

SMITHCO

Wayne, Pennsylvania 19087

PARTS & SERVICE MANUAL

PRIME MOVER

**Spray Star
Model 3000**

Starting Serial #3500

March, 2002

Revised 10-28-02

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

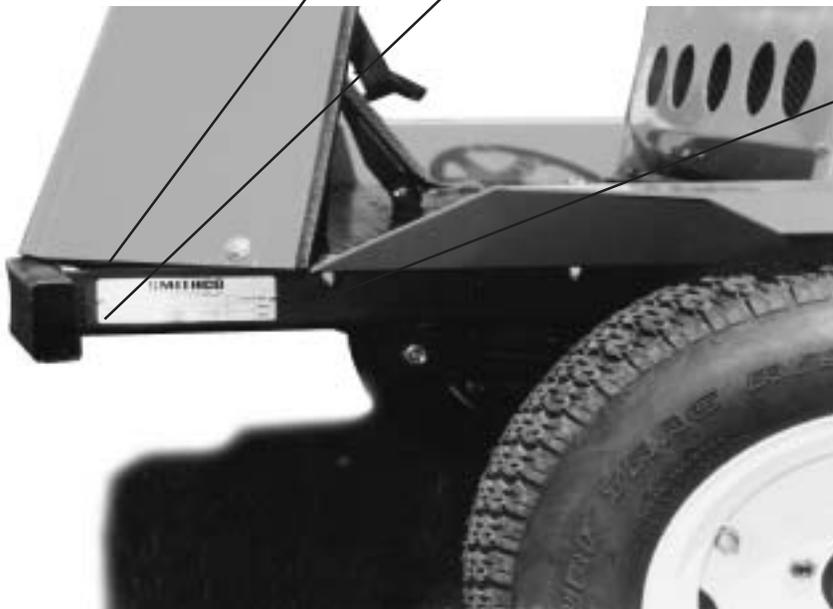
Read this manual and all other manuals pertaining to the Spray Star carefully as they have safety, operating, assembly and maintenance instructions. Failure to do so could result in personal injury or equipment damage.

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. If your Spray Star comes with a cab the serial tag is on the left cab leg. Refer to engine manual for placement of engine serial number.

For easy access record your Serial and Model numbers here.

SMITHCO			
WAYNE, PENNSYLVANIA 19087 USA 610-688-4009 Fax 610-688-6069			
○	YEAR OF MFG.		○
SERIAL NO.	<input type="text"/>	<input type="text"/>	kW/hp
MODEL NO.	<input type="text"/>	<input type="text"/>	kg/lb



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 **SMITHCO** only. Do not modify any function or part.
20. Use caution when booms are down as they extend out beyond the center line of the machine approximately 10 ft. (3 m).
21. The tank is a confined space, take precaution.
22. Never remove the radiator cap when the engine is running or hot.

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.

WEIGHTS AND DIMENSIONS

Length	144" (366 cm)
Width	72" (183 cm)
Width With Booms Open	230" (584 cm)
Height	53" (135 cm)
Wheel Base	84" (213 cm)
Weight Empty	2500 lbs (1134 kg)
Weight Loaded	5000 lbs (2268 kg)

SOUND LEVEL

At ear level	85 dB
At 3 ft. (0.914 m)	88 dB
At 30 ft. (9.14 m)	73 dB
At 23 ft. (7 m). pass by	74 dB

ENGINE

Make	Ford 1.3 Liter 4 Cylinder
Model#	VSG-413p
Type / Spec#	Overhead Valve 6006a
Horsepower	45 Hp (34 Kw)
Fuel	Unleaded 87 Octane Gasoline Minimum
Cooling System	Liquid Cooled
Belt Tension	Alternator New 79-101 lb (36-46 kg), Used 56-75 lb (25-34 kg) Governor New 75 lb (34 kg), Used 50 lb (23 kg)
Lubrication System	Pressure type
Alternator	37 Amp

WHEELS & TIRE

Front (2)	23.5 x 10.5 x 12 Multi-Trac 20 psi (1.4 bar)
Rear (2)	26.5 x 14.00 x 12 Ultra-Trac 18 psi (1.3 bar)

SPEED

Forward Speed	Infinitely adjustable from 0 to 12 m.p.h. (0-20 kph)
Reverse Speed	Infinitely adjustable from 0 to 4 m.p.h. (0-6 kph)

BATTERY (Included)

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	3 quart (2.75 liters) without filter 3.5 quart (3.25 liters) with filter
Fuel	17 gallon (64 liters)
Cooling System	12 quart (11.35 liters)
Hydraulic Fluid	17 gallon (64 liters)
Grade of Fluid	SAE 10W-40 API Service SJ or higher Motor Oil

OPTIONAL SPRAY EQUIPMENT

14-100	Super Boom 20' (6 m) Long	10-300	18' Terrain Following Boom
33-275	Fresh Water Wash Tank	15-493	Auto-Boom 18' (5.5 m) Long
16-856	Tank Rinsing System	15-577	18' Stainless Steel Boom - Manual
33-476	Hose Reel Mounting Frame	15-499	Foam Marker System (Factory Installed)
16-129*	Hose Reel 200' Manual capacity	15-571	15' Tri-Section Electric Lift Star Shield Boom
16-906*	Hose Reel 12 volt electric rewind 200' capacity	15-572	15' Dual Section Electric Lift Star Shield Boom
33-262	Operators Protective Enclosure & Roll Bar (Factory Installed)	15-573	15' Manual Lift Star Shield Boom
*	to be used with 33-476		

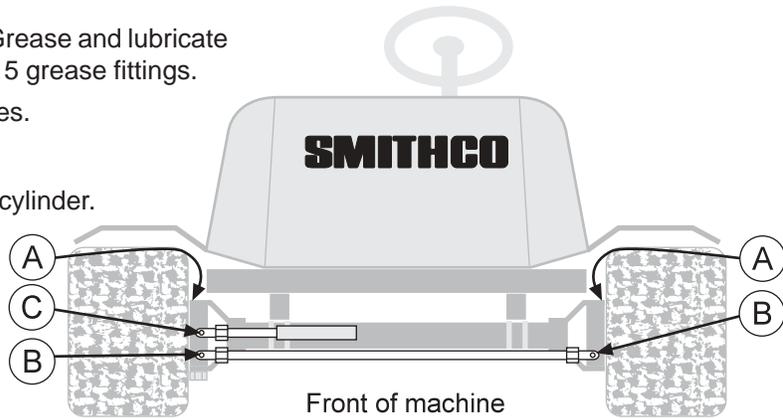


MAINTENANCE

LUBRICATION

Use No. 2 General purpose Lithium Base Grease and lubricate every 100 hours. The Spray Star 3000 has 5 grease fittings.

- A. One on each the right and left spindles.
- B. One on both rod ends of the tie rod.
- C. One on the rod end of the hydraulic cylinder.



HYDRAULIC OIL

1. Use SAE 10W-40 API Service SJ or higher motor oil.
2. For proper warranty, change oil every 500 hours or annually, which ever is first and change both filters after the first 20 hours, then at 100 hours, then every 250 hours thereafter.
3. The oil level should be 4" (10 cm) from the top of the fill tube when the fluid is cold. Do not overfill.
4. After changing oil and/or filter, run the machine for a few minutes. Check oil level and for leaks.
5. Always use extreme caution when filling the hydraulic oil tank or checking the level to keep the system free of contaminants. Check and service more frequently when operating in extremely cold, hot or dusty conditions.
6. If the natural color of the fluid has become black or smells burnt, it is possible that an overheating problem exists.
7. If the fluid becomes milky, water contamination may be a problem.
8. If either of the above conditions happen, change oil and filter immediately after fluid is cool and find the cause. Take fluid level readings when the system is cold.
9. In extreme hot or cold temperatures you can use a 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.
10. Oil being added to the system must be the same as what is already in the tank. Mark the tank fill area as to which type you put in.

TIRE PRESSURE

Caution must be used when inflating a low tire to recommended pressure. Over inflating can cause tires to explode. 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. Retorque after first 10 hours and every 100 hours thereafter.
7. Lower machine to ground and remove blocks.

BATTERY

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

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

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

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

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



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

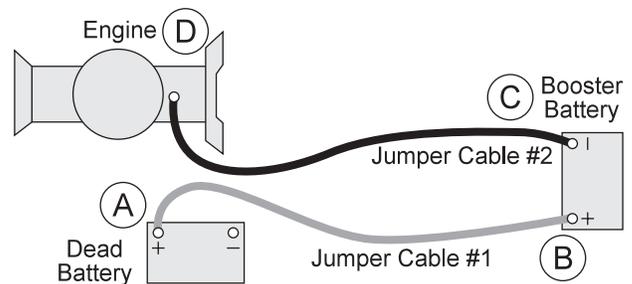
JUMP STARTING



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

To jump start (negative grounded battery):

1. Shield eyes.
2. 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.

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.

SERVICE CHART



Before servicing or making adjustments to the machine, stop engine, set park break, block wheels 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:

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

	Daily	As Required	100 Hours	200 Hours	250 Hours	300 Hours	400 Hours	Every 500 Hours/Yearly
Cab fresh air filter	C	R						
Fuel level	C	C						
Engine oil	C		R	R		R	R	R
Engine Oil Filter			R	R		R	R	R
Engine for leaks and loose parts	C		C	C		C	C	C
Hydraulic system for leaks and loose parts	C		C	C		C	C	C
*Tire pressure	C		C	C		C	C	C
Visual inspection of tires	C		C	C		C	C	C
Engine coolant	C		C	C		C	C	R
Fuel filters (2)		R						R
Air Cleaner		C			C			R
Belts and hoses	C				C			C
Valve clearance							C	
Idle speed					C			C
Hydraulic oil	C		C	C		C	C	R
**Hydraulic oil filters (2)					R			R
PCV valve							C	
Battery electrolyte level			C	C		C	C	C
Clean battery terminals					C			C
Flush spray systems water/chemical tanks	C							
Crankcase vent systems breather cap		C	C	C		C	C	C
Governor oil level		C	C	C		C	C	C
Spark Plugs							C	R
***Torque tire nuts				C			C	C
Rear axle gear lube			C	C		C	C	C
Lubricate			C	C		C	C	C

C=Check at specified intervals

R=Replace at specified intervals

* Tire pressure: Front 20 psi (1.4 bar), Rear 18 psi (1.3 bar)

**Replace hydraulic filters after the first 20, 100, 250, and every 250 there after.

***Torque lug nuts after the first 10 hours and every 200 hours there after (64 to 74 ft/lb (87-100 Nm))

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.

END USER'S SERVICE CHART

	Daily	As Required	100 Hours	200 Hours	250 Hours	300 Hours	400 Hours	Every 500 Hours/Yearly
Cab fresh air filter								
Fuel level								
Engine oil								
Engine Oil Filter								
Engine for leaks and loose parts								
Hydraulic system for leaks and loose parts								
*Tire pressure								
Visual inspection of tires								
Engine coolant								
Fuel filters (2)								
Air Cleaner								
Belts and hoses								
Valve clearance								
Idle speed								
Hydraulic oil								
**Hydraulic oil filters (2)								
PCV valve								
Battery electrolyte level								
Clean battery terminals								
Flush spray systems water/chemical tanks								
Crankcase vent systems breather cap								
Governor oil level								
Spark Plugs								
***Torque tire nuts								
Rear axle gear lube								
Lubricate								

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ADJUSTMENTS

FACET CARBURETOR

The idle speed adjustment screw, and the idle fuel mixture adjustment needle are accessible on the exterior of the carburetor. There are three factors that control the conversion of the fuel and mixture into engine power. These factors are engine compression, ignition and correct carburetor adjustment. Correct carburetor adjustment cannot be obtained unless engine compression and ignition meet specifications.

To make the adjustments, start the engine and operate it until it has reached normal operating temperature. Be sure the choke and throttle controls are pushed all the way in.

Start the adjustments by setting the idle speed screw to obtain an engine speed of 750 RPM. Then turn idle fuel mixture adjustment needle in (clockwise) until the engine begins to roll. Then, back it out slowly until the engine is running smoothly. Reset the idle speed to 750 RPM.

VALVE CLEARANCE

The valve clearance can also be adjusted without the engine running. Rotate the crankshaft until #1 cylinder is at the top of the compression stroke. Check the timing marks. It should read 0 or TDC. Both valves on #1 cylinder are now closed. Set the valve clearance on both valves (Intake Lash Cold 0.22 mm, Exhaust Lash Cold 0.32 mm, Next, Rotate the crankshaft 180° and set the valve lash on both valves on #2 cylinder. Again rotate the crankshaft 180° and set the valve lash on both valves on #4 cylinder. Rotate the crankshaft another 180° and set the valve lash on both valves on #3 cylinder.

GOVERNOR

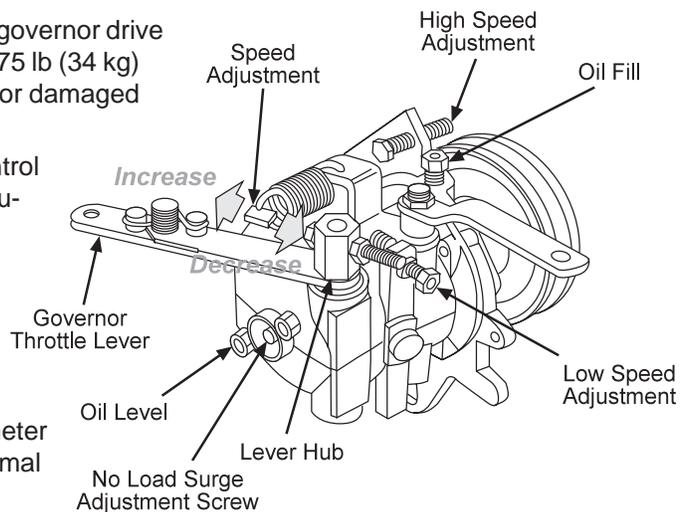
Before making any governor adjustments, check the governor drive belt tension with a belt tension gauge. Set the belt to 75 lb (34 kg) new, 50 lb (23 kg) used. (Replace the belt if cracked or damaged during shipping, etc.)

The first adjustment is the governor-to-carburetor control rod adjustment. With the control rod connected, manually move the governor throttle lever to the maximum open throttle position. Check that the carburetor throttle shaft lever is set from $\frac{1}{32}$ to $\frac{1}{4}$ of an inch from its maximum opening position stop. If necessary, adjust length of the control rod to obtain the setting.

To perform a high-speed adjustment, attach a tachometer to the engine, then run the engine until it reaches normal operating temperature.

1. Loosen the lock nut on the high speed stop screw.
2. Disengage engine load.
3. Slowly pull the throttle control to desired maximum no load engine speed.
4. Adjust the high speed stop screw on the governor to attain the desired maximum engine speed. Do NOT exceed the recommended maximum RPM.
5. Tighten the lock nut.

The next adjustment is for speed. Proper governor operation requires a difference between full-load and no-load governor speed. Too small an RPM spread between the two speeds will cause governor hunting and surging. Too large a spread will cause the low response. For this governor, normal RPM spread is approximately 250 RPM within the full load speed range of 2000-2800 RPM. If the engine hunts at maximum speed, no-load condition, turn the surge screw clockwise into governor until hunting just stops and tighten locknut. Do not turn screw in far enough to increase engine speed.



DISTRIBUTORLESS IGNITION TIMING

The ignition system does not require any mechanical external adjustments, however the spark plug high tension leads must be inserted correctly at each number coil position to the corresponding spark plug in the cylinder (front to rear #1, 2, 3, and 4).

FUEL LEVEL

The fuel level float adjustment is made with the carburetor or air intake body removed. First, turn the fuel shut-off valve to the OFF position, if so equipped. Remove the carburetor from the engine. Remove the 4 screws that retain the intake body to the throttle body.



Lift the air intake body off slowly as the accelerator jet assembly is spring loaded and may be lost.

The float pontoons should be level when the valve is seated. If not, bend the tab carefully to adjust. Reassemble the carburetor in reverse order of removal. Adjust the carburetor idle speed and idle fuel/air mixture.

SPARK PLUGS

The spark plugs should be replaced at the recommended intervals.

Remove the wires from each spark plug by grasping, twisting and then pulling the molded boot of the wire only. Do not pull directly on the wire because the wire connection inside the cap may become separated.

After loosening each spark plug one or two turns, clean the area around each spark plug port with compressed air, then remove the spark plugs.

Set the spark plug gap to specification by bending the ground electrode. All spark plugs new or used should have the gap checked.

Install the spark plugs and torque each plug to specifications.

Connect the spark plug wires.

NOTE: Do NOT overtighten spark plugs. The gap may change considerably due to distortion of the plug outer shell.

PARK BRAKE

There is a clevis on both ends of the Park Brake cable. If the park brake is too loose, turn one or both of the clevis' clockwise to tighten. If park brake is too tight, turn one or both clevis' counterclockwise to loosen.

SPEED CALIBRATION NUMBERS

The correct speed calibration number for the Spray Star 3000 is 688. This is measured off the front wheel. Nozzle size **MUST** be capable of delivering the programmed application rate.

SAFETY INTERLOCK SWITCH

To adjust the interlock switch on the back hydrostatic pump loosen the set screw on the front half of the switch, with the ignition switch OFF. With a continuity tester connected across the switch, it should light with the shift arm centered. Move the shift arm to the right or left and the light should go off. By turning the back half of the switch clockwise it will reduce the amount of travel on the shift arm that is required for the light to remain on. The light must be on **ONLY** with the shift arm centered.

GAS THROTTLE

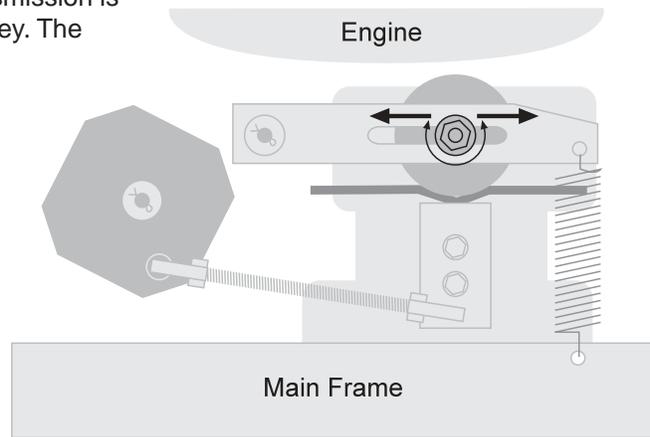
If the gas throttle governor doesn't stay in the open position you must tighten the tension located underneath the operator's panel.

ADJUSTMENTS (CONTINUED)

WHEEL 'CREEP'

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

1. Lift up and support the unit so rear wheels are off the ground, and block front wheels.
2. In the rear of the engine, on the hydrostatic transmission is the idler arm. The idler arm rests on the idler pulley. The idler pulley rests in the 'V' shape of the shift arm.
3. Loosen the bolt and nut holding the idler pulley to the idler arm. Leave it finger tight.
4. With the engine running, slide the pulley in the idler arm slot until it centers on the shift arm on the hydrostatic and the wheel 'creep' stops.
5. Tighten all fasteners and test by using the foot pedal linkage to see that the 'creep' is removed.
6. Turn the engine off and lower the machine.



STORAGE

NOTE: To prevent damage from freezing, pour window washer fluid into spray systems tank and operate pump to circulate mix through gun and hose back to tank. Open boom control to circulate through rest of spray system.

UP TO ONE MONTH

1. While engine is running, treat upper cylinders by spraying engine fogging agent into the air intake (NOT through air cleaner) for about two minutes. Fogging agent can be obtained from your local after market supplier. Open throttle for short burst of speed, shut off ignition and allow engine to come to a stop while continuing to spray fogging agent into air intake.
2. Leave spark plugs in holes or seal spark plug holes with suitable threaded metal plugs and cover all openings into engine with suitable non-hygroscopic material.
3. Check coolant protection. Store machine indoors in dry area.

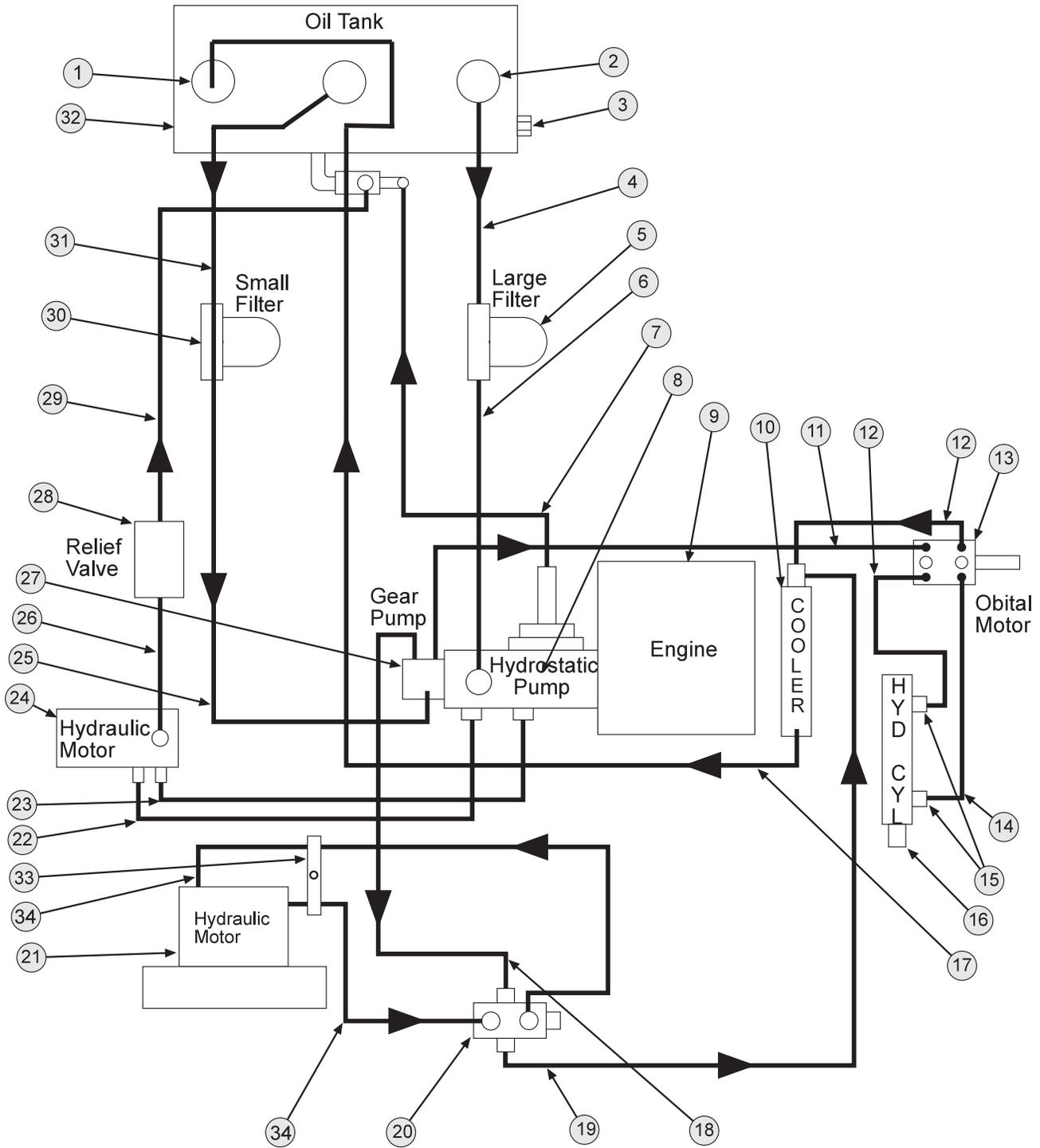
EXTENDED STORAGE

1. Check for any damaged parts or missing decals. Replace as needed.
2. Drain crankcase completely and refill with recommended engine oil or equivalent.
3. Run engine until completely out of gasoline, then restart and run on stabilizer mixed with unleaded gasoline for at least 10 minutes.
4. While engine is still running and at completion of above run, treat upper cylinders by spraying fogging agent into the air intake for about two minutes. Open throttle for short burst of speed, shut off ignition and allow engine to come to a stop while continuing to spray fogging agent into air intake (NOT through air cleaner).
5. Lubricate all grease points.
6. Check coolant protection and level.
7. Clean exterior surface of engine.
8. Leave spark plugs in holes or seal spark plug holes with suitable threaded metal plugs.
9. Seal all openings in engine and accessories with non-hygroscopic material. Mask off all areas to be used for electrical contact.
10. Tape all openings and make sure all surfaces are dry. Then spray all taped openings, all engine accessories including ignition wiring, and all exterior surfaces of engine with Insulation Compound.
11. Disconnect, remove and clean battery. Check electrolyte level. Charge the battery and store in a cool dry place (NOT directly on cement).
12. Put blocks or stands under the machine to take weight off tires.

AFTER STORAGE

1. Check for any damaged parts or missing decals. Replace as needed.
2. Lubricate all grease points.
3. Clean exterior surface of engine.
4. Replace spark plugs if previously removed.
5. Remove all tape and obstructions from exterior engine surfaces.
6. Charge and replace battery.
7. Check tire pressure.
8. Remove blocks or supports from under the machine.
9. Check engine oil level and coolant level and lubricate all grease points.
10. Fill fuel tank.
11. Check belt tension.
12. Run engine approximately 5 minutes before putting the engine under load.

HYDRAULIC DIAGRAM



HYDRAULIC DIAGRAM PARTS LIST

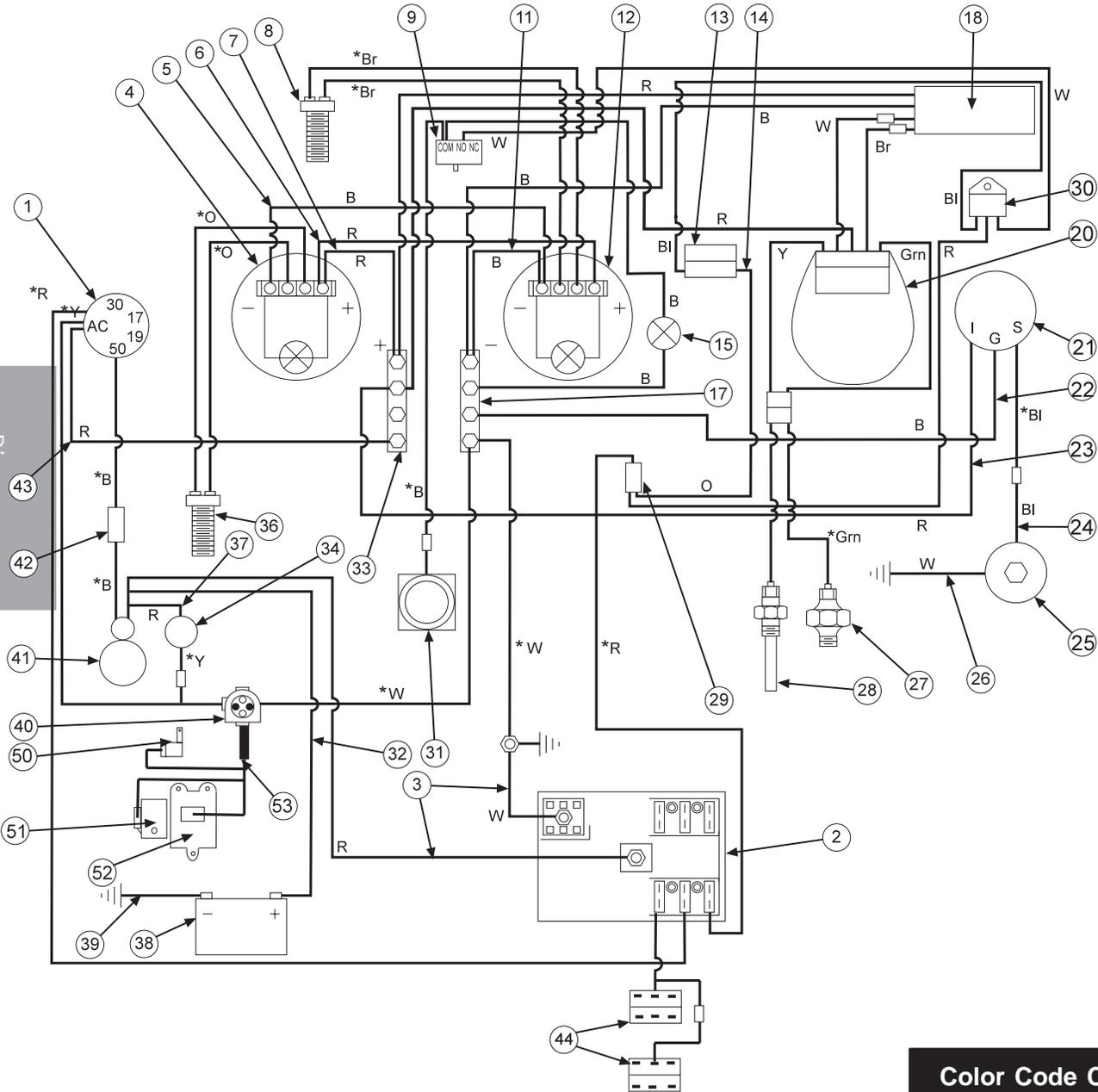
REF#	PART#	DESCRIPTION	QUANTITY
1	18-249	Barb Fitting $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
2	33-057	Strainer	1
3	18-069	Pipe Plug $\frac{3}{4}$ MPT	1
4	8833-17	Suction Hose 1 x 17	1
5	60-215	Oil Filter	1
6	8833-25	Suction Hose 1 x 25	1
7	33-258	Hydraulic Hose	1
8	33-058	Hydrostatic Pump	1
9	33-002	Ford Gas Engine 38.6 HP	1
10	33-067	Oil Cooler	1
	33-068	Mounting Kit	2
11	33-130	Hydraulic Hose	1
12	33-138	Hydraulic Hose	2
13	33-062	Power Steering Orbital Motor	1
14	33-139	Hydraulic Hose	1
15	18-168	O-Ring Elbow	2
16	75-714	Hydraulic Cylinder 2" OD x 7"	1
17	8832-73	Suction Hose $\frac{3}{4}$ x 73	1
18	33-132	Hydraulic Hose	1
19	33-137	Hydraulic Hose	1
20	33-066	Hydraulic Valve	1
21	33-525	Hydraulic Motor	1
22	33-136	Hydraulic Hose	1
23	33-135	Hydraulic Hose	1
24	33-060	Hydraulic Motor	1
25	8833-19	Suction Hose 1 x 19	1
26	33-131	Hydraulic Hose	1
27	33-326	Hydraulic Gear Pump	1
28	33-059	Relief Valve with Orifice	1
	33-059-01	Cartridge	1
	18-166	Adapter	2
29	33-259	Hydraulic Hose	1
30	23-006	Oil Filter	1
31	8833-27	Suction Hose 1 x 27	1
32	33-281	Hydraulic Oil Tank	1
	13-586	Filler Breather	1
33	60-501	Hose Hold-down	1
34	33-526	Hydraulic Hose	2
	18-116	Hose Clamp 8 Used on 8833 Hose	
	18-222	Hose Clamp 2 Used on 8832 Hose	

SEAL KITS

33-058	Hydrostatic Pump with neutral lockout switch and side band neutral.
33-058-01	Seal Repair Kit
33-060	Hydraulic Motor with built in hot oil shuttle valve
33-060-01	Motor Rear Seal Kit
33-060-02	Shaft Seal Kit
33-326	Hydraulic Gear Pump with 3 gpm priority flow and 1500 psi relief
33-326-08	Seal Kit
33-062	Power Steering Orbital Motor
33-062-01	Seal Kit
33-062-02	Needle Bearing Kit
33-062-03	End Cap Kit
33-062-04	Center Spring Kit
75-714	Hydraulic Cylinder
14-268	Seal Kit

WIRING DIAGRAM

Diagrams



FUSES AUTO BLADE TYPE

PART #	AMP	LOCATION
33-273	30 amp	Truck
33-273	30 amp	Boom Lift
33-508	15 amp	Spray System
33-284	5 amp	Manifold Ball Valve
33-507	10 amp	Foamer

IN-LINE FUSES

22-071	30 amp	Hose Reel
22-071	30 amp	Cab

Color Code Chart

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

WIRING DIAGRAM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	17-068	Key Switch	1
	17-079	Key Set	1
2	33-271	Fuse Block	1
3	33-274	Fuse Block Power Wiring Harness	1
4	33-211	Tachometer	1
5	33-202	Wire "-" Tachometer to "-" Speedometer	1
6	33-201	Wire "+" Tachometer to "+" Speedometer	1
7	33-200	Wire "+" Bus Bar to "+" on Tachometer	1
8	16-883	Speed Sensor	1
9	13-508	Limit Switch	1
11	33-203	Wire "-" Speedometer to "-" Bus Bar	1
12	33-212	Speedometer	1
13	33-083	Push Button Switch	1
14	33-197	Wire On/Off Switch to Button Switch	1
15	33-288	Indicator Light for Speed Control	1
17	8935	Bus Bar "-"	1
18	33-213	Low Battery Indicator Module	1
20	33-094	Warning Cluster (Includes wires)	1
21	33-093	Fuel Gauge	1
22	33-205	Wire "-" Bus Bar to "G" on Fuel Gauge	1
23	33-199	Wire "+" Bus Bar to "I" on Fuel Gauge	1
24	33-207	Wire Fuel Tank Sender to Wire from Gauge	1
25	33-092	Fuel Sender	1
26	33-208	Wire Fuel Tank Sender to Ground	1
27		Oil Sensor (part of engine)	
28		Temperature Sender (part of engine)	
29	12-003	Toggle Switch	1
	15-472	Switch Boot	1
30	33-285	Latching Switch with Wires and Resistor	1
31	33-502	Magnetic Coil	1
32	50-323	Red Battery Cable	1
33	8935	Bus Bar "+"	1
34		Alternator (part of engine)	
36	16-883	Tachometer Sensor	1
37	33-206	Wire Alternator to Hot "+" on Starter Solenoid	1
38	33-216	Battery	1
39	22-054	Black Battery Cable	1
40		Connector (wire harness to Ford engine)	
41		Starter (part of engine)	
42	33-058-45	Interlock Switch (on hydrostat)	1
43	33-195	Wire AC Ignition Switch to "+" Bus Bar	1
44	16-755	Boom Switch	2
50	33-507	Auto Blade Fuse 10 Amp (part of engine)	1
51	33-002-03	Map Sensor (part of engine)	1
52	33-002-02	Ignition Control Module (part of engine)	1
53	33-002-04	Wire Harness (part of engine)	1
*	33-097	Main Wire Harness (Includes all wire colors with a *)	1
Not Shown	13-197	Ground Strap (Engine to Frame)	1

