

Parts & Service



Spray Star 1008

10-100-D

SN: 100579

November 2015

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.

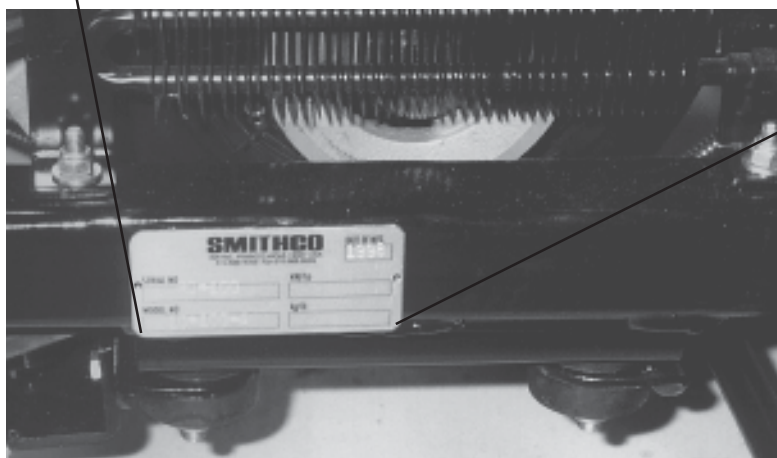
Read this manual and all other manuals pertaining to the Spray Star 1000 carefully as they have safety, operating, assembly and maintenance instructions. Failure to do so could result in personal injury or equipment damage.

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	85 dba
At 3 ft (0.914 m)	83 dba
At 30 ft (9.14 m)	72 dba

ENGINE

Make	Briggs & Stratton
Model#	386447
Type / Spec#	0058 G1
Horsepower	23HP (17 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; 20 psi (1.4 bar)

PARK BRAKE

Hand Operated Lever, Discs on Rear Axle Speed

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
15-835	Tank Rinsing System	1011	Sharp Shooter + 440 Spray System
17-585	18' Heavy Duty Boom	10-378	Foam Marker
10-370	Water Meter Kit (liters)	30-141	26 Gal. Wash System
10-365	Water Meter Kit (gallons)		
10-422	Hose Reel Mount Kit		
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.

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 5 hours and every 200 hours thereafter.
7. Lower machine to ground and remove blocks and jack.

TIRE PRESSURE

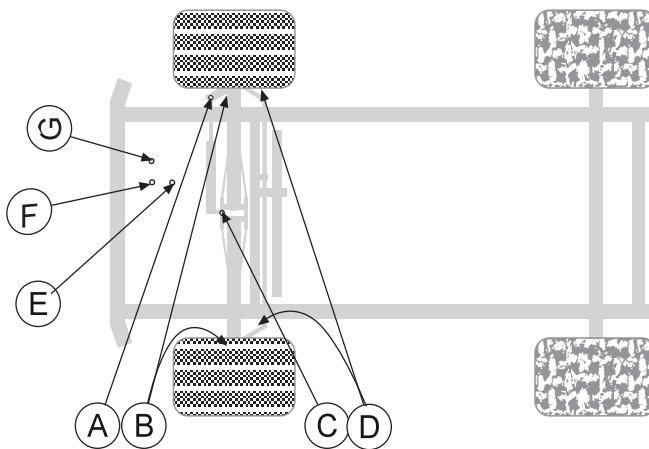
Caution must be used when inflating a low tire to recommended pressure. Over inflating can cause tires to explode. All tires should be 20 psi (1.4bar). Improper inflation will reduce tire life considerably.

LUBRICATION

Use No. 2 General purpose lithium base grease and lubricate every 100 hours. The Spray Star 1000 has 10

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 each end of tie rod.
- E. One on the pedal relay.
- F. One on the forward pedal.
- G. One on the reverse pedal.



ELECTRICAL CONNECTIONS

Use dielectric grease on all electrical connections.

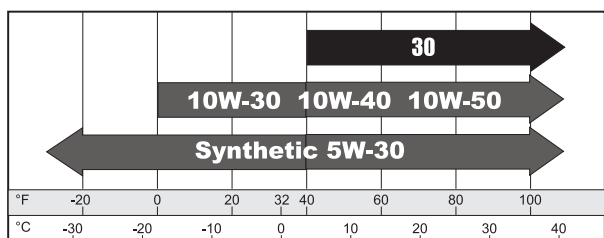
AIR CLEANER

1. Loosen cover retaining snaps 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

Change and add oil according to chart below. Do not overfill. Use a high quality detergent oil classified "For Service SJ or higher" SAE 30 oil. Use no special additives with recommended oils. Do not mix oil with gasoline.

SAE VISCOSITY GRADES



A quick twist and pull motion to open, push to close. Allows a quick and easy way to change oil without the mess



Engine Oil Drain Valve

Starting Temperature Range Anticipated Before Next Oil Change

Use of multi-viscosity oils (10W-30, etc.) above 40° F (4° C) will result in high oil consumption and possible engine damage. Check oil level more frequently if using these types of oils.

SAE 30 oil, if used below 40° F (4° C), will result in hard starting and possible engine bore damage due to inadequate lubrication.

HYDRAULIC OIL

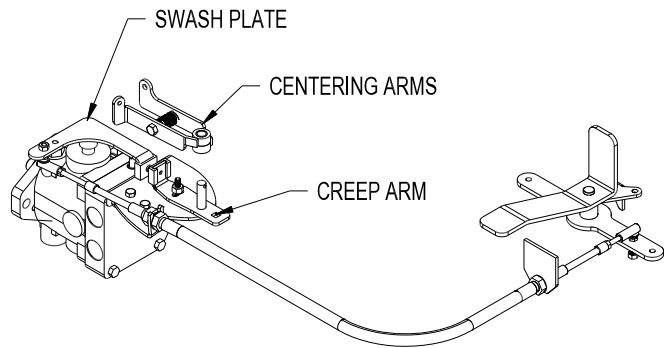
1. Use SAE 10W-40 API Service SJ or higher motor oil.
2. For proper warranty, change oil every 500 hours or annually, which ever is first.
3. Oil level should be 2-2½" (5-6.4cm) from top of the tank when fluid is cold. Do not overfill.
4. After changing oil, run the machine for a few minutes. Check oil 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.

MAINTENANCE

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. On top of the pump there is a Creep arm. Loosen bolt on creep arm.
3. With engine running, adjust the 'creep arm' side to side so centering arm centers on the swash plate.
4. Tighten all fasteners and test by using foot pedal linkage to see that 'creep' is removed.
5. Turn engine off and lower machine.



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.



WARNING

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.

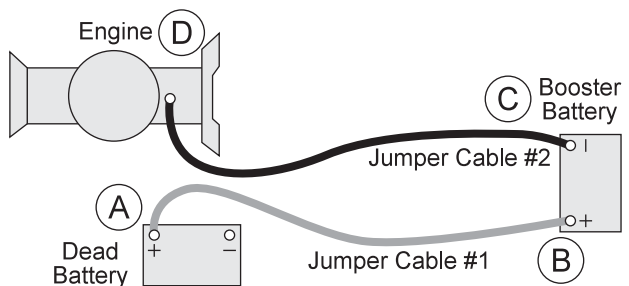


WARNING

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

TO JUMP START (NEGATIVE GROUNDED BATTERY):

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



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



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



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

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

Duplicate this page for routine use

Service

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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.

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 two $\frac{9}{16}$ x $1\frac{3}{4}$ bolts. Slide pump to the rear to desired tension. Tighten two $\frac{3}{8}$ x $1\frac{1}{2}$ bolts.

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.

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 $\frac{1}{3}$ 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 $\frac{1}{16}$ 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.

STORAGE

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

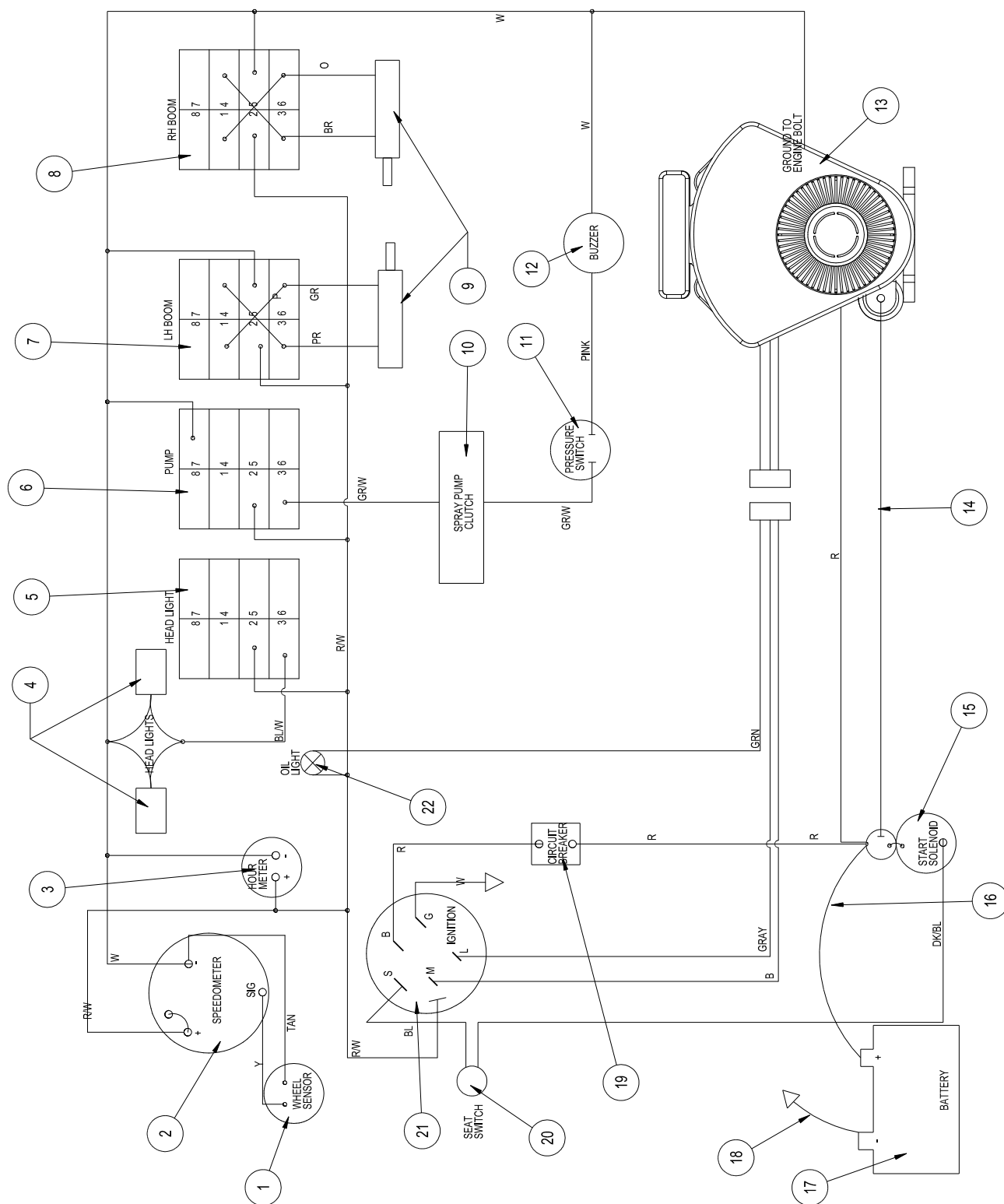
1. Clean the exterior surfaces of the engine.
2. Change the oil and filter while the engine is still warm from operation.
3. The fuel system must be completely emptied, or the gasoline must be treated with a stabilizer to prevent deterioration.

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

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

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

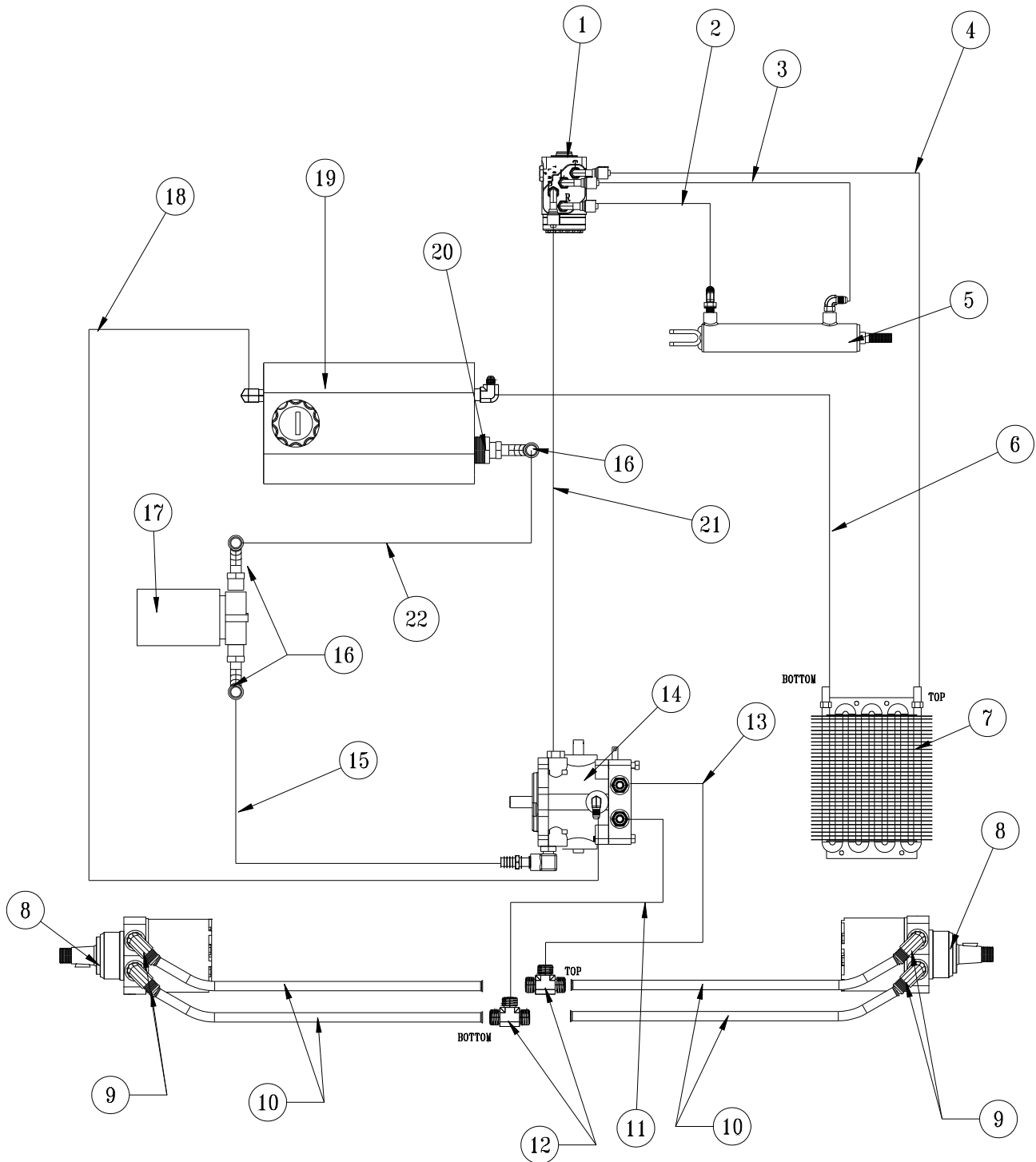
WIRING DIAGRAM



REF#	PART#	DESCRIPTION	QUANTITY
1	16-883	Wheel Sensor	1
2	10-556	Speedometer	1
	8854	Fork Terminal	2
	8963	Heat Shrink	2
3	12-017	Hour Meter	1
4	17-524	Lights	2
5	Head Lights		
	15-725	Mount Panel End	1
	15-727	Rocker, No Light	1
	15-782	Non-Lighted Switch	1
6	Pump		
	15-729	Mount Panel Middle	1
	15-726	Lighted Switch	1
	15-731	Rocker, Amber	1
7	Left Boom		
	15-729	Mount Panel Middle	1
	15-727	Rocker, No Light	1
	15-728	Centering Switch Momentary, On-Off-On	1
8	Right Boom		
	15-725	Mount Panel End	1
	15-727	Rocker, No Light	1
	15-728	Centering Switch Momentary, On-Off-On	1
9	30-214	KYB Electric/Hydraulic Actuators	2
10	16-998	Hypro Pump With Electric Clutch	1
11	33-480	Pressure Switch	1
12	77-207	Buzzer	1
	8875	Male Bullet	2
	8963	Heat Shrink	2
13	10-575	Briggs, 23HP Engine	1
14	22-017	Starter Cable	1
15	13-750	Solenoid w/ Connector	1
16	22-055	Red Battery Cable	1
17	33-216	Battery	1
18	76-327	Ground Battery Cable	1
19	77-261	Circuit Breaker	1
	8977	Circuit Breaker Boot	1
20	14-292	Seat Switch	1
21	13-488	Ignition Switch (Kohler 25 099 04)	1
22	50-359	Oil Warning Light	1
	8853	Slide On Connector	2
	8963	Heat Shrink	2
	10-573	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	10-576	Orbitrol	1
2	10-568	STC Hydraulic Hose x 45.5"	1
3	10-569	STC Hydraulic Hose x 59.5"	1
4	10-567	STC Hydraulic Hose x 78"	1
5	10-554	Hydraulic Cylinder	1
6	10-572	Hydraulic Hose x 24"	1
7	34-105	Oil Cooler	1
8	10-510	Wheel Motor	2
9	34-122	Short Elbow	4
10	20-656	Hydraulic Tube Assembly	4
11	10-584	Hydraulic Hose x 23"	1
12	18-302	Union Tee, 1"	2
13	10-571	Hydraulic Hose x 21.5"	1
14	42-797	Variable Pump	1
15	8832-29	3/4" Suction Hose x 29"	1
	18-040	Hose Clamp	2
16	34-123	Elbow	3
17	23-006	Oil Filter	1
	23-031	Filter Element, 25 Micron	1
18	10-570	Hydraulic Hose x 47"	1
19	60-473	Oil Tank	1
20	60-213	Strainer	1
21	10-566	STC Hydraulic Hose x 85"	1
22	8832-16	3/4" Suction Hose x 16"	1
	18-040	Hose Clamp	2

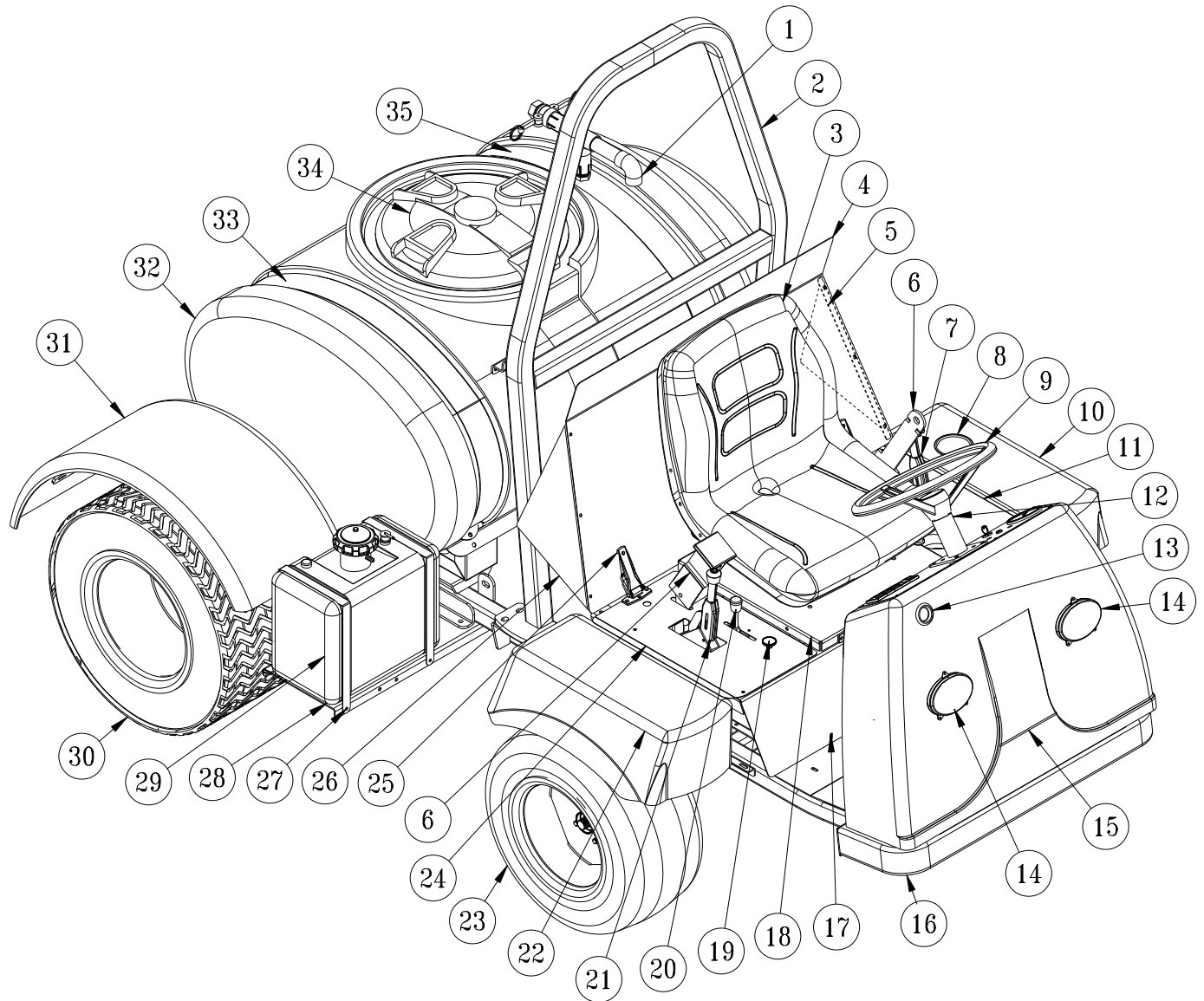
Diagrams

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

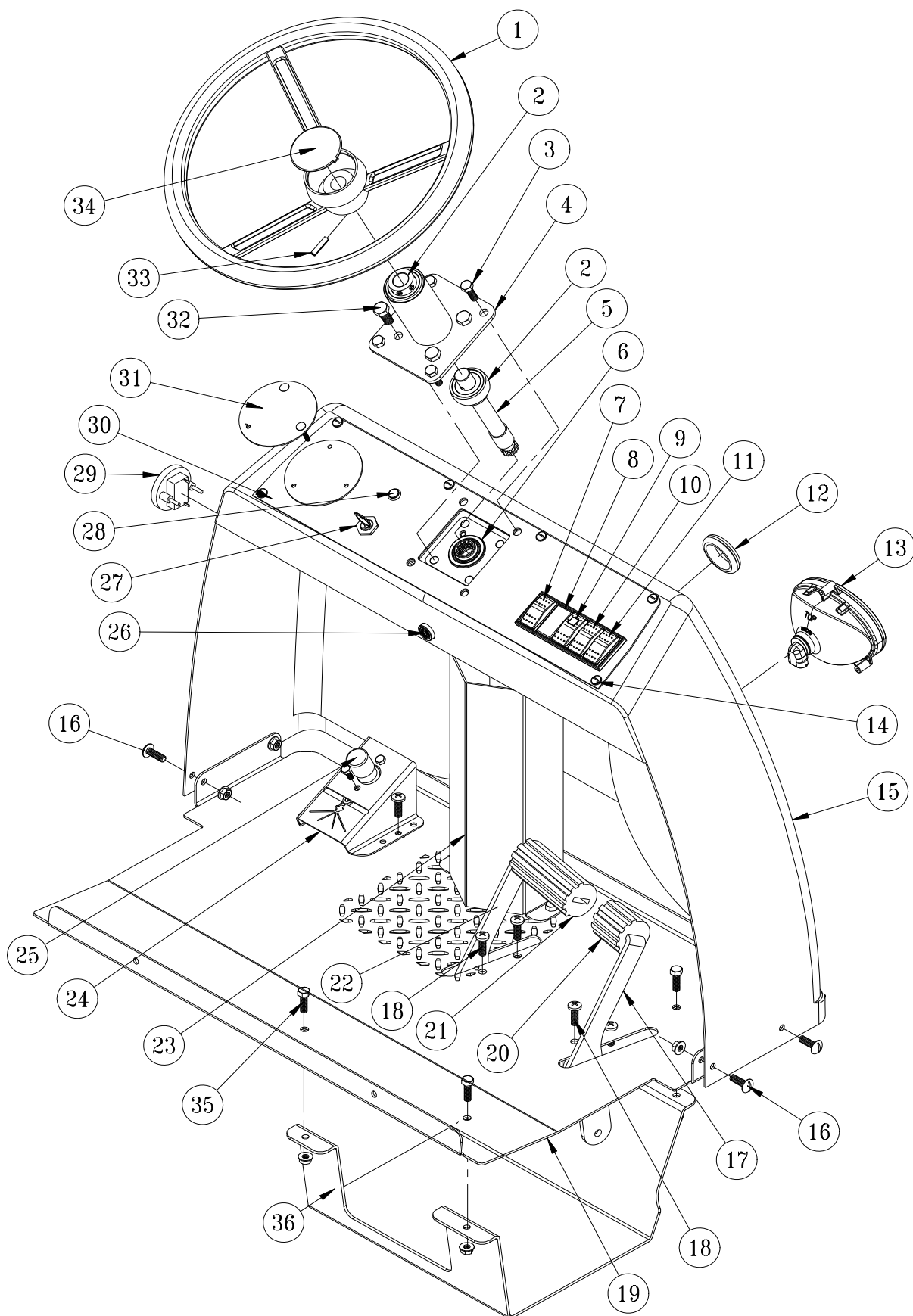
Over tightened fittings will result in crushing the cone which will create a leak.
Charts Developed by Parker Hennipin



