

Parts & Service



Spray Star 1760

14-300-B

SN: 176G001

March 2014

Product Support:

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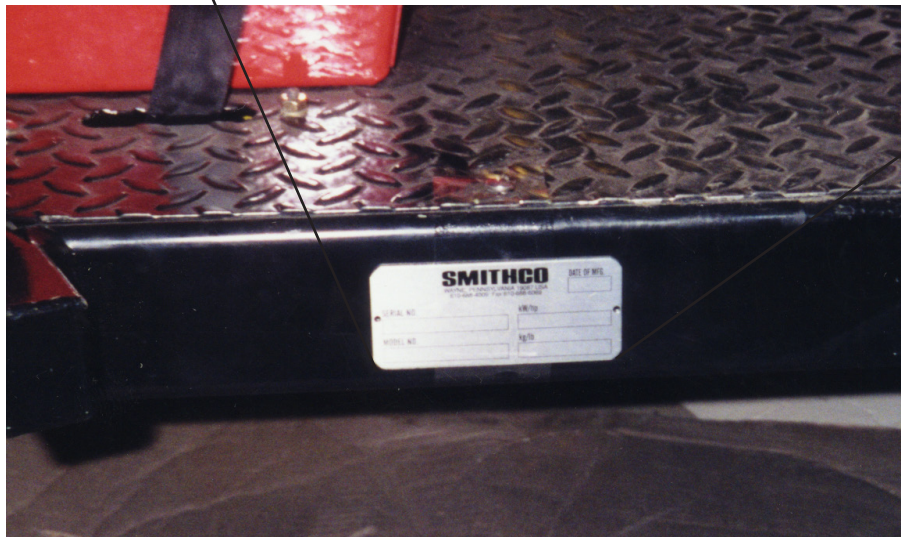
Thank you for purchasing a **Smithco** product.

Read this manual and all other manuals pertaining to the Spray Star 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 is located on the front left side of the main frame. 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.

GENERAL 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 _____ 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 approximately 10 ft. (3 m).
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 1760

WEIGHTS AND DIMENSIONS

Length	112" (285 cm)		
Width	61" (155 cm)	Width With Booms Down	230" (584 cm)
Height	50" (127 cm)	Height With Booms Up	126" (320 cm)
Wheel Base	60" (152 cm)		
Weight Empty	1200 lb (544 kg)		
Weight Loaded	2500 lb (1134 kg)		

SOUND LEVEL AT 3400 RPM

At ear level	84 dB
At 3 ft. (0.914 m)	82 dB
At 30 ft (9.14 m)	68 dB
At 23 ft (7 m) pass by	70 dB

ENGINE

Make	Kohler
Model#	Command CH20S
Type / Spec#	64558
Horsepower	20.5 hp (15.08 kW)
Fuel	Unleaded 87 Octane Gasoline Minimum
Cooling System	Air cooled
Lubrication System	Full pressure
Alternator	25 Amp

WHEELS & TIRE

Front (2)	20 x 1000 x 10 Multi-rib 20 psi (1.4 bar)
Rear (2)	24 x 1300 x 12 Super Soft 18 psi (1.3 bar)
Ground Pressure:	8.2 psi with 160 gallons

SPEED

Working Speed	1st gear 0-3 m.p.h. (0-5 kph)
	2nd gear 2-6 m.p.h. (3-10 kph)
Transport Speed	3rd gear 4-10 m.p.h. (6-16 kph)
Reverse Speed	0-3 m.p.h. (0-5 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	2.1 quart (2 liters) with filter
Fuel	6 gallon (22.7 liters)
Hydraulic Fluid	1 gallon (3.785 liters)
Grade of Fluid	SAE 10W-40 API Service SJ or higher motor oil

OPTIONAL SPRAY EQUIPMENT

30-006	Fresh Water Wash Tank	14-600	Chemical Cleanload for 1761
14-601	Chemical Cleanload for 1762	14-602	Chemical Cleanload for 1764
14-603	Hose Reel Mount Kit	15-835	Tank Rinsing System
14-515	Water Meter Kit (gallons)	15-618	Water Meter Kit (liter)
17-585	18.5 ft HD Super Boom	17-601	15 ft HD Super Boom
14-283	Foam Marker System (Factory Installed)	14-585	Roll Bars
14-285	Foam Marker System (Dealer Installed)		
16-906	Electric Rewind Hose Reel, 200-ft/61m	16-129	Manual Rewind Hose Reel, 200-ft/61m

MAINTENANCE



CAUTION

Before servicing or making adjustments to machine, stop engine and remove key from ignition. When servicing the spray pump or filter all control valves must be shut off if there is liquid in the tank.

NOTE:

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

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

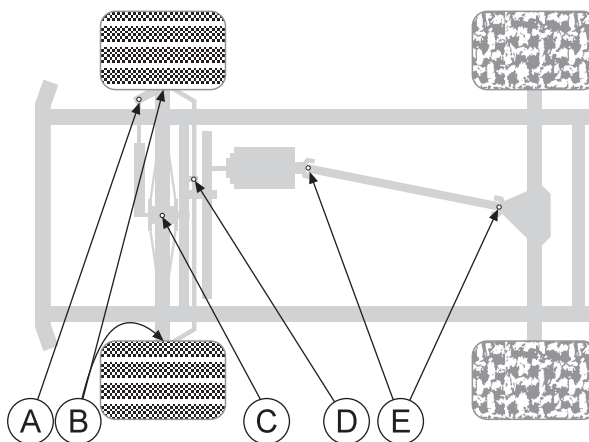
LUBRICATION

Use No. 2 General purpose Lithium Base Grease and lubricate every 100 hours. The Spray Star 1760 has 7 grease fittings.

- One on the rod end of hydraulic cylinder.
- One on each the right and left spindles.
- One on the front axle.
- One on clutch idler arm.
- One on each end of the drive line.

AIR CLEANER

- Loosen cover retaining knob and remove cover.
- Remove pre-cleaner from paper element.
- Check paper element. Replace element as necessary.
- 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.
- Saturate pre-cleaner with new engine oil. Squeeze out all excess oil.
- Reinstall pre-cleaner over paper element.
- Reinstall air cleaner cover. Secure cover with cover retaining knob.

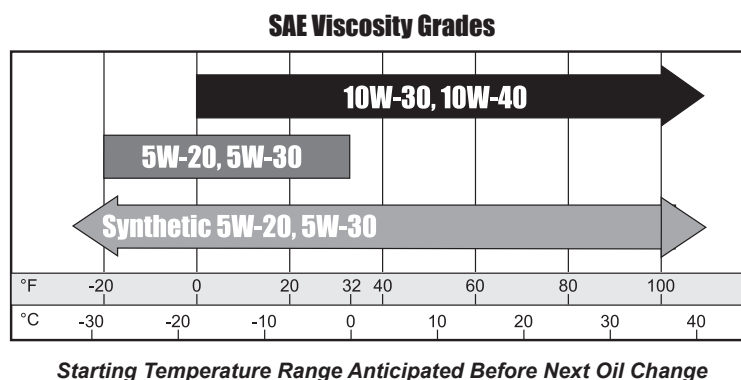


HYDRAULIC OIL

- Use SAE 10W-40 API Service SJ or higher motor oil.
- For proper warranty, change oil every 500 hours or annually, which ever is first.
- Oil level should be 1.5" (4 cm) from top of tank when fluid is cold. Do not overfill.
- After changing oil, run the machine for a few minutes. Check oil level and for leaks.
- 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.
- If the natural color of the fluid has become black or smells burnt, it is possible that an overheating problem exists.
- If fluid becomes milky, water contamination may be a problem.
- 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.
- In extreme temperatures you can use straight weight oil. We recommend SAE 30W API Service SJ or higher 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.
- 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.

ENGINE OIL

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



DIRECTO VALVES

Directo Valves should be disassembled, cleaned, inspected, and a service kit installed annually. More often depending on the chemicals being used and the frequency of use. In most cases this can be done without removing the valve from the sprayer.

HYPRO PUMP

1. After use, flush pump with clean water.
2. Hypro diaphragm pumps come with oil in the crankcase. Hypro recommends changing oil after 40 hours of break-in operation and every three months or 500 hours, whichever comes first. Hypro recommends a high grade, nondetergent, SAE 30 weight oil.
3. For winter storage or if a freezing condition will be encountered, flush pump with a 50/50 mixture of water and antifreeze.

DIAPHRAGM AND VALVE REPLACEMENT

1. Occasionally debris can cause the valves to not seal properly or damage the O-rings.
2. To check for this remove the pump manifold. With manifold removed, valves can readily be removed and checked for debris or wear. To replace valves or o-rings, refer to the Parts List for appropriate kits.
3. Hypro recommends changing diaphragms every 500 hours or three months, whichever comes first.
4. Drain the oil from the pump by removing drain plug. Rotate the shaft to remove excess oil.
5. Remove the pump manifold, remove the diaphragm retaining bolt, support washer and diaphragm. To replace the diaphragms order appropriate repair kit from parts list.
6. Turn the crankshaft to bring the piston to its upstroke to replace the diaphragm. Use the downstroke to seat the new diaphragm into the sleeve groove. Install retaining washer and tighten nut.
7. Replace the pulsation dampener diaphragm by first bleeding the air from the dampener. After replacing the diaphragm recharge dampener to 20% of operating pressure.
8. Refill crankcase with oil. Rotate shaft slowly forward and reverse to distribute oil and fill to proper level.

MAINTENANCE (CONTINUED)

TIRE PRESSURE

Caution must be used when inflating a low tire to recommended pressure. Over inflating can cause tires to explode. Front tires should be 20 psi (1.4 bar) and rear tires should be 18 psi (1.3 bar). Improper inflation will reduce tire life considerably.

WHEEL MOUNTING PROCEDURE

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

BATTERY

Batteries normally produce explosive gases which can cause personal injury. Do not allow flames, sparks or any ignited objects 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.

JUMP STARTING

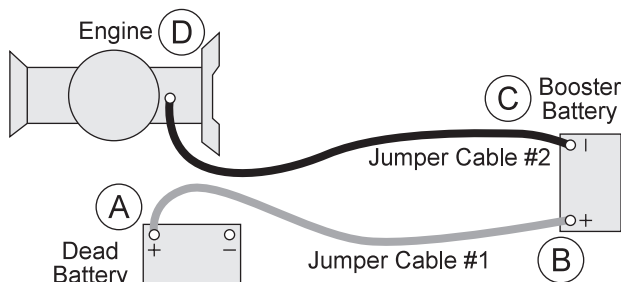
To jump start (negative grounded battery):

1. Shield eyes.
2. Disconnect computer supply leads.
3. Connect ends of one cable to positive (+) terminals of each battery, first (A) then (B).
4. Connect one end of other cable to negative (-) terminal of "good" battery (C).
5. 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.



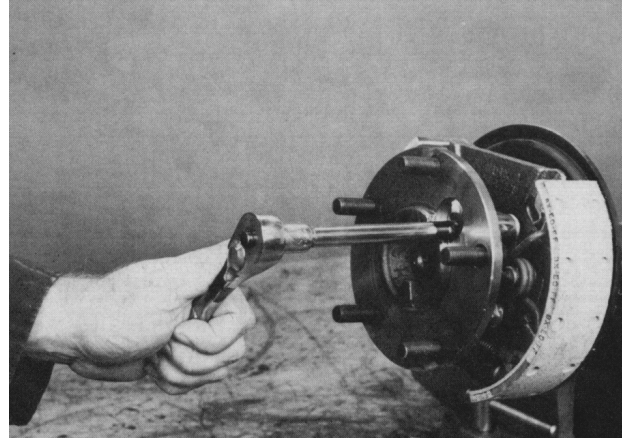
WARNING Use of booster battery and jumper cables. Particular care should be used when connecting a booster battery. Use proper polarity in order to prevent sparks.



AXLE SHAFT DISASSEMBLY



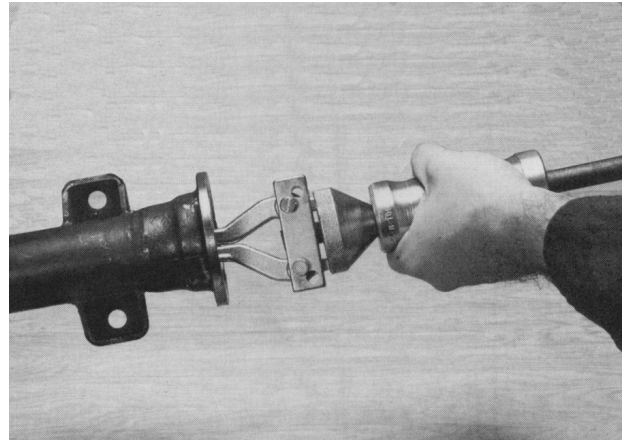
1. After the wheel is removed, remove the brake drum.



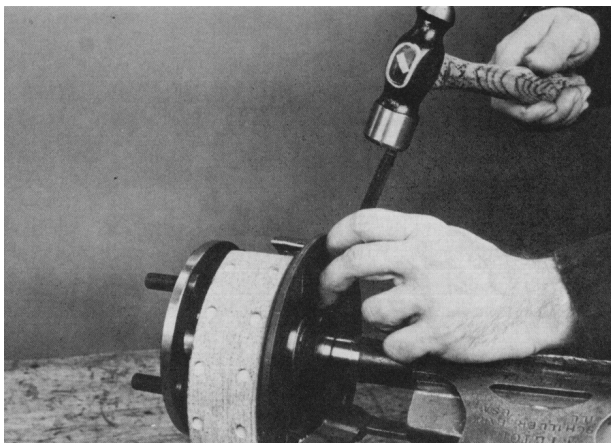
2. Using a $\frac{1}{2}$ " socket, line up the hole in the axle shaft flange to remove the backing plate nuts which hold the axle shaft assembly to the axle.



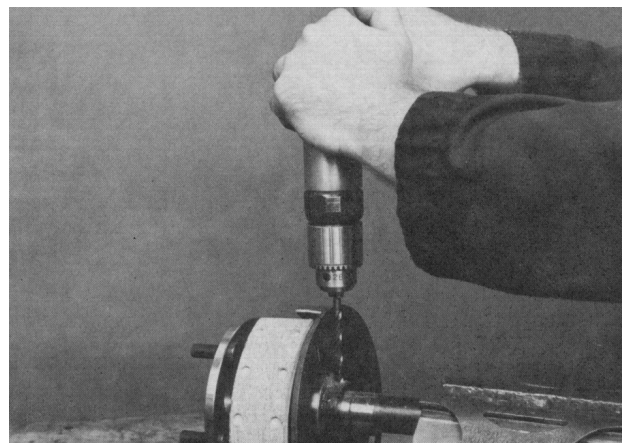
3. To remove the axle shaft assembly, grasp the axle shaft assembly with both hands (the assembly includes axle shaft, oil seal, brake assembly, gasket, bearing, and retainer) and pull the axle shaft free.



4. Remove inner Axle shaft seal using puller as shown. Discard Seal and replace with new one at time of assembly.



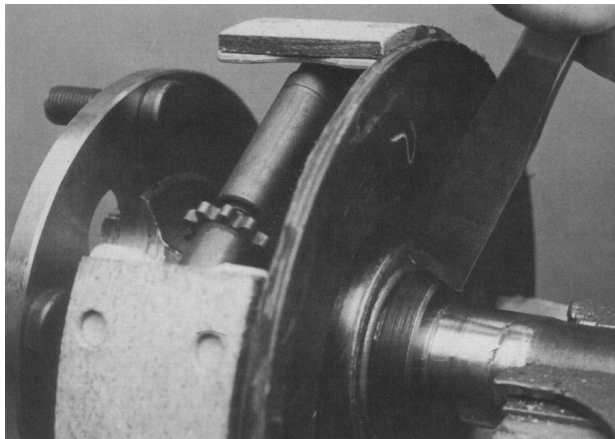
5. Place Axle shaft assembly in a vise. Center punch the outside of the retaining ring.



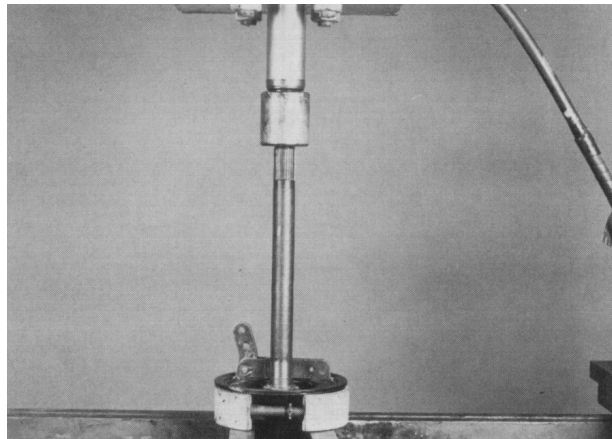
6. Drill a $\frac{1}{4}$ " hole in the outside of the retainer ring to a depth approximately $\frac{3}{4}$ the thickness of the ring. Drilling Completely through retainer ring will damage the shaft.



AXLE SHAFT DISASSEMBLY (CONTINUED)

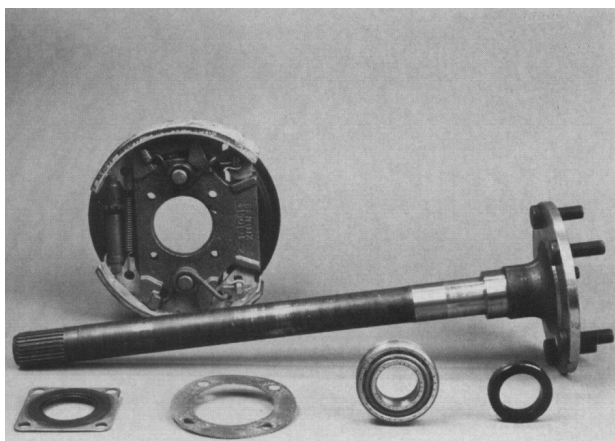


7. After drilling, position a chisel across the hole and strike sharply to break the ring. Replace with a new retainer ring when reassembly.

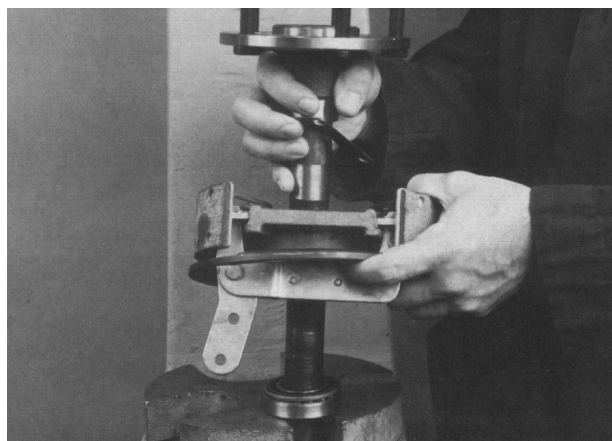


8. Support the axle shaft assembly in a suitable press. Press on the end of the axle shaft until the wheel bearing and brake assembly is removed.

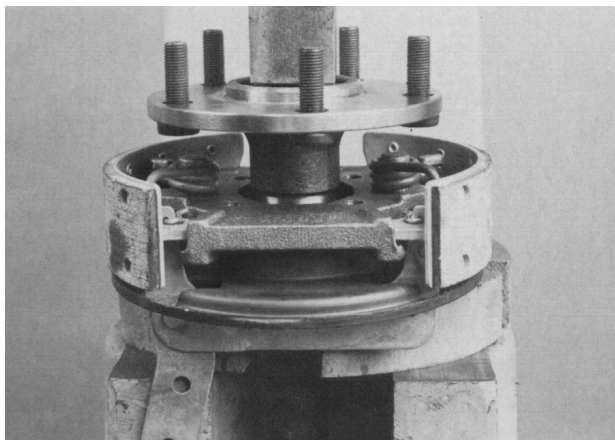
AXLE SHAFT ASSEMBLY



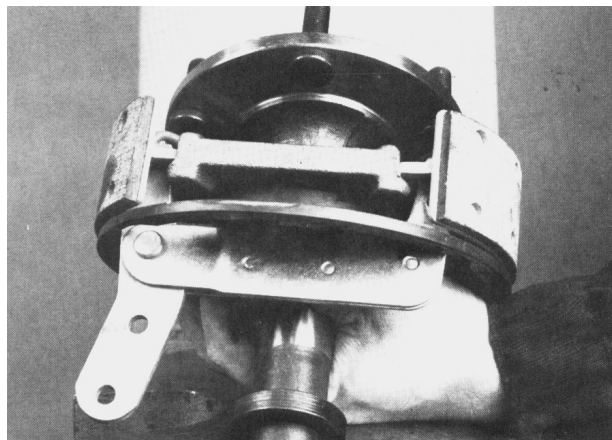
1. Inspect the shaft for possible damage. In the following order, place new oil seal, brake assembly, new grease packed bearing assembly (with unit bearing rib ring toward fanged end of shaft) on the axle shaft. The retaining ring will be placed on the shaft later.



2. Support the bearing assembly in a suitable press.

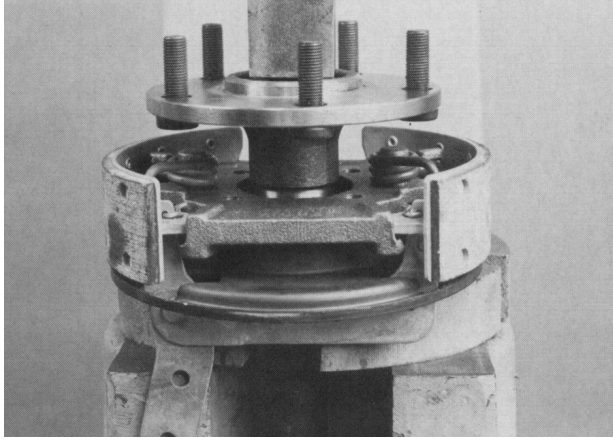


3. Press assembly until bearing is firmly seated against axle shaft shoulder.

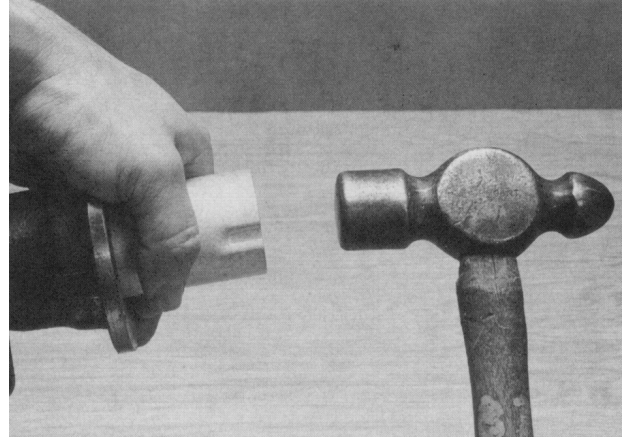


4. Slide new retaining ring on the axle shaft and support the shaft in suitable press.

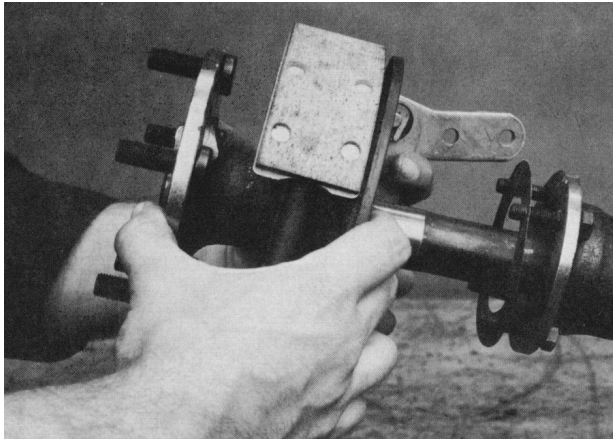
AXLE SHAFT ASSEMBLY (CONTINUED)



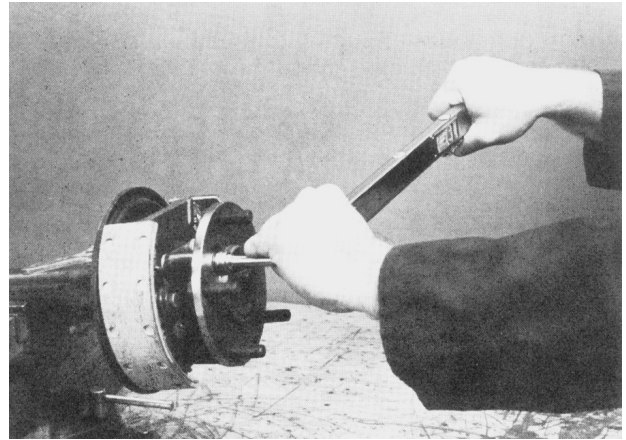
5. Press the retaining ring firmly against bearing.



6. Assembly new grease seal into housing to original depth. After seal has been assembled, grease lip of seal.



7. Assemble bearing retainer bolts and new gasket on axle housing. Then install axle shaft assembly into axle housing. Care should be taken not to damage gasket, oil seal, and bearing. Line up holes of brake assembly and oil seal. Push axle shaft as far as possible into axle housing.



8. Start nuts on bolts by hand. Tighten nuts in a manner that assures the seal and bearing assembly are drawn evenly into axle housing. Use a torque wrench and torque nuts to 16-20 ft/lb (21-27Nm)

SERVICE CHART



CAUTION

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

NOTE:

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

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

Before each use daily	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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 $\text{ft}\cdot\text{lb}$ (87-100 Nm)) Grease Machine. Check belt tension (where needed)
Every 200 Hours	<ul style="list-style-type: none"> Change oil filter Torque the wheel lug nuts. (64-74 $\text{ft}\cdot\text{lb}$ (87-100 Nm))
Every 250 hours	<ul style="list-style-type: none"> Check Idle Speed Change hydraulic filter Clean battery terminals
Every 400 hours	<ul style="list-style-type: none"> Check spark plugs
Every 500 hours or yearly	<ul style="list-style-type: none"> 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

Maintenance Check Item	For the week of:						
	Mon	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Check the Safety Seal Switch							
Check Steering Operation							
Check the fuel level							
Check the engine oil level.							
Check the condition of the air filter							
Clean the engine cooling fins.							
Check for unusual engine noises							
Check the hydraulic oil level							
Check hydraulic hoses and fittings for damage							
Check for fluid leaks.							
Check the line pressure (20-30 psi)							
Check the instrumentation							
Inspect electrical system for frayed wires							
Check neutral start							
Change oil filter.							
Change oil.							
Lubricate Machine							
Ensure all warning decals are in place.							

Areas of Concern		
Inspection Performed by:		
Item	Date	Information

ADJUSTMENTS

INTERLOCK SWITCH

Located on the front, below the floorboard and behind the clutch. The Interlock Switch is in the electrical circuit between the starter solenoid and the starter on the ignition switch. When the clutch pedal is depressed, it pushes the plunger on the interlock switch in, which creates a circuit. Thus allowing the engine to start. When the clutch pedal is released the plunger on the interlock switch comes out, which breaks the circuit. To adjust, loosen the two nuts holding the interlock switch and move the interlock switch towards or away from the clutch pedal as needed.

HYDRAULIC POWER UNIT BELT

Located to the rear and left of the engine. Should have approximately $\frac{1}{4}$ " (6.5 mm) of deflection in the center of the top strand. To adjust, loosen the bolt holding the hydraulic power unit bracket to the frame and adjust the belt tension as required. Retighten the bolt after the adjustments made.

FOOT CLUTCH BELT

See belt and pulley drawing in this book. Belt retainer should be adjusted so that there is $\frac{1}{8}$ " to $\frac{1}{4}$ " (3.25 to 6.5 mm) clearance between the belt and retainer with the clutch fully engaged. This is just a starting point. Start the engine with the transmission in neutral and the park brake set. Engage and disengage the clutch, check to see if the belt has stopped and is against the retainers. If not shut engine off and readjust the retainers. Adjust the clutch rods as required to shorten, turn the ball joints in and out to lengthen.

SPRAY PUMP

Located to the rear and left of the engine. Should have approximately $\frac{1}{2}$ " (13 mm) of deflection in the center of the top strand. Loosen and tighten the $\frac{3}{8}$ " - x $2\frac{1}{2}$ " set screw located on the frame pushing against the pump arm.

PARK BRAKE

Adjust on lever. Adjust on clevis.

BRAKES

Can be adjusted from outside of brake drum with a brake tool.

MASTER BOOM SWITCH (FOOT SWITCH)

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.

SPEED CALIBRATION NUMBERS

The speed calibration number for the Spray Star 1602 is 114. This is measured off the drive shaft.

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

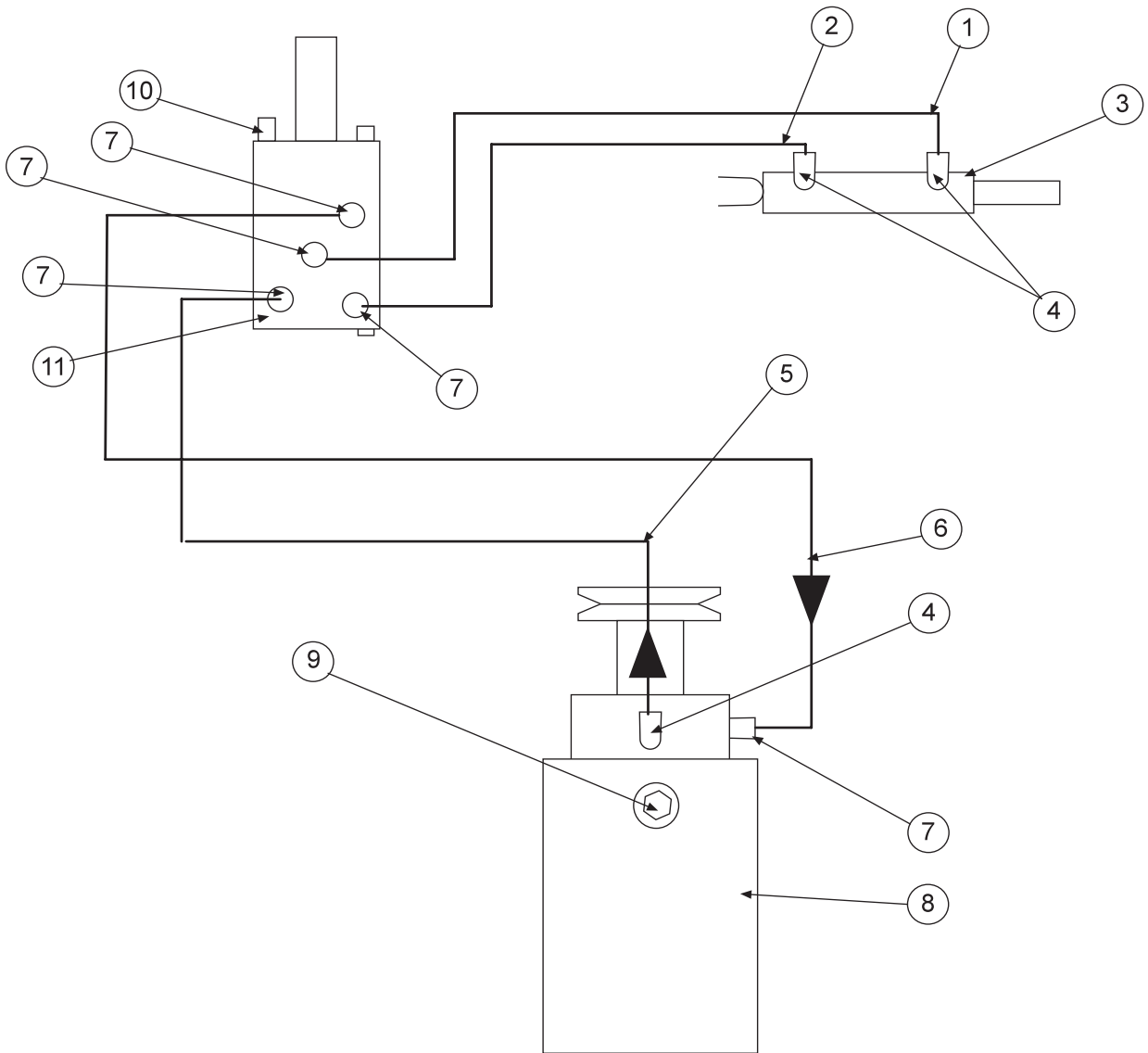
1. Clean the exterior surfaces of the engine.
2. Change the oil and filter while the engine is still warm from operation.
3. The fuel system must be completely emptied, or the gasoline must be treated with a stabilizer to prevent deterioration.

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.