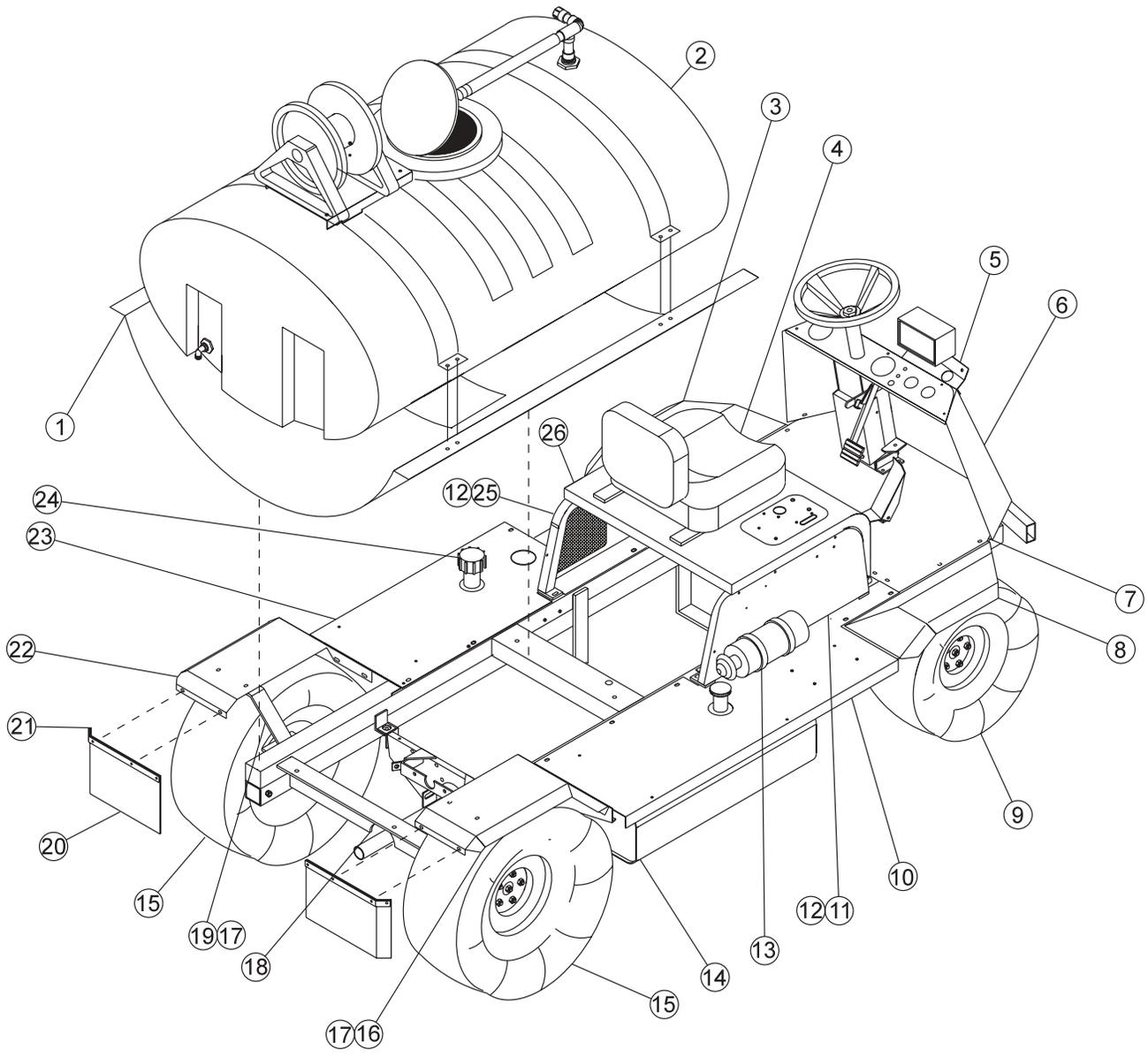
Use dielectric grease on all electrical connections

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



BODY AND FRAME DRAWING

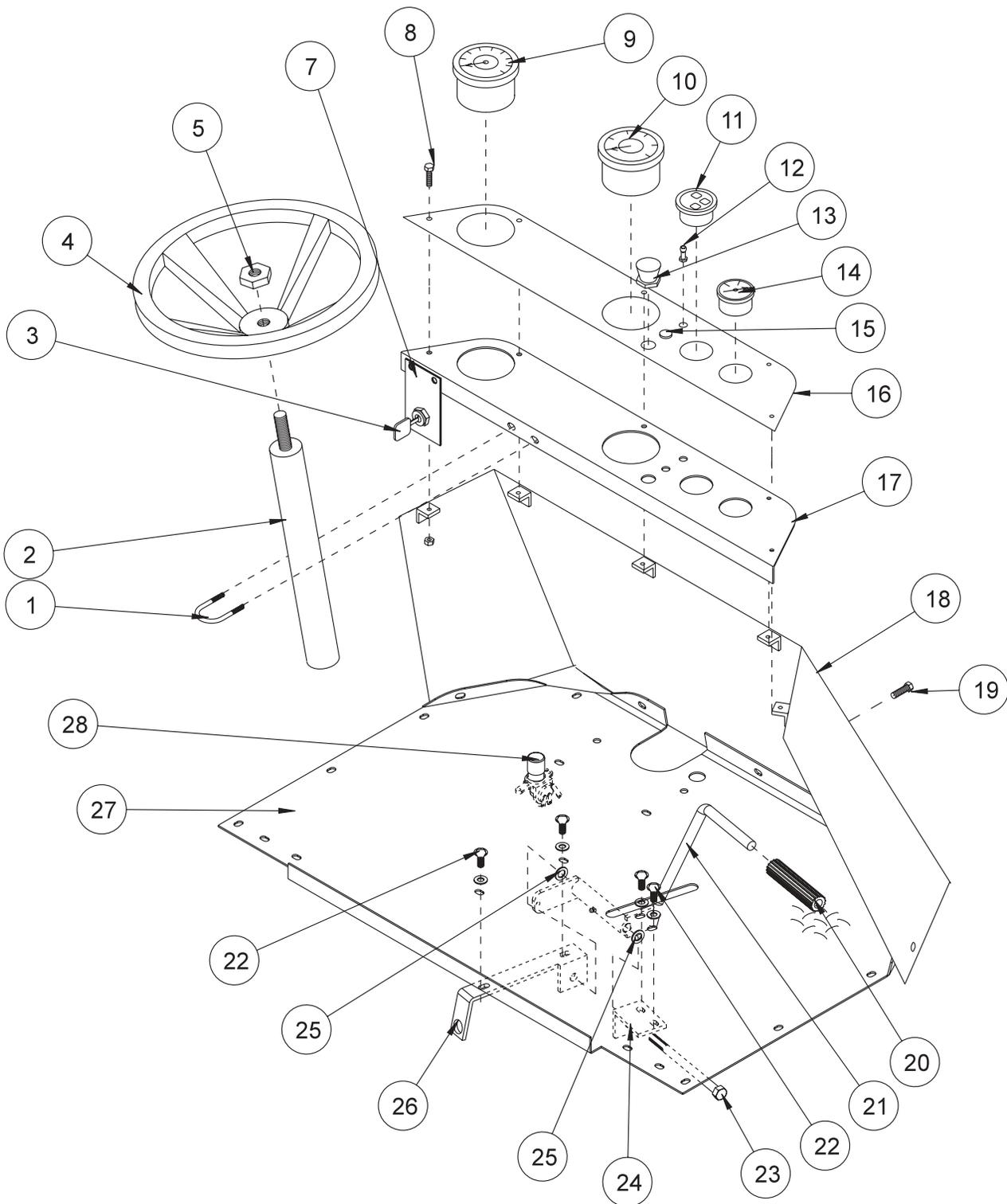
Parts



BODY AND FRAME PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	33-143	Tank Carrier	1
2	33-142	300 Gallon Tank	1
3	33-103	Left Front Fender	1
4	14-270	High Back Seat with Smithco Logo	1
5	33-189	Control Bracket	1
	15-514	Console Cover (Used with 3006 spray systems)	1
	16-234	Console Cover (Used with 3002 & 3007 spray systems)	1
6	33-148	Nose Cone	1
	50-400	Grommet (Used with spray systems)	1
7	33-122	Floorboard	1
	HB-38-16-100	Bolt ³ / ₈ - 16 x 1	8
	HW-38	Washer ³ / ₈	8
8	33-104	Right Front Fender	1
9	33-175	Front Tire and Wheel	2
	33-175-01	Tire 23 x 10.5 x 12	2
	33-175-02	Wheel	2
	HNL-12-20	Lug Nut, 1/2 - 20	10
10	33-533	Right Tank Bracket	1
	HLC-A-200	Loom Clamp ⁵ / ₈ x 2	1
11	33-053	Right Side Panel Frame	1
	50-081	Rubber Insulator	1
	33-107	Right Side Panel	1
12	HB-38-16-100	Bolt ³ / ₈ - 16 x 1	4
	HW-38	Washer ³ / ₈	4
	HWL-38	Lockwasher ³ / ₈	6
	50-081	Rubber Insulator	2
	HN-38-16	Nut ³ / ₈ - 16	2
	HB-14-20-075	Bolt ¹ / ₄ - 20 x ³ / ₄	10
	HWL-14	Lockwasher ¹ / ₄	10
13	60-602	Air Cleaner Assembly	1
	60-602-01	Air Cleaner Element	1
14	33-282	Gas Tank	1
15	33-072	Tire and Wheel	2
	33-072-01	Tire 26.5 x 14.00 x 12	2
	78-103-02	Wheel	2
	HNL-12-20	Lug Nut ¹ / ₂ - 20	10
16	33-117	Right Rear Fender	1
	33-161	Right Rear Fender Bracket	1
17	HB-38-16-100	Bolt ³ / ₈ - 16 x 1	4
	HWL-38	Lockwasher ³ / ₈	8
	HB-38-16-125	Bolt ³ / ₈ - 16 x 1 ¹ / ₄	4
	HW-38	Washer ³ / ₈	4
	HN-38-16	Nut ³ / ₈ - 16	4
18	33-052	Main Frame	1
19	33-162	Left Rear Fender Bracket	1
20	33-292	Mud Flap	2
21	33-293	Mud Flap Bracket	2
	HSTP-516-18-100	Phillip Truss Machine Screw ⁵ / ₁₆ - 18 x 1	8
	HNTL-516-18	Lock Nut ⁵ / ₁₆ - 18	8
22	33-116	Left Rear Fender	1
23	33-290	Left Tank Bracket	1
24	33-281	Hydraulic Oil Tank	1
25	33-054	Left Side Panel Frame	1
	50-081	Rubber Insulator	1
	33-256	Left Side Panel	1
26	33-055	Seat Panel	1

NOSE CONE DRAWING

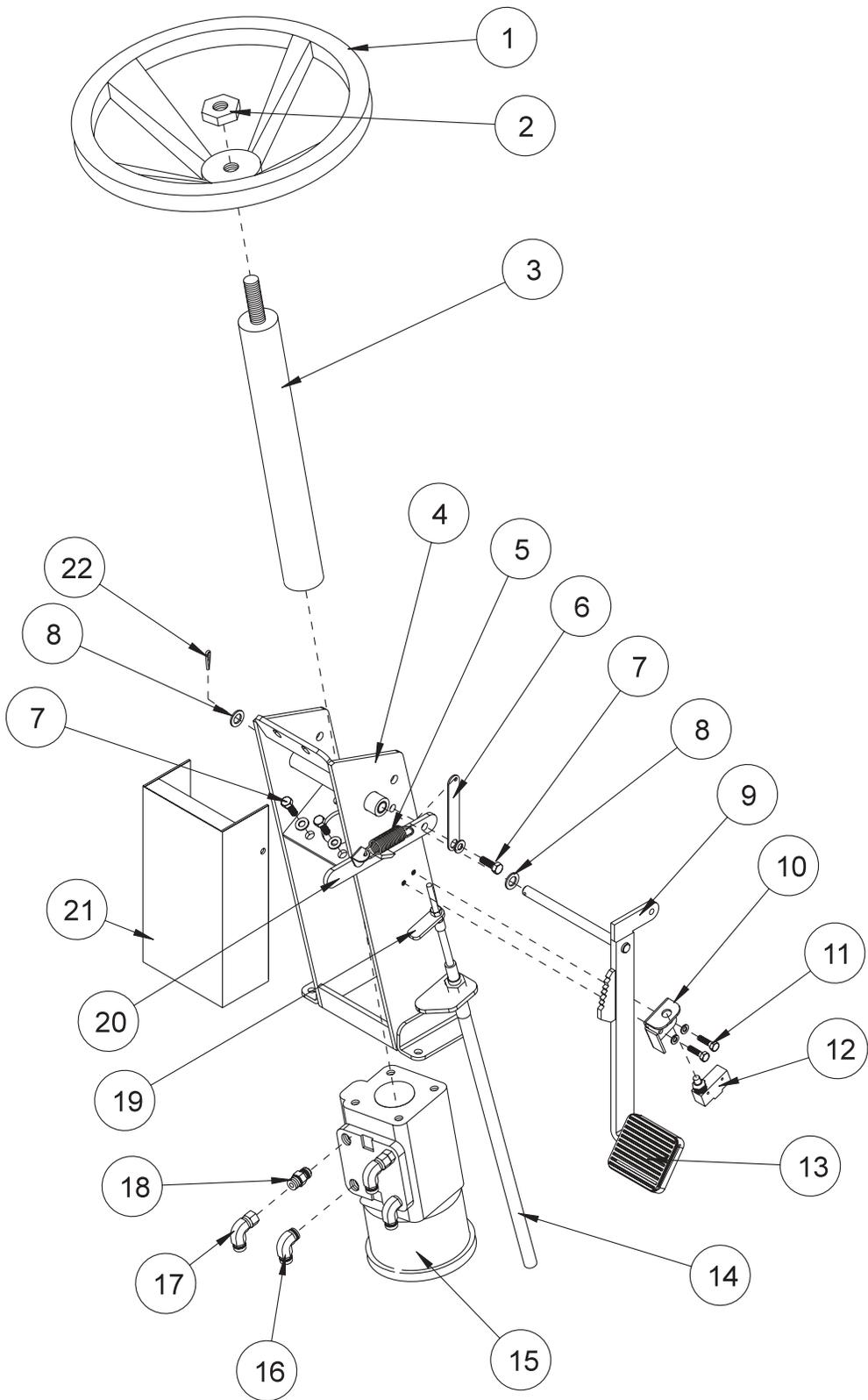


Parts

NOSE CONE PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	50-111	Muffler Clamp 1 $\frac{1}{2}$ "	1
2	33-063	Steering Column 18"	1
3	17-068	Key Switch	1
	17-079	Key Set	1
4	33-064	Steering Wheel with Cap	1
5	33-065	Nut for Steering Wheel (30-40 ft/lbs (41-54 Nm) Max Torque)	1
7	33-126	Key Switch Bracket	1
	27-074	Decal, Ignition	1
8	HB-14-20-100	Bolt $\frac{1}{4}$ - 20 x 1	5
	HW-14	Washer $\frac{1}{4}$	5
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	5
9	33-211	Tachometer with Terminals	1
10	33-212	Speedometer with Terminals	1
11	33-094	Cluster Gauge with Wiring	1
12	12-003	Toggle Switch	1
	15-472	Switch Boot	1
13	33-083	Push Button Switch	1
14	33-093	Fuel Gage	1
15	33-288	Indicator Light For Cruise Control	1
16	33-174	Dashboard Decal	1
17	33-105	Dashboard	1
18	33-148	Nose Cone	1
	8803-83	Trim, Black with Lace 83"	1
19	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	5
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	5
20	76-299	Pedal Pad	1
21	33-334	Hydro Pedal	1
22	HST-38-16-100	Truss Machine Screw $\frac{3}{8}$ - 16 x 1	4
	HW-38	Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
23	HB-12-13-700	Bolt $\frac{1}{2}$ - 13 x 7	2
	HN-12-13	Nut $\frac{1}{2}$ - 13	2
24	33-337	Right Pedal Bracket	1
25	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	2
26	33-336	Left Pedal Bracket	1
27	33-122	Floor Board	1
28	33-509	Master Boom Control Switch	1
	50-400	Rubber Grommet	1
	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HWL-14	Lockwasher $\frac{1}{4}$	2

STEERING DRAWING

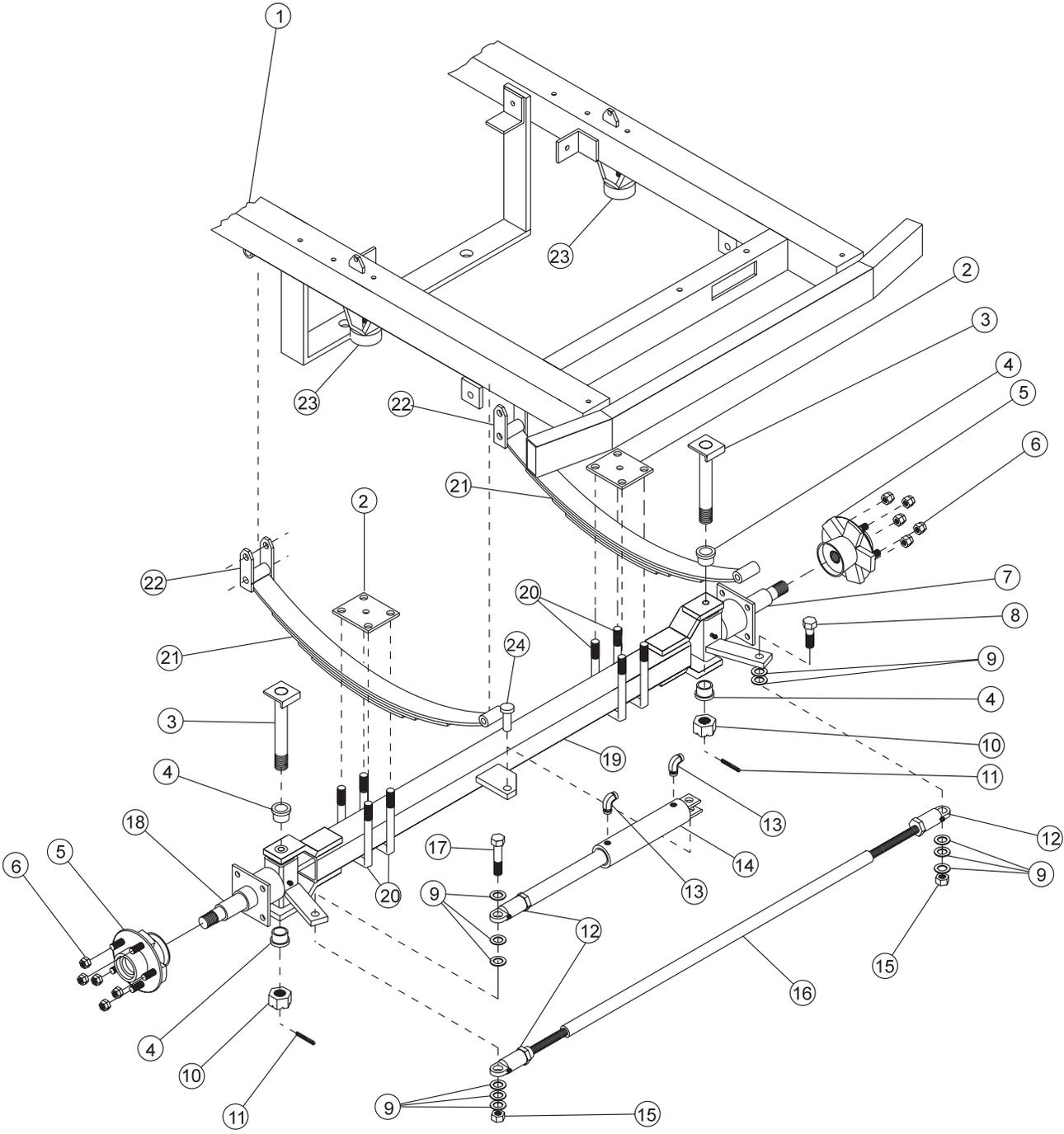


Parts

STEERING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	33-064	Steering Wheel with Cap	1
2	33-065	Nut for Steering Wheel (30-40 ft/lbs (41-54 Nm) Max Torque)	1
3	33-063	Steering Column 18"	1
4	33-123	Steering Column	1
	HB-38-16-150	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
	HW-38	Washer $\frac{3}{8}$	8
5	11-050	Extension Spring	1
6	33-242	Spring Clip	1
7	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	5
	HW-38	Washer $\frac{3}{8}$	3
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	5
8	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	2
9	33-125	Brake Pedal	1
10	33-517	Switch Mount Bracket	1
11	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	5
	HW-14	Washer $\frac{1}{4}$	5
12	13-508	Limit Switch	1
13	15-015	Pedal Pad	1
14	33-091	Brake Cable	1
15	33-062	Power Steering Orbital Motor	1
16	18-202	Elbow	2
17	18-168	Elbow	2
18	18-169	Adapter $\frac{3}{8}$	2
19	34-035	Switch Stop	1
	HN-516-24	Nut $\frac{5}{16}$ - 24	2
	HWL-516	Lock Washer $\frac{5}{16}$	1
20	33-124	Brake Release	1
	15-020	Hand Grip	1
21	33-511	Steering Column Guard	1
	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HWL-14	Lockwasher $\frac{1}{4}$	2
22	HP-18-075	Cotter Pin $\frac{1}{8}$ x $\frac{3}{4}$	1

FRONT AXLE DRAWING



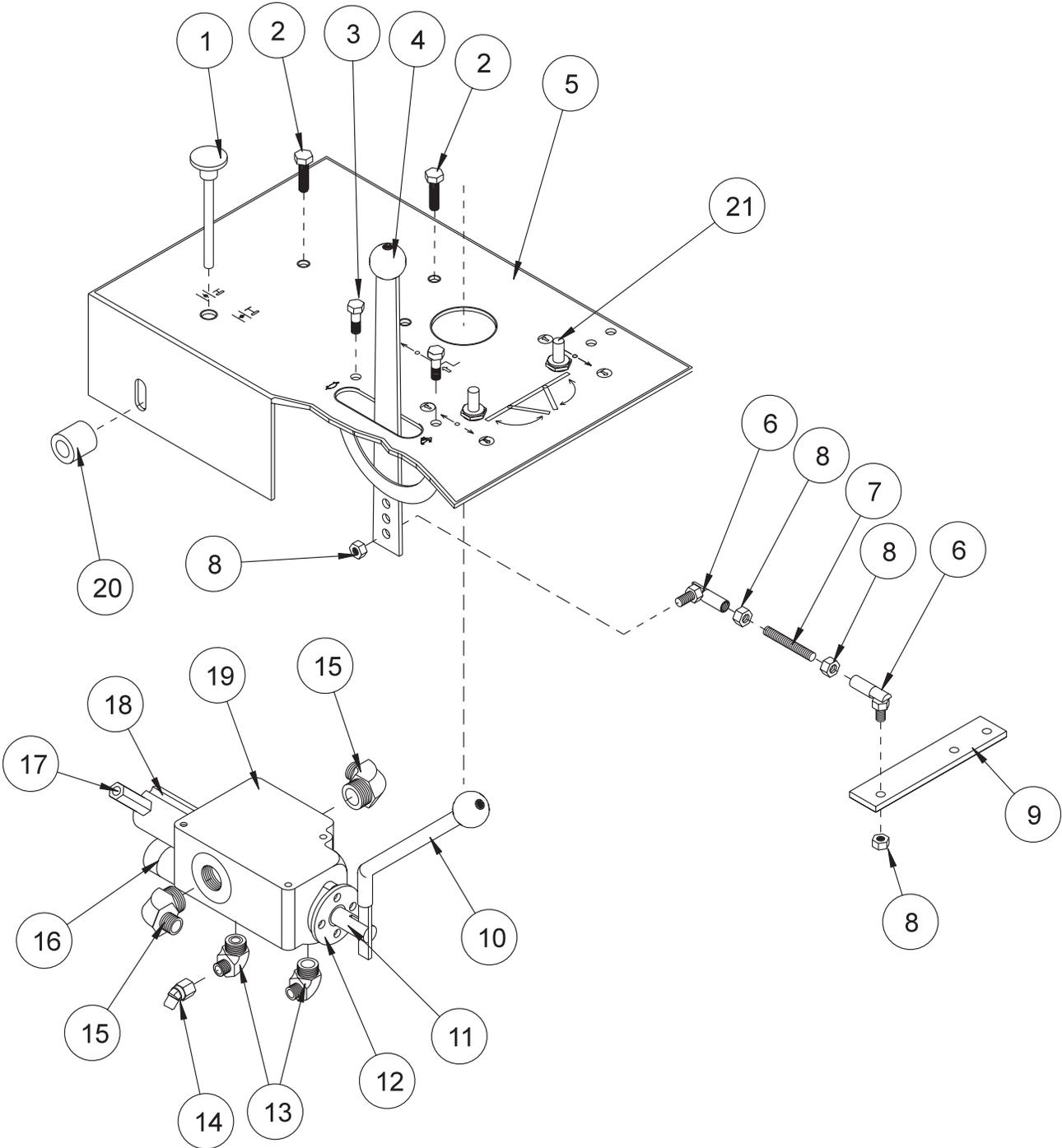
Parts

FRONT AXLE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	33-052	Main Frame	1
2	33-169	Spring Plate	2
3	33-147	King Pin	2
4	33-086	Flange Bushing (part of Ref# 7 and 18)	4
5	33-074	Hub Assembly (includes all * items)	2
	*33-073-01	Seal	2
	*33-073-02	Dust Cap	2
	*78-119	Outer Bearing	2
	*78-118	Inner Bearing	2
6	*HNL-12-20	Lug Nut, 1/2 - 20	10
7	33-099	Left Spindle	1
	HNAR-100-14	Slotted Hex Jam Nut 1 - 14	1
8	HB-58-11-200	Bolt, 5/8 - 11 x 2	1
9	HMB-58-14	Machine Bushing 5/8 x 14GA	11
10	HNA-100-14	Slotted Hex Nut 1 - 14	2
11	HP-18-200	Cotter Pin, 1/8 x 2	2
12	18-154	Rod End	3
	HNJ-58-18	Jam Nut 5/8 - 18	3
	HG-14-28-180	Grease Fitting, 1/4 - 28 - 180°	3
13	18-168	Elbow, 3/8	2
14	75-714	Hydraulic Cylinder, 2" OD x 7	1
	HCP-58-175	Clevis Pin 5/8 x 1 3/4	1
	HP-18-100	Cotter Pin 1/8 x 1	1
15	HNCL-58-11	Center Lock Nut, 5/8 - 11	2
16	33-145	Tie Rod	1
17	HB-58-11-300	Bolt, 5/8 - 11 x 3	1
18	33-100	Right Spindle	1
	HNAR-100-14	Thick Slotted Jam Nut 1 - 14	1
19	33-098	Front Axle	1
20	60-402	U-Bolt	4
	HNCL-12-20	Center Lock Nut, 1/2 - 20	8
21	33-078	Leaf Spring, 1750 lb (794 kg)	2
	HB-916-18-325	Bolt 9/16 - 18 x 3 1/4	6
	HNTL-916-18	Top Lock Nut 9/16 - 18	6
22	33-170	Spring Shackle	4
23	50-081	Rubber Insulator	2
24	HCP-58-175	Clevis Pin 5/8 x 1 3/4	1
	HP-18-100	Cotter Pin 1/8 x 1	1



CONTROL PANEL DRAWING



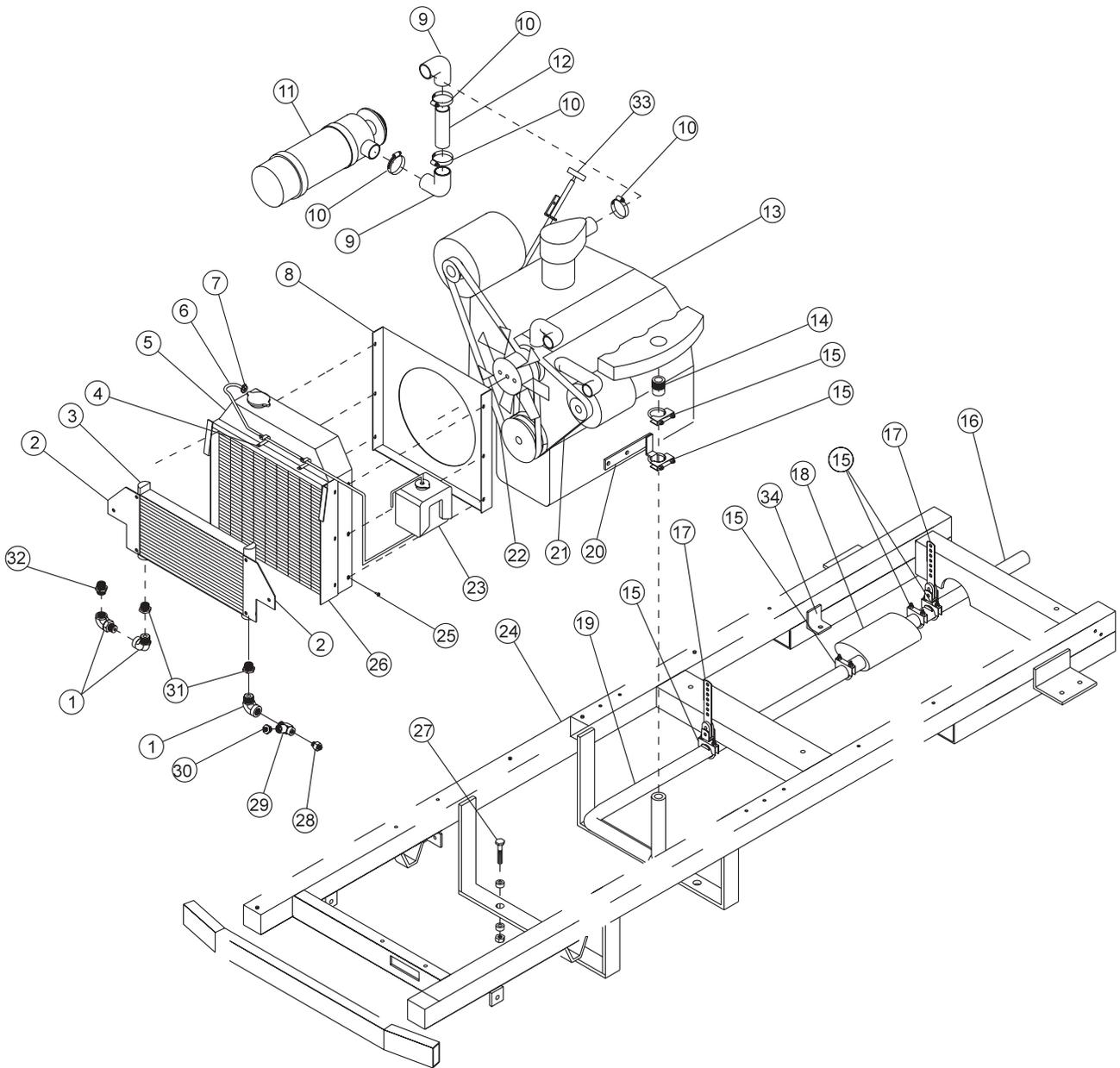
Parts

CONTROL PANEL PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	11-086	Choke Cable	1
2	HB-14-20-150	Bolt $\frac{1}{4}$ - 20 x $1\frac{1}{2}$	2
	HW-14	Washer $\frac{1}{4}$	2
	HWL-14	Lockwasher $\frac{1}{4}$	2
3	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HNCL-14-20	Center Lock Nut $\frac{1}{4}$ - 20	2
4	16-727	Friction Control	1
5	33-115	Operators Panel	1
	33-160	Decal, Control Panel	1
6	18-115	Ball Joint, $\frac{1}{4}$ NF	2
7	33-229	Threaded Rod 14 - 28 x $1\frac{3}{4}$	1
8	HN-14-28	Nut $\frac{1}{4}$ - 28	4
	HWL-14	Lockwasher $\frac{1}{4}$	2
9	33-112	Governor Extension	1
10	33-066-30	Valve Handle	1
	33-066-08	Ball Knob	1
11	33-066-02	Spool	1
	33-066-05	Quad Ring	2
	33-066-06	Wiper	2
12	33-066-15	Clevis Bracket	1
13	17-019	Male Elbow $\frac{3}{8}$ - $\frac{1}{2}$	2
14	18-214	Elbow 45°	1
15	18-244	Male Elbow	2
16	33-066-11	Cap Nut	1
	33-066-04	Washer	1
	33-066-10	Adjustment Screw	1
	33-066-09	Poppet	1
	33-066-03	Spring	1
17	33-066-27	Detent Housing	1
	33-066-17	Detent Plunger	1
	33-066-29	Spring	1
	33-066-19	Set Screw $\frac{5}{16}$ - 24 - $\frac{3}{8}$	1
	33-066-18	Washer	1
18	33-066-20	Detent End Cap	1
	33-066-22	Spacer	1
	33-066-25	Washer	2
	33-066-23	Spacer	1
	33-066-28	Spacer, Spool	1
	33-066-21	Center Spring	1
	33-066-26	Sleeve	1
	33-066-24	Bolt $\frac{5}{16}$ - 18 x $2\frac{1}{4}$	1
19	33-066	Hydraulic Valve, 1500 psi, 102 Bars	1
20	33-215	Operator Panel Spacer	2
21	15-472	Switch	2
	16-755	Switch Boot	2

ENGINE AND EXHAUST DRAWING

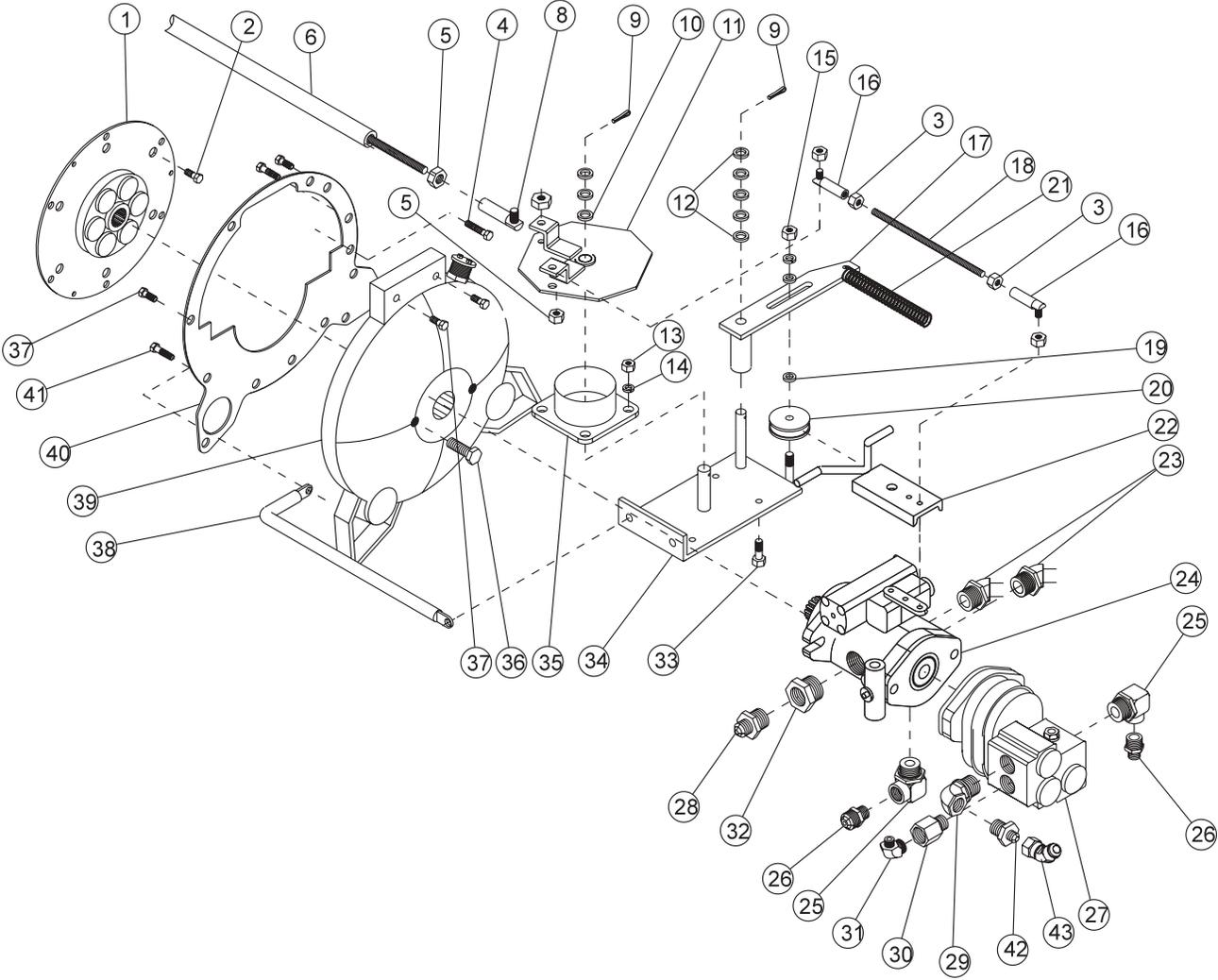
Parts



ENGINE AND EXHAUST PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	18-140	Fitting $\frac{3}{4}$	3
2	33-146	Oil Cooler Mounting Bracket	2
	33-068	Mounting Kit	2
3	33-067	Oil Cooler	1
4	HLC-58	Loom Clamp	2
	HST-516-18-075	Truss Screw $\frac{5}{16}$ - 18 x $\frac{3}{4}$	2
5		Radiator (Comes with Engine)	1
6	8940-28	Hose 28"	1
7	18-186	Hose Clamp $\frac{7}{32}$ - $\frac{5}{8}$	2
8	33-260	Fan Shroud	1
9	76-165	Air Cleaner Elbow	2
10	18-123	Hose Clamp 1 $\frac{9}{16}$ x 2 $\frac{1}{2}$	4
11	60-602	Air Cleaner	1
	60-602-02	Mounting Band	
	60-602-03	Air Inlet Cap	
12	33-217	Carburetor Intake Tube	1
13	33-002	Ford Gas Engine 38.6 HP	1
	33-253	Gas Filter (MotorCraft# FG795-A)	1
	33-257	Oil Filter (MotorCraft# FL400-A)	1
14	18-299	Black Nipple	1
15	50-111	Muffler Clamp 1 $\frac{1}{2}$	6
16	33-158	Tail Pipe	1
17	33-159	Universal Exhaust Hanger Bracket	2
	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
18	33-157	Muffler	1
19	33-156	Exhaust Pipe	1
20	33-141	Engine Exhaust Bracket	1
	HB-38-16-075	Bolt $\frac{3}{8}$ - 16 x $\frac{3}{4}$	2
	HWL-38	Lockwasher, 3/8	2
21	33-254	Alternator Belt (MotorCraft# C9PZ-8620-E)	1
22	33-255	Governor Belt (MotorCraft# E9JL-8620-A2A)	1
23	33-002-01	Fill Tank (Comes with Engine)	1
24	33-052	Main Frame	1
25	HSTC 8-32-050	Thread Cutting Screw 8 - 32 x $\frac{1}{2}$	12
	HW-8	Washer, 8	12
26	33-261	Oil Cooler Shroud	1
27	HB-12-13-300	Bolt 1/2 - 13 x 3 (Front Motor Mount)	2
	HNCL-12-13	Center Lock Nut $\frac{1}{2}$ - 13	4
	60-107	Rubber Bushing	8
	60-168	Spacer	4
	HB-12-13-350	Bolt $\frac{1}{2}$ - 13 x 3 $\frac{1}{2}$ (Rear Motor Mount)	2
28	18-243	Male Connector $\frac{1}{2}$	1
29	18-093	Street Tee	1
30	23-183	Male Connector $\frac{3}{8}$	1
31	18-107	Pipe Thread Reducer 1 x $\frac{3}{4}$	2
32	18-249	Barb Fitting	1
33	33-291	Dipstick Guide	1
	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	1
	HWL-516	Lockwasher $\frac{5}{16}$	1
		Dipstick (Comes with Engine)	1
34	33-513	Brake Mount bracket	1