BODY & FRAME PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-254	Air Gap Filler	1
2	10-478	Roll Bar	1
3	14-294	Seat Kit	1
	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
4	10-437	Back Panel	1
	9023	Heat Reflective Matting (18 x 25.5)	$\frac{1}{4}$ Sheet
5	10-439	Left Side Panel	1
6	76-198-03	Seat Belt	1
7	10-120	Spray Boss Handle	1
8	15-781	Drink Cup Holder	1
9	20-057	Steering Wheel	1
	20-129	Center Cap	1
10	10-392	Left Front Fender	1
11	10-596	LH Control Panel	1
12	76-530	Steering Column	1
13	50-400	Rubber Grommet	1
14	17-524	Oval Head Lights	2
15	15-822	Nose Cone	1
16	10-599	Mainframe	1
17	10-385	Front Panel	1
18	10-479	Seat Panel	1
19	80-020	Choke	1
20	45-118	Throttle Control with Cable	1
21	60-106	Park Brake Handle	1
22	10-391	Right Front Fender	1
23	16-857	Tire and Wheel	2
	16-857-01	Tire, 20 x 10 - 10NHS 4 Ply	2
	42-161-02	Wheel	2
24	10-595	RH Control Panel	1
25	27-055	Seat Hinge	4
26	10-438	Right Side Panel	1
27	78-456	Gas Tank Strap	2
28	10-400	Gas Tank Bracket	1
29	15-838	Fuel Tank	1
30	78-221	Tire and Wheel	2
	78-221-01	Tire, 24-13-12NHS	2
	78-221-02	Wheel	2
31	10-168	Rear Fender	2
	HBCL-516-18-100	Low Carriage Bolt, $\frac{5}{16}$ - 18 x 1	8
	HNFL-516-18	Flange-Lock Nut, $\frac{5}{16}$ - 18	8
32	10-111	110 Gallon Poly Tank	1
33	22-528	Right Tank Strap	1
34	14-532	Lid (comes with tank)	1
	16-169	Strainer Basket	1
35	10-410	Left Tank Strap	1

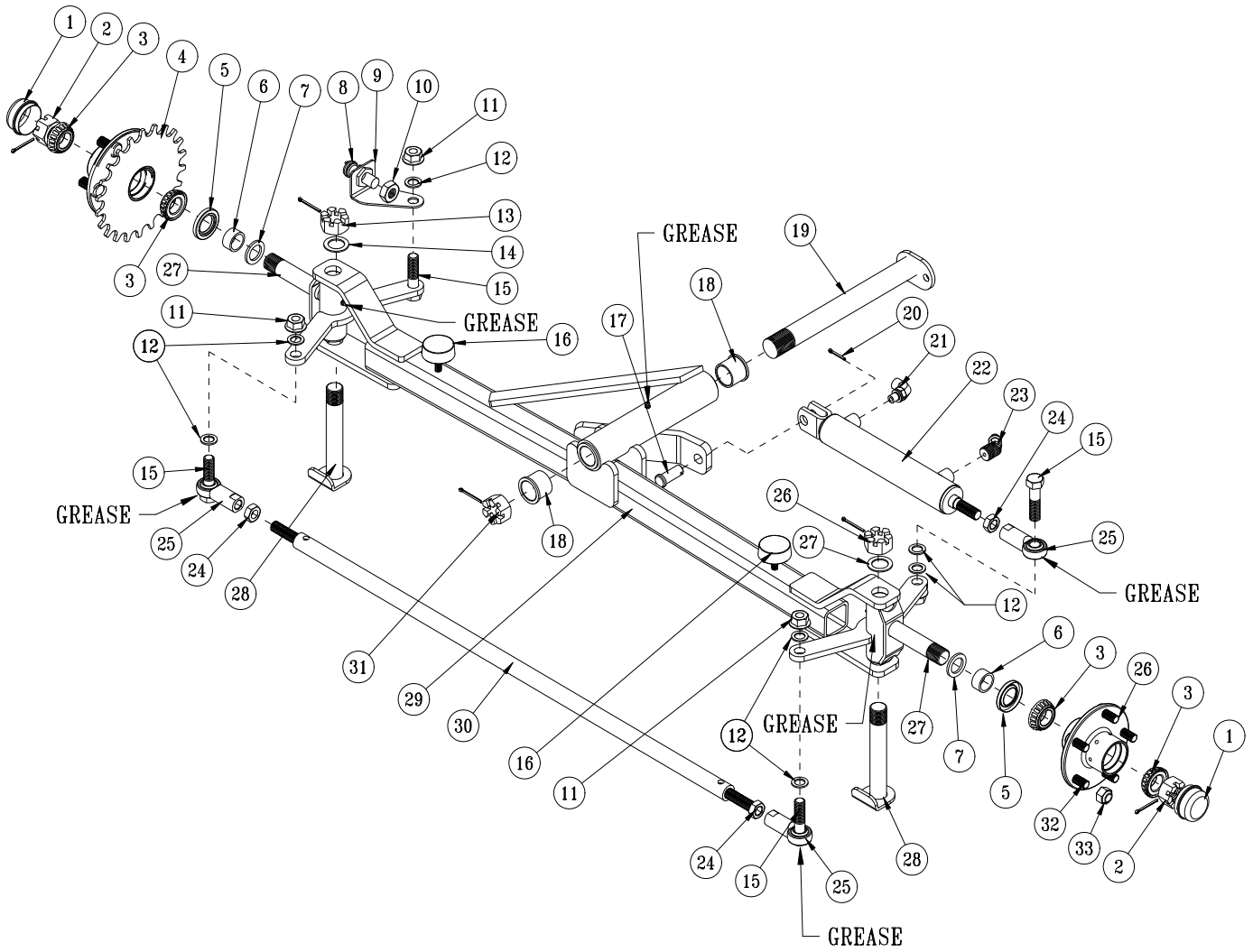
NOSE CONE DRAWING



NOSE CONE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	20-057	Steering heel	1
2	45-155	Bearing	2
3	HB-516-18-100	Bolt, $\frac{5}{16}$ - 18 x 1	4
	HNFL-516-18	Flange-Lock Nut, $\frac{5}{16}$ - 18	4
4	76-530	Steering Column	1
5	10-488	Splined Shaft	1
6	10-576	Orbitrol	1
7	15-725	Mount Panel End	1
	15-727	Rocker, No Light	1
	15-782	Non Lighted Switch	1
8	15-729	Mount Panel Middle	1
	15-730	Mount Panel Plug	1
9	15-729	Mount Panel Middle	1
	15-726	Lighted Switch	1
	15-731	Rocker, Amber	1
10	15-729	Mount Panel Middle	1
	15-727	Rocker, No Light	1
	15-728	Centering Switch Momentary, On-Off-On	1
11	15-725	Mount Panel End	1
	15-727	Rocker, No Light	1
	15-728	Centering Switch Momentary, On-Off-On	1
12	50-400	Rubber Grommet	1
13	17-524	Headlights	2
14	HSM-10-32-100	Machine Screw, #10 -32 x 1	6
	HNFL-10-32	Flange-Loc Nut, #10 -32	6
15	15-822	Nose Cone	1
16	HSTP-516-18-100	Machine Screw, $\frac{5}{16}$ - 18 x 1	7
	HNFL-516-18	Flange-Loc Nut, $\frac{5}{16}$ - 18	7
17	10-164	Reverse Pedal	1
18	HSTP-516-18-075	Machine Screw, $\frac{5}{16}$ - 18 x $\frac{3}{4}$	4
	HNFL-516-18	Flange-Lock Nut, $\frac{5}{16}$ - 18	4
19	10-599	Main Frame	1
20	48-132	Short Pedal Pad	1
21	48-066	Pedal Pad	1
22	10-163	Forward Foot Pedal	1
23	10-459	Hose Guard	1
24	10-458	Spray Switch Plate (440 System (1008))	1
25	33-509	Master Boom Switch (440 System (1008))	1
	HBM-6-1-16	Metric Bolt, #6 - 1 x 16	2
26	77-207	Buzzer	1
	8875	Bullet Terminal	2
	8963	$\frac{1}{4}$ " Heat Shrink	2
27	13-488	Key Switch	1
28	50-359	Oil Warning Indicator Light	1
	8853	Slide-On Connector	2
	8963	$\frac{1}{4}$ " Heat Shrink	2
29	12-017	Hour Meter	1
30	10-483	Dash Panel	1
	15-672	Decal, Dashboard	1
31	10-464	Panel Cover Plate	2
	HSM-10-32-112	Machine Screw, #10-32 x $1\frac{1}{8}$	3
	HNFL-10-32	Flange Lock Nut, #10-32	3
32	HBM-10-1.5-20	Metric Bolt, 10 -1.5 x 20	4
	HWLM-10	Metric Lock Washer, M10	4
33	HRP-14-150	Roll Pin, $\frac{1}{4}$ x $1\frac{1}{2}$	1
34	20-129	Steering Wheel Cap	1
35	HB-516-18-100	Bolt, $\frac{5}{16}$ - 18 x 1	4
	HNFL-516-18	Flange-Loc Nut, $\frac{5}{16}$ - 18	4
36	10-490	Pedal Guard	1

FRONT AXLE DRAWING

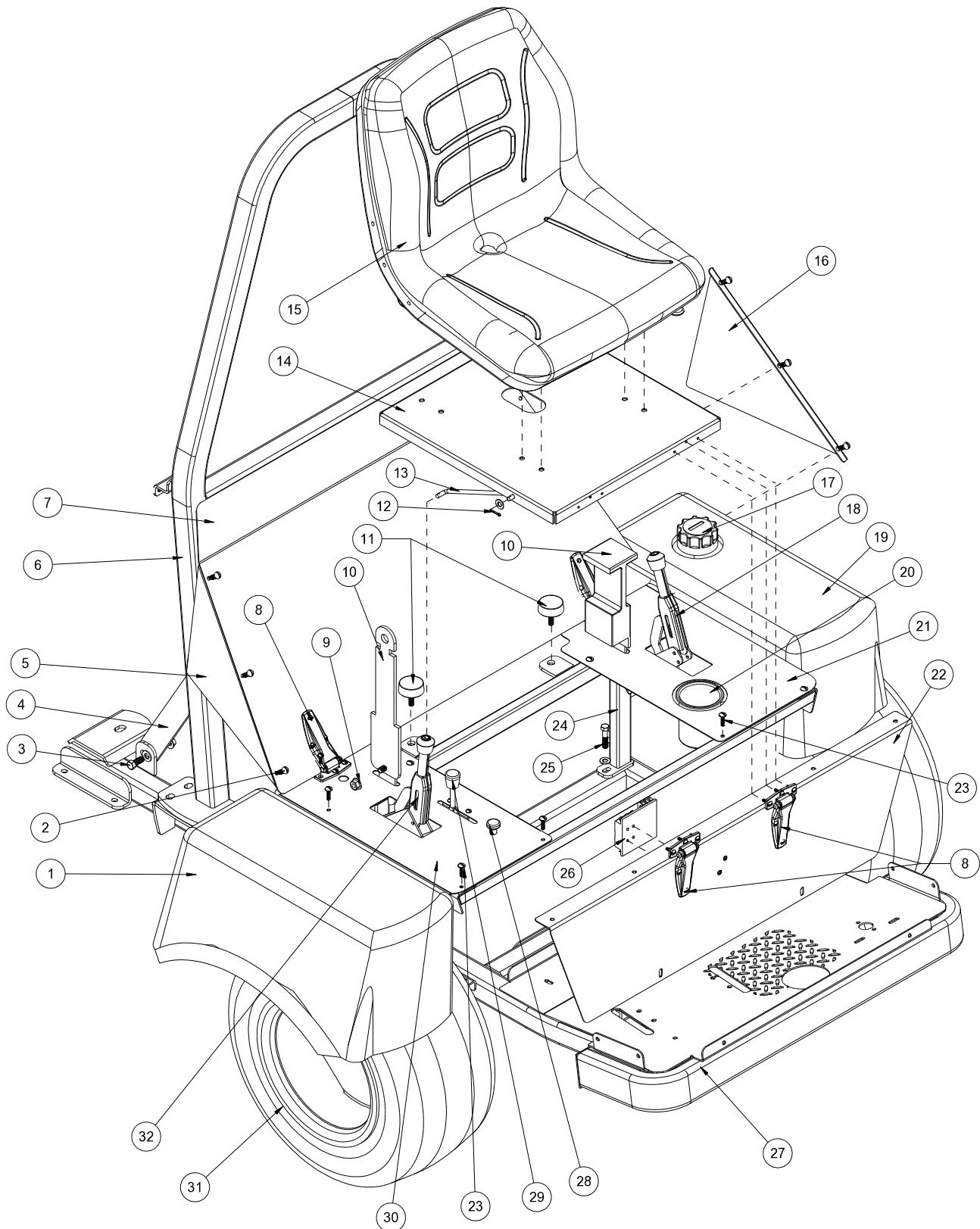


FRONT AXLE PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	80-167	Dust Cap	2
2	HNAR-100-14	Slotted Jam Nut, 1 - 14	2
	HP-18-150	Cotter Pin, $\frac{1}{8}$ - $1\frac{1}{2}$	2
3*	11-043	Bearing	4
4	10-561	Hub & Sprocket (includes * items Ref# 1,3,5,32 & 33)	1
5*	11-041	Oil Seal	2
6	11-042	Spacer	2
7	HMB-100-10	Machine Bushing, 1 x 10GA	2
8	16-883	Magnetic Sensor	1
9	10-594	Magnetic Pickup Mount	1
10	HNJ-34-16	Jam Nut, $\frac{3}{4}$ - 16	1
11	HNTL-58-11	Lock Nut, $\frac{5}{8}$ - 11	4
12	HMB-58-14	Machine Bushing, $\frac{5}{8}$ x 14GA	7
13	HNA-100-14	Slotted Nut, 1 - 14	2
	HP-18-150	Cotter Pin, $\frac{1}{8}$ - $1\frac{1}{2}$	2
14	HMB-100-14	Machine Bushing, 1 x 14GA	2
15	HB-58-11-250	Bolt, $\frac{5}{8}$ - 11 x $2\frac{1}{2}$	4
16	50-081	Rubber Insulator	2
17	HCP-58-175	Clevis Pin, $\frac{5}{8}$ - $1\frac{3}{4}$	1
18	18-153	Bushing (part of front axle)	2
19	10-138	Axle Pin	1
20	HP-18-100	Cotter Pin, $\frac{1}{8}$ x 1	1
21	18-307	45° Straight Thread Elbow, $\frac{11}{16}$ x $\frac{9}{16}$	1
22	10-554	Hydraulic Cylinder	1
	14-529	Seal Kit	1
23	18-171	90° Straight Thread Elbow, $\frac{11}{16}$ x $\frac{9}{16}$	1
24	HNJ-58-18	Jam Nut, $\frac{5}{8}$ - 18	3
25	18-154	Rod End	3
	HG-14-28-180	Grease Fitting, $\frac{1}{4}$ - 28 x 180°	3
26	80-019	Hub (includes * items Ref# 1,3,5,32 & 33)	1
27	10-582	Spindle	2
	18-035	Bushing (part of Spindle; 2 per)	4
	HG-14-28-180	Grease Fitting, $\frac{1}{4}$ - 28 x 180°	2
28	16-076	King Pin	2
29	10-131	Front Axle	1
	HG-14-28-180	Grease Fitting, $\frac{1}{4}$ - 28 x 180°	1
30	10-583	Steering Link	1
31	HNA-114-12	Slotted Nut, $1\frac{1}{4}$ - 12	1
	HP-18-200	Cotter Pin, $\frac{1}{8}$ - 2	1
32*	27-022-02	Stud, $\frac{1}{2}$ - 20	10
33*	HNL-12-20	Lug Nut, $\frac{1}{2}$ - 20	10

SEAT CONSOLE AND ROPS DRAWING

Parts

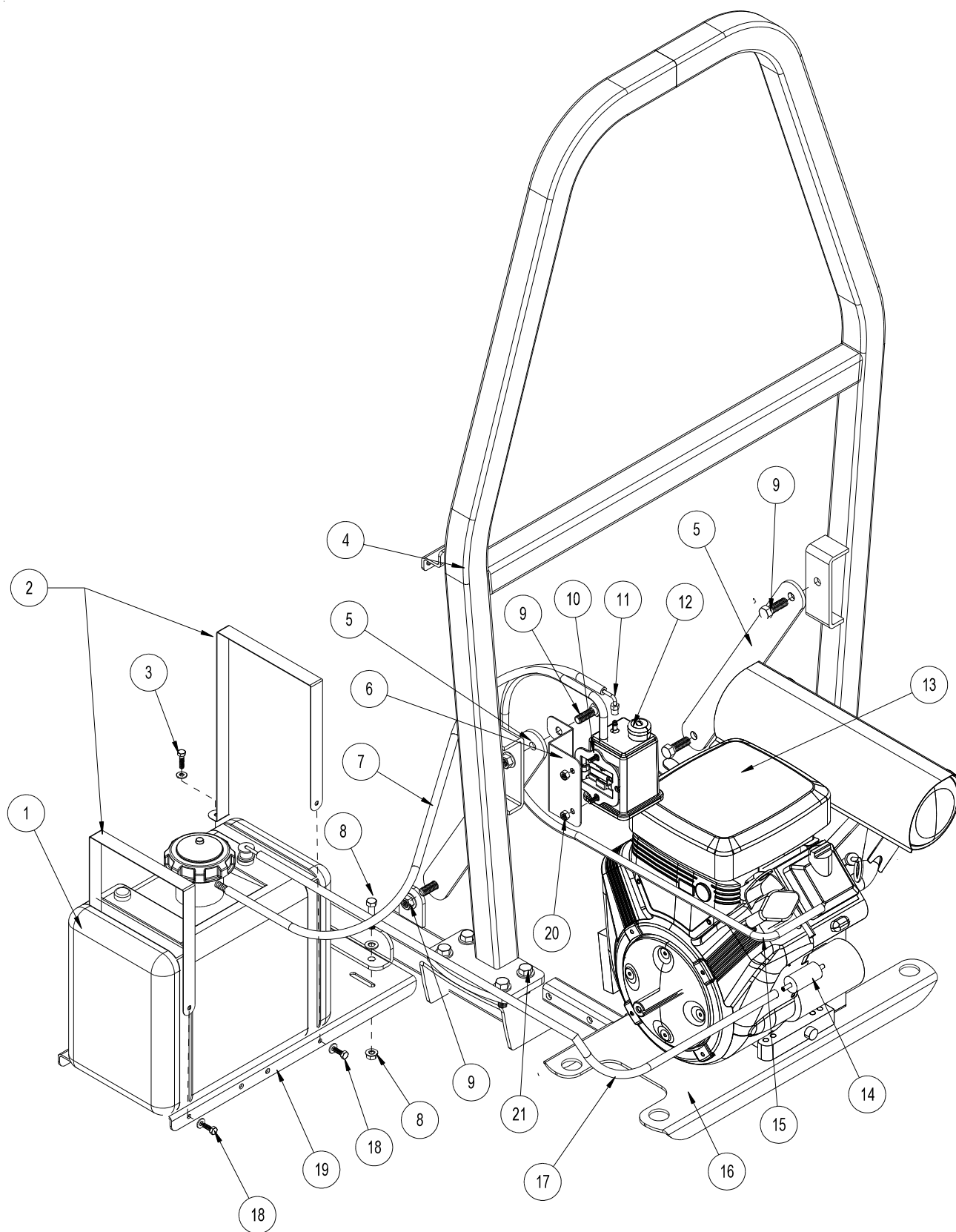


SEAT CONSOLE AND ROPS PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-391	Right Front Fender	1
2	HSTP-516-18-100	Truss Head Screw, $\frac{5}{16}$ - 18 x 1	6
	HNFL-516-18	Flange-Loc Nut, $\frac{5}{16}$ - 18	6
3	HB-12-13-150	Bolt, $\frac{1}{2}$ - 13 x $1\frac{1}{2}$	4
	HNTL-12-13	Lock Nut, $\frac{1}{2}$ - 13	4
4	10-398	Roll Bar Brace	2
5	10-439	RH Rear Seat Panel	1
6	10-478	Roll Bar	1
7	10-437	Rear Seat Panel	1
	9023	Heat Reflective Matting (18 x 25.5)	$\frac{1}{4}$ Sheet
8	27-055	Hinge	4
	HSMFCS-10-32-050	Machine Screw, #10-32- $\frac{1}{2}$	24
	HNFL-10-32	Flange-Loc Nut, #10-32	24
9	HB-716-14-125	Bolt, $\frac{7}{16}$ - 14 X $1\frac{1}{4}$	2
	HNTL-716-14	Lock Nut, $\frac{7}{16}$ - 14	2
10	76-198-03	Seat Belt	1
11	50-081	Rubber Bumper	2
	HNTL-38-16	Lock Nut, $\frac{3}{8}$ - 16	2
12	HW-38	Washer, $\frac{3}{8}$	2
	HP-18-075	Cotter Pin, $\frac{1}{8}$ x $\frac{3}{4}$	2
13	15-786	Hood Rod	1
14	10-479	Seat Panel	1
15	14-294	Seat Kit	1
	14-270	Seat	
	14-292	Seat Switch	
16	10-438	LH Rear Seat Panel	1
17	13-747	Filler Breather	1
	60-473	Oil Tank	1
18	10-120	Speed Boss Handle	1
19	10-392	LH Front Fender	1
20	15-781	Cup Holder	1
21	10-596	LH Control Panel	1
22	10-385	Front Panel	1
23	HSDPS-14-100	Pan Head Drill Screw, $\frac{1}{4}$ x 1	8
24	10-489	Seat Frame	1
25	HB-38-16-300	Bolt, $\frac{3}{8}$ - 16 x 1	2
	HNFL-38-16	Flange-Loc Nut, $\frac{3}{8}$ - 16	2
26	33-271	Fuse Block, 6-Gang	1
27	10-599	Main Frame	1
28	80-020	Choke Cable	1
29	45-118	Throttle Cable	1
30	10-595	RH Control Panel	1
31	16-857	Front Tire and Wheel	1
	16-857-01	Tire, 20 x 10 - 10NHS 4 Ply	2
	42-161-02	Wheel	2
32	60-106	Park Brake Handle	1

FUEL TANK DRAWING

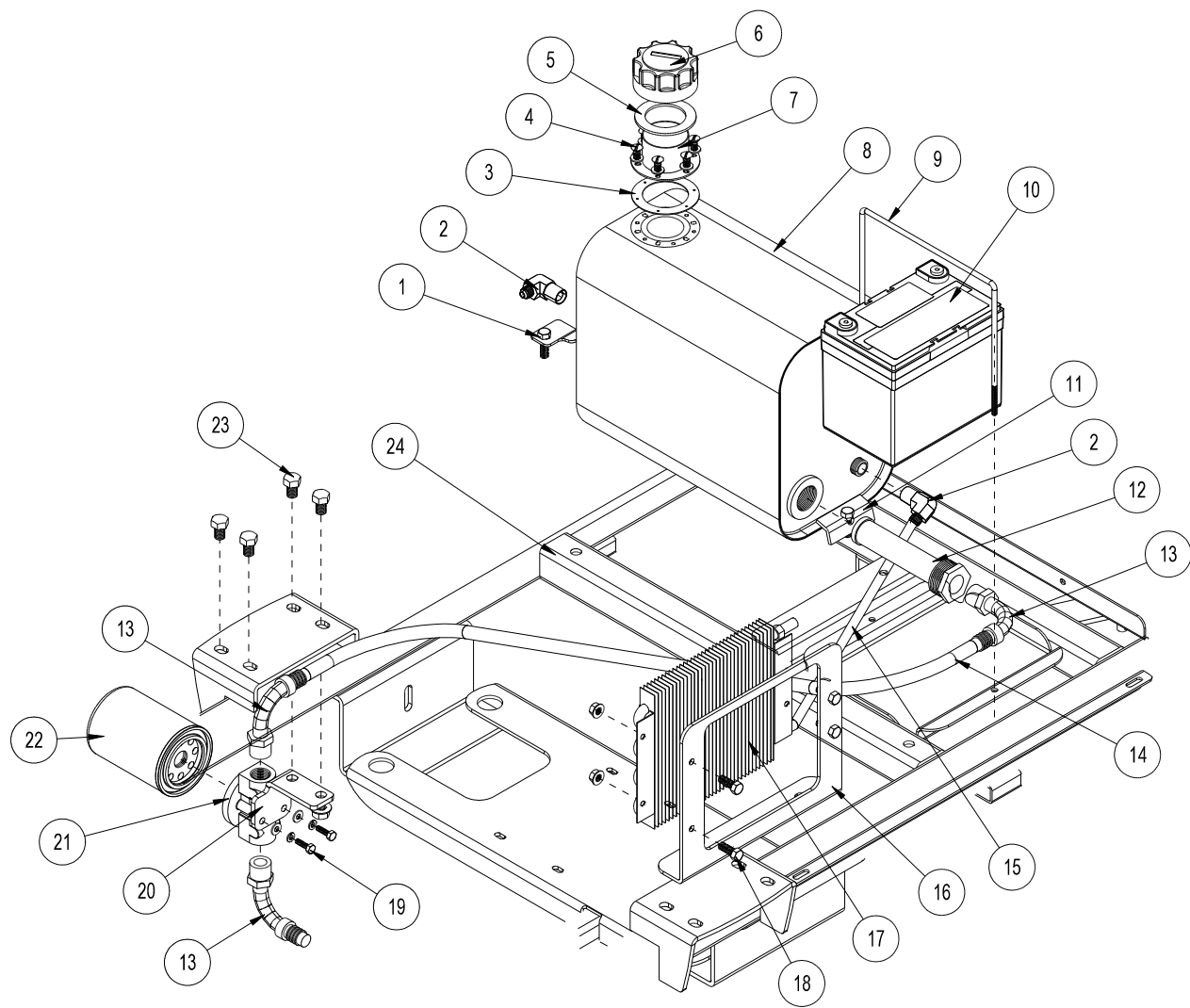
Parts



FUEL TANK PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-838	CARB Gas Tank	1
	15-838-01	Dial Fuel Level Gage	1
	73-050	Vented Cap with Gauge (replacement)	1
2	78-456	Tank Strap	2
3	HB-14-20-100	Bolt, 1/4 - 20 x 1	2
	HNTL-14-20	Lock Nut, 1/4 - 20	2
4	10-478	Roll Bar	1
5	10-398	Roll Bar Brace	2
6	10-462	Canister Mount	1
7	8800-26	1/4" Fuel Hose x 26"	1
	18-186	Hose Clamp	2
8	HB-12-13-125	Bolt, 1/2 - 13 x 1 1/4	2
	HW-12	Washer, 1/2	2
	HNFL-12-13	Flange-Loc Nut, 1/2-13	2
9	HB-12-13-150	Bolt, 1/2 - 13 x 1 1/2	4
	HNTL-12-13	Lock Nut, 1/2 -13	4
10	8-688	Carbon Canister Mount	1
11	8-693	Hose Connector (comes with engine)	1
12	8-689	Carbon Canister	1
13	10-575	Engine, B&S, 23HP	1
14	50-403	In-line Gas Filter (replacement)	
	18-186	Hose Clamp	1
15	9025-28	3/16" Fuel Hose x 28"	1
	18-186	Hose Clamp	2
16	10-580	Engine Plate	1
17	8800-46	1/4" Fuel Hose 46"	1
	18-186	Hose Clamp	2
18	HB-14-20-075	Bolt, 1/4 - 20 x 3/4	2
	HNTL-14-20	Lock Nut, 1/4 - 20	2
19	10-400	Gas Tank Bracket	1
20	HSTP-516-18-075	Truss Head Screw, 5/16 -18 x 3/4	2
	HNFL-516-18	Flange-Loc Nut, 5/16 - 18	2
21	HB-12-13-175	Bolt, 1/2 - 13 x 1 3/4	8
	HW-12	Washer, 1/2	8
	HNTL-12-13	Lock Nut, 1/4 - 13	8

