slide pivot bracket (Ref 24) in center mount (Ref 21) and hold in place with $\frac{1}{2}$ - 13 x $5\frac{1}{2}$ bolt and $\frac{1}{2}$ - 13 center lock nut (Ref 32). Do not over tighten, boom must be able to move up and down. Repeat for left boom.
- Install boom lifts (Ref 31) using clevis pin and cotter pin (Ref 27) so the bushing end hooks to the pivot bracket (Ref 24) and the slotted end hooks to the actuator bracket (Ref 20 and 22).
- Hook hoses to respective fittings using hose clamps (18-040). The hose coming from right side of sprayer goes to straight fitting on right boom. Center hose from sprayer goes to straight fitting on center boom. The left hose from sprayer goes to straight fitting on left boom. Be sure all clamps are tight.
- Use the adjustment slots on the boom lifts to completely lift and lower booms.
- Using set screws (Ref A) adjust actuator brackets so nozzles of booms are at same height with nozzles of center section. Tighten bolts holding actuator brackets to center mount and locknuts on set screws.
- Rubber boom carrier and latch are located on the horizontal boom support on top of tank.
- Put the viton gaskets (16-800), Raindrop tips (16-805) and quick TeeJet caps (16-921) on nozzle bodies (16-996) on the three boom sections.
- Make certain set screws (B) on both sides are completely screwed in and locked with the lock nut.

NOZZLE ASSEMBLY DRAWING



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	Brass Strainer	1
*	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

NOTE:

For all 15' Booms: The nine 16-996 bodies are installed on the boom sections. The nine 16-800 viton gasket, 16-802 strainers, 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.

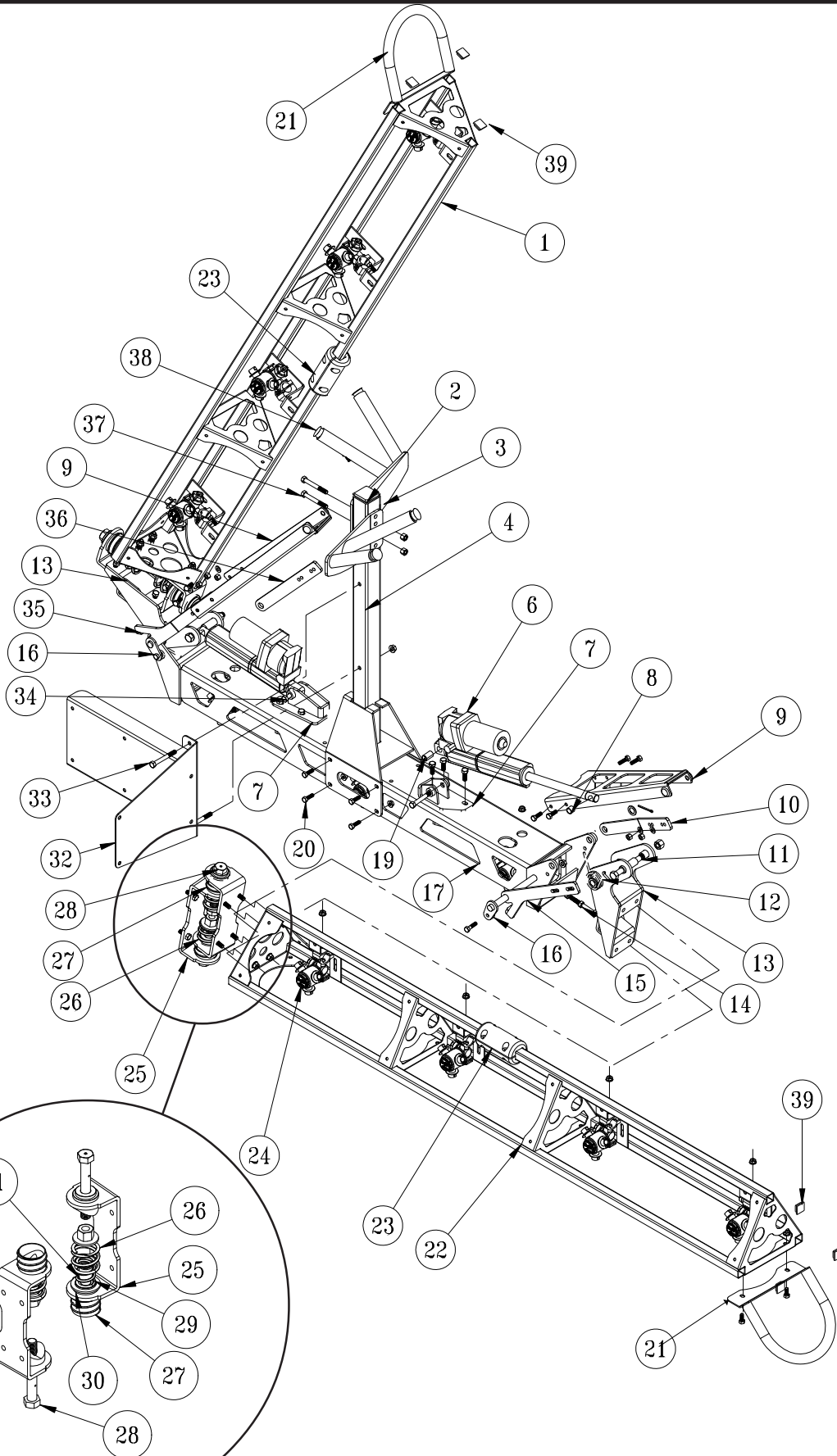
RECOMMENDED OVERLAP

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".

17-585 18' SMITHCO SUPER BOOM

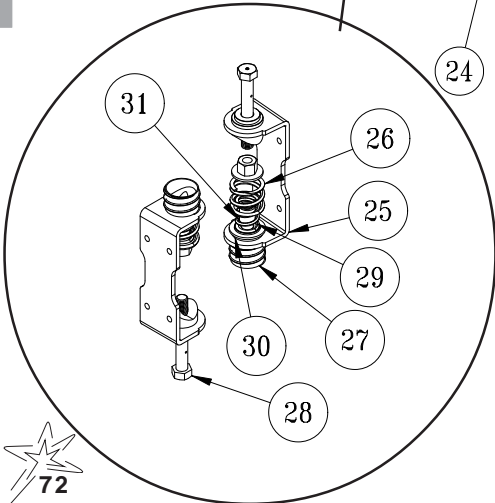


REF#	PART#	DESCRIPTION	QUANTITY
1	17-531	Left Boom Arm	1
2	18-297	Cap Plug	1
3	17-617	Boom Nest	2
4	17-578	Boom Nest Post	1
6	30-187	KYB Electric/ Hydraulic Actuator	2
7	30-184	Ram Mount	2
	HB-38-16-100	Bolt, $\frac{3}{8}$ - 16 x 1	6
	HW-38	Washer, $\frac{3}{8}$	6
	HNFL-38-16	Flange Lock Nut, $\frac{3}{8}$ -16	6
8	18-036	$\frac{1}{2}$ " Bushing	2
9	17-587	Boom Lock	2
	HB-516-18-100	Bolt, $\frac{5}{16}$ - 18 x 1	8
	HW-516	Flat Washer, $\frac{5}{16}$	8
	HNTL-516-18	Lock Nut, $\frac{5}{16}$ -18	8
	42-116	Rubber Insert	4
	8803-2.75	Trim Lace, 2.75"	2
10	17-588	Lock Hinge, RH	1
11	HB-12-13-500	Bolt, $\frac{1}{2}$ - 13 x 5	2
	HNTL-12-13	Lock Nut, $\frac{1}{2}$ - 13	2
12	17-597	Torson Spring, RH	1
13	30-185	Arm Pivot Hinge	2
	76-128	Bushing	4
14	HB-38-16-150	Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
	HNFL-38-16	Flange Lock Nut, $\frac{3}{8}$ - 16	2
15	17-589	Limit Hinge, Rh	1
16	17-596	Hinge Pin w/ Spacer	2
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	2
	HB-516-18-100	Bolt, $\frac{5}{16}$ - 18 x 1	2
	HNFL-516-18	Flange Lock Nut, $\frac{5}{16}$ -18	2
17	17-528	Boom Center	1
19	18-234	1" Bushing (part of 30-214)	2
20	HBFL-516-18-075	Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$	8
	HNFL-516-18	Flange Lock Nut, $\frac{5}{16}$ - 18	8
21	17-541	Boom End Guard	2
	HBFL-516-18-075	Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$	4
	HNFL-516-18	Flange Lock Nut, $\frac{5}{16}$ - 18	4
22	17-532	Right Boom Arm	1
23	17-573	Guide Block Set	2
	HB-14-20-125	Bolt $\frac{1}{4}$ - 20 x $1\frac{1}{4}$	8
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	8
24	33-506	Body (see nozzle drawing)	11
	HB-516-18-100	Bolt, $\frac{5}{16}$ -18 x 1	11
	HNFL-516-18	Flange Lock Nut, $\frac{5}{16}$ -18	11
25	17-527	Boom Hinge (matched set)	2
	HB-38-16-100	Bolt, $\frac{3}{8}$ - 16 x 1	8
	HNFL-38-16	Lock Nut, $\frac{3}{8}$ - 16	8
	HB-516-18-100	Bolt, $\frac{5}{16}$ - 18 x 1	8
	HW-516	Flat Washer, $\frac{5}{16}$	8
	HNFL-516-18	Flange Lock Nut, $\frac{5}{16}$ -18	8
26	17-539	Compression Spring- Outer	4
27	9026-2	Rubber Duct Hose x 2"	4

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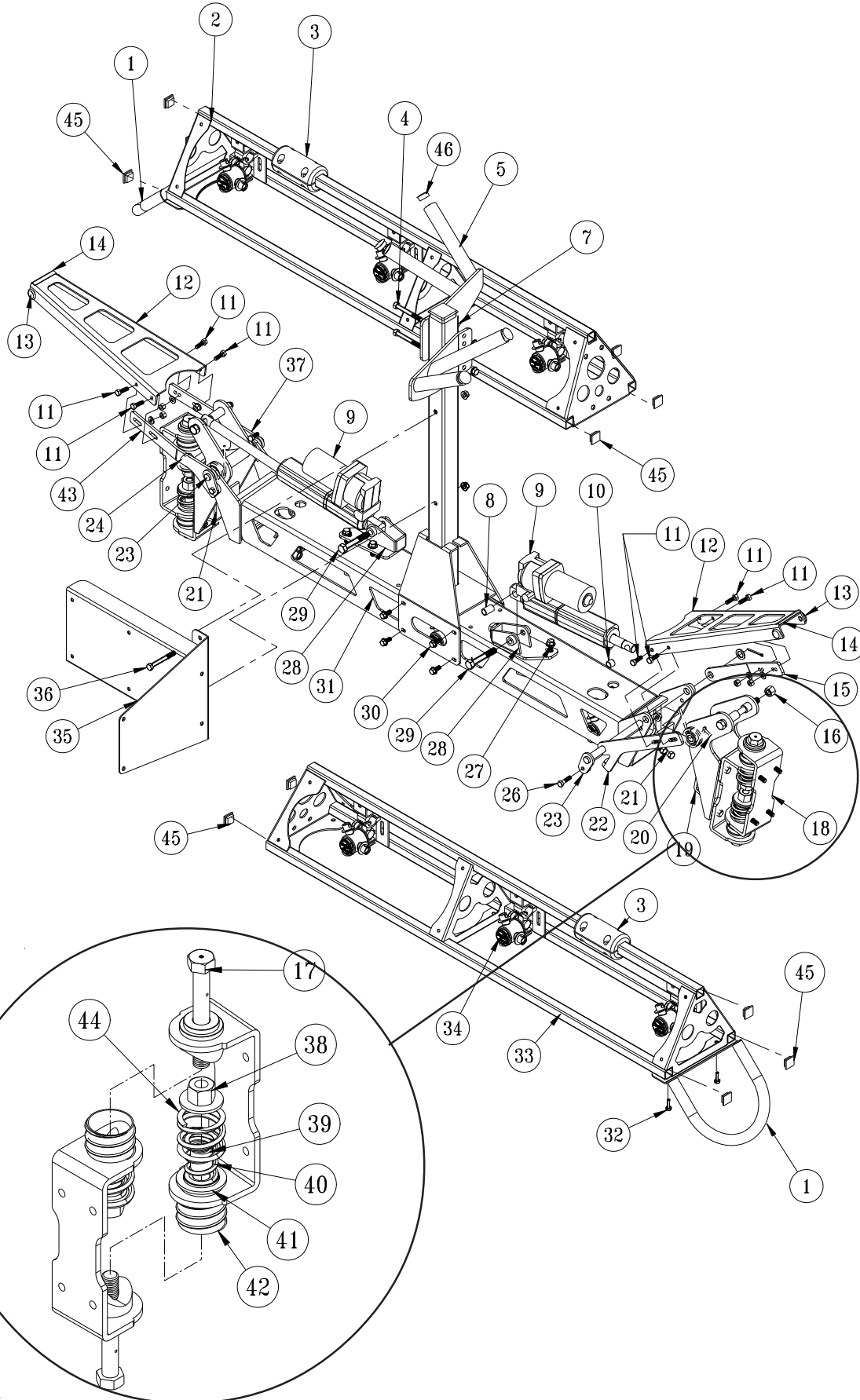