DRIVE LINKAGE DRAWING

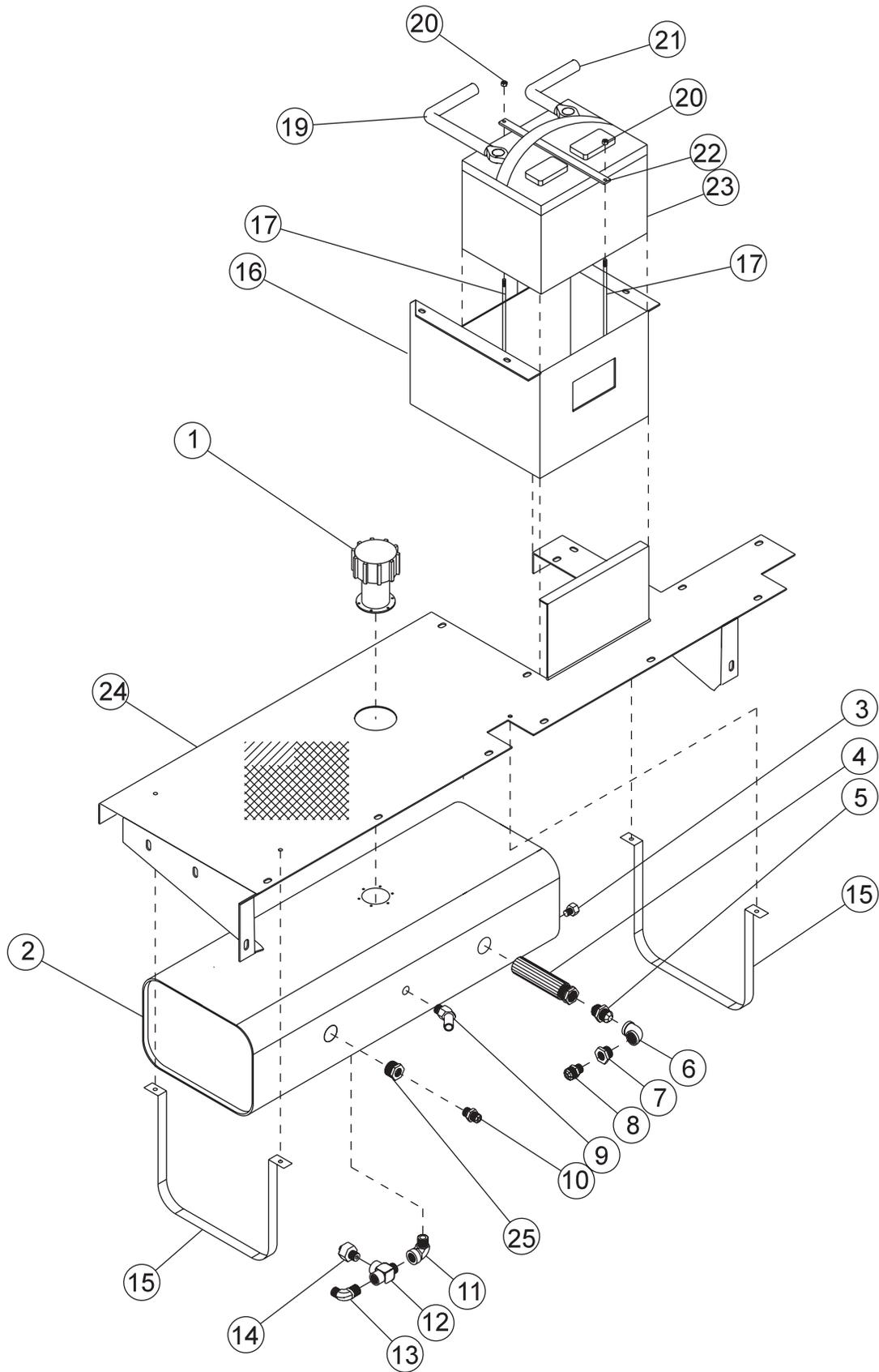


Parts

DRIVE LINKAGE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	33-070-02	Engine to Pump Coupling	1
2	HBM-8-1.25-20	Metric Bolt, 8 - 1.25 x 20M	6
	HWL-516	Washer, ⁵ / ₁₆	6
3	HN-516-24	Nut ⁵ / ₁₆ - 24	4
4	HBM-10-1.5-75	Metric Bolt, 10 - 1.5 x 75M	2
	HNM-10-1.50	Metric Nut, 10 - 1.5	2
5	HN-14-28	Nut ¹ / ₄ - 28	2
6	13-632	Push Pull Cable	1
8	18-115	Ball Joint, ¹ / ₄ NF	2
9	HP-18-100	Cotter Pin ¹ / ₈ x 1	2
10	HMB-58-14	Machine Bushing ⁵ / ₈ x 14GA	3
11	33-503	Shift Pivot	1
12	HMB-12-14	Machine Bushing ¹ / ₂ x 14GA	5
13	HN-14-20	Nut, ¹ / ₄ - 20	4
14	HWL-14	Lockwasher, ¹ / ₄	4
15	HN-38-16	Nut ³ / ₈ - 16	1
	HWL-38	Lockwasher ³ / ₈	1
	HW-38	Washer ³ / ₈	1
	HB-38-16-150	Bolt ³ / ₈ - 16 x 1 ¹ / ₂	1
16	21-462	Ball Joint ⁵ / ₁₆ - 24	2
17	33-113	Neutral Arm	1
18	33-230	Transmission Rod	1
19	HW-38	Washer ³ / ₈	2
20	40-022	Idler Pulley	1
21	60-323	Spring	1
22	33-109	Shifter	1
23	33-140	Fitting	2
24	33-058	Hydrostatic Pump	1
25	23-191	Elbow	2
26	18-250	Barb Fitting	2
27	33-326	Hydraulic Gear Pump	1
	77-130	Mounting Kit	1
28	18-227	Straight Thread Connector	1
29	23-127	Elbow	1
30	23-076	O-Ring Adapter	1
31	17-019	Male Elbow	1
32	18-176	Reducer	1
33	HB-14-20-075	Bolt, ¹ / ₄ - 20 x ³ / ₄	4
34	33-110	Speed Control Bracket	1
	HB-38-16-100	Bolt ³ / ₈ - 16 x 1	2
	HWL-38	Lockwasher ³ / ₈	2
35	33-502	Magnetic Coil	1
36	HB-12-13-125	Bolt ¹ / ₂ - 13 x 1 ¹ / ₄	2
	HW-716	Washer, ⁷ / ₁₆	2
	HWL-12	Lockwasher, ¹ / ₂	2
37	HBM-10-1.5-35	Metric Bolt, 10 - 1.5 x 35M	4
38	13-197	Ground Strap	1
39*	33-070-01	Flywheel Housing	1
	16-883	Tachometer Sensor	1
40*	33-070-03	Starter Plate	1
41	HBM-10-1.5-50	Metric Bolt, 10 - 1.5 x 50M	2
42	23-121	Fitting	1
43	34-044	45° Elbow	1
*	33-070	Adapter Assembly	1

HYDRAULIC TANK DRAWING (LEFT SIDE OF MACHINE)

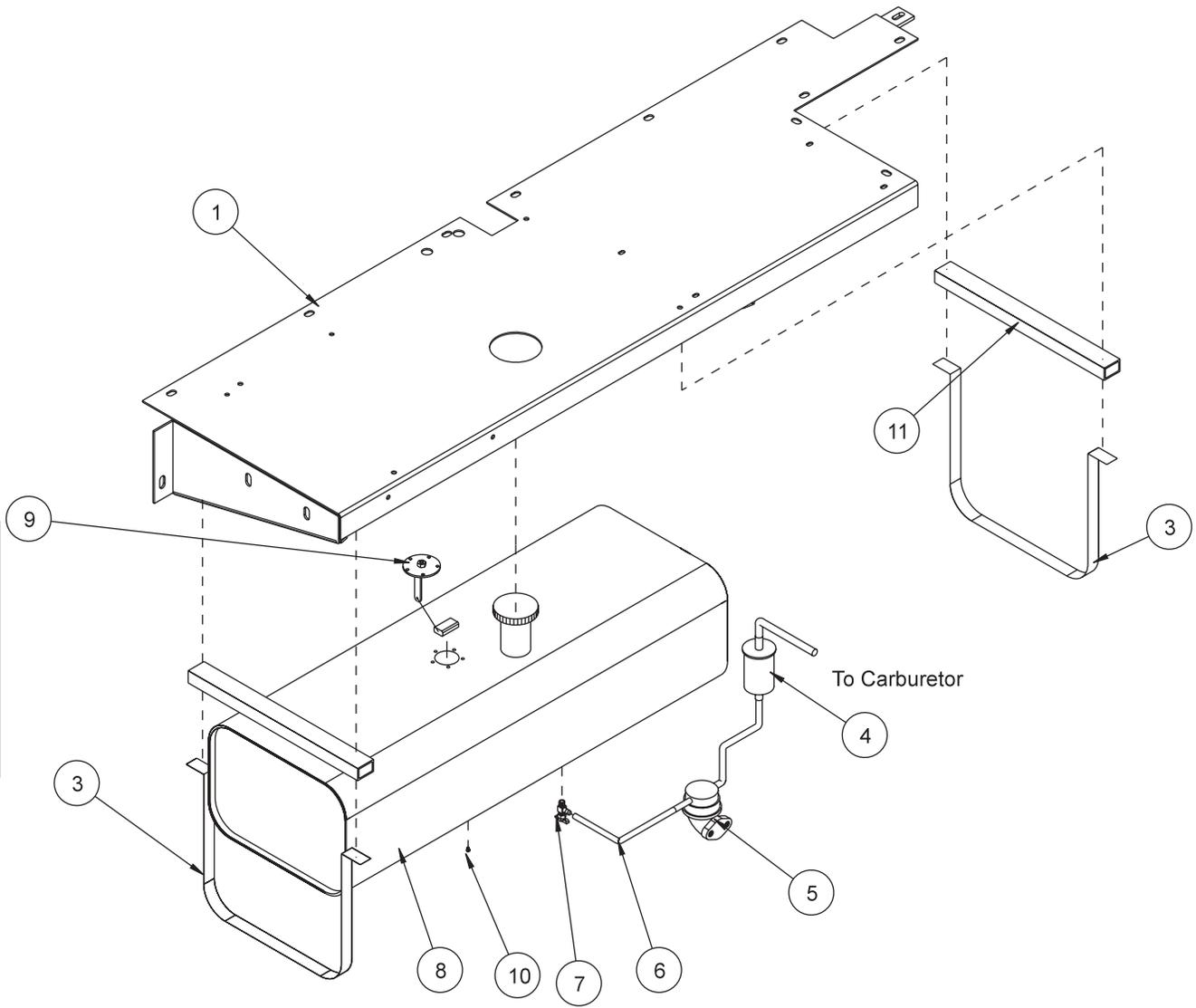


Parts

HYDRAULIC TANK PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	13-586	Filler Breather	1
	13-586-01	Cap Gasket	1
	13-586-02	Bottom Gasket	2
	HSM-8-32-050	Machine Screw #8 - 32 x 1/2	6
	HWS-8	Star Washer #8	6
2	33-281	Hydraulic Tank with Hole Near Center	1
3	18-069	Pipe Plug 1/2	1
4	33-057	Strainer	1
5	18-120	Nipple 1" x Close, Black	1
6	18-050	Elbow, Black 1 NPT x 90°	1
7	18-107	Reducer Bushing 1 x 3/4	1
8	18-250	Barb Fitting	1
9	23-190	Elbow, 45° 3/4 NPT 4503-16-12	1
10	18-249	Barb Fitting 125	1
11	18-009	Street Elbow	1
12	18-187	Street Tee	1
13	18-246	Male Elbow	1
14	18-245	Male Connector	1
15	33-076	Oil Tank Manufactured Strap	2
	8828-30	Foam Tape 30"	2
	HB-516-18-125	Bolt 5/16 - 18 x 1 1/4	4
	HW-516	Washer 5/16	8
	HNTL-516-18	Nylon Lock Nut 5/16 - 18	4
	16	33-172	Battery Box
17	33-121	Battery Hold Down	2
19	50-323	Red Battery Cable	1
20	HN-14-20	Nut 1/4 - 20	2
21	22-054	Black Battery Cable	1
22	33-120	Battery Hold Down	1
23	33-216	Battery	1
24	33-290	Left Tank Bracket	1
	8803-11	Trim, Black with Lace 11"	1
	HB-38-16-100	Bolt 3/8 - 16	14
	HW-38	Washer 3/8	18
	HWL-38	Lockwasher 3/8	6
	HNTL-38-16	Lock Nut 3/8 - 16	8
25	18-280	Reducer Bushing 1 1/2 x 3/4	1

FUEL TANK DRAWING (RIGHT SIDE OF MACHINE)



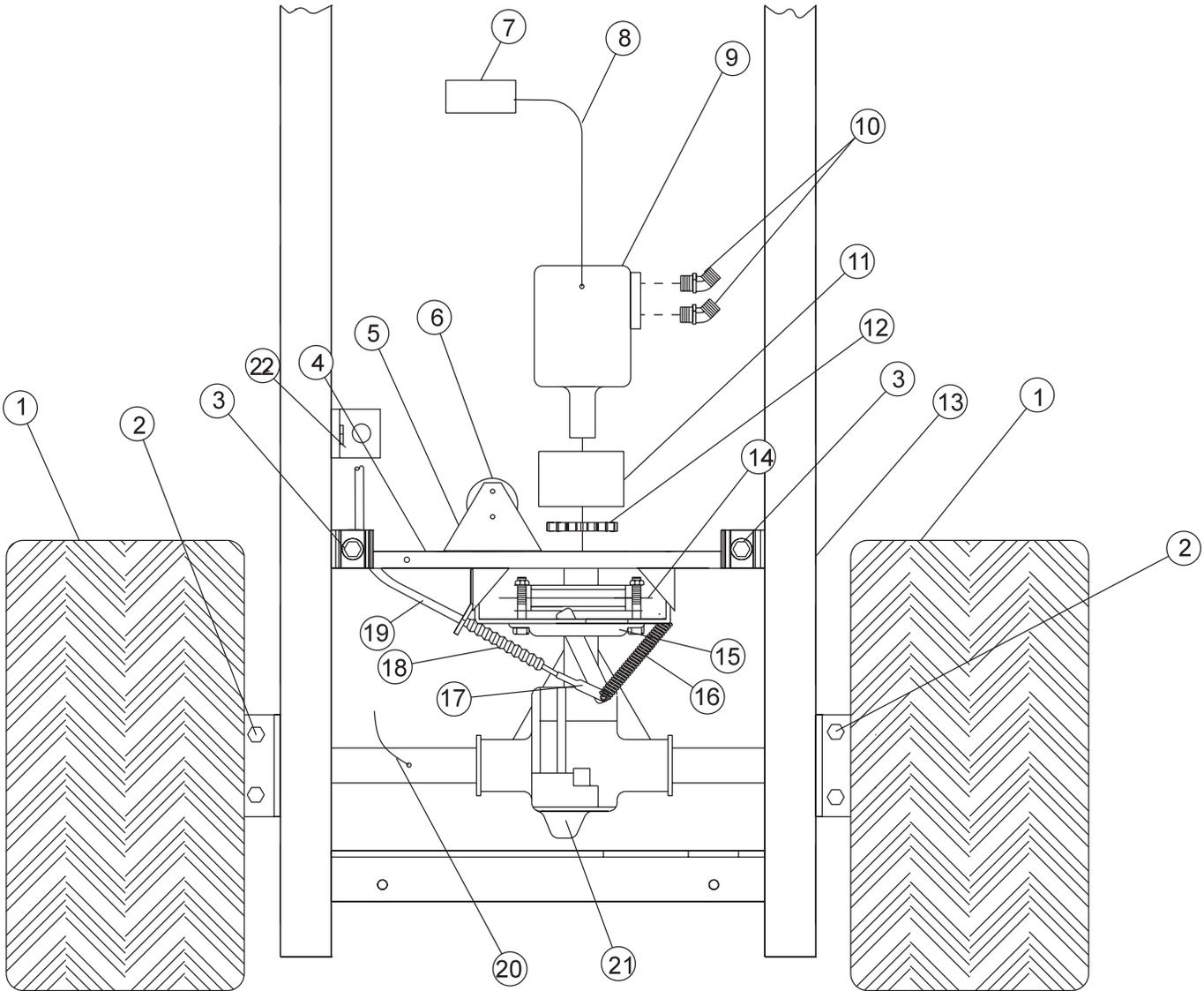
Parts

FUEL TANK PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	33-533	Right Tank Bracket	1
	8803-11	Trim Black with Lace 11"	1
	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 - 100	10
	HW-38	Washer $\frac{3}{8}$	14
	HWL-38	Lockwasher $\frac{3}{8}$	6
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
3	33-173	Gas Tank Strap	2
	8828-30	Foam Tape 30"	2
	HB-516-18-125	Bolt, $\frac{5}{16}$ - 18 x 1 $\frac{1}{4}$	4
	HNTL-516-18	Top Lock Nut, $\frac{5}{16}$ - 18	4
4	33-270	Gas Filter	1
5		Fuel Pump (Part of Engine)	1
6	8940-32	Fuel Hose $\frac{5}{16}$ X 32"	1
	18-186	Hose Clamp $\frac{7}{32}$ - $\frac{5}{8}$	2
7	15-039	Fuel Valve	1
8	33-282	Fuel Tank with Cap, Neck Near Center	1
	33-282-01	Gas Cap	1
9	33-092	Fuel Tank Sender	1
10	18-118	Pipe Plug	1
11	33-187	Spacer	2

REAR AXLE DRAWING

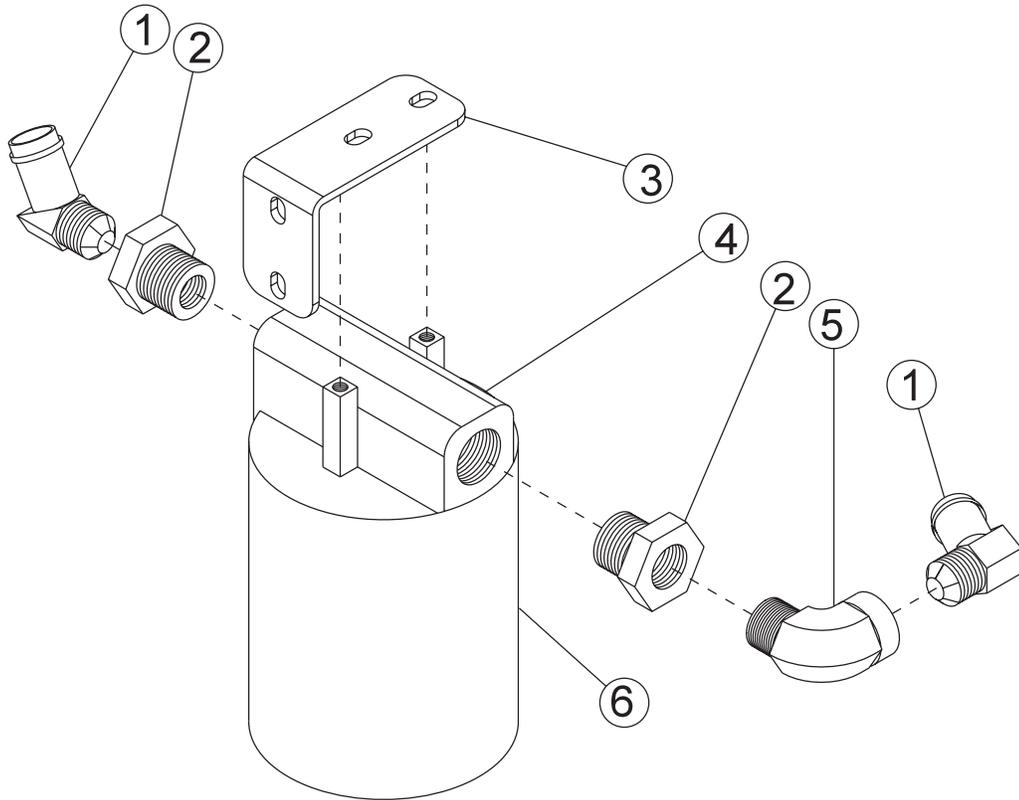
Parts



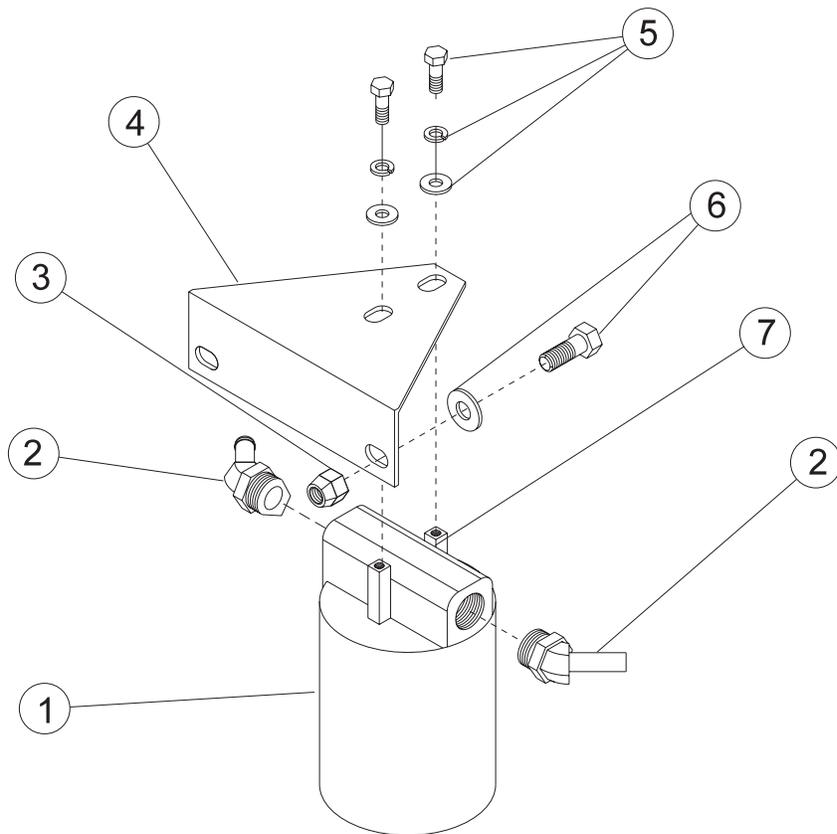
REAR AXLE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	33-072	Tire and Wheel	2
	HNL-12-20	Lug Nut, 1/2 - 20	10
2	HB-12-13-125	Bolt, 1/2 - 13 x 1 1/4	4
	HNCL-12-13	Center Lock Nut, 1/2 - 13	4
3	60-107	Rubber Bushing	4
	60-168	Spacer	2
	HB-12-13-275	Bolt 1/2 - 13 x 2 3/4	2
	HW-58	Washer 5/8	2
	HW-716	Washer 7/16	2
	HNTL-12-13	Top Lock Nut, 1/2 - 13	2
4	33-101	Hydraulic Motor Mount	1
	16-883	Magnetic Sensor	1
5	13-217	Oil Filter Bracket	1
	HB-38-16-100	Bolt 3/8 - 16 x 1	2
	HW-38	Washer 3/8	2
	HNTL-38-16	Top Lock Nut, 3/8 - 16	2
6	23-006	Oil Filter	1
	23-031	Replacement Filter ONLY	
	23-190	45° Elbow	2
	HB-14-20-075	Bolt 1/4 - 20 x 3/4	2
	HWL-14	Lockwasher 1/4	2
	HW-14	Washer 1/4	2
7	33-059	Relief Valve with Orifice	1
8	33-131	Hydraulic Hose	1
	18-166	Adapter 1/4 - 3/8	1
	18-202	Elbow 90°	1
9	33-060	Hydraulic Motor	1
	HB-12-13-175	Bolt 1/2 - 13 x 1 3/4	4
	HNCL-12-13	Center Lock Nut 1/2 - 13	4
10	33-140	Fitting	2
11	33-129	Axle Adapter	1
	HSSHS-38-16-038	Socket Head Set Screw 3/8 - 16 x 3/8	4
12	33-081	Sprocket	1
13	33-052	Main Frame	1
14	33-071	Disc	1
	HBM-12-175-40	Metric Bolt M12 - 1.75 x 40m	8
15	50-042	Brake Caliper	1
16	21-212	Spring	1
17	11-100	Linkage Yoke 5/16	1
18	60-536	Bellow	1
19	33-091	Brake Cable	1
	11-100	Linkage Yoke 5/16	1
	HN-516-18	Nut 5/8 - 18	2
20	18-045	Barb Fitting	1
	8800-12	Fuel Hose 1/4 x 12"	1
21	33-001	Ford Axle	1
22	33-513	Brake Mount Bracket	1

LARGE HYDRAULIC FILTER DRAWING



SMALL HYDRAULIC FILTER DRAWING



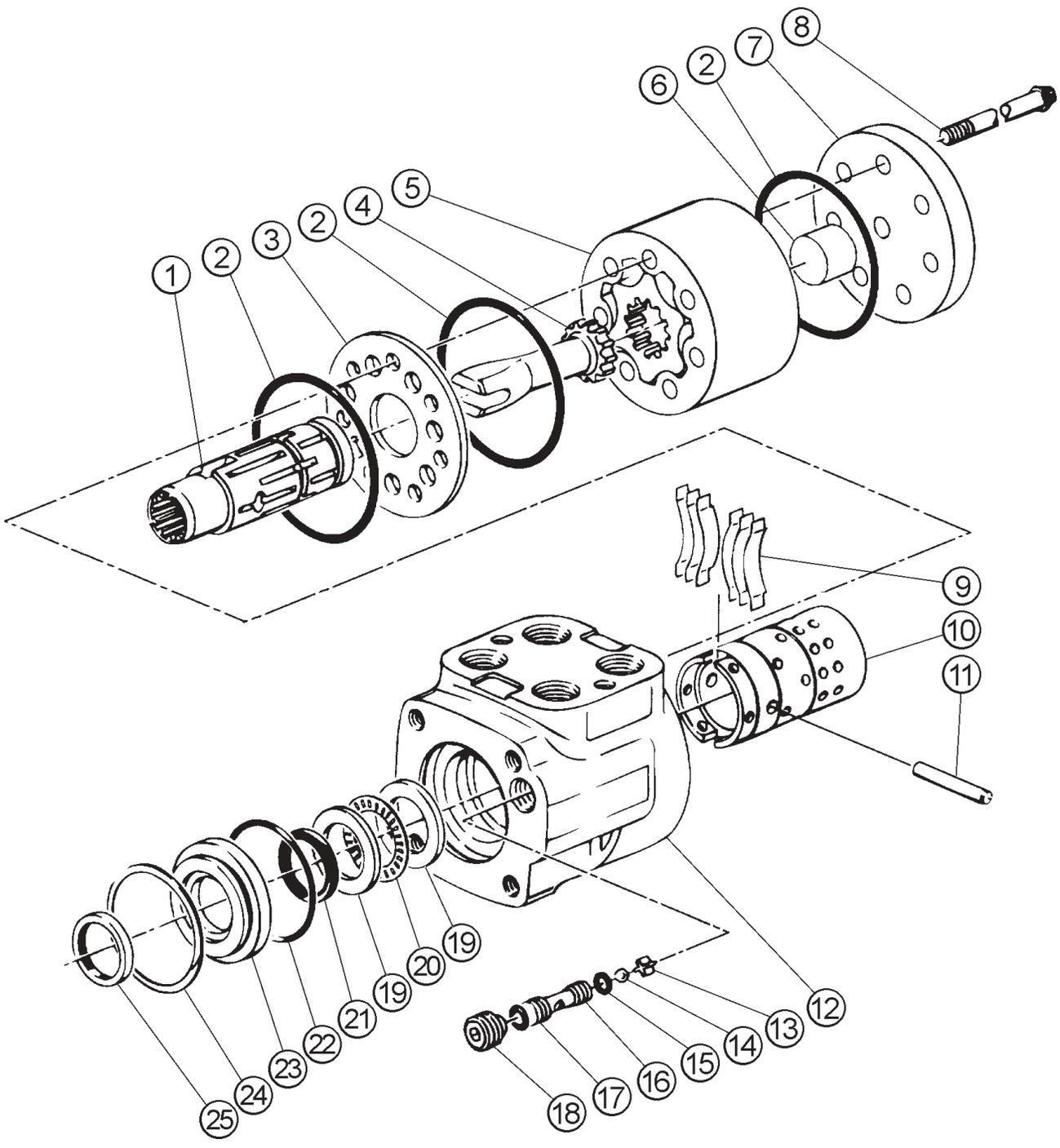
LARGE HYDRAULIC FILTER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	23-190	Elbow 45° 3/4 NPT	2
2	18-074	Bushing, 1 1/4 - 3/4	2
3	33-171	Oil Filter Bracket	1
4	60-215	Oil Filter Assembly	1
5	18-140	Fitting	1
6	60-334	Oil Filter Element	1

SMALL HYDRAULIC FILTER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	23-031	Oil Filter Element	1
2	23-190	45° Elbow	2
3	HNTL-38-16	Lock Nut, 3/8 - 16	2
4	13-217	Oil Filter Bracket	1
5	HB-14-20-075	Bolt 1/4 - 20 x 3/4	2
	HW-14	Washer 1/4	2
	HWL-14	Lockwasher 1/4	2
6	HB-38-16-100	Bolt 3/8 - 16 x 1	2
	HW-38	Washer 3/8	2
7	23-006	Small Oil Filter Assembly	1

33-062 POWER STEERING ORBITAL MOTOR DRAWING

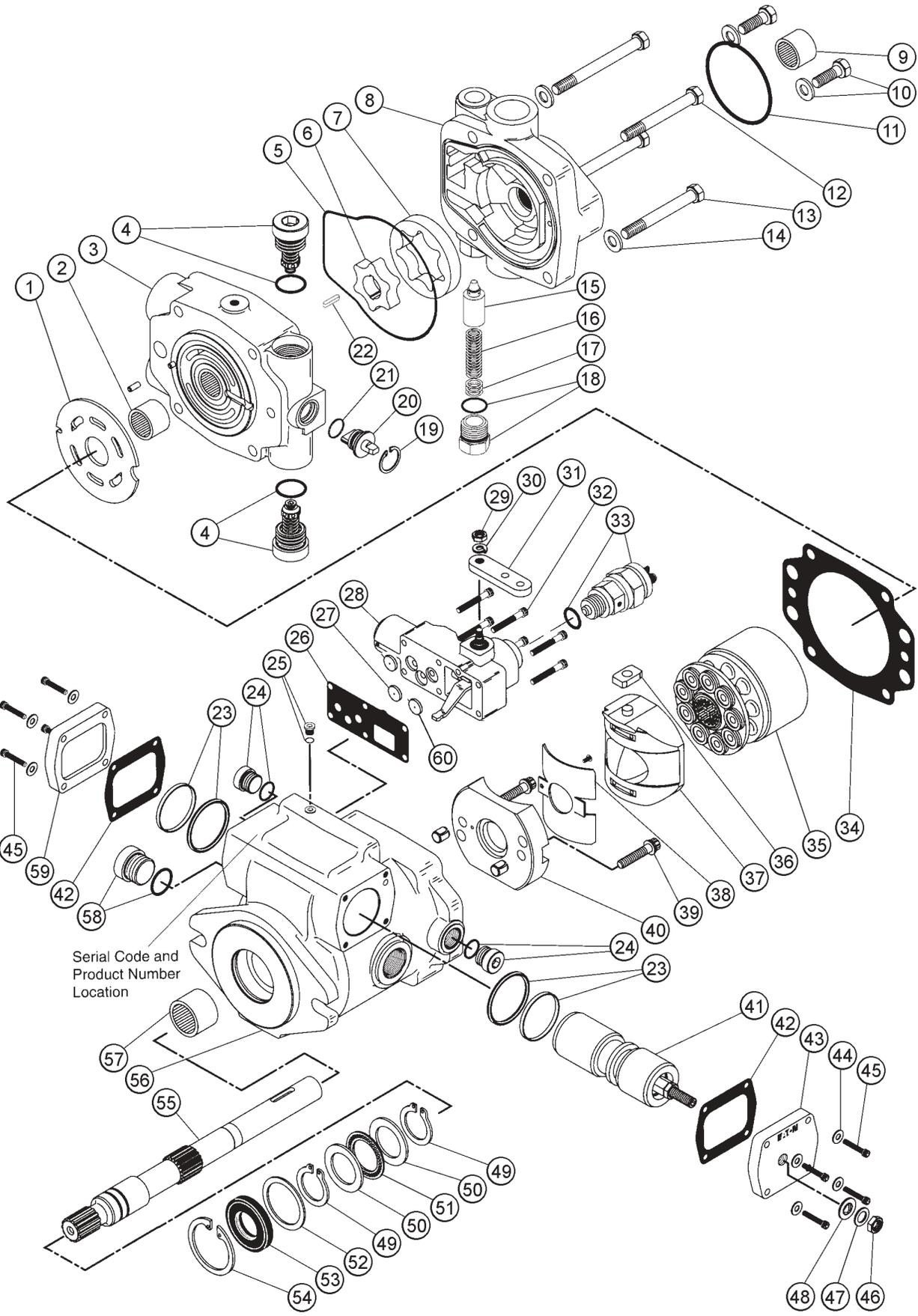


Parts

33-062 POWER STEERING ORBITAL MOTOR PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1		Control Sleeve	1
2*		Seal 2.89" (73.5 mm) ID	3
3§		Spacer Plate	1
4	33-062-07	Drive	1
5	33-062-05	Gerotor (Also order Ref# 6)	1
6	33-062-06	Spacer	1
7§		End Cap	1
8§		Cap Screw	7
9	33-062-04	Centering Spring Kit	1
10		Control Spool	1
11	33-062-08	Centering Pin	1
12		Housing	1
13	33-062-11	Retaining, Check Ball	1
14	33-062-12	Check Ball	1
15*		Seal, 0.30" (7.7 mm) ID	1
16	33-062-13	Check Ball Seat	1
17*		Seal, 0.36" (9.3 mm) ID	1
18	33-062-14	Set Screw	1
19†		Bearing Race	2
20†		Bearing Needle Thrust	1
21*		Seal, Quad Ring 1.046" (26.57 mm) ID	1
22*		Seal 1.86" (47.2 mm) ID	1
23	33-062-09	Bushing, Seal Gland	1
24	33-062-10	Retaining Ring	1
25*		Seal 1" (25 mm) ID	1
*	33-062-01	Seal Kit	
†	33-062-02	Needle Bearing Kit	
§	33-062-03	End Cap Kit	