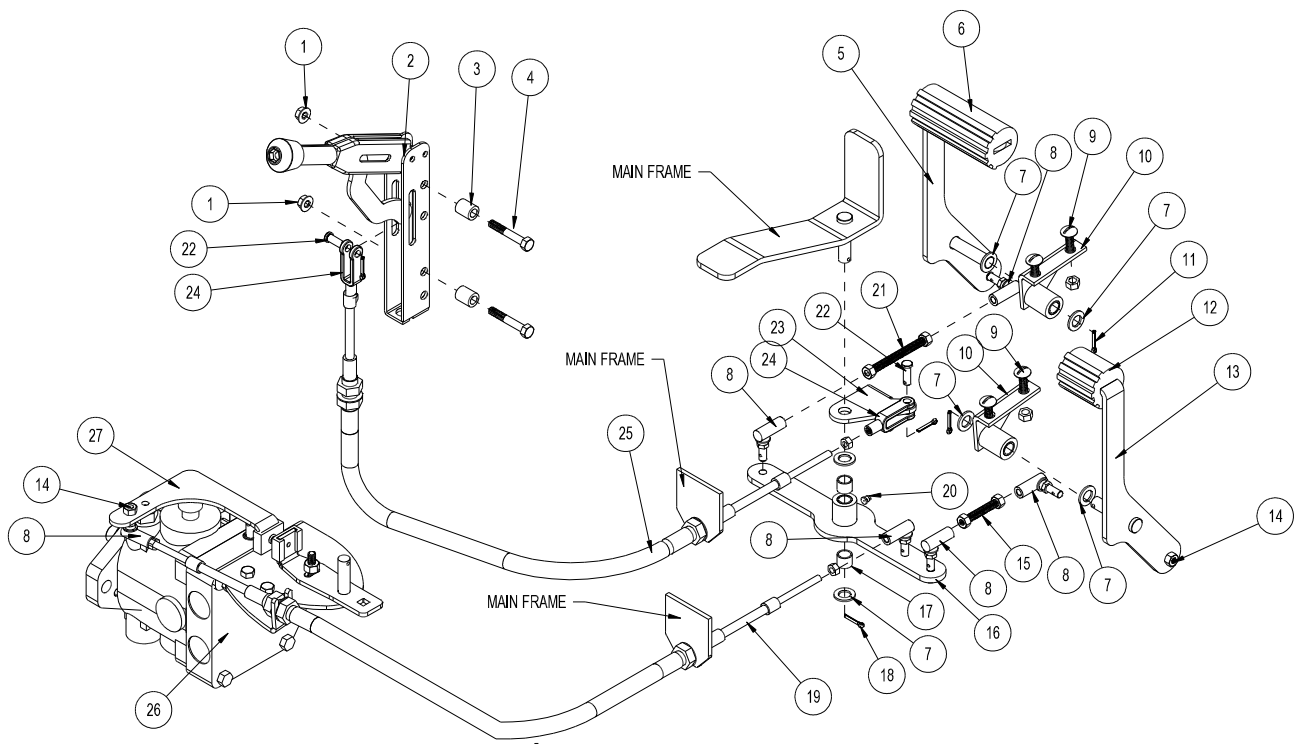
OIL TANK -OIL FILTER-OIL COOLER DRAWING



OIL TANK-OIL FILTER-OIL COOLER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-394	Tank Hold-down	1
2	17-019	Male Elbow	2
3	13-586-02	Bottom Gasket	1
4	13-586-03	Neck	1
5	13-586-01	Cap Gasket	1
6	13-747	Filler Breather	1
7	HSM-10-32-063	Machine Screw, 10- 32 x $\frac{5}{8}$	6
	HWL-10	Lock washer, #10	6
8	60-473	Hydraulic Oil Tank	1
9	10-393	Battery Hold Down	1
	HNFL-14-20	Flange-Loc Nut, $\frac{1}{4}$ - 20	2
10	33-216	Battery	1
11	75-792	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
12	60-213	Strainer	1
13	34-123	Elbow	3
14	8832-29	$\frac{3}{4}$ " Suction Hose x 29"	1
	18-040	Hose Clamp	2
15	10-572	Hydraulic Hose 24"	1
16	10-592	Cooler Mount	1
17	34-105	Oil Cooler	1
18	HB-516-18-100	Bolt, $\frac{5}{16}$ - 18 x 1	4
	HNFL-516-18	Flange-Loc Nut, $\frac{5}{16}$ - 18	4
19	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
20	10-402	Oil Filter Mount	1
21	23-006	Oil Filter Assembly	1
22	23-031	Filter Element, 25 Micron	1
23	HB-12-13-175	Bolt, $\frac{1}{2}$ - 13 x $1\frac{3}{4}$	8
	HW-12	Washer, $\frac{1}{2}$	8
	HNTL-12-13	Lock Nut, $\frac{1}{4}$ - 13	8
24	10-599	Main Frame	1

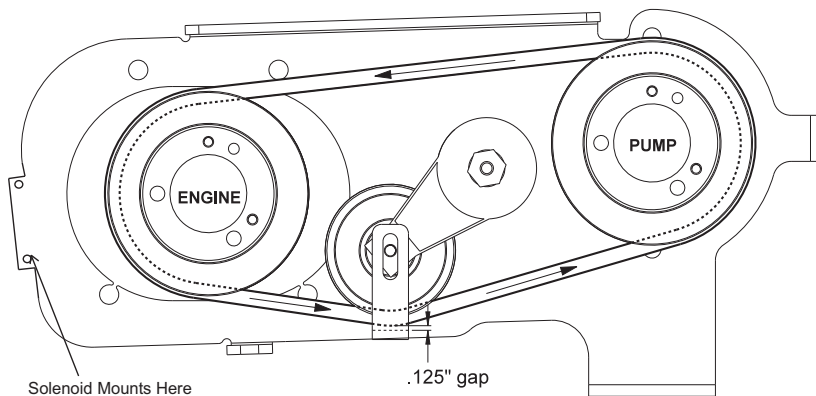
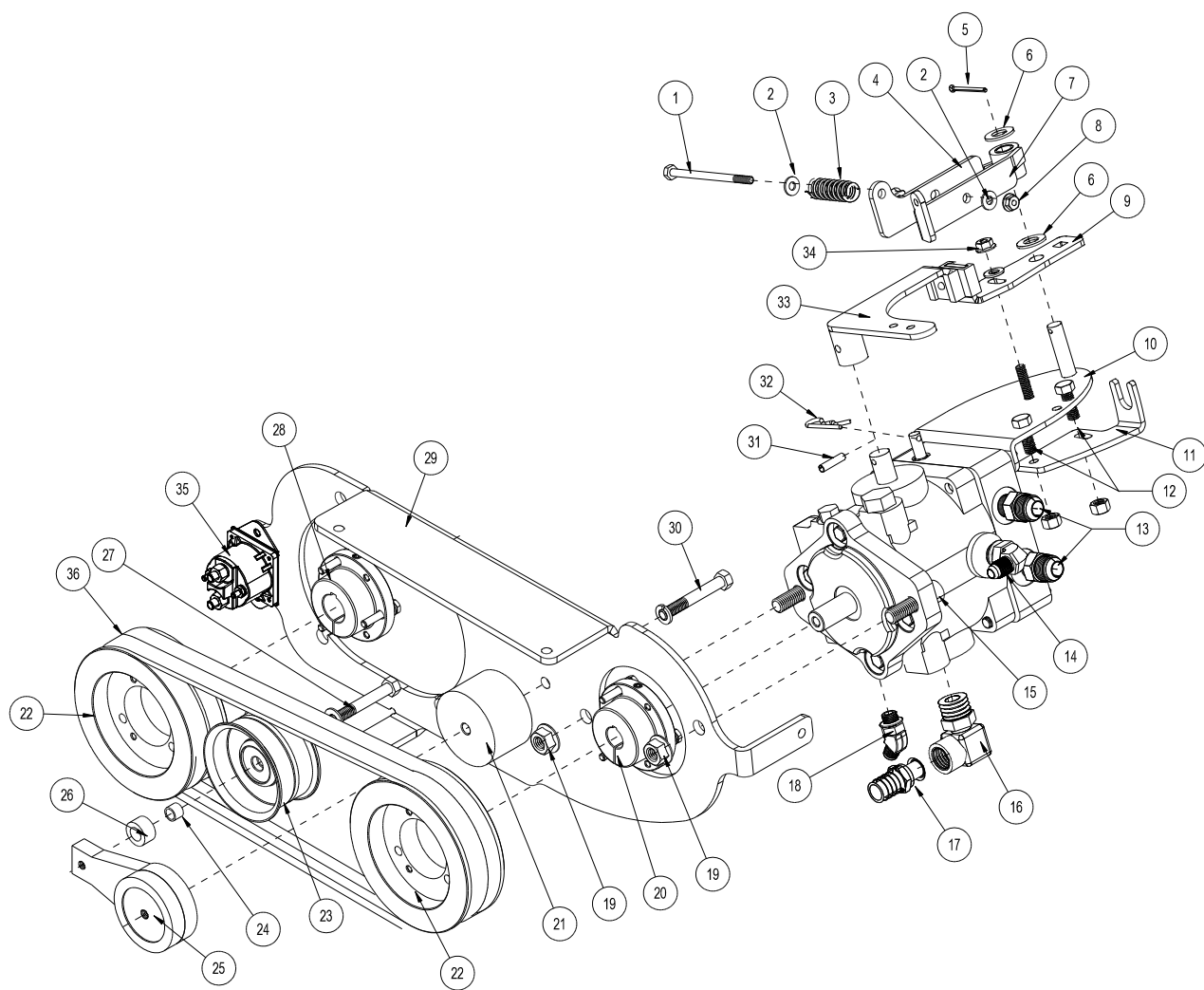
FOOT PEDAL LINKAGE DRAWING



FOOT PEDAL LINKAGE PARTS LIST

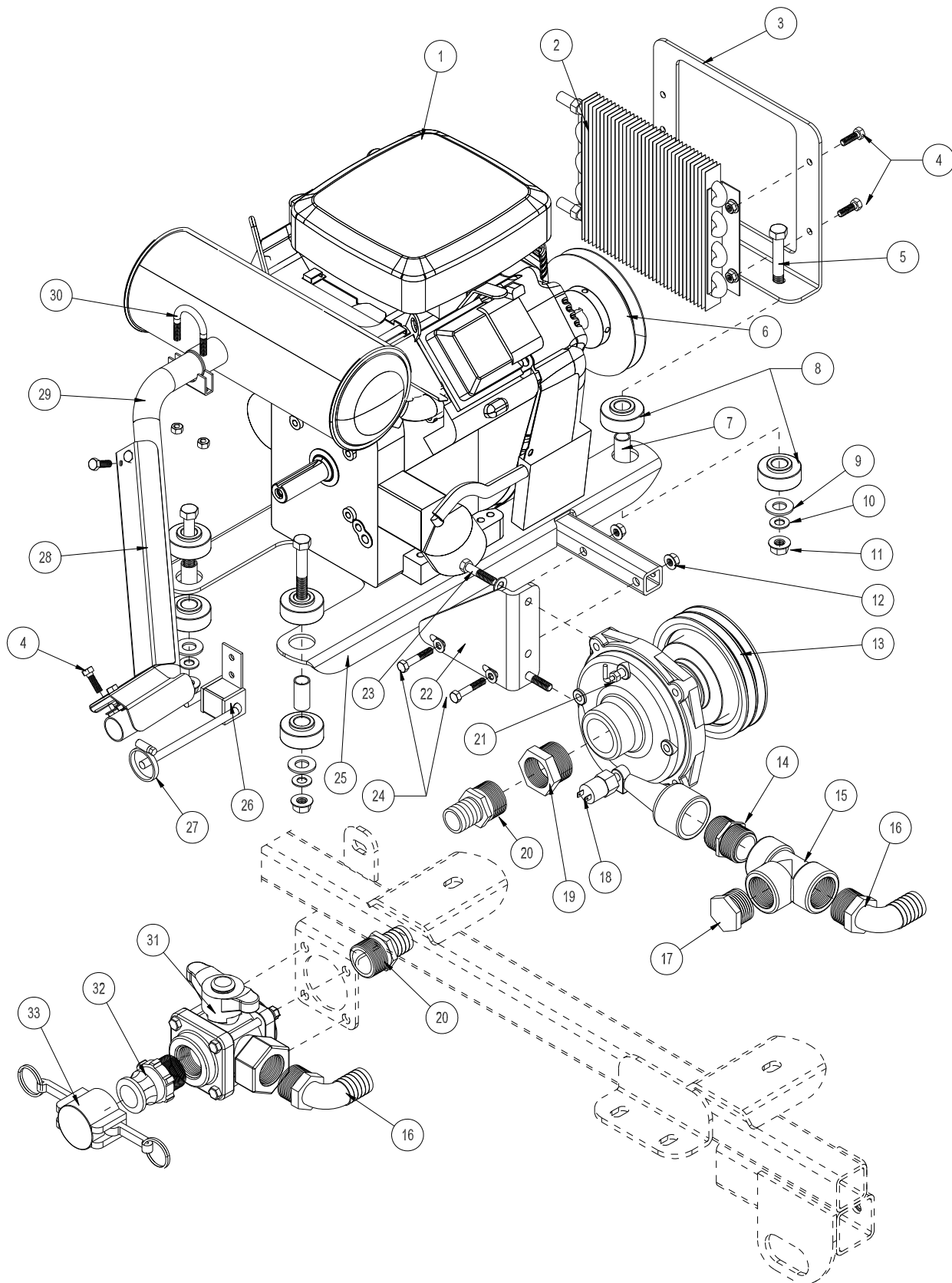
REF#	PART#	DESCRIPTION	QUANTITY
1	HNTL-516-18	Lock Nut, $\frac{5}{16}$ - 18	2
2	10-120	Speed Boss Handle	1
3	10-134	Handle Spacer	2
4	HB-516-18-200	Bolt, $\frac{5}{16}$ - 18 x 2	2
5	10-163	Forward Foot Pedal	1
6	48-066	Pedal Pad	1
7	HMB-12-14	Machine Bushing, $\frac{1}{2}$ x 14GA	6
8	21-462	Ball Joint	6
9	HSTP-516-18-075	Truss Head Screw, $\frac{5}{16}$ - 18 x $\frac{3}{4}$	4
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
10	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
11	HP-18-100	Cotter Pin, $\frac{1}{8}$ x 1	2
12	48-132	Short Pedal Pad	1
13	10-164	Reverse Foot Pedal	1
14	HN-516-24	Nut, $\frac{5}{16}$ - 24	6
15	10-597	Short Connector Link	1
	HN-516-24	Nut, $\frac{5}{16}$ - 24	2
16	10-579	Control Relay	1
17	18-234	Bushing (part of 10-579)	2
18	HP-18-100	Cotter Pin, $\frac{1}{8}$ x 1	1
19	10-565	Cable	1
20	HG-14-28-180	Grease Fitting, $\frac{1}{4}$ - 28 x 180°	1
21	10-598	Long Connector Link	1
	HN-516-24	Nut, $\frac{5}{16}$ - 24	2
22	HCP-516-100	Clevis Pin, $\frac{5}{16}$ x 1	2
	HP-18-100	Cotter Pin, $\frac{1}{8}$ x 1	2
23	10-587	Spray Boss	1
24	11-100	Yoke, $\frac{5}{16}$	2
	HN-516-24	Nut, $\frac{5}{16}$ - 24	2
25	10-190	Cable, Spray Boss Control	1
26	42-797	Hydro Pump	1
27	42-308	Swash Arm	1

PUMP DRAWING



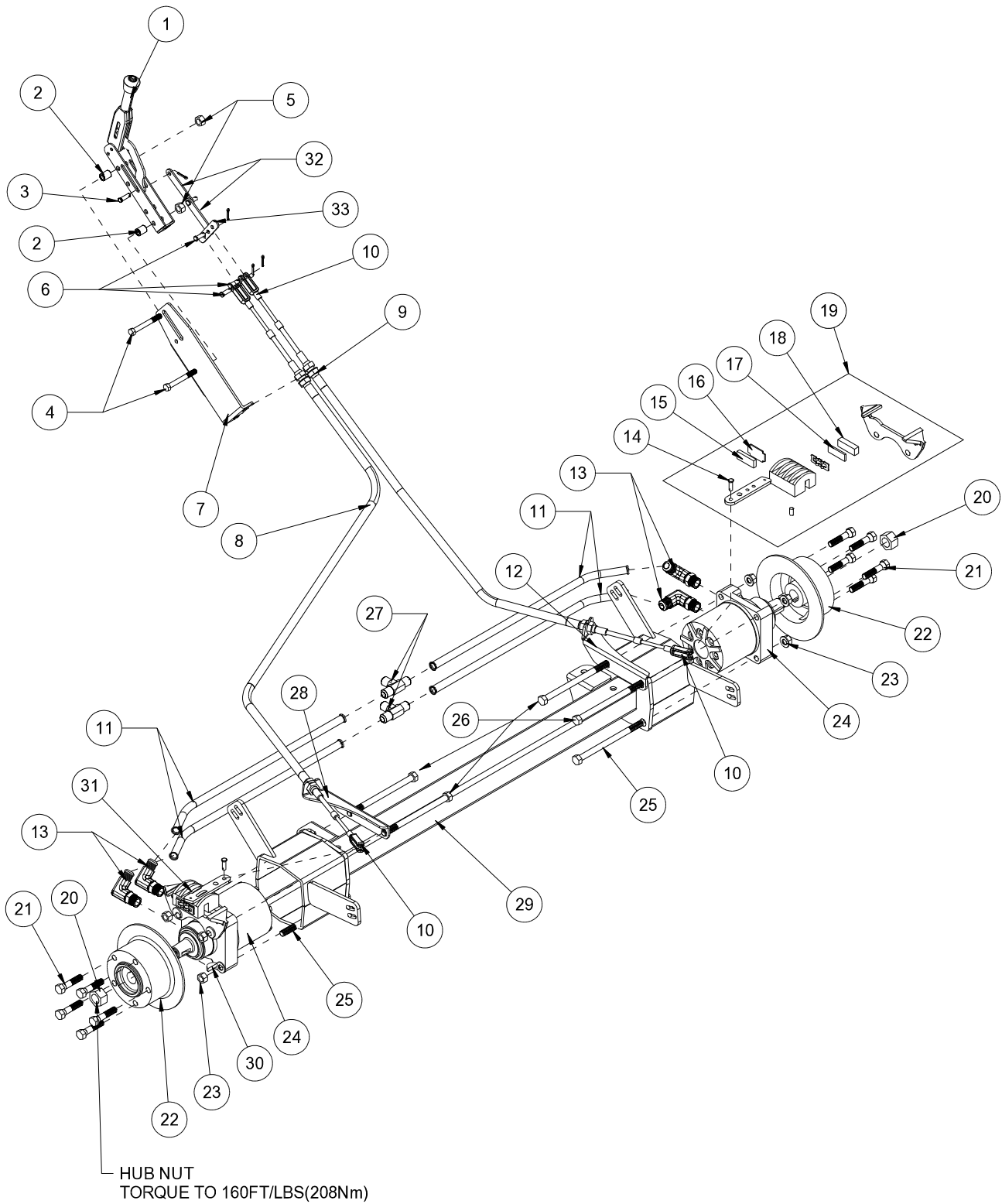
Belt Routing

REF#	PART#	DESCRIPTION	QUANTITY
1	HB-14-20-400	Bolt, 1/4 - 20 x 4	1
2	HW-14	Washer, 1/4	2
3	10-477	Compression Spring	1
4	42-606	Top Centering Arm	1
5	HP-18-100	Cotter Pin, 1/8 x 1	1
6	HMB-12-14	Machine Bushing, 1/2 x 14GA	2
7	42-607	Bottom Centering Arm	1
8	HNTL-14-20	Lock Nut, 1/4 - 20	1
9	10-586	Creep Arm	1
10	10-581	Hydro Control	1
11	45-094	Cable Bracket	1
12	HB-38-16-100	Bolt, 3/8 - 16 x 1	2
	HNTL-38-16	Lock Nut, 3/8 - 16	2
13	18-267	Straight Thread Connector	2
14	18-185	Elbow	1
15	42-797	Hydro Pump	1
	23-126	Pipe Plug	1
16	23-130	Elbow	1
17	18-133	Barb Fitting, 1/2 MPT X 3/4 HB	1
18	18-188	45° Elbow	1
19	HSSH-12-13-175	Socket Screw, 1/2 - 13 x 1 3/4	2
	HNFL-12-13	Flange-Loc Nut, 1/2 - 13	2
20	42-246	Hub, 3/4"	1
21	42-361	Tensioner Spacer	1
22	42-331	Pulley	2
23	42-358	Idler Pulley	1
24	42-338	Oilite Bushing	1
25	42-327	Belt Tensioner	1
26	16-990	Spacer	1
27	HB-38-16-275	Bolt, 3/8 - 16 x 2 3/4	1
	HW-38	Washer, 3/8	1
	HNTL-38-16	Lock Nut, 3/8-16	1
28	42-245	Hub 1"	1
29	45-045	Pump Mount	1
30	HB-38-16-250	Bolt, 3/8 -16 x 2 1/2	1
	HWL-38	Lock Washer, 3/8	1
31	HRP-14-100	Roll Pin, 1/4 x 1	1
32	HHP-18	Bridge Pin, 1/8	1
33	42-308	Swash Arm	1
34	HNTL-516-18	Lock Nut, 5/16-18	1
	HW-516	Washer, 5/16	1
35	13-750	Solenoid w/ Connector	1
	22-017	Starter Cable	1
36	42-359	Belt	2



REF#	PART#	DESCRIPTION	QUANTITY
1	10-575	Briggs, 23HP Engine	1
	13-750	Solenoid	1
2	34-105	Oil Cooler	1
3	10-592	Oil Cooler Mount	1
4	HB-516-18-100	Bolt, $\frac{5}{16}$ -18 x 1	8
	HNFL-516-18	Flange-Loc Nut, $\frac{5}{16}$ - 18	5
5	HB-12-13-300	Bolt, $\frac{1}{2}$ - 13 x 3	4
6	10-578	Pulley	1
7	60-168	Spacer	4
8	60-107	Rubber Bushing	8
9	HW-58	Washer, $\frac{5}{8}$	4
10	HW-716	Washer, $\frac{7}{16}$	4
11	HNFL-12-13	Flange-Loc Nut, $\frac{1}{2}$ - 13	4
12	HNFL-516-18	Flange-Loc Nut, $\frac{5}{16}$ - 18	2
13	16-998	Hypro® Pump	1
14	16-880	Close Nipple, $\frac{1}{4}$ "	1
15	18-390	Pipe Tee, $\frac{1}{4}$ "	1
16	16-156	Elbow, $\frac{1}{4}$ MPT x $\frac{1}{4}$ HB	2
17	10-389	Plug, $\frac{1}{4}$ "	1
18	33-480	Pressure Switch	1
19	16-825	Hex Bushing, $\frac{1}{2}$ x $\frac{1}{4}$	1
20	16-161	Fitting, $\frac{1}{4}$ MPT x $\frac{1}{4}$ HB	2
21	33-494	Male Elbow	1
22	10-593	Hypro Pump Mount	1
23	HB-38-16-175	Bolt, $\frac{3}{8}$ - 16 x $\frac{3}{4}$	2
	HW-38	Washer, $\frac{3}{8}$	2
	HTNL-38-16	Lock Nut, $\frac{3}{8}$ - 16	
24	HB-516-18-175	Bolt, $\frac{5}{16}$ -18 x $\frac{3}{4}$	2
	HW-516	Washer, $\frac{5}{16}$	2
25	10-580	Engine Plate	1
26	17-564	Exhaust Hanger	1
27	18-222	Hose Clamp	1
28	10-476	Exhaust Shield	1
29	10-585	Exhaust	1
30	18-220	Muffler Clamp, $\frac{1}{4}$ "	1
31	18-372	3-Way Valve	1
32	16-180	Quick Coupler, $\frac{1}{4}$ " Male	1
33	16-935	Quick Coupler Cap	1
NS	15-704	Belt	1