17-585 18' SMITHCO SUPER BOOM



REF#	PART#	DESCRIPTION	QUANTITY
28	17-540	Tapped Bolt	4
	HW-34	Washer, ³ / ₄	4
	HNCL-34-10	Center Lock Nut, ³ / ₄ - 10	4
	HG-14-28-180	Grease Fitting, ¹ / ₄ - 28 x 180°	4
29	17-591	Compression Spring - Inner	4
30	17-599	Spring Shim	4
31	17-594	Spring Sleeve	4
32	17-535	Clean Load Mount	1
33	HB-38-16-300	Bolt, ³ / ₈ - 16 x 3	2
	HNTL-38-16	Lock Nut, ³ / ₈ - 16	2
34	HB-12-13-300	Bolt, ¹ / ₂ - 13 x 3	2
	HNTL-12-13	Lock Nut, ¹ / ₂ - 13	2
35	17-593	Limit Hinge, LH	1
	17-598	Torsion Spring, LH	1
36	17-592	Lock Hinge, LH	1
37	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
38	17-619	Tube Cap	4
39	30-258	Ribbed 1" Plug	10

17-601 15' HD BOOM DRAWING

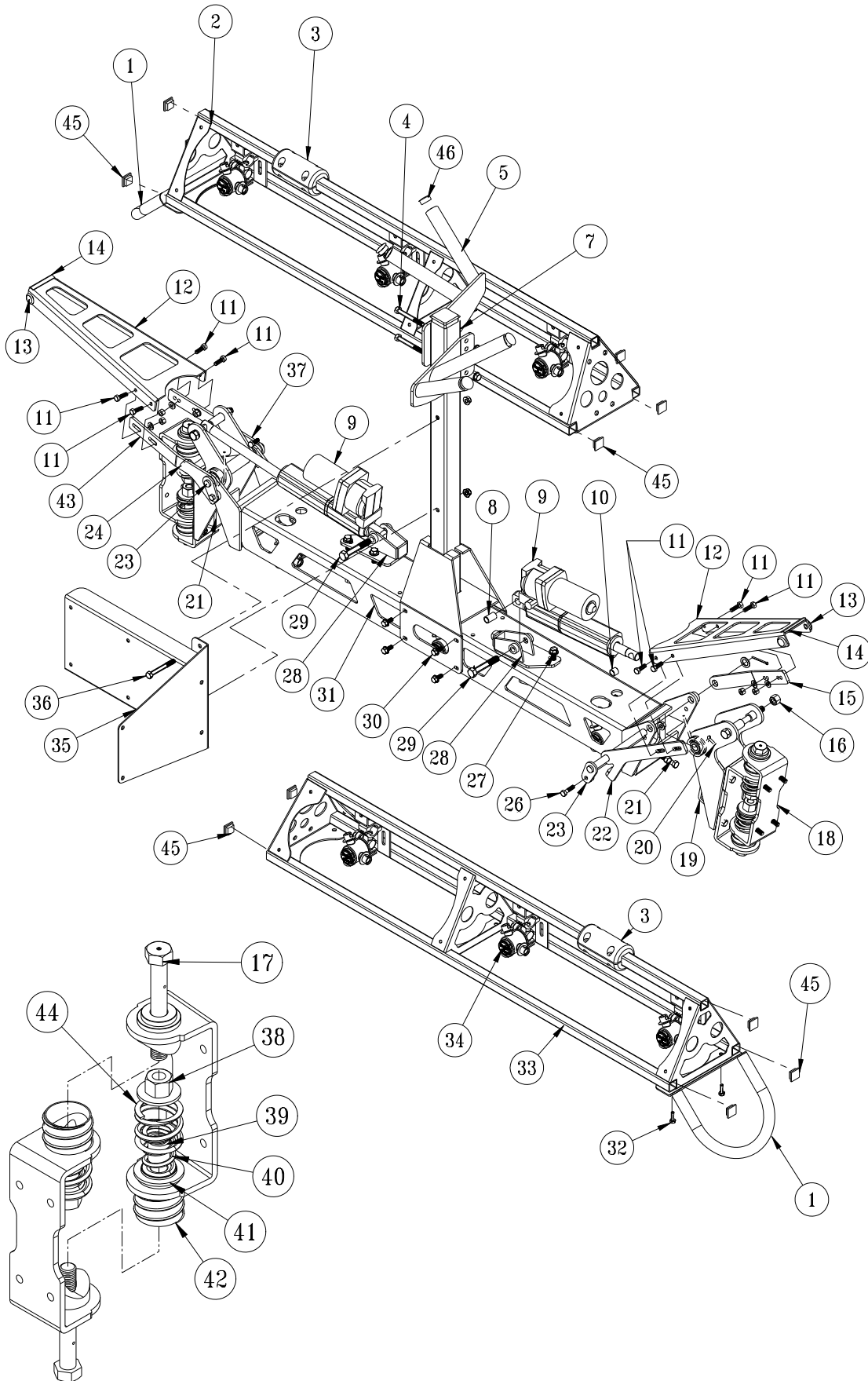


17-601 15' HD BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	17-541	Boom End Guard	2
2	17-551	Left Boom Arm	1
3	17-573	Guide Block Set	2
	HB-14-20-125	Bol $1/4$ - 20 x $1/4$	8
	HNTL-14-20	Lock Nut $1/4$ - 20	8
4	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
5	17-619	V-Boom Nest	1
7	17-578	Boom Nest Post	1
	18-297	Cap Plug	1
8	18-036	1" Bushing (part of 30-214)	2
9	30-214	10" Electric/Hydraulic Actuator	2
10	18-234	$1/2$ " Bushing (part of 30-214)	2
11	HB-516-18-100	Bolt, $5/16$ - 16 x 1	8
	HW-516	Flat Washer, $5/16$	8
	HNTL-516-18	Lock Nut, $5/16$ - 18	8
12	17-587	Boom Lock	2
13	42-116	Rubber Insert	4
14	8803-2.75	Trim Lace, $2^{3/4}$	2
15	17-588	Lock Hinge, RH	1
16	HB-12-13-500	Bolt, $1/2$ - 13 x 5	2
	HNTL-12-13	Lock Nut, $1/2$ - 13	2
17	17-540	Tapped Bolt	4
	HG-14-28-180	Grease Fitting, $1/4$ - 28 x 180°	4
18	17-527	Boom Hinge (matched set)	4
	HB-38-16-100	Bolt, $3/8$ - 16 x 1	8
	HNFL-38-16	Lock Nut, $3/8$ - 16	8
	HB-516-18-100	Bolt, $5/16$ - 16 x 1	8
	HW-516	Flat Washer, $5/16$	8
	HNFL-516-18	Flange Lock Nut, $5/16$ - 18	8
19	30-185	Arm Pivot Hinge	2
	76-128	Bushing (part of 30-185)	4
20	17-597	Torsion Spring, RH	1
21	HB-38-16-150	Bolt, $3/8$ - 16 x $2^{1/2}$	2
	HNFL-38-16	Flange Lock Nut, $3/8$ - 16	2
22	17-589	Limit Hinge, RH	1
23	17-596	Hinge Pin w/Spacer	2
	HP-18-100	Cotter Pin, $1/8$ x 1	2
24	17-598	Torsion Spring, LH	1
26	HB-516-18-100	Bolt, $5/16$ - 16 x 1	2
	HNFL-516-18	Flange Lock Nut, $5/16$ - 18	2
27	HB-38-16-100	Bolt, $3/8$ - 16 x 1	6
	HW-38	Washer, $3/8$	6
	HNFL-38-16	Flange Lock Nut, $3/8$ - 16	6
28	30-184	Ram Mount	2
29	HB-12-13-300	Bolt, $1/2$ - 13 x 3	2
	HNTL-12-13	Lock Nut, $1/2$ - 13	2

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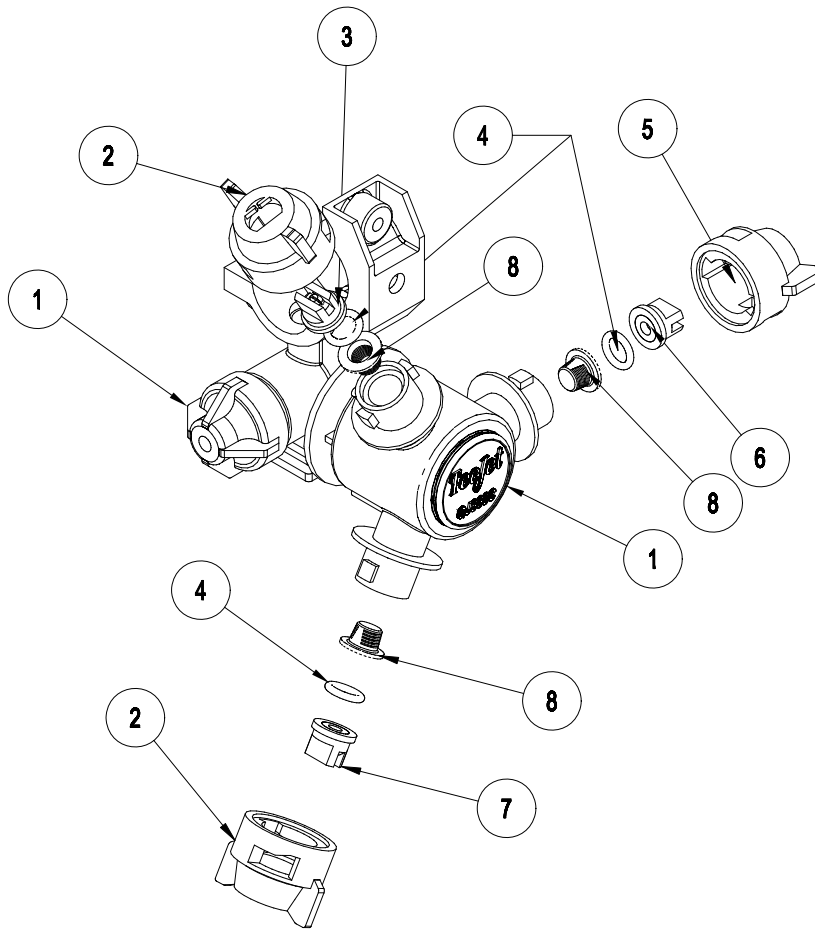
17-601 15' HD BOOM DRAWING



17-601 15' HD BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
30	HBFL-516-18-100	Bolt, $\frac{5}{16}$ - 18 x 1	8
	HNFL-516-18	Flange Lock Nut, $\frac{5}{16}$ - 18	8
31	17-528	Boom Center	1
32	HBFL-516-18-075	Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$	4
	HNFL-516-18	Flange Lock Nut, $\frac{5}{16}$ - 18	4
33	17-552	Right Boom Arm	1
34	33-506	Body (see nozzle drawing)	9
	HB-516-18-100	Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$	9
	HNFL-516-18	Flange Lock Nut, $\frac{5}{16}$ - 18	9
35	17-535	Clean Load Mount	1
36	HB-38-16-300	Bolt, $\frac{3}{8}$ - 16 x 3	2
	HNTL-38-16	Lock Nut, $\frac{3}{8}$ - 16	2
37	17-592	Lock Hinge, LH	1
38	HNCL-34-10	Center Lock Nut, $\frac{3}{4}$ - 10	4
	HW-34	Flat Washer, $\frac{3}{4}$	4
39	17-594	Spring Sleeve	4
40	17-591	Compression Spring - inner	4
41	17-599	Spring Shim	4
42	9026-2	Rubber Duct Hose x 2"	4
43	17-593	Limit Hinge, LH	1
44	17-539	Compression Spring - outer	4
45	30-258	1" 10-14ga Ribbed Plug	10

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	3

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.