33-058 HYDROSTATIC PUMP DRAWING



Serial Code and Product Number Location

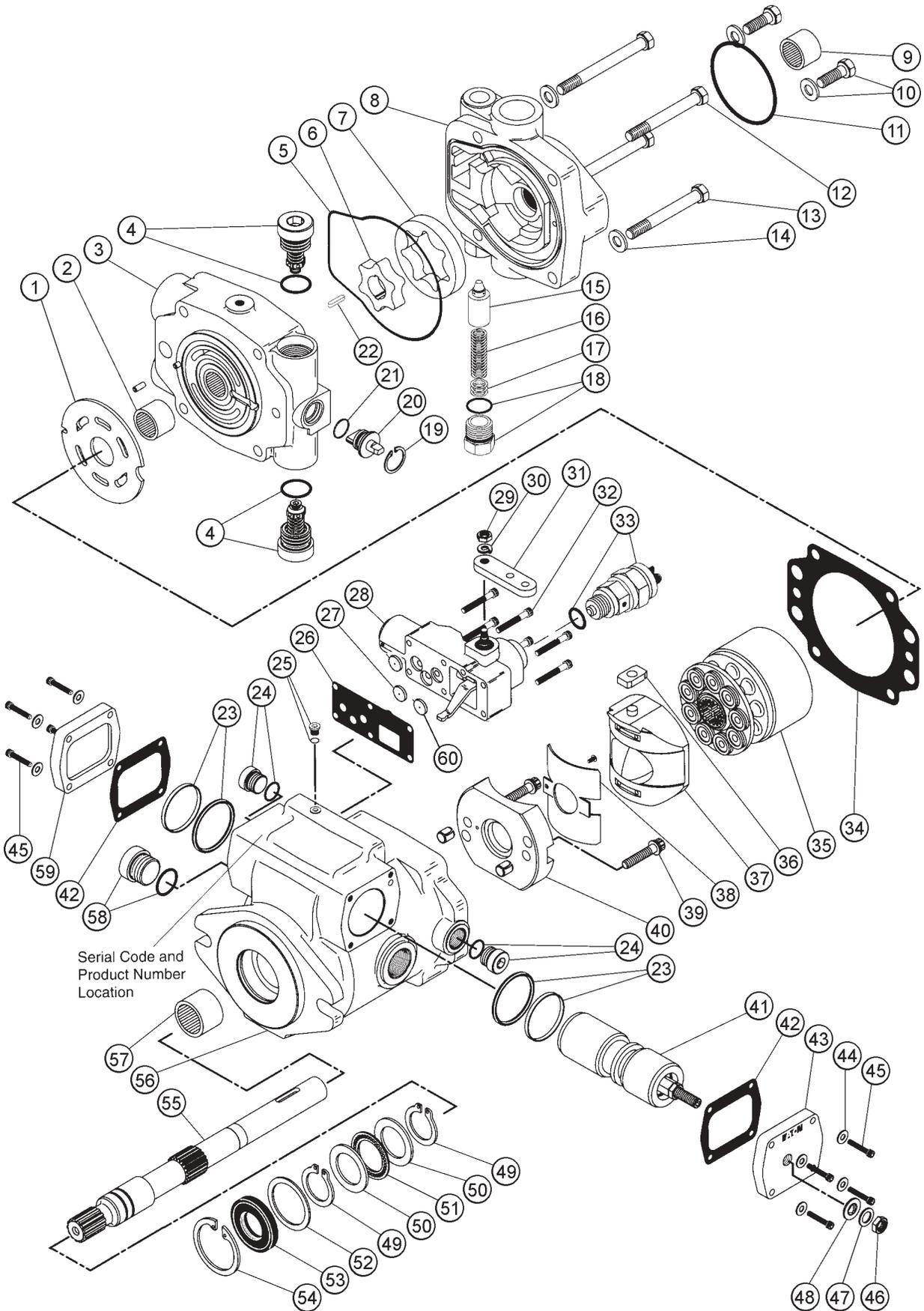
Parts

33-058 HYDROSTATIC PUMP PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	33-058-16	Valve Plate (CW Rotation)	1
2	33-058-26	Bearing (Press Fit)	1
3	33-058-25	Back Plate Assembly	1
4	33-058-12	Relief Valve S/A	2
*		O-Ring	2
5*		Molded O-Ring	1
6	33-058-38	Inner Ring Gerotor	1
7	33-058-39	Outer Ring Gerotor	1
8	33-058-35	Charge Pump Adapter Assembly	1
9¤	33-058-46	Bearing (Press Fit)	1
10£		Bolt and Washer	2
11*£		O-Ring	1
12	33-058-14	Cap Screw ³ / ₈ - 16 x 4	2
13	33-058-13	Cap Screw ³ / ₈ - 16 x 3 ¹ / ₂	2
14	33-058-44	Washer	4
15¤	33-058-50	Poppet	1
16¤	33-058-49	Spring	1
17¤	33-058-48	Shims	As Required
18¤	33-058-47	Plug	1
*¤		O-Ring	1
19*		Retaining Ring	1
20	33-058-41	Dump Valve Actuator	1
21*		Quad-Ring	1
22	33-058-34	Key	1
23*†		Seal Sub-Assembly	2
24	33-058-32	Plug S/A	2
*		O-Ring	2
25†	33-058-19	Plug Sub-Assembly	1
*†		O-Ring	1
26*		Control Housing Gasket	1
27	33-058-40	Control Valve Orifice	1
28	33-058-37	Servo Control Assembly	1
29	33-058-29	Nut	1
30	33-058-30	Lockwasher	1
31	33-058-36	Control Arm	1
32	33-058-15	Cap Screw	6
33	33-058-45	Interlock Switch	1
*	33-058-01	Seal Repair Kit	
†	33-058-17	Housing Assembly (Some Items May Be Ordered Separately)	
§	33-058-20	Cradle Sub-Assembly (Some Items May Be Ordered Separately)	
¤	33-058-35	Charge Pump Adapter Assembly (Some Items May Be Ordered Separately)	
£	77-130	Mounting Kit	

(Continued on next page)

33-058 HYDROSTATIC PUMP DRAWING



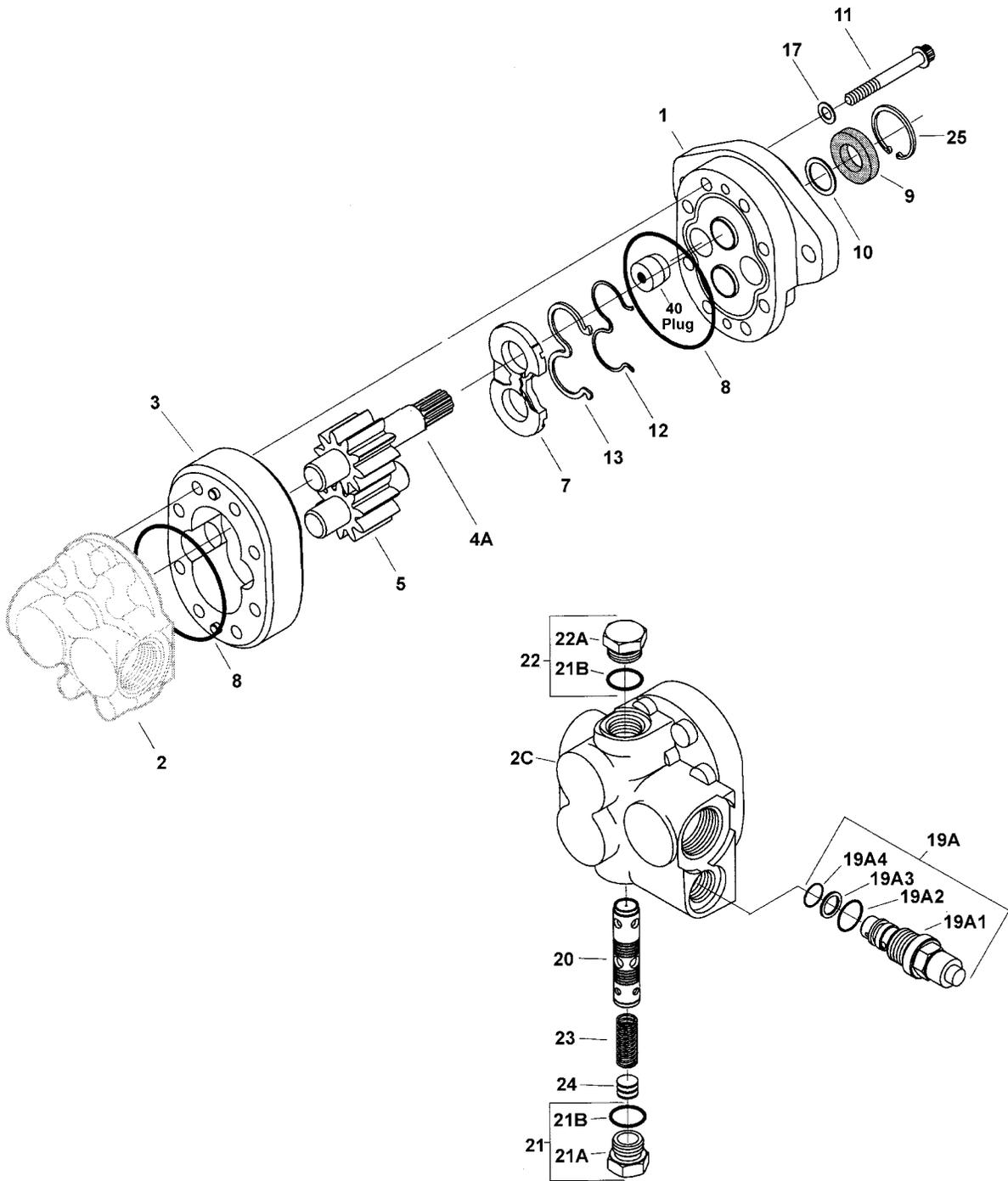
Serial Code and
Product Number
Location

33-058 HYDROSTATIC PUMP PARTS LIST (CONTINUED)

REF#	PART#	DESCRIPTION	QUANTITY
34*		Housing Gasket	1
35	33-058-04	Rotating Kit Assembly	1
36	33-058-06	Servo Piston Follower	1
37	33-058-09	Cam Plate S/A	1
38†§	33-058-22	Bushing	1
39†§	33-058-24	Cap Screw	2
40†	33-058-20	Cradle Sub-Assembly	1
41	33-058-05	Servo Piston Assembly	1
42*		Cover Plate Gasket	2
43	33-058-08	Cover Plate	1
44	33-058-43	Washer	8
45	33-058-03	Cap Screw #10 - 24 x 1	8
46	33-058-02	Jam Nut	1
47	33-058-42	Washer	1
48*		Seal Washer	1
49*		Retaining Ring	2
50	33-058-10	Thrust Race	2
51	33-058-11	Thrust Bearing	1
52	33-058-31	Washer	1
53*	33-058-52	Shaft Seal	1
54*		Retaining Ring	1
55	33-058-28	Drive Shaft	1
56	33-058-17	Housing Assembly	1
57†	33-058-18	Bearing (Press Fit)	1
58	33-058-33	Plug S/A	1
*†		O-Ring	1
59	33-058-07	Cover Plate	1
60	33-058-51	Control Valve Orifice	2
*	33-058-01	Seal Repair Kit	
†	33-058-17	Housing Assembly (Some Items May Be Ordered Separately)	
§	33-058-20	Cradle Sub-Assembly (Some Items May Be Ordered Separately)	
▣	33-058-35	Charge Pump Adapter Assembly (Some Items May Be Ordered Separately)	
£	77-130	Mounting Kit	

33-326 HYDRAULIC GEAR PUMP DRAWING

Parts



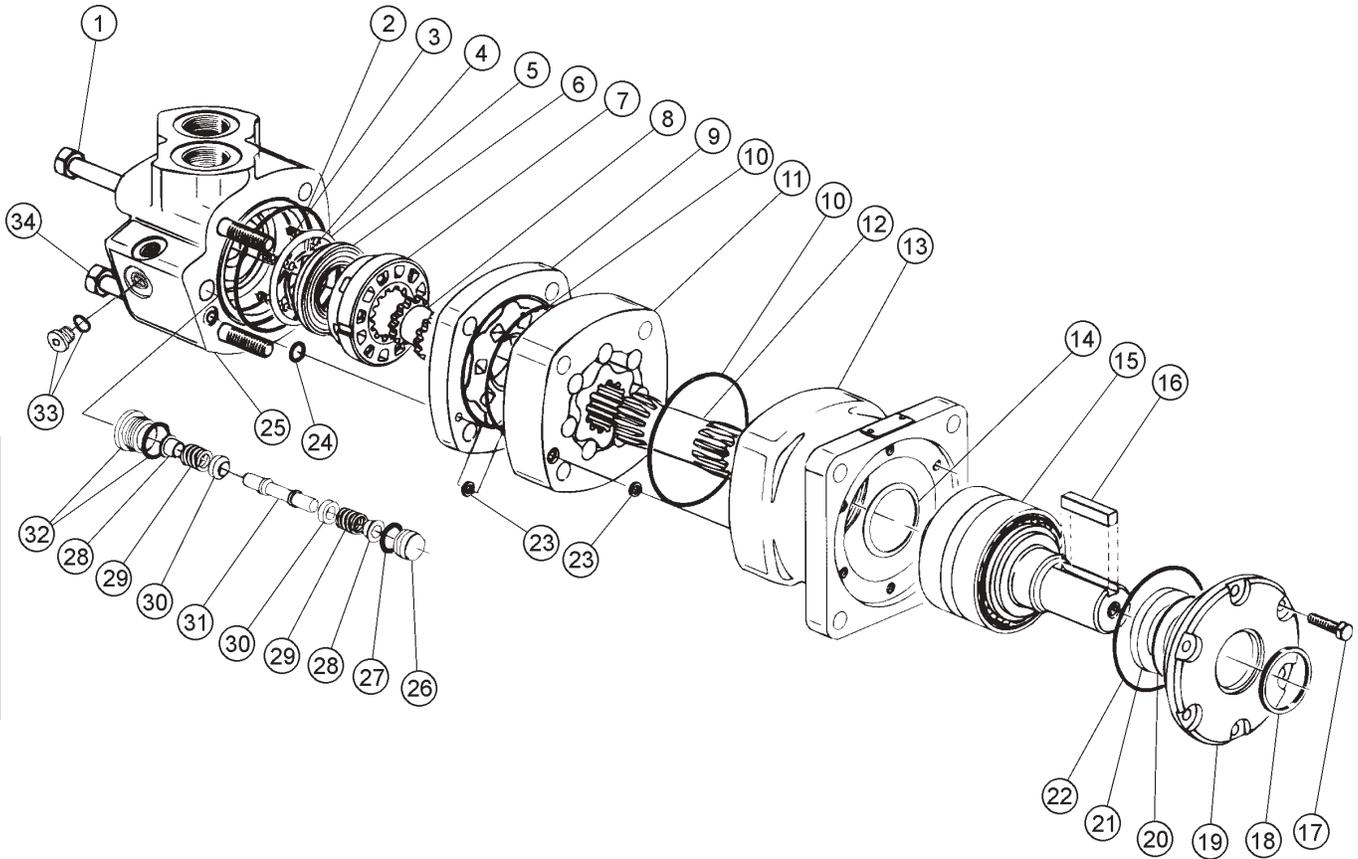
33-326 HYDRAULIC GEAR PUMP PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	33-326-01	Front Plate Assembly	1
2	33-326-02	Backplate	1
3	33-326-03	Body Assembly	1
4	33-326-04	Drive Gear Assembly	1
5	33-326-05	Idler Gear Assembly	1
7	*	Wear Plate	1
8	*	O-ring	2
9	*	Shaft Seal	1
10	*	Washer	1
11	33-061-03	Cap Screw	8
12	*	Backup Gasket	1
13	*	Seal	1
17	*	Washer	4
19A	33-061-08	Relief Valve Assembly	1
19A2	*	O-ring	1
19A3	*	Backup Ring	1
19A4	*	O-ring	1
20		Flow Divider Spool	1
21	33-061-07	Plug/O-ring Assembly	1
21B	*	O-ring	2
22	33-061-05	Plug/O-ring	1
23	33-061-10	Spring	1
24	33-061-09	Shim (.0239 inch thick)	A/R
25	33-326-07	Retaining Ring	1
40	*	Plug	1
*	76-197-08	Seal Kit	

PUMP DATA

Rated Pressure Priority	3000 PSI (206.8 bar)
Rated Pressure Secondary	3000 PSI (206.8 bar)
Max Pressure	3500 PSI (241.3 bar)
Rated Speed	3600 RPM
Max Continuous Inlet Temperature	225 °F (107 °C)
Max Continuous Inlet Vacuum	6 in Hg (.203 bar)

33-060 HYDRAULIC MOTOR PARTS DRAWING

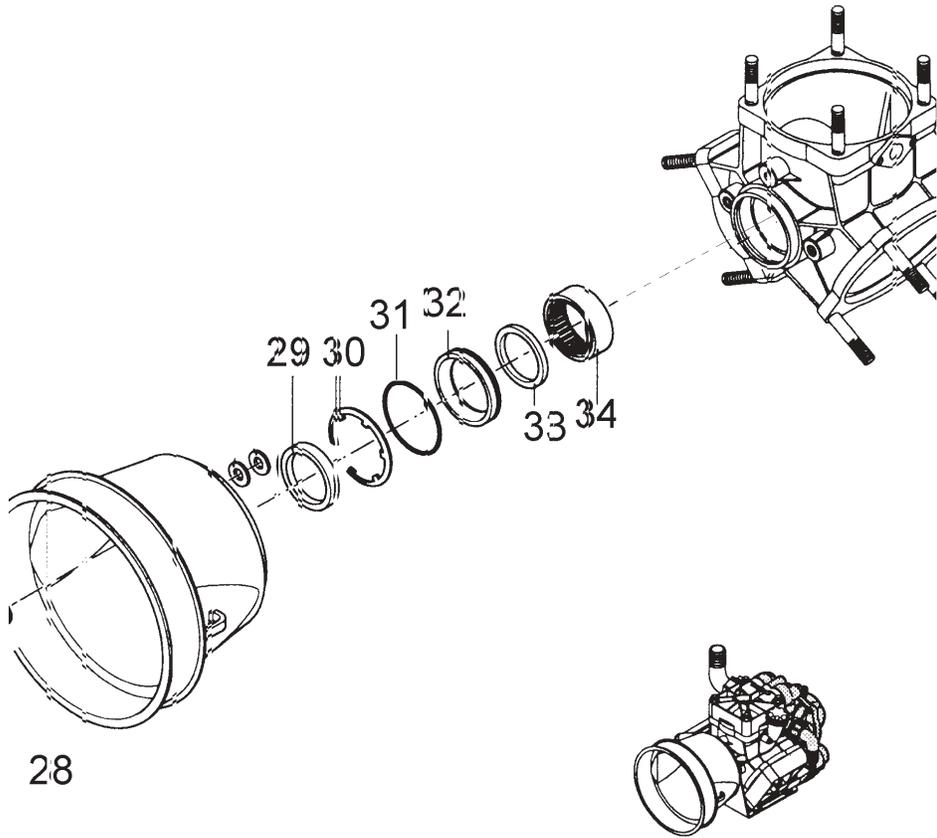


Parts

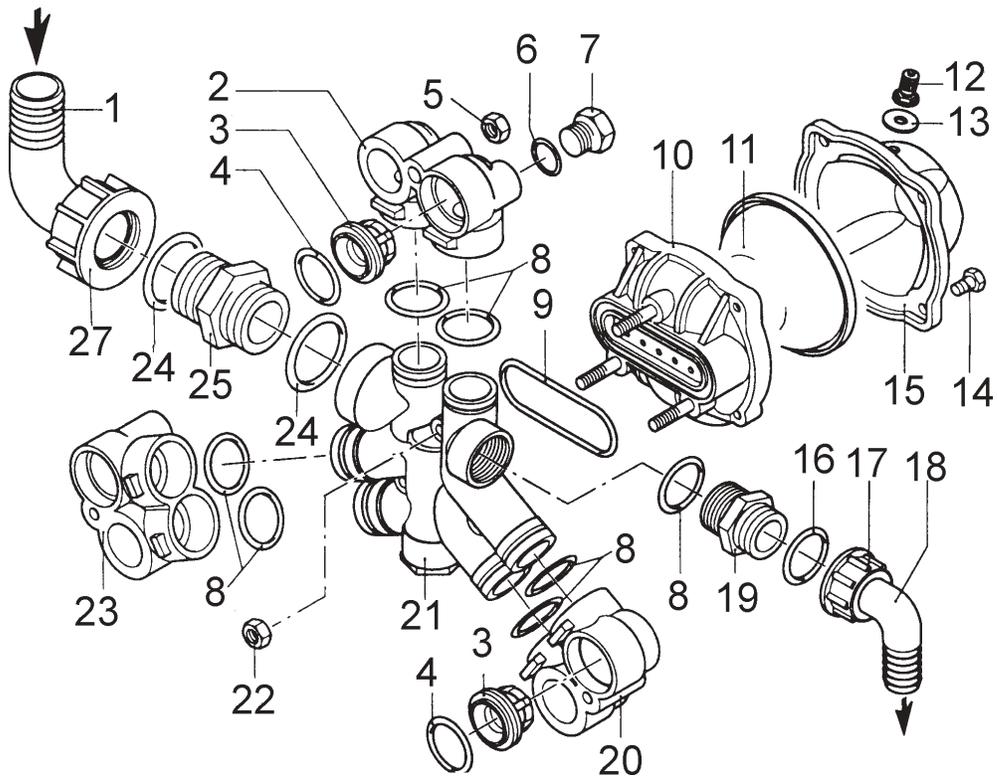
33-060 HYDRAULIC MOTOR PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	33-060-16	Cap Screw	2
2*		Seal	1
3	33-060-12	Compression Spring	3
4*		Seal Inner	1
5*		Seal Outer	1
6	33-060-13	Balancing Ring with Pins	1
7	33-060-11	Valve	1
8	33-060-10	Valve Drive	1
9	33-060-09	Valve Plate	1
10*†		Seal	2
11	33-060-08	Gerotor Assembly	1
12	33-060-07	Drive	1
13	33-060-04	Bearing Housing	1
14†		Seal Shaft Face	1
15	33-060-03	Shaft Sub-Assembly	1
16	33-060-25	Key $\frac{3}{8} \times \frac{3}{8} \times 1\frac{5}{8}$	1
17	33-060-06	Bolt	6
18†		Seal Dust	1
19	33-060-05	Front Retainer	1
20†		Backup Ring in Kit Shaft	1
21†		Seal Shaft	1
22*†		Seal	1
23*		Seal	2
24*		Seal	1
25	33-060-14	Valve Housing	1
26	33-060-21	Plug	1
27†		O-Ring	1
28	33-060-22	Dash Pot Sleeve	2
29	33-060-17	Spring	2
30	33-060-20	Poppet	2
31	33-060-19	Piston Shuttle	1
32	33-060-24	Plug Sub-Assembly	1
33	33-060-23	Plug Sub-Assembly	1
34	33-060-15	Cap Screw	2
*	33-060-01	Seal Kit, Motor Rear	
†	33-060-02	Seal Kit Shaft	

33-524 DIAPHRAGM PUMP DRAWING



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Parts

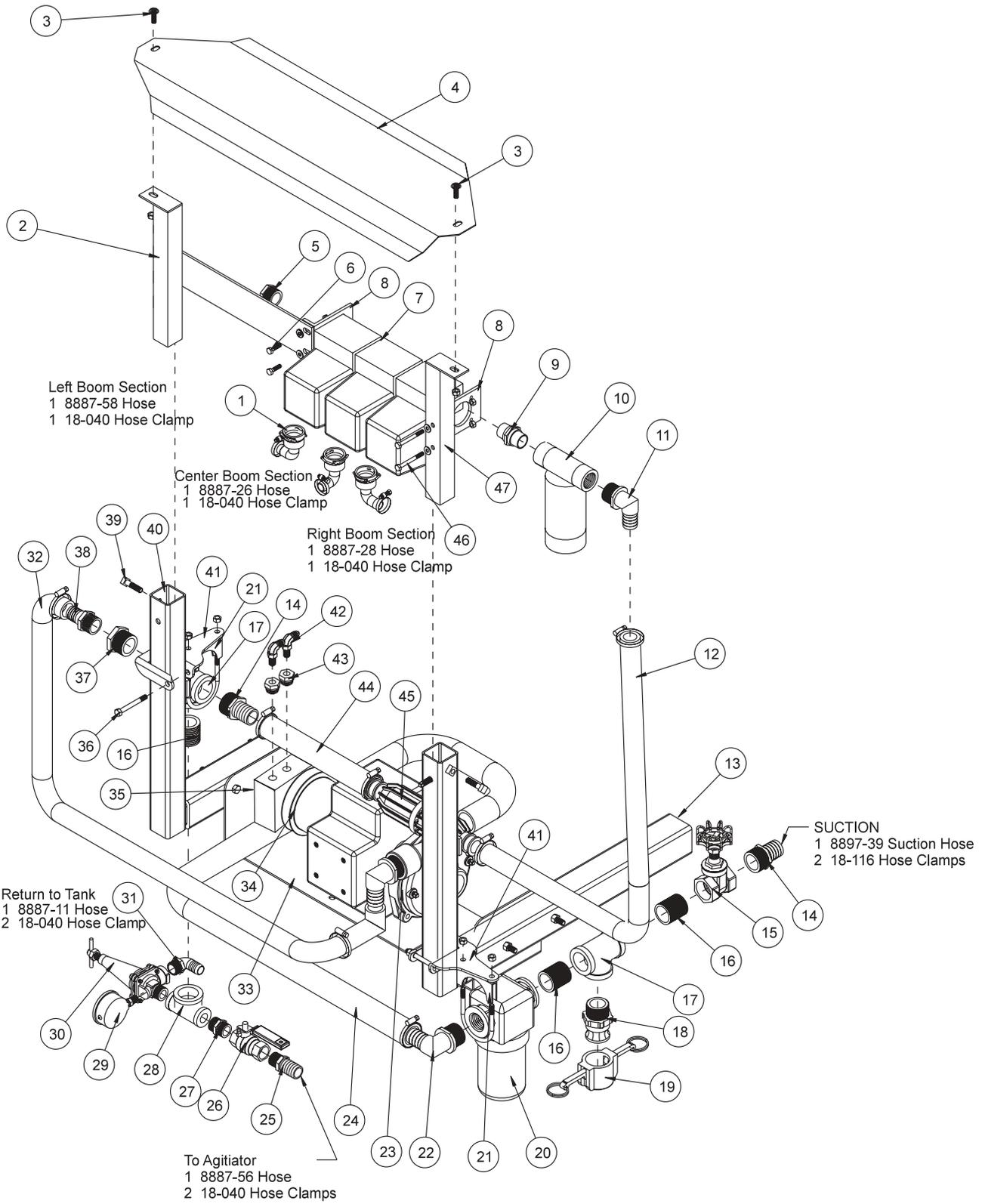
33-524 DIAPHRAGM PUMP PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	33-524-01	Elbow	1
2	33-524-04	Manifold with Port	1
3†	33-524-05	Complete Valve	6
4†*	16-654	O-Ring	6
5	33-524-06	Nut	15
6*	33-524-07	O-Ring	1
7	33-524-08	Plug	1
8*	16-638	O-Ring	7
9	16-660	Gasket	1
10	16-662	Lower Air Chamber	1
11	16-663	Accumulator Diaphragm	1
12	16-665	Air Valve	1
13*	16-666	Gasket	1
14	16-667	Bolt	4
15	33-524-09	Upper Air Chamber	1
16*	16-427	O-Ring	1
17	16-428	Ring Nut	1
18	16-453	Bypass Fitting 1" HB	1
19	33-524-10	Threaded Adapter	1
20	16-693	Valve Retainer	1
21	16-640	Manifold	1
22	33-524-11	Nut	3
23	33-524-12	Valve Retainer	1
24	16-688	O-Ring	2
25	33-524-13	Threaded Adapter	1
27	33-524-14	Ring Nut	1
28	33-524-15	Shield	1
29	16-689	Seal Ring	1
30	16-668	Retaining Ring	1
31*	16-690	O-Ring	1
32	16-669	Gasket Retainer	1
33	16-678	Spacer Ring	1
34	33-524-16	Roller Bushing	1
* †	33-524-02	O-Ring Kit	1
	33-524-03	Valve Kit	1 per Valve
	33-524-17	Buna Diaphragm Kit	1



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

3002D PLUMBING DRAWING (RAVEN 440)



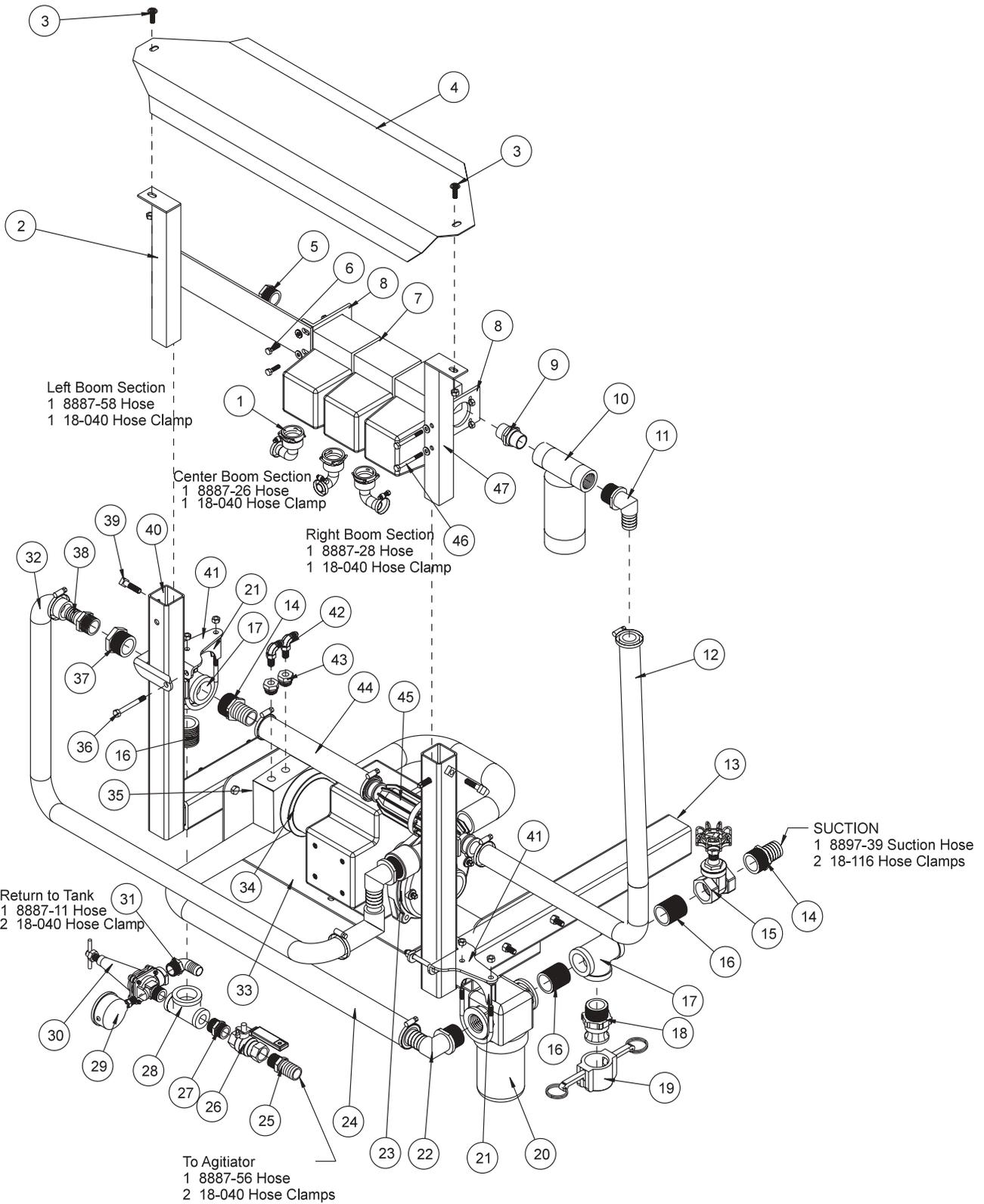
Accessories

3002D PLUMBING PARTS LIST (RAVEN 440)

REF#	PART#	DESCRIPTION	QUANTITY
1	15-553	90° Elbow (comes with 15-552)	3
	15-553-01	Clip (comes with 15-552)	3
	15-553-02	O-Ring (comes with 15-552)	3
2	33-499	Left Valve Guard Mount	1
3	HSTP-516-18-100	Phillip Truss Head ⁵ / ₁₆ - 18 x 1	2
	HNFL-516-18	Flange Whiz Lock Nut ⁵ / ₁₆ -18	2
4	33-498	Valve Guard	1
	25-357	Decal, Smithco	1
5	16-162	Hex Plug 1"	1
6	HB-14-20-100	Bolt ¹ / ₄ - 20 x 1	2
	HW-14	Washer ¹ / ₄	2
	HNFL-14-20	Flange Whiz Lock Nut ¹ / ₄ - 20	2
7	15-552	Manifold Ball Valve	1
8	15-552-07	Steel Mounting Bracket (part of 15-552)	2
9	16-851	Close Nipple 1"	1
10	16-524	Motorized Control Valve (comes with computer)	1
11	18-294	90° Elbow	1
12	8897-22	Hose 1 ¹ / ₄ x 22	1
	18-116	Hose Clamp	2
13	33-180	Right Sprayer Support	1
14	16-161	Fitting 1 ¹ / ₄ MPT x 1 ¹ / ₄ HB	2
15	16-170	Brass Gate Valve 1 ¹ / ₄	1
16	18-160	Nipple 1 ¹ / ₄	3
17	18-219	Tee 1 ¹ / ₄ Black Pipe	2
18	16-180	Quick Coupler 1 ¹ / ₄ Female	1
19	16-935	Quick Coupler Male	1
20	16-968	Strainer 50 Mesh	1
21	10-147	Muffler Clamp	2
22	16-993	Fitting 1 ¹ / ₄ MPT x 1 ¹ / ₂ HB	1
23	33-524	Diaphragm Pump	1
	HB-516-18-100	Bolt ⁵ / ₁₆ - 18 x 1	4
	HNFL-516-18	Flange Whiz Lock Nut ⁵ / ₁₆ -18	4
24	8986-50	Discharge Hose 1 ¹ / ₂ " x 50"	1
	18-116	Hose Clamp	2
25	16-154	Fitting ³ / ₄ MPT x ³ / ₄ HB	1
26	16-859	Ball Valve ³ / ₄ Brass	1
27	16-158	Close Nipple ³ / ₄ x ³ / ₄	1
28	18-276	Tee ³ / ₄ x ³ / ₄ x 1 ¹ / ₄	1
29	16-281	Liquid Filled Gauge 2 ¹ / ₂	1