PARK BRAKE DRAWING

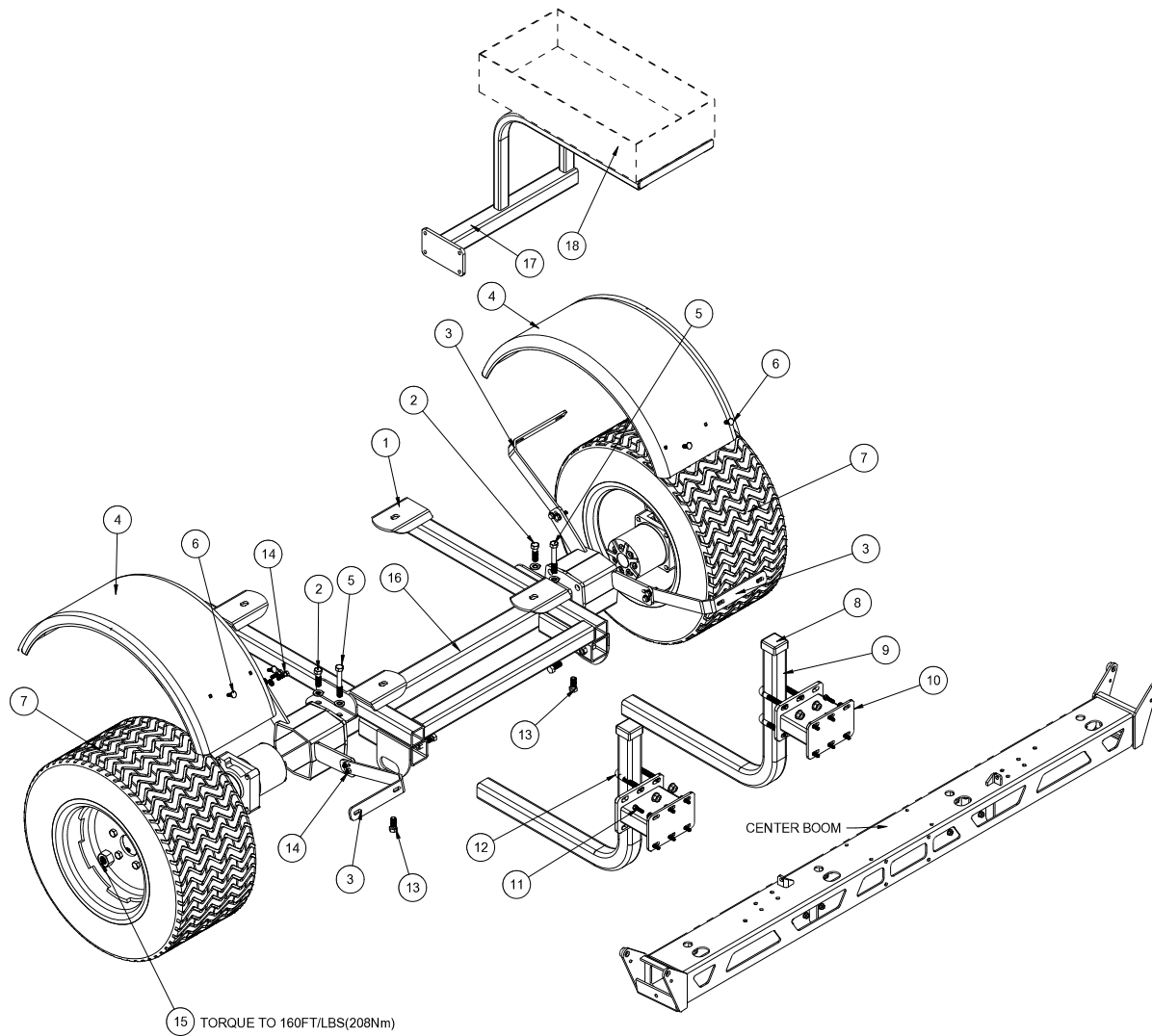


PARK BRAKE PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	60-106	Park Brake Handle	1
2	10-134	Spacer	2
3	HCP-516-138	Clevis Pin, $\frac{5}{16} \times 1\frac{3}{8}$	1
	HP-18-100	Cotter Pin, $\frac{1}{8} \times 1$	1
4	HB-516-18-200	Bolt, $\frac{5}{16}$ - 18 x 2	2
5	HNFL-516-18	Flange-Loc Nut, $\frac{5}{16}$ - 16	2
6	HCP-516-100	Clevis Pin, $\frac{5}{16} \times 1$	3
	HP-18-100	Cotter Pin, $\frac{1}{8} \times 1$	3
7	10-590	Brake Lever Mount	1
8	10-564	LH Brake Cable	1
9	10-563	RH Brake Cable	1
10	11-100	Linkage Yokes, $\frac{5}{16}$	4
	HN-516-24	Nut, $\frac{5}{16}$ - 24	8
11	20-656	Hydraulic Tube Assembly	4
12	10-589	RH Brake Cable Bracket	1
13	34-122	Short Elbow	4
14	HCP-516-100	Clevis Pin, $\frac{5}{16} \times 1$	2
	HP-18-100	Cotter Pin, $\frac{1}{8} \times 1$	2
15*		Carrier Side Pad	1
16*		Carrier Side Pad Support	1
17*		Cam Side Pad Support	1
18*		Cam Side Pad	1
19	76-241	Right Caliper (CW)	1
20	14-265	Nut, 1 - 20 (included with Ref# 24)	2
21	60-268	Lug Bolt, $\frac{1}{2}$ - 20 x $1\frac{5}{16}$	10
22	76-239	8" Brake Disk (5 hole)	2
23	HNFL-12-13	Flange Loc Nut, $\frac{1}{2}$ - 13	8
24	10-510	Wheel Motor	2
25	HB-12-13-750	Bolt, $\frac{1}{2}$ - 13 x $7\frac{1}{2}$	4
26	HB-12-13-800	Bolt, $\frac{1}{2}$ - 13 x 8	4
27	18-302	Union Tee 1"	2
28	10-588	LH Brake Cable Bracket	1
29	10-473	Rear Axle	1
30	HWK-516-100	Woodruff Key, $\frac{5}{16} \times 1$ (included with Ref# 24)	2
31	76-240	Left Caliper (CCW)	1
32	45-074	Park Brake Link	2
33	10-591	Brake Equalizer	1

*	34-101-02	Pad Kit with 2 Pads and Steel Backing Plates	2 Kits
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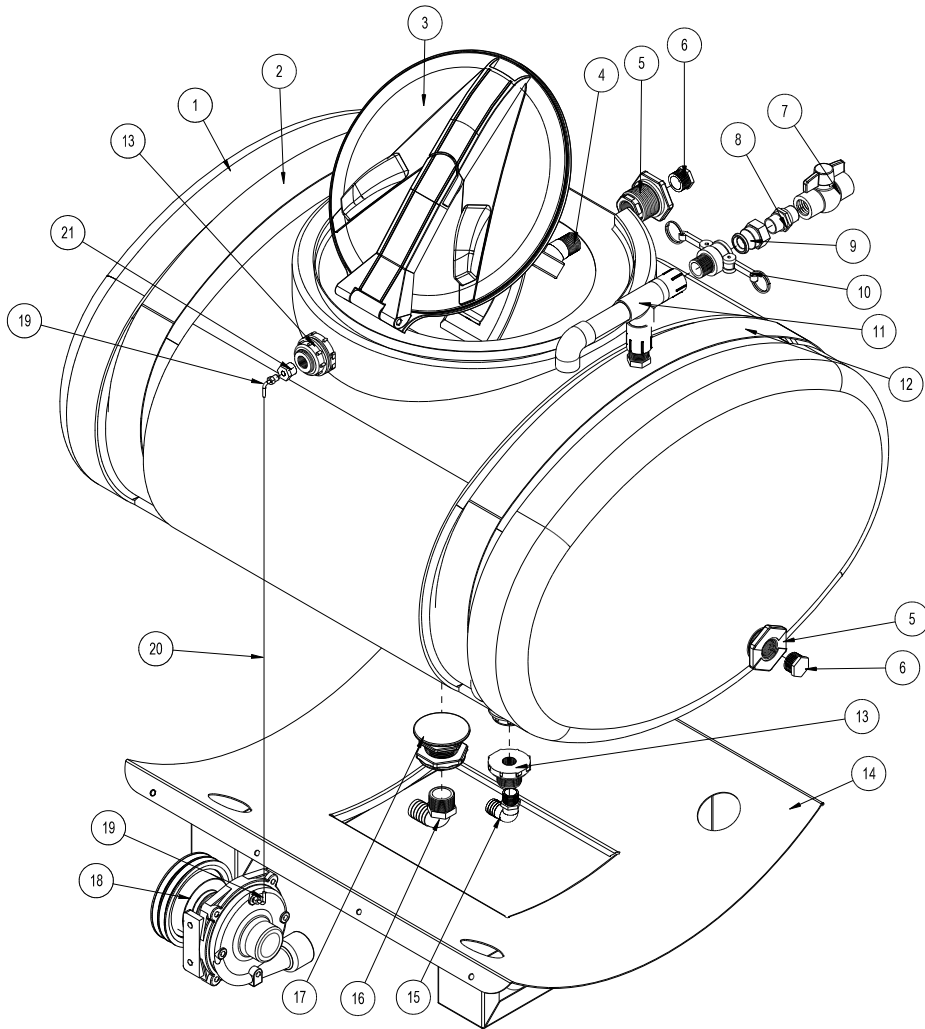
REAR AXLE DRAWING



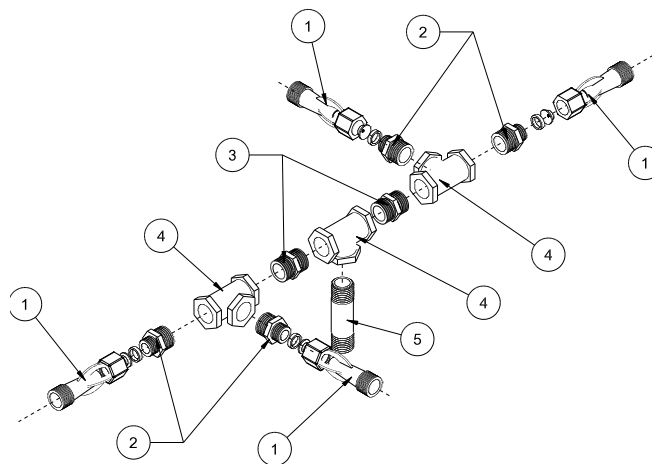
REAR AXLE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-599	Main Frame	1
2	HB-12-13-175	Bolt, $\frac{1}{2}$ - 13 x $1\frac{3}{4}$	2
	HW-12	Washer, $\frac{1}{2}$	2
	HNTL-12-13	Lock Nut, $\frac{1}{2}$ - 13	2
3	10-466	Rear Fender Bracket	4
4	10-168	Rear Fender	2
5	HB-12-13-350	Bolt, $\frac{1}{2}$ - 13 x $3\frac{1}{2}$	2
	HW-12	Washer, $\frac{1}{2}$	2
	HNTL-12-13	Lock Nut, $\frac{1}{2}$ - 13	2
6	HBCL-516-18-100	Carriage Bolt, $\frac{5}{16}$ - 18-1	8
	HNFL-516-18	Flange-Loc Nut, $\frac{5}{16}$ - 18	8
7	78-221	Rear Tire and Wheel	2
	78-221-01	Tire	2
	78-221-02	Wheel	2
8	16-557	Square Cap	2
9	17-615	Boom Carrier	2
10	17-614	Boom Spacer	2
11	HB-516-18-100	Bolt, $\frac{5}{16}$ - 18 x 1	12
	HW-516	Washer, $\frac{5}{16}$	12
	HNFL-516-18	Flange-Loc Nut, $\frac{5}{16}$ - 18	12
12	20-555	U-bolt	4
	HNFL-12-13	Flange-Loc Nut, $\frac{1}{2}$ - 13	8
13	HB-12-13-125	Bolt, $\frac{1}{2}$ - 13 x $1\frac{1}{4}$	4
	HN-12-13	Nut, $\frac{1}{2}$ - 13	4
14	HB-516-18-125	Bolt, $\frac{5}{16}$ - 18 x $1\frac{1}{4}$	8
	HW-516	Washer, $\frac{5}{16}$	16
	HNTL-516-18	Lock Nut, $\frac{5}{16}$ - 18	8
15	14-265	Nut, 1 - 20	2
16	10-473	Rear Axle	1
17	10-463	Basket Mount	1
18	10-465	Basket	1

TANK DRAWING



TURBO-QUAD AGITATOR DRAWING



TANK PARTS LIST

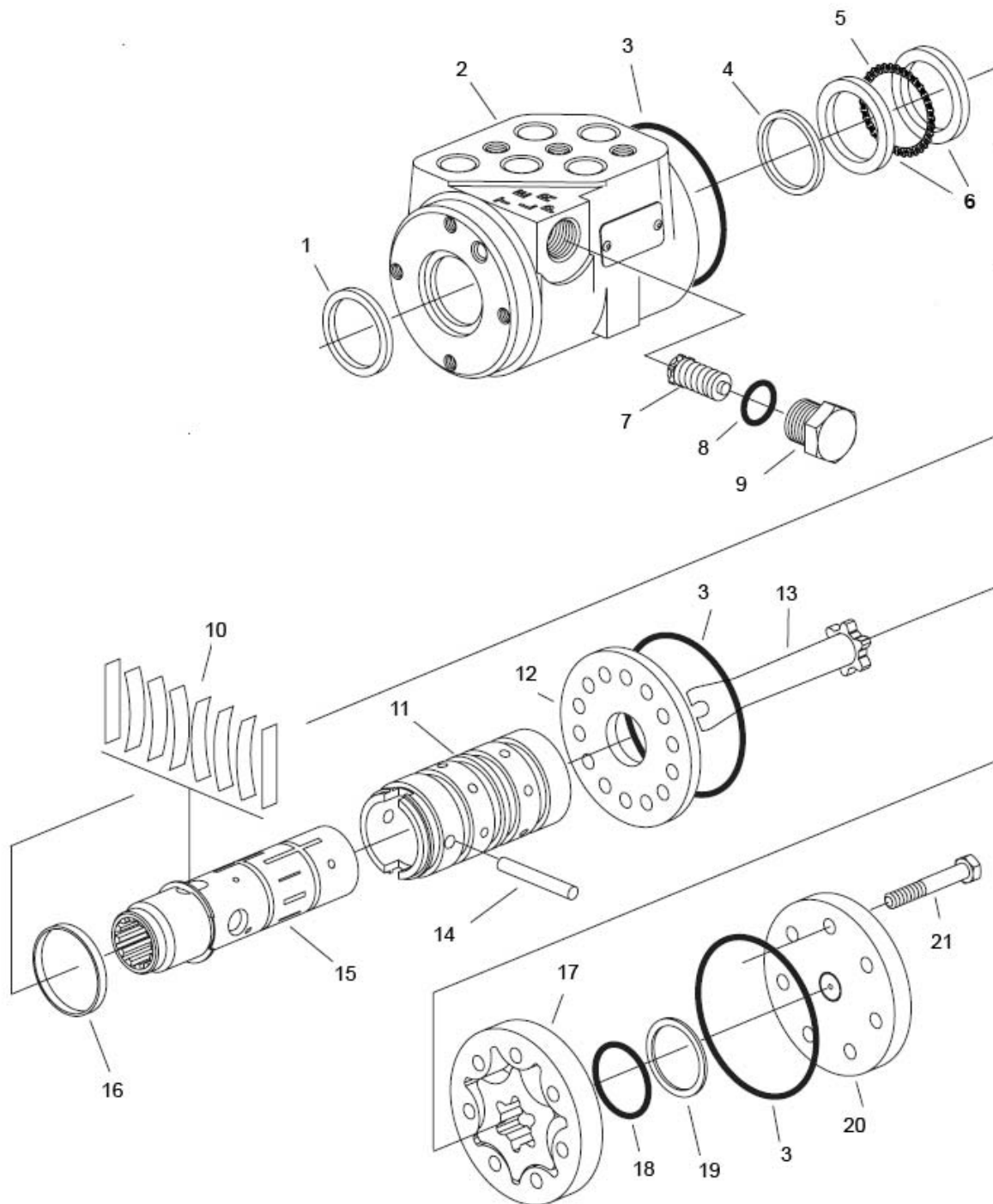
REF#	PART#	DESCRIPTION	QUANTITY
1	10-111	110 Gallon Poly Tank	1
	16-169	Strainer Basket 16"	1
2	10-410	Left Tank Strap	1
	HB-38-16-400	Bolt $\frac{3}{8}$ - 16 x 4	1
	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
3*	14-532	16" Hinged Lid/Well with Gasket	1
4	16-971	45° Elbow (inside tank)	1
5	16-945	Double Head Fitting	2
6	16-162	Hex Plug 1"	2
7	18-448	1" Ball Valve	1
8	16-851	1" Nipple	1
9	16-961	Aluminum Adapter 1" Female Thread	1
10	16-962	Aluminum Coupler 1" Male Thread	1
11	10-254	Air Gap Filler	1
12	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
13*	16-150	Double Threaded Fitting $\frac{3}{4}$	2
14	10-112	Tank Carrier	1
15	16-155	Elbow, $\frac{3}{4}$ MPT x 1 HB	1
16	16-156	Elbow $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	1
17*	16-194	Anti-Vortex Fitting $1\frac{1}{4}$	1
18	16-998	Hypro® Pump	1
19	33-494	Male Elbow	2
20	8954-30	Clear Hose $\frac{3}{16}$ ID	1
	18-116	Hose Clamp	2
21	10-390	Reducer	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 $\frac{1}{8}$ ", $\frac{5}{53}$ ", 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

10-576 ORBITROL DRAWING



Parts

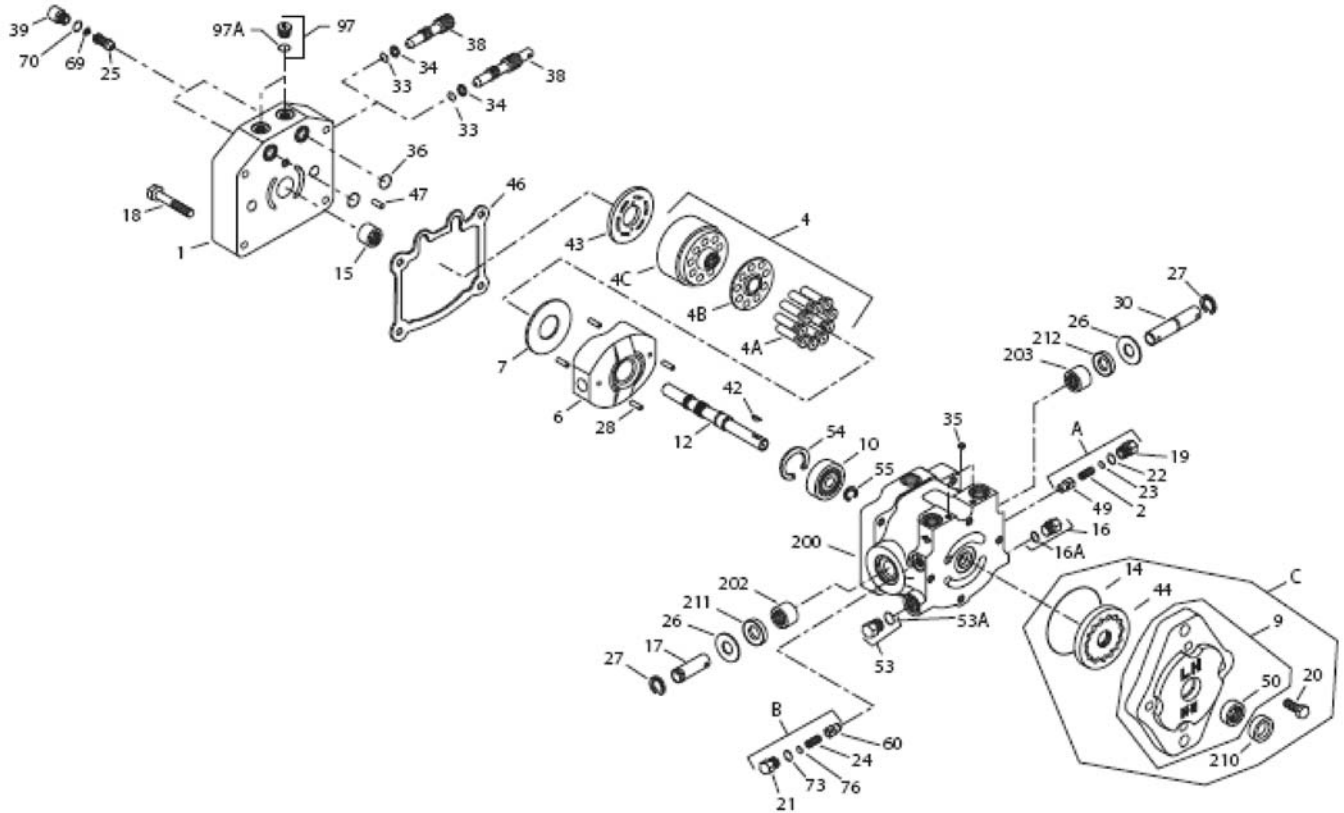
10-576 ORBITROL PARTSLIST

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

10-576 ORBITROL SPECIFICATIONS

Inlet Relief Valve Setting	1020 psi (70 bar)
Nominal Flow	3 gpm (11 lpm)
Displacement	4.50 cu. in/ R (73.8 cu cm/R)
Check Valve for Manual Steering	Yes
Inlet Pressure Rating	2030 psi (140 bar)
Return Pressure Rating	145 psi (10 bar) Maximum
Fluid	SAE 10W-40 API Service SJ or higher Motor Oil
Ports	Side Ported, 4 x Dash 06 Seal Tight Connector (STC)

42-797 HYDRAULIC PUMP DRAWING



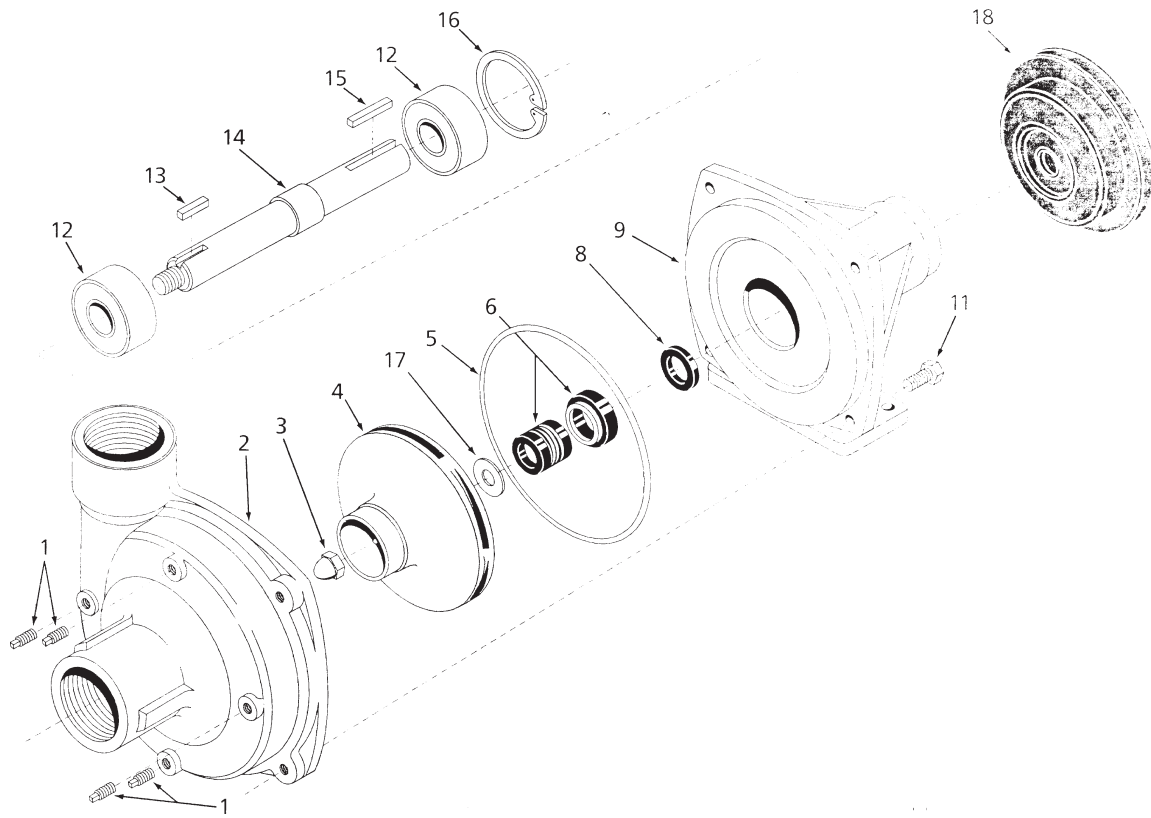
Note: Item 200 includes items 202, 203 and 204

REF#	PART#	DESCRIPTION	QUANTITY
1	10-117-01	End cap	1
2	14-263	Implement relief spring	1
4	42-003-16	Cylinder block kit	1
4A		Piston assembly	9
4B		Slipper retainer	1
4C		Cylinder block	1
6		Swash Plate	1
7	14-114	Thrust plate	1
9		Charge pump housing assembly	1
10	42-003-10	Ball bearing	1
12		Shaft	1
14		O-ring	1
15	14-217	Roller bearing	1
16		Plug	1
16A		O-ring	1
17	14-212	Trunnion shaft	1
18	42-003-11	Screw	4