HYDRAULIC DIAGRAM



Diagrams

HYDRAULIC DIAGRAM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	14-352	Hydraulic Hose 54"	1
2	14-351	Hydraulic Hose 46"	1
3	77-263	Hydraulic Cylinder 1 1/2 x 7	1
	14-530	Seal Kit	
4	18-171	1 1/16 x 9/16 90° Straight Thread Elbow	3
5	14-355	Hydraulic Hose 81"	1
6	14-354	Hydraulic Hose 84"	1
7	18-306	1 1/16 x 9/16 Straight Thread Connector	5
8	15-315	Hydraulic Power Unit	1
	15-315-01	Repair Kit	
9	27-059	Filler Breather (part of 15-315)	1
	18-314	3/8 Pipe Coupler	1
	18-287	3/8 Pipe Nipple x 2	1
10	HBM-6-1-16	Metric Bolt M6 - 1 x 16	4
	HWLM-6	Lockwasher M6	4
11	15-301	Orbitrol	1
	15-301-01	Seal Kit	

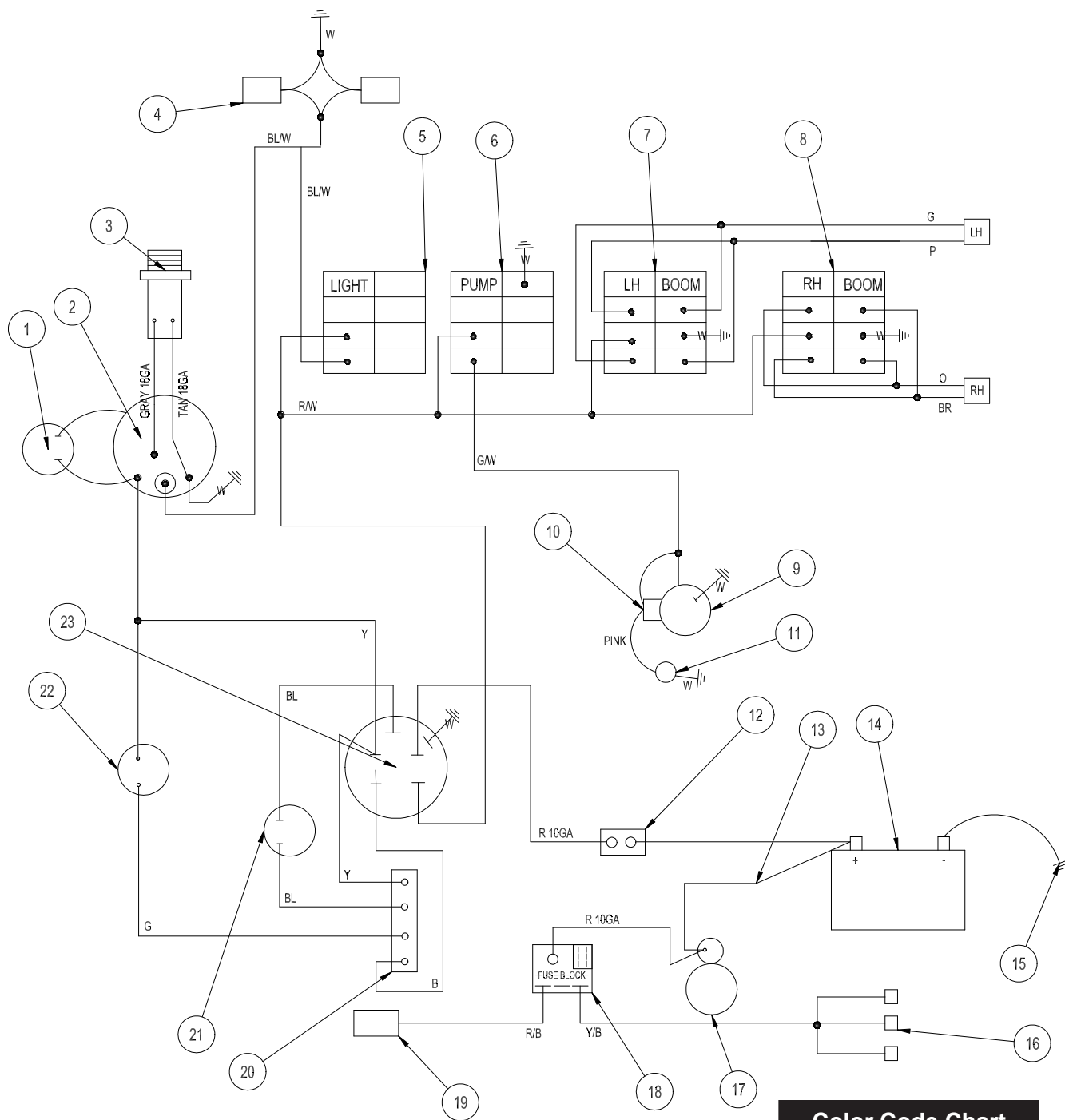
FITTING TORQUE CHARTS

Seal-Lok Straight and Adjustable Fitting (Steel) Torque Ratings				
Fitting Size	SAE Tube Thread Size	Tube Side		Port Side
		in. lbs.	ft. lbs.	ft. lbs.
4	9/16 - 18	220	18	15
6	1 1/16 - 16	360	30	35
8	1 3/16 - 16	480	40	60
10	1-14		60	100
12	1 3/16 - 12		85	135
14	1 5/16 - 12		95	175
16	1 7/16 - 12		110	200
20	1 11/16 - 12		140	250
24	2 - 12		180	305
32	2 1/2 - 12		360	375

Over tightened fittings will result in crushing the cone which will create a leak.

Charts Developed by Parker Hennipin

WIRING DIAGRAM



FUSES

Boom Lift	30 AMP	33-273
Spray System	15 AMP	33-508
Manifold Valve	5 AMP	33-284
Foamer	10 AMP	33-507
Hose Reel	30 AMP	33-273

Color Code Chart

Bl	Blue
Br	Brown
Y	Yellow
Grn	Green
O	Orange
R	Red
B	Black
P	Purple
W	White

WIRING DIAGRAM PARTS LIST

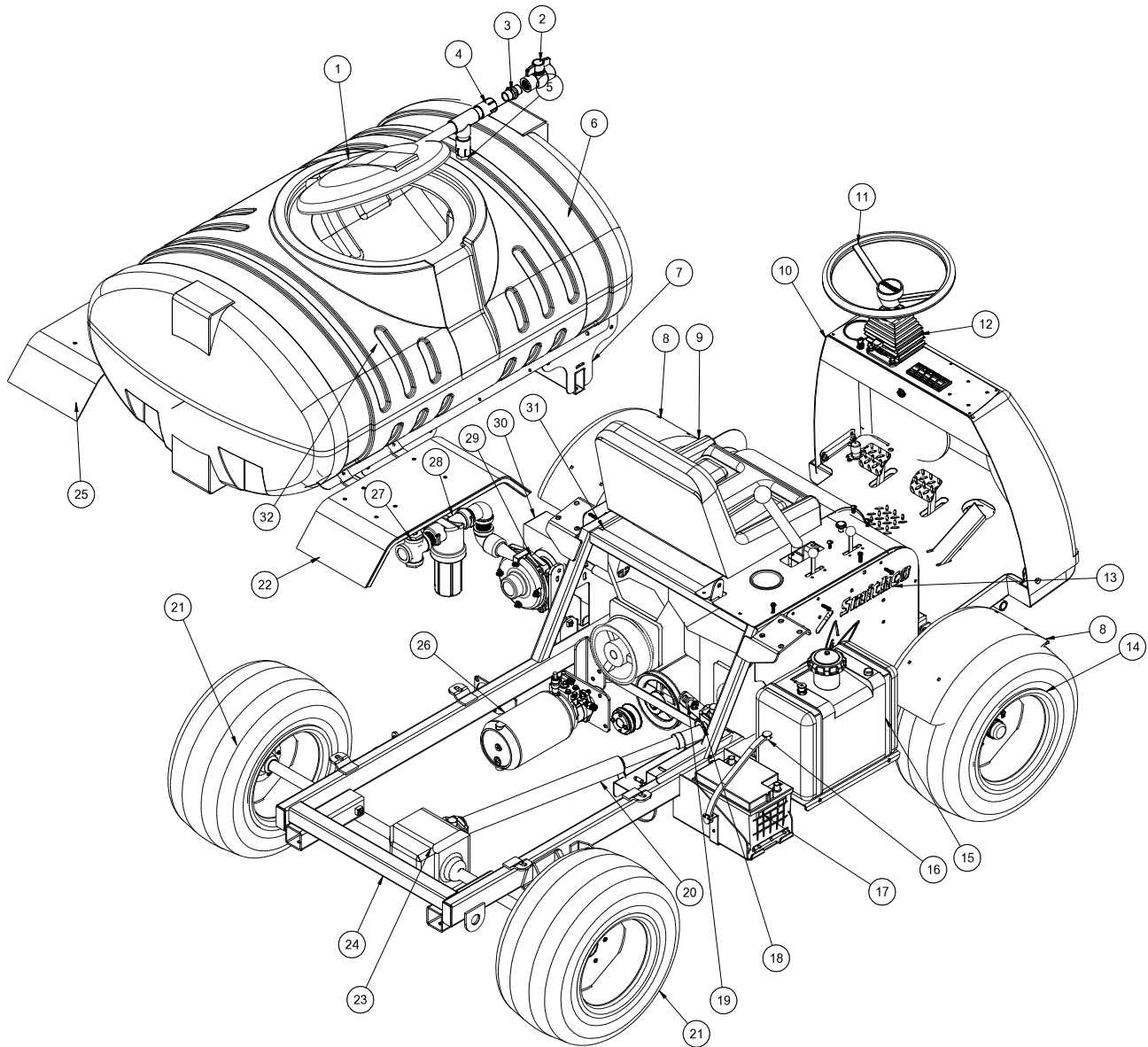
REF#	PART#	DESCRIPTION	QUANTITY
1	12-017	Hourmeter	1
2	14-543	Speedometer	1
3	16-883	Magnetic Sensor	1
4	17-524	Oval Head Lights	2
5	Lights		
	15-725	Mount Panel End	1
	15-782	Switch Body, On-Off-On	1
	15-727	Switch Actuator - No light	1
6	Pump		
	15-729	Mount Panel Middle	1
	15-726	Switch Body - Light	1
	15-731	Actuator Amber	1
7	Left Boom		
	15-729	Mount Panel Middle	1
	15-728	Switch Body, On-Off-On	1
	15-727	Switch Actuator - No light	1
8	Right Boom		
	15-725	Mount Panel End	1
	15-727	Switch Actuator - No light	1
	15-728	Switch Body, On-Off-On	1
9	16-998	Hypro® Pump With Electric Clutch	1
10	33-480	Pressure Switch	1
11	77-207	Buzzer	1
12	9875	Circuit Breaker, 30AMP	1
	8977	Circuit Breaker Boot	1
13	75-518	Red Battery Cable	1
14	33-216	Battery	1
15	48-147	Negative Battery Cable	1
16*		Wiring for Valve	
17		Starter (part of engine)	
18	33-271	Fuse Block	1
19*		Auxiliary Wiring	
20		Engine Plug (part of engine)	1
21	22-002	Interlock Switch	1
22	50-359	Oil Warning Light	1
23	13-288	Ignition Switch (Kohler 25 099 04)(part of engine)	1
	76-310	Key Set	1
	14-548	Main Wire Harness (includes * items)	1

NOTE:

Use dielectric grease on all electrical connections.

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

BODY & FRAME DRAWING

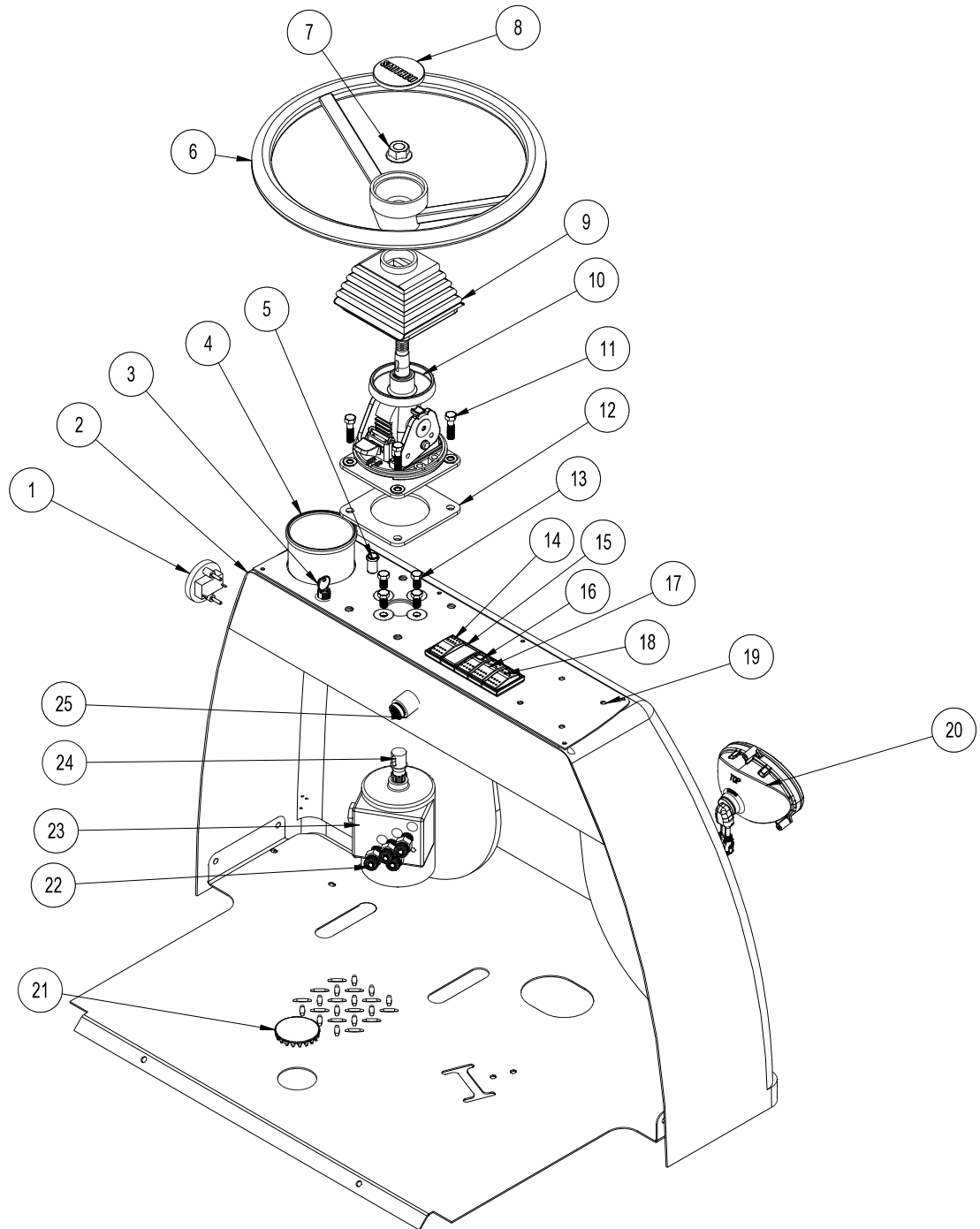


Parts

BODY & FRAME PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-953	16" Hinged Lid/Well with Gasket (part of tank)	1
	16-953-01	Gasket	1
	16-169	Strainer Basket 16"	1
2	18-448	1" Ball Valve	1
3	16-851	1" Nipple	1
4	14-365	Air Gap Filler	1
5	14-327	Front Tank Strap	1
6	14-451	160 Gallon Poly Tank	1
7	14-321	Tank Carrier	1
8	10-180	Front Fender	2
9	14-270	Seat with Adjusters	1
10	14-588	Nose Cone	1
11	13-718	Steering Wheel	1
	13-726	Steering Wheel Cap	1
12	76-362	Mini Tilt Steering	1
	76-364	Black Boot	1
13	14-574	Right Side Panel	1
	14-575	Left Side panel	1
14	16-857	Front Tire & Wheel	2
	16-857-01	Tire 20 x 10.00 - 10NHS 4 Ply	2
	16-857-02	Wheel	2
	HNL-12-20	Lug Nut $\frac{1}{2}$ - 20	10
15	15-838	CARB Gas Tank	1
16	8-603	Battery Strap	1
17	33-216	Battery	1
18	15-182	Cross (part of 14-370)	2
	16-003-01	Strap Kit	4
19	16-883	Magnetic Sensor	1
20	14-370	Driveline (complete)	1
21	16-225	Rear Tire & Wheel	2
	16-225-01	Tire 24 x 13.00 - 12NHS 4 Ply	2
	16-225-02	Wheel	2
	HNL-716-20	Lug Nut $\frac{7}{16}$ - 20	10
22	15-446	Right Fender	1
23	16-037	Axle with Brakes	1
24	14-550	Main Frame	1
25	15-447	Left Fender	1
26	15-315	Hydraulic Power Unit	1
	15-315-01	Repair Kit	1
27	16-976	Cross $1\frac{1}{4}$	1
28	14-521	Strainer	1
29	16-998	Hypro® Pump	1
30	15-345	Belt Cover	1
31	14-559	Seat Frame	1
32	14-322	Rear Tank Strap	1

NOSE CONE DRAWING

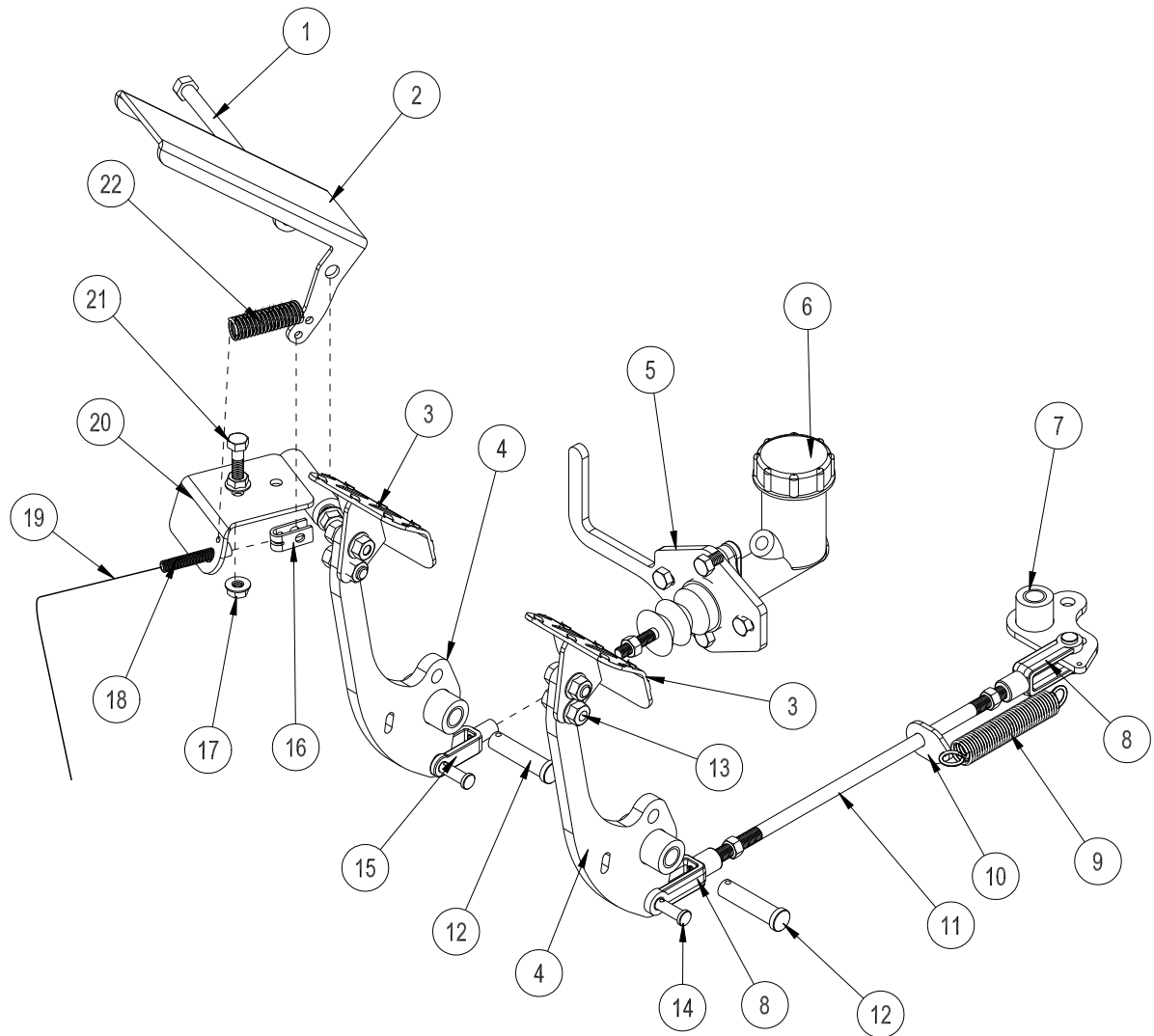


Parts

NOSE CONE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	12-017	Hour Meter	1
2	14-588	Nose Cone	1
	50-400	Rubber Grommet	1
3	13-288	Key Switch (Kohler 25 099 04)(part of engine)	1
	76-310	Set of Keys	1
4	14-543	Speedometer	1
5	50-359	Warning Light	1
6	13-718	Steering Wheel	1
7	HNJ-58-18	Jam Nut $\frac{5}{8}$ - 18	1
8	13-726	Steering Wheel Cap	1
	27-077	Decal, Smithco	1
9	76-364	Black Boot	1
10	76-362	Mini Tilt Steering	1
	HWK-316-075	Woodruff Key $\frac{3}{16}$ x $\frac{3}{4}$	1
11	HB-516-18-125	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{4}$	4
	HW-516	Washer $\frac{5}{16}$	4
	HNFL-516-18	Flange Lock Nut $\frac{5}{16}$ - 18	4
12	15-844	Steering Shim	1
13	HBM-6-1-16	Metric Bolt M6 -1 x 16	4
	HWLM-6	Metric Lockwasher M6	4
14	LIGHTS		
	15-725	Mount Panel End	1
	15-727	Actuator, No Light	1
	15-782	Rocker Switch, Unlit	1
15	BLANK		
	15-730	Blank	1
	15-729	Mount Panel Middle	1
16	PUMP		
	15-731	Actuator, Amber	1
	15-726	Switch Body, Light	1
	15-729	Mount Panel Middle	1
17	10-556	Speedometer	1
13	LEFT BOOM		
	15-727	Actuator, No Light	1
	15-729	Mount Panel Middle	1
	15-728	Switch Body, Momentary On-Off-On	1
18	RIGHT BOOM		
	15-725	Mount Panel End	1
	15-727	Actuator, No Light	1
	15-728	Switch Body, Momentary On-Off-On	1
19	14-554	Dash Board	1
	14-561	Decal, Dash Board	1
20	17-524	Oval Headlight	2
21	25-199	2" Plug Button	1
22	18-306	Straight Thread Connector	4
23	15-301	Orbital	1
24	48-187	Stub Shaft	1
25	77-207	Buzzer	1

PEDAL DRAWING

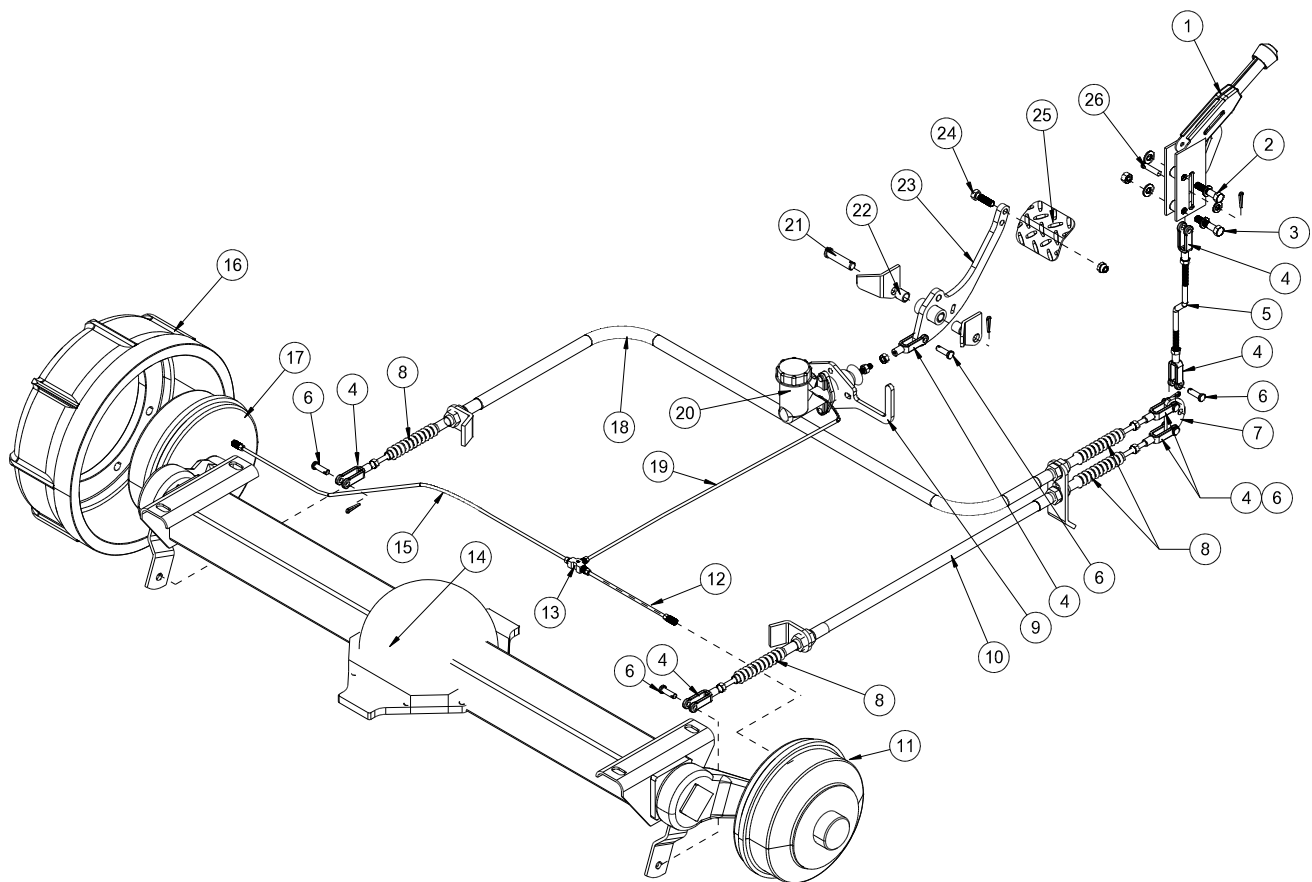


Parts

PEDAL PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HB-38-16-450	Bolt $\frac{3}{8}$ - 16 x $4\frac{1}{2}$	1
	HNFL-38-16	Flange Nut $\frac{3}{8}$ - 16	1
2	52-029	Gas Pedal	1
3	32-028	Pedal Plate	2
4	14-557	Pedal Arm	1
5	14-566	Cylinder Adapter	1
6	32-084	Master Cylinder	1
7	14-558	Clutch Relay	1
8	21-351	Linkage Yoke $\frac{3}{8}$ - 24	2
	HN-38-24	Nut $\frac{3}{8}$ - 24	2
9	29-118	Spring	1
10	14-582	Spring Lock	1
11	14-552	Long Clutch Rod	1
12	HCP-12-250	Clevis Pin $\frac{1}{2}$ x $2\frac{1}{2}$	2
	HP-18-150	Cotter Pin $\frac{1}{8}$ x $1\frac{1}{2}$	2
13	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
14	HCP-516-100	Clevis Pin $\frac{5}{16}$ x 1	3
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	3
15	11-100	Linkage Yoke	1
	HN-516-24	Nut $\frac{5}{16}$ - 24	1
16	17-153	Clevis	1
17	HNFL-516-18	Flange Nut $\frac{5}{16}$ - 18	3
18	17-155	Retainer	1
19	15-310	Throttle Cable	1
20	52-026	Gas Pedal Mount	1
21	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	2
22	52-132	Extension Spring	1

BRAKE DRAWING

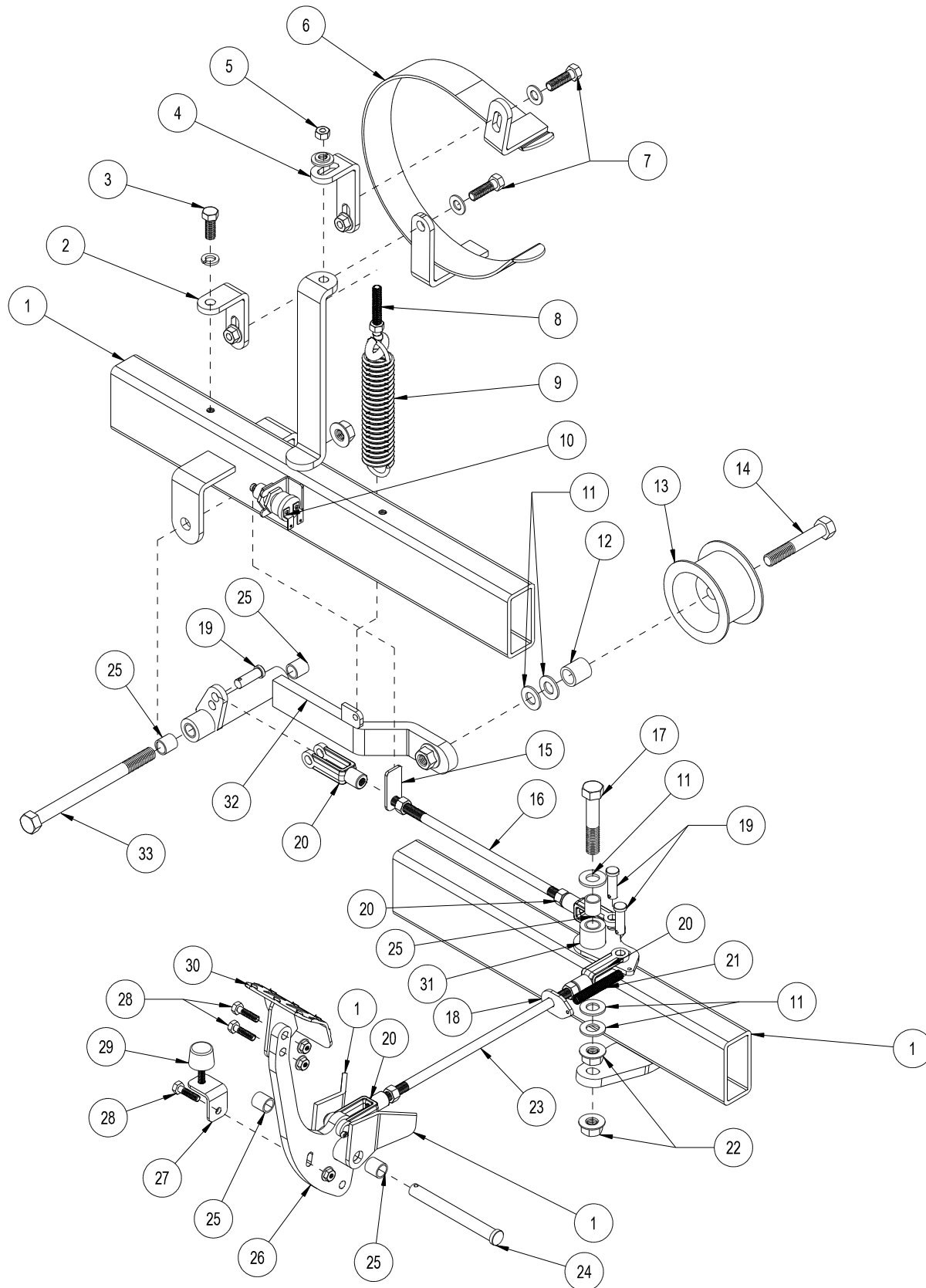


Parts

BRAKE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	60-106	Brake Lever	1
2	HB-38-16-175	Bolt $\frac{3}{8}$ - 16 x $1\frac{3}{4}$	1
	HW-38	Washer $\frac{3}{8}$	1
	HWL-38	Lockwasher $\frac{3}{8}$	1
3	HB-38-16-175	Bolt $\frac{3}{8}$ - 16 x $1\frac{3}{4}$	1
	HW-38	Washer $\frac{3}{8}$	1
	HWL-38	Lockwasher $\frac{3}{8}$	1
	HN-38-16	Nut $\frac{3}{8}$ - 16	1
4	11-100	Yoke	7
	HN-516-24	Nut $\frac{5}{16}$ - 24	7
5	15-347	Brake Rod	1
6	HCP-516-100	Clevis Pin $\frac{5}{16}$ x 1	6
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	6
7	15-331	Park Brake relay	1
8	60-536	Bellows	4
9	14-556	Cylinder Adapter	1
	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $1\frac{3}{4}$	2
	HNFL-516-18	Flange Lock Nut $\frac{5}{16}$ - 18	2
10	14-338	Right Brake Cable	1
11	16-554	Right Brake Assembly (comes with 16-037)	1
12	16-187	Brake Line $\frac{3}{16}$ x 12 (steel)	1
13	18-089	Tee	1
14	16-037	Rear Axle	1
15	16-188	Brake Line $\frac{3}{16}$ x 34 (steel)	1
16	16-559	Brake Drum (comes with 16-037)	2
17	16-514	Left Brake Assembly (comes with 16-037)	1
18	14-339	Left Brake Cable	1
19	15-871	Brake Line $\frac{3}{16}$ x 84	1
20	32-084	Master Cylinder	1
21	HCP-12-250	Clevis Pin $\frac{1}{2}$ x $2\frac{1}{2}$	1
	HP-18-150	Cotter Pin $\frac{1}{8}$ x $1\frac{1}{2}$	1
22	15-497	Brake Bracket	1
	HB-38-16-150	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
23	14-557	Pedal Arm	1
22	20-019	Bushing (comes with pedal arm)	2
24	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
25	32-028	Brake Pedal	1
26	HCP-516-125	Clevis Pin $\frac{5}{16}$ x $1\frac{1}{4}$ (comes 60-106)	1
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
	HW-516	Washer $\frac{5}{16}$	1