(Continued on next page)

3002D PLUMBING DRAWING (RAVEN 440) (CONTINUED)



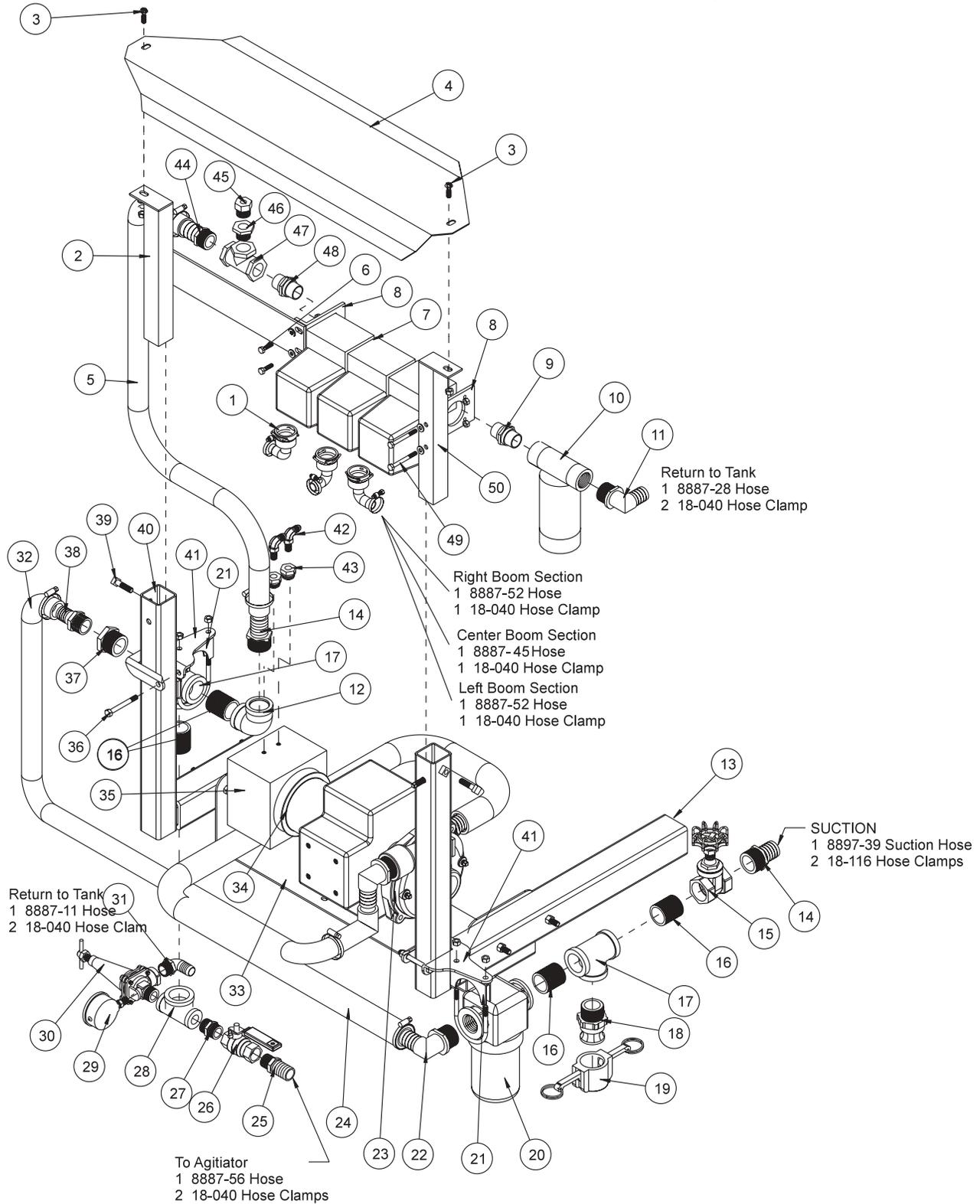
Accessories

3002D PLUMBING PARTS LIST (RAVEN 440) (CONTINUED)

REF#	PART#	DESCRIPTION	QUANTITY
30	16-294	Relief Valve	1
31	16-153	Elbow $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
32	8896-46	Discharge Hose 1" x 46	1
	18-222	Hose Clamp	2
33	33-177	Spray Pump Bracket	1
	HB-38-16-350	Bolt $\frac{3}{8}$ - 16 x $3\frac{1}{2}$	4
	HW-38	Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
34	33-525	Hydraulic Motor Mounting Kit (comes with pump)	1
35	33-532	Hydraulic Motor	1
	HB-38-16-200	Bolt $\frac{3}{8}$ - 16 x 2	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
36	HB-516-18-300	Bolt $\frac{5}{16}$ - 18 x 3	2
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	2
37	16-824	Reducer 1" x $1\frac{1}{4}$	1
38	16-828	Fitting 1 MPT x 1 HB	1
39	HSSQ-38-16-150	Square Head Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
40	33-179	Left Spray Support	1
41	33-529	Mount	1
42	16-168	Elbow $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	2
43	18-172	Reducer $\frac{5}{8}$ x $\frac{3}{8}$	2
44	8897-14	Discharge Hose $1\frac{1}{4}$ " x 14"	1
	18-116	Hose Clamp	2
45	16-456	Flow Meter (comes with computer)	1
46	HB-14-20-250	Bolt $\frac{1}{4}$ - 20 x $2\frac{1}{2}$	2
	HW-14	Washer $\frac{1}{4}$	2
	HNFL-14-20	Flange Whiz Lock Nut $\frac{1}{4}$ - 20	2
47	33-501	Right Valve Guard Mount	1

3004D PLUMBING DRAWING (RAVEN 203)

All systems are shipped with windshield wash in them to prevent freezing. Flush with clear water.



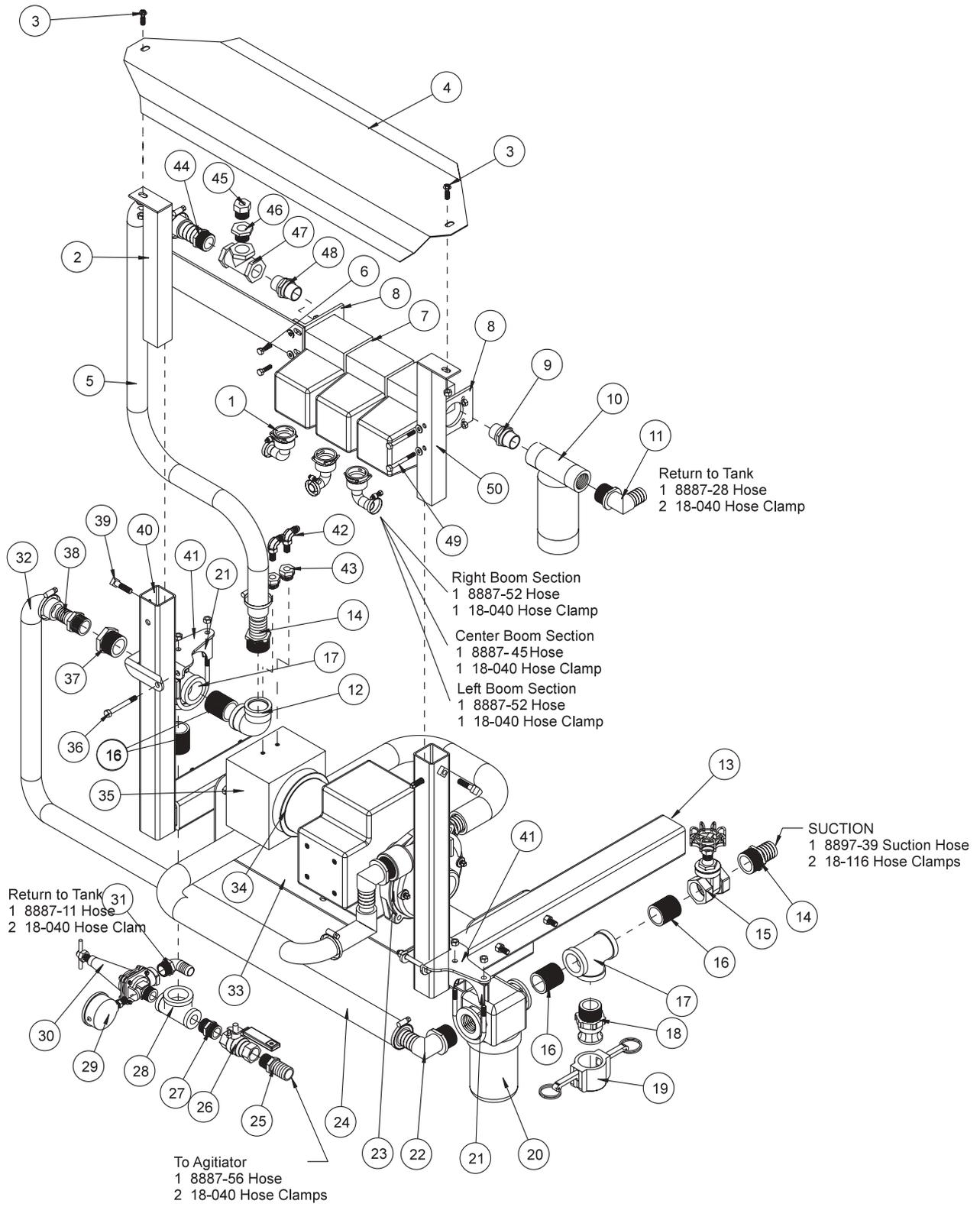
Accessories

3004D PLUMBING PARTS LIST (RAVEN 203)

REF#	PART#	DESCRIPTION	QUANTITY
1	15-553	90° Elbow (comes with 15-552)	3
	15-553-01	Clip (comes with 15-552)	3
	15-553-02	O-Ring (comes with 15-552)	3
2	33-499	Left Valve Guard Mount	1
3	HSTP-516-18-100	Phillip Truss Head ⁵ / ₁₆ - 18 x 1	2
	HNFL-516-18	Flange Whiz Lock Nut ⁵ / ₁₆ -18	2
4	33-498	Valve Guard	1
	25-357	Decal, Smithco	1
5	8897-12	Hose 1 ¹ / ₄ x 12	1
	18-116	Hose Clamp	2
6	HB-14-20-100	Bolt ¹ / ₄ - 20 x 1	2
	HW-14	Washer ¹ / ₄	2
	HNFL-14-20	Flange Whiz Lock Nut ¹ / ₄ - 20	2
7	15-552	Manifold Ball Valve	1
8	15-552-07	Steel Mounting Bracket (part of 15-552)	2
9	16-851	Close Nipple 1"	1
10	16-995	Motorized Control Valve (comes with computer)	1
11	18-294	90° Elbow	1
12	16-182	90° Elbow	1
13	33-180	Right Sprayer Support	1
14	16-161	Fitting 1 ¹ / ₄ MPT x 1 ¹ / ₄ HB	2
15	16-170	Brass Gate Valve 1 ¹ / ₄	1
16	18-160	Nipple 1 ¹ / ₄	4
17	18-219	Tee 1 ¹ / ₄ Black Pipe	2
18	16-180	Quick Coupler 1 ¹ / ₄ Female	1
19	16-935	Quick Coupler Male	1
20	16-968	Strainer 50 Mesh	1
21	10-147	Muffler Clamp	2
22	16-993	Fitting 1 ¹ / ₄ MPT x 1 ¹ / ₂ HB	1
23	33-524	Diaphragm Pump	1
	HB-516-18-100	Bolt ⁵ / ₁₆ - 18 x 1	4
	HNFL-516-18	Flange Whiz Lock Nut ⁵ / ₁₆ -18	4
24	8986-50	Discharge Hose 1 ¹ / ₂ " x 50"	1
	18-116	Hose Clamp	2
25	16-154	Fitting ³ / ₄ MPT x ³ / ₄ HB	1
26	16-859	Ball Valve ³ / ₄ Brass	1
27	16-158	Close Nipple ³ / ₄ x ³ / ₄	1
28	18-276	Tee ³ / ₄ x ³ / ₄ x 1 ¹ / ₄	1
29	16-281	Liquid Filled Gauge 2 ¹ / ₂	1

(Continued on next page)

3004D PLUMBING DRAWING (RAVEN 203) (CONTINUED)

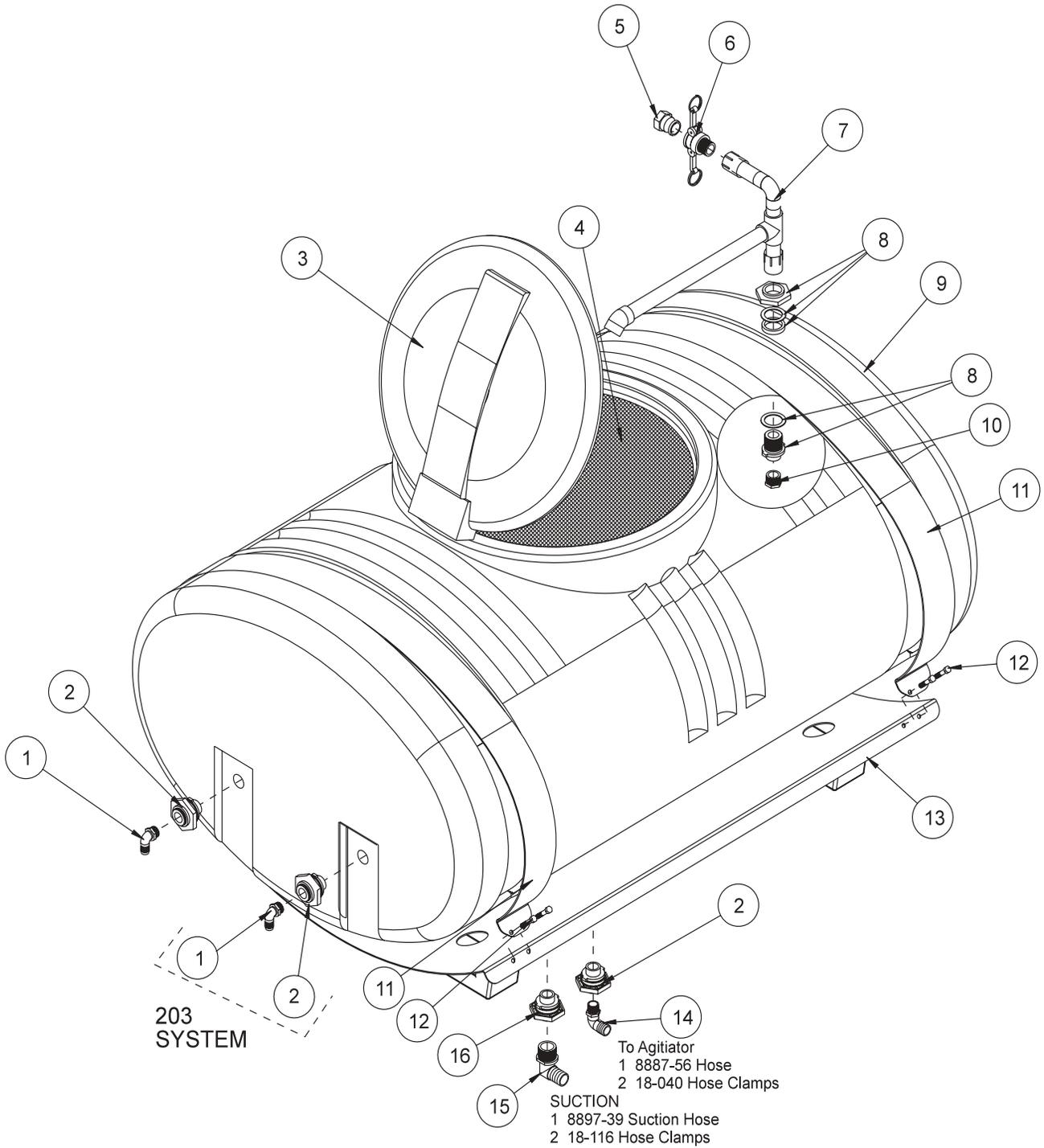


Accessories

3004D PLUMBING PARTS LIST (RAVEN 203) (CONTINUED)

REF#	PART#	DESCRIPTION	QUANTITY
30	16-294	Relief Valve	1
31	16-153	Elbow $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
32	8896-46	Discharge Hose 1" x 46	1
	18-222	Hose Clamp	2
33	33-177	Spray Pump Bracket	1
	HB-38-16-350	Bolt $\frac{3}{8}$ - 16 x $3\frac{1}{2}$	4
	HW-38	Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
34	33-525	Hydraulic Motor Mounting Kit (comes with pump)	1
35	33-532	Hydraulic Motor	1
	HB-38-16-200	Bolt $\frac{3}{8}$ - 16 x 2	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
36	HB-516-18-300	Bolt $\frac{5}{16}$ - 18 x 3	2
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	2
37	16-824	Reducer 1" x $1\frac{1}{4}$	1
38	16-828	Fitting 1 MPT x 1 HB	1
39	HSSQ-38-16-150	Square Head Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
40	33-179	Left Spray Support	1
41	33-529	Mount	1
42	16-168	Elbow $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	2
43	18-172	Reducer $\frac{5}{8}$ x $\frac{3}{8}$	2
44	16-159	Fitting 1 MPT x $1\frac{1}{4}$ HB	1
45	16-288	Reducer Bushing $\frac{3}{4}$ x $\frac{3}{4}$	1
46	16-163	Reducer Bushing 1 x $\frac{3}{4}$	1
47	16-183	Tee 1"	1
48	16-851	Close Nipple 1 x 1	1
49	HB-14-20-250	Bolt $\frac{1}{4}$ - 20 x $2\frac{1}{2}$	2
	HW-14	Washer $\frac{1}{4}$	2
	HNFL-14-20	Flange Whiz Lock Nut $\frac{1}{4}$ - 20	2
50	33-501	Right Valve Guard Mount	1

TANK WITH AIR GAP FILLER DRAWING

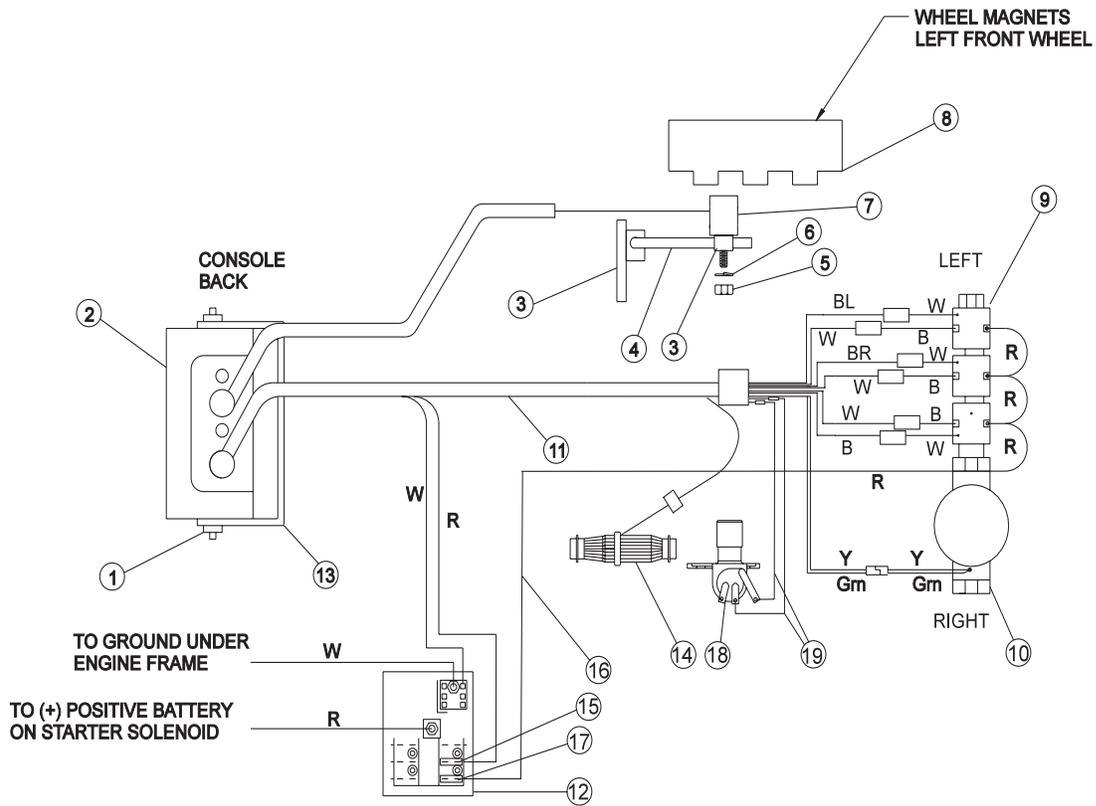


Accessories

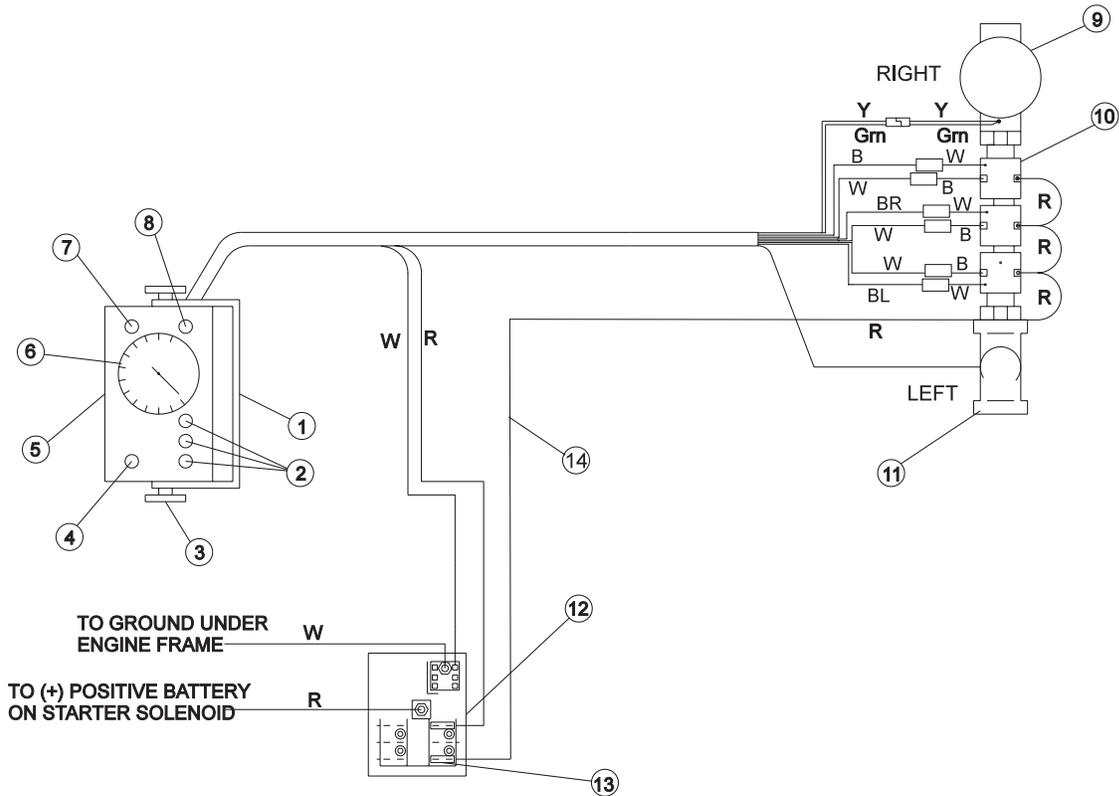
TANK WITH AIRGAP FILLER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-153	Elbow $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	2
2*	16-150	Double Thread Fitting, $\frac{3}{4}$ " (bottom one come swith tank)	3
3*	16-953	16" Hinged Lid/Well with Gasket	1
*	16-953-01	Gasket for 16-953	1
4	16-169	Strainer Basket 16"	1
5†	16-961	Aluminum Adapter 1"	1
6†	16-962	Aluminum Coupler 1"	1
†	16-962-01	Buna-N Gasket 1"	1
7†	33-250	Air Gap Filler	1
8†	16-945	Double Thread Fitting, 1" (5-parts)	1
9	33-530	Poly Tank, 300 Gallon	1
10†	16-162	Hex Plug 1"	1
11	33-192	Tank Strap	2
12	HB-38-16-225	Bolt $\frac{3}{8}$ - 16 x 2 $\frac{1}{4}$	4
	HB-38-16-250	Bolt $\frac{3}{8}$ - 16 x 2 $\frac{1}{2}$	4
	HNTL-38-16	Top Lock Nut $\frac{3}{8}$ - 16	8
	HW-38	Washer $\frac{3}{8}$	8
13	33-143	Tank Carrier	1
14	16-155	Elbow $\frac{3}{4}$ MPT x 1 HB	1
15	16-156	Elbow, 1 $\frac{1}{4}$ MPT x 1 $\frac{1}{4}$ HB	1
16*	16-194	Fitting 1 $\frac{1}{4}$ Anti-Vortex	1
*	33-530	Poly Tank, 300 Gallon	
	16-227	Decal, Tank Flush	1
	25-359	Decal, Smithco	2
†	33-249	Air Gap Filler Kit	

CONTROL 3002D SYSTEM DRAWING (RAVEN 440)



CONTROL 3004D SYSTEM DRAWING (RAVEN 203)



CONTROL 3002D SYSTEM PARTS LIST (RAVEN 440)

REF#	PART#	DESCRIPTION	QUANTITY
*1	16-558	Mounting Knob	2
*2	16-525	Console (only)	1
	16-234	Computer Cover	1
3	15-370-03	Turret Assembly	2
4	15-370-04	Speed Sensor Rod	1
5	HN-14-20	Nut, 1/4 - 20	2
6	HWL-14	Lockwasher, 1/4	2
7	33-089-03	Sensor Assembly	1
8	33-089-04	Red Magnet Assembly	1
	33-089-05	Black Magnet Assembly	1
9	15-552	Manifold Ball Valve	1
*10	16-524	Motorized Control Valve	1
*11	33-089-01	Console Control Cable	1
12	33-271	Fuse Block	1
13	33-189	Mounting Bracket	1
*14	16-456	Flow Meter	1
15	33-284	Auto Blade Type Fuse 5 amp	1
16	15-560	Ball Valve Power Wire	1
17	33-508	Auto Blade Type Fuse 15 AMP	1
18	33-509	Master Boom Control Switch	1
19	8851-72	14GA Brown Wire	2
	8854	Fork Terminal	2
	8860	String Connector	2
	8962	Heat Shrink	4
*	33-089	440 Computer	

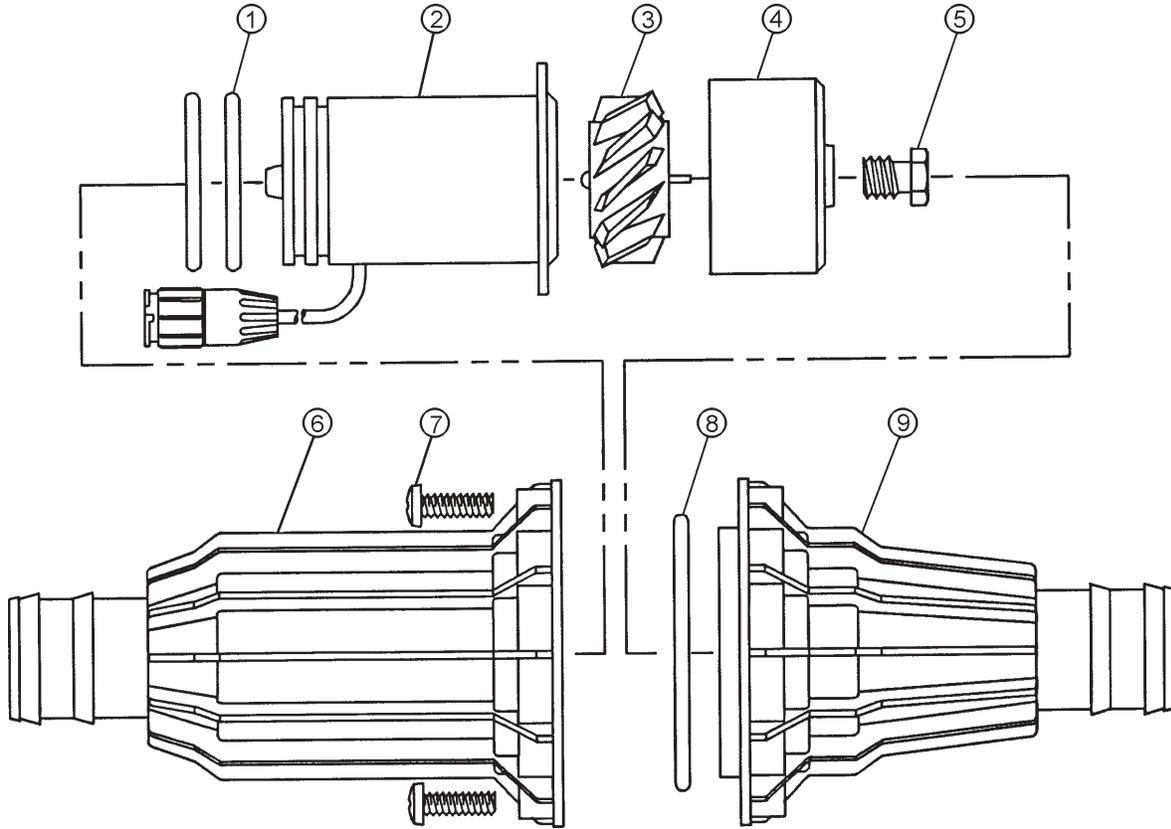
*NOTE: White wire on manifold ball valve may be red/yellow
Use dielectric grease on all electrical connections*

CONTROL 3004D SYSTEM PARTS LIST (RAVEN 203)

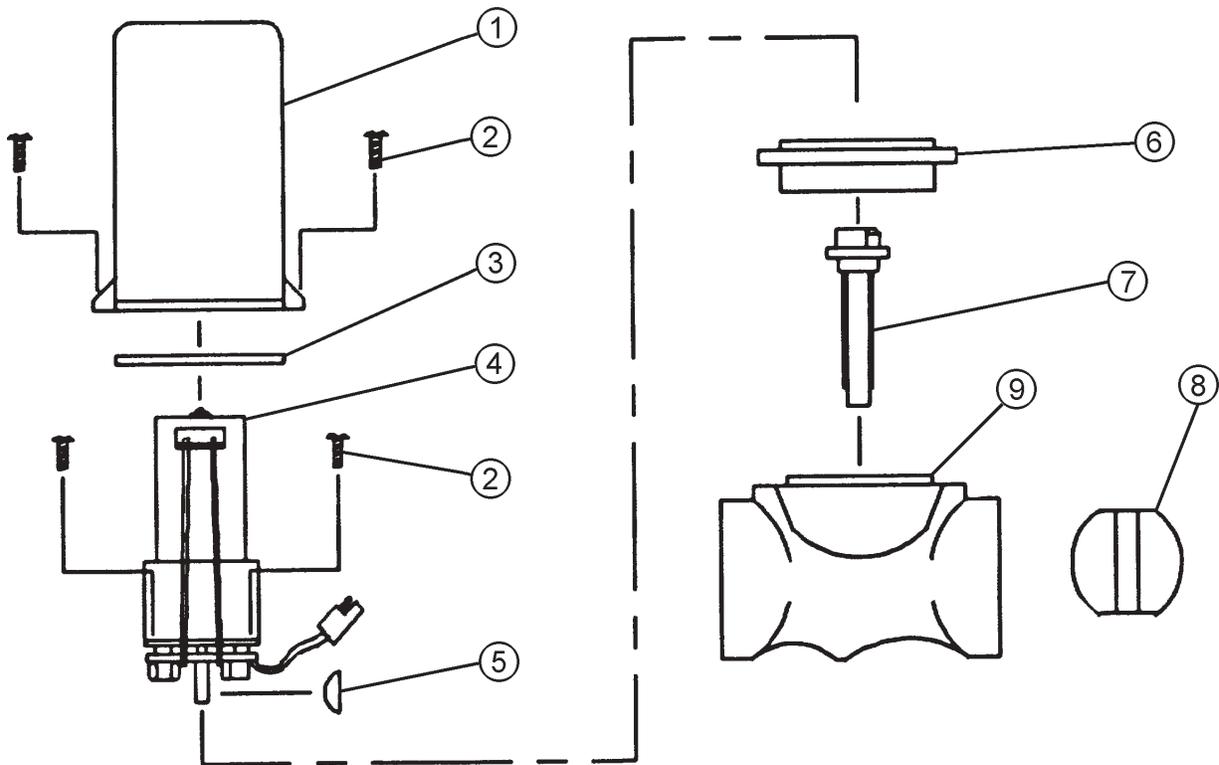
REF#	PART#	DESCRIPTION	QUANTITY
1	16-958-01	Mounting Bracket	1
2	16-898	Boom Switch	3
3	16-900	Mounting Knob	2
4	16-899	Master Switch	1
5	33-090-01	Console with 212" Cable	1
6	33-090-02	Pressure Gauge Liquid Filled	1
7	16-958-02	Fuse Holder	1
	16-525-03	Fuse, 15 AMP	1
8	16-895	Pressure Switch	1
9	16-995	Motorized Control Valve	1
10	15-552	Manifold Ball Valve	1
11	16-183	Tee, FPT 1"	1
12	33-271	Fuse Block	1
13	33-284	Auto Blade Type Fuse 5 amp	1
14	15-560	Ball Valve Power Wire	1
15	33-508	Auto Blade Type Fuse 15 amp	1

*NOTE: White wire on manifold ball valve may be red/yellow
Use dielectric grease on all electrical connections*

16-456 FLOWMETER DRAWING



16-524 AND 16-995 MOTORIZED CONTROL VALVE DRAWING



16-456 FLOWMETER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	16-456-03	O-Ring, Viton	2
2*	16-456-04	RFM55 Dual O-Ring XDCR Assembly	1
3	16-456-05	RFM55 Turbine	1
4	16-456-06	Turbine Hub/Bearing Assembly	1
5	16-143	Turbine Stud Assembly	1
6	16-456-01	Sensor Housing	1
7	16-456-02	#10-32 x 3/4 Stainless Steel Screw	12
8	16-144	O-Ring, Viton	1
9	16-456-07	Hub Housing with Inserts	1
*	16-456-10	O-ring transducer kit	1
Not Shown	16-456-08	Mounting Bracket, RFM 55	1
Not Shown	16-456-09	Thread Sealer	1

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

REF#	PART#	DESCRIPTION	QUANTITY
1	16-870	Valve Cover	1
2*	16-524-01	#6 Self Tapping Screw 3/4" Long	6
3	16-897	Seal Tetraseal	1
4	16-875	Motor Assembly (For 16-524 on Spray Star 3002)	1
4	16-866-01	Motor Assembly (For 16-866 on Spray Star 3004)	1
5*	16-957	Woodruff Key	1
6*	16-524-04	Isolation Flange Assembly	1
7*	16-524-02	Coupler Shaft	1
8*	16-956	Butterfly	1
9*	16-524-03	Valve Body Assembly (for 16-524)	1
	16-995-01	Valve Body Assembly (for 16-995)	1
10	16-995-01		
*	16-524-05	1" Valve ISO-Body Kit (for 15-524)	
	16-955-02	1" Valve ISO-Body Kit (for 16-995)	

WHEN SERVICING VALVE:

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

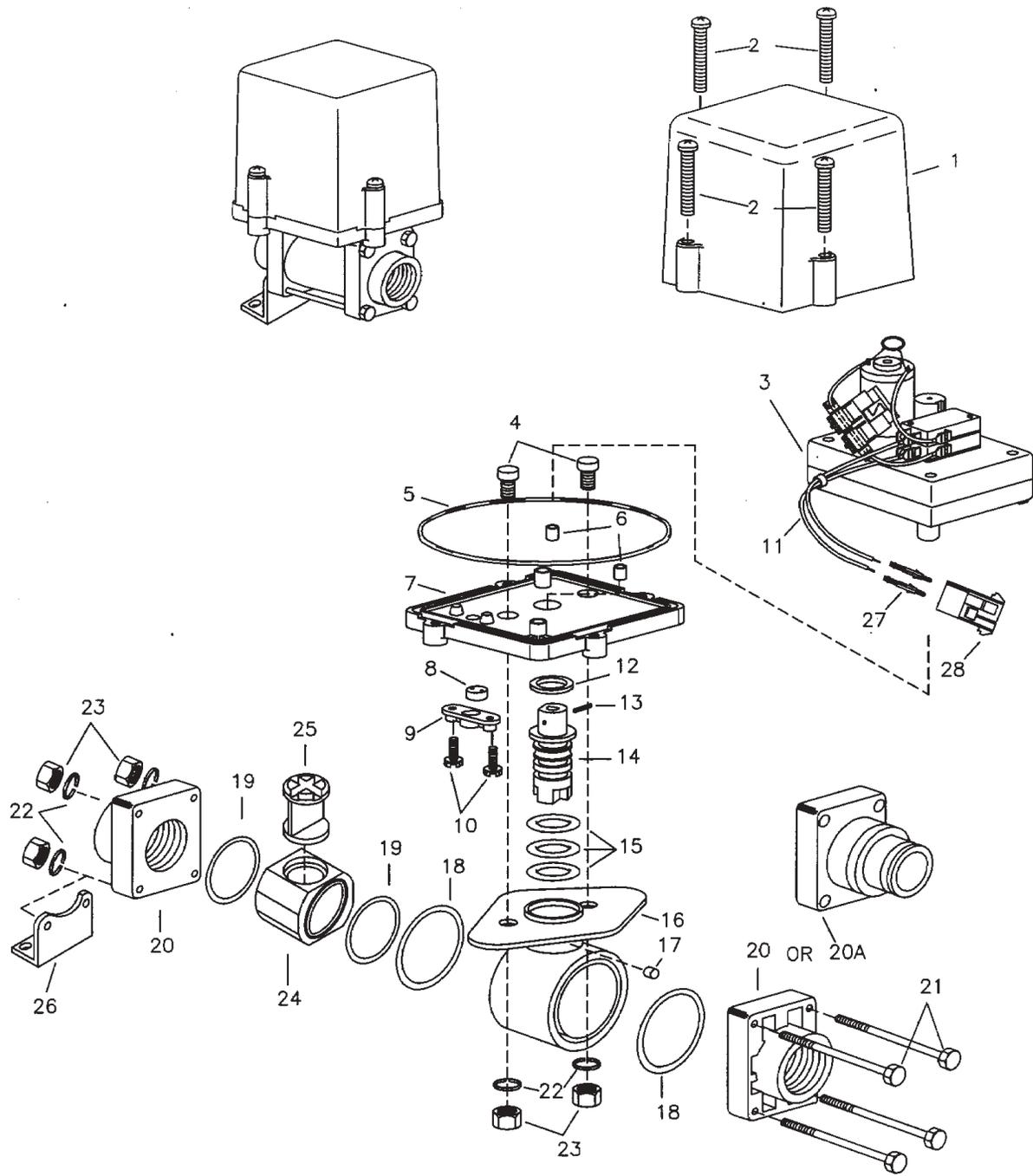
Replace motor assembly if the motor will not run or if the printed circuit board is corroded.