42-797 HYDRAULIC PUMP PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
19	13-110-10	Plug	1
20		Screw	4
21	13-110-10	Plug	1
22		O ring	1
23	34-109-03	Shim kit	1
24	14-234	Charge relief spring	1
25	10-117-04	Check valve poppet	2
26	42-003-05	Washer	2
27	14-105	Retaining ring	2
28	14-216	Spring coiled pin	4
30	14-220	Trunnion shaft	1
33	14-226	O-ring	1
34	14-130	Back up ring	1
35	13-110-05	Pipe plug	2
36		O-ring	2
38	13-110-01	Bypass valve	1
39	10-117-03	Plug	2
42		O-ring	2
43	34-109-01	Valve plate	1
44	42-003-08	Gerotor assembly	1
46	14-107	Gasket	1
47	14-215	Pin	1
49	34-109-02	Charge relief cone	1
50	42-003-07	Needle bearing	1
53	42-159-05	Plug	1
53A		O-ring	1
54	14-132	Retaining ring	1
55	42-003-09	Retaining ring	1
60	34-109-02	Poppet	1
69		Spring	2
70		O-ring	2
73		O-ring	1
76	34-109-03	Shim kit	1
97	42-003-03	Plug assembly	2
97A		O-ring	2
200		Housing assembly	1
202	14-069	Needle bearing	1
203	14-069	Needle bearing	1
210	14-054	Lip seal	1
211	14-014	Lip seal	1
212	14-014	Lip seal	1
A	13-110-17	Relief valve kit	1
B	14-214	Relief valve kit	1
C	42-003-14	Charge pump kit	1

16-998 HYPRO PUMP DRAWING

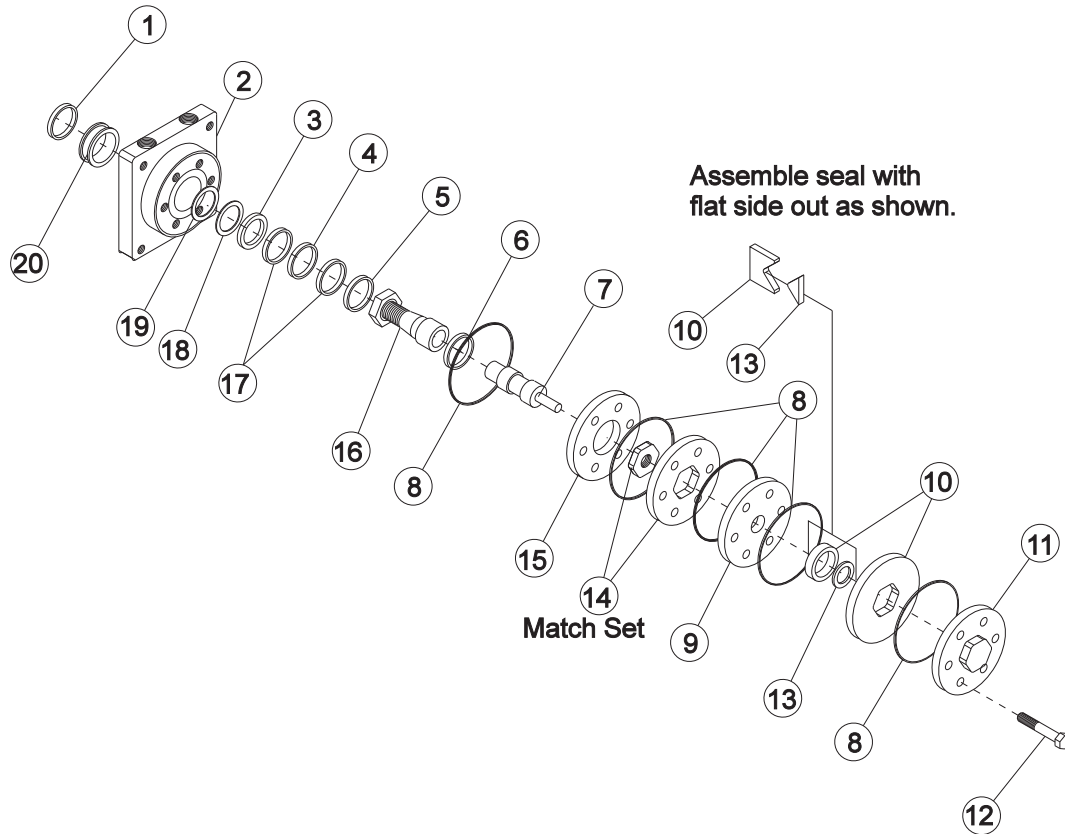


REF#	PART#	DESCRIPTION	QUANTITY
1	16-998-01	Drain Plug	4
2	16-998-02	Pump Casing	1
3	16-998-03	Impeller Nut	1
4	16-966-16	Impeller	1
5*	16-467	O-Ring	1
6*	16-998-05	Mechanical Seal (Silicon Carbide)	1
8*	16-966-06	Slinger Ring	1
9	16-998-06	Mounting Flange	1
11	16-998-07	Bolt	4
12	16-966-10	Ball Bearing	2
13	16-998-08	Key	1
14	16-998-09	Pump Shaft	1
15	16-822-20	Key	1
16	16-966-13	Bearing Retainer	1
17*	16-998-10	Gasket	1
18	16-994-01	Clutch	1
	16-998-12	Pump Only	1
*	16-967	Silicone - Carbon Seal Kit	

NOTE:

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

10-510 WHEEL MOTOR DRAWING

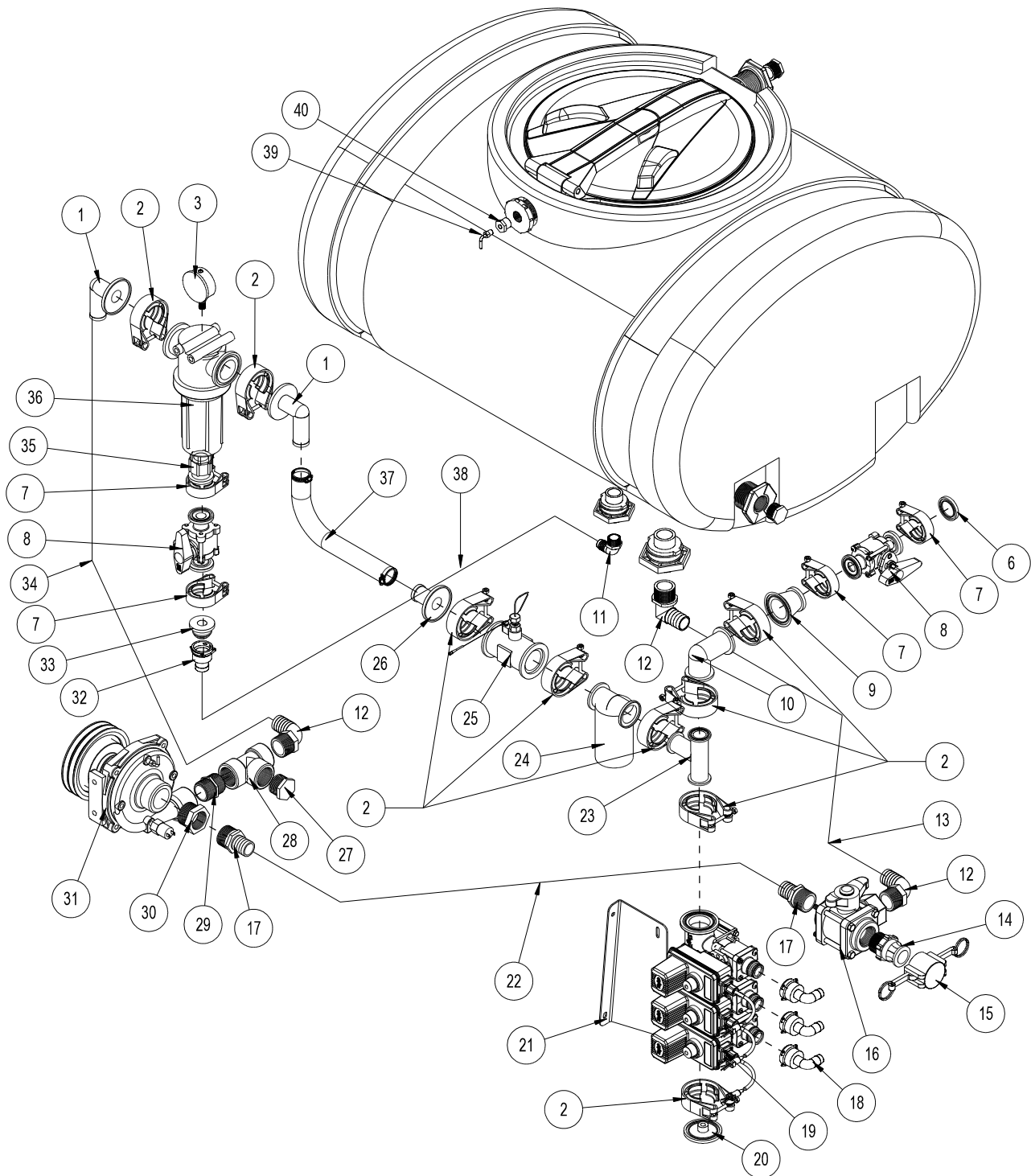


REF#	PART#	DESCRIPTION	QUANTITY
1*	13-032-39	Water & Dirt Seal	1
2	13-615-05	Service Housing Assembly (Includes Ref 4, 5, 17(2 req'd) and 20)	1
3*		Inner Seal	1
4	13-032-27	Thrust Bearing	1
5	13-032-28	Inner Bearing	1
6	13-032-29	Thrust Bearing	1
7	10-510-01	Drive Link	1
8*		Ring Seal	5
9	13-032-31	Manifold	1
10	13-032-32	Commutator Assembly (matched set)	1
11	13-032-33	End Cover	1
12	10-510-02	Special Bolt	7
13*		Commutator Seal (matches with #10)	1
14	10-510-03	Rotor Set (matched set)	1
15	10-510-04	Wear Plate	1
16	13-615-04	Coupling Shaft	1
	HWK-516-100	Woodruff Key $\frac{5}{16} \times 1$	1
	14-265	Nut 1 - 20	1
17	13-032-37	Thrust Washer	2
18*		Backup Washer	1
19*		Backup Ring	1
20	13-032-38	Outer Bearing	1
*	14-080	Seal Kit	1

1008 PLUMBING DRAWING (RAVEN 440)

15-817 O-ring for 50 Series Clamp

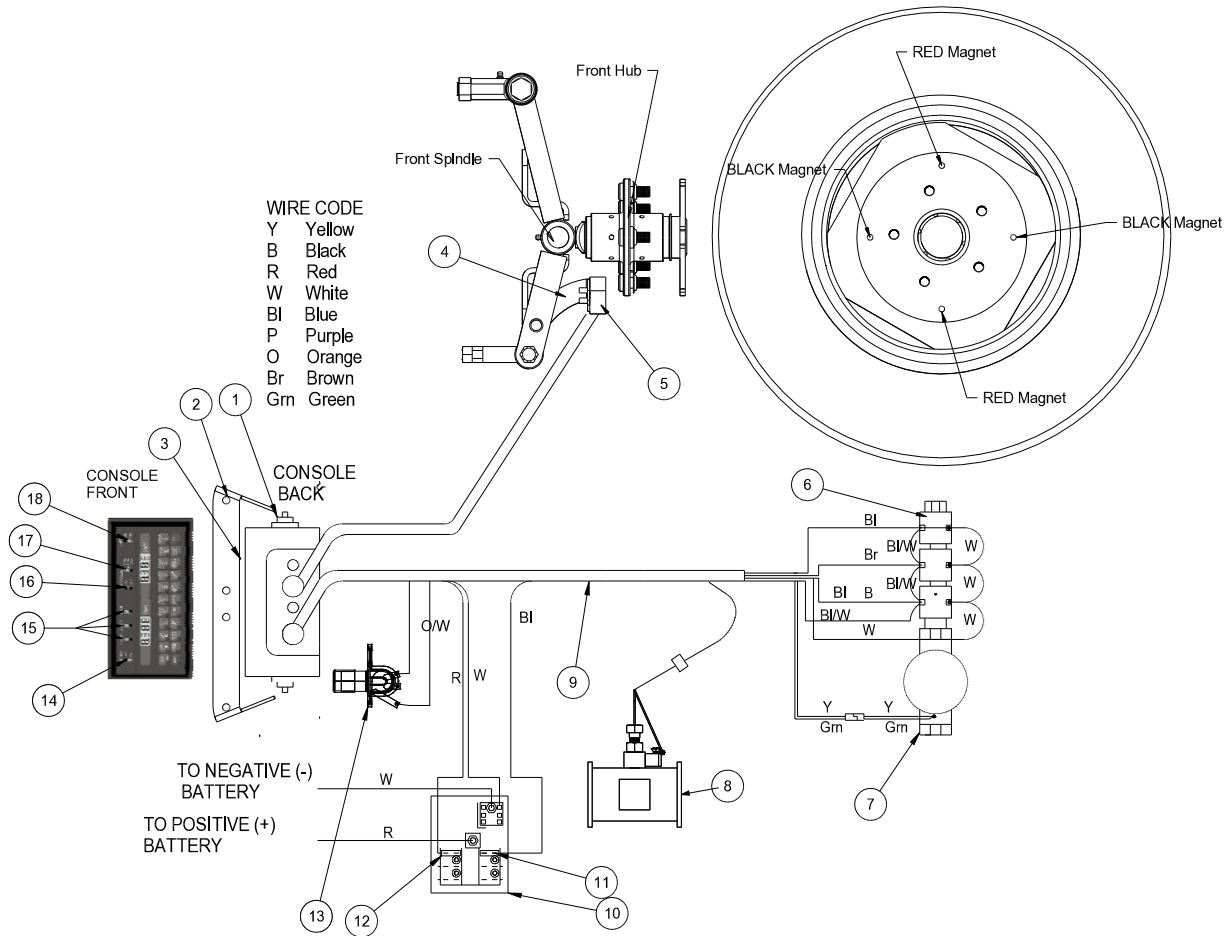
15-818 O-ring for 75 Series Clamp



1008 PLUMBING PARTS LIST (RAVEN 440)

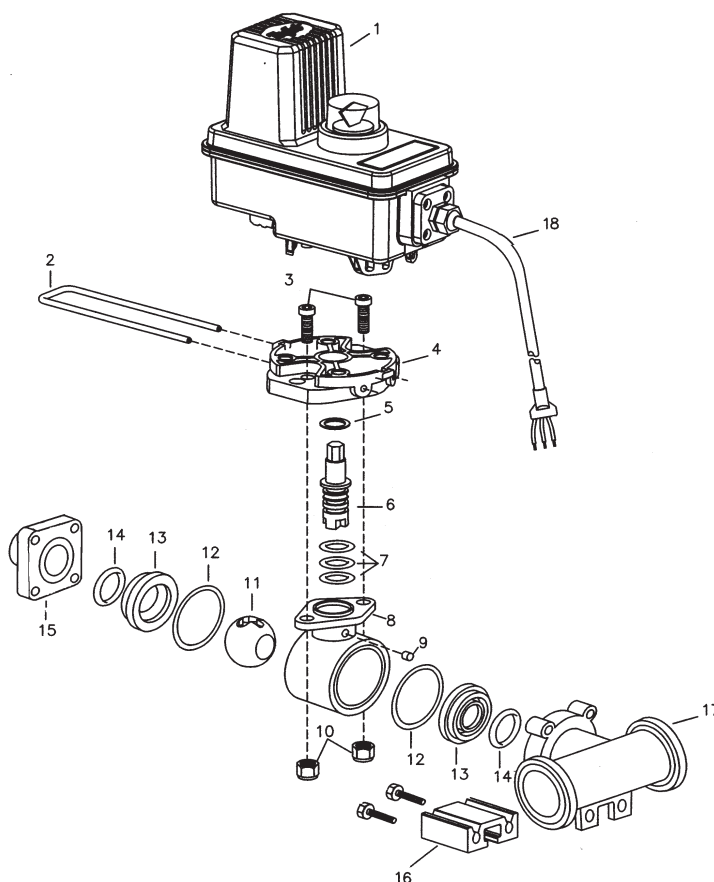
REF#	PART#	DESCRIPTION	QUANTITY
1	15-739	75 Series 90° x 1½ Hose Barb	2
2	15-741	75 Series Clamp	9
3	16-281	Liquid Filled Gauge	1
4	10-111	110 Gallon Poly Tank	1
	16-169	Strainer Basket 16"	1
5	14-532	16" Hinged Lid/Well with Gasket	1
	16-953-01	Gasket	1
6	15-778	Blank Gauge Port Flange	1
7	15-740	50 Series Clamp	4
8	15-738	Flanged Ball Valve	2
9	15-748	Reducer Coupling	1
10	15-734	75 Series Elbow Coupling	1
11	16-155	Elbow ¾" MPT x 1" HB	1
12	16-156	Elbow 1¼ MPT x 1¼ HB	3
13	8897-38	Discharge Hose 1¼"	1
	18-040	Hose Clamp, HS-12	2
14	16-180	Quick Coupler 1¼ Male	1
15	16-935	Quick Coupler 1¼ Cap	1
16	18-372	3-Way Valve	1
	18-372-01	T-handle	1
17	16-161	Fitting 1¼ MPT x 1¼ HB	1
18	15-553	¾ -90° Hose Barb	3
	15-553-01	Clip	3
	15-553-02	O-Ring	3
	8887-80	Orange PVC Hose ¾"	1
	8887-100	Orange PVC Hose ¾"	2
	18-040	Hose Clamp, HS-12	3
19	15-743	Manifold Valve	1
20	15-742	#75 Inlet Cover	1
21	10-480	Valve Mount	1
22	8897-52	Discharge Hose 1¼"	1
	18-040	Hose Clamp, HS-12	2
23	10-574	Tee	1
24	16-524	Motorized Control Valve	1
25	18-373	Flow Meter	1
	18-373-01	Sensor	1
26	15-744	Series 75 1¼ Hose Barb	1
27	10-389	Plug 1¼	1
28	10-390	Reducer	1
29	16-880	Close Nipple	1
30	16-825	Stainless Steel Reducer Bushing 1½ x 1¼	1
31	16-998	Hypro® Pump	1
32	15-869	1" Hose Barb Outlet	1
	15-553-01	Clip	1
	15-553-02	O-ring	1
33	15-825	#50 Male Quick Coupler	1
34	8897-50	Discharge Hose 1¼"	2
	18-116	Hose Clamp, HS-24	4
35	15-735	50 Series 1" FPT	1
36	15-737	Flanged Strainer	1
37	8897-27	Discharge Hose 1¼"	1
	18-116	Hose Clamp, HS-24	2
38	8896-40	Discharge Hose 1"	1
	18-222	Hose Clamp, 13/16 to 1½	2
39	33-494	Male Elbow	1
40	10-390	Reducer	1

1008 CONTROL SYSTEM (RAVEN 440)



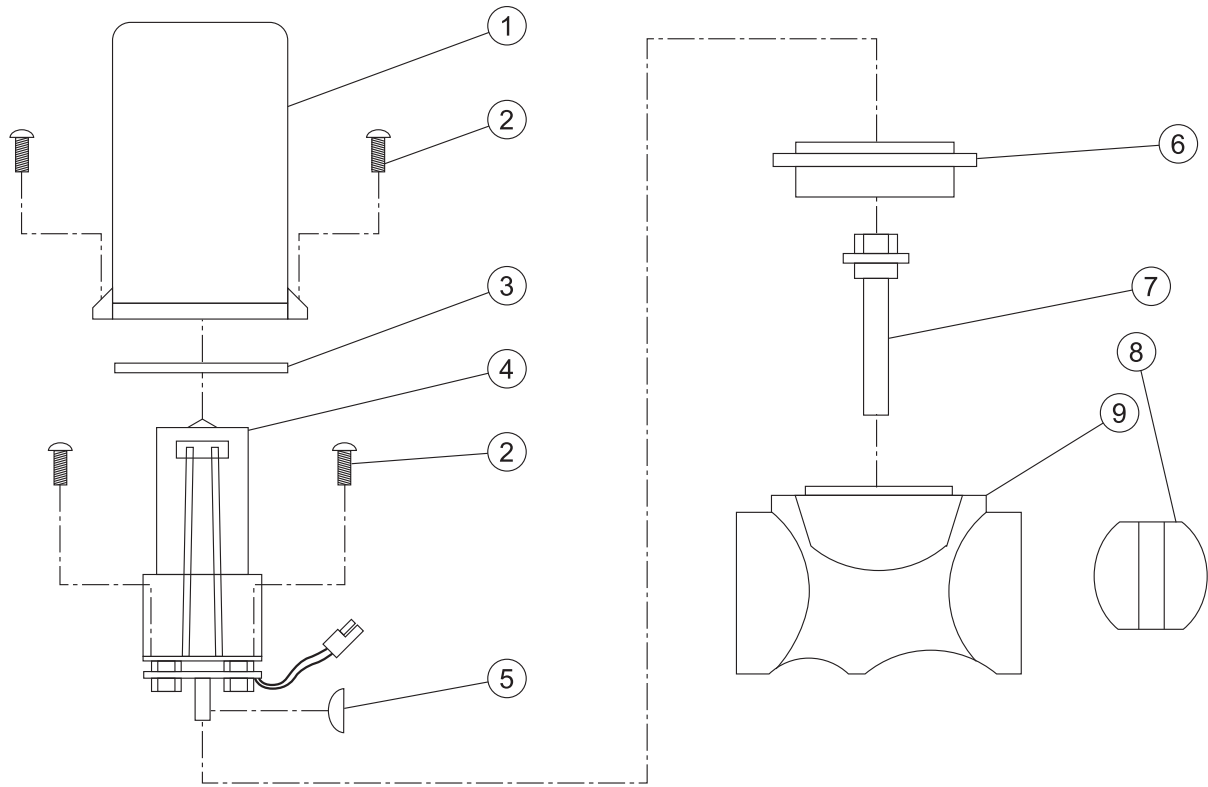
REF#	PART#	DESCRIPTION	QUANTITY
1	16-558	Mounting Knob	2
2	10-237	Mount Bracket	1
3	16-525	Console (only)	1
	16-234	Console Cover	1
4	15-715	Sensor Bracket	1
5	16-139	Sensor	1
6	15-743	Manifold Valve	1
7	16-524	Motorized Control Valve	1
8	18-373	Flow Meter	1
9	15-369	Console Control Cable	1
10	33-271	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
	33-089-04	Red Magnet	2
	33-089-05	Black MAGnet	2

Use Dielectric Grease On All Electrical Connections

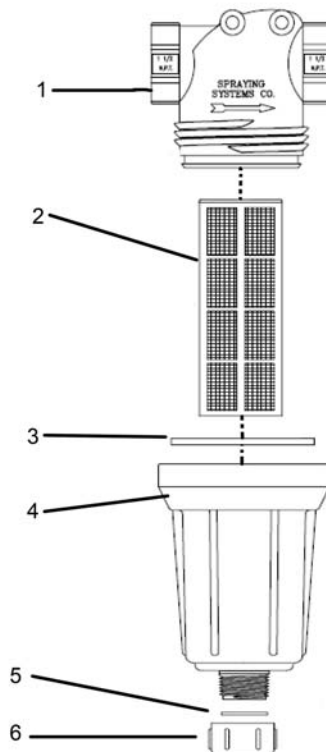


REF#	PART#	DESCRIPTION	QUANTITY
1	15-552-23	Motor	
2	15-552-24	Retaining Clip	1
3	15-552-25	Socket Head Cap Screw, Stainless Steel	2
4	15-552-26	Motor Adapter, Polypropylene	1
5*	15-517-11	Thrust Washer, Teflon	1
6	15-552-27	Stem, Stainless Steel	1
7*	15-552-05	O-ring, Viton	3
8	15-517-16	Body, Nylon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

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	16-897	Seal Tetraseal	1
4	16-875	Motor Assembly	1
5*	16-957	Woodruff Key	1
6*	16-524-04	Isolation Flange Assembly	1
7*	16-524-02	Coupler Shaft	1
8*	16-956	Butterfly	1
9*	16-524-03	Valve Body Assembly	1
*	16-524-05	1" Valve ISO-Body Kit	

WHEN SERVICING VALVE:

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

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

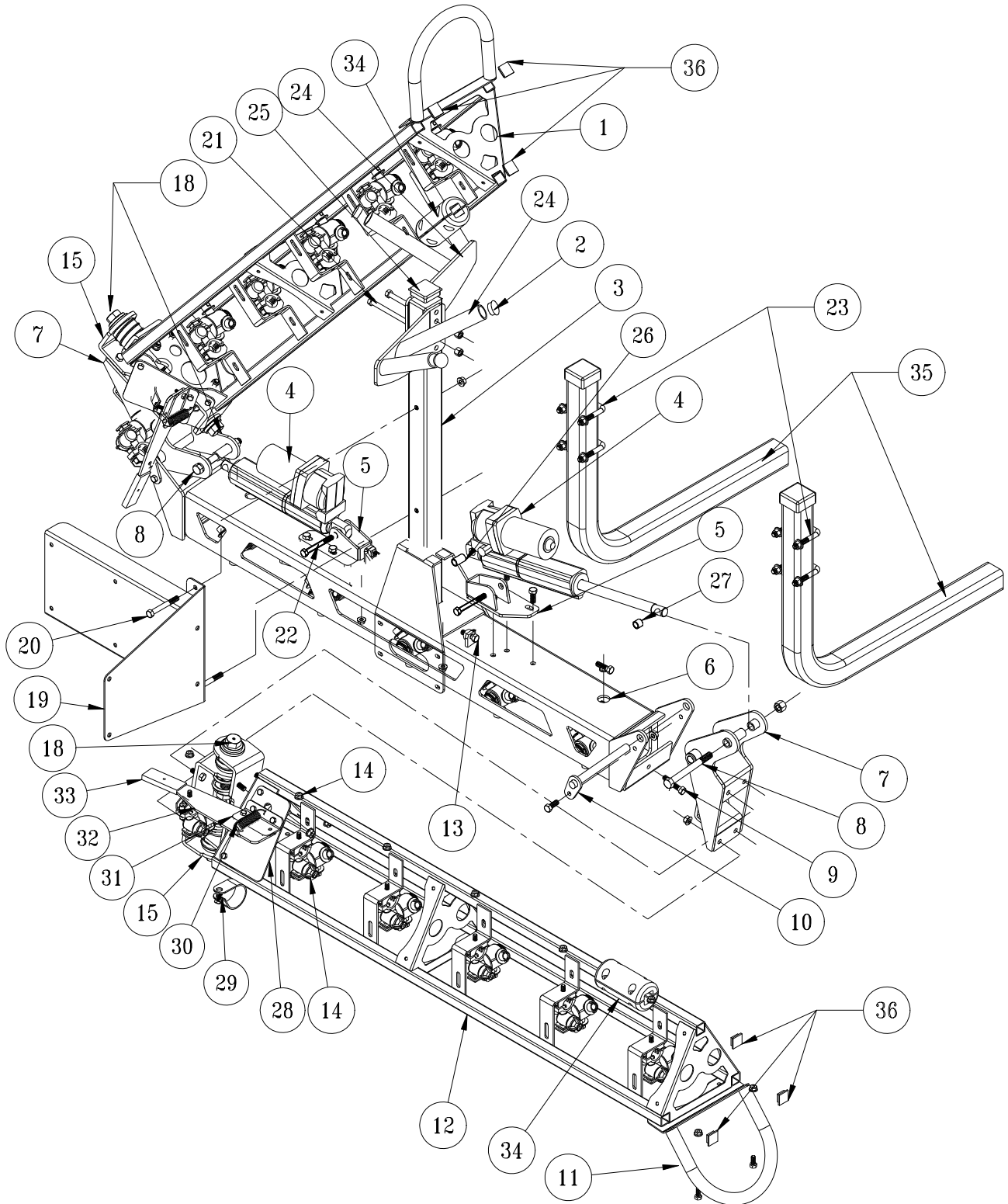
Before reassembling valve, remove the coupler shaft from the valve body. Apply Loctite to coupler shaft and woodruff key. Place the coupler shaft (Ref 7) and the woodruff key (Ref 5) onto the motor shaft. Plug motor into the valve connector coming from Sprayer Control Console. Check that the motor rotates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