CLUTCH LINKAGE DRAWING

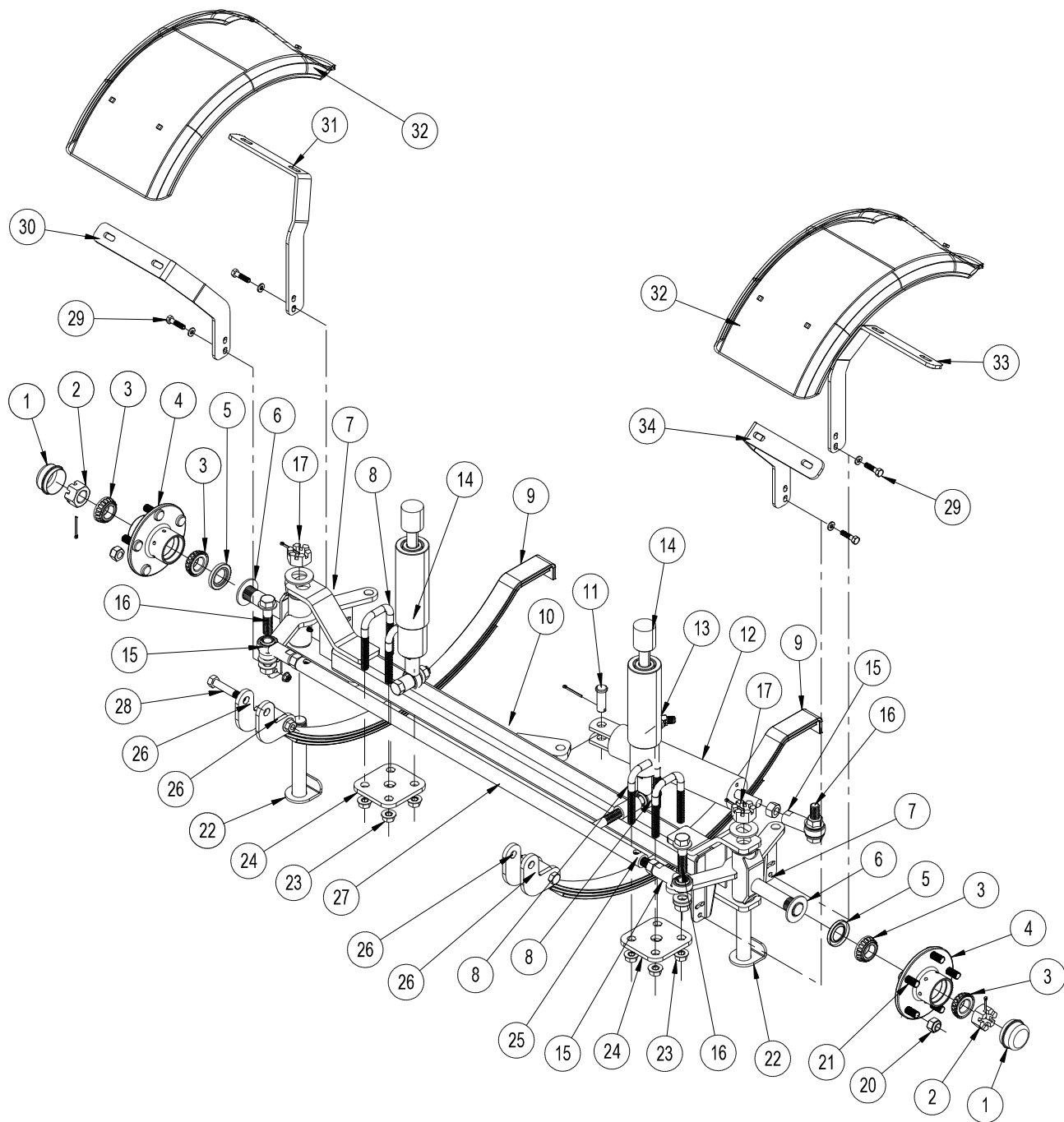


Parts

CLUTCH LINKAGE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	14-550	Parts of Main Frame	
2	15-482	Bottom Mount Bracket	1
3	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	1
	HWL-38	Lockwasher $\frac{3}{8}$	1
4	15-483	Top Mount Bracket	1
5	HN-516-18	Nut $\frac{5}{16}$ - 18	1
	HW-516	Washer $\frac{5}{16}$	1
	HWL-516	Lock Washer $\frac{5}{16}$	1
6	15-481	Belt Guard	1
7	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HW-38	Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
8	20-008	Eye Bolt $\frac{5}{16}$ - 18	1
9	16-830	Spring	1
10	22-002	Interlock Switch	1
11	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	5
12	15-376	Clutch Arm Spacer	1
13	16-013	Idler Pulley	1
14	HB-12-13-300	Bolt $\frac{1}{2}$ - 13 x 3	1
	HNTL-12-13	Lock Nut $\frac{1}{2}$ - 13	1
15	14-563	Clutch Switch Tab	1
16	14-551	Short Clutch Rod	1
17	HB-12-13-275	Bolt $\frac{1}{2}$ - 13 x $2\frac{3}{4}$	1
18	14-582	Spring Lock	1
19	HCP-38-113	Clevis Pin $\frac{3}{8}$ x $1\frac{1}{8}$	4
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	4
20	21-351	Linkage Yoke, $\frac{3}{8}$ - 24	4
	HN-38-24	Nut $\frac{3}{8}$ - 24	4
21	29-118	Spring	1
22	HNFL-12-13	Flange Lock Nut $\frac{1}{2}$ - 13	2
23	14-552	Long Clutch Rod	1
24	HCP-12-250	Clevis Pin $\frac{1}{2}$ x $2\frac{1}{2}$	1
	HP-18-150	Cotter Pin $\frac{1}{8}$ x $1\frac{1}{2}$	1
25	20-019	Oilite Bushing	5
26	14-557	Pedal Arm	1
27	14-565	Bump Tab	1
28	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	3
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	3
29	15-013	Rubber Bumper	1
	HWL-14	Lockwasher $\frac{1}{4}$	1
	HN-14-20	Nut $\frac{1}{4}$ - 20	1
30	32-028	Brake Pedal	1
31	14-558	Clutch Relay	1
32	14-556	Clutch Arm	1
33	HB-12-13-650	Bolt $\frac{1}{2}$ - 13 x $6\frac{1}{2}$	1

FRONT AXLE DRAWING

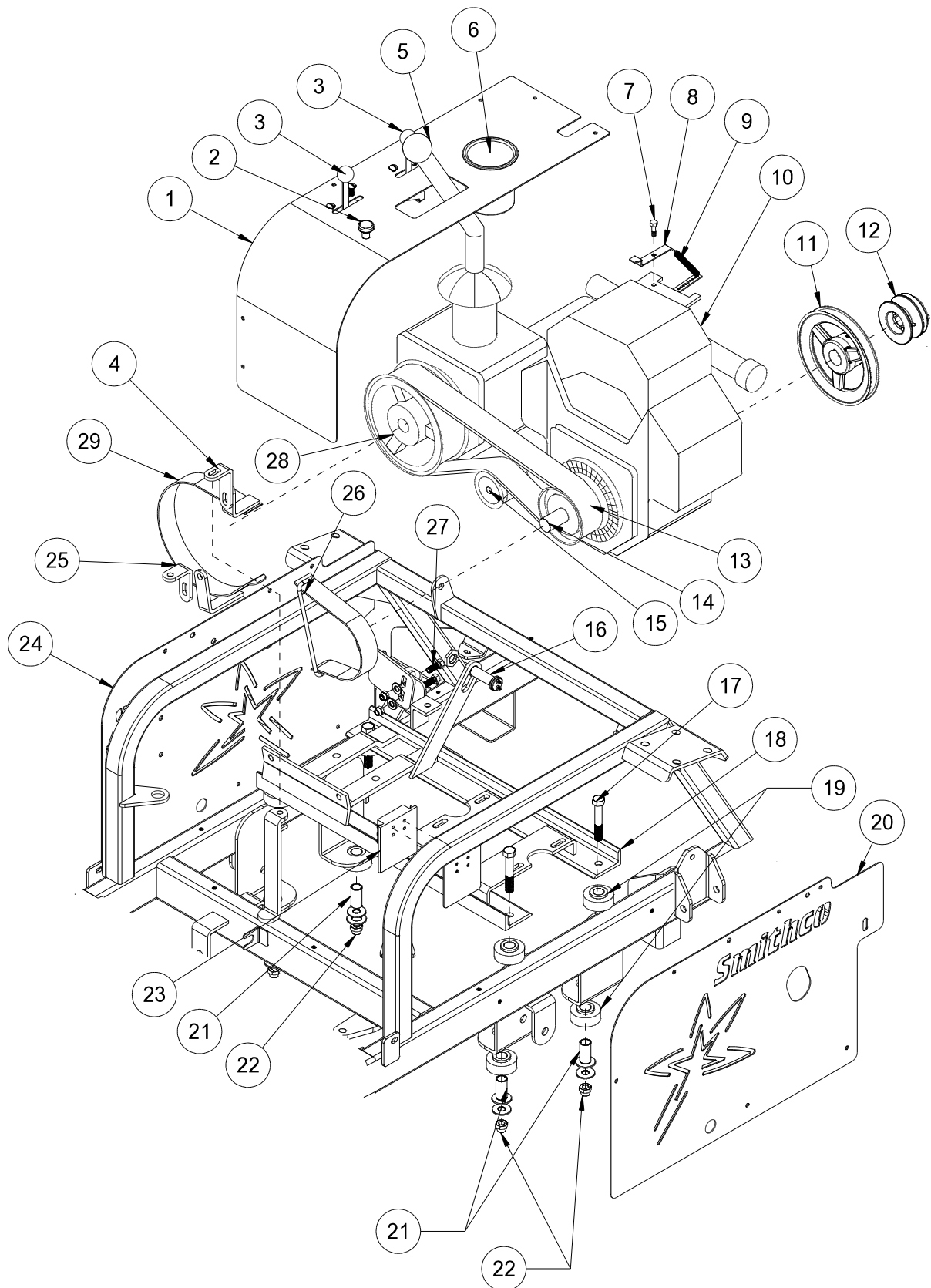


Parts

FRONT AXLE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	80-167	Dust Cap	2
2*	HNA-100-14	Jam Nut 1 - 14	2
	HP-18-150	Cotter Pin $\frac{1}{8}$ - $1\frac{1}{2}$	2
3*	11-043	Bearing with Races	4
4	80-019	Hub (includes all * items)	1
5*	11-041	Oil Seal	2
6	HMB-100-10	Machine Bushing 1 x 10GA	2
7	14-555	Spindle	2
8	20-555	U-Bolt	4
9	16-042	Leaf Spring	2
10	14-549	Front Axle	1
11	HCP-58-175	Clevis Pin $\frac{5}{8}$ x $1\frac{3}{4}$	1
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
12	77-263	Hydraulic Cylinder	1
	14-530	Cylinder Seal Kit	1
13	18-171	90° Straight Elbow	2
14	20-617	Shock Absorber	2
15	18-154	Rod End	3
	HG-14-28-90	Grease Fitting $\frac{1}{4}$ - 28 x 90°	3
	HNJ-58-18	Jam Nut $\frac{5}{8}$ - 18	3
16	HB-58-11-250	Bolt $\frac{5}{8}$ - 11 x $2\frac{1}{2}$	3
	HMB-58-14	Machine Bushing $\frac{5}{8}$ x 14GA	6
	HNTL-58-11	Lock Nut $\frac{5}{8}$ - 11	3
17	HNA-100-14	Jam Nut 1 - 14	2
	HP-18-150	Cotter Pin $\frac{1}{8}$ - $1\frac{1}{2}$	2
20*	HNL-12-20	Lug Nut $\frac{1}{2}$ - 20	10
21*	27-022-02	Stud	10
22	16-076	King Pin	2
23	HNFL-12-13	Flange Lock Nut $\frac{1}{2}$ - 13	8
24	20-538	Spring Mount	2
25	HB-58-11-300	Bolt $\frac{5}{8}$ - 11 x 3	2
	HNTL-58-11	Lock Nut $\frac{5}{8}$ - 11	2
26	30-253	Spring Shackle	4
27	14-573	Tie Rod	1
28	HB-916-18-325	Bolt $\frac{9}{16}$ - 18 x $3\frac{1}{4}$	4
	HNTL-916-18	Lock Nut $\frac{9}{16}$ - 18	4
29	HB-516-18-125	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{4}$	4
	HW-14	Washer $\frac{1}{4}$	4
	HNFL-516-18	Flange Lock Nut $\frac{5}{16}$ - 18	4
30	14-570	LH Rear Fender Bracket	1
31	14-568	LH Front Fender Bracket	1
32	10-180	Front Fender	2
	HBC-516-18-100	Carriage Bolts	8
	HNFL-516-18	Flange Lock Nut $\frac{5}{16}$ - 18	8
33	14-566	RH Front Fender Bracket	1
34	14-569	LH Rear Fender Bracket	1

ENGINE AND CONTROL PANEL DRAWING



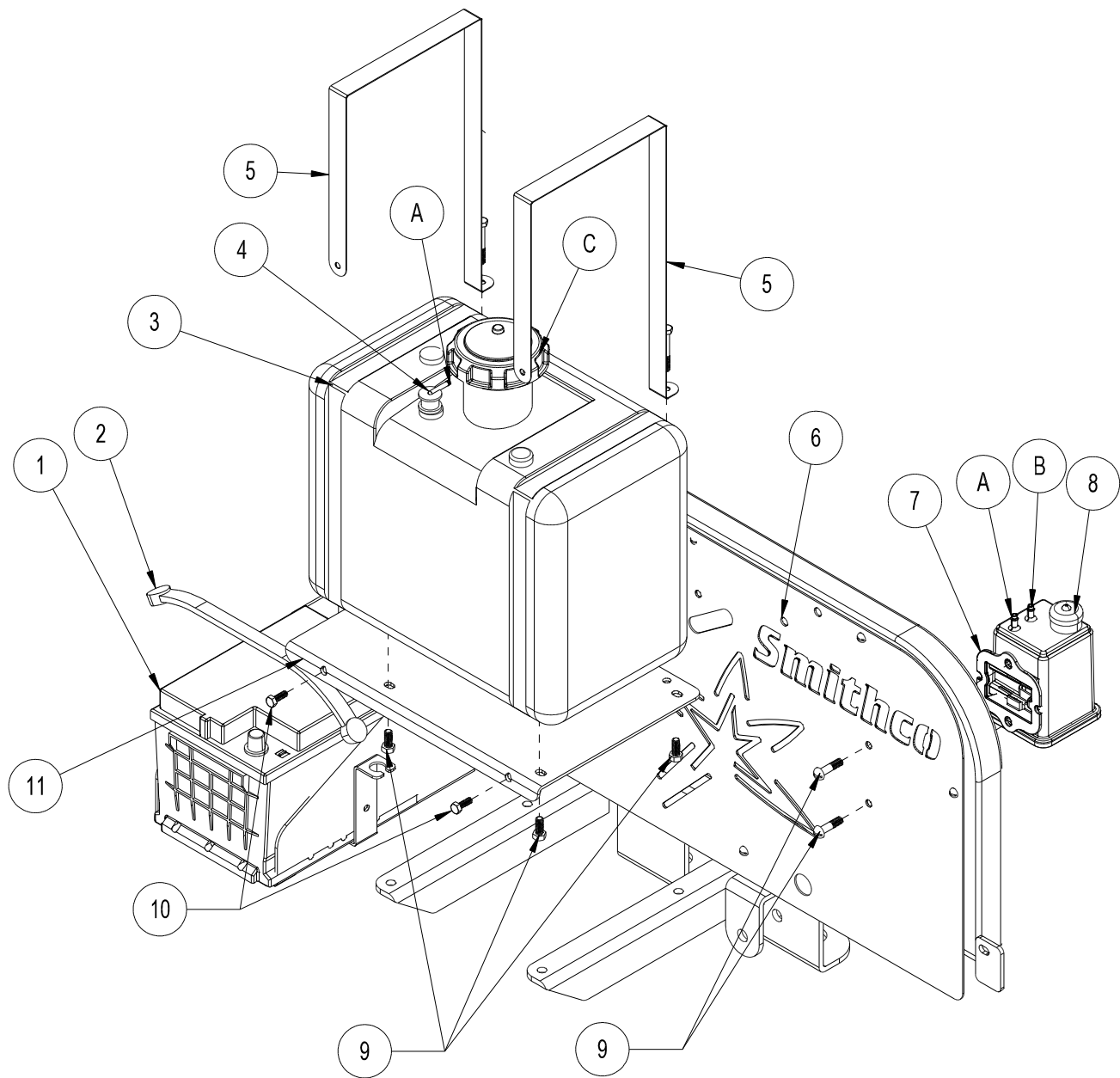
Parts

ENGINE AND CONTROL PANEL PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	14-553	Control Panel	1
	14-562	Decal, Control Panel	1
2	11-086	Choke Cable	1
3	45-118	Throttle Cable	2
4	15-483	Top Mount Bracket	1
5	15-409	Transmission	1
	16-259	Ball Knob	1
	16-011	Decal, Shift Knob	1
6	15-781	XLG Drink Cup Holder	1
7	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	1
	HW-14	Washer $\frac{1}{4}$	1
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	1
8	15-335	Governor Linkage Arm	1
9	16-046	Extension Spring	1
10	15-373	Kohler 20.5 hp Command Engine	1
	8800-9	Fuel Hose	1
	18-186	Hose Clamp	2
	50-403	Fuel Filter	1
	HB-38-16-175	Bolt $\frac{3}{8}$ - 16 x $1\frac{3}{4}$	4
	HW-38	Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
11	15-316	Pulley BK72 x $1\frac{1}{8}$	1
	HKSQ-14-150	Machine Key $\frac{1}{4}$ x $\frac{1}{4}$ x $1\frac{1}{2}$	1
12	15-318	Pulley BK30H with Hub $1\frac{1}{8}$	1
	HKSQ-14-150	Machine Key $\frac{1}{4}$ x $\frac{1}{4}$ x $1\frac{1}{2}$	1
13	16-827	Belt	1
14	16-820	Pulley $4\frac{1}{4}$ OD with Hub	1
	HKSQ-14-150	Machine Key $\frac{1}{4}$ x $\frac{1}{4}$ x $1\frac{1}{2}$	1
15	16-013	Idler Pulley	1
16	16-883	Magnetic Sensor	1
17	HB-12-13-300	Bolt $\frac{1}{2}$ - 13 x 3	4
18	15-357	Engine Frame	1
19	60-107	Rubber Bushing	8
20	14-575	Left Side Panel	1
	HSDPS-14-100	Pan Head Drill Screw SS $\frac{1}{4}$ x 1	5
21	60-168	Spacer	4
22	HNFL-12-13	Flange Whiz Lock Nut $\frac{1}{2}$ - 13	4
	HW-58	Washer $\frac{5}{8}$	4
	HW-716	Washer $\frac{7}{16}$	4
23	33-271	Fuse Block	1
24	14-574	Right Side Panel	1
	HSDPS-14-100	Pan Head Drill Screw SS $\frac{1}{4}$ x 1	6
25	15-482	Bottom Mount Bracket	1
26	15-555	Left Belt Guard	1
27	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	2
	HW-38	Washer $\frac{3}{8}$ - 16	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
28	16-821	Pulley $7\frac{1}{2}$ OD with Hub	1
	HWK-14-1125	Woodruff Key $\frac{1}{4}$ x $1\frac{1}{8}$	1
29	15-481	Belt Guard	1
NS	21-161	Wire Block	3

GAS TANK DRAWING

Parts

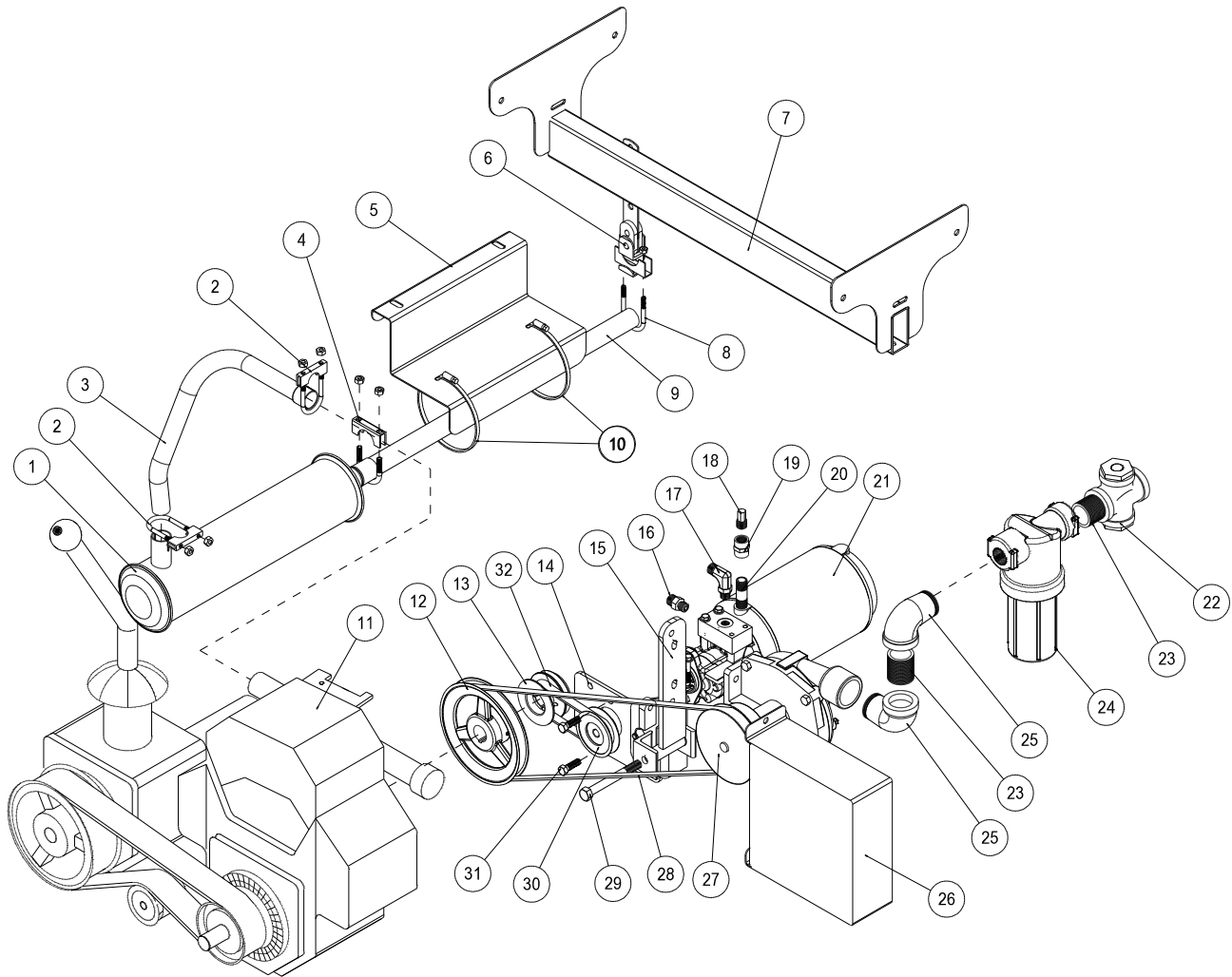


GAS TANK PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	33-216	Battery	1
2	8-603	Battery Strap	1
3	15-838	6 Gallon CARB Gas Tank (includes all * items)	1
	73-050	Replacement Cap	1
4	*	Top Draw	1
5	78-456	Tank Strap	2
	HB-14-20-200	Bolt $\frac{1}{4}$ - 20 x 2	2
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	2
6	14-574	Side Panel	1
7	8-688	Mount Bracket	1
8	8-689	Carbon Canister	1
9	HSTP-516-18-075	Machine Screw $\frac{5}{16}$ - 18 x $\frac{3}{4}$	6
	HNFL-516-18	Flange Lock Nut $\frac{5}{16}$ - 18	6
10	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	2
11	14-533	Gas Tank Bracket	1
A	8800-31	Fuel Hose $\frac{1}{4}$ " x 31" (tank to carb canister)	1
	18-186	Hose Clamp	2
B	9025-25	Fuel Hose $\frac{3}{16}$ " x 25" (carb to engine)	1
	18-186	Hose Clamp	1
C	8800-43	Fuel Hose $\frac{1}{4}$ " x 43" (Neck Vent Port to engine)	1
	18-186	Hose Clamp	2

PUMPS AND EXHAUST DRAWING

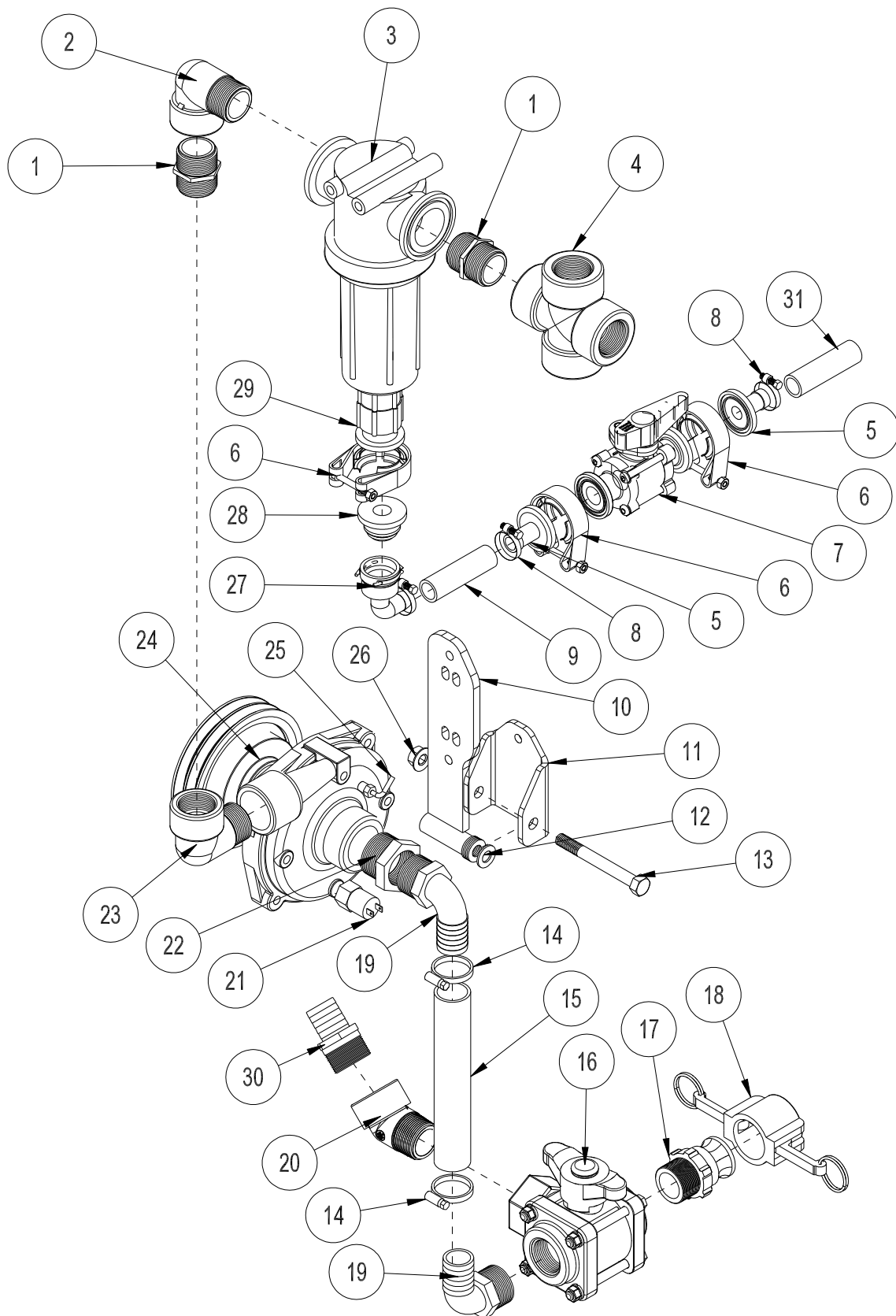
Parts



PUMPS AND EXHAUST PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-371	Muffler	1
2	13-498	Muffler Clamp 1 $\frac{1}{8}$	2
3	15-379	Exhaust Pipe	1
4	18-220	Muffler Clamp 1 $\frac{1}{4}$	1
5	14-583	Muffler Bracket	1
6	33-159	Universal Exhaust Hanger	1
	HSDPS-14-100	Pan Head Drill Screw SS 1 $\frac{1}{4}$ x 1	1
7	14-321	Tank Carrier	1
8	18-220	Muffler Clamp 1 $\frac{1}{4}$	1
9	15-387	Tail Pipe	1
10	18-147	Hose Clamps	2
	9024	Clamp End Cover	2
11	15-373	Engine Kohler Command 20.5 hp	1
	15-373-01	Exhaust Manifold (Kohler 24 164 11)	1
12	15-316	Pulley BH72 x 1 $\frac{1}{8}$	1
	HSSHS-516-50	Socket Head Set Screw 5 $\frac{1}{16}$ x 1 $\frac{1}{2}$	2
	HKSQ-14-150	Machine Key 1 $\frac{1}{4}$ x 1 $\frac{1}{4}$ x 1 $\frac{1}{2}$	1
13	15-318	Pulley with Hub BK30H 1 $\frac{1}{8}$	1
	HKSQ-14-150	Machine Key 1 $\frac{1}{4}$ x 1 $\frac{1}{4}$ x 1 $\frac{1}{2}$	1
	HB-14-20-075	Bolt 1 $\frac{1}{4}$ - 20 x 3 $\frac{3}{4}$	2
14	15-344	Pump Mount Plate	1
	HBC-516-18-100	Low Carriage Bolt 5 $\frac{1}{16}$ - 18 x 1	2
	HNTL-516-18	Lock Nut 5 $\frac{1}{16}$ - 18	2
15	15-580	Pump Arm	1
16	18-306	1 $\frac{1}{16}$ x 9 $\frac{9}{16}$ Straight Thread Connector	1
17	18-171	1 $\frac{1}{16}$ x 9 $\frac{9}{16}$ 90° Straight Thread Elbow	1
18	27-059	Filler Breather (part of 15-315)	1
19	18-314	3 $\frac{3}{8}$ Coupler	1
20	18-287	3 $\frac{3}{8}$ Pipe Nipple x 2	1
21	15-315	Hydraulic Power Unit	1
	15-315-01	Repair Kit	1
	HWK-18-063	Woodruff Key 1 $\frac{1}{8}$ x 5 $\frac{5}{8}$	1
22	16-976	Cross 1 $\frac{1}{4}$	1
23	16-880	Close Nipple 1 $\frac{1}{4}$	2
24	14-521	Strainer	1
25	16-972	Elbow 1 $\frac{1}{4}$	1
26	15-345	Belt Guard	1
27	16-998	Hypro® Pump	1
28	16-869	Belt L447	1
29	HB-12-13-450	Bolt 1 $\frac{1}{2}$ - 13 x 4 $\frac{1}{2}$	1
	HNFL-12-13	Flange Lock Nut 1 $\frac{1}{2}$ - 13	1
	HMB-12-14	Machine Bushing 1 $\frac{1}{2}$ x 14GA	6
30	15-414	Pulley BK30 x 1 $\frac{1}{2}$	1
31	HB-38-16-125	Bolt 3 $\frac{3}{8}$ - 16 x 1 $\frac{1}{4}$	2
	HNTL-38-16	Lock Nut 3 $\frac{3}{8}$ -16	2
32	15-320	Belt 5L230	1

SPRAY PUMP DRAWING

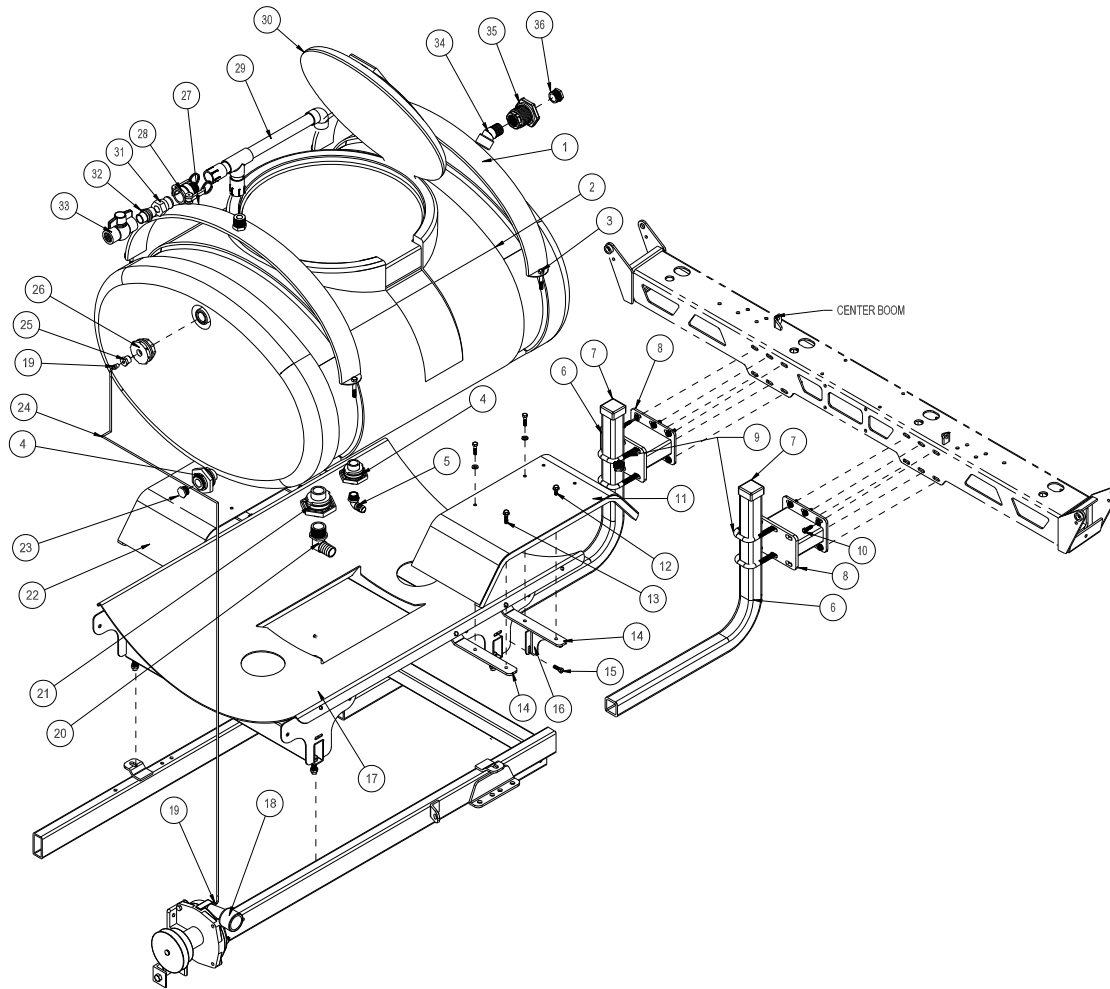


Parts

SPRAY PUMP PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-880	Close Nipple 1 ¹ / ₄	2
2	16-972	Elbow 1 ¹ / ₄	1
3	14-521	Strainer	1
4	16-976	Cross 1 ¹ / ₄	1
5	15-749	Hose Barb 3 ³ / ₄	2
6	15-740	50 Series Clamp	3
	18-222	Hose Clamp	3
7	15-738	Flanged Ball Valve	1
8	18-040	Hose Clamp	3
9	8832-3.5	3 ³ / ₄ Suction Hose x 3 ¹ / ₂	1
10	15-580	Pump Arm	1
	HB-38-16-150	Bolt 3 ³ / ₈ - 16 x 1 ¹ / ₂	2
	HW-38	Washer 3 ³ / ₈	2
	HNTL-38-16	Lock Nut 3 ³ / ₈ - 16	2
11	14-550	Main Frame	1
12	HMB-12-14	Machine Bushing 1 ¹ / ₂ x 14GA	6
13	HB-12-13-450	Bolt 1 ¹ / ₂ - 13 x 4 ¹ / ₂	1
14	18-222	Hose Clamp	2
15	8897-8.5	1 ¹ / ₂ " Discharge Hose x 8 ¹ / ₂	1
16	18-372	3-Way Valve	1
17	16-180	Quick Coupler Male	1
18	16-935	Quick Coupler Cap	1
19	16-156	90° Elbow 1 ¹ / ₄ MPT x 1 ¹ / ₄ HB	2
20	18-461	1 ¹ / ₄ 45° Elbow	1
21	33-480	Pressure Switch	1
22	16-825	Reducer Bushing 1 ¹ / ₂ x 1 ¹ / ₄	1
23	16-972	Elbow 90°	1
24	16-998	Hypro® Pump	1
	HSSQ-38-16-250	Square Head Set Screw 3 ³ / ₈ - 16 x 2 ¹ / ₂	1
	HN-38-16	Nut 3 ³ / ₈ - 16	1
25	33-494	Elbow 1 ¹ / ₈ MPT x 3 ³ / ₁₆ HB	1
26	HNFL-12-13	Flange Lock Nut 1 ¹ / ₂ - 13	1
27	15-553	3/4 - 90° Hose Barb	1
	15-553-01	Clip	1
	15-553-02	O-ring	1
28	16-825	QC Flange Adapter	1
29	15-735	#50 x 1 FPT	1
30	16-161	Fitting 1 ¹ / ₄ MPT x 1 ¹ / ₄ HB	1
31	8832-27	3 ³ / ₄ Suction Hose x 27(to tank bottom)	1