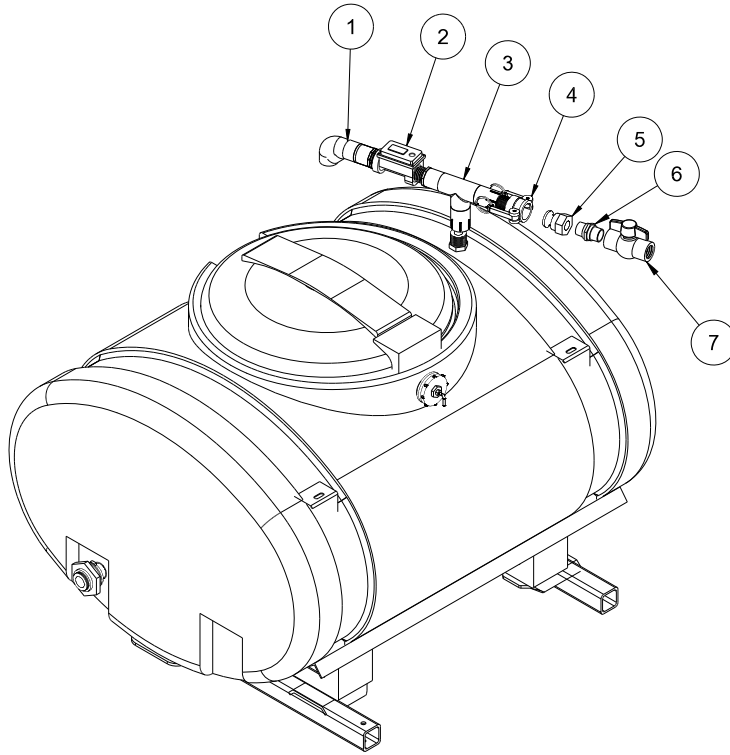
For re-ordering Nozzle Kits the following numbers apply

33-540 Triple Nozzle Kit for 18' Booms

33-541 triple Nozzle Kit for 15' Booms

10-370 WATER FILL METER KIT - LITERS

10-365 WATER FILL METER KIT - GALLONS



REF #	PART #	DESCRIPTION	QUANTITY
1	14-524	Filler Outlet	1
2	14-514	Water Meter - Gallons	1
	14-527	Water meter - Liters	1
3	10-364	Filler Inlet	1
4	16-962	Quick Coupler (already on machine)	1
5	16-961	Quick Coupler (already on machine)	1
6	16-851	1" Nipple	1
7	18-448	1" Ball Valve	1

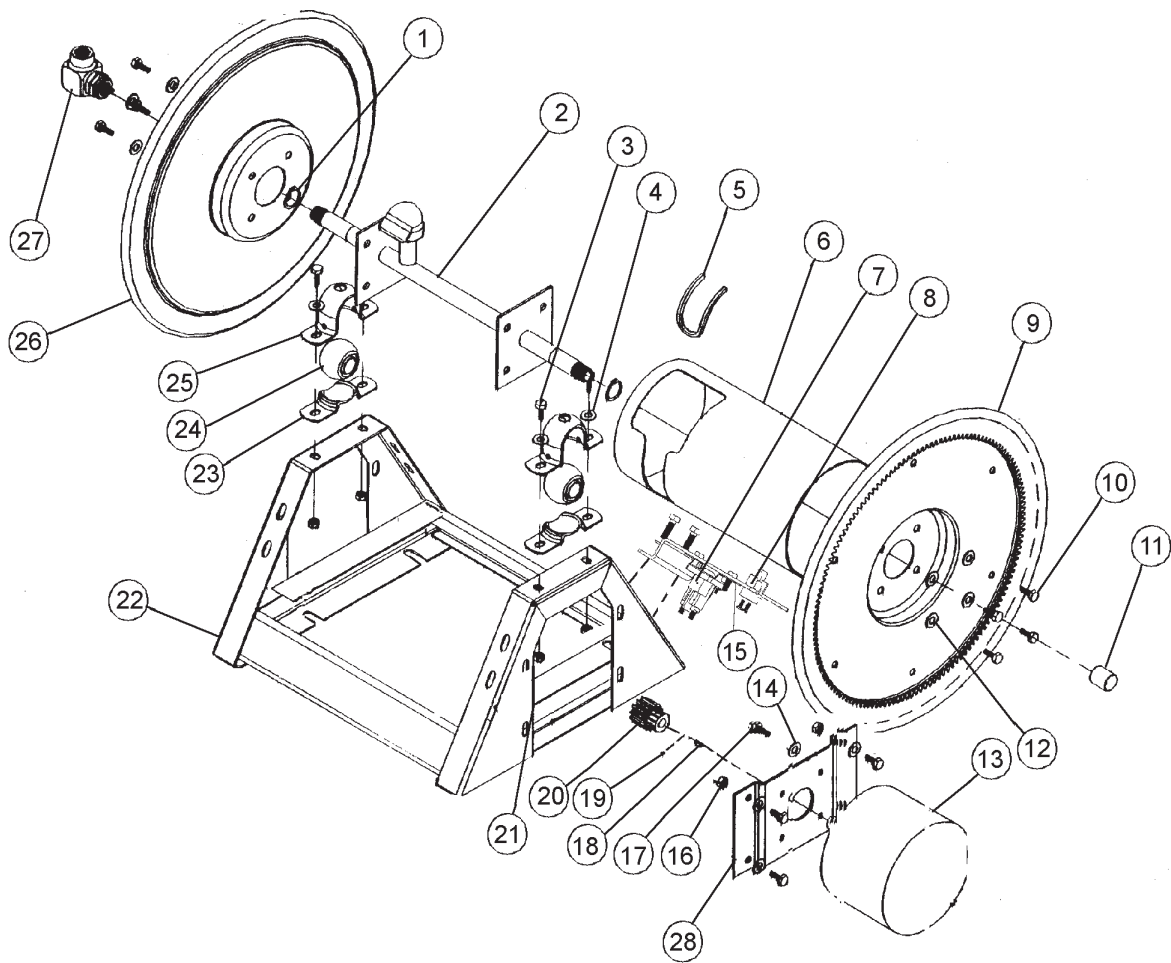
1. Thoroughly flush the service line upstream of the meter to remove dirt and debris.
2. Set meter inline.
3. Make sure the water flow follows the arrow cast on the meter body.
4. The DLJ Meter is for use **only** with **COLD WATER** up to 122°F (50°C)
5. Slowly open any upstream valves to prevent damage to the meter.

Gallons to Cubic feet Conversion :

Multiply gallons reading by 0.1337 to get cubic feet.

There are 7.48052 gallons per cubic foot.

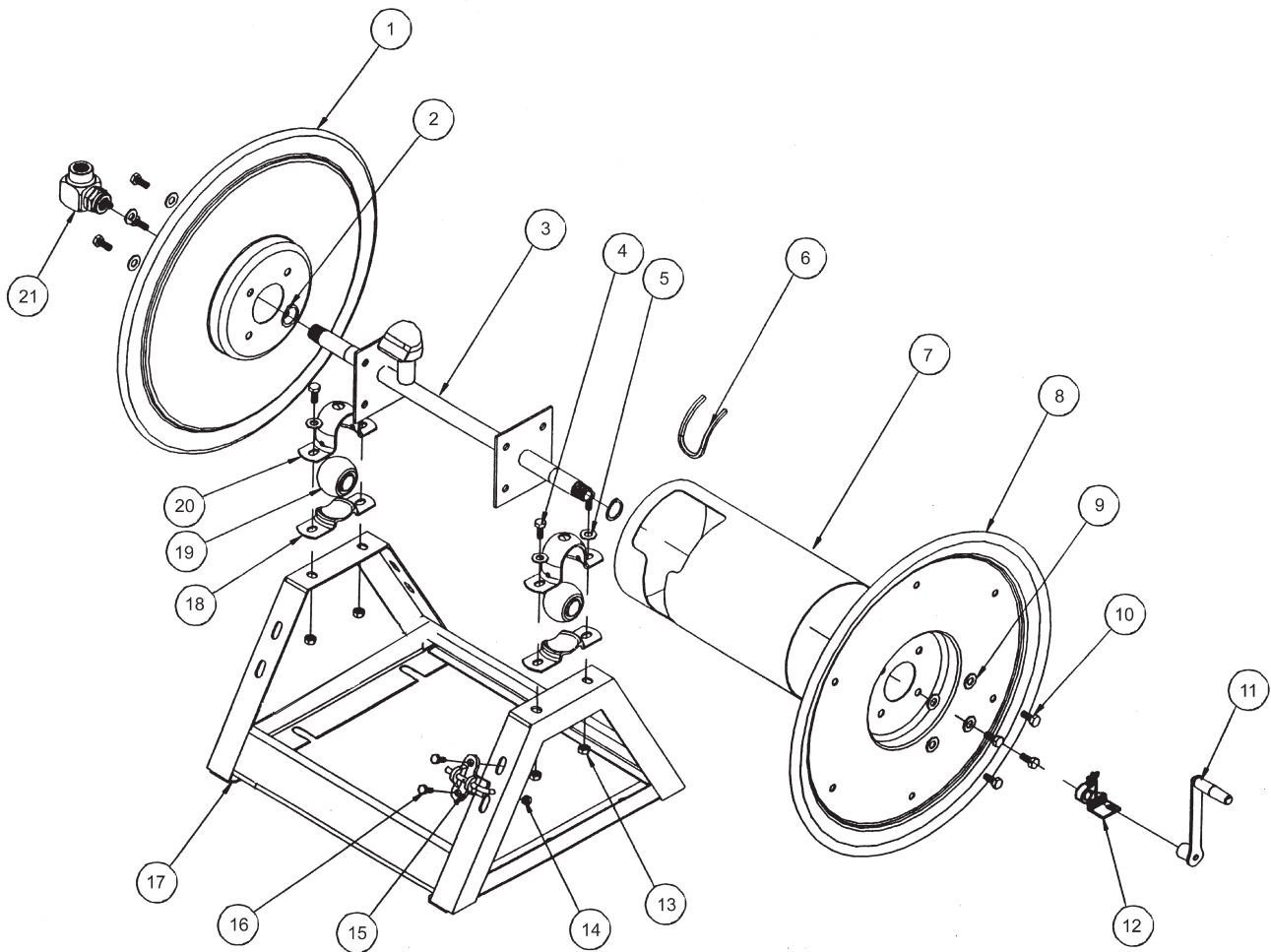
16-906 ELECTRIC HOSE REEL DRAWING



16-906 ELECTRIC HOSE REEL PARTS LIST

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-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	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