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

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

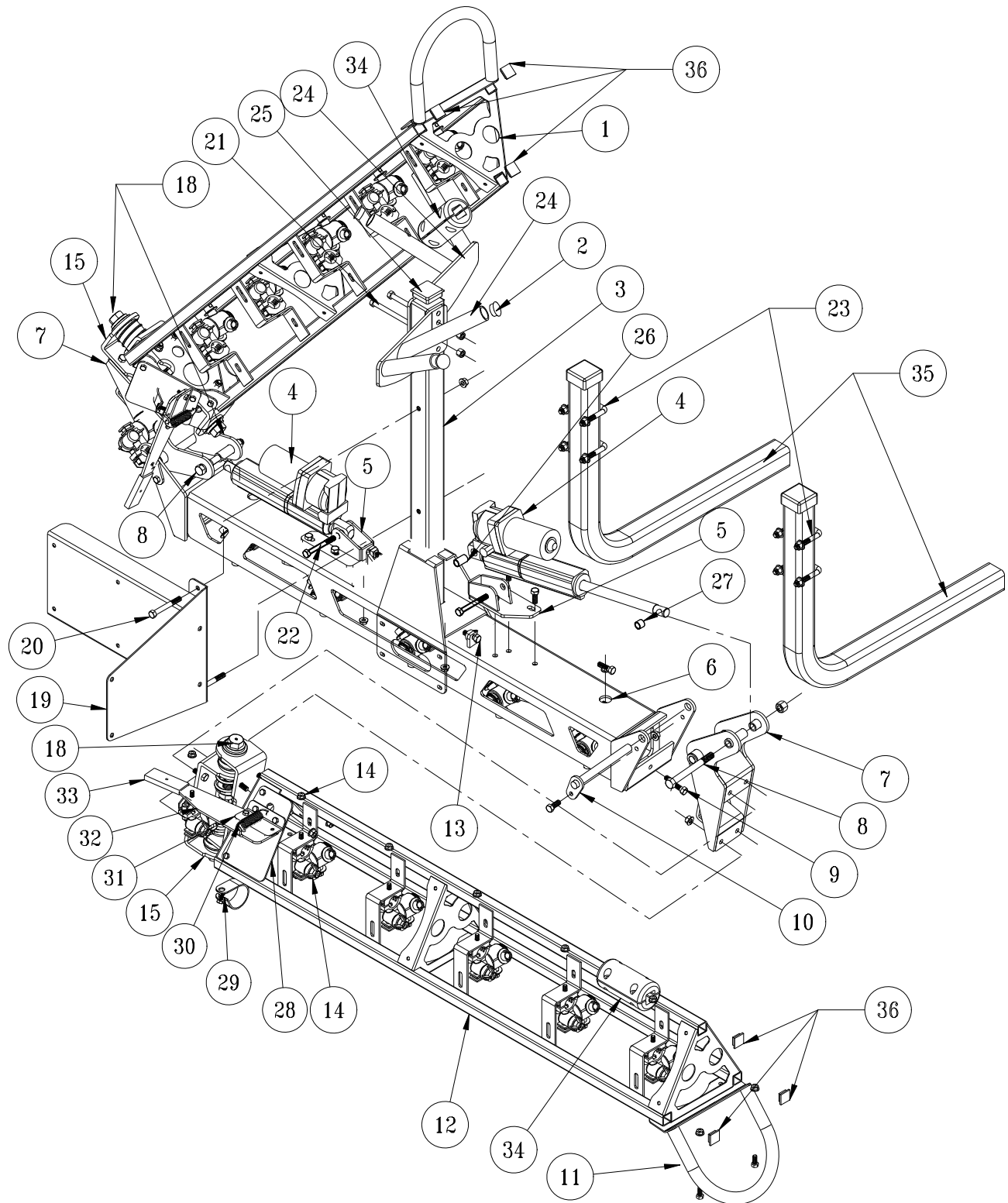
17-835 BOOM DRAWING



REF#	PART#	DESCRIPTION	QUANTITY
1	17-557	Left Boom Arm	1
2	17-619	Tube Cap	4
3	17-578	Boom Nest post	1
	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	30-214	HYB Electric /Hydraulic Actuator	2
5	30-184	Ram Mount	2
	HB-38-16-100	Bolt, $\frac{3}{8}$ - 16 x 1	6
	HW-516	Washer, $\frac{5}{16}$	6
	HNFL-38-16	Flange Lock Nut, $\frac{3}{8}$ -16	6
6	17-556	Boom Center	1
7	30-185	Arm Pivot Hinge	2
	76-128	Bushing	4
8	HB-12-13-500	Bolt, $\frac{1}{2}$ - 13 x 5	2
	HNTL-12-13	Lock Nut, $\frac{1}{2}$ - 13	2
9	HB-38-16-250	Bolt, $\frac{3}{8}$ - 16 x $2\frac{1}{2}$	2
	HNFL-38-16	Flange Lock Nut, $\frac{3}{8}$ -16	4
10		Hinge Pin	2
	HBFL-516-18-075	Flange Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$	2
11	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
12	17-558	Right Boom Arm	1
13	HSSQS-38-16-150	Square Head Set Screw, $\frac{3}{8}$ -16 x $1\frac{1}{2}$	2
14	33-506	Body (see nozzle drawing)	17
	HB-516-18-075	Bolt, $\frac{5}{16}$ -18 x $\frac{3}{4}$	17
	HNFL-516-18	Flange Lock Nut, $\frac{5}{16}$ -18	17
15		Boom Hinge	4
	HB-38-16-100	Bolt, $\frac{3}{8}$ - 16 x 1	16
	HNFL-38-16	Lock Nut, $\frac{3}{8}$ - 16	16
16	17-539	Compression Spring	4
17	9026-2	Rubber Duct Hose x 2"	4
18	17-540	Tapped Bolt	4
	HW-34	Washer, $\frac{3}{4}$	4
	HNTL-34-10	Lock Nut, $\frac{3}{4}$ -10	4
	HG-14-28-180	Grease Fitting, $\frac{1}{4}$ - 28 x 180°	4
19	17-535	Clean Load Mount	1
20	HB-38-16-300	Bolt, $\frac{3}{8}$ - 16 x $3\frac{1}{2}$	2
	HNTL-38-16	Lock Nut, $\frac{3}{8}$ - 16	2
21	HB-38-16-350	Bolt, $\frac{3}{8}$ - 16 x 3	2
	HW-38	Washer, $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut, $\frac{3}{8}$ - 16	2
22	HB-12-13-300	Bolt, $\frac{1}{2}$ - 13 x 3	2
	HNTL-12-13	Lock Nut, $\frac{1}{2}$ - 13	2
23	20-555	U-Bolts	4
24	17-617	V-Boom Nest	2
25	18-297	Tube Cap	1
26	18-036	1" Bushing	2
27	18-234	$\frac{1}{2}$ " Bushing	2
28	17-559	Break-Away Mount	2
29	HLC-100	Loom Clamp	2

(Continue on next page)

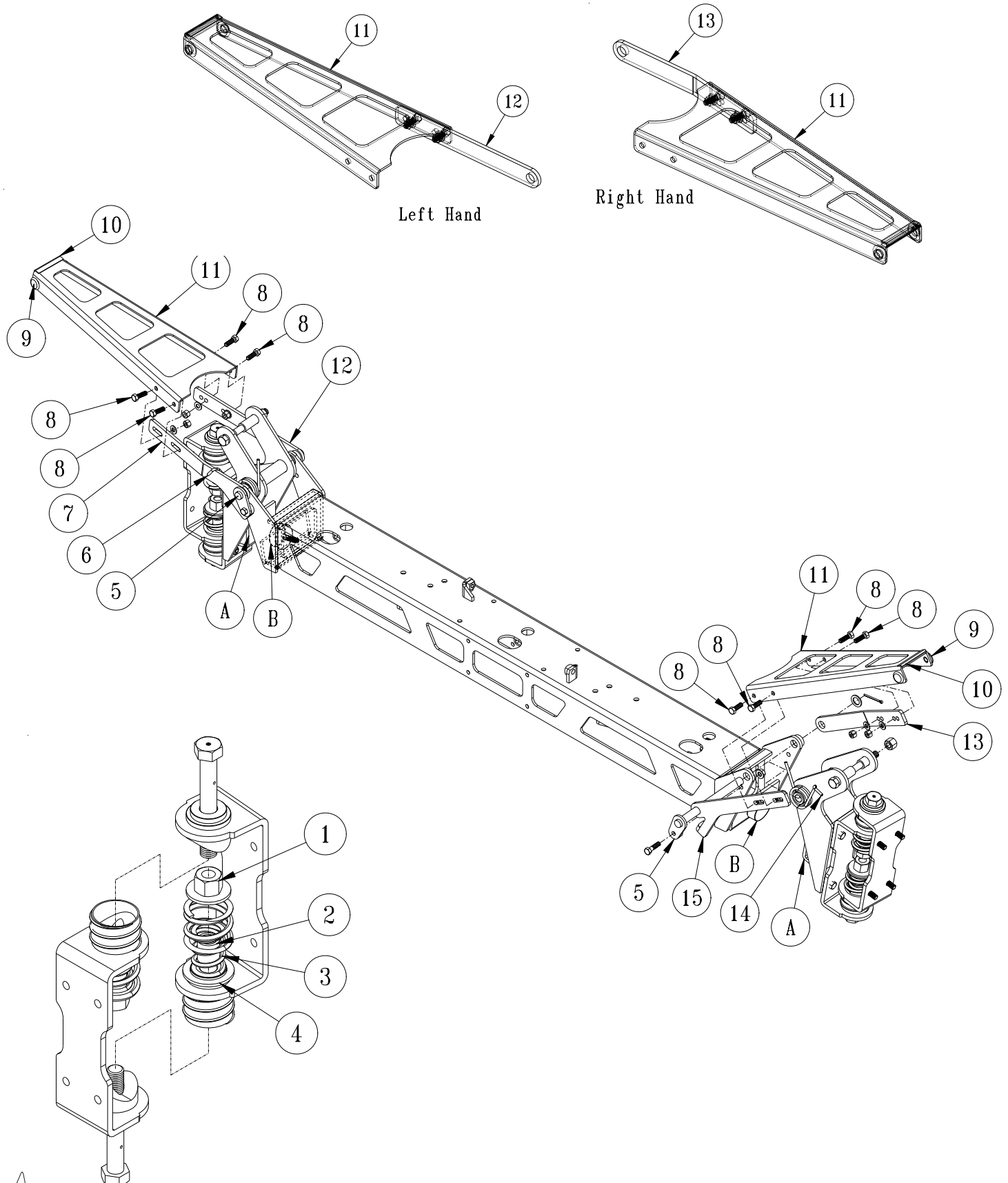
17-835 BOOM DRAWING



17-835 BOOM PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
30	11-050	Spring	2
31	17-560	Hinge Mount	2
32	17-561	RH Break-Away Arm	1
	17-562	LH Break-Away Arm	1
33	8946-3.5	Plastic Wear strip	2
	HRS-316-050	Steel Rivet 3/16 x 1/2	2
34	17-573	Guide Block Set	2
	HB-14-20-125	Bolt 1/4" -20 x 1 1/4"	8
	HNTL-14-20	Lock Nut 1/4" - 20	8
35	17-615	Boom Mount	2
	16-557	Tube cap	2
36	30-258	1" 10-14ga Ribbed Plug	10

BOOM LOCK-HINGE PARTS ILLUSTRATION



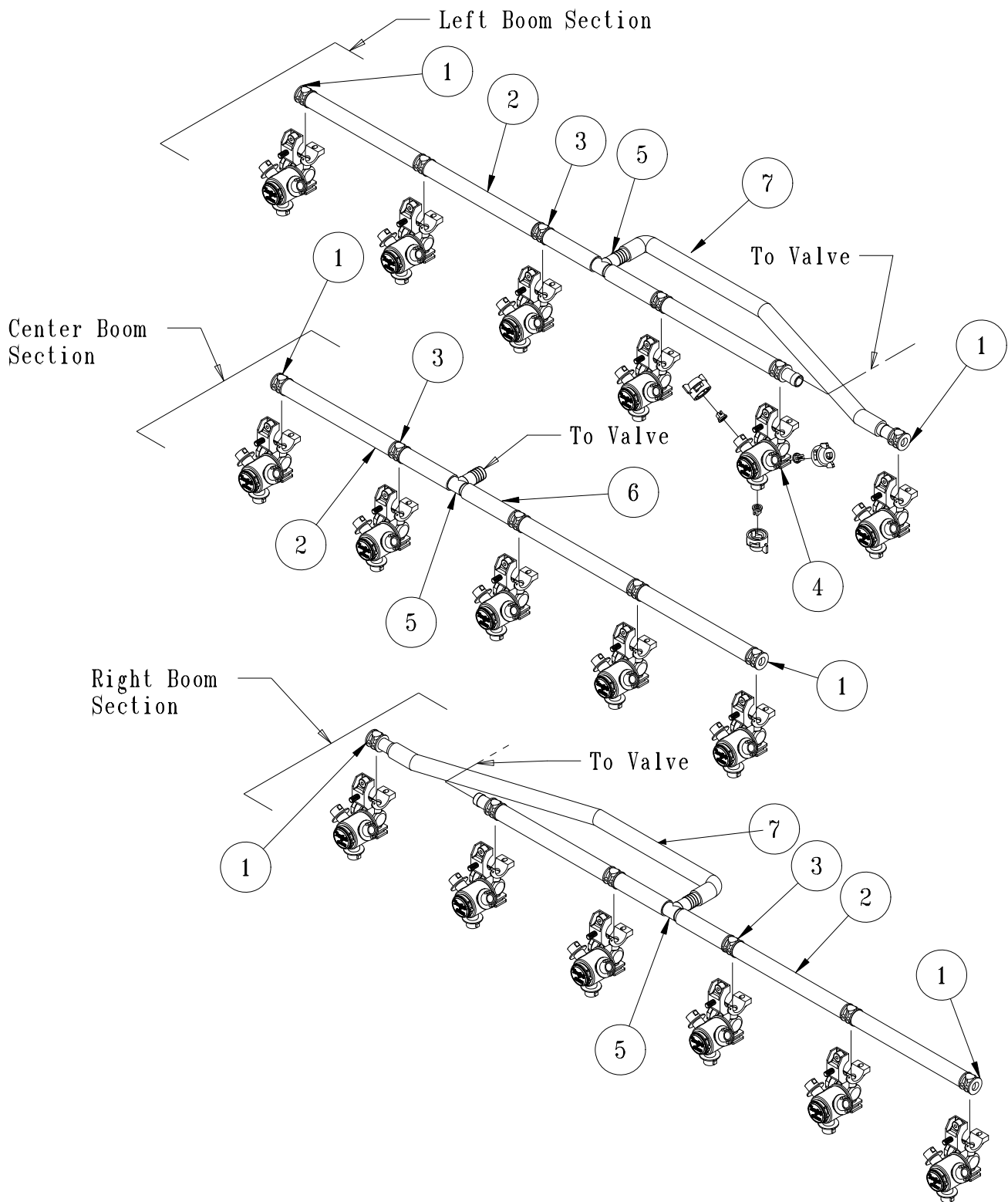
REF#	PART#	DESCRIPTION	QTY
1	HNCL-34-10	Center Lock Nut, $\frac{3}{4}$ -10	4
	HW-34	Flat Washer, $\frac{3}{4}$	4
2	17-594	Spring Sleeve	4
3	17-591	Compression Spring	4
4	17-599	Spring Shim	4
5	17-596	Hinge Pin w/Spacer	2
	HMB-58-14	Machinge Bushing, $\frac{5}{8}$ x 14GA	2
	HP-18-100	Cotter Pin, $\frac{1}{8}$ x 1	2
	HB-516-18-125	Bolt, $\frac{5}{16}$ -16 x $1\frac{1}{4}$	2
	HNTL-516-18	Lock Nut, $\frac{5}{16}$ - 18	2
6	17-598	Torsion Spring, LH	1
7	17-593	Limit Hinge, LH	1
8	HB-516-18-100	Bolt, $\frac{5}{16}$ -16 x 1	8
	HW-516	Flat Washer, $\frac{5}{16}$	8
	HNTL-516-18	Lock Nut, $\frac{5}{16}$ - 18	8
9	42-116	Rubber Insert	4
10	8803-2.75	Trim Lace, $2\frac{3}{4}$	2
11	17-587	Boom Lock	2
12	17-592	Lock Hinge, LH	1
13	17-588	Lock Hinge, RH	1
14	17-597	Torsion Spring, RH	1
15	17-589	Limit Hinge, RH	1

1. Lower boom arms to level position.
2. Only work with one bolt/spring assembly at a time. Repeat steps for the other three assemblies.
3. Remove $\frac{3}{4}$ -10 nylon lock nut from hinge bolt. Leave hinge bolt in assembly. Discard nut and washer.
4. Slide hinge bolt out far enough to work. Position Spring Shim(**Ref. 4**) under existing compression spring.
5. Insert new Compression Spring(**Ref. 3**) inside of existing spring. Insert Spring Sleeve(**Ref. 2**) inside of Compression Spring(**Ref.3**).
6. Slide hinge bolt back in and secure using new Flat Washer & Center Lock Nut(**Ref. 1**). Tighten nut until $\frac{1}{8}$ " threads are exposed.
7. Repeat steps 3-6 for the other three bolt/spring assemblies.

NOTE: Use an assistant or a hoist while removing & replacing the hinge pin.

8. Lower boom arms into the level position. Leave some "play" between hinge(**Ref A**) and limit stop(**Ref B**).
9. Pre-Assemble Boom Locks(**Ref. 11**) to Lock Hinges RH(**Ref. 13**) and LH(**Ref. 12**), as illustrated, using $\frac{5}{16}$ -18 Lock Nut, $\frac{5}{16}$ Flat Washer & $\frac{5}{16}$ -18 x 1 Hex Bolt(**Ref. 8**).
10. Support boom arm and remove hinge pin. Discard hinge pin.
11. Install Torsion Springs, LH(**Ref. 6**) & RH(**Ref. 14**), on Arm Pivot Hinge(**Ref. A**) in the position illustrated at left.
12. Place LH Limit Hinge(**Ref. 7**) on new Hinge Pin(**Ref. 5**). Secure with $\frac{5}{16}$ -18 x $1\frac{1}{4}$ Hex Bolt & $\frac{5}{16}$ -18 Lock Nut. Repeat for right hand side using RH Limit Hinge(**Ref. 15**).
13. Raise boom arms to 45° angle. Install Boom Locks/Lock Hinges, from Step 9, on open end of Hinge Pin.
14. Loosely connect LH Limit Hinge(**Ref. 7**) to Boom Lock(**Ref. 11**) using $\frac{5}{16}$ -18 Lock Nut, $\frac{5}{16}$ Flat Washer & $\frac{5}{16}$ -18 x 1 Hex Bolt(**Ref. 8**). Center Boom Lock on top rail of boom arm (see photo below left). Press Limit Hinge tightly against Boom Lock and secure hardware. Repeat for right hand side using RH Limit Hinge(**Ref. 15**).
15. Use the $\frac{5}{8}$ Machine Bushing and Cotter Pin to secure Hinge Pins(**Ref. 5**).
16. Check all hardware for tightness. Ensure Torsion Springs(**Refs. 6 & 14**) are hooked over the edge of the Limit Hinges(**Refs. 7 & 15**). Test operation.

17-835 BOOM DRAWING



17-835 BOOM PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	18-417	Single Barb	6
2	9032-9	Black AG200 Hose $\frac{3}{4}$ " x 9"	9
	18-040	Hose Clamp	18
3	18-416	Double Barb	11
4	33-506	Nozzle body (see nozzle drawing)	17
5	18-415	$\frac{3}{4}$ " T Hose Barb	3
6	9032-4	Black AG200 Hose $\frac{3}{4}$ " x 4"	6
	18-040	Hose Clamp	12
7	9032-28	Black AG200 Hose $\frac{3}{4}$ " x 28":	2
	18-040	Hose Clamp	4

NOZZLE ASSEMBLY

If you choose to install the TurfJet #8 Nozzles, please use the drawings below for installation purposes. The 45° cap must point towards the front of the machine and the tip opening must point toward the rear of the machine. (See Figure 1).

If you need to rotate the 45° cap, be advised it will not rotate all the way around. You will need to rotate it right or left to get at other nozzles. (See Figure 2).

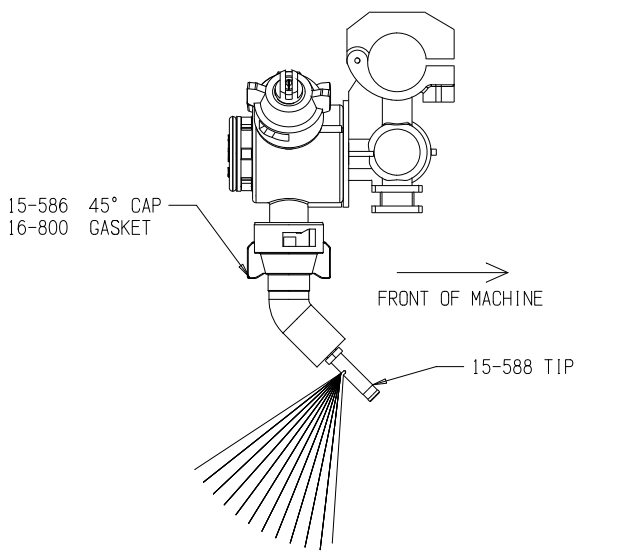


FIGURE 1

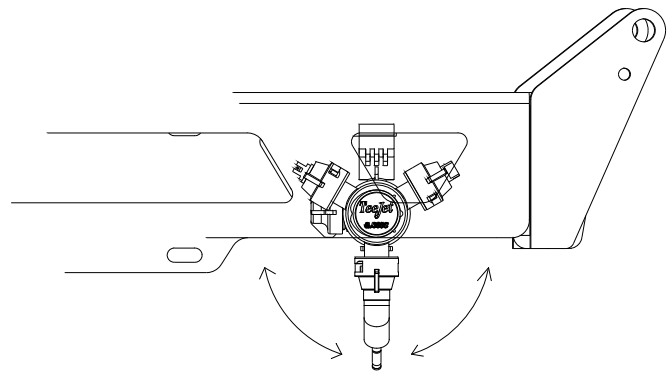
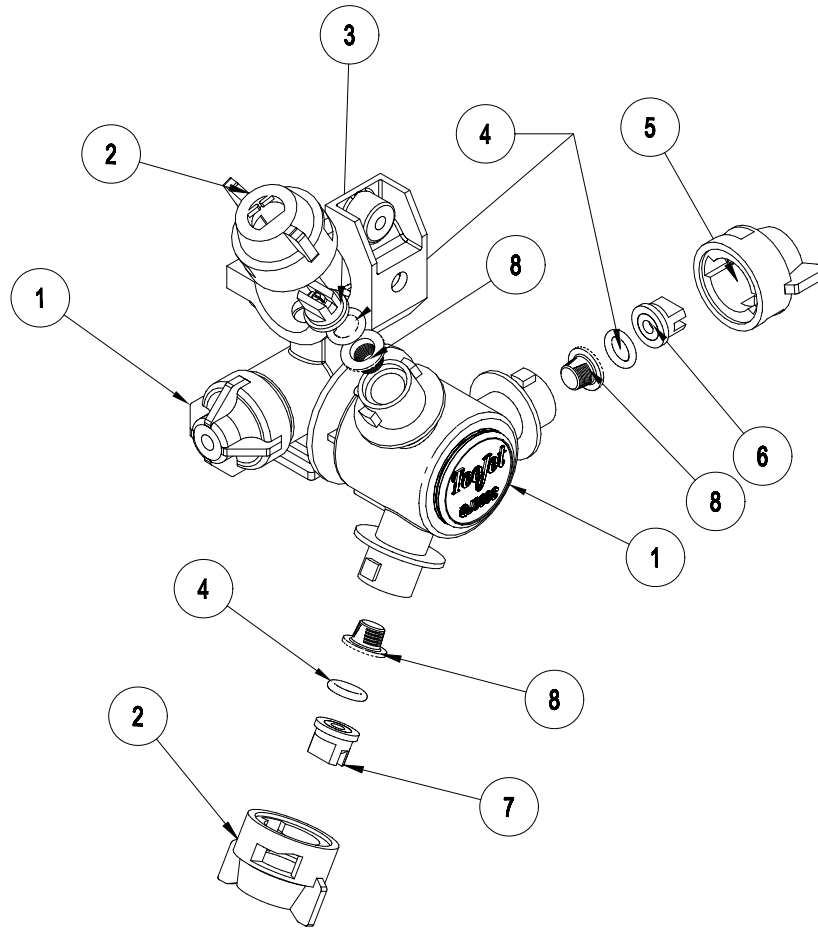


FIGURE 2

NOZZLE ASSEMBLY DRAWING

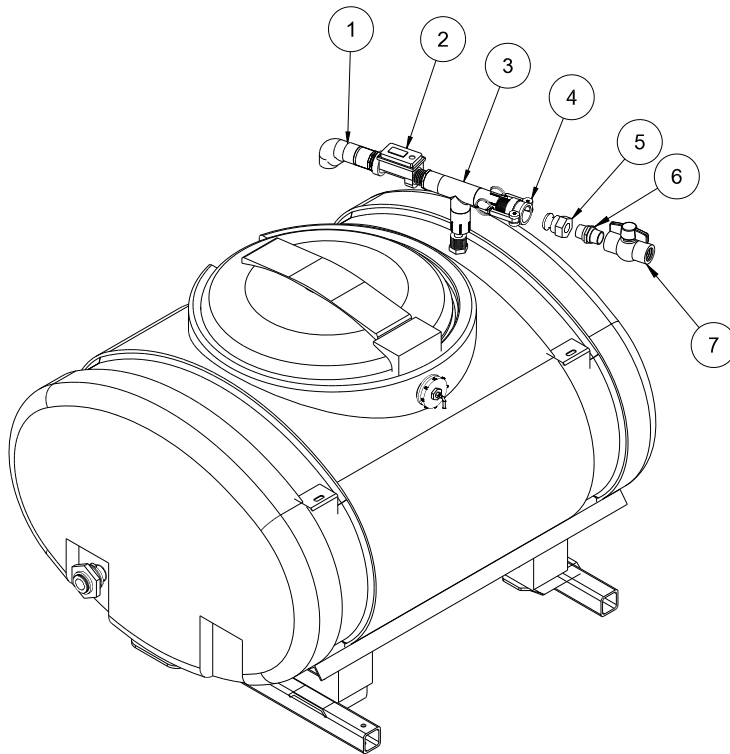


REF#	PART#	DESCRIPTION	QUANTITY
1	33-506	Body	1
2	33-538	Cap - Gray	2
3	33-553	Nozzle -Gray (XR11006-VS)	1
4	16-800	Viton Gasket	3
5	33-537	Cap - Red	1
6	33-552	Nozzle - Red (XR11004-VS)	1
7	33-554	Nozzle - White (XR11008-VS)	1
8	16-802	Strainer	3

Quantity is per nozzle body. For this boom multiply quantity by 17.