TANK AND REAR FENDER DRAWING

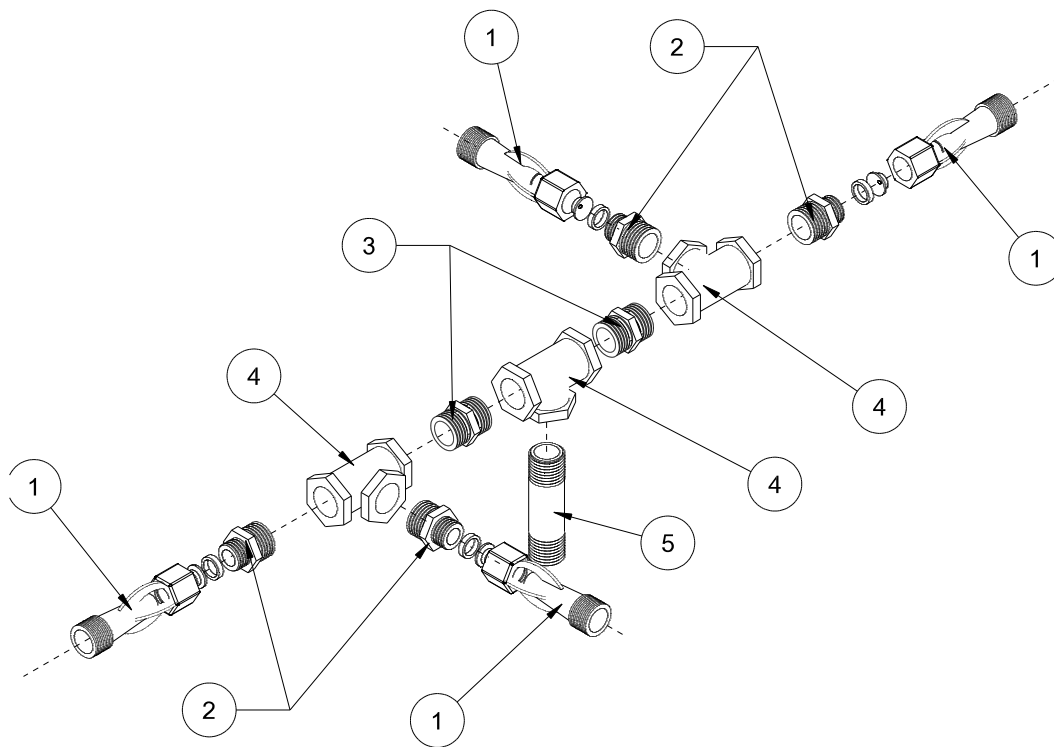


Parts

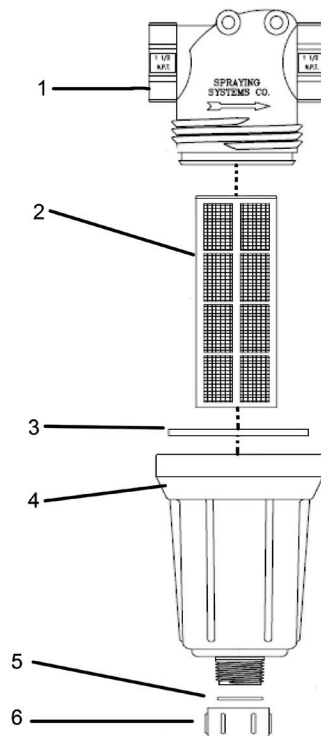
TANK AND REAR FENDER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	14-322	Rear Tank Strap	1
2	14-451	160 Gallon Poly Tank	1
3	HB-38-16-250	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{2}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
4	16-150	Double Threaded Fitting $\frac{3}{4}$ (bottom fitting only part of tank)	2
5	16-153	Elbow $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
6	17-615	Boom Carrier	2
7	16-557	Square Cap	2
8	17-614	Boom Spacer	2
9	20-555	U-bolt	4
	HNFL-12-13	Flange Lock Nut $\frac{1}{2}$ - 13	8
10	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	12
	HW-516	Washer $\frac{5}{16}$ - 18	12
	HNFL-516-18	Flange Lock Nut $\frac{5}{16}$ - 18	12
11	15-447	Left Fender	1
12	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	6
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	6
13	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	2
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	2
14	14-324	Fender Mount	4
	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	4
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	4
15	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	2
	HNTL -516-18	Lock Nut $\frac{5}{16}$ - 18	2
	HW-516	Washer $\frac{5}{16}$	as needed
16	14-341	Left Fender Brace	1
	14-340	Right Fender Brace	1
17	14-321	Tank Carrier	1
18	16-998	Hypro® Pump	1
19	33-494	Elbow $\frac{1}{8}$ MPT x $\frac{3}{16}$ HB	2
20	16-156	Elbow $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	1
21	16-194	Anti Vortex Fitting $1\frac{1}{4}$ (part of tank)	1
22	15-446	Right Fender	1
23	16-166	$\frac{3}{4}$ " Plug	1
24	8954-29	Clear Hose $\frac{3}{16}$ ID x 29"	1
25	33-496	Reducer Bushing $\frac{1}{2}$ MPT x $\frac{1}{8}$ FPT	1
26	33-495	Bulkhead Fitting	1
27	14-327	Front Tank Strap	1
28	16-962	Aluminum Coupler 1" Male Thread	1
	16-962-01	1" Buna-N Gasket (part of 16-962)	1
29	14-365	Air Gap Filler	1
30	16-953	16" Hinged Lid/Well with Gasket (part of tank)	1
	16-953-01	Gasket	1
	16-169	Strainer Basket (not included with tank)	1
31	16-961	Aluminum Adapter 1" Female thread	1
32	16-851	1" Nipple	1
33	18-448	1" Ball Valve	1

TURBO QUAD AGITATOR DRAWING



14-521 STRAINER DRAWING



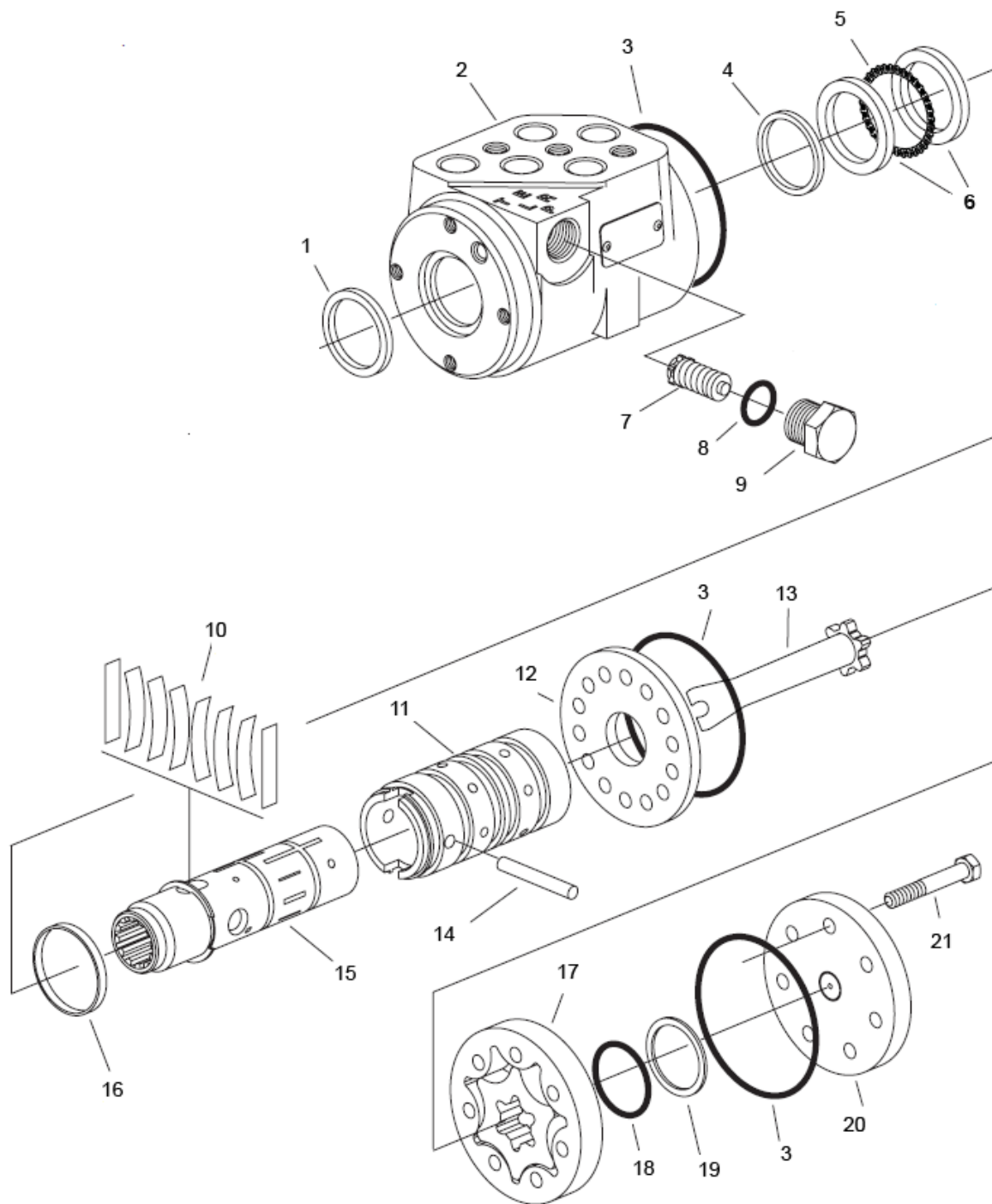
TURBO QUAD AGITATOR PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-036	Agitator Jets (includes one each $\frac{1}{8}$ " , $\frac{5}{32}$ " , and $\frac{3}{16}$ " orifices)	4
		Interchangeable Nozzles $\frac{3}{16}$ " (factory installed)	4
2	16-173	Reducer $\frac{3}{4}$ x $\frac{1}{2}$	4
3	16-158	Close Nipple $\frac{3}{4}$	2
4	16-157	Tee Female Pipe Thread $\frac{3}{4}$ x $\frac{3}{4}$ x $\frac{3}{4}$	3
5	16-172	Nylon Nipple $\frac{3}{4}$ NPT x $3\frac{1}{2}$	1
	*	One each comes with 16-036 Agitator Jet.	

14-521 STRAINER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	14-521-01	Head $1\frac{1}{4}$ (Poly)	1
2	16-968-03	Screen	1
3	14-521-02	Gasket	1
4	14-521-03	Bowl	1
5	14-521-04	Gasket	1
6	14-521-05	Cap	1

15-301 ORBITROL DRAWING



Parts

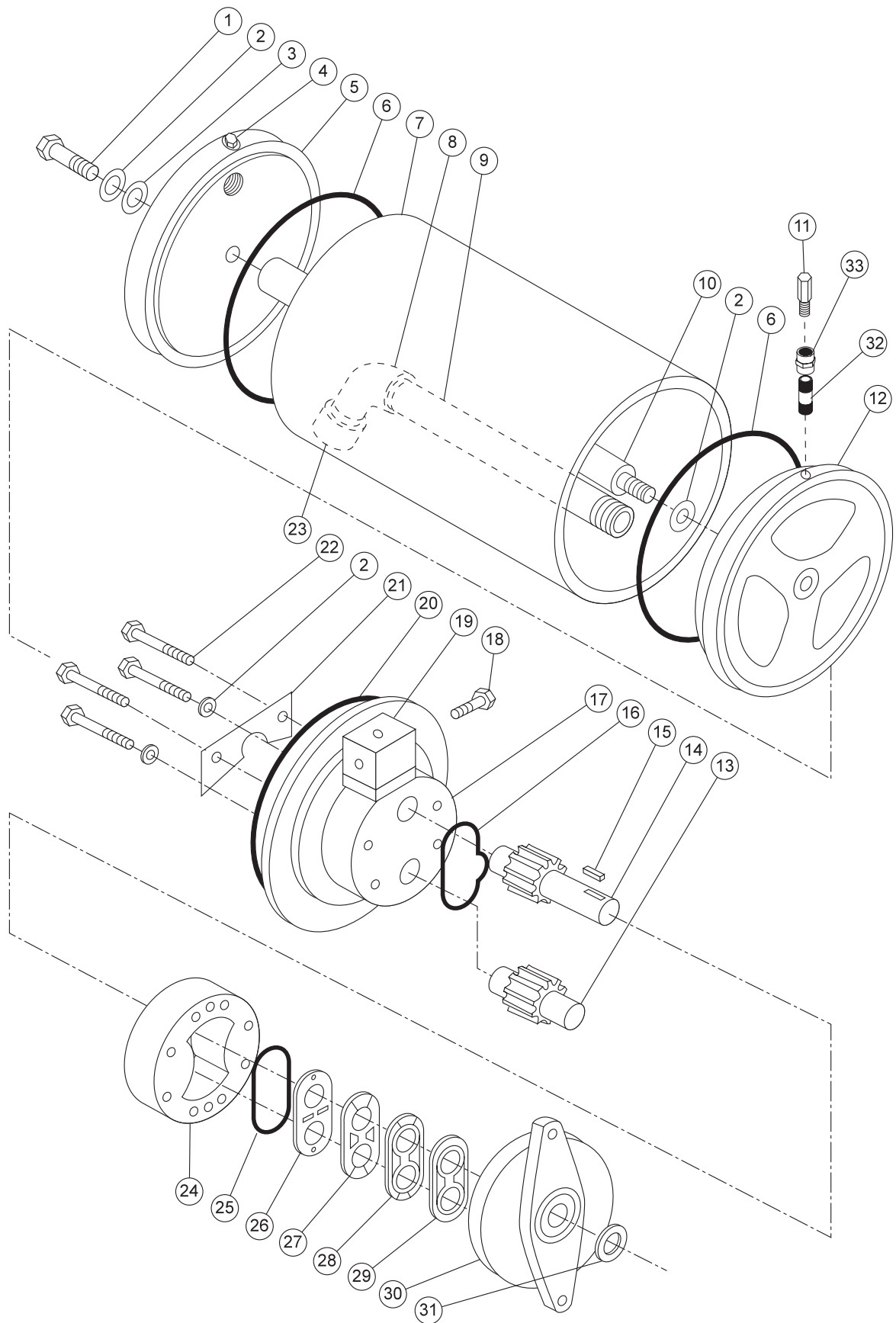
15-301 ORBITROL PARTS LIST

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

15-301 ORBITROL SPECIFICATIONS

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

15-315 HYDRAULIC PUMP



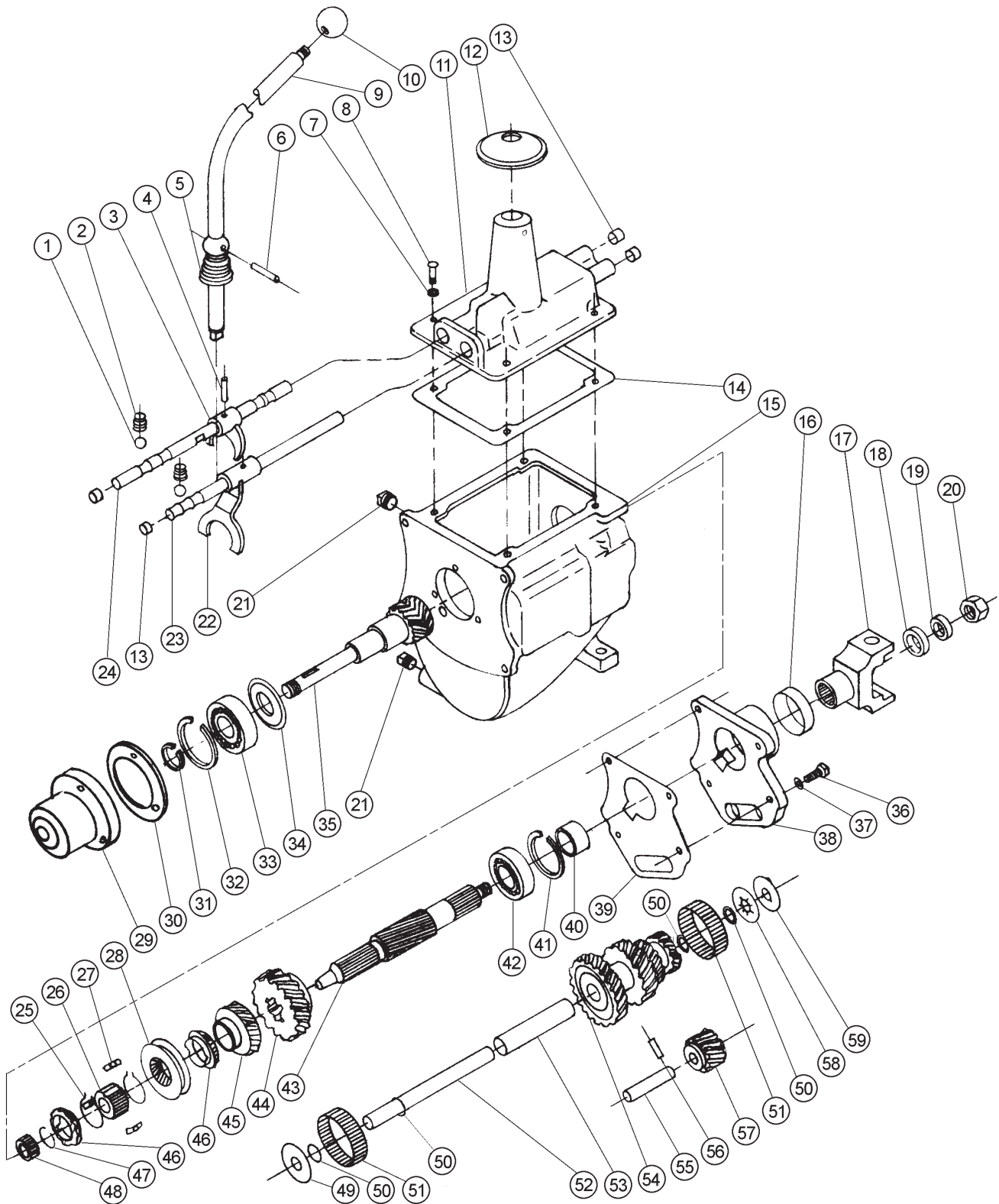
Parts

15-315 HYDRAULIC PUMP

REF#	PART#	DESCRIPTION	QUANTITY
1	15-315-18	Cap Screw	1
2	15-315-17	Washer	4
3*		Stato-Seal	1
4	18-060	Pipe Plug $\frac{3}{8}$ NPT	2
5	15-315-10	Tank End	1
6*	15-315-20	O-Ring	2
7	15-315-11	Tube (Tank)	1
8	15-315-13	Elbow	1
9	15-315-12	Nipple	1
10	15-315-15	Spacer Assembly	1
11	27-059	Filler Breather	1
12	15-315-09	Tank End/Tank Pump	1
13	15-315-05	Driven Gear Assembly	1
14	15-315-04	Drive Gear Assembly	1
15	HWK-18-063	Woodruff Key $\frac{1}{8}$ x $\frac{5}{8}$	1
16*		Molded O-Ring	1
17	15-315-07	Back Cover	1
18	15-315-06	Relief Valve	1
19	15-315-16	Sub-Plate (Includes 1-Sub-Plate, 4-Mounting Bolts, 3-O-Rings and 1-Plug)	1
20*	15-315-21	Tank/Pump Gasket	1
21	15-315-08	Baffle	1
22	15-315-19	Cap Screw	4
23	15-315-14	Strainer	1
24	15-315-03	Center Section	1
25*		O-Ring	1
26*		Wear Plate	1
27*		Heat Shield	1
28*		Gasket	1
29*		V-seal	1
30	15-315-02	Front Cover	1
31*	15-315-22	Shaft Seal	1
32	18-287	$\frac{3}{8}$ " Pipe Nipple x 2"	1
33	18-314	$\frac{3}{8}$ " Pipe Coupler	1
*	15-315-01	Repair Kit (For Pump and Tank)	

15-409 3-SPEED TRANSMISSION DRAWING

Parts



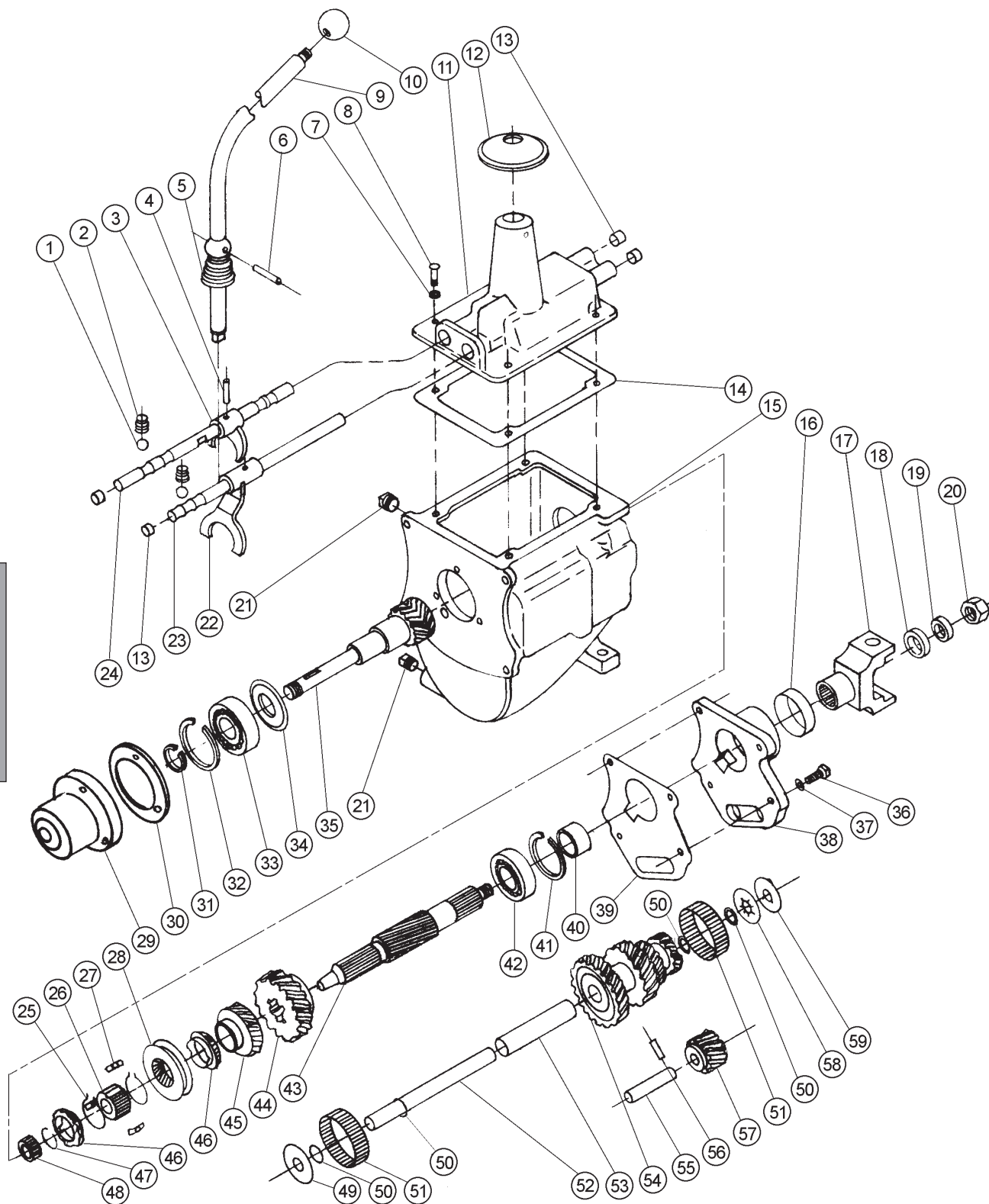
15-409 3-SPEED TRANSMISSION PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1†	16-341	Ball $\frac{3}{8}$ detent	2
2†	16-342	Poppet Spring	2
3†	16-348	Low & Reverse Shift Fork	1
4†	16-343	Rail Pin	2
5†	16-344	Shift Spring	1
6†	16-308	Pin	1
7†	HWL-516	Lockwasher $\frac{5}{16}$	7
8†	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	7
9†	15-458	Shift Lever	1
10†	16-259	Shift Knob (not included with 15-409)	1
	16-011	Decal Shift (not included with 15-409)	1
11†	16-301	Transmission Housing Cover	1
12†	16-039	Rubber Rain/Dust Boot (not included with 15-409)	1
13†	16-340	Plug Cap	4
14†	16-302	Housing Cover Gasket	1
15	16-330	Top Shift type Case	1
16	16-313	Seal M/S (rear)	1
17	16-004	Yoke	1
18	16-306	Washer M/S	1
19	HWL-34	Lockwasher $\frac{3}{4}$	1
20	16-307	Nut	1
21	16-336	Drain/Fill Plug	2
22†	16-337	High & Inter. Shift Fork	1
23†	16-338	High & Inter. Shift Rail	1
24†	16-339	Low & Reverse Shift Rail	1
25*	16-351	Syncro Snap Ring	2
26*	16-352	Syncro Hub	1
27*	16-350	Shift Plate	3
28*	16-908	Sleeve	1
29	16-054	Tran. Bearing Housing (not included with 15-409)	1
	16-008	Bearing (part of 16-054)	1
	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	3
	HW-38	Washer $\frac{3}{8}$	3
30	16-218	Gasket (not included with 15-409)	1
31	16-335	Snap Ring (small)	1
32	16-334	Snap Ring (large)	1
33	16-333	Bearing M/D Gear	1
34	16-332	Oil Baffle	1
35	16-331	Gear M/D keyed (input shaft)	1
36	16-347	Bolt $\frac{7}{16}$ - 14 x 1 (black)	4
37		Washer $\frac{7}{16}$ (star burst)	4
38	16-314	Rear Bearing Retainer	1
39	16-326	Gasket M/D retainer	1
*	16-328	Synchronized Assembly with BR Rings	1
†	16-299	Transmission Cover Assembly	

(Continued on next page)

15-409 3-SPEED TRANSMISSION DRAWING

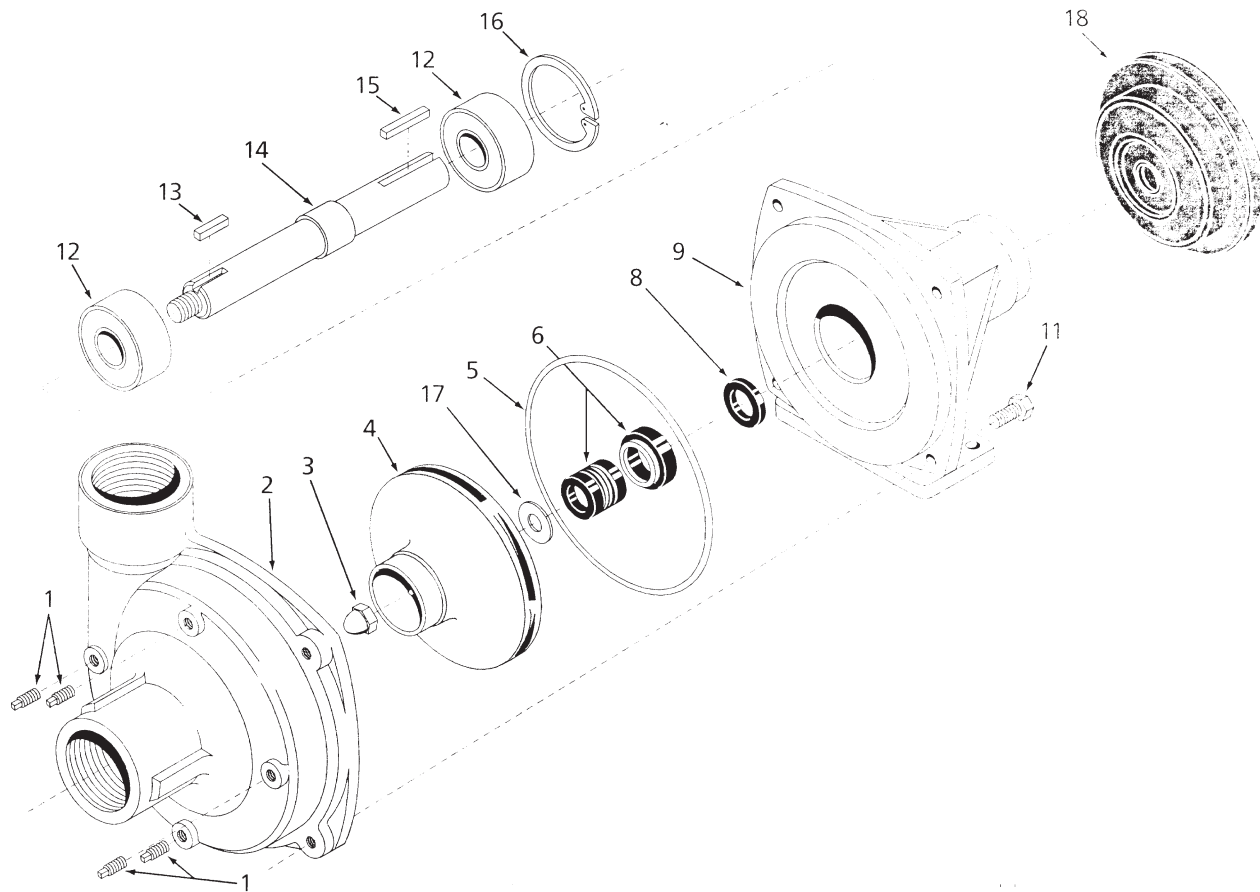
Parts



15-409 3-SPEED TRANSMISSION PARTS LIST

40	16-309	Spacer (speedometer)	1
41	16-305	Snap Ring	1
42	16-304	Rear Bearing	1
43	16-303	Main Shaft	1
44	16-310	Gear M/S (low & reverse)	1
45	16-311	Gear M/S (2nd)	1
46*	16-312	Syncro Ring M/S 2nd & 3rd	2
47	16-329	Snap Ring	1
48	16-327	Needle Bearing (13 rollers per set)	1 set
49	16-325	Steel Washer	1
50	16-317	Thrust Washer	4
51	16-318	Main Needle Bearing (20 rollers per set)	2 sets
52	16-324	Cluster Gear Shaft C/S	1
53	16-323	Cluster Spacer Tube	1
54	16-322	Gear C/S (cluster)	1
55	16-321	Reverse Gear Shaft	1
56	16-320	Lockplate	1
57	16-319	Reverse Idler Gear	1
58	16-316	Thrust Washer	1
59	16-315	Thrust Washer	1
* 16-328		Synchronized Assembly with BR Rings	1