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

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



16-986 REGULATING BUTTERFLY VALVE DRAWING

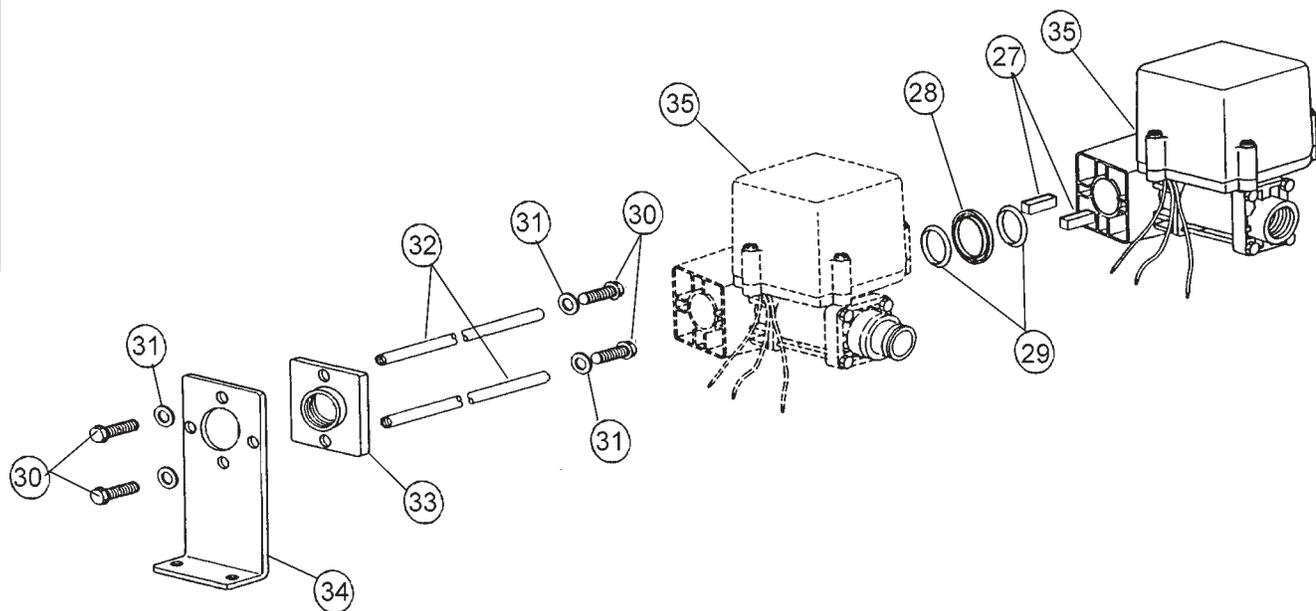
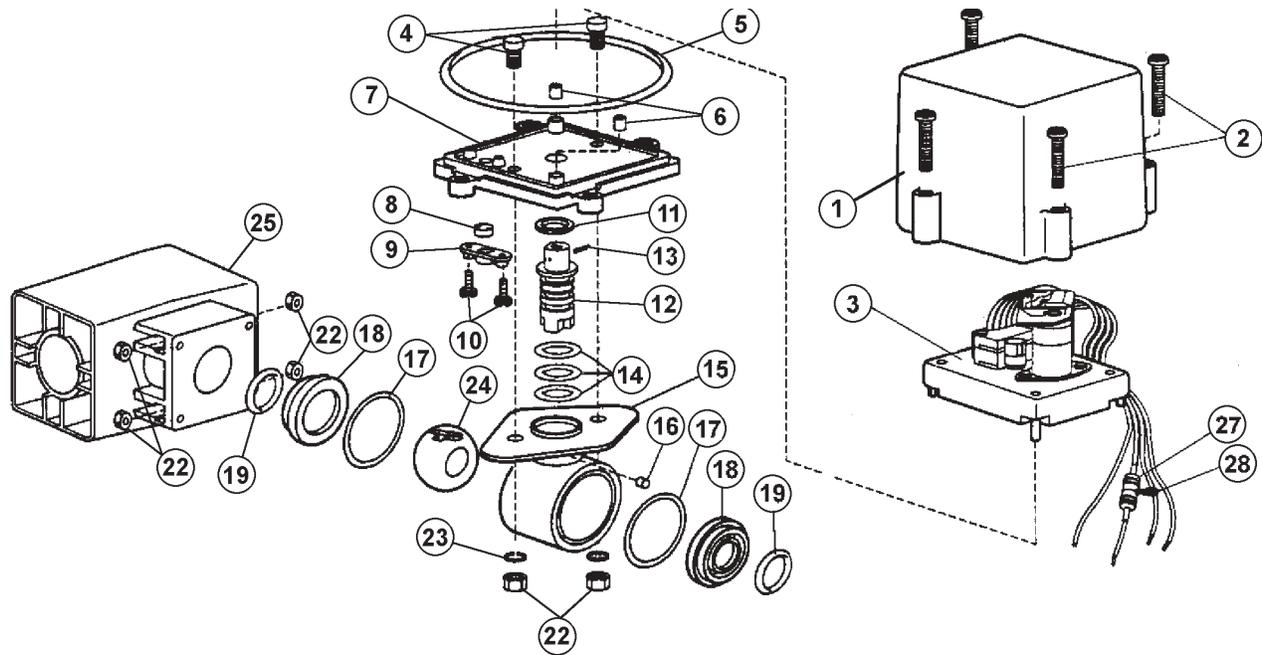


Accessories

16-986 REGULATING BUTTERFLY VALVE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-531-06	Polypropylene Cover	1
2	15-552-12	Stainless Steel Phillips/Square Pan Head Screw	4
3	16-986-01	Motor Sub Assembly	1
4	15-517-04	Stainless Steel Self Cinching Stud	2
5	16-986-02	EPDM Rubber O-ring	1
6	15-517-06	Neoprene Motor Mount	2
7	15-517-07	Nylon Mounting Plate	1
8	15-517-08	EPDM Rubber Grommet	1
9	16-986-03	Nylon Grommet Retainer	1
10	15-517-10	Stainless Steel Slotted Hex Washer Screw	2
11	16-986-04	Control Harness Subassembly	1
12*	15-517-11	Teflon Thrust Washer	1
13	15-517-13	Stainless Steel Spring Pin	1
14*	15-552-04	Nylon Ball Valve Stem	1
15*	15-552-05	Teflon Coated Viton O-ring	1
16	15-517-16	Nylon Body	1
17*	15-517-17	Dense Felt Dust Plug	1
18*	15-552-13	Viton Gasket	2
19*	16-986-05	Viton O-ring	2
20	15-531-03	Nylon End Cap	1
21	16-986-06	Quick Connector End Cap	1
22	15-517-22	Stainless Steel Hex Head Cap Screw	4
23	15-517-24	Stainless Steel Lockwasher	2
24	15-517-23	Stainless Steel Hex Nut	6
25*	16-986-07	Nylon Body Insert	1
26*	16-986-08	Nylon Butterfly	1
27	16-986-09	Steel Mounting Bracket	1
28	16-986-10	Pin Contact	2
29	16-986-11	Connector Cap	1
	16-986-12	Spare Parts Kit (includes all * items)	

15-552 MANIFOLD BALL VALVE DRAWING (1 UNIT)



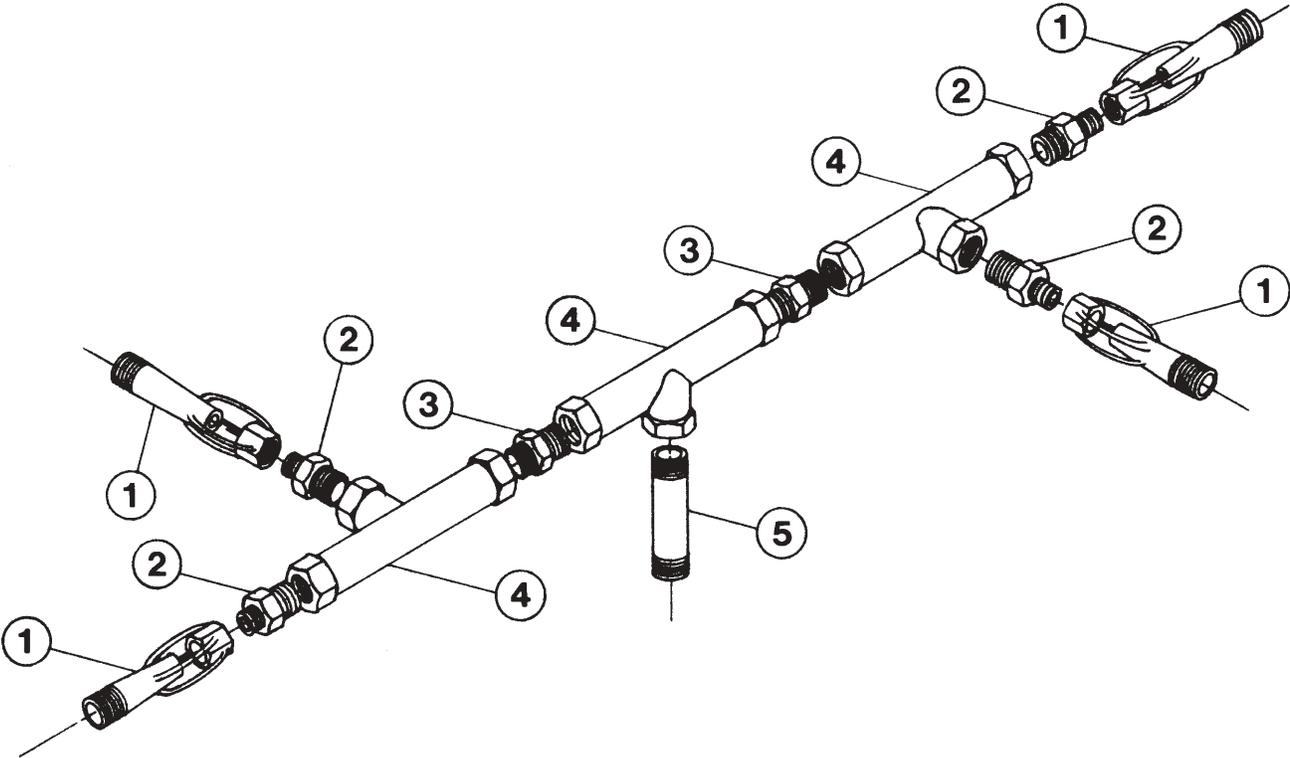
Accessories

15-552 MANIFOLD BALL VALVE PARTS LIST (1 UNIT)

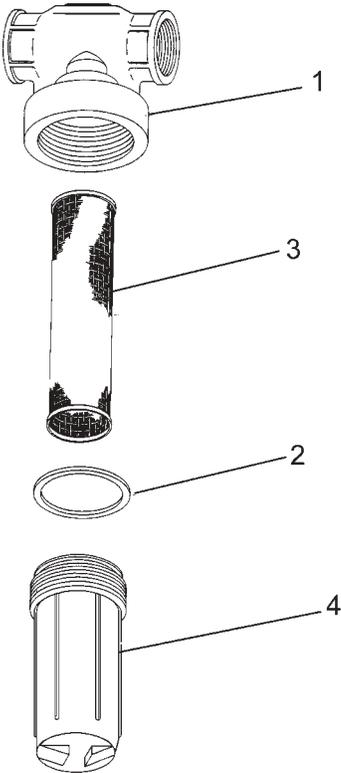
REF#	PART#	DESCRIPTION	QUANTITY
1	15-531-06	Polypropylene Cover	1
2	15-552-12	Stainless Steel Phillips/Square Pan Head Screw	4
3	15-552-06	Motor Sub Assembly	1
4	15-517-04	Stainless Steel Self Cinching Stud	2
5	15-552-03	O-Ring, ERP Rubber	1
6	15-517-06	Neoprene Motor Mount	2
7	15-517-07	Nylon Mounting Plate	1
8	15-552-02	EPDM Rubber Grommet	1
9	15-517-09	Polypropylene Grommet Retainer	1
10	15-517-10	Stainless Steel Slotted Hex Washer Screw	2
11*	15-517-11	Teflon Thrust Washer	1
12*	15-552-04	Nylon Ball Valve Stem	1
13	15-517-13	Stainless Steel Spring Pin	1
14*	15-552-05	Viton O-ring	1
15	15-517-16	Nylon Body	1
16*	15-517-17	Dense Felt Dust Plug	1
17*	15-552-13	Viton Gasket	2
18*	15-517-19	Teflon Seal	2
19*	15-517-20	Viton O-ring	2
22	15-517-23	Stainless Steel Hex Nut	6
23	15-517-24	Stainless Steel Lockwasher	2
24*	15-552-09	Polypropylene Ball	1
25	15-552-11	Manifold Body, Nylon	1
26	15-552-19	Control Cable	1
27	15-552-16	Alignment Insert, Polypropylene	4
28	15-552-14	Inner Connector, Polypropylene	2
29	15-552-15	O-Ring, Viton	4
30	15-552-22	Hex Head Bolt, Stainless Steel	4
31	15-552-21	Flat Washer, Stainless Steel	4
32	15-552-18	Connecting Stud, Stainless Steel	2
33	15-552-20	1" NPT Female Threaded Inlet Body, Polypropylene	2
34	15-552-07	Steel Mounting Bracket	2
35	15-552-01	Single Unit	3
.	15-552-10	Spare Parts Kit	

Comes with three 15-553 3/4 - 90° Hose Barbs

TURBO-QUADAGITATOR DRAWING



16-968 STRAINER DRAWING



Accessories

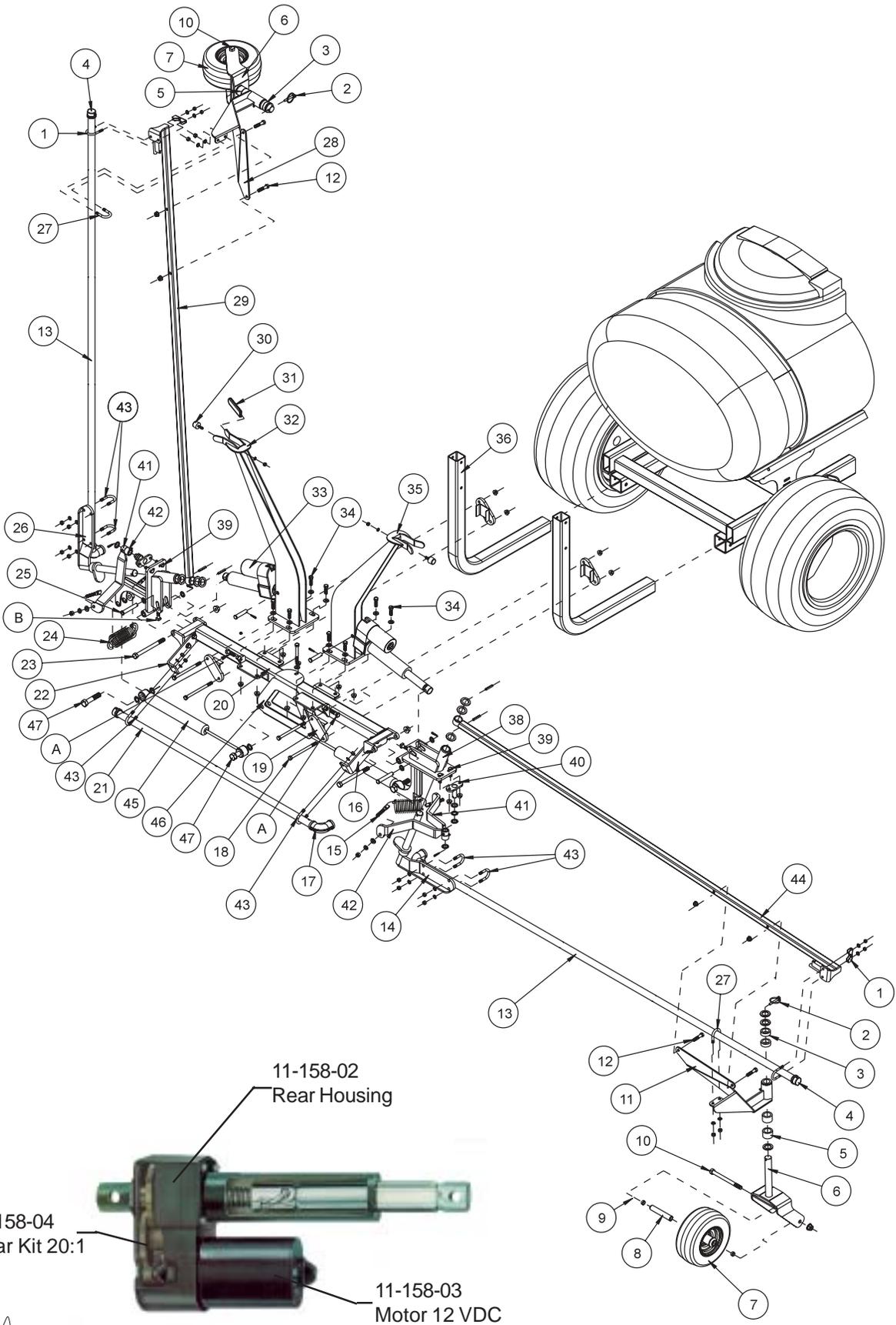
TURBO-QUAD AGITATOR PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-036	Agitator Jet (Includes one each $\frac{1}{8}$ ", $\frac{5}{53}$ ", and $\frac{3}{16}$ " orifices)	4
2	16-173	Reducer $\frac{3}{4}$ - $\frac{1}{2}$	4
3	16-158	Close Nipple $\frac{3}{4}$ x $\frac{3}{4}$	2
4	16-157	Female Pipe Thread Tee $\frac{3}{4}$ x $\frac{3}{4}$ x $\frac{3}{4}$	3
5	16-172	Nylon Nipple $\frac{3}{4}$ NPT x $3\frac{1}{2}$	1

16-968 STRAINER PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-968-01	Head $1\frac{1}{4}$	1
2	16-968-02	Gasket	1
3	16-968-03	Screen	1
4	16-968-04	Bowl	1

10-300 18' TERRAIN FOLLOWING BOOM DRAWING



Accessories

11-158-02
Rear Housing

11-158-04
Gear Kit 20:1

11-158-03
Motor 12 VDC

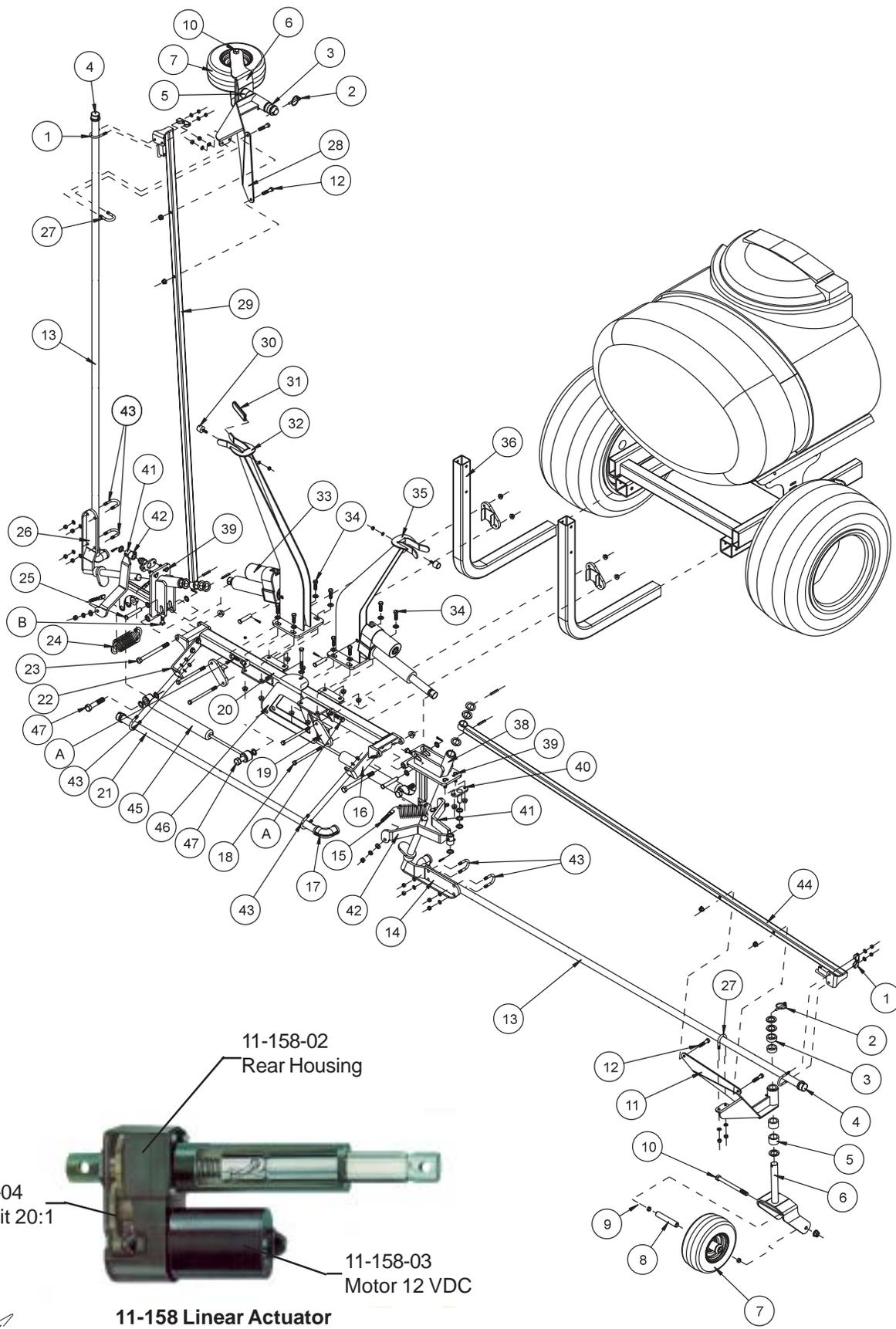
11-158 Linear Actuator

10-300 18' TERRAIN FOLLOWING BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
	13-498	Muffler Clamp 1 ¹ / ₈	2
	HWL-516	Lockwasher ⁵ / ₁₆	4
	HN-516-18	Nut ⁵ / ₁₆ - 18 (part of 13-498)	4
2	42-539	Lynch Pin ¹ / ₄	2
3	29-584	¹ / ₂ " Spacer	4
4	16-926	Stainless Steel Cap	3
5	29-585	1" Spacer	4
6	10-312	Castor Fork	2
	HMB-100-10	Machine Bushing 1 x 10GA (3 per fork)	6
7	42-202	Tire and Wheel	2
	42-202-01	Tire	2
	42-202-02	Wheel	2
8	42-213	Axle Bearing	2
9	42-212	Castor Wheel Spacer	4
10	HBS-12-13-600	Stainless Steel Bolt ¹ / ₂ - 13 x 6	2
	HNTL-12-13	Lock Nut ¹ / ₂ - 13	2
11	10-310	Right Castor Wheel Bracket	1
	18-035	Bushing (part of 10-310)	2
	HG-14-28-180	Grease Fitting ¹ / ₄ - 28 x 180° (part of 10-310)	1
12	HBS-38-16-175	Stainless Steel Bolt ³ / ₈ - 16 x 1 ³ / ₄	4
	HNTL-38-16	Lock Nut ³ / ₈ - 16	4
13	16-928	Right and Left Tube	2
14	33-301	Right Pivot Bracket	1
	HMBS-100-10	Stainless Steel Machine Bushing 1 x 10GA	1
	HMBS-100-14	Stainless Steel Machine Bushing 1 x 14GA	2
	HRPS-14-150	Stainless Steel Roll Pin ¹ / ₄ x 1 ¹ / ₂	2
15	42-537	Spade Bolt ³ / ₈ - 16	4
	HW-38	Washer ³ / ₈	4
	HWL-38	Lockwasher ³ / ₈	4
	HN-38-16	Nut ³ / ₈ - 16	4
16	33-308	Right Center Tube Mount	1
	HBS-38-16-125	Stainless Steel Bolt ³ / ₈ - 16 x 1 ¹ / ₄	2
	HWS-38	Stainless Steel Washer ³ / ₈	2
	HNTL-38-16	Lock Nut ³ / ₈ - 16	2
17	16-925	Stainless Steel Pipe Elbow ³ / ₄ x 90°	3
	18-249	Barb Fitting	3
	18-040	Hose Clamp HS-12	3
18	HBS-38-16-550	Stainless Steel Bolt ³ / ₈ - 16 x 5 ¹ / ₂	4
	HNTL-38-16	Lock Nut ³ / ₈ - 16	4
19	10-304	Boom Bracket	4
20	10-305	Center Boom Mount	1
21	16-927	Center Tube	1
A	HSSQS-38-16-150	Stainless Steel Set Screw ³ / ₈ - 16 x 1 ¹ / ₂ (part of 10-305)	2
	HN-38-16	Nut ³ / ₈ - 16 (part of 10-305)	2
22	33-309	Left Center Tube Mount	1
	HBS-38-16-125	Stainless Steel Bolt ³ / ₈ - 16 x 1 ¹ / ₄	2
	HWS-38	Stainless Steel Washer ³ / ₈	2
	HNTL-38-16	Lock Nut ³ / ₈ - 16	2
23	HBS-12-13-600	Stainless Steel Bolt ¹ / ₂ - 13 x 6	2
	HNTL-12-13	Lock Nut ¹ / ₂ - 13	2
24	10-313	Extension Spring	2
25	HCPS-12-275	Stainless Steel Clevis Pin ¹ / ₂ x 2 ³ / ₄	2
	HMB-12-14	Machine Bushing ¹ / ₂ x 14GA	4
	HPS-18-100	Stainless Steel Cotter Pin ¹ / ₈ x 1	2

(Continue on Next Page)

10-300 18' TERRAIN FOLLOWING BOOM DRAWING



Accessories

11-158-02
Rear Housing

11-158-04
Gear Kit 20:1

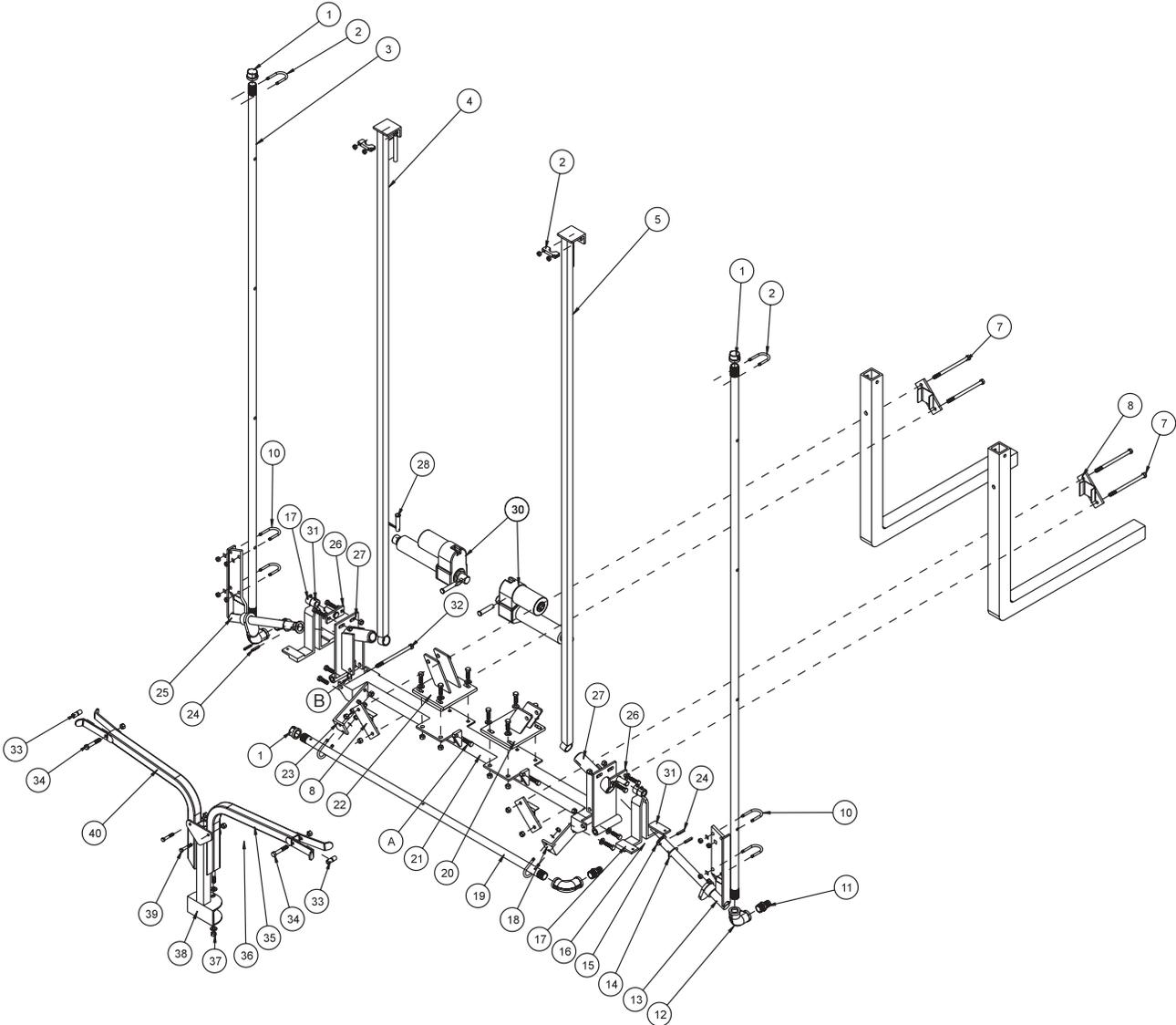
11-158-03
Motor 12 VDC

11-158 Linear Actuator

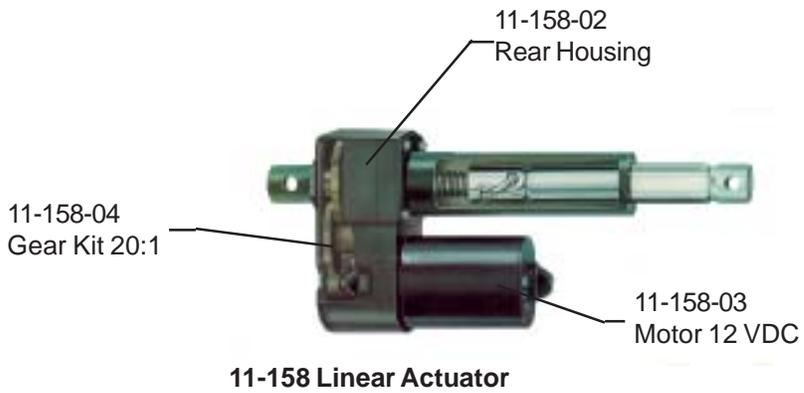
10-300 18' TERRAIN FOLLOWING BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
26	33-302	Left Pivot Bracket	1
	HMBS-100-10	Stainless Steel Machine Bushing 1 x 10GA	1
	HMBS-100-14	Stainless Steel Machine Bushing 1 x 14GA	2
	HRPS-14-150	Stainless Steel Roll Pin 1/4 x 1 1/2	2
27	16-024	U-Bolt 5/16 - 24	2
	HWLS-516	Stainless Steel Lockwasher 5/16	4
	HNS-516-24	Stainless Steel Nut 5/16 - 24	4
28	10-311	Left Castor Wheel Bracket	1
	18-035	Bushing (part of 10-311)	2
	HG-14-28-180	Grease Fitting 1/4 - 2 8 x 180° (part of 10-311)	1
29	10-307	Left Brush Guard	1
30	15-013	Rubber Bumper	2
	HWL-14	Lockwasher 1/4	2
	HN-14-20	Nut 1/4 - 20	2
31	10-318	Grip Pad	4
32	10-316	Left Boom Holder	1
33	11-158	Linear Actuator	2
	HCPS-12-200	Stainless Steel Clevis Pin 1/2 x 2	2
	HPS-18-100	Stainless Steel Cotter Pin 1/8 x 1	2
34	HBS-38-16-125	Stainless Steel Bolt 3/8 - 16 x 1 1/4	8
	HWS-38	Stainless Steel Washer 3/8	8
	HNTL-38-16	Lock Nut 3/8 - 16	8
35	10-317	Right Boom Holder	1
36		Boom Carrier (part of machine)	
38	10-330	Pivot Bracket	2
	15-494	Nylon Flange Bushing 1" ID (2 per 10-330)	4
	18-036	Oilite Bushing 1/2 ID (2 per 10-330)	4
	HG-14-28-180	Grease Fitting 1/4 - 28 x 180° (2 per 10-330)	4
	HN-38-16	Nut 3/8 - 16 (1 per 10-330)	2
B	HSSQS-38-16-150	Stainless Steel Set Screw 3/8 - 16 x 1 1/2 (1 per 10-330)	2
39	HBS-38-16-125	Stainless Steel Bolt 3/8 - 16 x 1 1/4	4
	HWS-38	Stainless Steel Washer 3/8	4
	HNTL-38-16	Lock Nut 3/8 - 16	4
40	10-303	Pivot	2
	HMBS-58-14	Stainless Steel Machine Bushing 5/8 x 14GA	8
	HPS-18-100	Stainless Steel Cotter Pin 1/8 x 1	2
41	10-309	Left Cam Stop (must also order 10-308)	2
	18-268	Oilite Bushing (part of 10-309)	2
	HG-14-28-180	Grease Fitting 1/4 - 28 x 180° (part of 10-309)	2
42	10-308	Right Cam Stop (must also order 10-309)	2
	18-268	Oilite Bushing (part of 10-308)	2
	HG-14-28-180	Grease Fitting 1/4 - 28 x 180° (part of 10-308)	2
43	16-024	U-Bolt 5/16 - 24	6
	HWLS-516	Stainless Steel Lockwasher 5/16	12
	HNS-516-24	Stainless Steel Nut 5/16 - 24	12
44	10-306	Right Brush Guard	1
45	10-332	Stabilizer	2
46	10-331	Center Stabilizer Mount	1
	HB-38-16-300	Bolt 3/8 - 16 x 3	1
	HW-38	Washer 3/8	2
	HNTL-38-16	Lock Nut 3/8 - 16	1
47	HB-58-11-300	Bolt 5/8 - 11 x 3	4
	HMB-58-14	Machine Bushing 5/8 x 14GA	8
	HNTL-58-11	Lock Nut 5/8 - 11	4