Nozzles are located 10" (24.5 cm) apart on the right, left, and center tubes. Nozzles are 20" high off ground.

10-370 WATER FILL METER KIT - LITERS



REF #	PART #	DESCRIPTION	QUANTITY
1	14-524	Filler Outlet	1
2	14-514	Water Meter - Gallons	1
	14-527	Water Meter - Liters	1
3	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

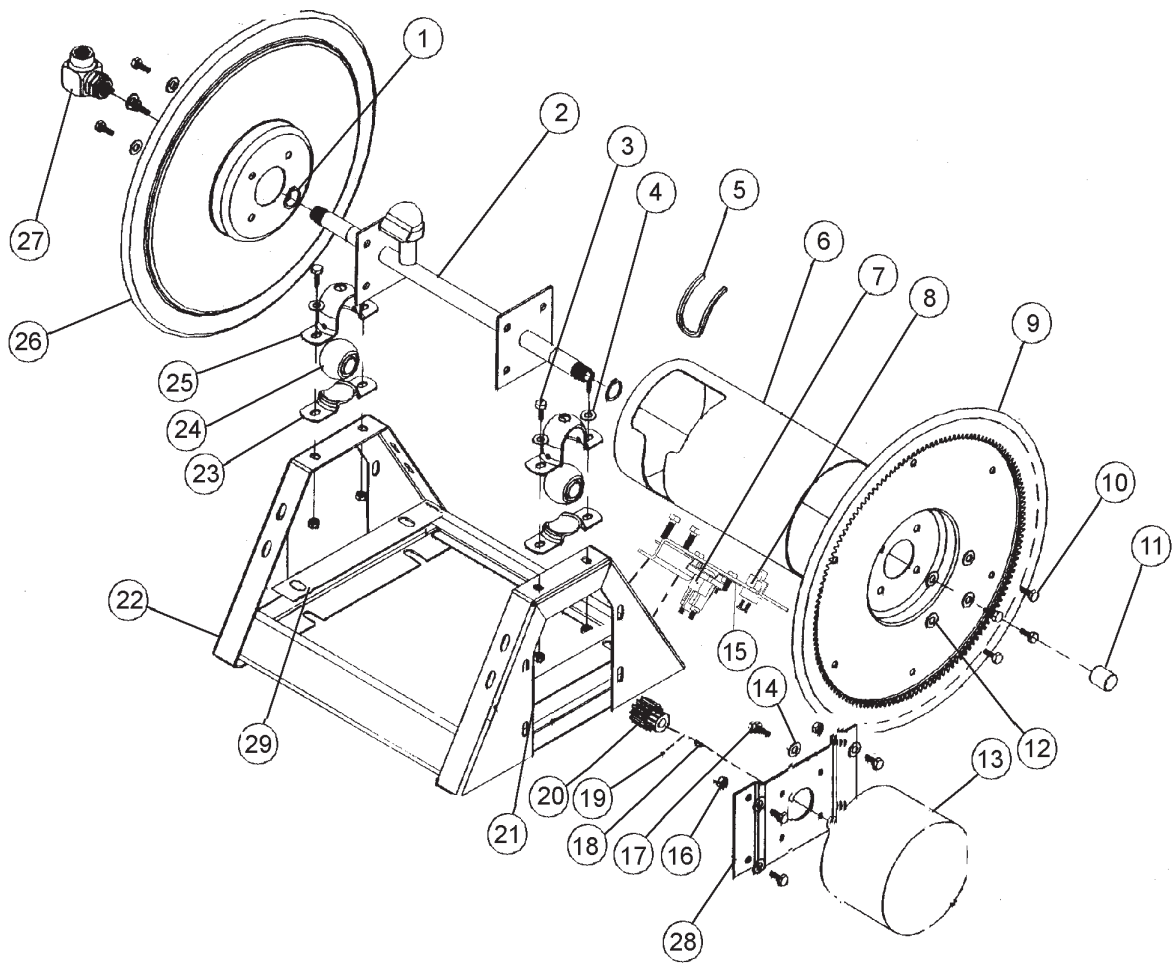
1. Thoroughly flush the service line upstream of the meter to remove dirt and debris.
2. Set meter inline.
3. Make sure the water flow follows the arrow cast on the meter body.
4. The DLJ Meter is for use **only** with **COLD WATER** up to 122°F (50°C)
5. Slowly open any upstream valves to prevent damage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

Gallons to Cubic feet Conversion :

Multiply gallons reading by 0.1337 to get cubic feet.

There are 7.48052 gallon per cubic foot.

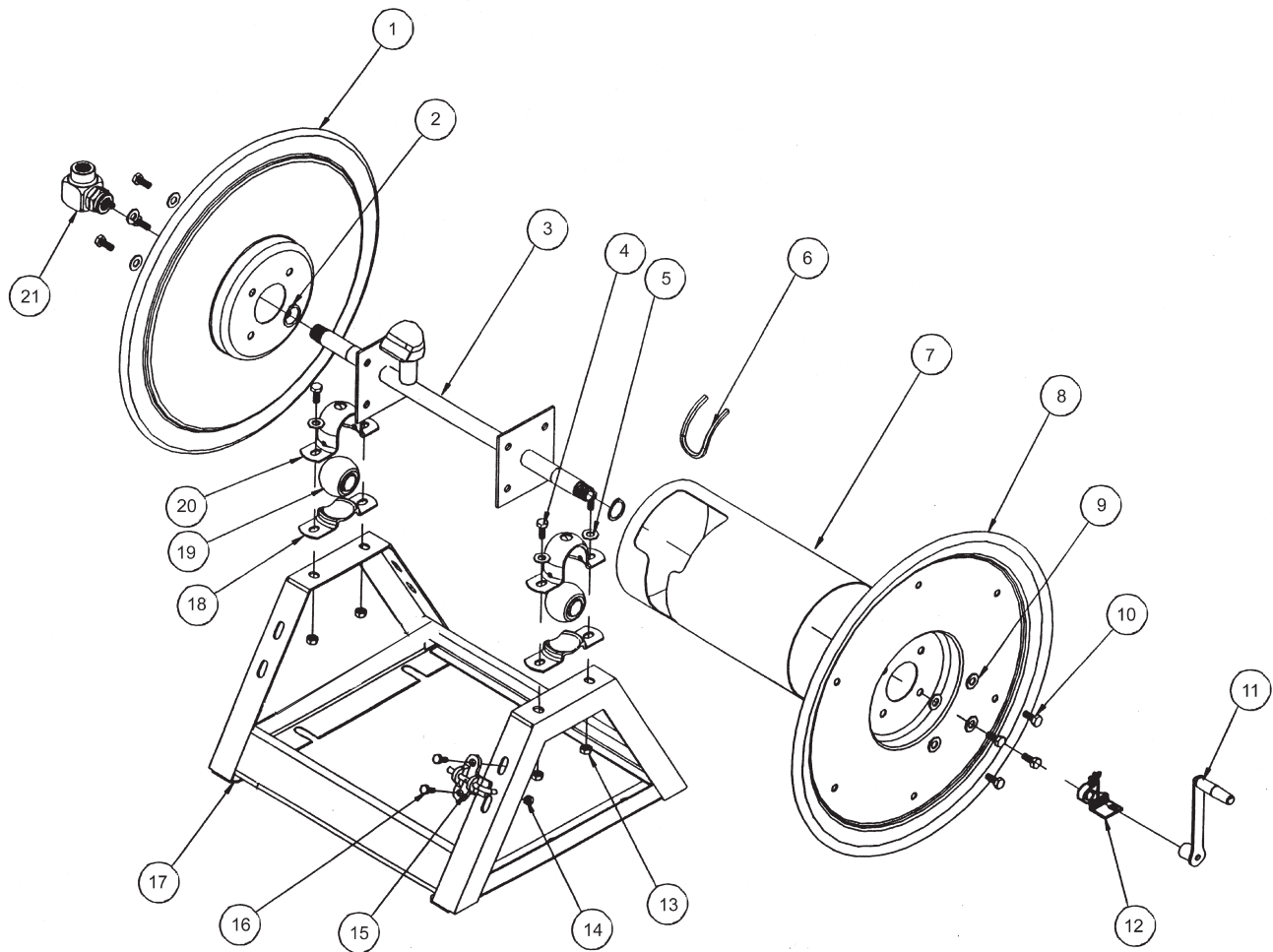
16-906 ELECTRIC HOSE REEL DRAWING



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
	16-982	Electric Hose Reel (only)	1

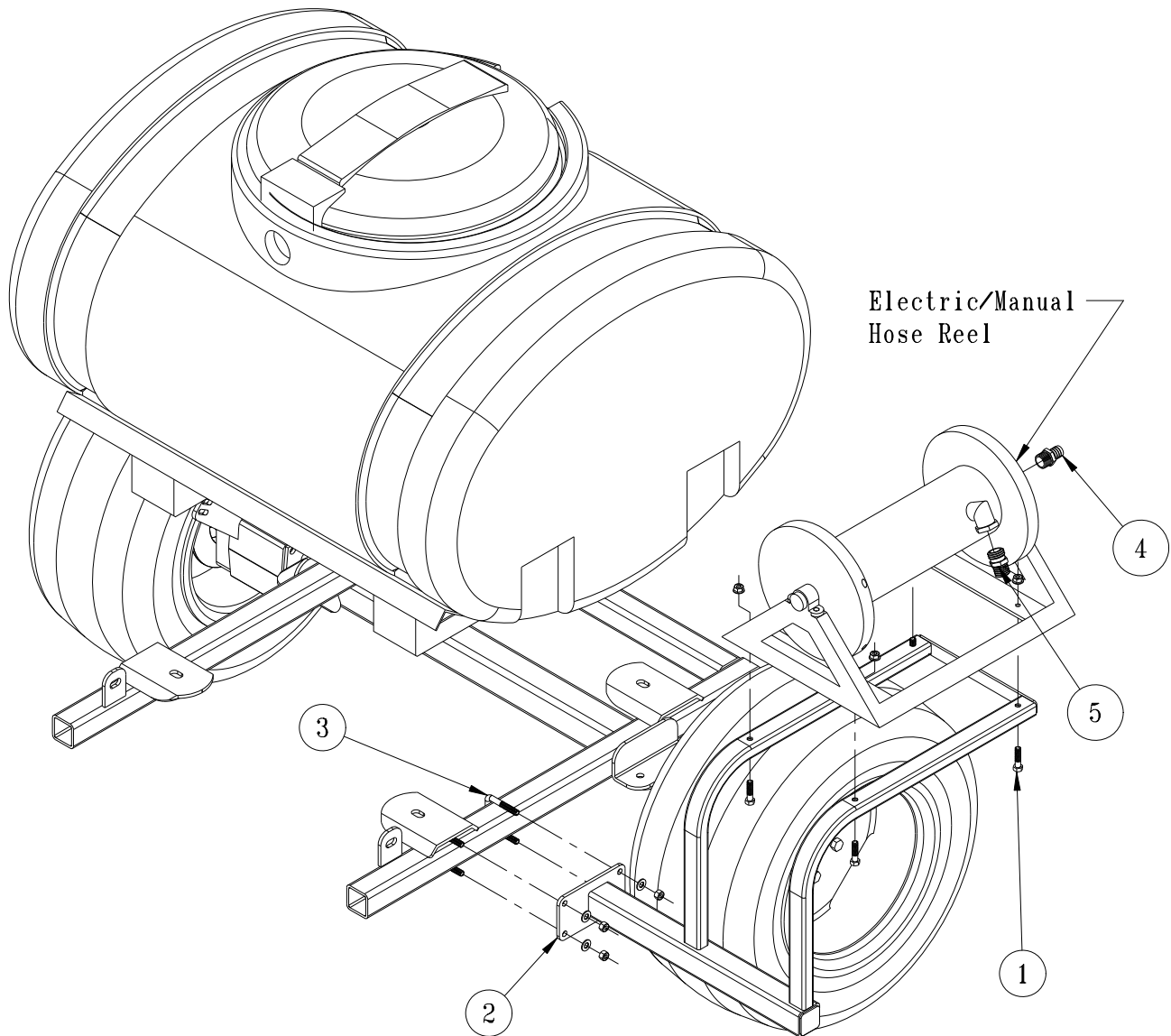
16-129 MANUAL HOSE REEL DRAWING



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

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

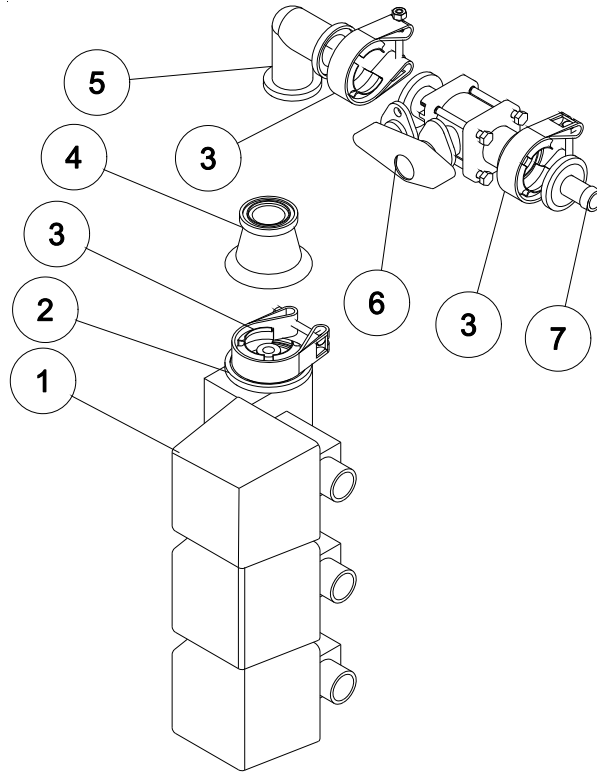


HOSE REEL MOUNT PARTS LIST

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.

1008 (RAVEN 440) HOSE REEL PLUMBING DRAWING



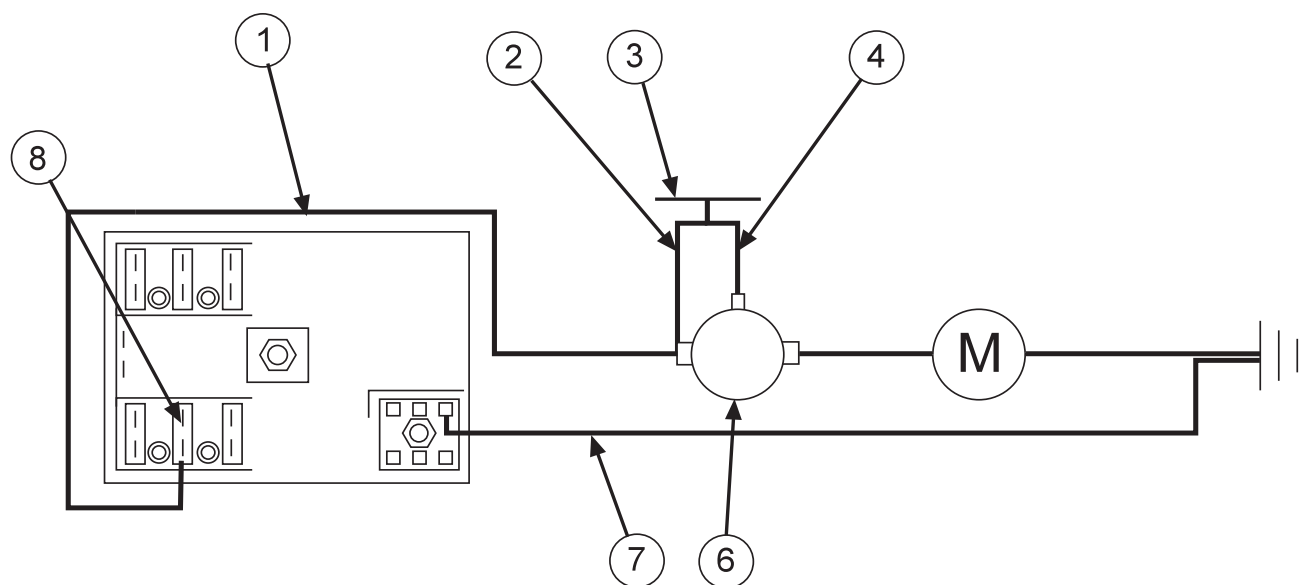
1008 (RAVEN 440) HOSE REEL PLUMBING PARTS LIST

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.

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
1	8843-132	Flexguard $\frac{3}{8}$ ID	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			
7	HN -516-24	$\frac{5}{16}$ - 24 Hex Nut	2
	HN -10-32	10 - 32 Hex Nut	1
	8931-144	10GA White Wire 144"	1
8	8901	Slide-On Connector	1
	33-273	Auto Blade Type Fuse 30Amp	1

CONNECTION INSTRUCTIONS

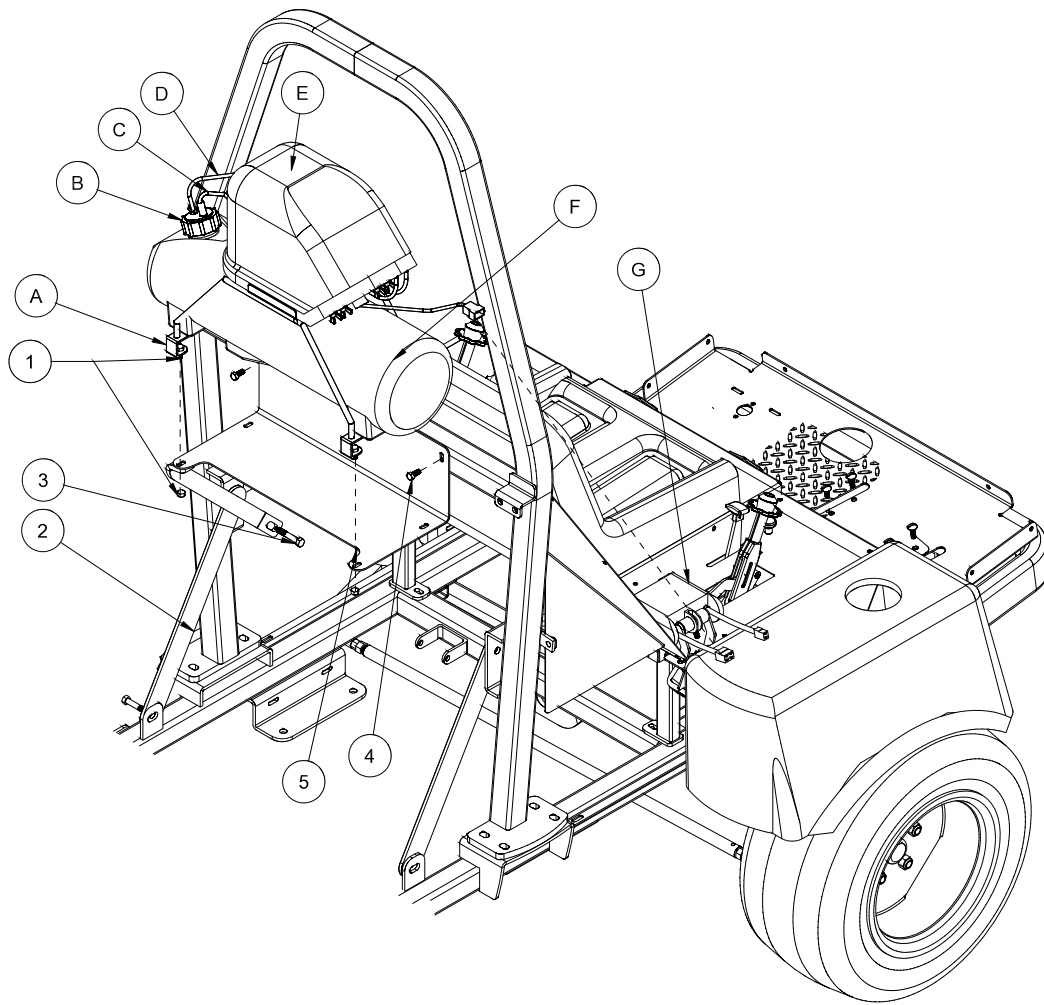
Route wire harness along side of tank and over to fuse block taking care to stay clear of moving parts or hot engine components. Cut off excess wire and strip back $\frac{3}{8}$ ". Place one 8963 heat shrink ($\frac{1}{4}$ x $1\frac{1}{4}$) on each wire before crimping 8901 slide on connectors to the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



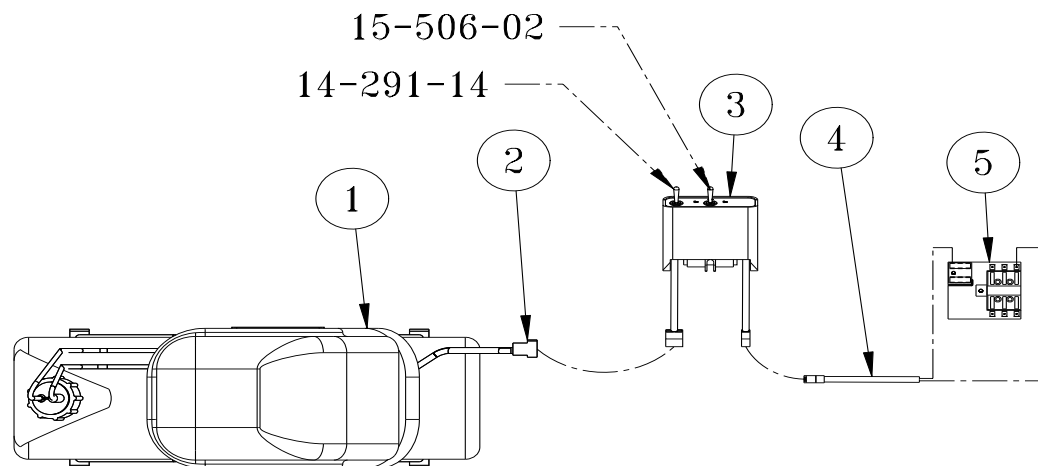
Make certain you are connecting positive (+) to positive; negative (-) to negative while attaching power leads. If you do not observe polarity, damage will result to electrical components.

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.