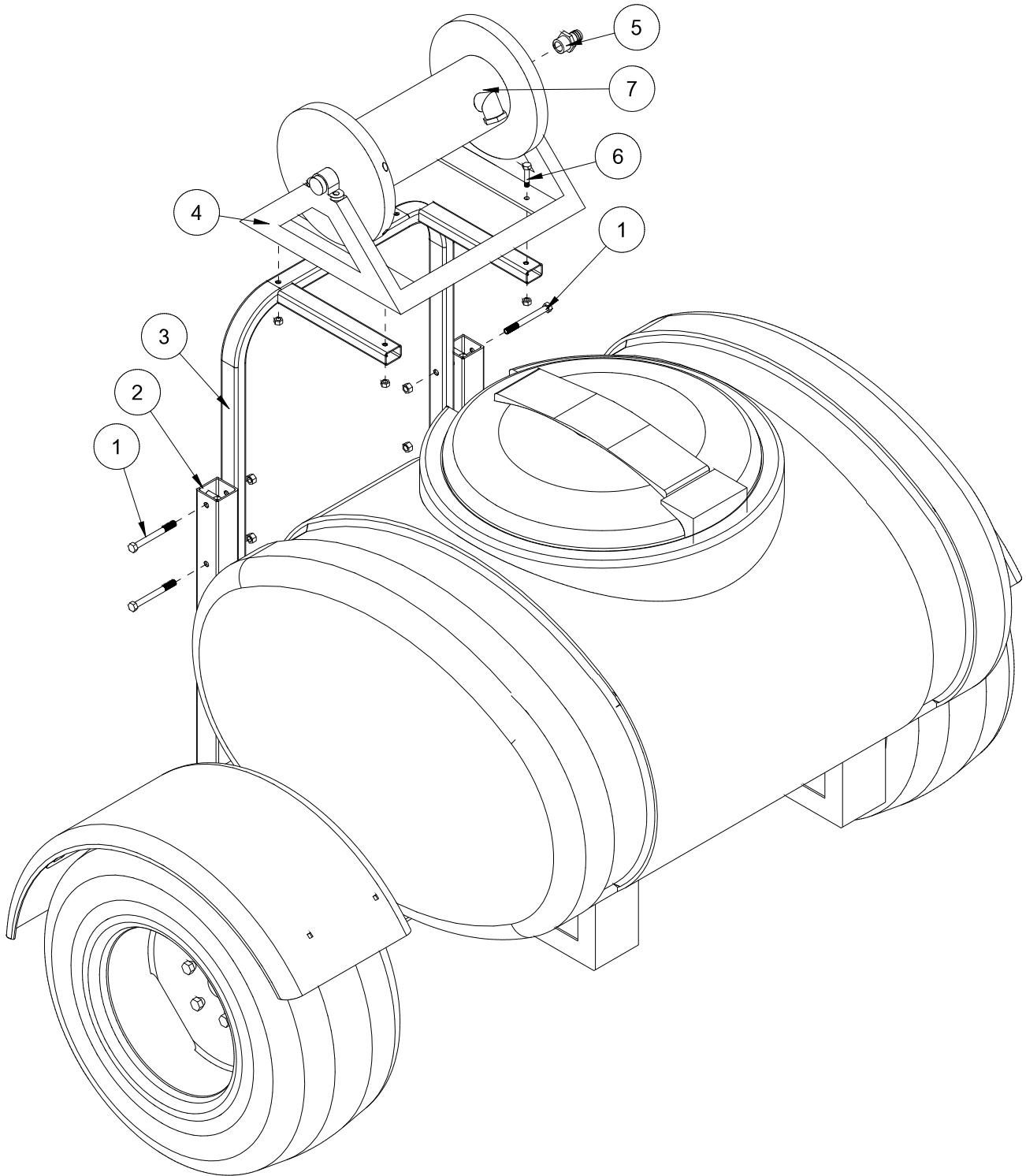
16-129 MANUAL HOSE REEL DRAWING



16-129 MANUAL HOSE REEL PARTSLIST

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

10-377 HOSE REEL MOUNT FOR 10-160 BOOM

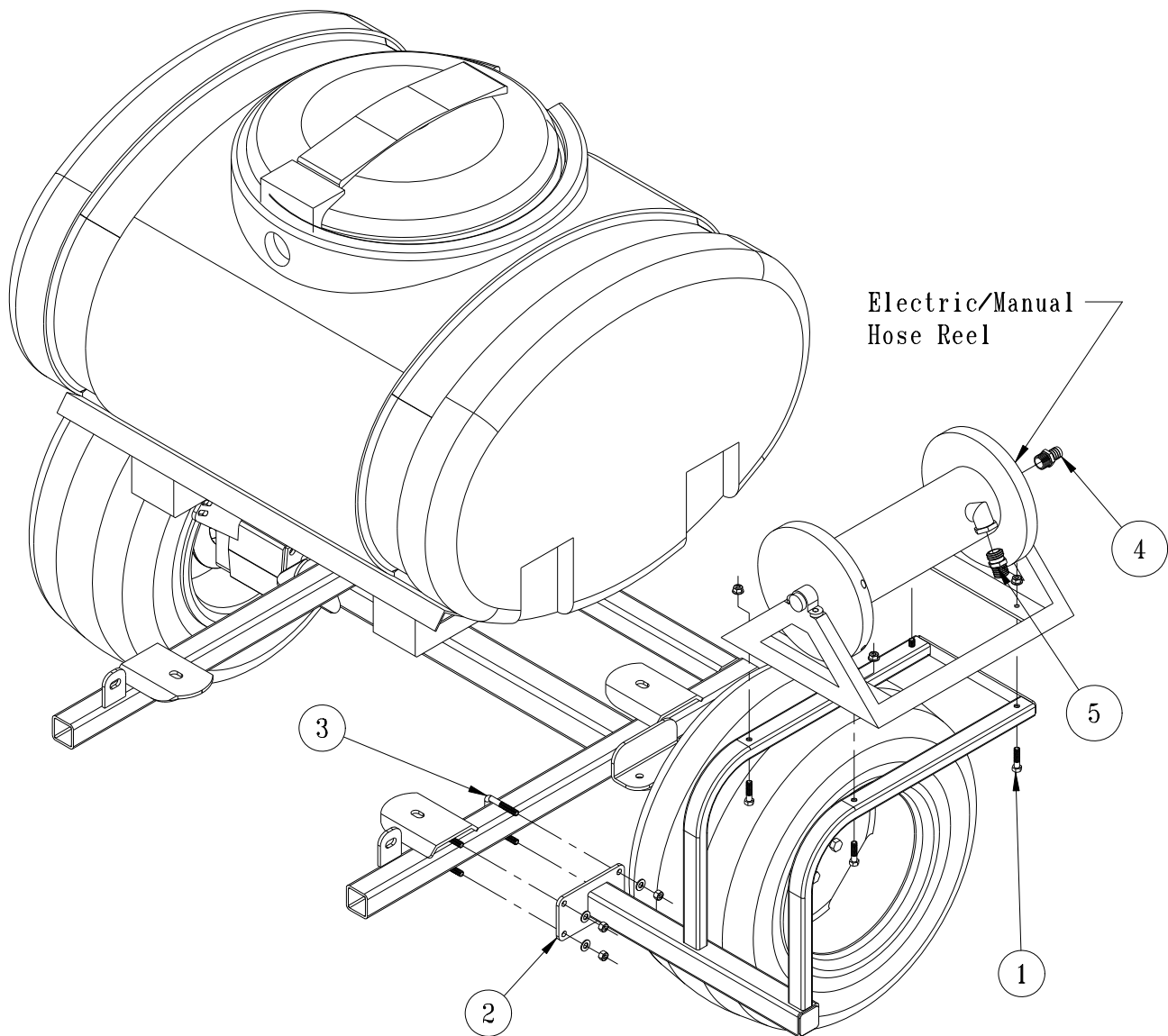


HOSE REEL MOUNT PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HB-38-16-375	Bolt $\frac{3}{8}$ - 16 x $3\frac{3}{4}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
2	10-205	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	Barb 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	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. Cut a notch into the covers to clear the top bolt then put them back in.
5. Place hose reel bracket inside the boom carrier tubes with arms pointing toward front of machine.
6. Lower bracket until top hole in bracket lines up with hole in upright. Use four $\frac{3}{8}$ - 16 x $3\frac{3}{4}$ bolts and four $\frac{3}{8}$ - 16 lock nuts with nuts on inside of uprights.
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.

10-422HOSE REEL MOUNT FOR 17-525/17-550 BOOMS

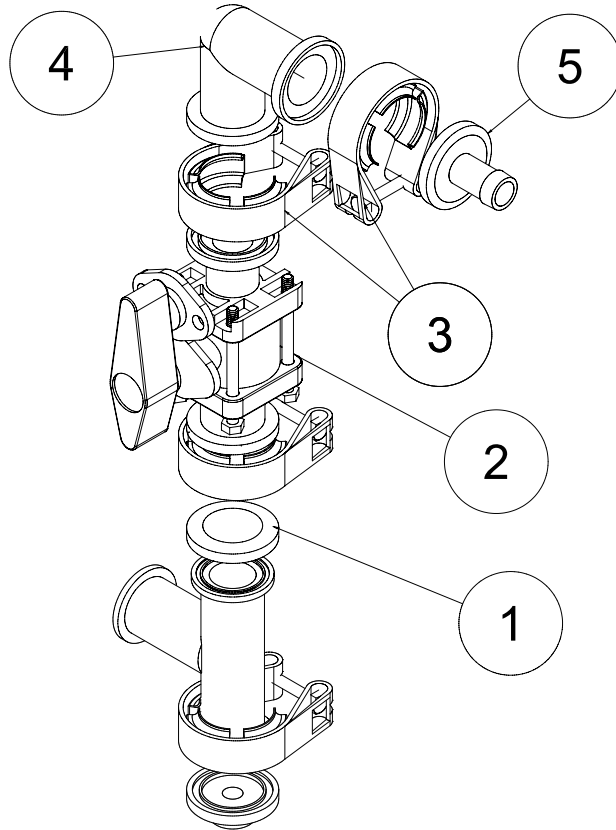


HOSE REEL MOUNT PARTS LIST

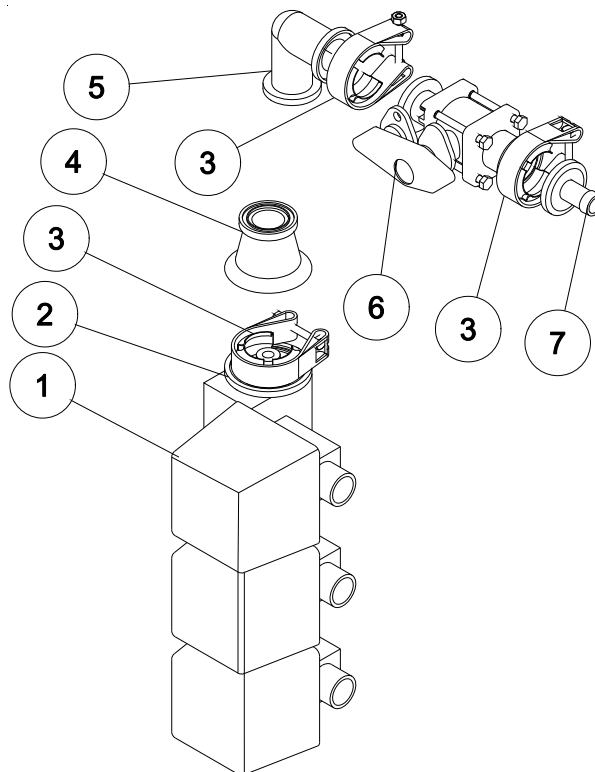
REF#	PART#	DESCRIPTION	QUANTITY
1	HB-516-18-150	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{2}$	4
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
2	10-423	Hose Reel Mount	1
3	17-537	Square U-bolt	2
4	18-249	Barb Fitting	1
5	16-295	Hose e Fitting	1

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. Install hose reel mount on the left side of the machine in front of the rear wheel. Mount arms pointing to the rear of the machine.
5. Use the u-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 side of hose reel. Place 16-295 Fitting into center of hose reel. Run 55" hose from the 18-249- to the 15-749 hose barb.