16-998 HYPRO PUMP DRAWING



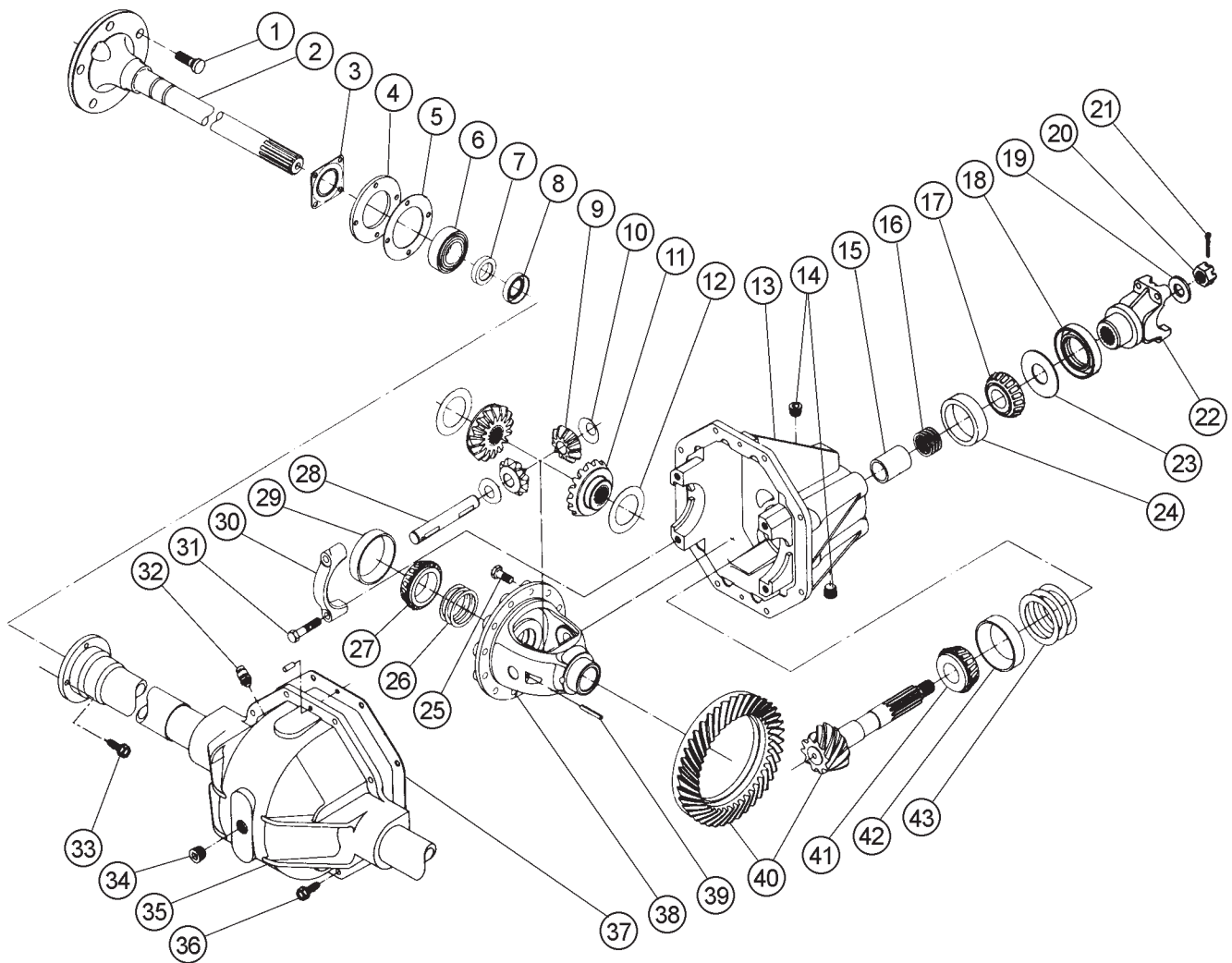
Parts

16-998 HYPRO® PUMP PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-998-01	Drain Plug	4
2	16-998-02	Pump Casing	1
3	16-998-03	Impeller Nut	1
4	16-966-16	Impeller	1
5*	16-467	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	
*	16-967	Silicone - Carbon Seal Kit	

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

16-037 REAR AXLE DRAWING



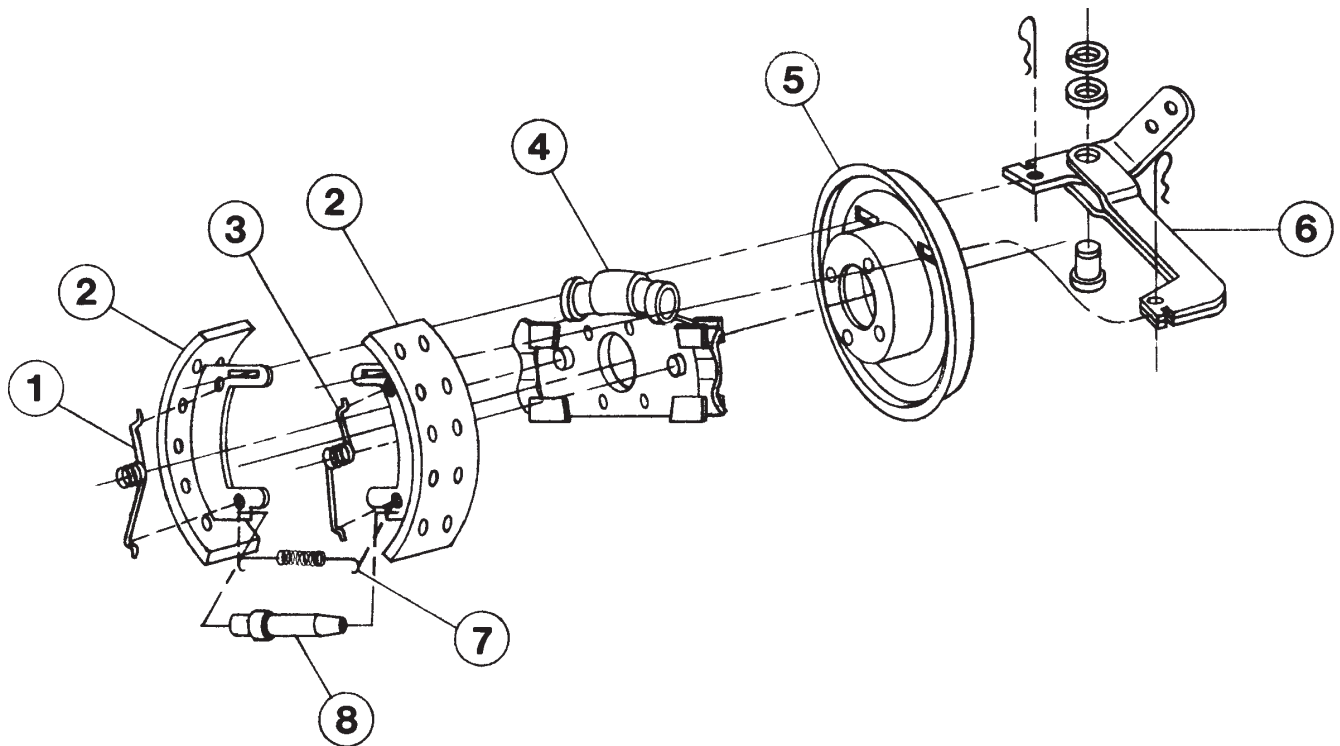
Parts

16-037 REAR AXLE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-510	Wheel Bolt	10
	16-562	Lock Nut	2
2	16-511	Axle Shaft (Left and Right)	2
3	16-513	Oil Seal	2
4		Part of Brake Dust Shield	
5	16-518	RTV Gasket Eliminator (Loctite Brand)	As Required
6	16-515	Bearing	2
7	16-516	Wheel Bearing Retainer Ring	2
8	16-519	Oil Seal	2
9	16-495	Pinion Mate	2
10	16-496	Thrust Washer	2
11	16-494	Side Gear	2
12	16-493	Thrust Washer	2
13	16-501	Carrier	1
14	16-502	Oil Plug	2
15	16-503	Sleeve Spacer	1
16	16-504	Shim (Set of 4)	2-4
17	16-506	Bearing Cone	1
18	16-508	Oil Seal	1
19	16-816	Flat Washer	1
20	HNA-58-18	Axle Nut $\frac{5}{8}$ - 18	1
21	HP-18-150	Cotter Pin $\frac{1}{8}$ x $1\frac{1}{2}$	1
22	16-509	End Yoke	1
23	16-507	Shim	1
24	16-505	Bearing Cup	1
25	16-489	Drive Gear Screw	14
26	16-488	Shim (Set of 4)	4-6
27	16-487	Bearing Cone	2
28	16-492	Pinion Mate Shaft	1
29	16-486	Bearing Cup	2
30		Bearing Cap	
31	16-484	Bearing Cup Screw	4
32	16-481	Vent Assembly	1
33	16-963	Bolt Kit	
		(Includes Bolt, Washer, and Nut (Replace all 8 when replacing one))	8
34	18-069	Plug $\frac{1}{2}$ NPT	1
35	16-480	Rear Axle Housing	1
36	16-815	Housing Bolt	8
	16-561	Hex Nut	8
	16-563	Lockwasher	8
37	16-482	RTV Sealant	As Required
38	16-490	Differential Case	1
39	16-491	Pinion Lock Pin	1
40	16-497	Gear and Pinion Assembly 12.25:1 Ratio (Matched Set)	1
41	16-498	Bearing Cone	1
42	16-499	Bearing Cup	1
43	16-500	Spacer (Set of 3)	2-4

16-037 Includes Brakes and Drums

BRAKE ASSEMBLY DRAWING

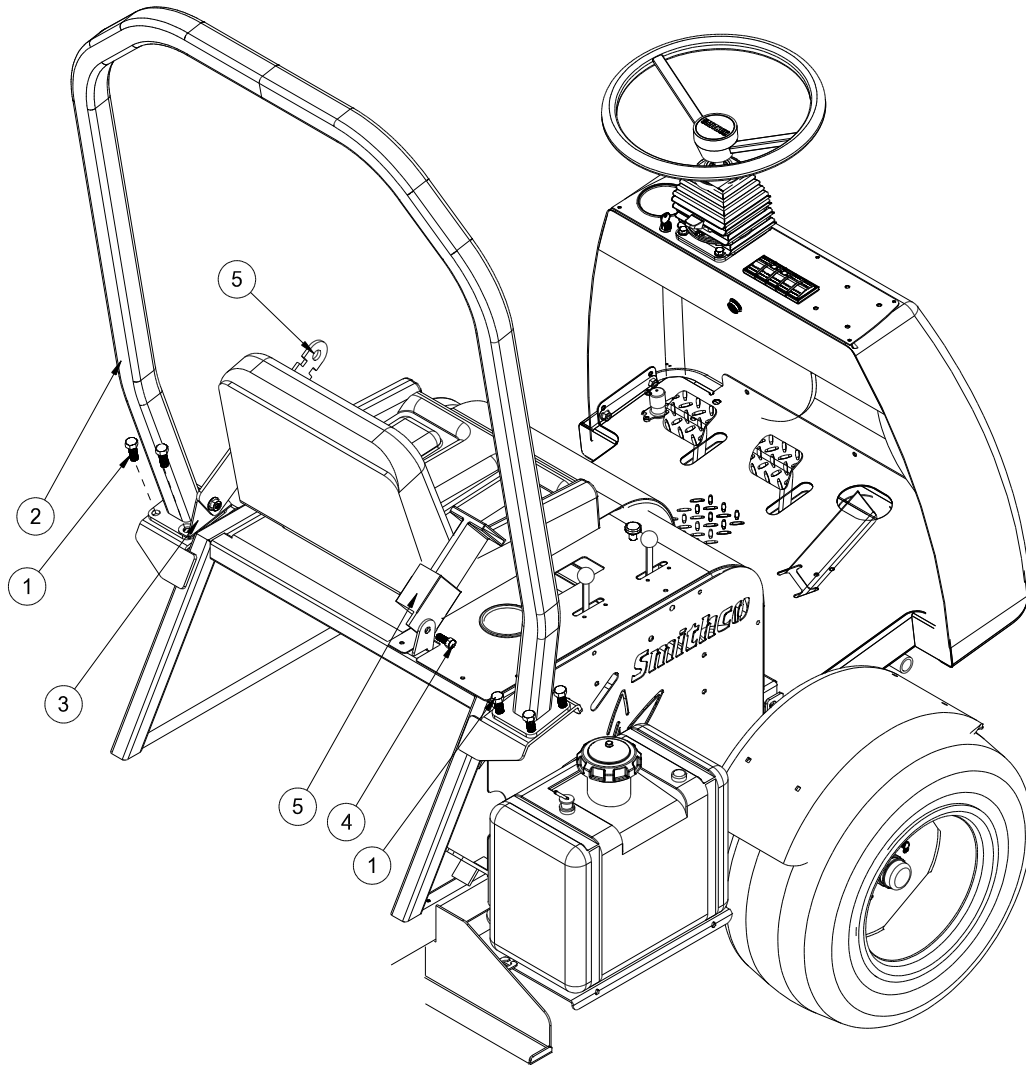


BRAKE ASSEMBLY PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-704	Shoe Return Spring (Green)	1
2	16-725	Shoe and Lining Kit	2 sets required
3	16-705	Shoe Return Spring (Red)	1
4	16-723	Spider Torque Kit	1
5	16-709	Dust Shield and Bearing Retainer	1
6	16-713	Brake Lever Kit (Right or Left)	1
7	16-719	Adjusting Spring	1
8	16-720	Adjusting Screw Kit	1
	16-514	Left Brake Assembly (part of 16-037)	1
	16-554	Right Brake Assembly (part of 16-037)	1
	16-559	Brake Drum (part of 16-037)	2
	16-723-01	Cylinder Kit (Includes Boot and Cup)	2 per cylinder

1. For Left brake, assembly with star wheel of adjusting screw (Ref# 8) towards the front of the brake (as shown), opposite for Right brake.
2. Red Spring- Assemble to front of brake on right side assembly, opposite for left.
3. Green Spring - Assemble to rear of brake on right side assembly, opposite for left.
4. Brake actuating lever (Ref# 6) shown for right assembly, reverse for left assembly. Bent arm stays up, double arm switches to forward.

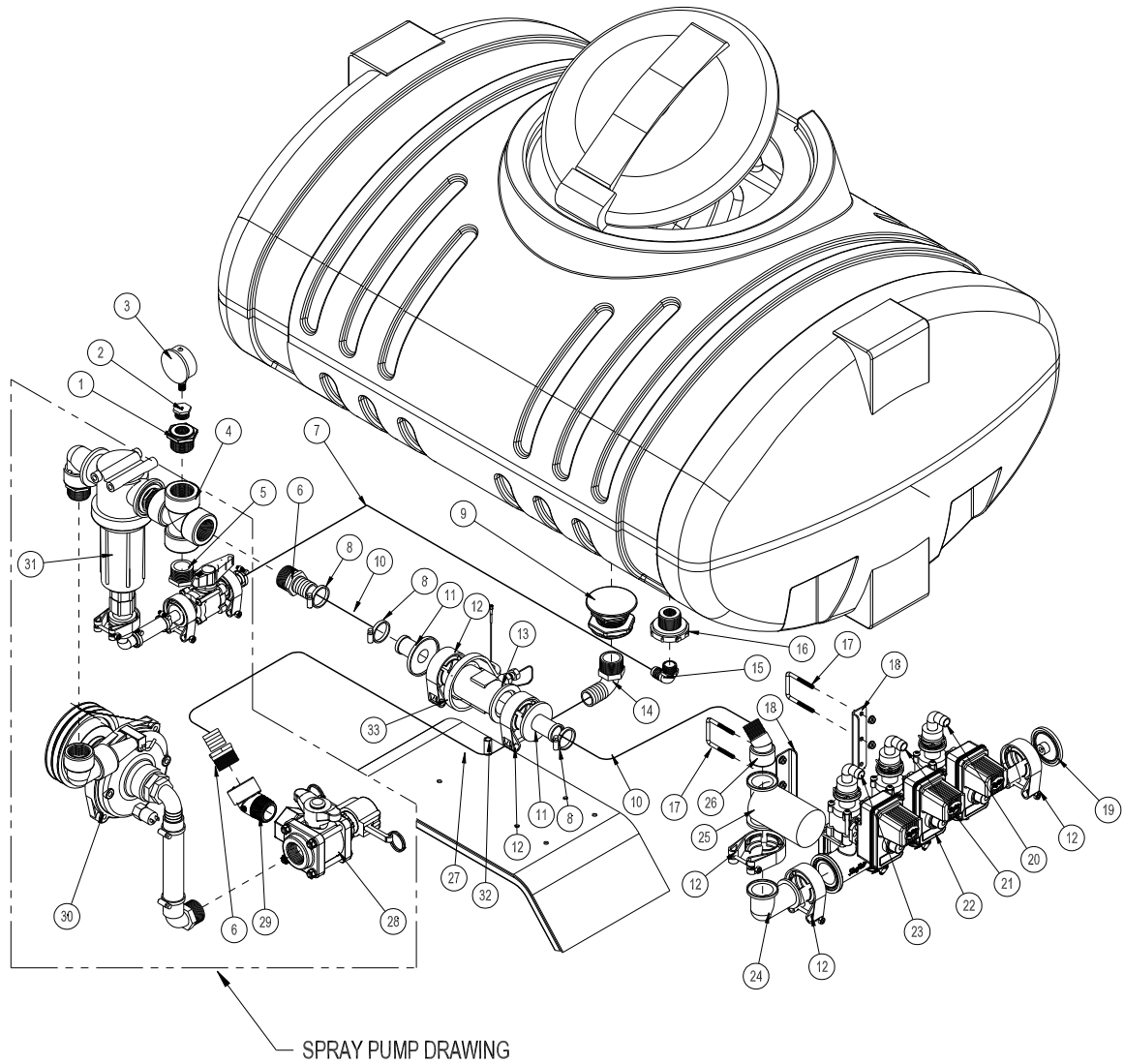
14-585 ROLL OVER BARS FOR 1760



Accessories

REF#	PART#	DESCRIPTION	QUANTITY
1	HB-12-13-125	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{4}$	8
	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	8
	HNFL-12-13	Flange Nut $\frac{1}{2}$ - 13	8
2	14-580	ROPS Bar	1
3	14-581	LH Seat Belt Bracket	1
4	HB-716-14-100	Bolt $\frac{7}{16}$ - 18 x 1	2
	HNTL-716-14	Lock Nut $\frac{7}{16}$ - 14	2
5	76-198-03	Seat Belt	1

1762 PLUMBING (RAVEN 440)

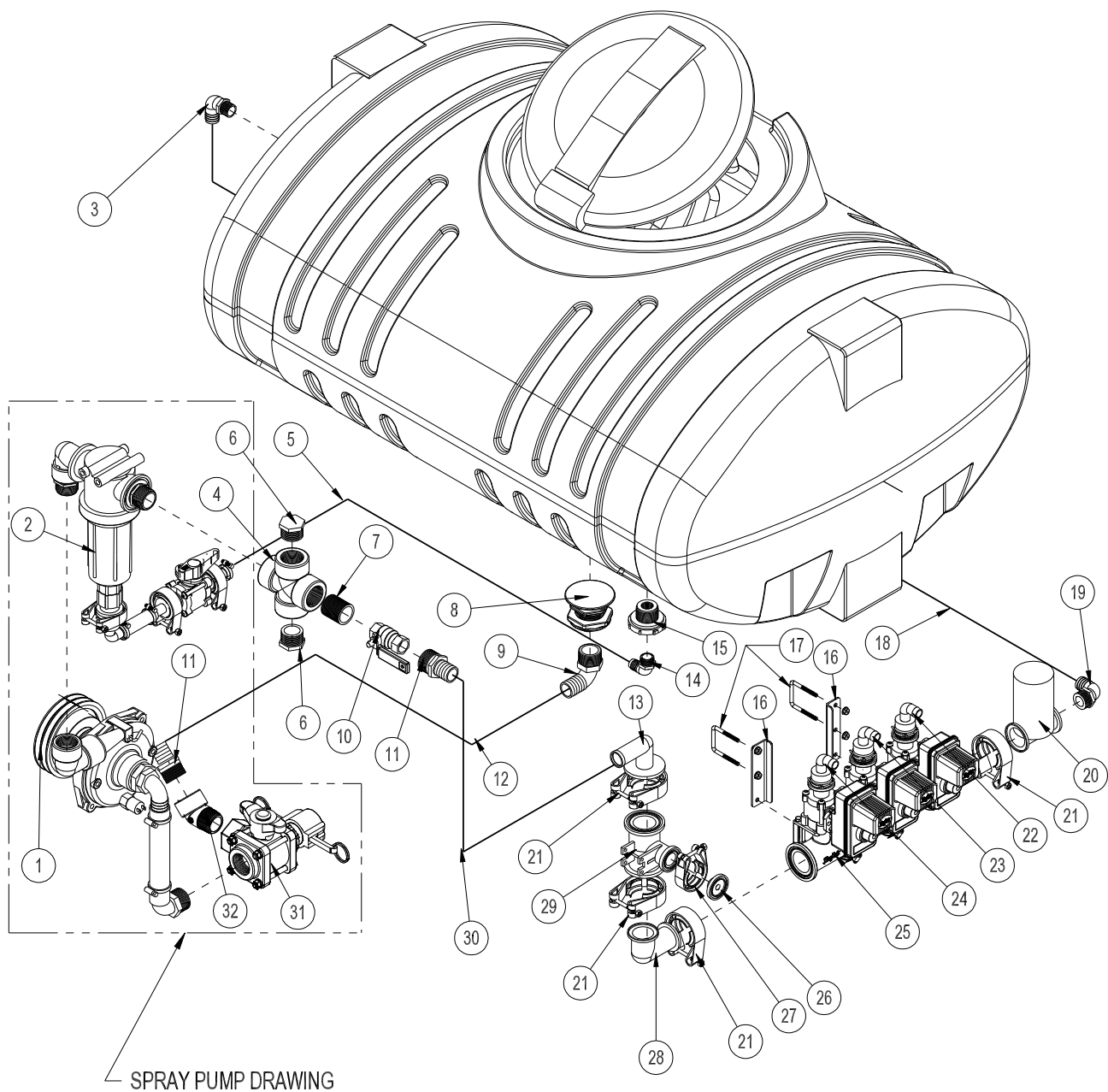


1762 SYSTEM (RAVEN 440)

REF#	PART#	DESCRIPTION	QUANTITY
1	18-388	Reducer Bushing 1 $\frac{1}{4}$ x 3 $\frac{3}{4}$	1
2	16-288	Reducer Bushing 3 $\frac{3}{4}$ x 1 $\frac{1}{4}$	1
3	16-281	Liquid Filled Gauge	1
4*	16-976	Cross 1 $\frac{1}{4}$	1
5	10-389	1 $\frac{1}{4}$ Plug	1
6	16-161	Fitting 1 $\frac{1}{4}$ MPT x 1 $\frac{1}{4}$ HB	2
7*	8832-27	Suction Hose 3 $\frac{3}{4}$ " x 27	1
	18-040	Hose Clamp HS-12	2
8	18-222	Hose Clamp 1 $\frac{3}{16}$ x 1 $\frac{1}{2}$	4
9*	16-194	Anti Vortex Fitting (part of tank)	1
10	8897-15	Discharge Hose 1 $\frac{1}{4}$ " x 15	2
11	15-744	#75 Hose Barb 1 $\frac{1}{4}$	2
12	15-741	#75 Clamp	5
13	18-373	Flow Meter	1
	18-373-01	Sensor	1
14*	16-156	Elbow 1 $\frac{1}{4}$ MPT x 1 $\frac{1}{4}$ HB	1
15*	16-153	Elbow 3 $\frac{3}{4}$ MPT x 3 $\frac{3}{4}$ HB	1
16*	16-150	Double Threaded Fitting	1
17	10-194	U-Bolt	2
	HNFL-14-20	Flange lock Nut 1/4 - 20	4
18	14-577	Manifold Valve Bracket	2
19	15-742	#75 Inlet Cover	1
20	8887-57	Orange PVC Hose 3 $\frac{3}{4}$ x 57" (to right boom)	1
	18-040	Hose Clamp HS-12	1
21	8887-16	Orange PVC Hose 3 $\frac{3}{4}$ x 16" (to center boom)	1
	18-040	Hose Clamp HS-12	1
22	15-743	453 Manifold	1
	15-553	3 $\frac{3}{4}$ - 90° Hose Barb	3
	15-553-01	Clip	3
	15-553-02	O-Ring	3
23	8887-51	Orange PVC Hose 3 $\frac{3}{4}$ x 51" (to left boom)	1
	18-040	Hose Clamp HS-12	1
24	15-734	#75 Elbow Coupling	1
25	16-524	Motorized Control Valve	1
26	16-971	45° Elbow 1 FPT x 1 MPT	1
27*	8897-14.5	Discharge Hose 1 $\frac{1}{4}$ " x 14 $\frac{1}{2}$ "	1
	18-116	Hose Clamp HS-24	2
28*	18-372	3-Way Valve	1
29*	18-461	45° Street Elbow	1
30*	16-998	Hypro® Pump	1
31*	14-521	Strainer	1
32	14-578	Spacer	1
33	HLC-A-200	Loom Clamp (bolt to LH rear fender)	1

* parts on Spray Truck

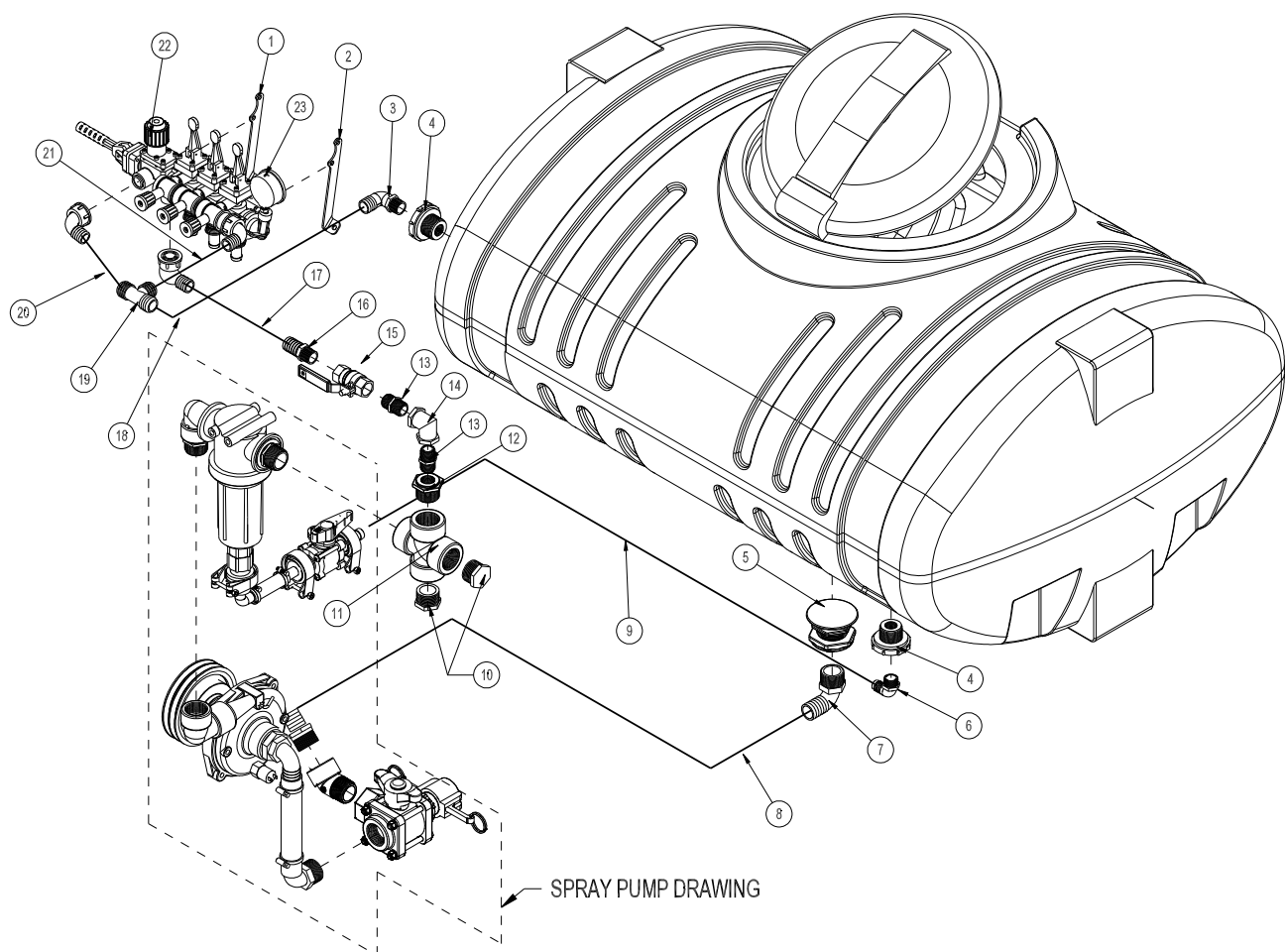
1764 SYSTEM (RAVEN 203)



Accessories

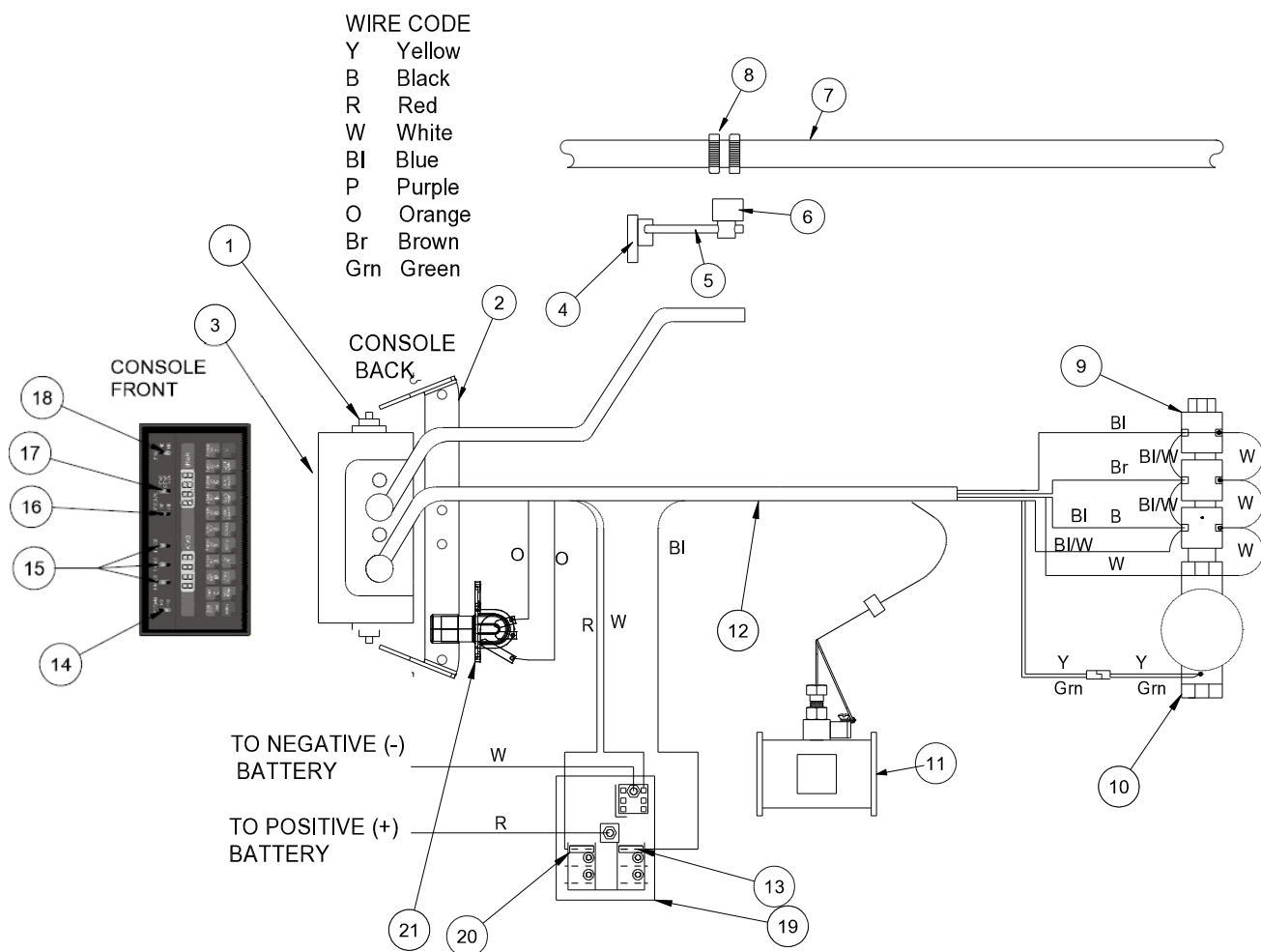
REF#	PART#	DESCRIPTION	QUANTITY
1*	16-998	Hypro® Pump	1
2*	14-521	Strainer	1
3	16-155	Elbow $\frac{3}{4}$ MPT x 1HB	1
4*	16-976	Cross $1\frac{1}{4}$	1
5*	8832-27	Suction Hose $\frac{3}{4}$ " x 27	1
	18-040	Hose Clamp HS-12	2
6	10-389	Plug $1\frac{1}{4}$	2
7	18-160	Close Nipple $1\frac{1}{4}$ "	1
8*	16-194	Anti Vortex Fitting (part of tank)	1
9*	16-156	Elbow $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	1
10	18-279	Ball Valve $1\frac{1}{4}$	1
11	16-161	Fitting $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	2
12*	8897-14.5	Discharge Hose $1\frac{1}{4}$ " x $14\frac{1}{2}$ "	1
	18-116	Hose Clamp HS-24	2
13	15-739	#75 90° Hose Barb	1
14*	16-153	Elbow $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
15*	16-150	Double Threaded Fitting	1
16	14-577	Manifold Valve Bracket	2
17	10-194	U-Bolt	2
	HNFL-14-20	Flange lock Nut 1/4 - 20	4
18	8896-66	Discharge Hose 1" x 66	1
	18-222	Hose Clamp $\frac{13}{16}$ x $1\frac{1}{4}$	2
19	16-164	Elbow 1 MPT x 1HB	1
20	16-524	Motorized Control Valve	1
21	15-741	#75 Clamp	4
22	8887-57	Orange PVC Hose $\frac{3}{4}$ x 57" (to right boom)	1
	18-040	Hose Clamp HS-12	1
23	8887-16	Orange PVC Hose $\frac{3}{4}$ x 16" (to center boom)	1
	18-040	Hose Clamp HS-12	1
24	8887-51	Orange PVC Hose $\frac{3}{4}$ x 51" (to left boom)	1
	18-040	Hose Clamp HS-12	1
25	15-743	453 Manifold	1
	15-553	$\frac{3}{4}$ - 90° Hose Barb	3
	15-553-01	Clip	3
	15-553-02	O-Ring	3
26	15-777	Gauge Port Flange	1
27	15-740	#50 Clamp	1
28	15-734	#75 Elbow Coupling	1
29	15-775	Reducer Tee	1
30	8897-40	Discharge Hose $1\frac{1}{4}$ " x 40	1
	18-116	Hose Clamp HS-24	2
31*	18-372	3-Way Valve	1
32*	18-461	45° Street Elbow	1