15-493 STAINLESS STEEL 18' AUTO BOOM DRAWING



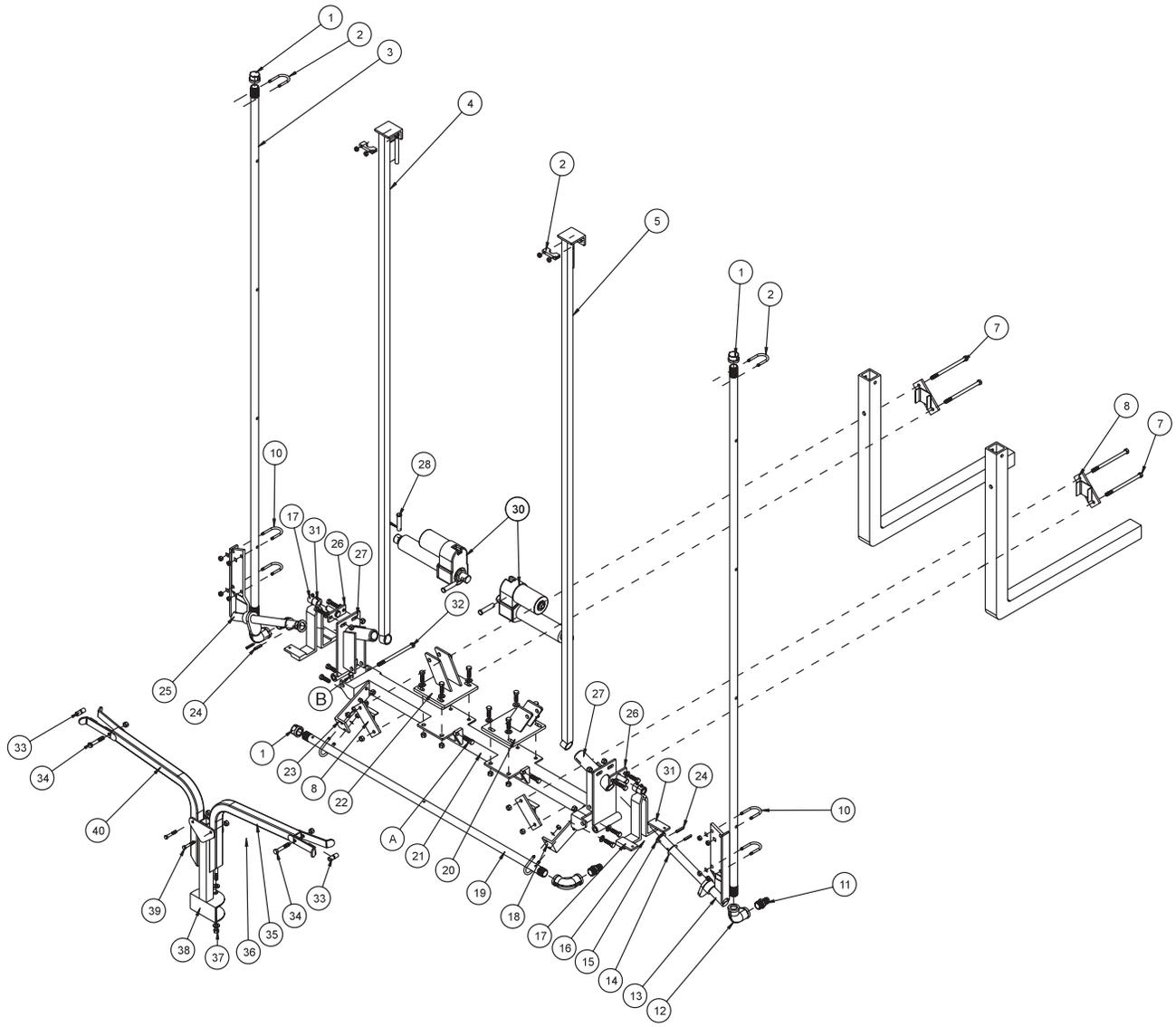
Accessories



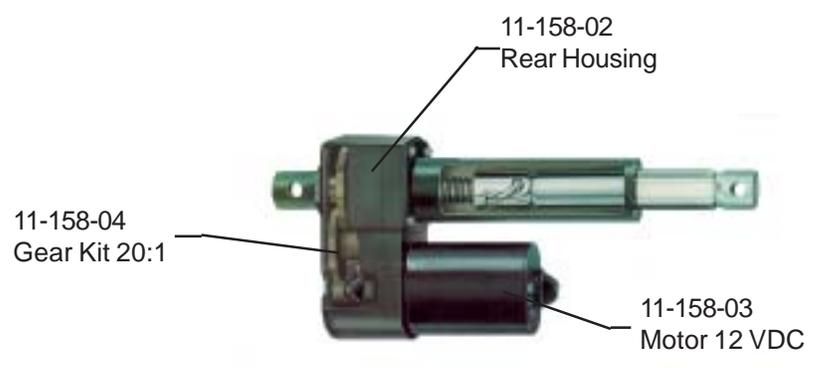
15-493 STAINLESS STEEL 18' AUTO BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-926	Stainless Steel Cap $\frac{3}{4}$	3
2	13-498	U-Bolt Kit $1\frac{1}{8}$	2
3	16-928	Right and Left Tube	2
4	33-333	Left Brush Guard	1
5	33-332	Right Brush Guard	1
7	HBS-38-16-550	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $5\frac{1}{2}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
8	16-761	Boom Brackets	4
10	16-024	U-Bolt $\frac{5}{16}$ - 24	6
	HWLS-516	Stainless Steel Lockwasher $\frac{5}{16}$	12
	HNS-516-24	Stainless Steel Nut $\frac{5}{16}$ - 24	12
11	18-249	Barb Fitting	3
12	16-925	Stainless Steel Pipe Elbow $\frac{3}{4}$ x 90°	3
13	33-301	Right Pivot Bracket	1
14	HMB-100-14	Machine Bushing 1 x 14GA	4
15	HMB-100-10	Machine Bushing 1 x 10GA	2
16	15-495	Extension Spring	2
17	33-306	Right Cam Stop (must also order 33-307)	2
18	33-308	Right Center Tube Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
19	16-927	Center Tube	1
20	33-330	Right Actuator Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
21	33-329	Center Mount	1
A	HSSQS-38-16-150	Stainless Steel Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$ (part of 33-329)	2
	HN-38-16	Nut $\frac{3}{8}$ - 16 (part of 33-329)	2
22	33-331	Left Actuator Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
23	33-309	Left Center Tube Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
24	HRPS-14-150	Stainless Steel Roll Pin $\frac{1}{4}$ x $1\frac{1}{2}$	4
25	33-302	Left Pivot Bracket	1
26	33-305	Pivot	2
	HMB-58-14	Machine Bushing $\frac{5}{8}$ - 14	8
	HPS-18-100	Stainless Steel Cotter Pin $\frac{1}{8}$ x 1	2
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
27	33-295	Pivot Bracket	2
	15-494	Nylon Flange Bushing (part of 33-295)	4
	18-036	Oilite Bushing (part of 33-295)	4
B	HSSQS-38-16-150	Stainless Steel Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2

15-493 STAINLESS STEEL BOOM DRAWING



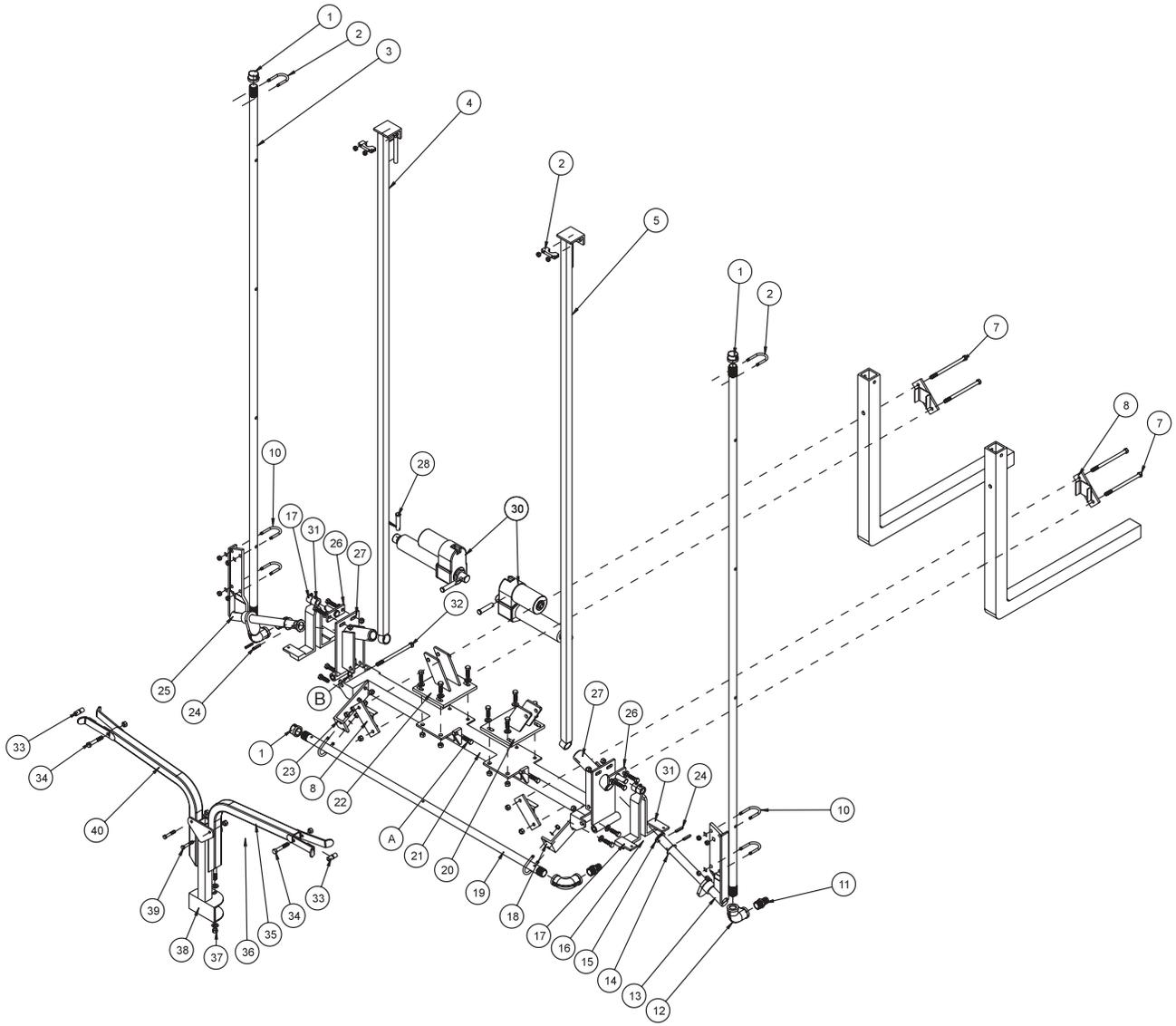
Accessories



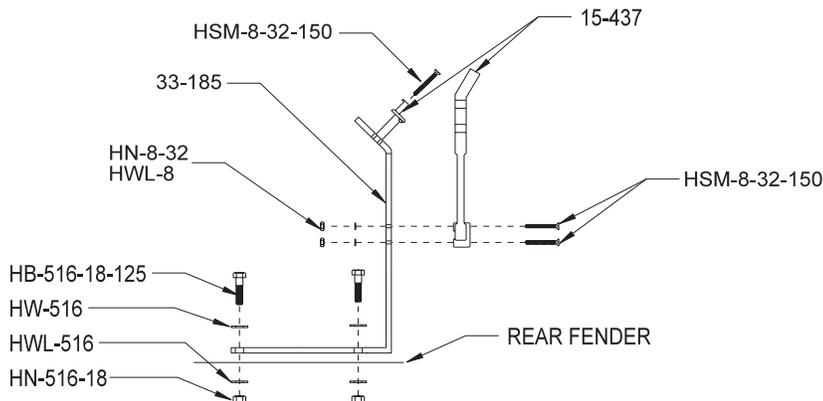
15-493 STAINLESS STEEL BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
28	HCPS-12-225	Stainless Steel Clevis Pin $1/2 \times 2 1/4$	4
	HPS-18-100	Stainless Steel Cotter Pin $1/8 \times 1$	4
30	11-158	Linear Actuator with 4" Stroke	2
31	33-307	Left Cam Stop (must also order 33-306)	2
	18-268	Oilite Bushing (part of 33-307)	2
32	HBS-12-13-550	Stainless Steel Bolt $1/2 - 13 \times 5 1/2$	2
	HNCL-12-13	Center Lock Nut $1/2 - 13$	2
33	18-289	Bushing $3/8$ ID - $1/2$ OD $\times 5/8$	4
34	HB-38-16-225	Bolt $3/8 - 16 \times 2 1/4$	2
	HNTL-38-16	Lock Nut $3/8 - 16$	2
35	10-247	Right Boom Stabilizer	1
36	21-212	Extension Spring	1
37	HB-38-16-300	Bolt $3/8 - 16 \times 3$	1
	HW-38	Washer $3/8$	2
	HNTL-38-16	Lock Nut $3/8 - 16$	1
38	10-162	Boom Support	1
39	HB-516-18-225	Bolt $5/16 - 18 \times 2 1/4$	2
	HNTL-516-18	Lock Nut $5/16 - 18$	2
40	10-246	Left Boom Stabilizer	1

15-493 STAINLESS STEEL BOOM DRAWING



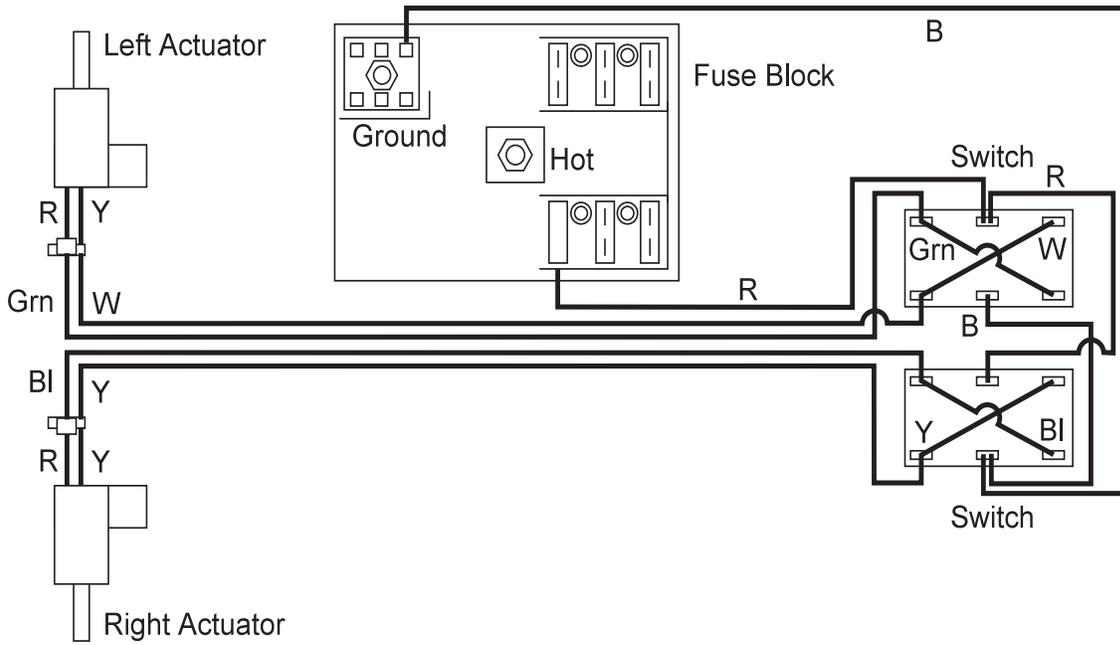
BOOM CARRIER DRAWING



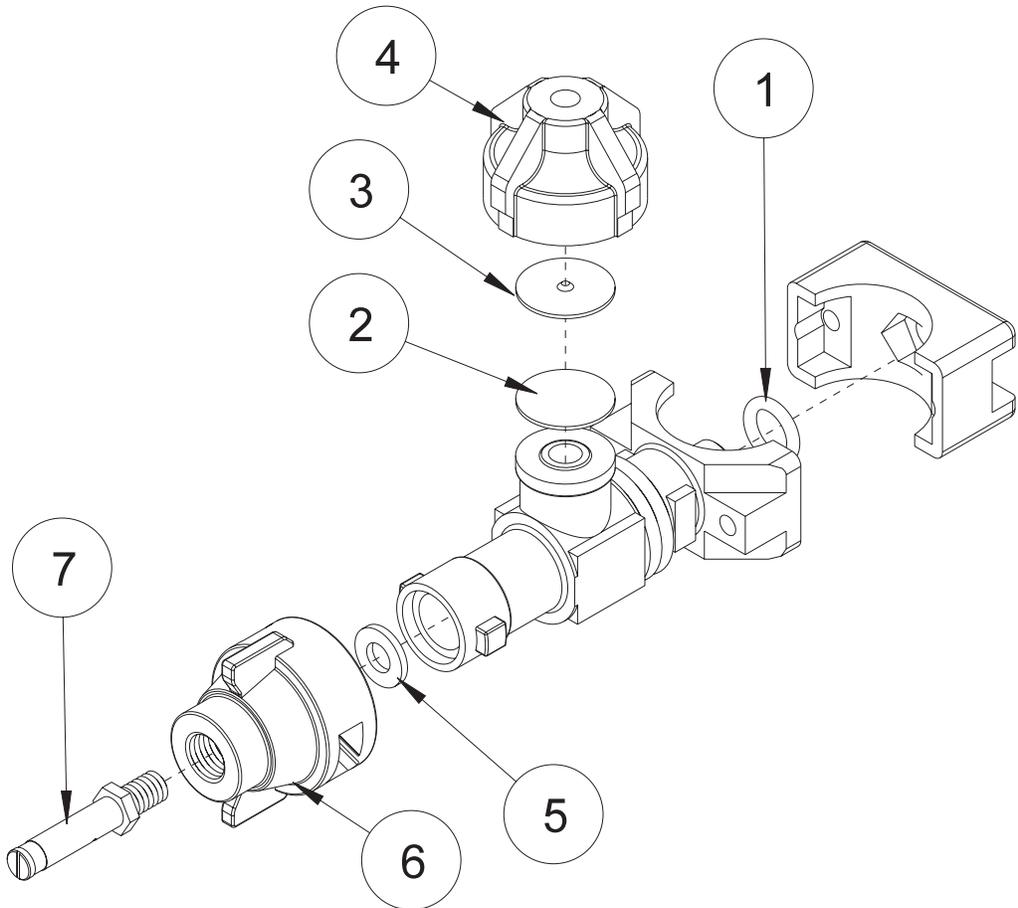
For best results use Teflon® tape on all fittings.

1. The three boom assemblies are not on the packing list but are in carton. The long boom assemblies are the right and left booms. The labels are located on right and left pivot brackets (Ref 13 and 25). The small boom assembly is the center boom. You can NOT order these boom assemblies as one unit. Please refer to parts drawing for individual parts.
2. Mount small boom assembly to rear upright support on sprayer using four boom brackets (Ref 8), four bolts, $\frac{3}{8}$ - 16 x $5\frac{1}{2}$ and four lock nuts, $\frac{3}{8}$ - 16 (Ref 7). One boom bracket should go on boom assembly and one on upright support of sprayer. Do the same for right and left side. Place boom at desired level (approximately 20" (51 cm) nozzle height) and center. Tighten bolts.
3. Put the actuator brackets (Ref 20 and 22) on the center mount (Ref 21) using $\frac{3}{8}$ - 16 x $1\frac{1}{4}$ bolts, washers and lock nuts, with washers over the slots. Snug up the bolts so that you can adjust actuator brackets with the set screws (Ref A) on the center mount after booms have been mounted.
4. Take right boom and slide pivot bracket (Ref 27) in center mount (Ref 21) and hold in place with $\frac{1}{2}$ - 13 x $5\frac{1}{2}$ bolt and $\frac{1}{2}$ - 13 center lock nut (Ref 32). Do not over tighten, boom must be able to move up and down. Repeat for left boom.
5. Mount actuator (Ref 30) fixed end to actuator bracket and ram end to pivot bracket using $\frac{1}{2}$ x $2\frac{1}{4}$ clevis pins and $\frac{1}{8}$ x 1 cotter pins (Ref 28). It may be necessary to lift boom slightly for proper fit. Repeat process for other boom.
6. Hook hoses to respective fittings using hose clamps (18-040). The hose coming from right side of sprayer goes to straight fitting on right boom. Center hose from sprayer goes to straight fitting on center boom. The left hose from sprayer goes to straight fitting on left boom. Be sure all clamps are tight.
7. Connect wire harness to actuator. Use two nylon ties (22-075) to hold wire to fixed end of actuators.
8. Use boom switches to completely extend actuator and lower booms.
19. Using set screws (Ref A) adjust actuator brackets so nozzles of booms are at same height with nozzles of center section. Tighten bolts holding actuator brackets to center mount and locknuts on set screws.
10. Make certain set screws (B) on both sides are completely screwed in. Raise booms with boom switches all the way up, adjust set screws (A) so they contact the stop.
11. To install boom carriers (33-185) and latch (15-437) see diagram. The boom holders should point upward and latch pointing outward. Use 8 - 32 x $1\frac{1}{2}$ machine screws, nuts and washers to install latch to boom carriers.
12. To put booms into boom carriers, booms must be down. Push booms towards front of machine and lift boom slightly to clear fenders. Disconnect latch and put it over brush guard and reconnect.

BOOM WIRING DIAGRAM



NOZZLE ASSEMBLY



Accessories

BOOM WIRING DIAGRAM

PART#	DESCRIPTION	QUANTITY
PART#	DESCRIPTION	QUANTITY
8853	Female Spade Connectors	2
15-472	Switch Boot	2
11-158	Linear Actuator with 4" stroke	2
16-755	Switch	2
16-810	Wiring Harness (for Spray Star 1600)	1
33-190	Wiring Harness (for Spray Star 3000)	1
22-075	Nylon Tie	10
33-273	Fuse 30 amp	1

Use Dielectric Grease On All Electrical Connections

NOZZLE ASSEMBLY

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

NOTE:

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

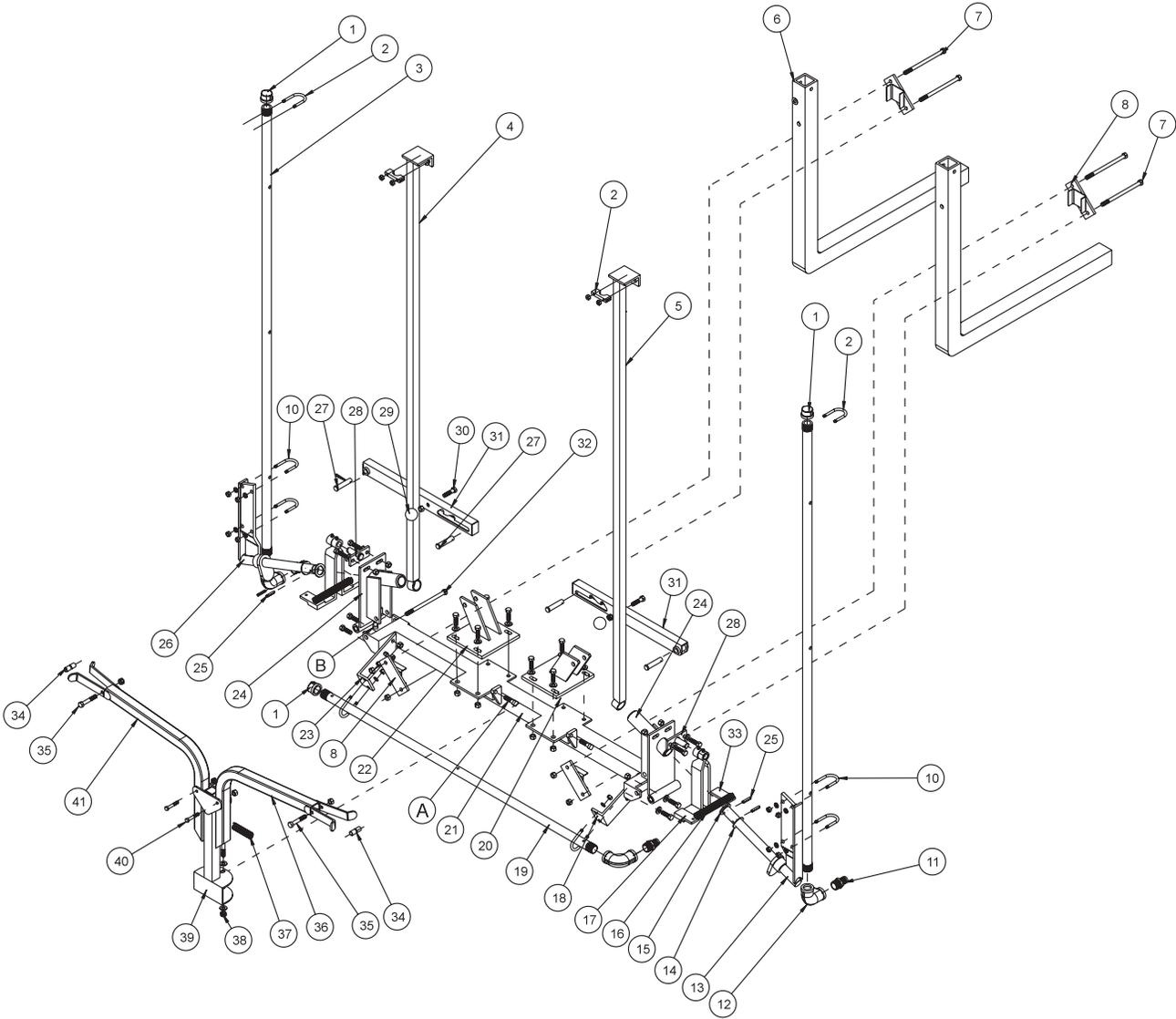
NOTE:

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

NOTE:

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

15-577 STAINLESS STEEL 18' MANUAL BOOM DRAWING



Accessories

15-577 STAINLESS STEEL 18' MANUAL BOOM PARTS LIST

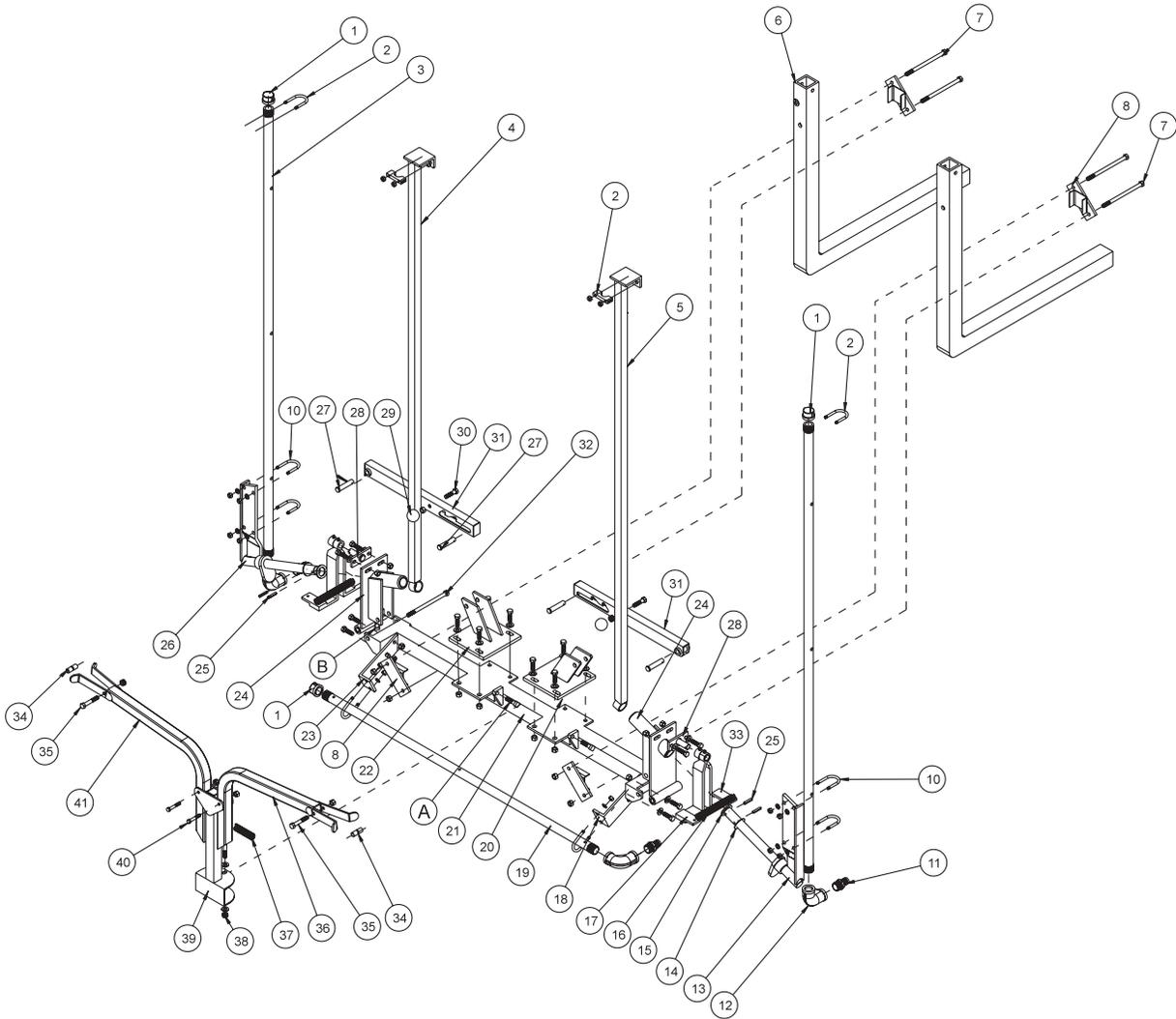
REF#	PART#	DESCRIPTION	QUANTITY
1	16-926	Stainless Steel Cap $\frac{3}{4}$	3
2	13-498	U-Bolt Kit $1\frac{1}{8}$	2
3	16-928	Right and Left Boom Tube	2
4	33-333	Left Brush Guard	1
5	33-332	Right Brush Guard	1
6		Boom Carrier (part of the truck)	
7	HBS-38-16-550	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $5\frac{1}{2}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
8	16-761	Boom Brackets	4
10	16-024	U-Bolt $\frac{5}{16}$ - 24	6
	HWLS-516	Stainless Steel Lockwasher $\frac{5}{16}$	12
	HNS-516-24	Stainless Steel Nut $\frac{5}{16}$ - 24	12
11	18-249	Barb Fitting	3
	18-040	Hose Clamp	3
12	16-925	Stainless Steel Pipe Elbow $\frac{3}{4}$ x 90°	3
13	33-301	Right Pivot Bracket	1
14	HMB-100-14	Machine Bushing 1 x 14GA	4
15	HMB-100-10	Machine Bushing 1 x 10GA	2
16	15-495	Extension Spring	2
17	33-306	Right Cam Stop (must also order 33-307)	2
	18-268	Oilite Bushing (part of 33-306)	2
18	33-308	Right, Center Tube Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
19	16-927	Center Tube	1
20	33-330	Right Actuator Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
21	33-329	Center Mount	1
A	HSSQS-38-16-150	Stainless Steel Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$ (part of 33-329)	2
	HN-38-16	Nut $\frac{3}{8}$ - 16 (part of 33-329)	2
22	33-331	Left Actuator Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
23	33-309	Left Center Tube Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
24	33-295	Pivot Bracket	2
	15-494	Nylon Flange Bushing (part of 33-295)	4
	18-036	Oilite Bushing (part of 33-295)	4
B	HSSQS-38-16-150	Stainless Steel Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2
25	HRPS-14-150	Stainless Steel Roll Pin $\frac{1}{4}$ x $1\frac{1}{2}$	4
26	33-302	Left Pivot Bracket	1
27	HCPS-12-225	Stainless Steel Clevis Pin $\frac{1}{2}$ x $2\frac{1}{4}$	4
	HPS-18-100	Stainless Steel Cotter Pin $\frac{1}{8}$ x 1	4

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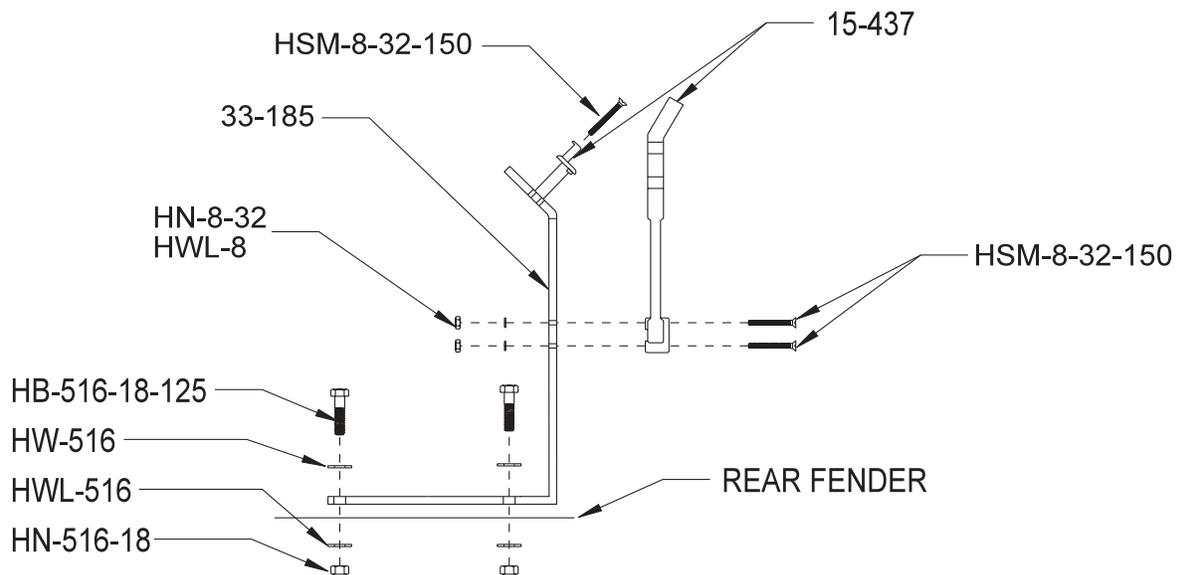
15-577 STAINLESS STEEL 18' MANUAL BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
28	33-305	Pivot	2
	HMB-58-14	Machine Bushing $\frac{5}{8}$ x 14GA	8
	HPS-18-100	Stainless Steel Cotter Pin $\frac{1}{8}$ x 1	2
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
29	15-014	Shift Knob	2
30	HB-38-16-175	Bolt $\frac{3}{8}$ - 16 x $1\frac{3}{4}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2
31	15-561	Boom Lift	2
32	HBS-12-13-550	Stainless Steel Bolt $\frac{1}{2}$ - 13 x $5\frac{1}{2}$	2
	HNCL-12-13	Center Lock Nut $\frac{1}{2}$ - 13	2
33	33-307	Left Cam Stop (must also order 33-306)	2
	18-268	Oilite Bushing (part of 33-307)	2
34	18-289	Bushing $\frac{3}{8}$ ID - $\frac{1}{2}$ OD x $\frac{5}{8}$	4
35	HB-38-16-225	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{4}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
36	10-247	Right Boom Stabilizer	1
37	21-212	Extension Spring	1
38	HB-38-16-300	Bolt $\frac{3}{8}$ - 16 x 3	1
	HW-38	Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	1
39	10-162	Boom Support	1
40	HB-516-18-225	Bolt $\frac{5}{16}$ - 18 x $2\frac{1}{4}$	2
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	2
41	10-246	Left Boom Stabilizer	1

15-577 STAINLESS STEEL 18' MANUAL BOOM DRAWING



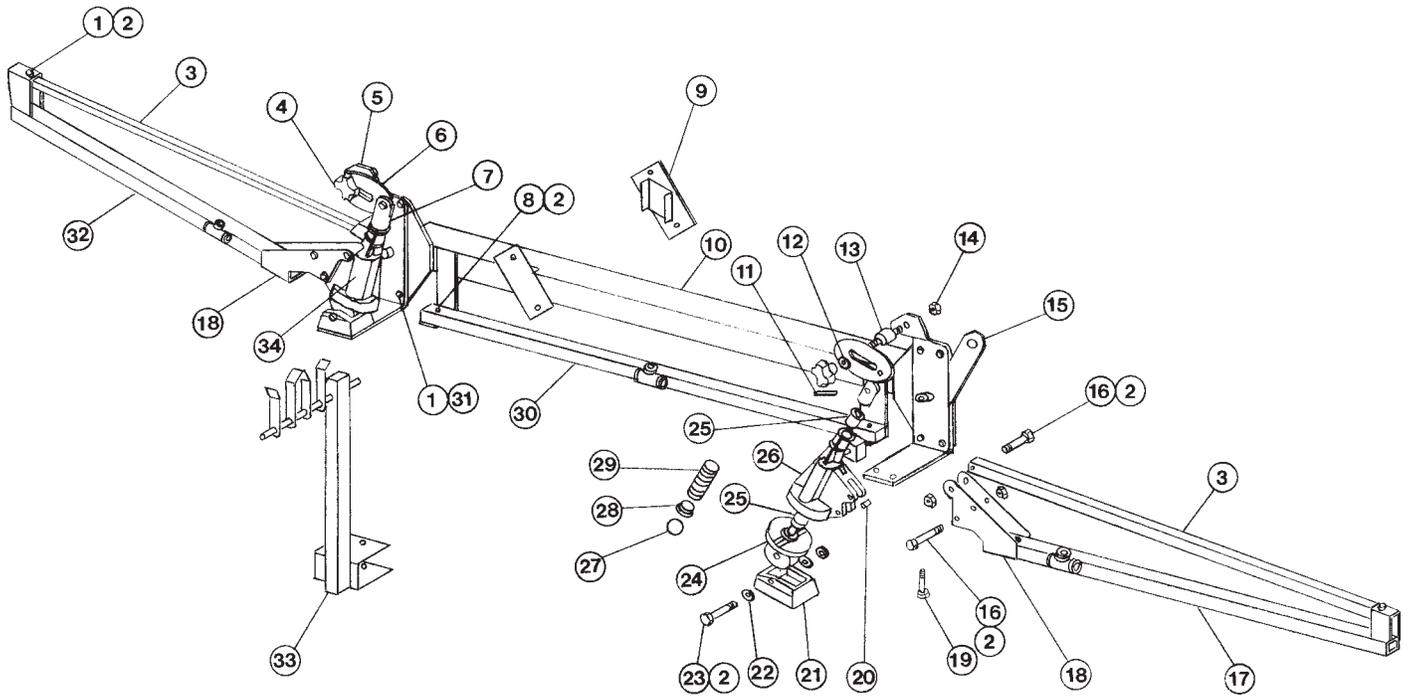
BOOM CARRIER DRAWING FOR SPRAY STAR 1600 AND 3000



For best result use Teflon® tape on all fittings.