1002 (RAVEN 203) HOSE REEL PLUMBING DRAWING



1008 (RAVEN 440) HOSE REEL PLUMBING DRAWING



1002 (RAVEN 203) HOSE REEL PLUMBING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-778	Blank Gauge 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 18-040 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.

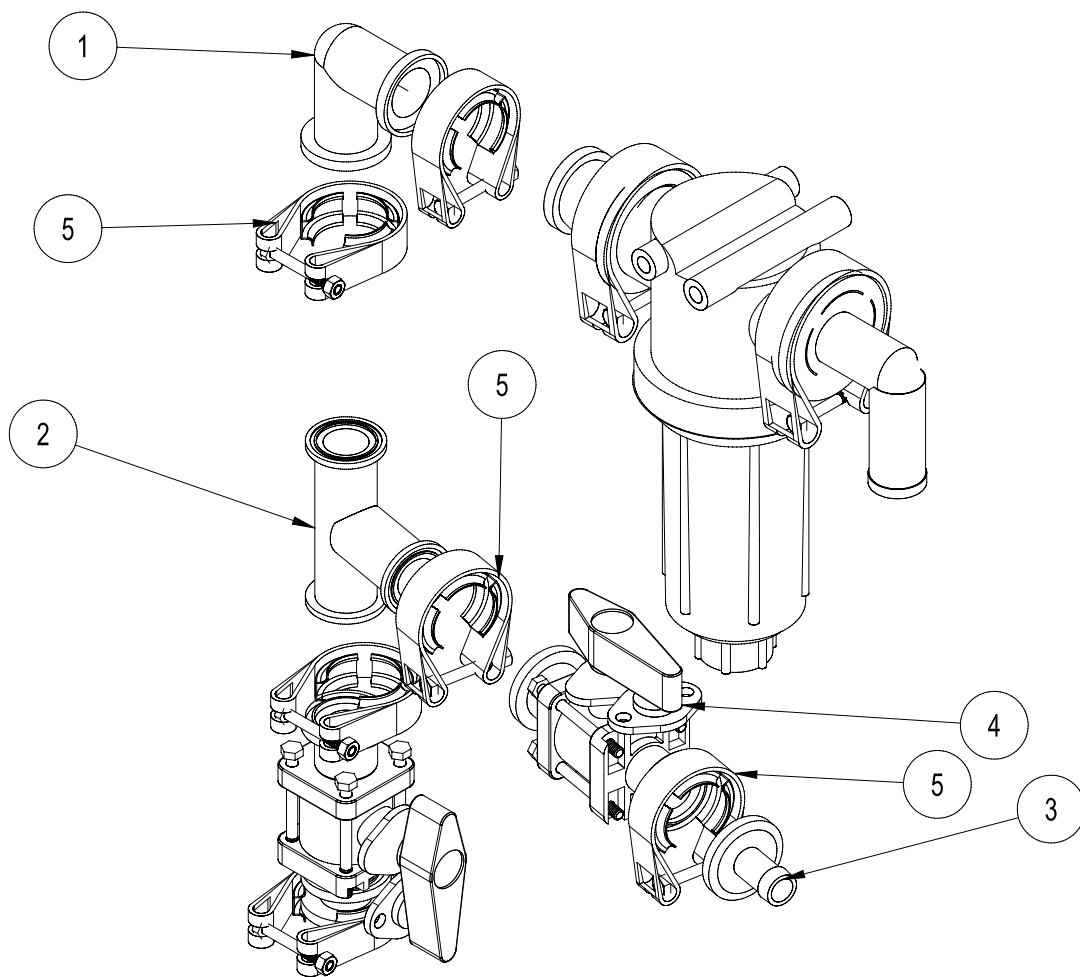
1008 (RAVEN 440) HOSE REEL PLUMBING PARTS LIST

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.

1010 (MANUAL) HOSE REEL PLUMBING DRAWING



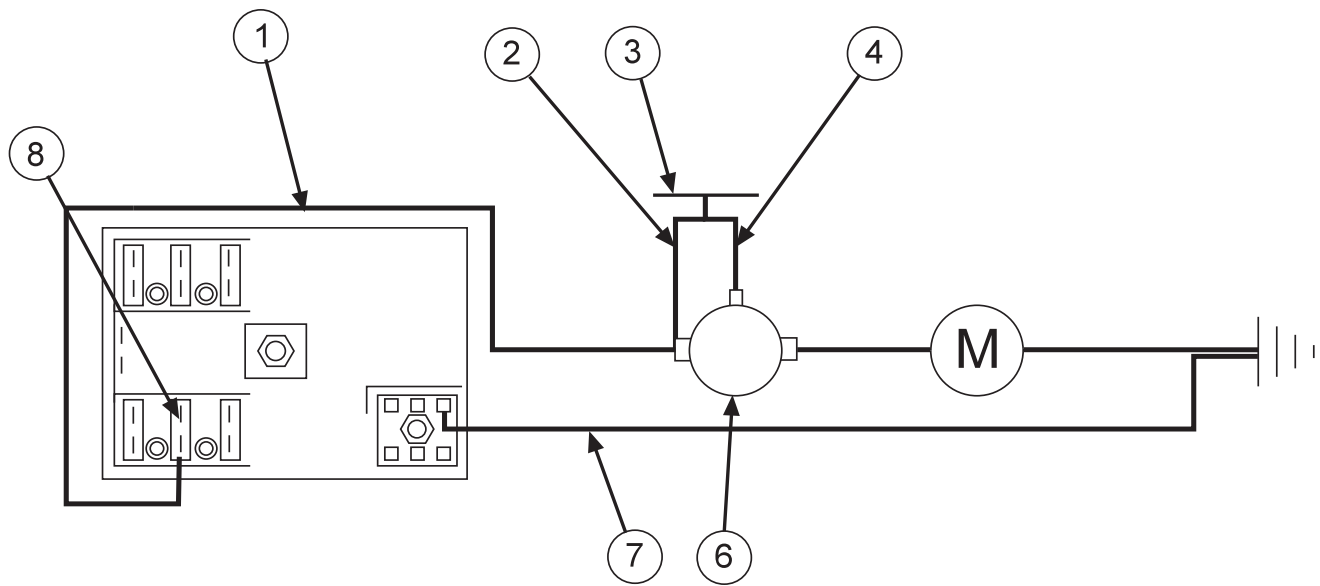
1010 (MANUAL) HOSE REEL PLUMBING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-736	Elbow	1
2	15-776	Tee	1
3	15-749	Hose Barb	1
4	15-738	Ball Valve	1
5	15-740	50 Seires Clamp	1

INSTALLATION INATRUCTIONS

1. Disconnect the ball valve from the elbow fitting on the outside of the filter assembly. Install 15-776 tee fitting (Ref 2) between the ball valve and the elbow. Use the clamp that was removed and on of the new ones provided. Only tighten clamps enough so it can be rotated.
2. Install 15-749 hose barb (Ref 3) onto the 15-738 ball valve (Ref 4) using a 50 series clamp (Ref 5) Tighten clamp. Install the ball valve and hose barb to the 15-776 tee (Ref 2) that was installed in step 1.
3. Rotate the tee fitting so the valve points toward the outside of the machine, just behind the filter assembly. Tighten all clamps.
4. Route the 3/4" orange hose from the hose barb you installed in step 2 to the hose barb on the hose reel. Secure with 18-040 Hose clamps.
5. When installing the hose reel with a manual spray system you will have a reducer coupling and an elbow coupling left over that you will not need.

ELECTRIC HOSE REEL WIRING DIAGRAM



HOSE REEL ADJUSTMENTS

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.

ELECTRIC HOSE REEL WIRING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
	8843-132	Flexguard $\frac{3}{8}$ 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	12-015	Solenoid	1
SOLENOID TERMINALS			
	HN -516-24	$\frac{5}{16}$ - 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

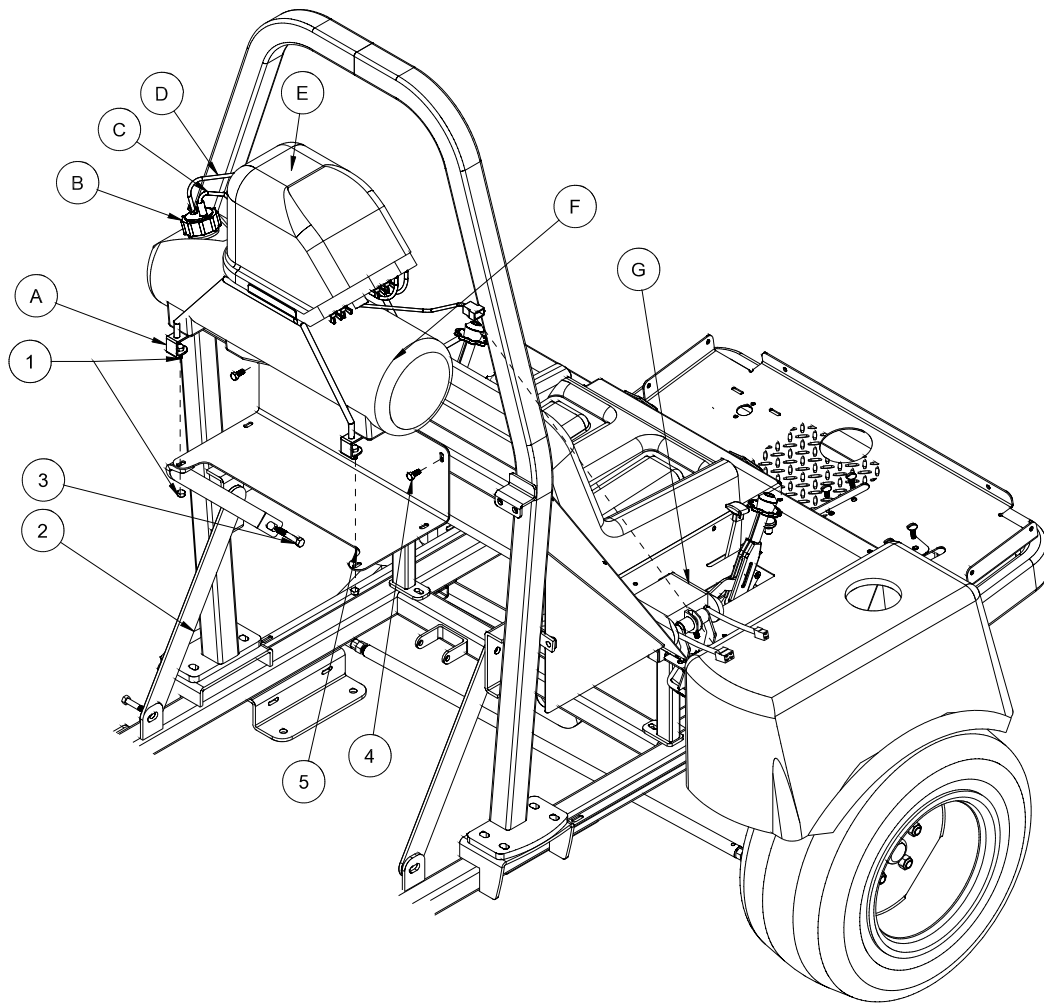
Route wire harness along side of tank and over to fuse block taking care to stay clear of moving parts or hot engine components. Cut off excess wire and strip back $\frac{3}{8}$ ". Place one 8963 heat shrink ($\frac{1}{4} \times 1\frac{1}{4}$) on each wire before crimping 8901 slide on connectors to 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.