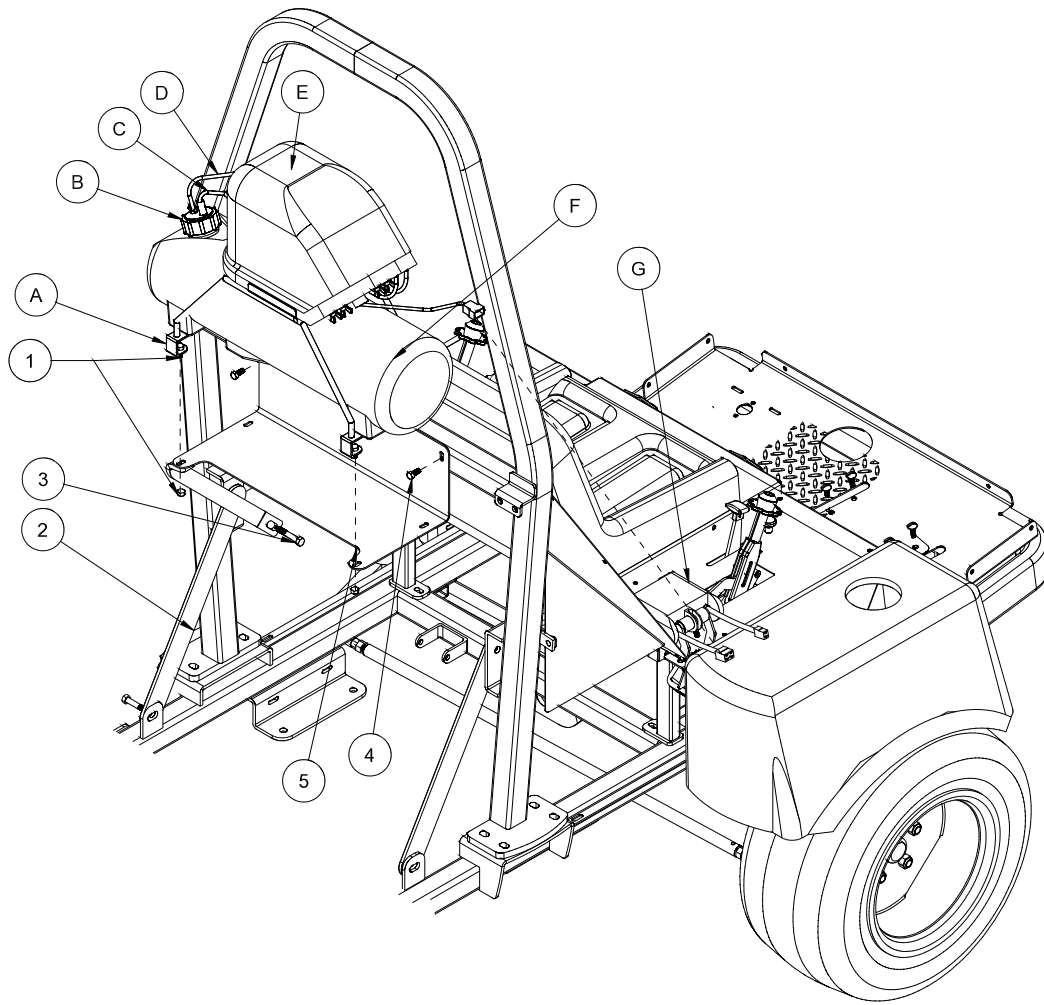
WIRING

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 5/16 flange bolts. Install the brace by removing the 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 1/4 bolts and flange nuts bolt foamer marker to mount plate. The left rear corner mount of the foamer will bolt 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.

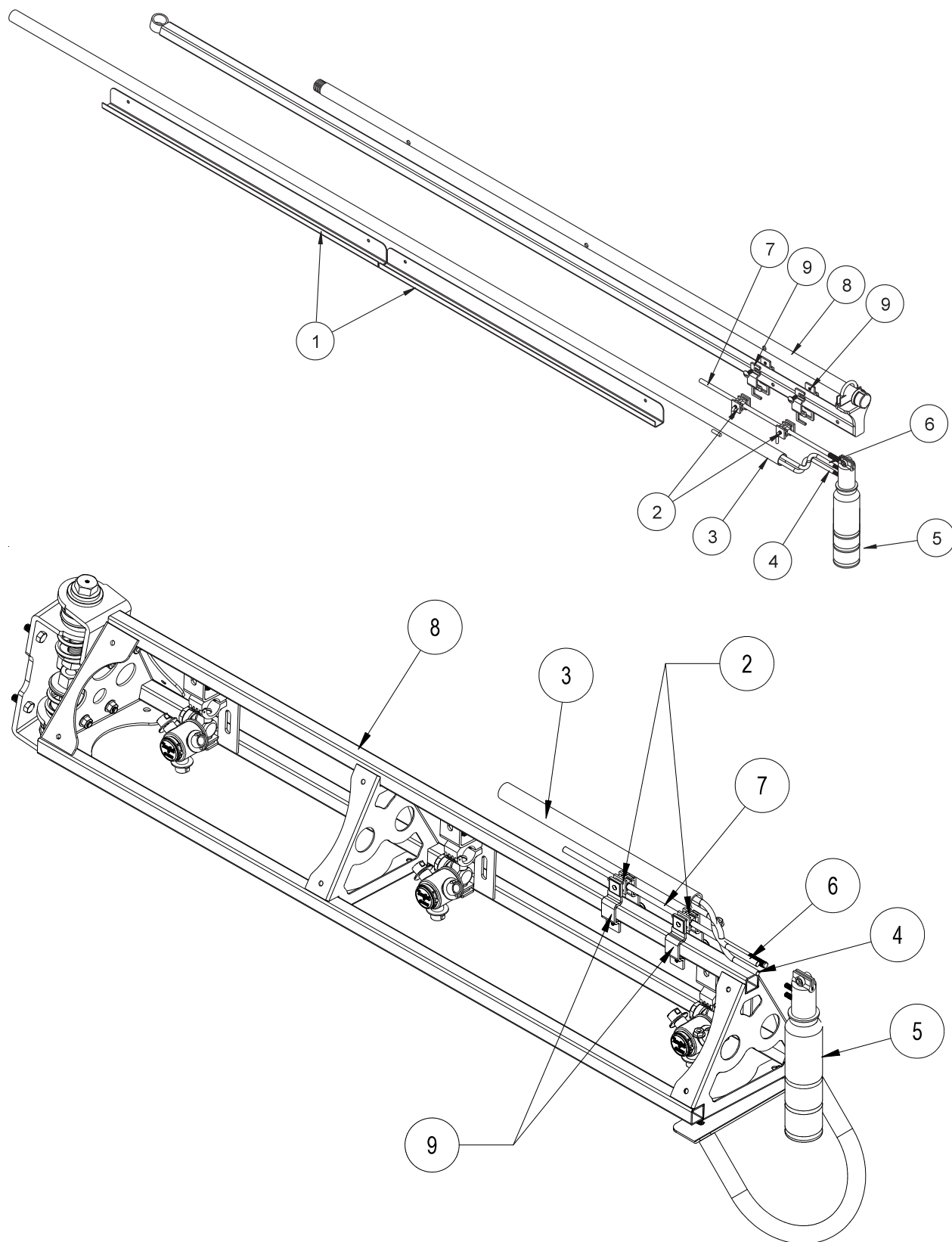
HOSES

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 PARTS LIST

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

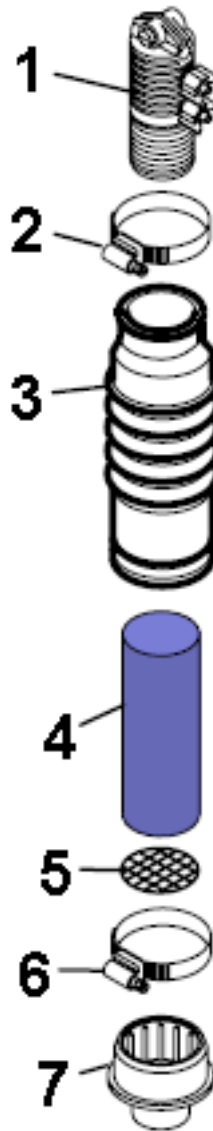
- Slide hose clamp onto drop tube of foam nozzle and attach restrictor bell.
- Place splined end of Nozzle mounting rod (Ref 7) into top of foam nozzle (Ref 5). Tighten screw.
- Slide two foam nozzle mounts (Ref 2) onto the rod. Place square clamps (Ref 9) on foam nozzle mounts and mount the square clamps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



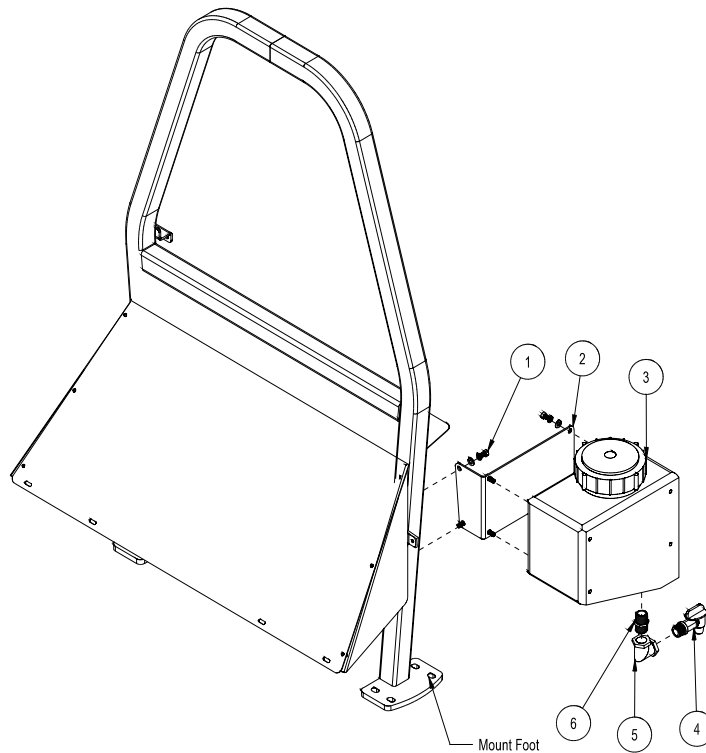
REF#	PART#	DESCRIPTION	QUANTITY
1	15-507	Foamer Tubing	1
2	14-291-02	Tank	1
3	14-291-01	Black Cover	1
	14-291-03	Compressor Complete	1
4	14-284-02	Cap Assembly	1
5	14-291-04	Tank Bracket	1
6	14-291-05	Double Switch Box	1
7	15-511	Foam Nozzle	1
8	15-510-01	Nozzle Mounting Rod	1
9	16-987	Foam Nozzle Mounting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

10-419 FRESH WATER WASH TANK DRAWING



REF#	PART#	DESCRIPTION	QUANTITY
1*	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	6
	HWL-516	Lock Washer $\frac{5}{16}$	6
	HW-516	Washer $\frac{5}{16}$	6
2*	15-750	Fresh Water Tank Bracket	1
3	10-234	3 Gallon Rectangular Tank	1
	10-234-01	Lid	
4	16-960	Spigot $\frac{3}{4}$ NPT	1
5	16-151	Elbow FPT $\frac{3}{4}$ x $\frac{3}{4}$	1
6	16-158	Close Nipple $\frac{3}{4}$ x $\frac{3}{4}$	1
*	Not needed for HD Booms.		

1. Fresh Water Wash Tank mounts on the left side of the horizontal boom support.
2. Clamp the mount bracket to the backside of the rollbar post approximately 24" up from the mount foot. Drill 2 holes into the tubing using a $\frac{1}{4}$ " drill bit. Then use a $\frac{5}{16}$ -18 tap to thread the holes.
3. Install mount bracket to rollbar post using two $\frac{5}{16}$ -18- x $\frac{3}{4}$ bolts, lockwashers and washer.
4. Line holes on the tank with holes on the mount bracket and use the $\frac{5}{16}$ bolts to fasten tank to mount bracket.
5. Rinse tank with clear water and check for leaks around fittings.



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.

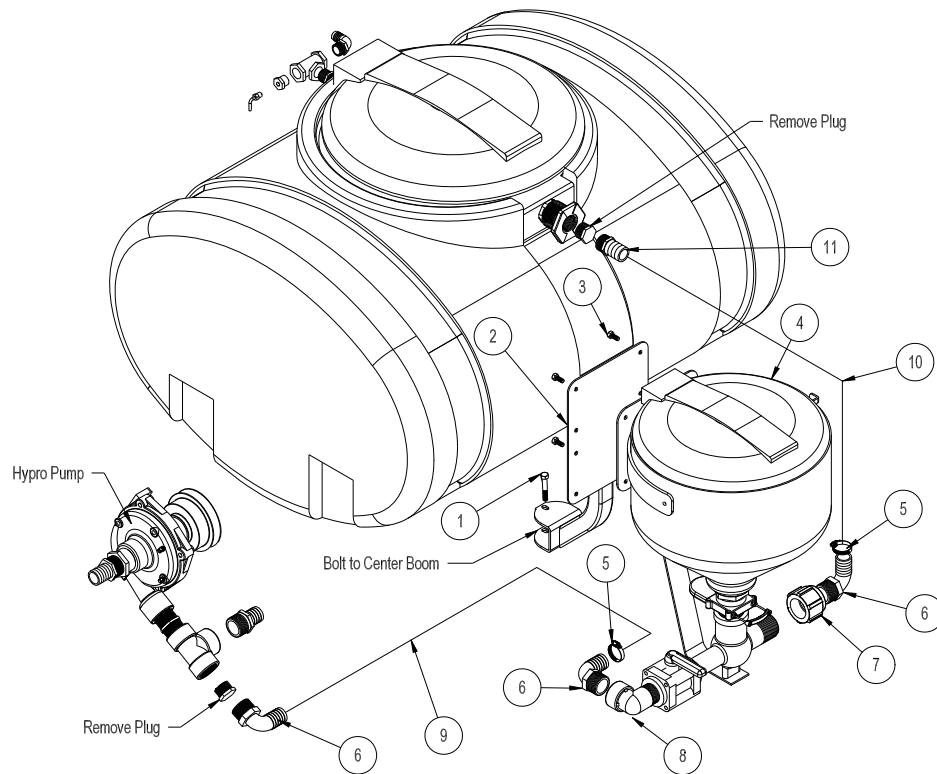
8. Insert lance body with o-ring into eductor until the o-ring is sealed.
9. Use the free end of the lance to pierce bag or container to vacuum powdered or liquid chemical.
10. Rinse lance. Place lance end into a clean container of water to rinse lance assembly.
11. Remove lance body from eductor and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

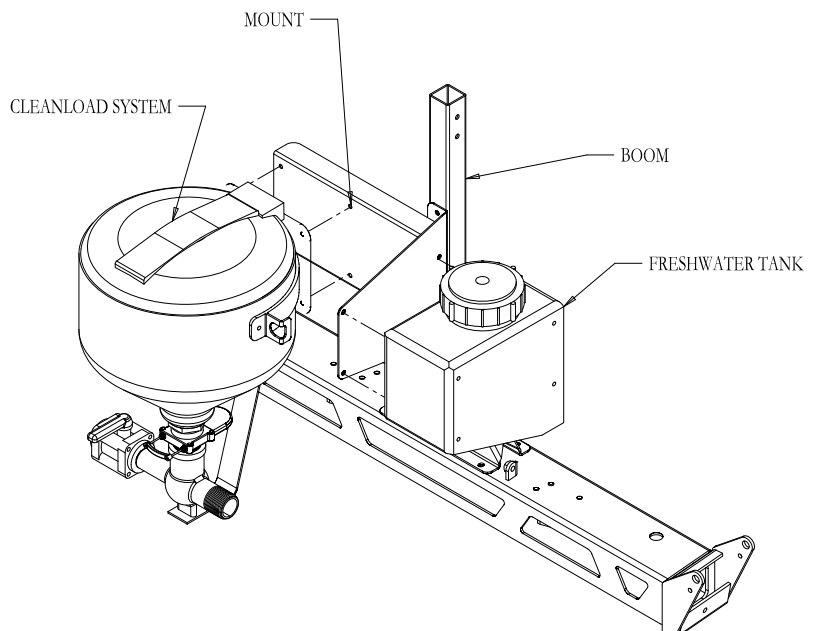
Symptom	Corrective Action
Low education rate	Check pump pressure and flow. Cleanload Eductor performance is based on flow and pressure to the system. Note requirements for high education rates.
	Increase outlet hose size back to tank.
Plugged or clogged bottle rinse nozzle	Disassemble rotary portion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

10-417CHEMICAL CLEANLOAD®



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

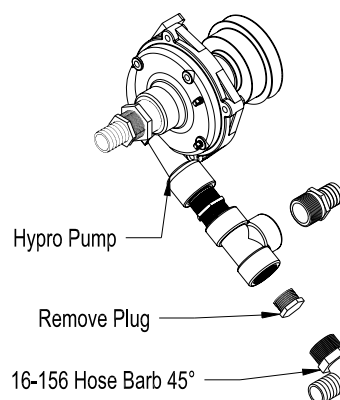
When placing a 17-525/17-550 Heavy Boom on the Sprayer you will have to relocate the Chemical Cleanload System and the Fresh Water tank. There is a mount provided for you, please see in the illustration.



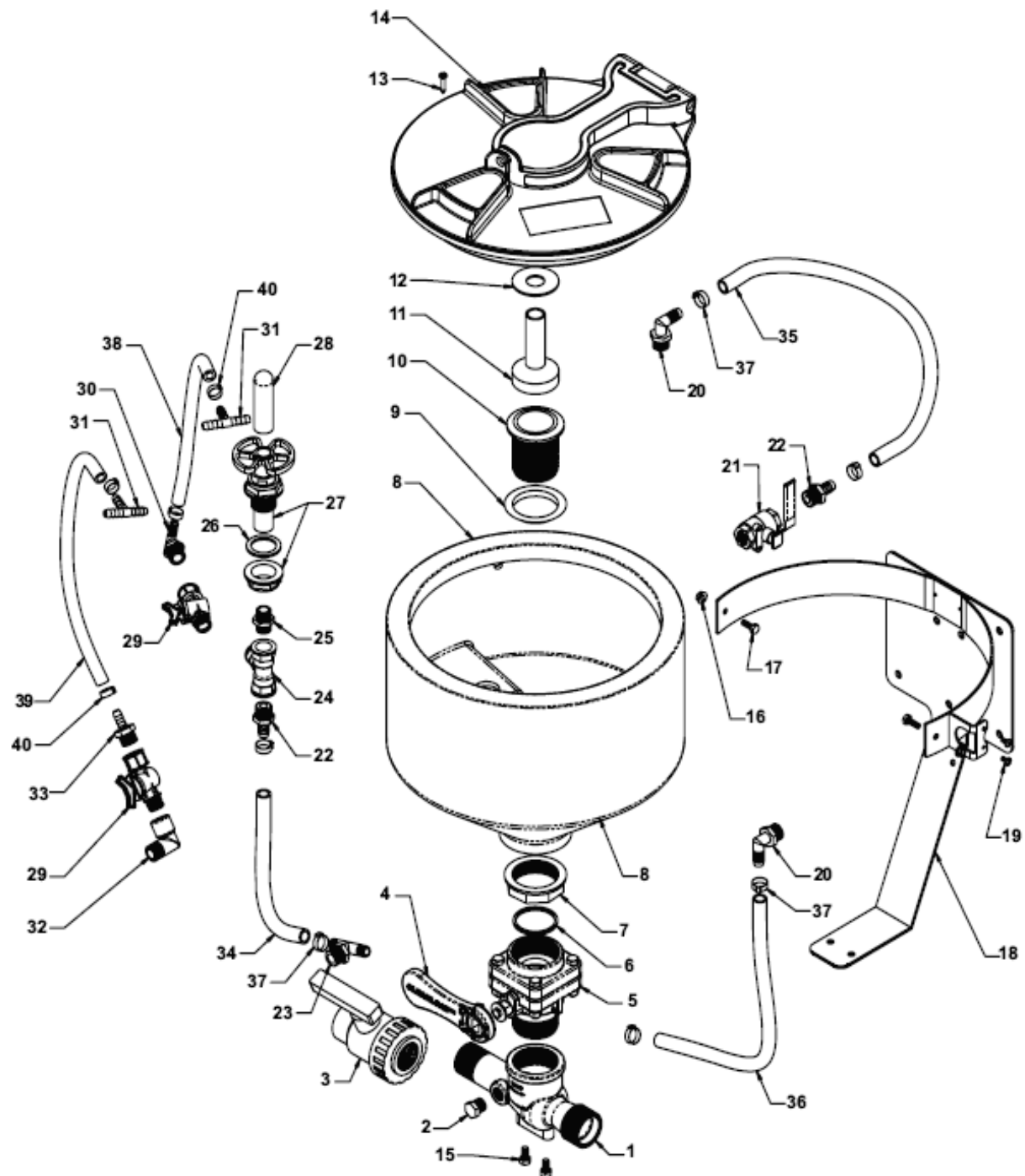
10-417 CHEMICAL CLEANLOAD® PART LIST

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.



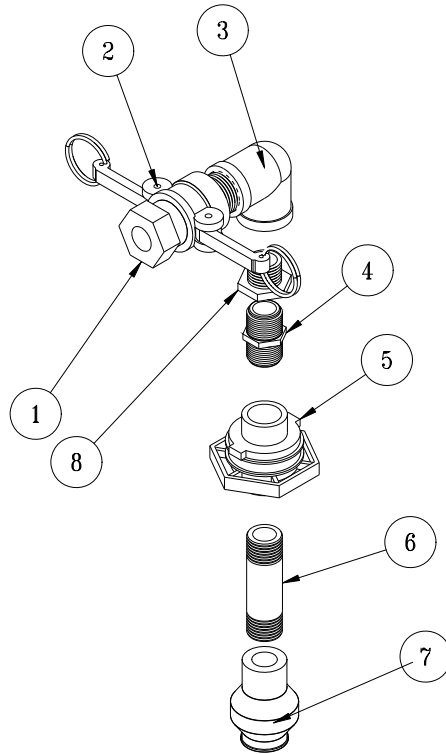
15-620CHEMICAL CLEANLOAD® DRAWING



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		Tank	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.

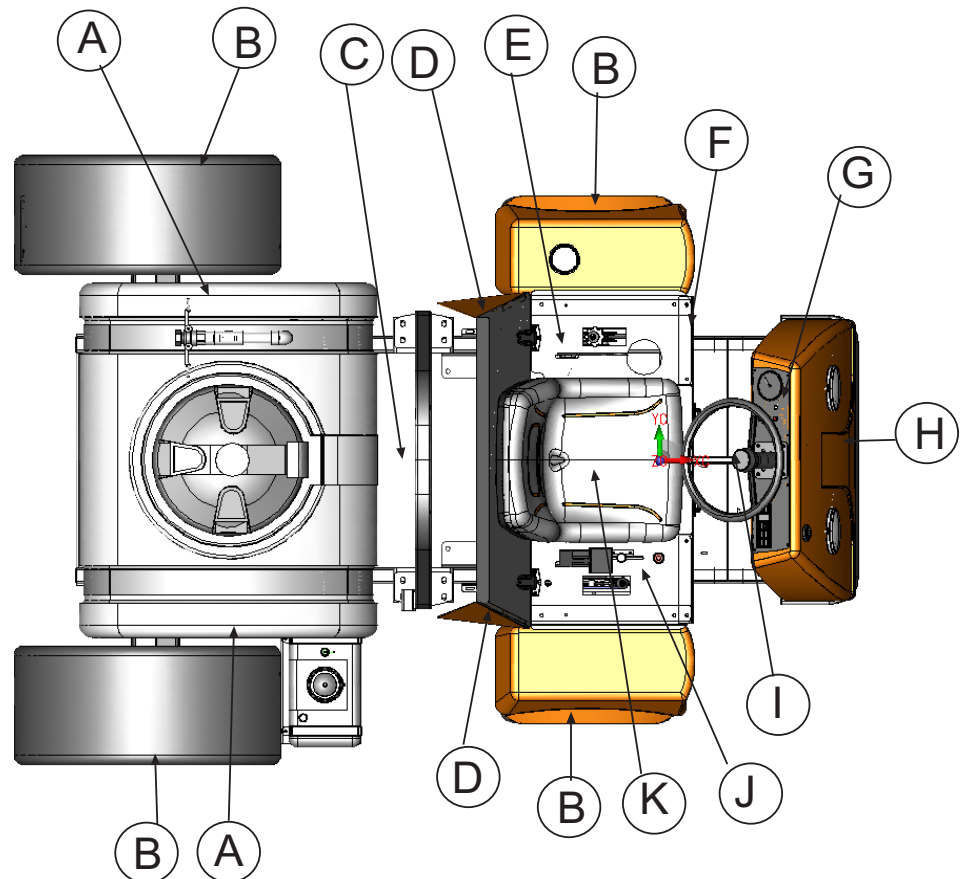
Basket Must be removed During Use.



DECAL LIST

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

A	10-367	Decal, Spray Star 1000	Right and Left Tank Sides
B	25-356	Decal, Tire Pressure 20psi	All Wheels
C	25-352	Decal, Bypass Valve	Hang Tag on pump
D	25-298	Decal, Warning Hot	Tailpipe Guard
D	25-286	Decal, Crush Pinch	Hood - Back Edge, Both Sides
			RH Control Panel
E	15-719	Decal, Speed Control	LH Control Panel
	27-093	Decal, Oil Level	LH Control Panel
F	25-370	Decal, 88 dba	LH Front Panel
	15-463	Decal, Spray Pump	LH Front Panel
G	15-672	Decal, Dash Panel	Dash Board
H	25-373	Decal, Smithco	Front Nose Cone
I	27-077	Decal, Smithco	Steering Wheel
J	10-414	Decal, Control Panel	RH Control Panel
K	25-277	Decal, Battery Warning	Seat Panel



QUICK REFERENCE REPLACEMENT PARTS

REPLACEMENT FILTERS

23-031	Hydraulic Oil Filter Element 25 Micron Oil Filter
	Air Filter Element
	Pre-Cleaner
13-488	Key Switch
76-310	Key Set

REPLACEMENT BELTS

42-359	Belt (engine to hydrostat pump)
15-704	Belt (engine to Hypro® Pump)

SEAL KITS

10-576	Orbital
15-301-01	Repair Kit
10-554	Hydraulic Cylinder
14-529	Seal Kit
10-510	Wheel Motor
14-080	Seal Kit
42-797	Pump
14-098	Seal Kit
16-998	Hypro® Pump
16-967	Silicone - Carbon Seal Kit

FLUIDS

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

OTHER PARTS

14-532	Hinged Cover On Tank with Gasket
16-953-01	Gasket For Cover
16-169	Strainer Basket
15-818	#75 Fitting O-ring
15-817	#50 Fitting O-ring
Spark Plugs	Champion type RC12YC (Gap 0.030 inch (.76 mm))

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:

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

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

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

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

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

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

SMITHCO, INC.

Wayne, PA 19087