* Part s on Spray Truck



REF#	PART#	DESCRIPTION	QUANTITY
1	10-263	Front Valve Bracket	1
2	10-264	Rear Valve Bracket	1
3	16-155	Elbow $\frac{3}{4}$ MPT x 1 HB	1
4*	16-150	Double Threaded Fitting	2
5*	16-194	Anti Vortex Fitting (part of tank)	1
6*	16-153	Elbow $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
7*	16-156	Elbow $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	1
8*	8897-14.5	Discharge Hose $1\frac{1}{4}$ " x $14\frac{1}{2}$ "	1
	18-116	Hose Clamp HS-24	2
9*	8832-27	Suction Hose $\frac{3}{4}$ " x 27	1
	18-040	Hose Clamp HS-12	2
10	10-389	$1\frac{1}{4}$ Plug	2
11*	16-976	Cross $1\frac{1}{4}$	1
12	18-388	Reducer	1
13	16-158	Close Nipple $\frac{3}{4}$	2
14	16-151	Elbow FPT $\frac{3}{4}$	1
15	16-859	Ball Valve $\frac{3}{4}$ Brass	1
16	16-196	Hose Barb $\frac{3}{4}$ MPT x 1 HB	1
17	8896-32	Discharge Hose 1" x 32"	1
	18-222	Hose Clamp $\frac{13}{16}$ x $1\frac{1}{2}$	2
18	8896-20	Discharge Hose 1" x 20"	1
	18-222	Hose Clamp $\frac{13}{16}$ x $1\frac{1}{2}$	2
19	10-269	Plastic Tee 1 x 1 x 1HB	1
20	8896-10	Discharge Hose 1" x 10"	1
	18-222	Hose Clamp $\frac{13}{16}$ x $1\frac{1}{2}$	2
21	8896-4	Discharge Hose 1" x 4"	1
	18-222	Hose Clamp $\frac{13}{16}$ x $1\frac{1}{2}$	2
22	10-268	3 Way Manual Valve	1
23	16-281	Liquid Filled Gauge	1
Boom Hoses (not shown)			
	8887-122	Orange PVC Hose $\frac{3}{4}$ " x 122" (right boom)	1
	18-040	Hose Clamp HS-12	1
	8887-109	Orange PVC Hose $\frac{3}{4}$ " x 109" (center boom)	1
	18-040	Hose Clamp HS-12	1
	8887-130	Orange PVC Hose $\frac{3}{4}$ " x 130" (left boom)	1
	18-040	Hose Clamp HS-12	1

WIRING 1762 SYSTEM (RAVEN 440)

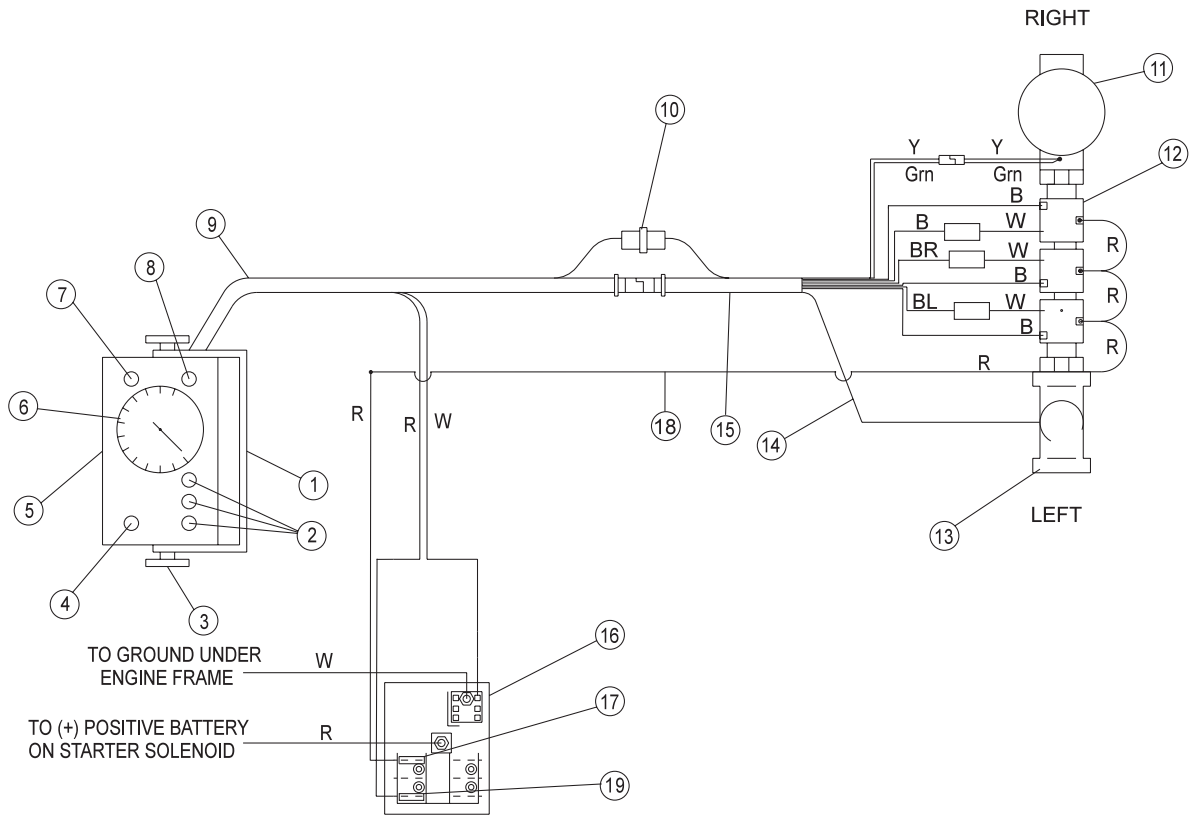


WIRING 1762 SYSTEM (RAVEN 440)

REF#	PART#	DESCRIPTION	QUANTITY
1	16-558	Mounting Knob	2
2	10-237	Mounting Bracket	1
3	16-525	Console (only)	1
	16-234	Computer Cover	1
4*	15-370-03	Turret Assembly	2
5*	15-370-04	Speed Sensor Rod	1
6*	16-139	7' Magnetic Sensor Cable'	1
	15-365-01	10' Magnetic Sensor Cable	1
7	14-370	Drive Line (Spray Star)	1
	18-422	Sensor Drive Shaft Assembly	1
8*	15-370-01	Red Magnet Assembly north	1
*	15-370-02	Black Magnet Assembly south	1
*	15-370-07	Small Band Clamp	2
9	15-743	Manifold Valve	1
10	16-524	Motorized Control Valve	1
11	18-373	Flow Meter	1
12	15-369	Console Control Cable	1
13	33-562	Auto Blade Type Fuse 40 amp	1
14	16-697	Master Switch	1
15	16-141	Boom Switch	3
16	16-873	Adjustment Switch	1
17	16-525-01	Rate 1/ Rate 2 Manual Switch	1
18	16-140	Power Switch	1
19	33-271	Fuse Block	1
20	33-508	Auto Blade Type Fuse 15 amp	1
21	33-509	Master Boom Control	1
	8848-36	Orange 14ga Wire	2
	8853	Slide on Connector	2
	8859	Ring Terminal	2
	8963	Heat Shrink	4
	10-458	Spray Switch Mount	1
*	15-370-08	Drive Shaft Hardware Kit (for speed sensor)	

Use Dielectric Grease On All Electrical Connections

WIRING 1764 SYSTEM (RAVEN 203)



WIRING 1764 SYSTEM (RAVEN 203)

REF#	PART#	DESCRIPTION	QUANTITY
1	16-958-01	Mounting Bracket	1
2	16-898	Boom Switch	3
3	16-900	Mounting Knob	2
4	16-899	Master Switch	1
5	18-418	Console with Liquid Filled Pressure Gauge	1
6	33-090-02	Liquid Filled Pressure Gauge	1
	33-090-04	Pressure Gauge Tube Fitting	1
7	16-958-02	Fuse Holder	1
	16-525-03	Fuse 15 AMP	1
8	16-895	Pressure Switch	1
9	16-958-04	Cable Assembly 8ft Enclosure Hook-Up	1
10	16-958-05	Union Fitting	1
11	16-524	Motorized Control Valve	1
12	15-743	453 Manifold Ball	1
13	15-734	#75 Elbow Coupling	1
14	16-955	Tubing	1
15	16-902	Cable Assembly 72" Solenoid Hook-Up	1
16	33-271	Fuse Block	1
17	33-562	Auto Blade Type Fuse 40 amp	1
18	10-225	Wire Harness (fuse block to electric valve)	1
19	33-508	Auto Blade Type Fuse 15 Amp	1

Use Dielectric Grease On All Electrical Connections

16-524 MOTORIZED CONTROL VALVE

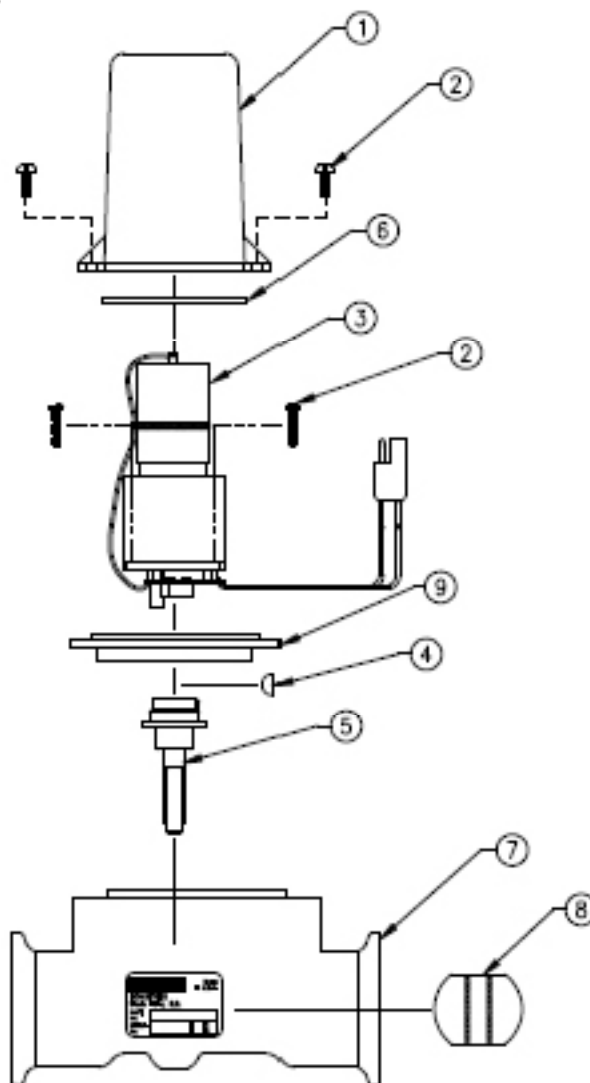
WHEN SERVICING VALVE:

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

Replace motor assembly if the motor will not run.

Before reassembling valve, remove the coupler shaft from the valve body. Apply Loctite to coupler shaft and woodruff key. Place the coupler shaft (Ref 5) and the woodruff key (Ref 4) onto the motor shaft. Plug motor into the valve connector coming from Sprayer Control Console. Check that the motor rotates in both directions. Motor must stop when coupler shaft CAM releases printed circuit board button.

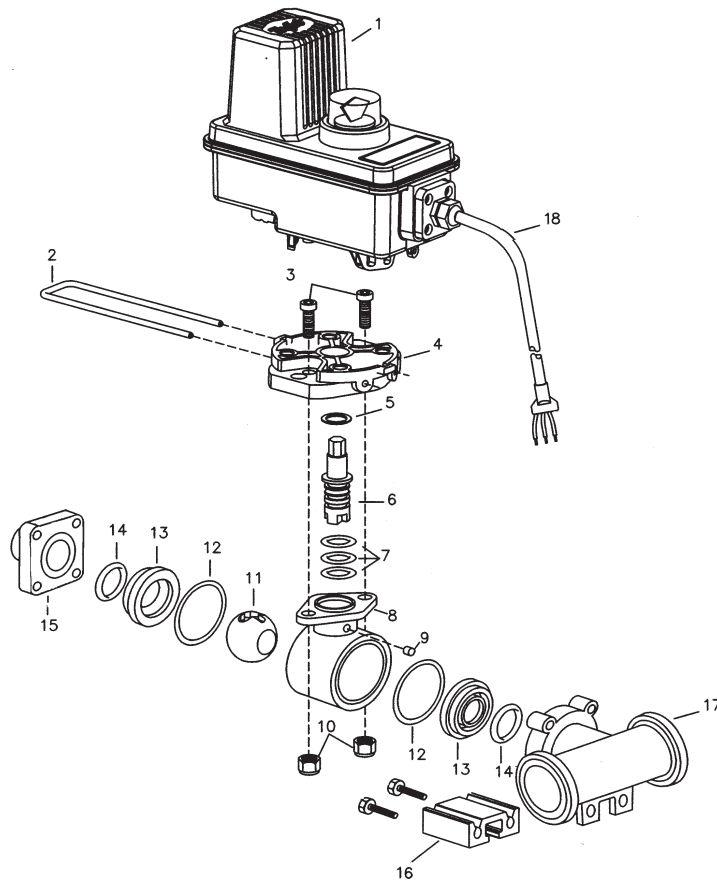
When reassembling valve, grease both sealing surfaces of coupler shaft. Insert coupler shaft into Iso-flange and be sure seal properly seats on shaft. Install motor on valve body and apply silicon sealant to mounting holes. Reassemble remaining items as shown in parts diagram.



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

* 16-524-05 1" Valve ISO-Body Kit

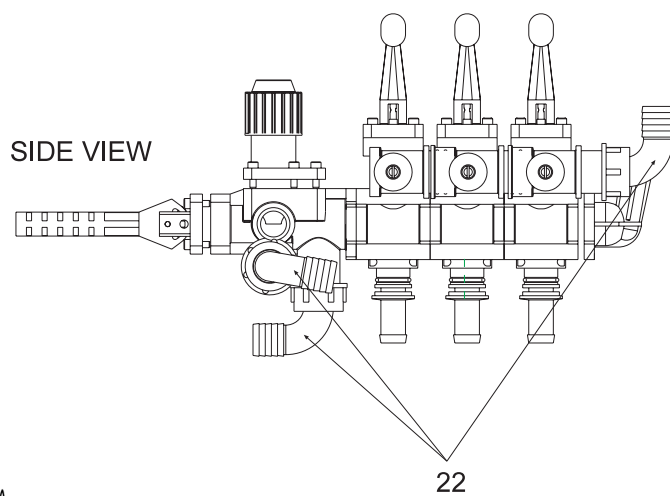
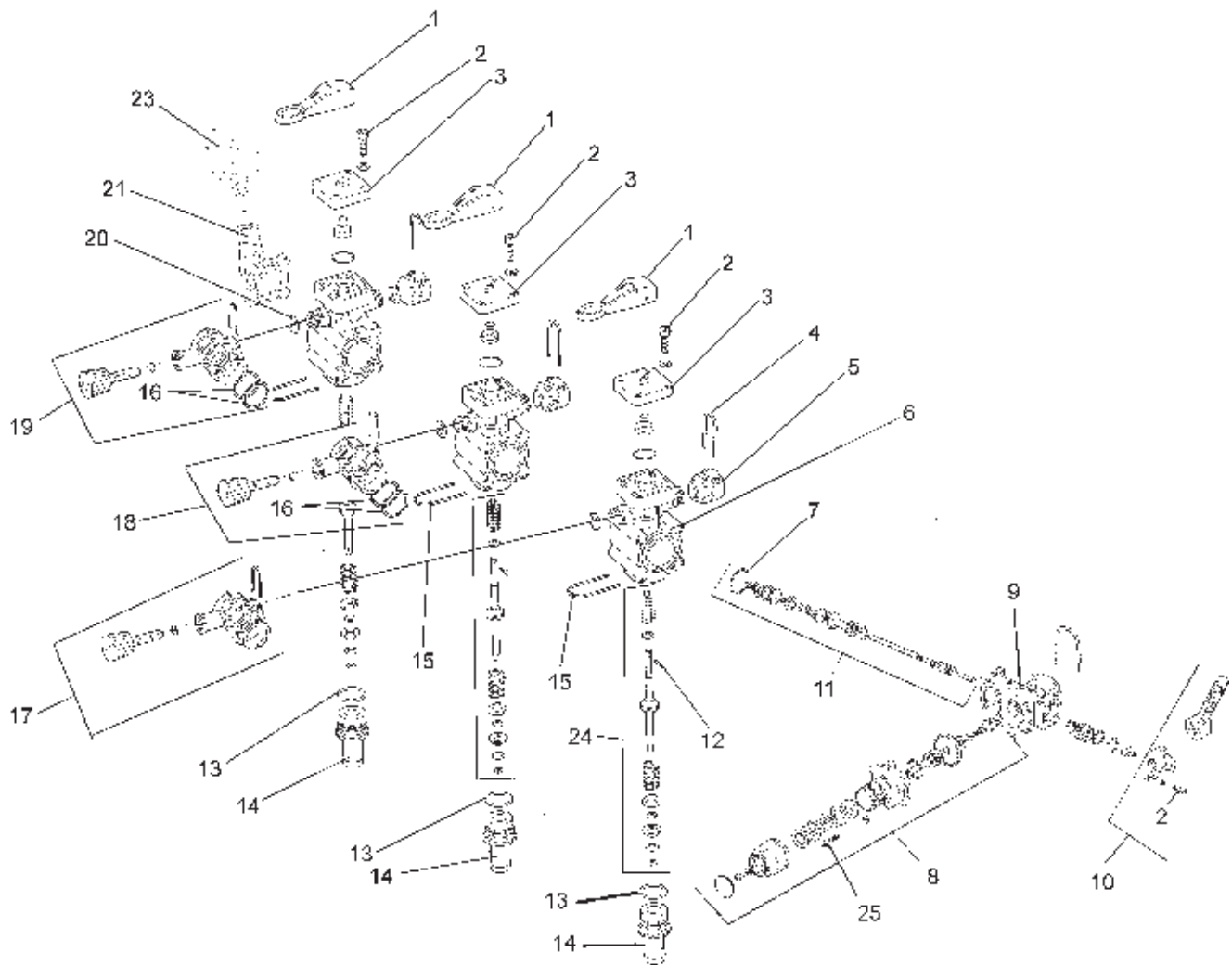
15-743 MANIFOLD VALVE



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)

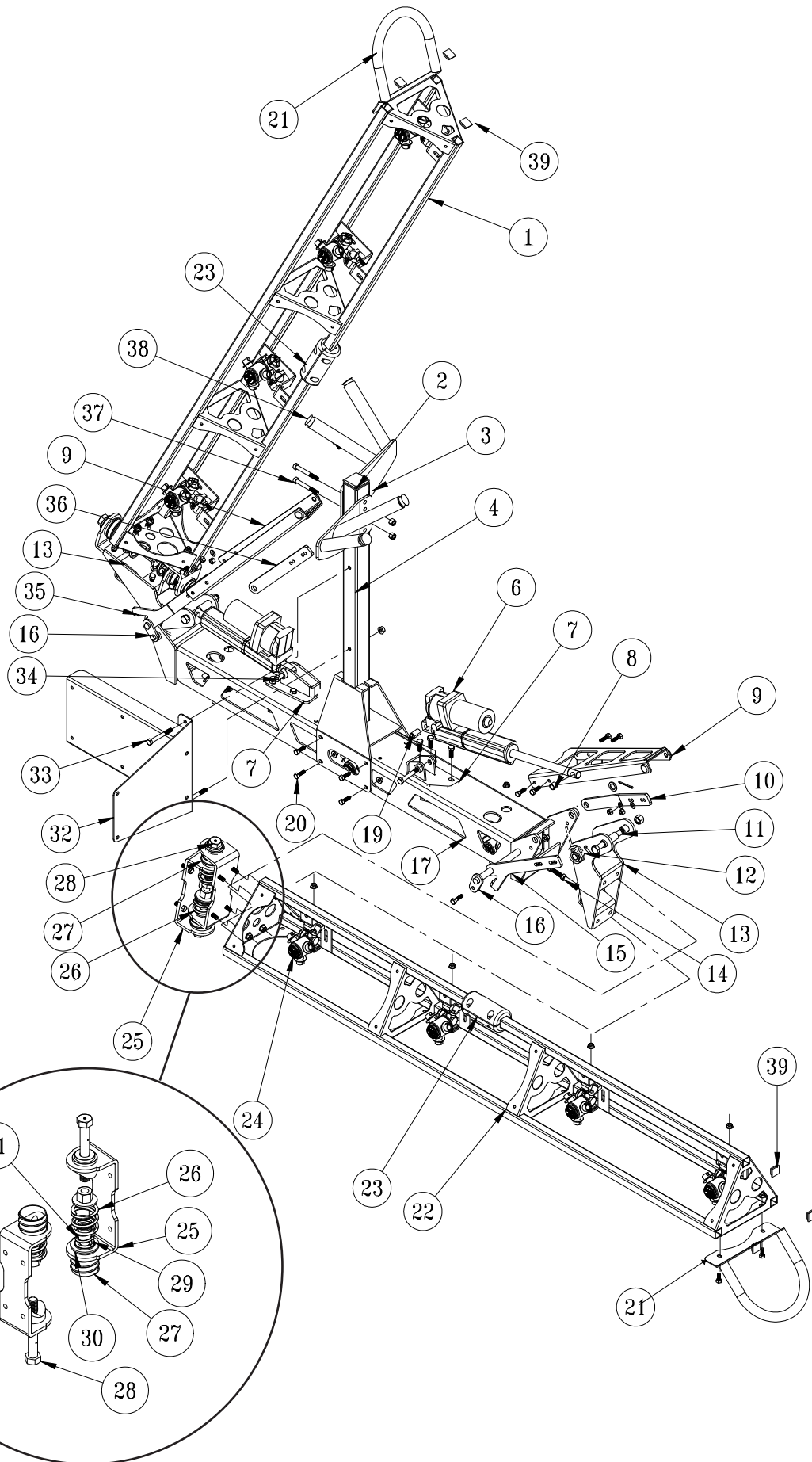
10-268 3-WAY MANUAL VALVE



10-268 3-WAY MANUAL VALVE

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

17-585 18' SMITHCO SUPER BOOM

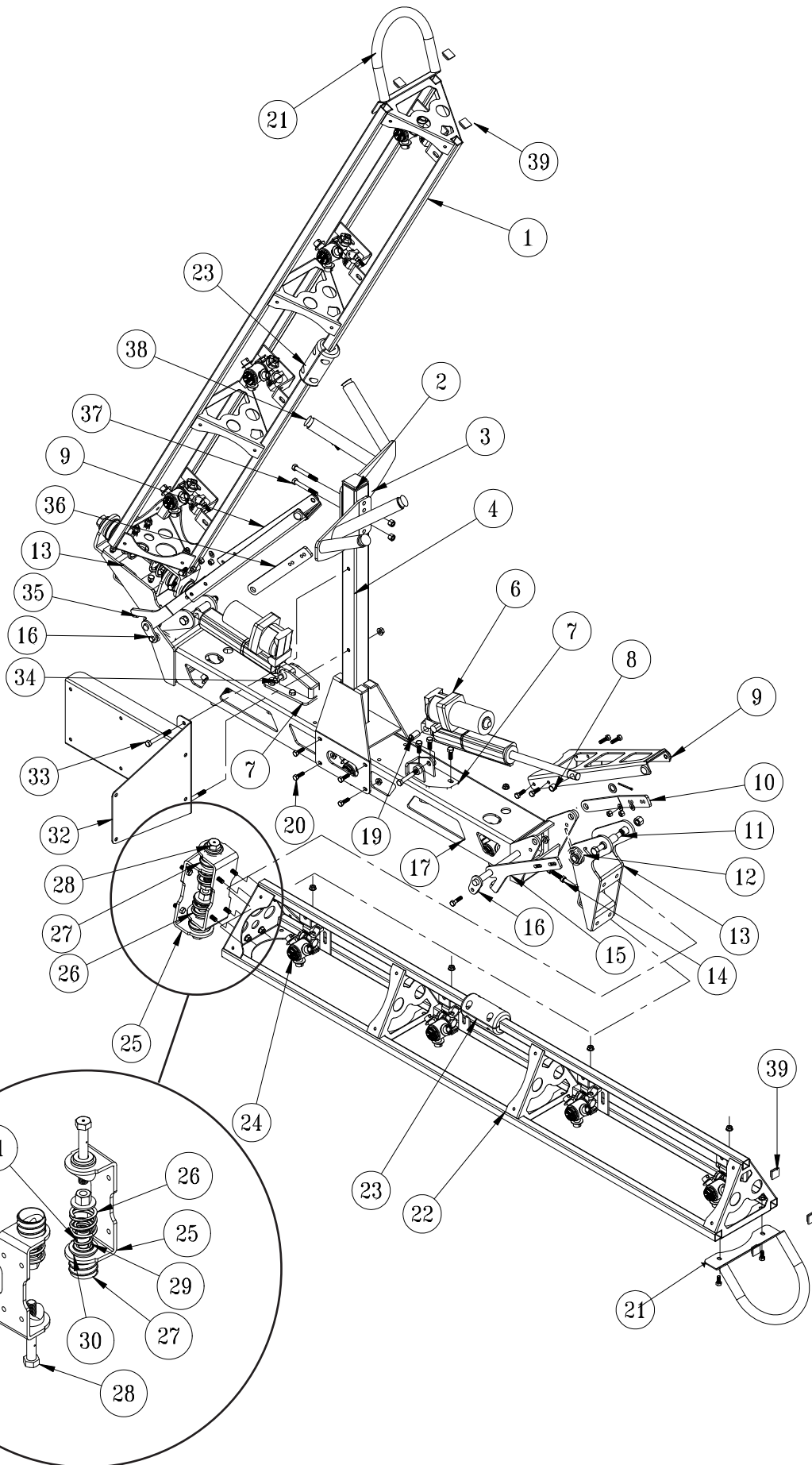


17-585 18' SMITHCO SUPER BOOM

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

(Continue on next page)

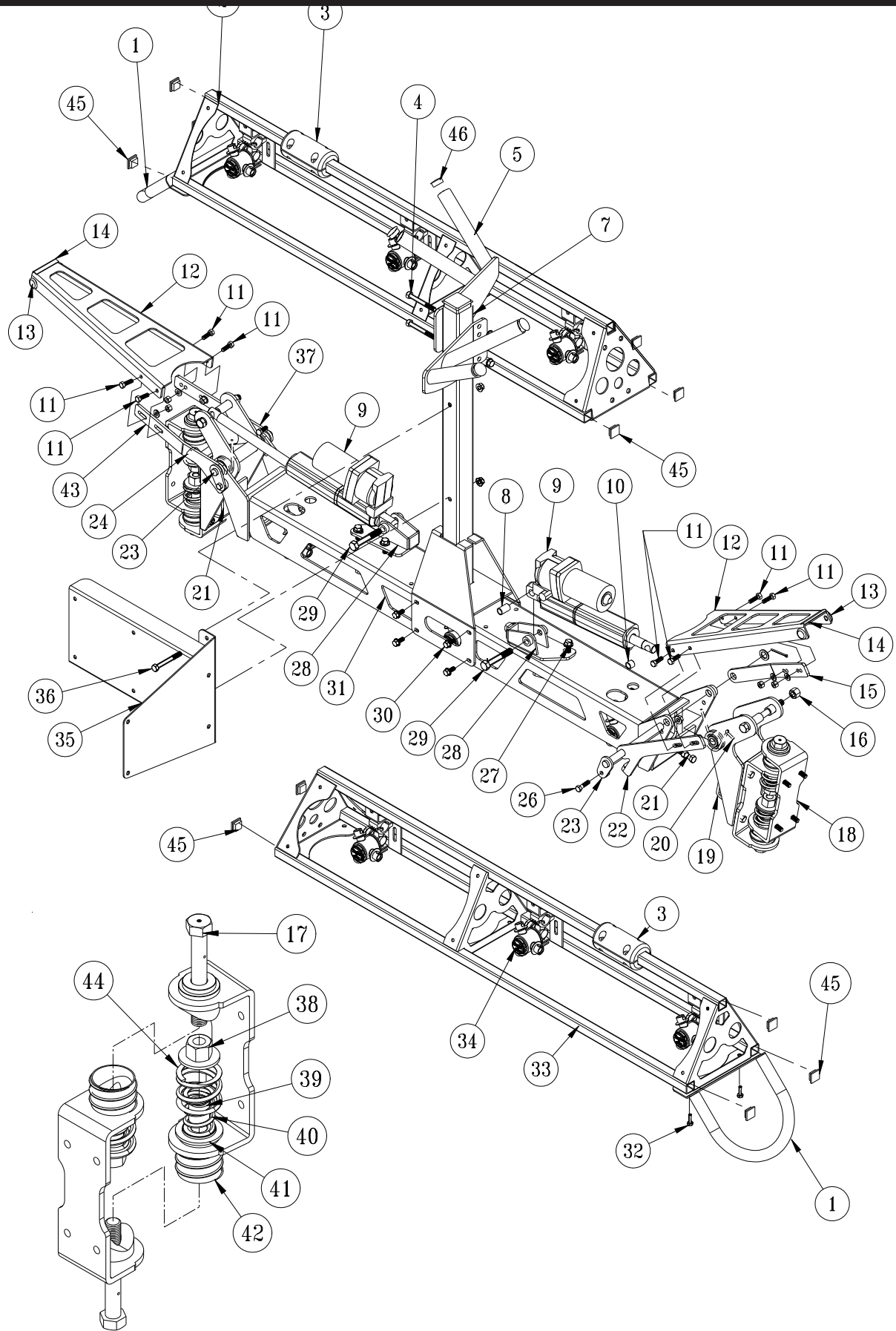
17-585 18' SMITHCO SUPER BOOM



17-585 18' SMITHCO SUPER BOOM

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

17-601 15' SMITHCO SUPER BOOM



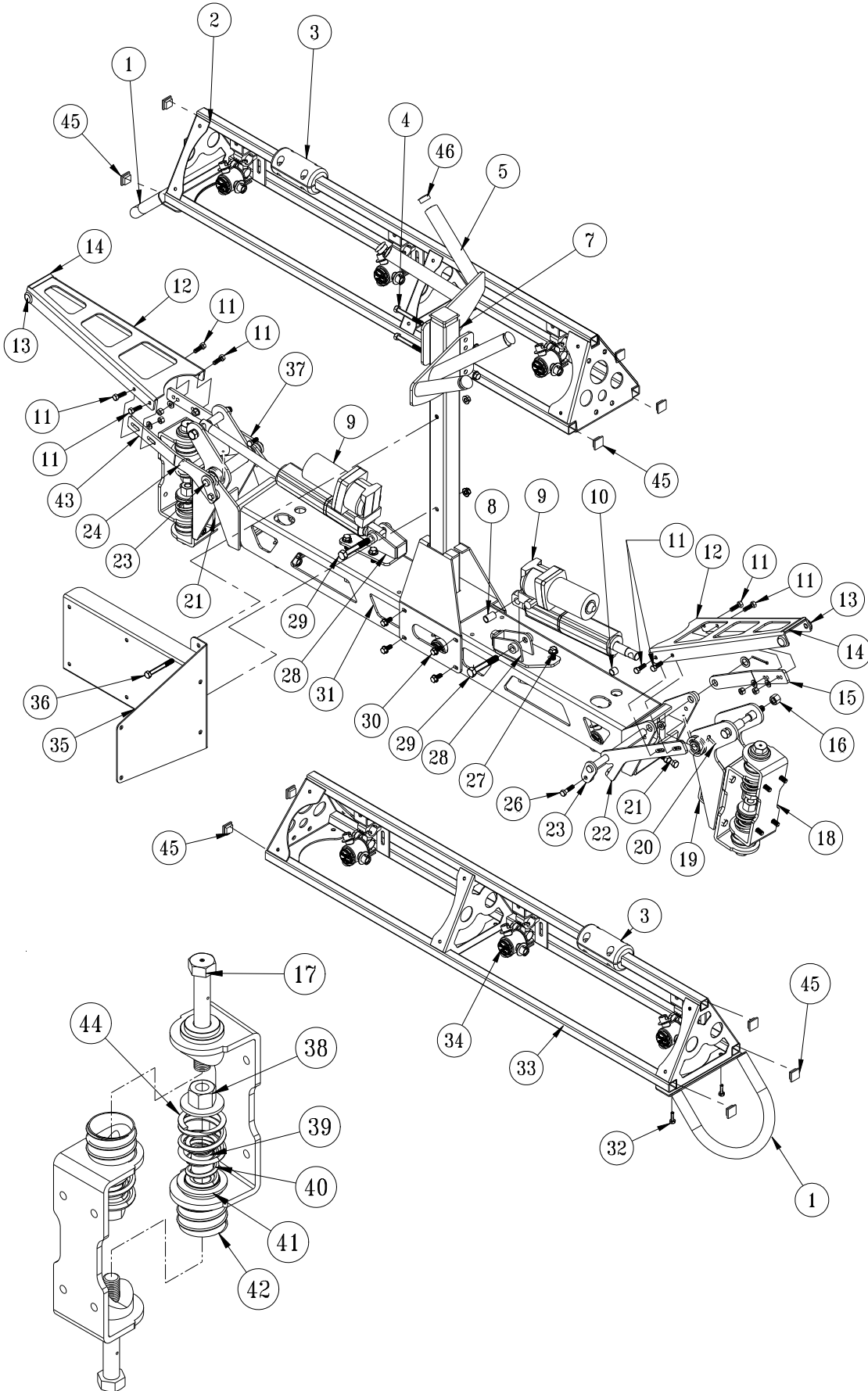
Accessories

17-601 SMITHCO SUPER BOOM

REF#	PART#	DESCRIPTION	QUANTITY
1	17-541	Boom End Guard	2
2	17-551	Left Boom Arm	1
3	17-573	Guide Block Set	2
	HB-14-20-125	Bol $\frac{1}{4}$ -20 x $1\frac{1}{4}$	8
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	8
4	HB-38-16-300	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
5	17-576	V-Boom Nest	1
	8897-12	$1\frac{1}{4}$ Discharge Hose 12"	4
7	17-578	Boom Nest Post	1
	18-297	Cap Plug	1
8	18-036	1" Bushing (part of 30-214)	2
9	30-214	10" Electric/Hydraulic Actuator	2
10	18-234	$\frac{1}{2}$ " Bushing (part of 30-214)	2
11	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
12	17-587	Boom Lock	2
13	42-116	Rubber Insert	4
14	8803-2.75	Trim Lace, $2\frac{3}{4}$	2
15	17-588	Lock Hinge, RH	1
16	HB-12-13-500	Bolt, $\frac{1}{2}$ - 13 x 5	2
	HNTL-12-13	Lock Nut, $\frac{1}{2}$ -13	2
17	17-540	Tapped Bolt	4
	HG-14-28-180	Grease Fitting, $\frac{1}{4}$ - 28 x 180°	4
18	17-527	Boom Hinge (matched set)	4
	HB-38-16-100	Bolt, $\frac{3}{8}$ - 16 x 1	8
	HNFL-38-16	Lock Nut, $\frac{3}{8}$ - 16	8
	HB-516-18-100	Bolt, $\frac{5}{16}$ -16 x 1	8
	HW-516	Flat Washer, $\frac{5}{16}$	8
	HNFL-516-18	Flange Lock Nut, $\frac{5}{16}$ - 18	8
19	30-185	Arm Pivot Hinge	2
	76-128	Bushing (part of 30-185)	4
20	17-597	Torsion Spring, RH	1
21	HB-38-16-150	Bolt, $\frac{3}{8}$ - 16 x $2\frac{1}{2}$	2
	HNFL-38-16	Flange Lock Nut, $\frac{3}{8}$ - 16	2
22	17-589	Limit Hinge, RH	1
23	17-596	Hinge Pin w/Spacer	2
	HP-18-100	Cotter Pin, $\frac{1}{8}$ x 1	2
24	17-598	Torsion Spring, LH	1
26	HB-516-18-100	Bolt, $\frac{5}{16}$ -16 x 1	2
	HNFL-516-18	Flange Lock Nut, $\frac{5}{16}$ - 18	2
27	HB-38-16-100	Bolt, $\frac{3}{8}$ - 16 x 1	6
	HW-38	Washer, $\frac{3}{8}$	6
	HNFL-38-16	Flange Lock Nut, $\frac{3}{8}$ -16	6
28	30-184	Ram Mount	2
29	HB-12-13-300	Bolt, $\frac{1}{2}$ - 13 x 3	2
	HNTL-12-13	Lock Nut, $\frac{1}{2}$ - 13	2