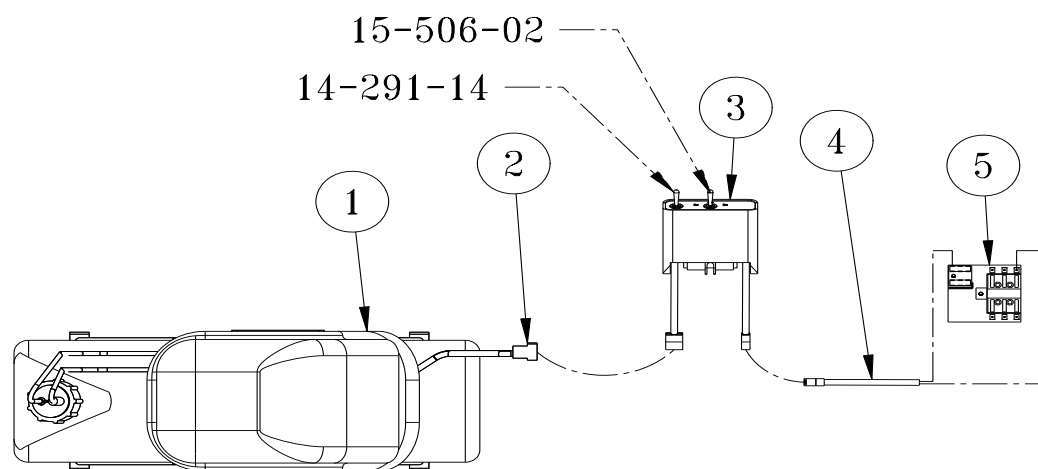
Make certain you are connecting positive (+) to positive; negative (-) to negative while attaching power leads. If you do not observe polarity, damage will result to electrical components.

Use Dielectric Grease On All Electrical Connections

10-378 FOAM MARKER FOR 1000 DRAWING



WIRING DRAWING



10-378 FOAM MARKER FOR 1000 PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HB-14-20-075	Hex Bolt, $\frac{1}{4}$ -20 x $\frac{3}{4}$	4
	HNFL-14-20	Flange Lock Nut, $\frac{1}{4}$ -20	4
2	10-413	Foamer Brace	1
3	HB-12-13-150	Flange Bolt, $\frac{5}{16}$ -18 x $1\frac{1}{2}$	1
4	HBFL-516-18-075	Flange Bolt, $\frac{5}{16}$ -18 x $\frac{3}{4}$	2
5	10-409	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
	33-508	Fuse	1
	15-506-02	Switch	1
A-G	14-291	Foamer (includes parts A-G)	1

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 on the side control panel facing towards the seat using the two wing nuts that came with the switch box.
2. Connect the compressor to the switch box.

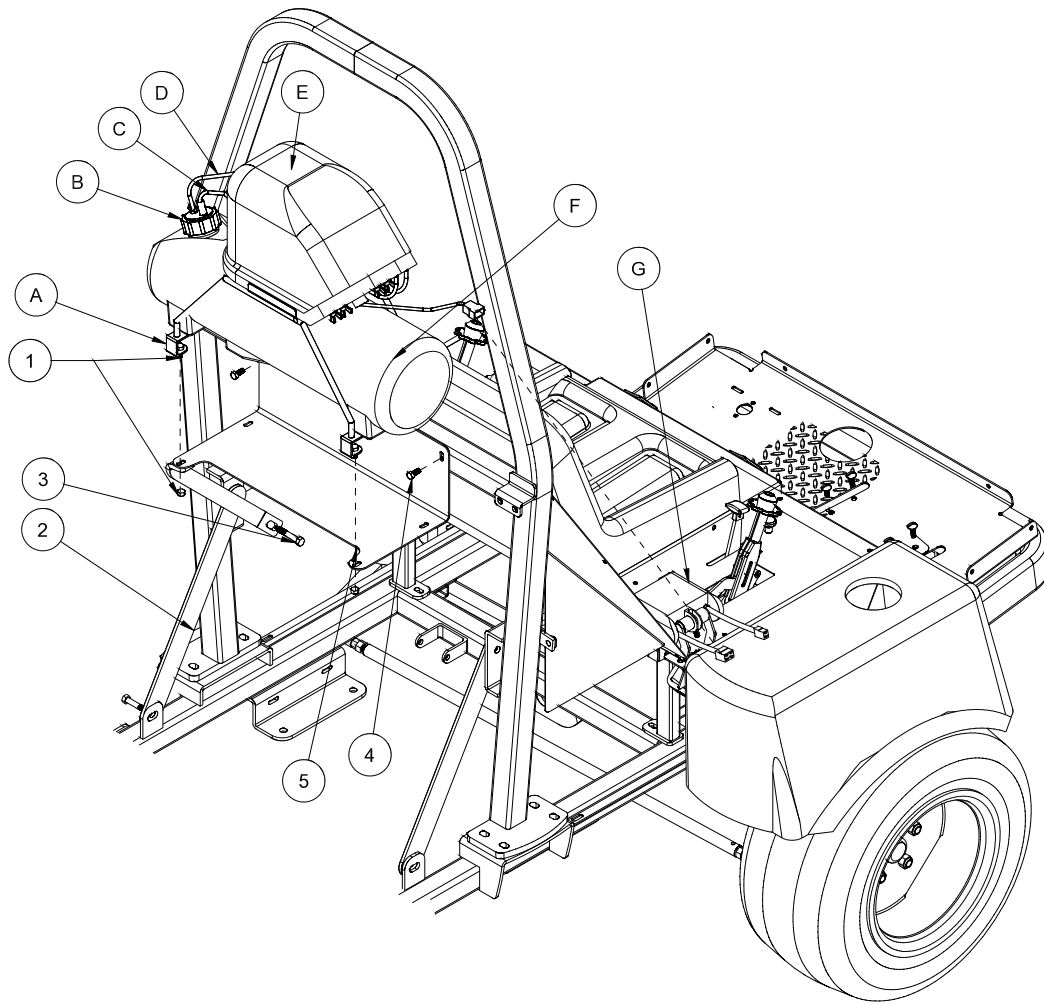
WIRING

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.

FOAM MARKER WIRING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	14-291-03	Compressor	1
2	15-504-04	Wiring Harness	1
3	14-291-05	Switch Box	1
	33-508	Fuse	1
	15-506-02	Switch - Center	1
	14-291-14	Switch - outside	1
4	15-509	Power Cable	1
5	33-271	Fuse Block (part of machine)	1
	33-508	Auto Blade Type Fuse	1

10-378 FOAM MARKER DRAWING



10-378 FOAM MARKER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HB-14-20-075	Hex Bolt, $\frac{1}{4}$ -20 x $\frac{3}{4}$	4
	HNFL-14-20	Flange Lock Nut, $\frac{1}{4}$ -20	4
2	10-413	Foamer Brace	1
3	HB-12-13-150	Flange Bolt, $\frac{1}{2}$ -13 x $1\frac{1}{2}$	1
4	HBFL-516-18-075	Flange Bolt, $\frac{5}{16}$ -18 x $\frac{3}{4}$	2
5	10-409	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

1. Position the mount plate on the back side of the roll bar using two $\frac{5}{16}$ flange bolts. Install the brace by removing the $\frac{1}{2}$ bolt from the left side roll bar brace. Reinstall the bolt, holding the two braces to the roll bar. Other end of foamer mount brace goes under the mount plate.
2. Place foamer unit onto mount plate, with cap facing to the left side of machine. Using $\frac{1}{4}$ bolts and flange nuts bolt foam marker to mount plate. The left rear moner mount of the foamer will oblt through the mount plate and brace. Tighten all hardware.
3. Make sure all bolts are tightened.

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.

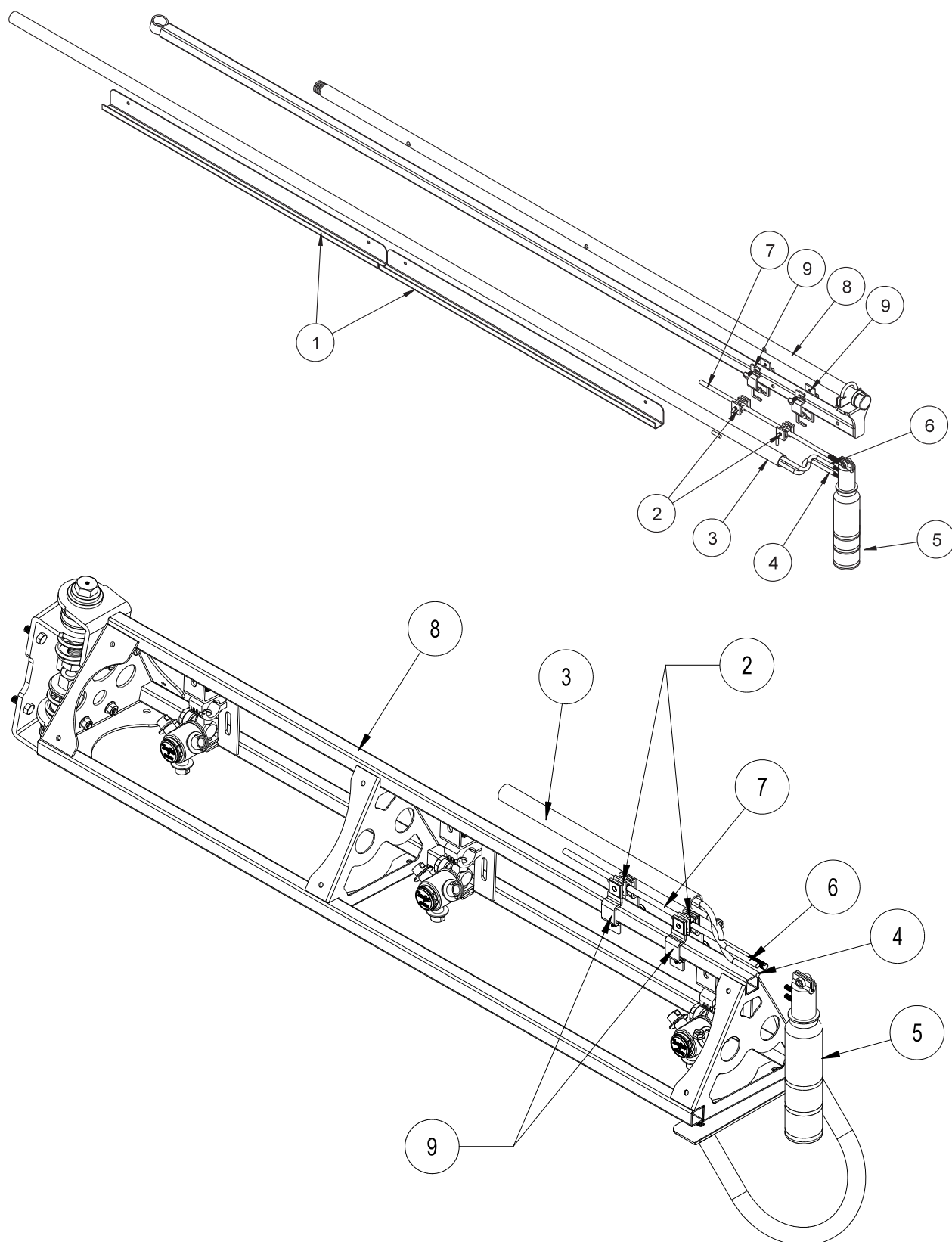
HOSES

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



10-378 FOAM MARKER PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-537	Foamer Hose Guard 31"	2
	10-256	Foamer Hose Guard 16"	2
	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	1
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

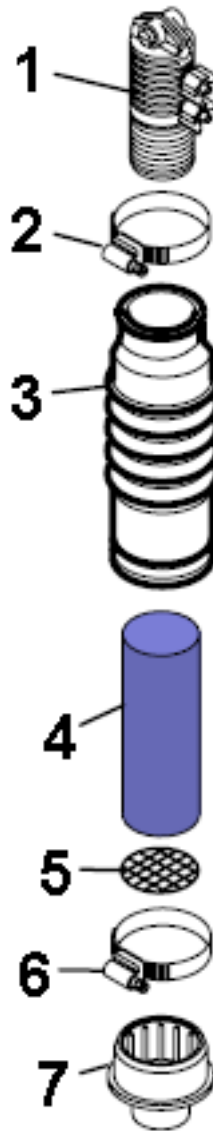
- Slide hose clamp onto drop tube of foam nozzle and attach restrictor bell.
- Place splined end of Nozzle mounting rod (Ref 7) into top of foam nozzle (Ref 5). Tighten screw.
- Slide two foam nozzle mounts (Ref 2) onto the rod. Place square clamps (Ref 9) on foam nozzle mounts and mount the square clamps 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 DRAWING



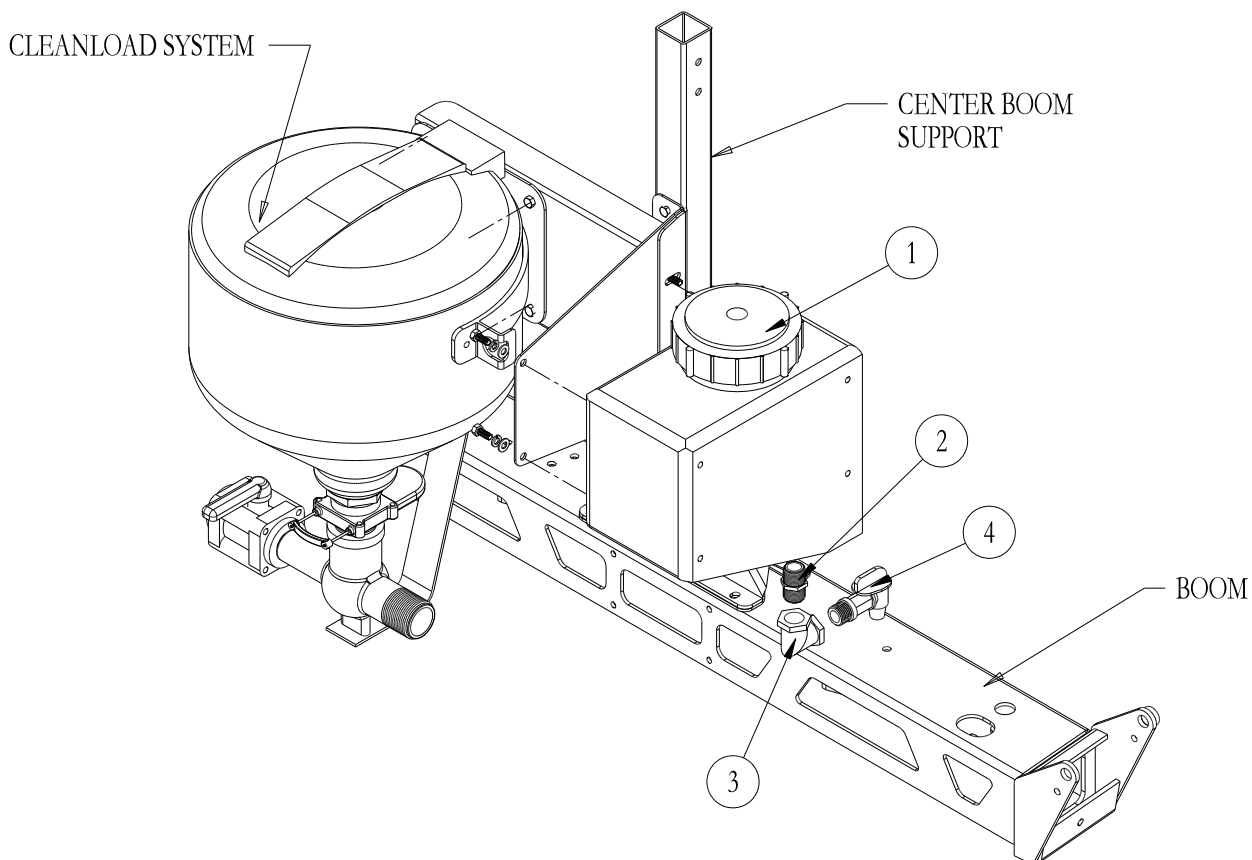
REF#	PART#	DESCRIPTION	QUANTITY
1	15-507	Foamer Tubing	1
2	14-291-02	Tank	1
3	14-291-01	Black Cover	1
	14-536	Compressor Complete	1
4	14-284-02	Cap Assembly	1
5	14-291-04	Tank Bracket	1
6	14-291-05	Double Switch Box	1
7	15-511	Foam Nozzle	1
8	15-510-01	Nozzle Mounting Rod	1
9	16-987	Foam Nozzle Mounting Kit	1
	14-536	Compressor Sub-assembly	

15-511 FOAM NOZZLE SUB ASSEMBLY DRAWING



REF#	PART#	DESCRIPTION	QUANTITY
1*	15-511-01	Foam Nozzle Inlet Body	1
	15-511-02	Foam Sponge	1
	15-511-10	Plastic Screen	1
2*		Hose Clamp	1
3*		Drop Tube	1
4	15-511-08	Long Foam Sponge	1
5	15-511-09	Stainless Steel Screen	1
6		Hose Clamp	1
7	14-284-09	Foam Nozzle Reducer	1
NS	15-510-01	Nozzle Mounting Rods	2
*	15-511-07	Foam Nozzle Sub Assembly	

30-006 FRESH WATER WASH TANK DRAWING



REF#	PART#	DESCRIPTION	QUANTITY
1	10-234	Wash Tank	1
2	16-158	Close Nipple	1
3	16-151	Elbow	1
4	16-960	Spigot	1
5	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	4
	HWL-516	Lockwasher $\frac{5}{16}$	4
	HW-516	Washer $\frac{5}{16}$	4



WARNING

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

10-417 CHEMICAL CLEANLOAD® OPERATING INSTRUCTIONS

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 education 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.

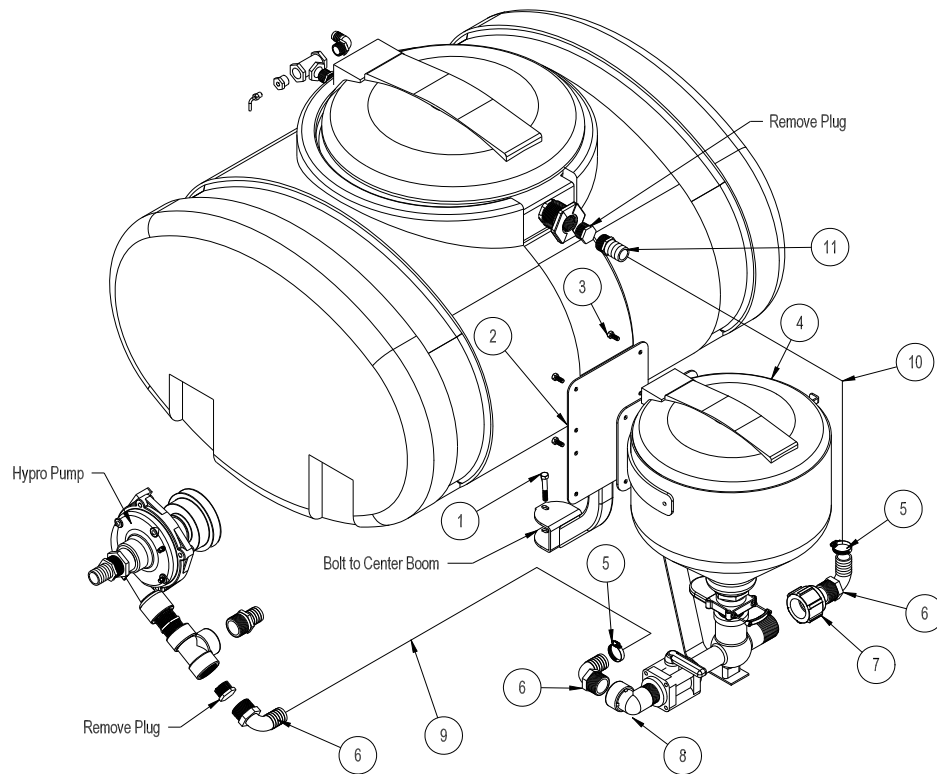
8. Insert lance body with o-ring into eductor until the o-ring is sealed.
9. Use the free end of the lance to pierce bag or container to vacuum powdered or liquid chemical.
10. Rinse lance. Place lance end into a clean container of water to rinse lance assembly.
11. Remove lance body from eductor and 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.

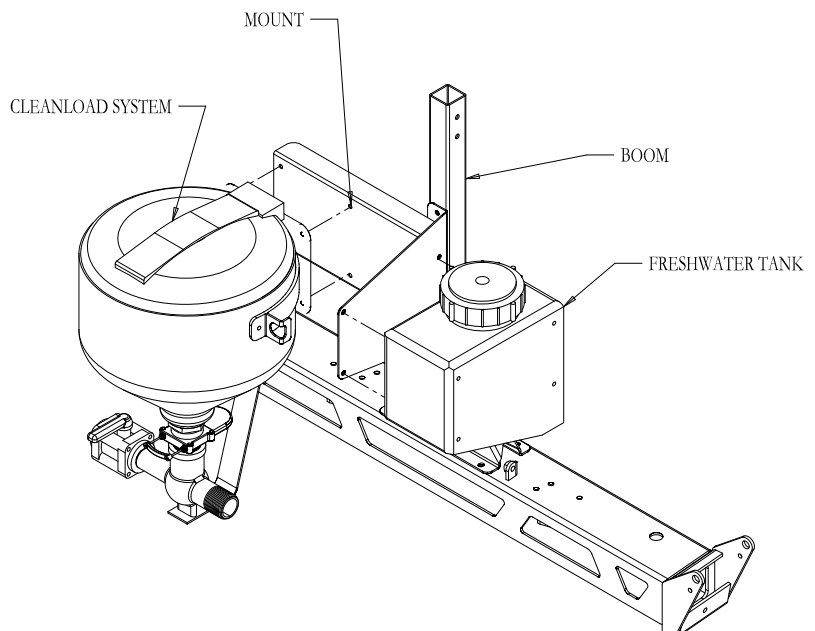
Symptom	Corrective Action
Low education rate	Check pump pressure and flow. Cleanload Eductor performance is based on flow and pressure to the system. Note requirements for high education rates.
	Increase outlet hose size back to tank.
Plugged or clogged bottle rinse nozzle	Disassemble rotary portion 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.

10-417 CHEMICAL CLEANLOAD®



CLEANLOAD FRESHWATER MOUNT ON 17-550/17-525 BOOMS

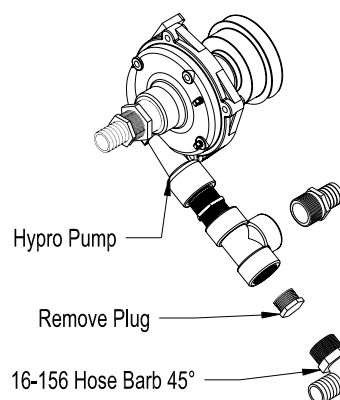
When placing a 17-525/17-550 Heavy Boom on the Sprayer you will have to relocate the Chemical Cleanload System and the Fresh Water tank. There is a mount provided for you, please see in the illustration.