(Continued on next page)

17-601 15' SMITHCO SUPER BOOM

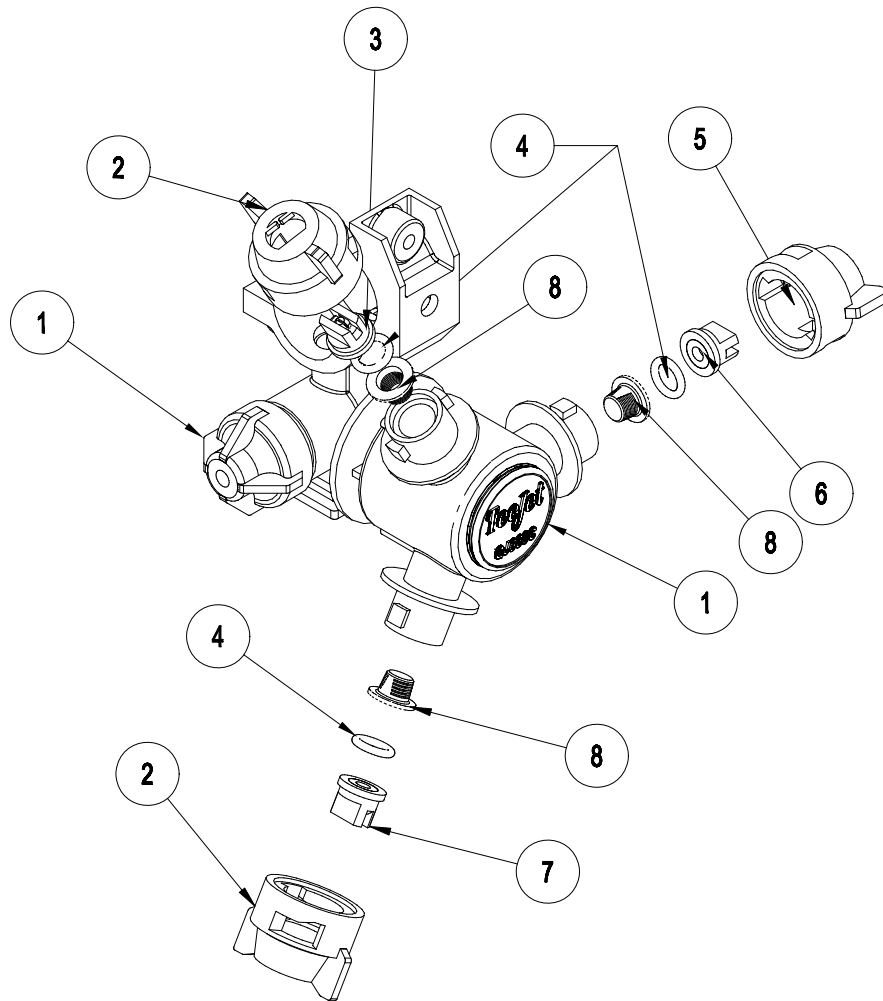


Accessories

17-601 SMITHCO SUPER BOOM

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

TRIPLE NOZZLE ASSEMBLY



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

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

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

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

For reordering Nozzle Kits the following numbers apply

33-540 Triple Nozzle Kit for 18' Booms

33-541 Triple Nozzle Kit for 15' Booms

TURBO TURFJET TIPS

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

FEATURES:

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

NOZZLE TILT

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

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

RECOMMENDED OVERLAP AND NOZZLE HEIGHT

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

DRIFTABLE FINES PRODUCED

(0.5 gpm at 40 psi)

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

XR TEEJET TIPS

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

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

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

FEATURES:

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

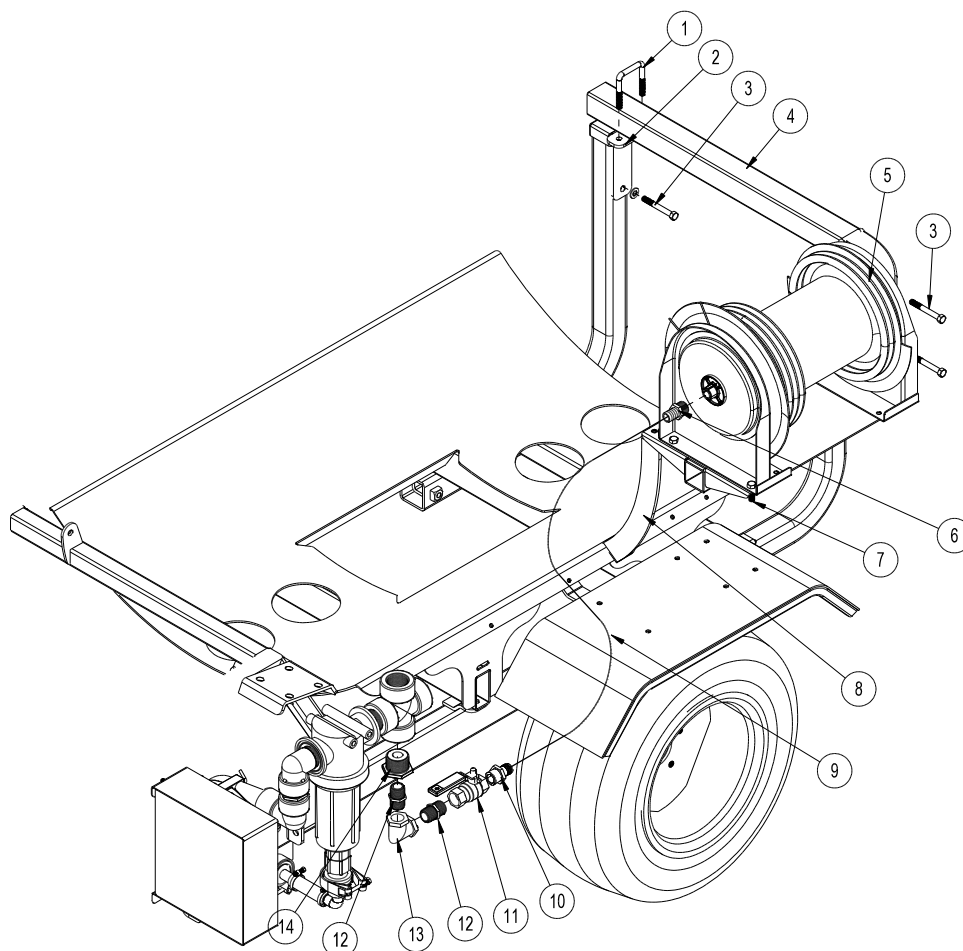
RECOMMENDED OVERLAP

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

NOZZLE HEIGHT

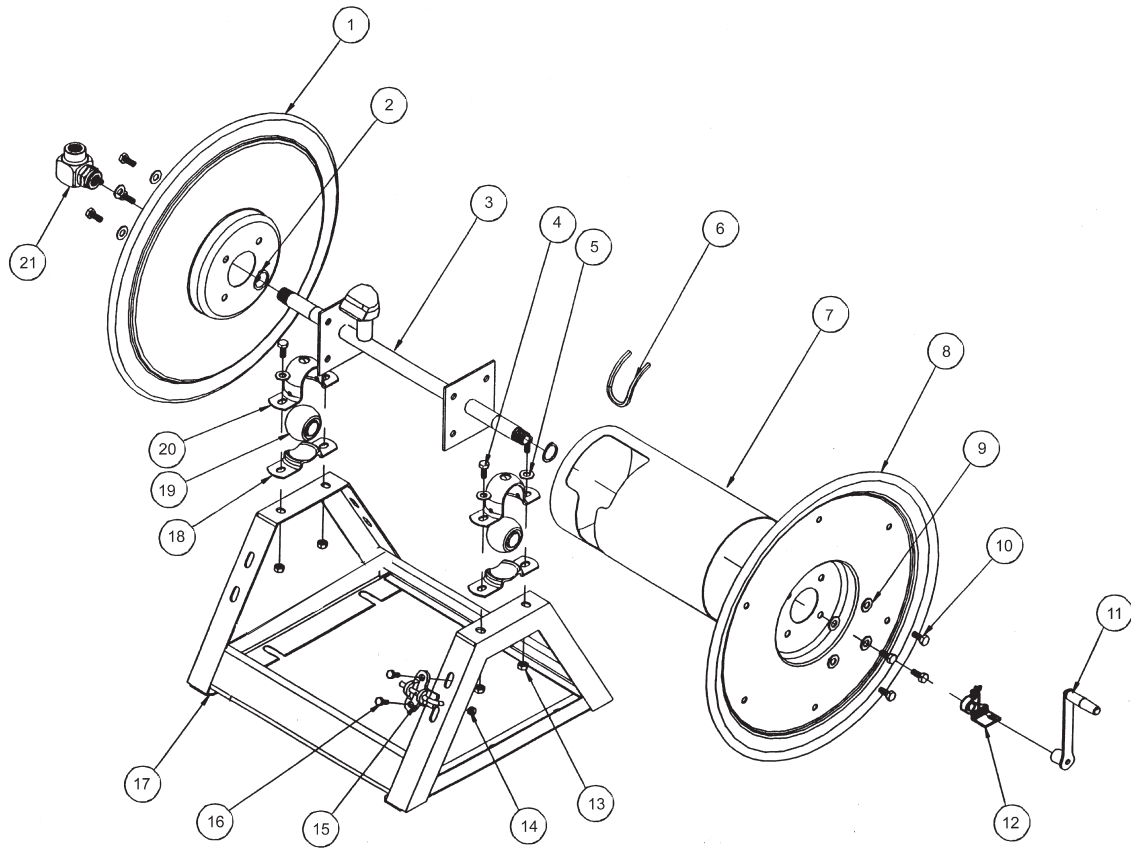
Suggested spray nozzle height with 20" spacing, tip spray angle of 80° should be 17-19", tip spray angle of 110° should be 12-14".

14-603 HOSE REEL MOUNT



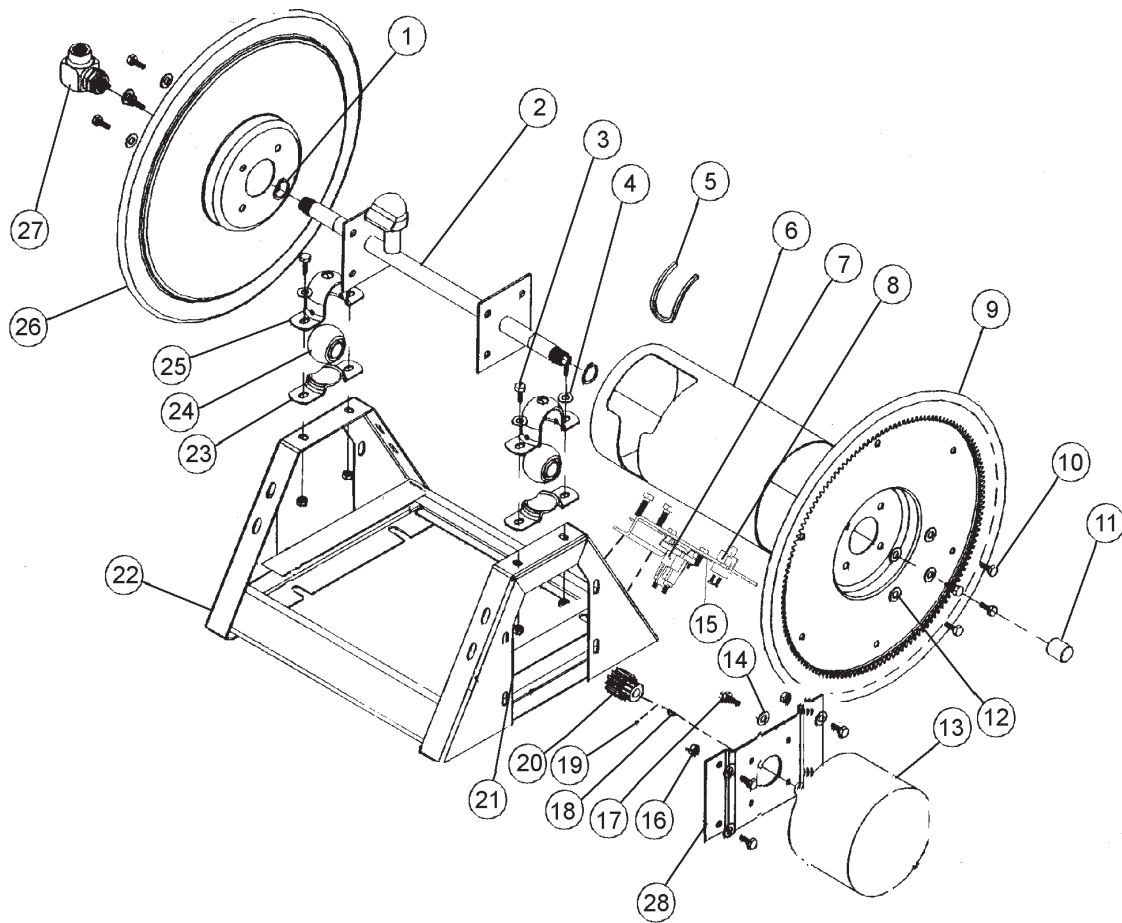
REF#	PART#	DESCRIPTION	QUANTITY
1	17-537	Square U-bolts	2
2	15-840	Mount Brackets	2
3	HB-38-16-300	Bolt $\frac{3}{8}$ - 16 x 3	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
	HW-38	Washer $\frac{3}{8}$	4
4	15-841	Reel Platform	1
5	16-906	Electric Hose Reel	1
	16-129	Manual Hose Reel	1
6	18-249	Brass Fitting $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
7	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	4
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
8	14-542	Support Bracket	1
	HB-14-20-100	Bolt $\frac{1}{4}$ - 20 x 1	1
9	8887-24	Orange PVC Hose $\frac{3}{4}$	1
	18-040	Hose Clamp	2
10	16-154	Fitting $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
11	16-859	Ball Valve $\frac{3}{4}$ Brass	1
12	16-158	Close Nipple $\frac{3}{4}$	2
13	16-151	Elbow F.P.T. $\frac{3}{4}$ x $\frac{3}{4}$	1
14	18-388	Reducer	1

16-129 MANUAL HOSE REEL



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

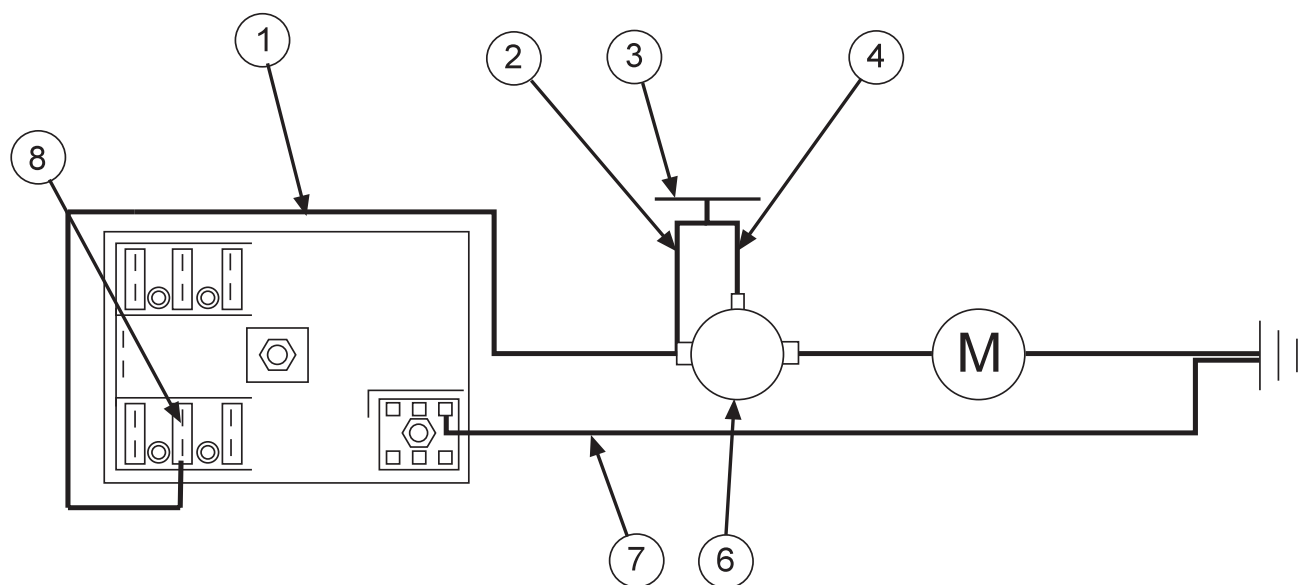
16-906 ELECTRIC HOSE REEL



16-906 ELECTRIC HOSE REEL

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 Bracket	1
	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	2
	HW-516	Washer $\frac{5}{16}$	2
	HWL-516	Lockwasher $\frac{5}{16}$	2
	HN-516-18	Nut $\frac{5}{16}$ - 18	2
16	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
17	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	4
18	16-906-17	Key	1
19		Set Screw	2
20	16-906-29	Pinion	1
21	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
22	16-906-18	Frame Assembly	1
23	16-906-08	Mounting Pillow Block (Bottom)	2
24	16-906-24	Bearing	2
25	16-906-07	Mounting Pillow Block (Top)	2
26	16-906-20	Disc 17 $\frac{1}{2}$	1
27	16-906-23	Swivel Assembly $\frac{3}{4}$	1
	16-906-30	Seal Kit (For 16-906-23)	1
28	16-906-28	Bracket 12VDC	1
29	16-980	Mount Bracket	2
	HB-516-18-175	Bolt $\frac{5}{16}$ - 18 x 1 $\frac{3}{4}$	4
	HW-516	Washer $\frac{5}{16}$	4
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
	16-982	Electric Hose Reel (only)	1

ELECTRIC HOSE REEL WIRING



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	13-750	Solenoid	1

SOLENOID TERMINALS

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

CONNECTION INSTRUCTIONS

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



WARNING 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

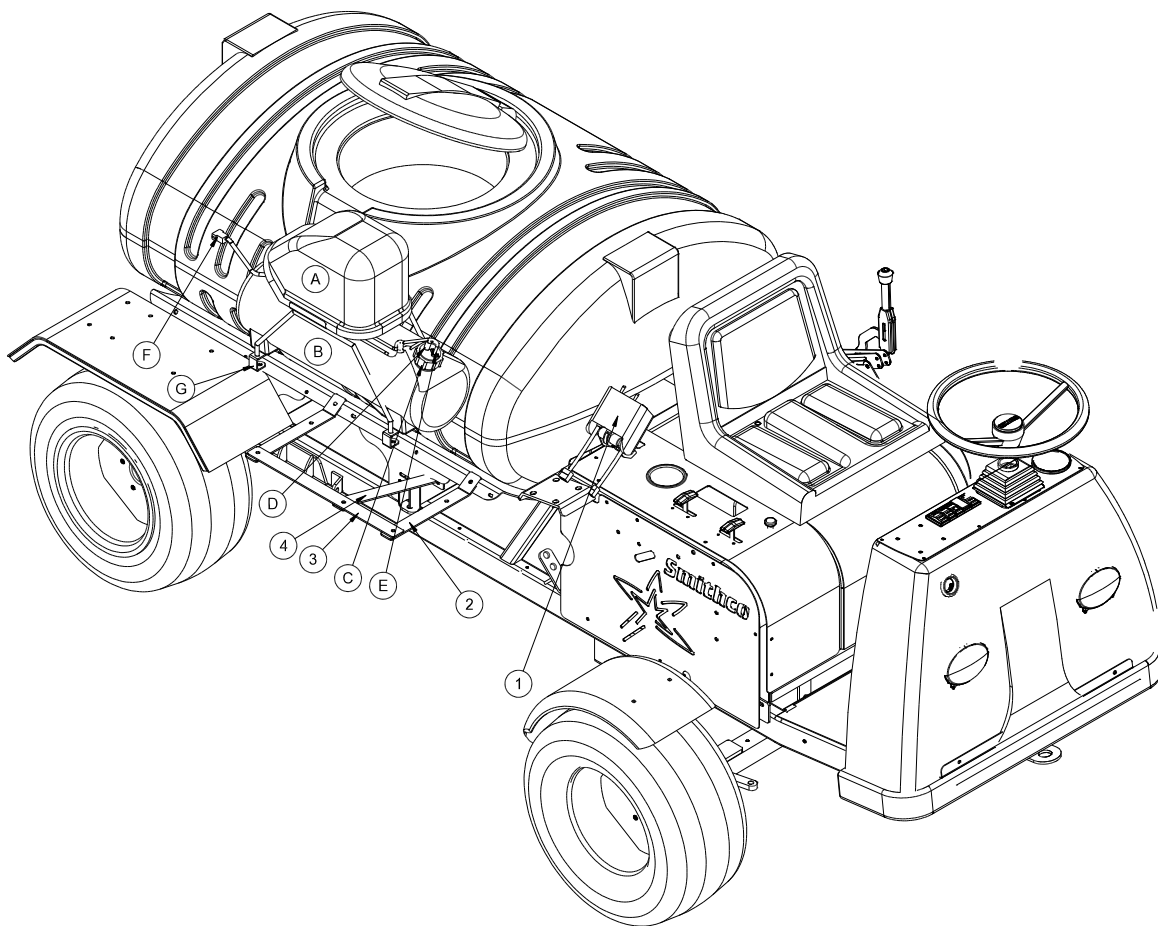
OPERATIONAL CHECK:

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.

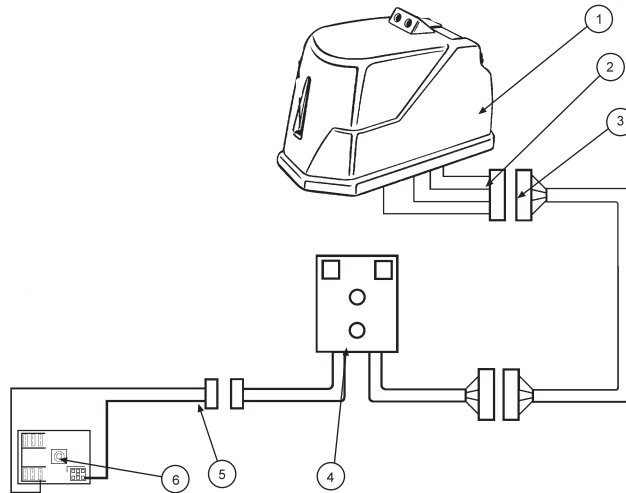
HOSE REPLACEMENT PROCEDURE:

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.

14-283 FOAM MARKER

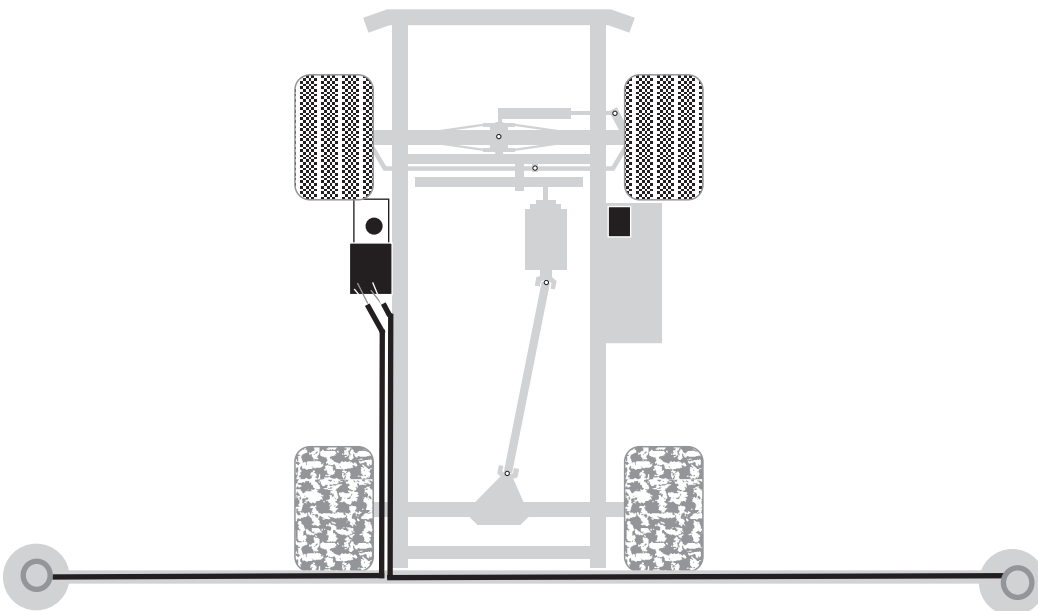
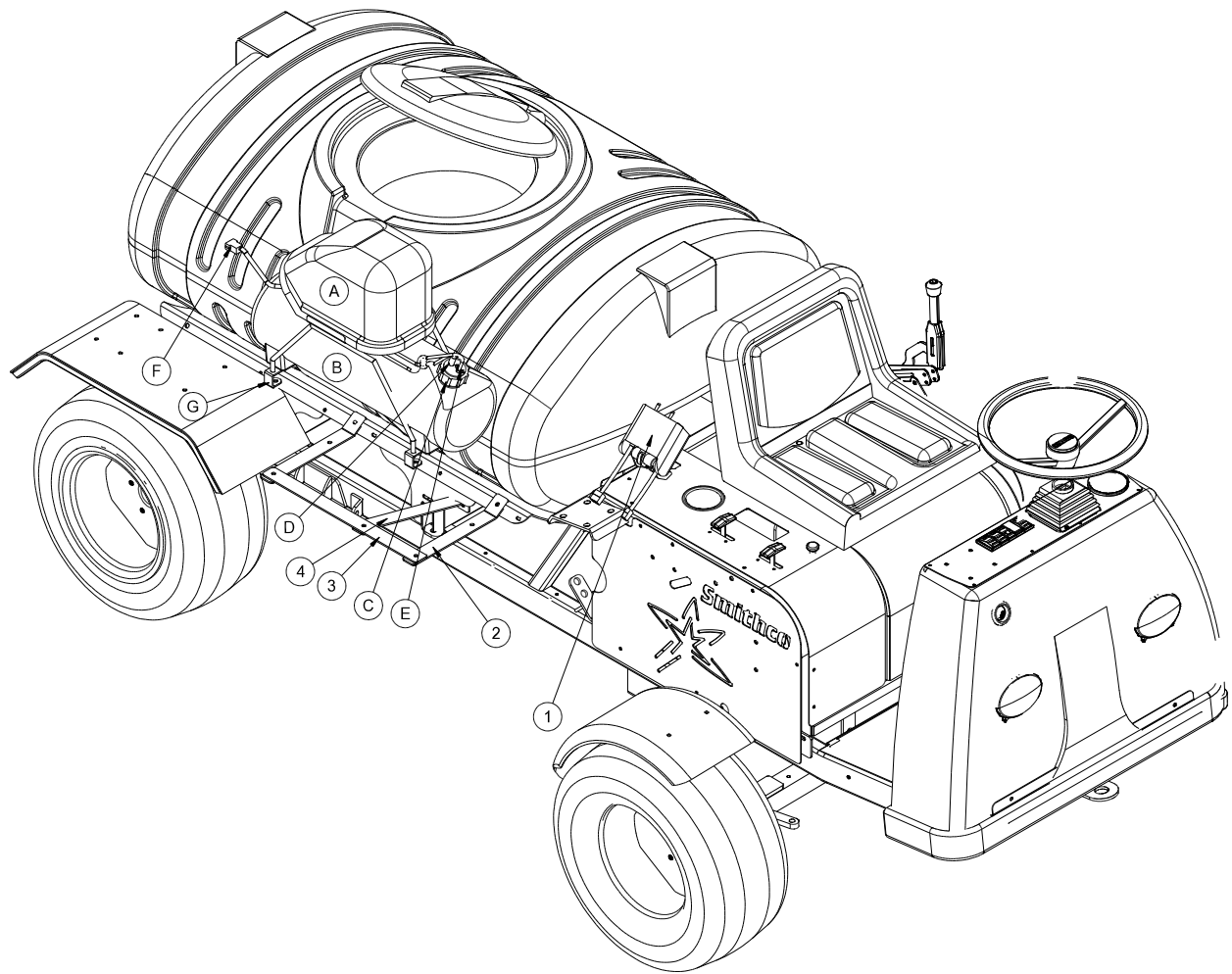


REF#	PART#	DESCRIPTION	QUANTITY
1*	14-291-05	Double Switch Box	1
	33-508	Fuse	1
	14-291-14	Outside Switch	1
	15-506-02	Center Switch	1
2	HB-516-18-175	Bolt $\frac{5}{16}$ - 18 x $1\frac{3}{4}$ (part of machine)	1
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18 (part of machine)	1
4	HB-516-18-400	Bolt $\frac{5}{16}$ - 18 x 4 (part of machine)	1
	HNCL-516-18	Center Lock Nut $\frac{5}{16}$ - 18 (part of machine)	1
5	14-393	Park Brake Bracket (part of machine)	1
6	14-286	Foamer End Bracket	2
7	14-288	Foamer Cross Bar	1
8	14-287	Foamer Center Bracket	1
9	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	8
	HNFL-516-18	Flange Whiz Lock Nut $\frac{5}{16}$ - 18	8
A*	14-291-03	Compressor Only	1
	14-291-01	Black Cover	1
B*	14-291-02	Foamer Tank	1
C*	14-284-02	Cap Assembly	1
D*		Blue Tube	1
E*		Clear Tube	1
F*	10-222	Extension Wire	1
G*	14-291-04	Tank Bracket	2
*	14-291	Foamer	1



REF#	PART#	DESCRIPTION	QUANTITY
1	14-291-03	Compressor	1
2	15-504-04	Wiring Harness	1
3	10-222	Extension Wire	1
4	14-291-05	Switch Box	1
	33-508	Fuse	1
	15-506-02	Center Switch	1
	14-291-14	Outside Switch	1
5	15-509	Power Cable	1
6	33-271	Fuse Block (part of machine)	1
	33-508	Fuse	1

14-283 FOAM MARKER



Accessories

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

1. Mount the switch box (Ref 1) behind the seat on the rear engine cover.
2. Use the extension wire (10-222) to connect the compressor to the switch box.
3. Mount the two foamer end brackets (Ref G) to the tank brackets (Ref 2) in the first and third holes on the right side. Use two $\frac{5}{16}$ - 18 x 1 bolts and flange whiz lock nuts.
4. Mount the foamer center bracket (Ref 4) to the slot on the tank carrier support leg.
5. Put the cross bar (Ref 3) across the ends of the end and center brackets. Bolt center brackets to cross bar using two $\frac{5}{16}$ - 18 x 1 bolts and flange whiz lock nuts (Ref 4).
6. Place foamer assembly on the foamer end brackets and bolt in place with four $\frac{5}{16}$ - 18 x 1 bolts and flange whiz lock nuts.
7. Make sure all bolts are tightened.

WIRING

Use dielectric grease on all electrical connections. Connect extension wire to the pig tail on the switch box and compressor. 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.

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.