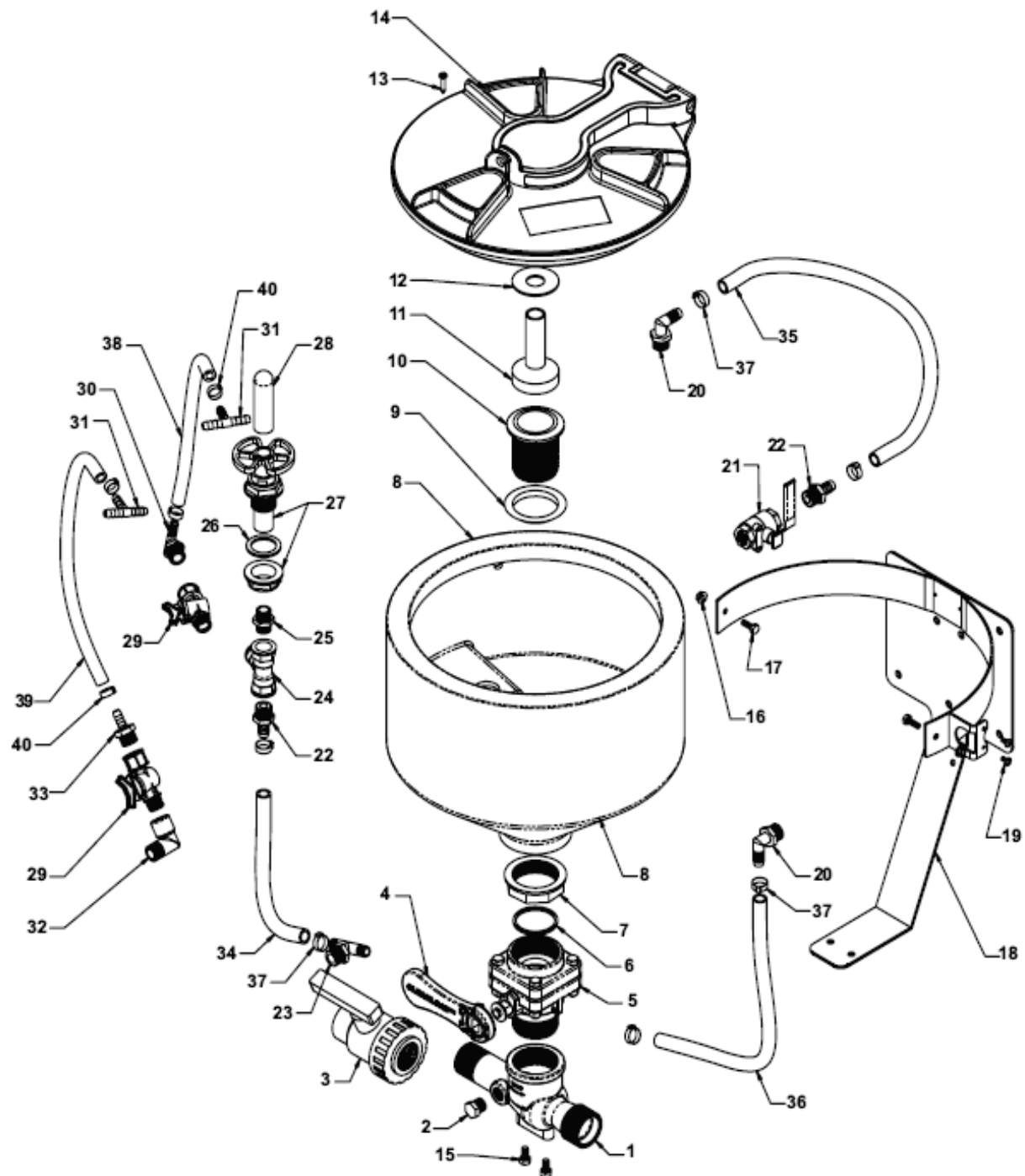
10-417 CHEMICAL CLEANLOAD® PART LIST

REF#	PART #	DESCRIPTION	QUANTITY
1	HB-38-16-300	Bolt $\frac{3}{8}$ -16 x 3	1
	HNFL-38-16	Flange Lock Nut $\frac{3}{8}$ -16	1
2	15-816	Mount Bracket	1
3	HBFL-516-18-075	Flange Bolt $\frac{5}{16}$ -18 x $\frac{3}{4}$	4
	HNFL-516-18	Flange Lock Nut $\frac{5}{16}$ -18	4
4	15-620	Cleanload Eductor	1
5	18-116	Hose Clamps	4
6	16-156	90° Hose Barb	3
7	18-391	Reducer Coupling	1
8	16-972	Elbow	1
9	8897-80	Hose to Tee by Valve	1
10	8897-35	Hose to fitting on Back of Tank	1
11	16-159	Tank Fitting	1

1. Make sure all chemicals have been flushed out of spray system, as you will be disconnecting fittings from the pump. Remember to use threaded tape on all new fitting connections.
2. Remove the $1\frac{1}{4}$ " plug from the tee on the outlet side of the pump and install one Hose barb (16-156). Then tighten so it points to the left side of the machine.
3. Install mounting brackets onto left side of center boom between boom pivot and vertical boom support. Secure with $\frac{3}{8}$ x 3 bolt, flatwasher (top and bottom) and lock nut.
4. Bolt Cleanload assembly onto mounting bracket using four flange bolts $\frac{5}{16}$ -18 x $\frac{3}{4}$ and flange nuts. Install 90° hose barb (16-156) into inlet side of Cleanload (valve with yellow handle) then tighten so it points forward and down.
5. Install one reducer coupling (18-391) and one 90° Hose Barb (16-156) onto the outlet side of Cleanload. Tighten so hose barb points forward and up.
6. Remove plug from top rear center of spray tank and discard. Install one hose barb (16-159) into tank fitting and tighten.
7. Route 80" hose from the 90° hose barb on spray pump to the inlet side of the Cleanload and secure with hose clamps (18-116).
8. Route 35" hose from 90° hose barb on outlet side on Cleanload to the hose barb on the top rear of the tank.
9. 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 and check for leaks.
10. Be sure to read start up and shutdown instructions for Cleanload assembly before using it with chemicals. When working with chemicals always wear protective clothing, goggles and gloves.



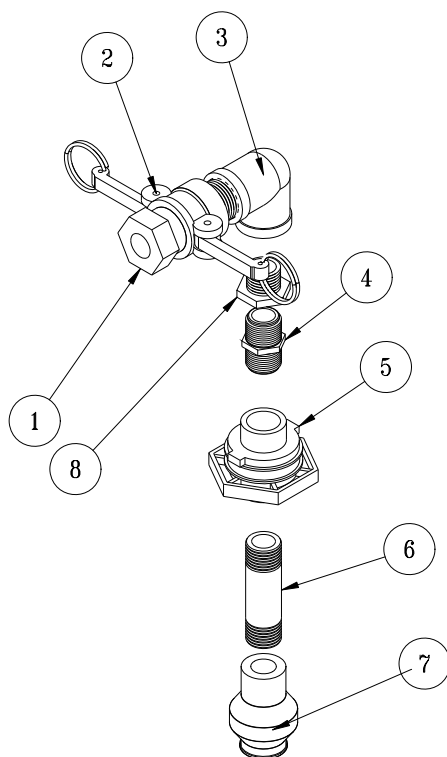
15-620CHEMICAL CLEANLOAD® DRAWING



15-620 CHEMICAL CLEANLOAD® PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-620-04	Cleanload Eductor	1
2		Plug, 1/2"	1
3	15-620-14	Ball Valve, 1 1/4 Single Union	1
4	15-620-13	Handle, Cleanload	1
5	15-620-12	Ball Valve	1
6	15-620-15	Gasket: 2" BSP	1
7	15-620-16	Locking Ring, 2"	1
8	15-620-21	Tank 5.8 Gallon	1
9	15-620-17	Gasket: 2", Tapered	1
10	15-620-18	Drain Head, 2"	1
11	15-620-19	Tank Rinse	1
12		Slinger Ring	1
13		Screw, #6 x 1"	8
14	15-620-02	Tank Lid	1
15		Bolt, 5/16-18 x 5/8	2
16		Nut, Flanged 1/4 - 20	2
17		Bolt, 1/4 - 20 x 3/4 SS	2
18	15-620-01	Frame, Back Mount	1
19		Screw, 10-24 x .375	2
20	15-620-11	Elbow 1/2"	2
21	15-620-10	Valve, SS Tank Rinse	1
22	15-620-09	HB, 1/2 MNPT x 1/2 HB	2
23	15-620-05	HB Tee, 1/2 MNPT to 1/2 HB	1
24		Tee, 1/2 FNPT	1
25		Nipple, 1/2"	1
26	15-620-20	Gasket, 1"	1
27		Valve, Bottle Rinse Base Assy.	1
28		Bottle Rinse Head	1
29		Valve, 1/2"	1
30		HB Elbow, 1/2" MNPT x 3/8" HB	1
31		HB Tee, 3/8"	1
32		1/2" Street Elbow	1
33		HB, 1/2 MNPT x 3/8 HB	1
34	15-620-07	Hose, Bottle Rinse, 1/2" EPDM	1
35	15-620-08	Hose, Tank Rinse, 1/2" EPDM	1
36	15-620-06	Hose, Valve Feeder, 1/2" EPDM	1
37		Hose Clamp, 1/2"	6
38		Hose Tank Rinse, 3/8" EPDM	1
39		Hose Tank Rinse, 3/8" EPDM	1
40		Hose Clamp, 3/8"	2

15-835 TANK RINSING DEVICE



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.



This is a list of decals located on the Spray Star 1000. Part number, description and location will help in reordering a decals.

10-367	Decal, Spray Star 1000	Right and Left Tank Sides
10-414	Decal, Control Panel	Control Panel
15-672	Decal, Dash Panel	Dash Board
25-298	Decal, Warning Hot	Hood - Back Edge, Both Sides
25-352	Decal, Bypass Valve	Hang Tag
25-356	Decal, Tire Pressure	All Wheels
25-373	Decal, Smithco	Front Nose Cone
25-370	Decal, 88 dba	Console
76-304	Decal, Crush Pinch	Front Side of Tank
15-463	Decal, Spray Pump	Seat Panel
15-719	Decal, SPeed Control	Left Control Panel

QUICK REFERENCE REPLACEMENT PARTS

REPLACEMENT FILTERS

15-626-01	Hydraulic Oil Filter	
78-090	Oil Filter	Kohler # 12 050 01
76-311	Air Filter Element	Kohler # 24 083 03
76-312	Pre-Cleaner	Kohler # 24-083-05
13-488	Key Switch	
76-310	Key Set	

REPLACEMENT BELTS

10-179	Belt
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SEAL KITS

15-301	Orbital
15-301-01	Repair Kit
10-554	Hydraulic Cylinder
14-529	Seal Kit
10-116	Wheel Motor
10-116-13	Seal Kit
10-117	Pump
14-098	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

16-953	Hinged Cover On Tank with Gasket
16-953-01	Gasket For Cover
16-169	Strainer Basket
15-818	#75 Fitting Oring
15-817	#50 Fitting Oring
Spark Plugs	Champion type RC12YC (Gap 0.030 inch (.76 mm))
Spline Grease	#77 Assembly Paste (Kohler # 25 357 12-s)

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

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 workman-ship. 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:

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