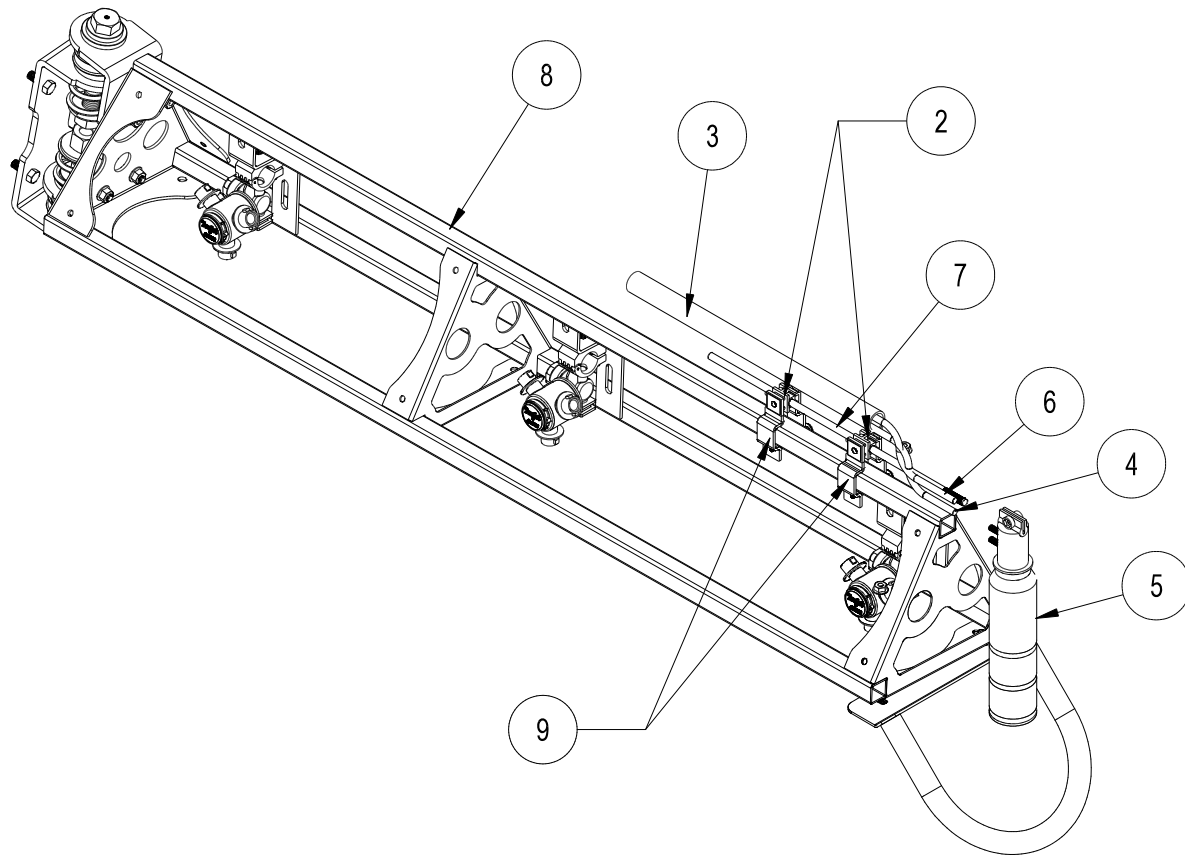
HOSES

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



14-283 FOAM MARKER

REF#	PART#	DESCRIPTION	QUANTITY
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

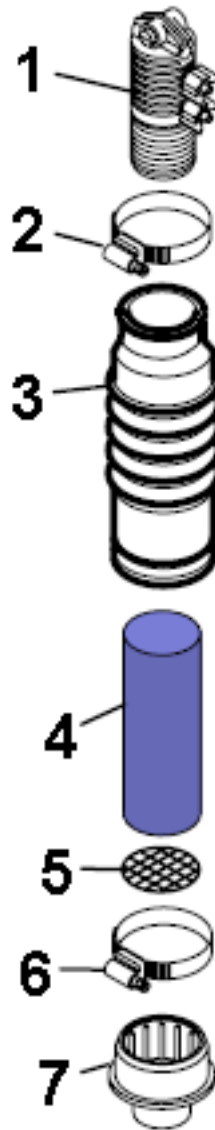
- Slide hose clamp onto drop tube of foam nozzle and attach restrictor bell.
- Place splined end of Nozzle mounting rod (Ref 7) into top of foam nozzle (Ref 5). Tighten screw.
- Slide two foam nozzle mounts (Ref 2) onto the rod. Place square clamps (Ref 9) on foam nozzle mounts and mount the square clamps 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.
- Connect small plastic electrical plug under compressor to electrical extension cable.
- For *Spray Star 1760* route extension cable under engine along the mainframe cross bar, using tie downs as necessary.
- 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.

14-291 FOAM MARKER



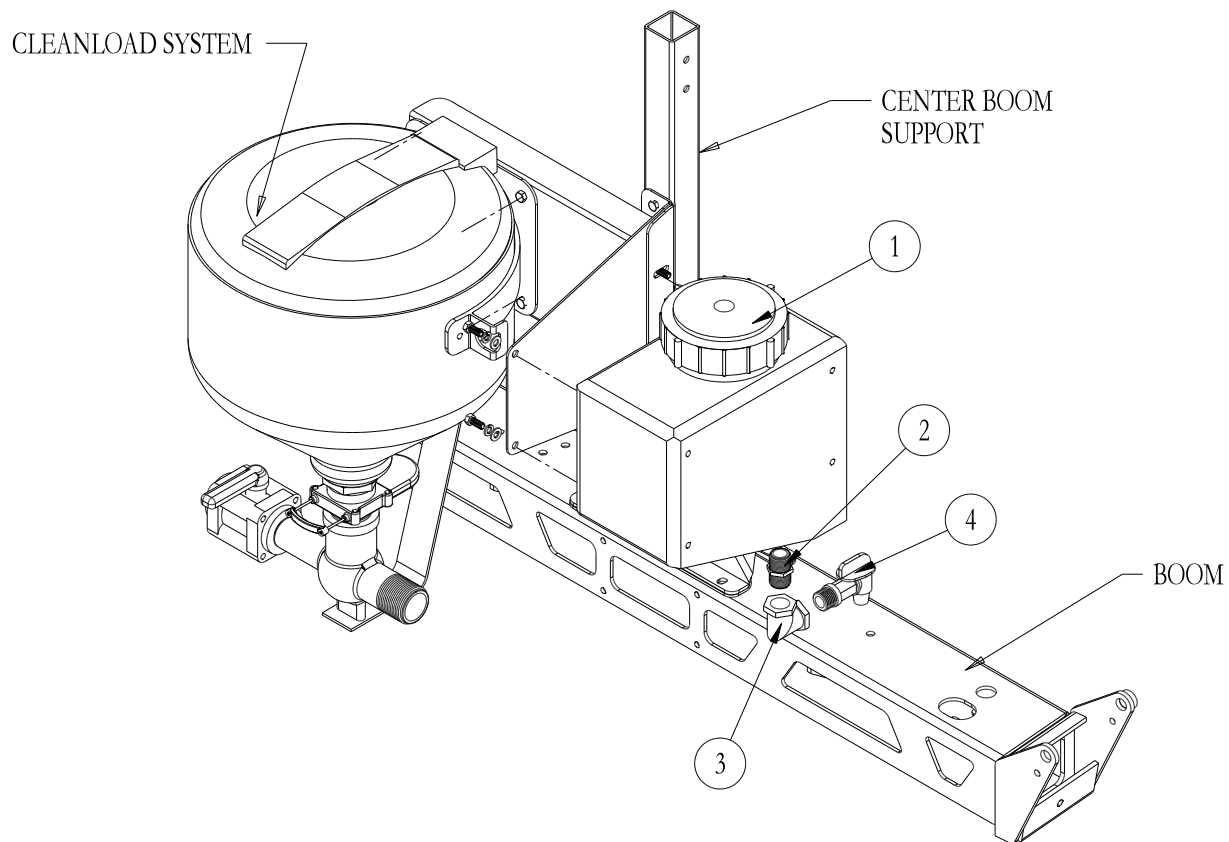
REF#	PART#	DESCRIPTION	QUANTITY
1	15-507	Foamer Tubing	1
2	14-291-02	Tank	1
3	14-291-01	Black Cover	1
	14-536	Compressor Complete	1
4	14-284-02	Cap Assembly	1
5	14-291-04	Tank Bracket	1
6	14-291-05	Double Switch Box	1
7	15-511	Foam Nozzle	1
8	15-510-01	Nozzle Mounting Rod	1
9	16-987	Foam Nozzle Mounting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

15-511 FOAM NOZZLE SUB ASSEMBLY



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	14-384-09	Foam Nozzle Reducer	1
NS	15-510-01	Nozzle Mounting Rods	2
*	15-511-07	Foam Nozzle Sub Assembly	

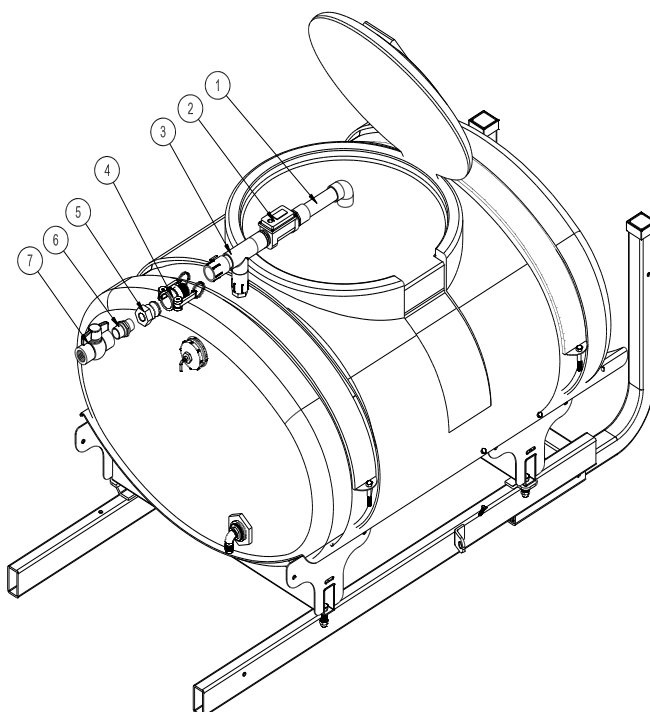
30-006 FRESH WATER TANK



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

14-515 WATER METER KIT (GALLONS)

15-618 WATER METER KIT (LITERS)



REF #	PART #	DESCRIPTION	QUANTITY
1	14-524	Filler Outlet	1
2	14-514	Water Meter (gallon)	1
	14-527	Water Meter (liters)	
3	14-525	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

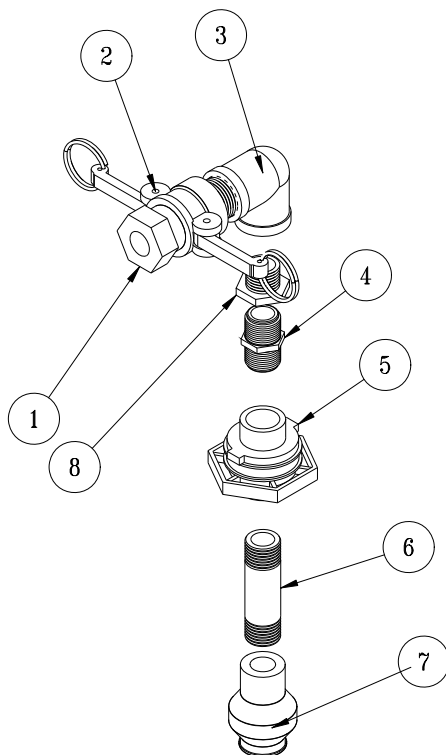
1. Thoroughly flush the service line upstream of the meter to remove dirt and debris.
2. Set meter in-line.
3. Make sure the water flow follows the arrow cast on the meter body.
4. The DLJ Meter is for use **only** with **COLD WATER** up to 122°F (50°C)
5. Slowly open any upstream valves to prevent damage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

Gallons to Cubic feet Conversion :

Multiply gallons reading by 0.1337 to get cubic feet.

There are 7.48052 gallons per cubic foot.

15-835 TANK RINSING SYSTEM



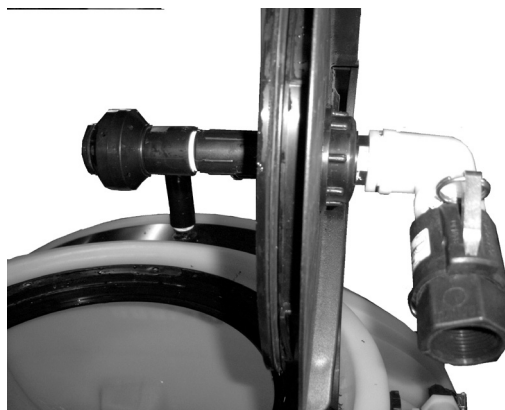
REF#	PART#	DESCRIPTION	QUANTITY	
	1	16-961	1" Adapter	1
	2	16-962	1" Coupler	1
	3	16-864	1" FTP Elbow	1
	4	16-158	Close Nipple	1
	5	16-150	Double Thread Fitting	1
	6	16-172	4" Nipple	1
	7	15-834	Tank Rinsing Nozzle	1
	8	16-163	Reducer Bushing	1

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

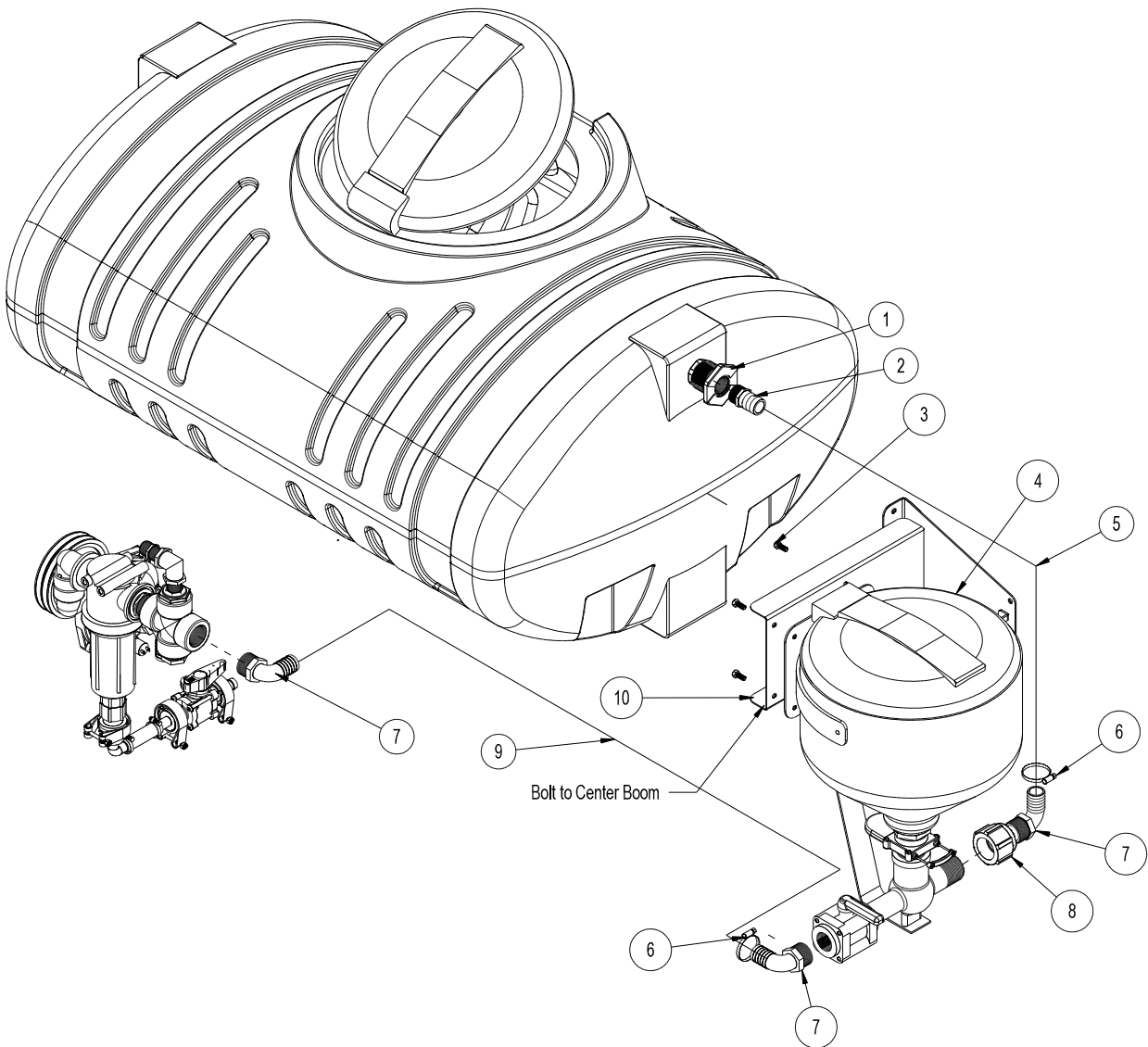
Install Tank Rinsing kit as shown, with the Double Thread Fitting (Ref 5) going into the cover.

Basket Must be removed During Use.

33-541 triple Nozzle Kit for 15' Booms

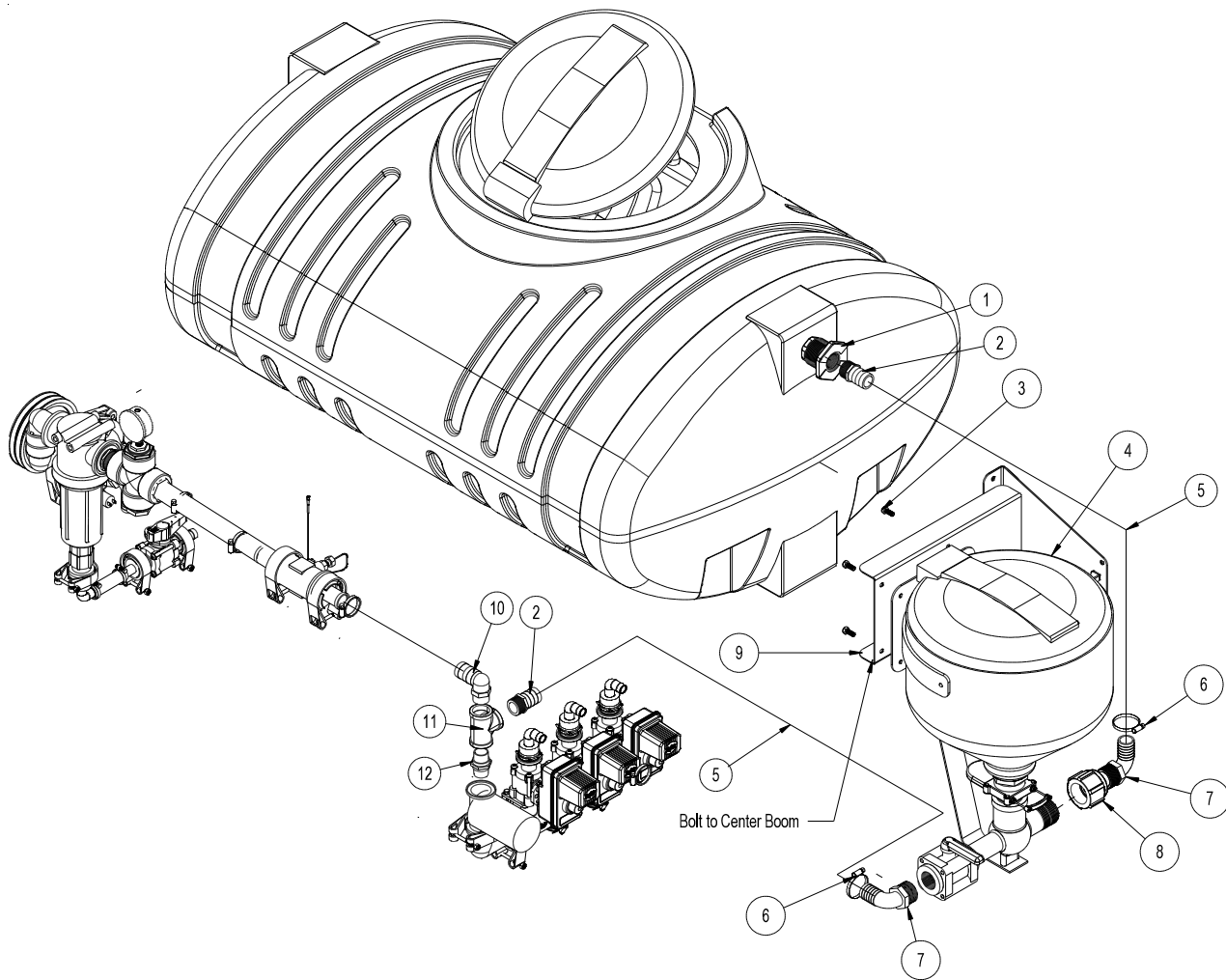


14-600 CHEMICAL CLEANLOAD FOR 1761 SPRAY TRUCK



REF#	PART #	DESCRIPTION	QUANTITY
1	16-945	Bulk Head Fitting	1
2	16-159	Hose Barb	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 Educator	1
5	8897-36	1 $\frac{1}{4}$ Discharge Hose x 36"	1
6	18-116	Hose Clamps	4
7	16-156	90° Hose Barb	3
8	18-391	Reducer Coupling	1
9	8897-72	1 $\frac{1}{4}$ Discharge Hose x 72"	1
10	17-535	Cleanload Mount (part of boom)	1

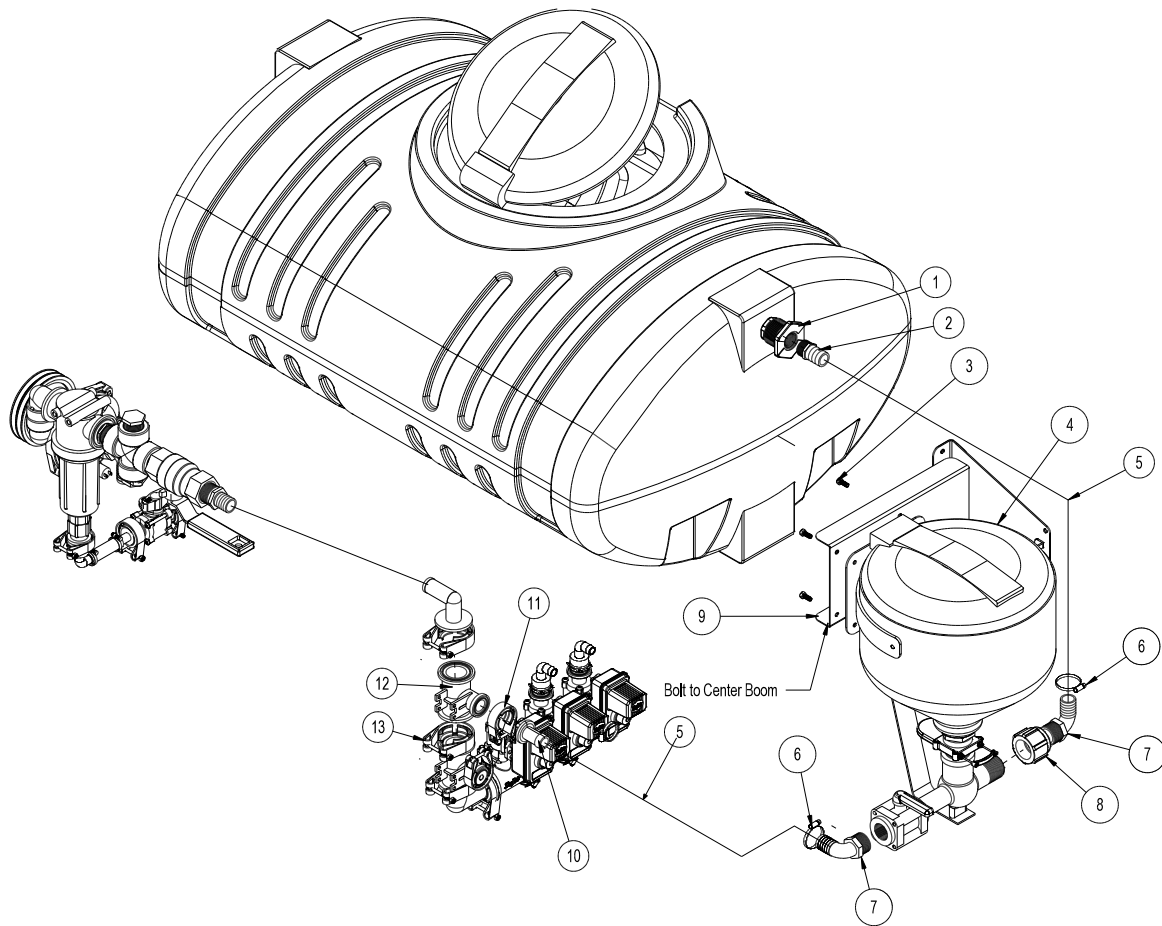
14-601 CHEMICAL CLEANLOAD FOR 1762 SPRAY TRUCK



Accessories

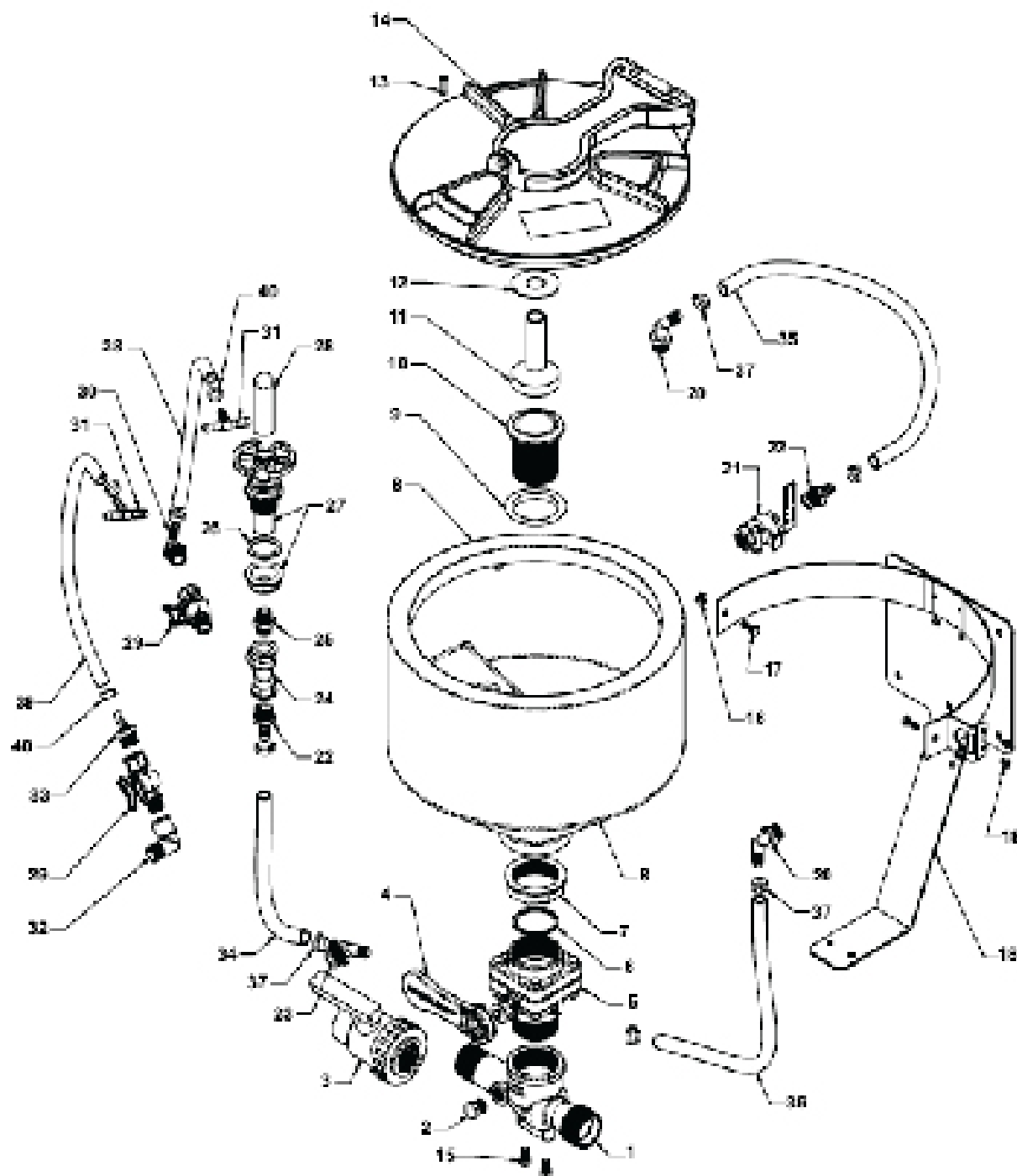
REF#	PART #	DESCRIPTION	QUANTITY
1	16-945	Bulk Head Fitting	1
2	16-159	Hose Barb	2
3	HBFL-516-18-075	Flange Bolt $\frac{5}{16}$ -18 x $\frac{3}{4}$	4
	HNFL-516-18	Flange Lock Nut $\frac{5}{16}$ -18	4
4	15-620	Cleanload Eductor	1
5	8897-36	1 $\frac{1}{4}$ Discharge Hose x 36"	2
6	18-116	Hose Clamps	4
7	16-156	90° Hose Barb	3
8	18-391	Reducer Coupling	1
9	17-535	Cleanload Mount (part of boom)	1
10	15-779	90° Barb Fitting	1
11	16-183	Tee	1
12	18-851	Close Nipple	1

14-602 CHEMICAL CLEANLOAD FOR 1764 SPRAY TRUCK



REF#	PART #	DESCRIPTION	QUANTITY
1	16-945	Bulk Head Fitting	1
2	16-159	Hose Barb	2
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	8897-36	1 $\frac{1}{4}$ Discharge Hose x 36"	2
6	18-116	Hose Clamps	4
7	16-156	90° Hose Barb	3
8	18-391	Reducer Coupling	1
9	17-535	Cleanload Mount (part of boom)	1
10	15-870	Hose Barb	1
11	15-740	#50 Clamp	1
12	15-775	Reducer Tee	1
13	51-741	#75 Clamp	1

15-620 CHEMICAL CLEAN LOAD® PARTS DRAWING



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

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.

Symptoms	Corrective Action
Low education rate	Check pump pressure and flow. Cleanload Eductor performance is based on flow and pressure to the system. Make adjustments for high education rates. hose and outlet hose are back to tank.
Plugged or clogged bottle rinse nozzle	Disassemble nozzle/pistol nozzle from lance valve assembly and back flush until nozzle ports are clear of debris.
Plugged or clogged tank rinse nozzle	Disassemble nozzle/pistol nozzle from NPT hose barb and back flush until nozzle ports are clear of debris. Remove screen and flush with water to clear any foreign material.
Filling leaks	Check for cracks in filling. Replace filling if necessary. Disassemble and add more part seal in compound if leak occurs on threads.

DECAL LIST

This is a list of decals located on the Spray Star 1760. Part number, description and location will help in reordering decals.

13-063	Multiple Warning	Right Side of Seat in Front of Controls Facing Operator
14-561	Sprayer Dash	Dashboard
14-562	Control Panel	Control Panel
14-510	Tank Volume Side	Side of tank
14-511	Tank Volume Back	Back of Tank
15-462	Hang Tag	Hang From Steering Wheel
15-463	Spray Pump	Seat Panel
14-560	Spray Star 1760	Tank Sides
16-011	Shift Knob	Shift Knob
16-088	Moving Parts Hot	Pump Guard
16-228	Not a Motor Vehicle	In Front of seat Left Side
16-858	Caution Steering	Dashboard by Steering Column
25-279	Safety Warning	Under Seat Cover
25-286	Pinch Point	Left and Right Side Panel
25-298	Warning Hot	Right Exhaust Guard/ Right Side of Frame Next to Muffler
25-307	Gas Refuel	Below Gas Tank
25-355	Tire Pressure 18PSI	Front Tires
25-356	Tire Pressure 20PSI	Rear Tires
34-147	Smithco	Front Nose Cone
25-369	84 dBa	Console
27-077	Smithco - Round	Steering Wheel
27-093	Hydraulic Oil	Left Exhaust Guard by Dipstick/ Left Side Frame by Oil Reservoir
27-277	Battery	Battery Plate

QUICK REFERENCE REPLACEMENT PARTS

REPLACEMENT FILTERS

78-090	Oil Filter	Kohler # 12 050 01
78-088	Air Cleaner	Kohler # 47 083 03
78-089	Pre-Cleaner	Kohler # 24 083 02
50-403	Fuel Filter	

REPLACEMENT BELTS

16-827	Foot Clutch Belt
16-869	Spray Pump Belt
15-320	Hydraulic Pump Belt

SEAL KITS

15-315	Hydraulic Power Unit
15-315-01	Repair Kit
15-301	Power Steering Orbital Motor
15-301-01	Seal Kit
77-263	Hydraulic Cylinder
14-530	Seal Kit
11-158 and 16-754	Linear Actuators
11-158-01	Seal Kit

FLUIDS

Brake Fluid	Dot 3
Engine Oil	SAE 10W-40 API Service SJ or higher Motor Oil
Hydraulic Fluid	SAE 10W-40 API Service SJ or higher Motor Oil
Rear Axle Fluid	SAE 80W-90 Gear Lube API Service GL-5, GL-4
Transmission Fluid	SAE 80W-90 Gear Lube API Service GL-5, GL-4

OTHER PARTS

16-953	Hinged Cover On Tank with Gasket	
16-953-01	Gasket For Cover	
16-169	Strainer Basket	
	Spark Plugs	Champion type RC12YC (Gap 0.040 inch (1.02mm))
16-218	Gasket	
13-288	Key Switch	Kohler # 25 099 04
76-310	Key Set	

The Smithco Commercial Products Two-Year Limited Warranty

Smithco, Inc. (Smithco) warrants your 2016 or newer Smithco Commercial Product ("Product") purchased after October 1, 2016 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 Five 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 West Poplar Ave.
Cameron, Wisconsin 54822
Telephone: 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 workmanship. The items/conditions listed below are not covered by this warranty:



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



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



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



This warranty does not apply to parts subject to consumption through use, unless found to be defective.

Examples of parts which are consumed, or used up, during normal Product operation include, but are not limited to: blades, tines, teeth, scarifiers, rakes, plates, wear plates, castor wheels, tires, batteries, filters, belts, nozzles, etc.



This warranty does not apply to failures caused by outside 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.