1. The three boom assemblies are not on the packing list but are in the carton. The long boom assemblies are the right and left booms. The labels are located on the pivot brackets (Ref 13 and 26). The small boom assembly is the center boom. Each assembly is shipped with the nozzle bodies (16-996) attached. The remainder part of the nozzles need to be installed. You can NOT order these boom assemblies as one unit. Please refer to parts drawing for individual parts.
2. Mount small boom assembly to the boom carriers on sprayer using four boom brackets (Ref 8), four bolts, $\frac{3}{8}$ - 16 x 5 $\frac{1}{2}$ and four lock nuts, $\frac{3}{8}$ - 16 (Ref 7). One boom bracket should go on boom assembly and one on boom carrier. Do the same for right and left side. Place boom at desired level (approximately 20" (51 cm) nozzle height) and center. Tighten bolts.
3. Put the actuator brackets (Ref 20 and 22) on the center mount (Ref 21) using $\frac{3}{8}$ - 16 x 1 $\frac{1}{4}$ bolts, washers and lock nuts, with washers over the slots. Snug up the bolts so that you can adjust actuator brackets with the set screws (Ref A) on the center mount after booms have been mounted.
4. Take right boom and slide pivot bracket (Ref 24) in center mount (Ref 21) and hold in place with $\frac{1}{2}$ - 13 x 5 $\frac{1}{2}$ bolt and $\frac{1}{2}$ - 13 center lock nut (Ref 32). Do not over tighten, boom must be able to move up and down. Repeat for left boom.
5. Install boom lifts (Ref 31) using clevis pin and cotter pin (Ref 27) so the bushing end hooks to the pivot bracket (Ref 24) and the slotted end hooks to the actuator bracket (Ref 20 and 22).
6. Hook hoses to respective fittings using hose clamps (18-040). The hose coming from right side of sprayer goes to straight fitting on right boom. Center hose from sprayer goes to straight fitting on center boom. The left hose from sprayer goes to straight fitting on left boom. Be sure all clamps are tight.
7. Use the adjustment slots on the boom lifts to completely lift and lower booms.
8. Using set screws (Ref A) adjust actuator brackets so nozzles of booms are at same height with nozzles of center section. Tighten bolts holding actuator brackets to center mount and locknuts on set screws.
9. To install boom carriers (33-185) and latch (15-437) see drawing. The boom holders should point upward and latch pointing outward. Use 8 - 32 x 1 $\frac{1}{2}$ machine screws, nuts and washers to install latch to boom carriers.
10. To put booms into boom carriers, booms must be down. Push booms towards front of machine and lift boom slightly to clear fenders. Disconnect latch and put it over brush guard and reconnect.
12. Put the viton gaskets (16-800), Raindrop tips (16-805) and quick TeeJet caps (16-921) on the nozzle bodies (16-996) on the three boom sections.
13. Make certain set screws (B) on both sides are completely screwed in and locked with the lock nut.

14-100 BOOM DRAWING



14-100 BOOM INSTALLATION INSTRUCTIONS

1. Lay out all parts in an orderly manner.
2. Attach the Boom frame to the two vertical posts at the rear of the Spray Star vehicle using four (Ref# 9) Boom brackets on the mounting posts. DO NOT tighten the large clamps at this point.

If nozzle bodies are factory installed, attach the right outer boom and hinge assembly and the left outer boom and hinge assembly to the center boom assembly using items in boom drawing, (Ref# 19) Bolts and (Ref# 4) Knobs. Tighten the bolts securely and knob loosely. Level the outer right and left boom sections with the center section. Tighten the (Ref# 4) Knobs. Nozzles on the outer boom assemblies are to be towards the rear and match the position of the nozzles on the center boom.

3. If nozzle bodies are not installed go to the plumbing and nozzle kit page for your type of nozzle kit
4. Connect the three $\frac{3}{4}$ " orange supply hose which comes from the electric boom control valve, to the $\frac{3}{4}$ " hose barb inlet in the steel tees on each boom section. Take care to insure the right-center-left boom sections are correctly connected to the supply hoses from the right-center-left control valves. Secure with hose clamp.

Both the 16-806 and the 16-807 nozzle kits are furnished with average size nozzles. The user should never hesitate to change nozzle sizes to achieve the desired spray application rate. See nozzle charts included.

The nozzles in both the 16-806 and the 16-807 nozzle kits may be replaced with Spraying Systems Co. "FULLJET" and "FLOODJET" nozzles. Consult Spraying Systems Co. catalog for more information.

14-100 BOOM PARTSLIST

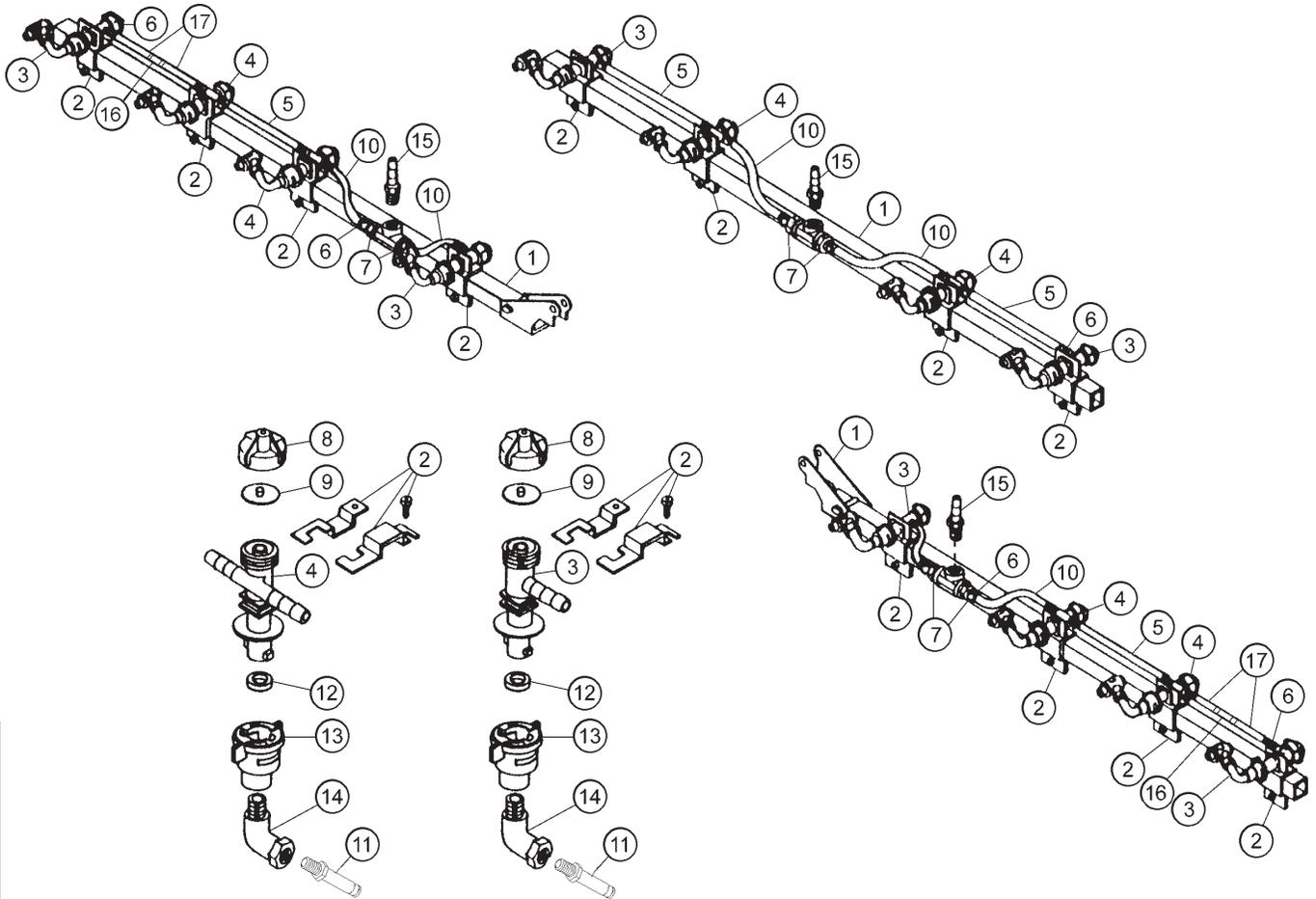
REF#	PART#	DESCRIPTION	QUANTITY
1	HBM-8-25	Bolt, M8 x 25	10
2	HNM-8	Nut, M8	18
3	16-770	Arm Tie Bar	2
4	16-775	Knob	2
5	16-790	Hinge Bracket, Left	1
	10-025	Flange Bushing, $\frac{3}{4}$	1
6	16-774	Plate	2
7	16-782	Yoke	2
8	HBM-8-45	Bolt, M8 x 45	2
9	16-761	Boom Bracket	4
	HB-38-16-550	Bolt, $\frac{3}{8}$ - 16 x $5\frac{1}{2}$	4
	HWL-38	Lockwasher, $\frac{3}{8}$	4
	HN-38-16	Nut, $\frac{3}{8}$ - 16	4
10	16-791	Boom Frame	1
11	16-784	Pin, D10 x 35	2
12	HW-12	Flat Washer, $\frac{1}{2}$	4
13	16-773	Stud, M12	2
14	HNTLM-1 2	Top Lock Nut, M12	2
15	16-789	Hinge Bracket, Right	1
	10-025	Flange Bushing, $\frac{3}{4}$	1
16	HBM-8-50	Bolt, M8 x 50	12
17	16-793	Side Boom, Right	1
18	16-788	Boom Arm Yoke	2
19	HBM-10-25	Bolt, M10 x 25	4
20	16-787	Spacer	2
21	16-786	Hinge Base	4
22	HW-516	Flat Washer $\frac{5}{16}$	8
23	HBM-8-60	Bolt, M8 x 60	2
24	16-785	Aluminum Ball Bearing	2
25	16-781	Boom Washer	4
26	16-783	Yoke Support	2
27	16-780	1" Hinge Ball, D 25.4	2
28	16-779	Spring/ball Retainer	2
29	16-778	Spring	2
30	16-792	Center Boom	1
31	HNTLM-8	Top Lock Nut, M8	8
32	16-794	Side Boom, Left	1
33	16-212	Boom Arm Support Bracket	1
	HB-38-16-350	Bolt, $\frac{3}{8}$ - 16 x $3\frac{1}{2}$	1
	HNCL-38-16	Center Lock Nut, $\frac{3}{8}$ - 16	1
34	16-914	Hinge Assembly	2

14-100 6 Meter Boom includes the 16-807 Nozzle Kit (Raindrop Tips)

14-101 6 Meter Boom includes the 16-806 Nozzle Kit (Teejet Tips)



14-100 PLUMBING & 16-807 NOZZLE KIT DRAWING (TURBO TURFJET TIPS)



Accessories

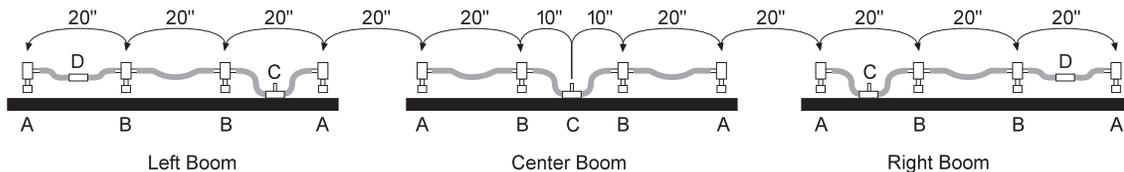
14-100 PLUMBING & 16-807 NOZZLE KIT PARTS LIST (TURBO TURFJET TIPS)

REF#	PART#	DESCRIPTION	QUANTITY
1	14-100	Boom	1
2	16-795	Square clamp, 1	12
3	16-796	Diaphragm Check Valve, Single (complete with 8 & 9)	6
4	16-797	Diaphragm Check Valve, Double (complete with 8 & 9)	6
5	8888-19	Orange PVC Hose, 1/2"	4
6	18-224	Hose Clamp, 1/2"	28
7	16-137	Fitting, 1/2 MPT x 1/2 HB	6
8	16-798	End Cap	12
9	16-960-06	Diaphragm	12
10	8888-8	Orange PVC Hose, 1/2"	6
11*	15-588	Turbo TurfJet Tips	12
12*	16-800	Gasket	12
13*	16-921	Quick Teejet Cap 1/4" FPT	12
14*	16-199	45° Street Elbow 1/4" PT	12
15	16-135	Fitting, 1/2 MPT x 3/4 HB	3
	18-077	Hose Clamp	3
16	16-200	Ball Valve, 1/4 FPT	2
	16-136	Fitting, 1/4 MPT x 1/2 HB	4
17	8888-9	Orange PVC Hose, 1/2"	4
*	16-807	Nozzle Kit	12 each

NOZZLE KIT INSTALLATION (TURBO TURFJET TIPS)

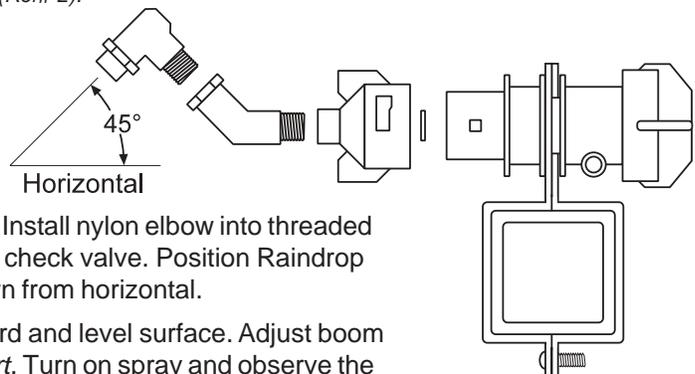
All measurements are done from the fitting on center boom with booms in-line. Nozzles are exactly 20" apart.

1. Install check valves (A and B) above the square tubing and pointing to the rear.



- A. Single Ended Check Valve (Ref# 3) and Clamp (Ref# 2), install with fitting toward middle of boom.
- B. Double Ended Check Valve (Ref# 4) and Clamp (Ref# 2).
- C. Fitting (Ref# 17)
- D. Ball Valve and Fitting (Ref# 15)

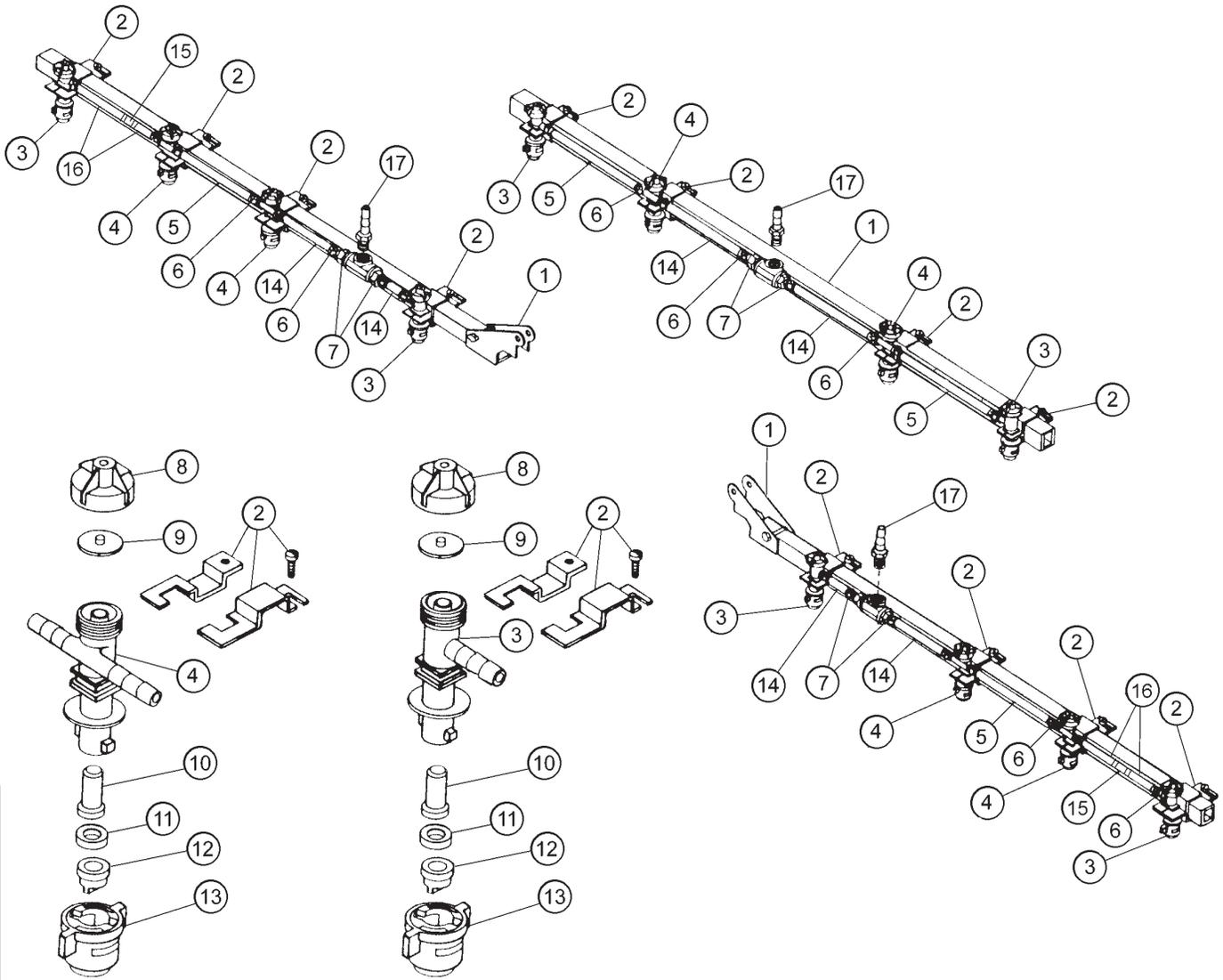
2. Place ball valve (D) between the outer check valves on both right and left booms. Connect the check valves together using the 1/2" hose and hose clamps.



3. Install Raindrop nozzles into nylon 45° elbow. Install nylon elbow into threaded quickjet caps. Attach caps and gaskets to the check valve. Position Raindrop nozzles so they point to the rear, and 45° down from horizontal.
4. Fill the tank 1/2 full of water. Place unit on a hard and level surface. Adjust boom height according to the *Nozzle Selection Chart*. Turn on spray and observe the amount of overlapping spray between adjoining nozzles. There should be 100% overlap. The edge of the spray from one nozzle should reach to the center of the adjoining nozzle. If required, adjust boom height until the correct overlap is achieved.

Strainers are not supplied with Raindrop nozzles. Use 50 mesh slotted strainers (16-802) on nozzle tips smaller than standard.

14-101 PLUMBING & 709-420 NOZZLE KIT PARTS DRAWING (TEEJET TIPS)



Accessories

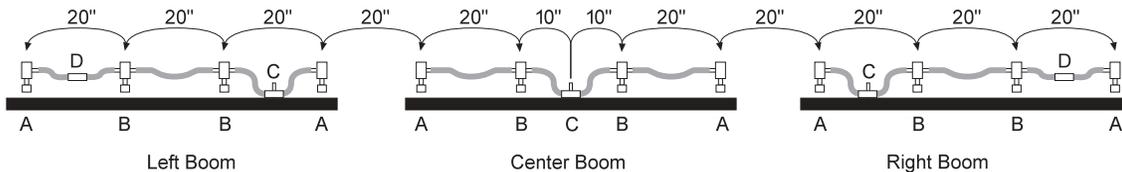
14-101 PLUMBING & 709-420 NOZZLE KIT PARTS LIST (TEEJET TIPS)

REF#	PART#	DESCRIPTION	QUANTITY
1	14-101	Boom	1
2	16-795	Square Clamp, 1	12
3	16-796	Diaphragm Check Valve, Single (includes 8 & 9)	6
4	16-797	Diaphragm Check Valve, Double (includes 8 & 9)	6
5	8888-19	Orange PVC Hose, 1/2"	4
6	18-224	Hose Clamp	28
7	16-137	Fitting, 1/2 MPT x 1/2 HB	6
8	16-798	End Cap	12
9	16-960-06	Diaphragm	12
10*	16-802	Strainer	12
11*	16-800	Gasket	12
12*	16-803	Teejet Tip, XR8004, Standard (all sizes available)	12
13*	16-804	Quick Teejet Cap (white)	12
14	8888-8	Orange PVC hose, 1/2"	6
15	16-200	Ball Valve, 1/4 FPT	2
	16-136	Fitting, 1/4 MPT x 1/2 HB	4
16	8888-9	Orange PVC Hose, 1/2"	4
17	16-135	Fitting, 1/2 MPT x 3/4 HB	3
	18-077	Hose Clamp	3
*	709-420	Nozzle Kit	12 each

14-101 PLUMBING & 709-420 NOZZLE KIT INSTALLATION (TEEJET TIPS)

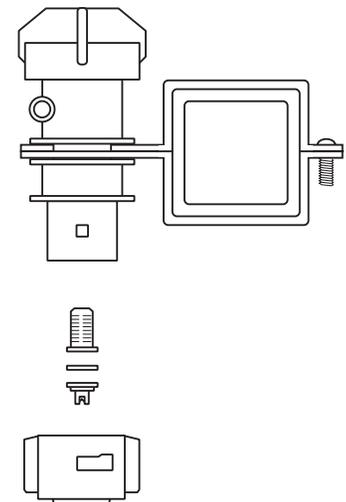
All measurements are done from the fitting on center boom with booms in-line. Nozzles are exactly 20" apart.

1. Install check valves (A and B) behind the square tubing and pointing down.



- A. Single Ended Check Valve (Ref# 3) and Clamp (Ref# 2), install with fitting toward middle of boom.
- B. Double Ended Check Valve (Ref# 4) and Clamp (Ref# 2).
- C. Fitting (Ref# 17)
- D. Ball Valve and Fitting (Ref# 15)

2. Install strainer, gasket, nozzles into cap and connect to the check valve. Strainers may be omitted if #XR8008, 8010, 8015 or 8020 nozzle tips are used.
3. Place ball valve (D) between the outer check valves on both right and left booms. Connect the check valves together using the 1/2" hose and hose clamps.
4. Fill the tank 1/2 full of water. Place unit on a hard and level surface. Adjust boom height according to the *Nozzle Selection Chart*. Turn on spray and observe the amount of overlapping spray between adjoining nozzles. There should be 30% overlap. The edge of the spray from one nozzle should reach approximate 1/3 of the way to the next nozzle. If required, adjust boom height until the correct overlap is achieved.



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%

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".

14-283 FOAM MARKER FOR 3000 PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	33-533	Right Tank Bracket	1
2	33-053	Right Side Panel Frame	1
3	33-107	Right Side Panel	1
A*	14-284-03	Compressor Only	1
	14-284-01	Black Cover	1
B*	14-284-06	Switch Box	1
C*	14-284-07	Foamer Tank	1
D*	14-284-02	Cap Assembly	1
E*		Blue Tube	1
F*		Clear Tube	1
G*	10-222	Extension Wire	1
H*	14-284-04	Tank Carrier	1
	HB-14-20-100	Bolt $\frac{1}{4}$ - 20 x 1	4
	HNFL-14-20	Flange Whiz Lock Nut $\frac{1}{4}$ - 20	4
*	14-284	Foam Marker (includes all * items)	

INSTALLATION INSTRUCTIONS

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

1. Remove original mounting bracket from switch box and discard.
2. To mount the switch box (Ref 1) place the switch box bracket next to the holes in the side panel. Use the bolts that come with the foam marker to mount control box.
3. Using the four $\frac{1}{4}$ bolts, bolt the foamer to the right side floorboard.
4. Use the extension wire (10-222) to connect the compressor to the switch box.

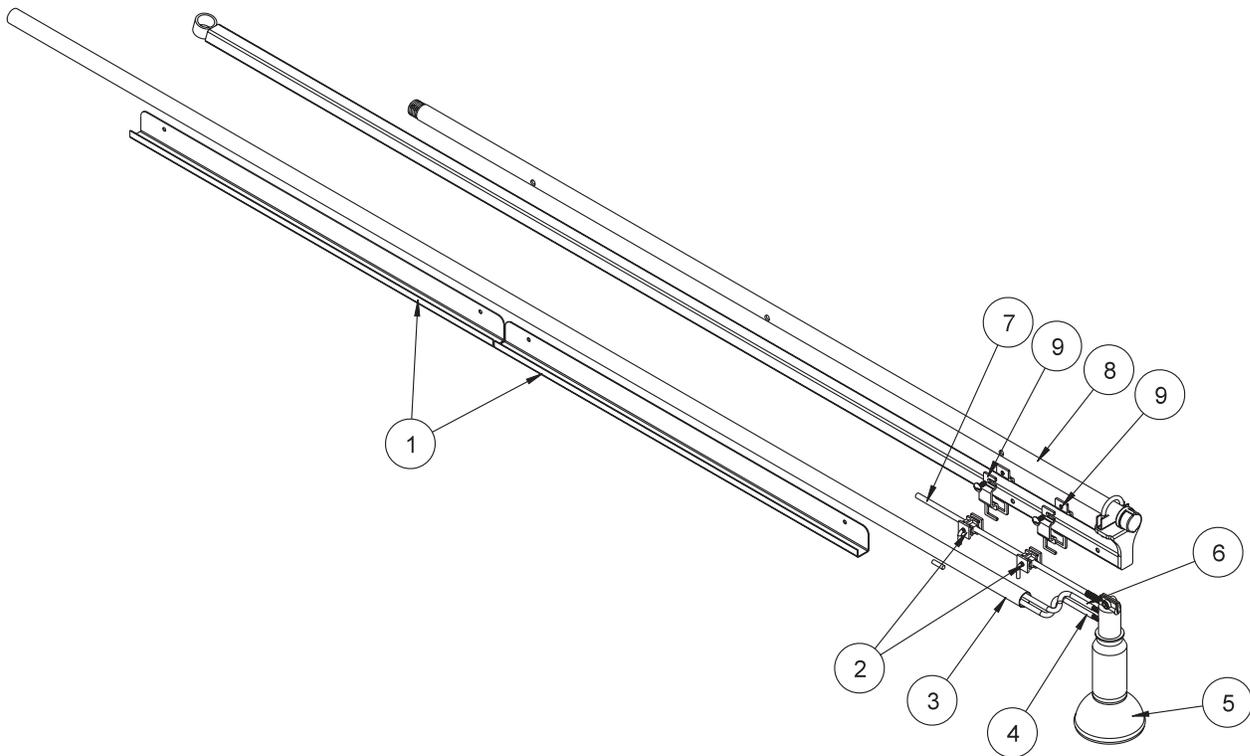
WIRING

Use dielectric grease on all electrical connections. Connect extension wire (10-222) 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.

FOAM MARKER WIRING PARTS LIST

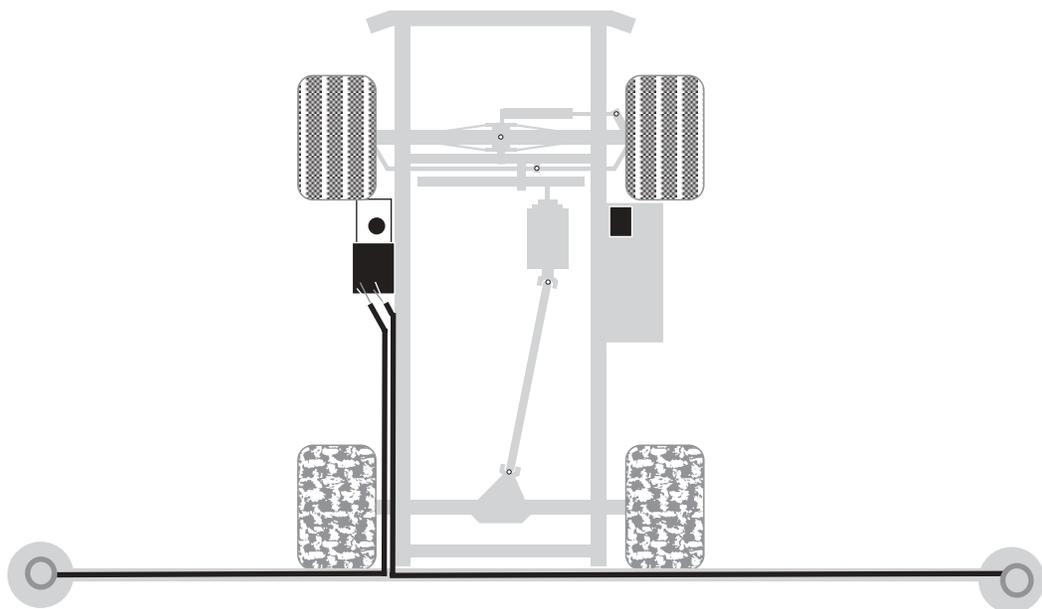
REF#	PART#	DESCRIPTION	QUANTITY
1	14-284-03	Compressor	1
2	15-504-04	Wiring Harness	1
3	10-222	Extension Wire	1
4	14-284-06	Switch Box	1
	15-506-01	Fuse (F10A 250V)	1
	15-506-02	Switch	1
5	15-509	Power Cable	1
6	33-271	Fuse Block (part of machine)	1
	33-507	Auto Blade Type Fuse 10 amp	1

FOAMER NOZZLE MOUNT & HOSE GUARD MOUNT DRAWING



TUBING ROUTE

Accessories



15-499 FOAM MARKER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-537	Foamer Hose Guard 31"	2
	10-256	Foamer Hose Guard 16"	2
	HSDPS-14-075	Stainless Steel Pan Head Drill Screw $\frac{1}{4} \times \frac{3}{4}$	8
2	16-987	Foam Nozzle Mounting Kit	1 per boom
3	15-507	Foamer Tubing	2
4		Clear Tubing	
5	15-511	Foam Nozzle	2
6		Blue Tubing	
7	15-510-01	Nozzle Mounting Rod	2
8		Boom	
9	16-795	Square Clamp	4

INSTALLATION INSTRUCTIONS

- Slide hose clamp onto drop tube of foam nozzle and attach restrictor bell.
- Place splined end of Nozzle mounting rod (Ref 7) into top of foam nozzle (Ref 5). Tighten screw.
- Slide two foam nozzle mounts (Ref 2) onto the rod. Place square clamps (Ref 9) on foam nozzle mounts and mount the square clamps to the boom (Ref 8). Adjust foam nozzle mounts and clamps so nozzle assembly will clear end of boom. Tighten foam nozzle mounts and square clamps to prevent side to side movement. Do the same to the other side.
- Being careful not to cut the tubing (Ref 3), cut the oversleeve back approximately 2" (5 cm) to expose blue (Ref 6) and clear tubing (Ref 4).
- Remove blue wing nut from top connector of foam nozzle and slide it on the blue tube with the threads facing toward end of tube. Slide blue tube all the way over the top of the small tube on foam nozzle. Slide wing nut back to the threads and hand tighten. Follow the same steps for the clear tube and tube nut.
- Route the tubing along underside of main frame using tie downs as necessary.
- Install opposite ends of air-liquid tubes to compressor, again cutting back the oversleeve approximately 2" (5 cm) and inserting blue and clear tubes for the left boom section into the tubing connectors (Ref A) on the right side of compressor as far as possible.
- Follow the same steps for the right boom tubing. Notice the right boom is inserted into left side of compressor. To release tubing from compressor, hold black ring around tubing, and pull tube out.
- Hose's must be routed on bottom of the boom square tubing.
- Mark 6 inches in from inside edge of foamer nozzle mounting bracket on square boom tubing.
- Place hose guard (Ref 1) flush with top of square tubing with edge on previous mark. The channel covers hoses on the bottom of the square tubing.
- Install hose guard using 2 drill screws (you may want to drill a $\frac{3}{16}$ pilot hole first).
- Place another hose guard against first and install in same manner.
- Repeat process for other boom side.
- Connect small plastic electrical plug under compressor to electrical extension cable.
- For *Spray Star 1600* 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.

14-284 FOAM MARKER DRAWING

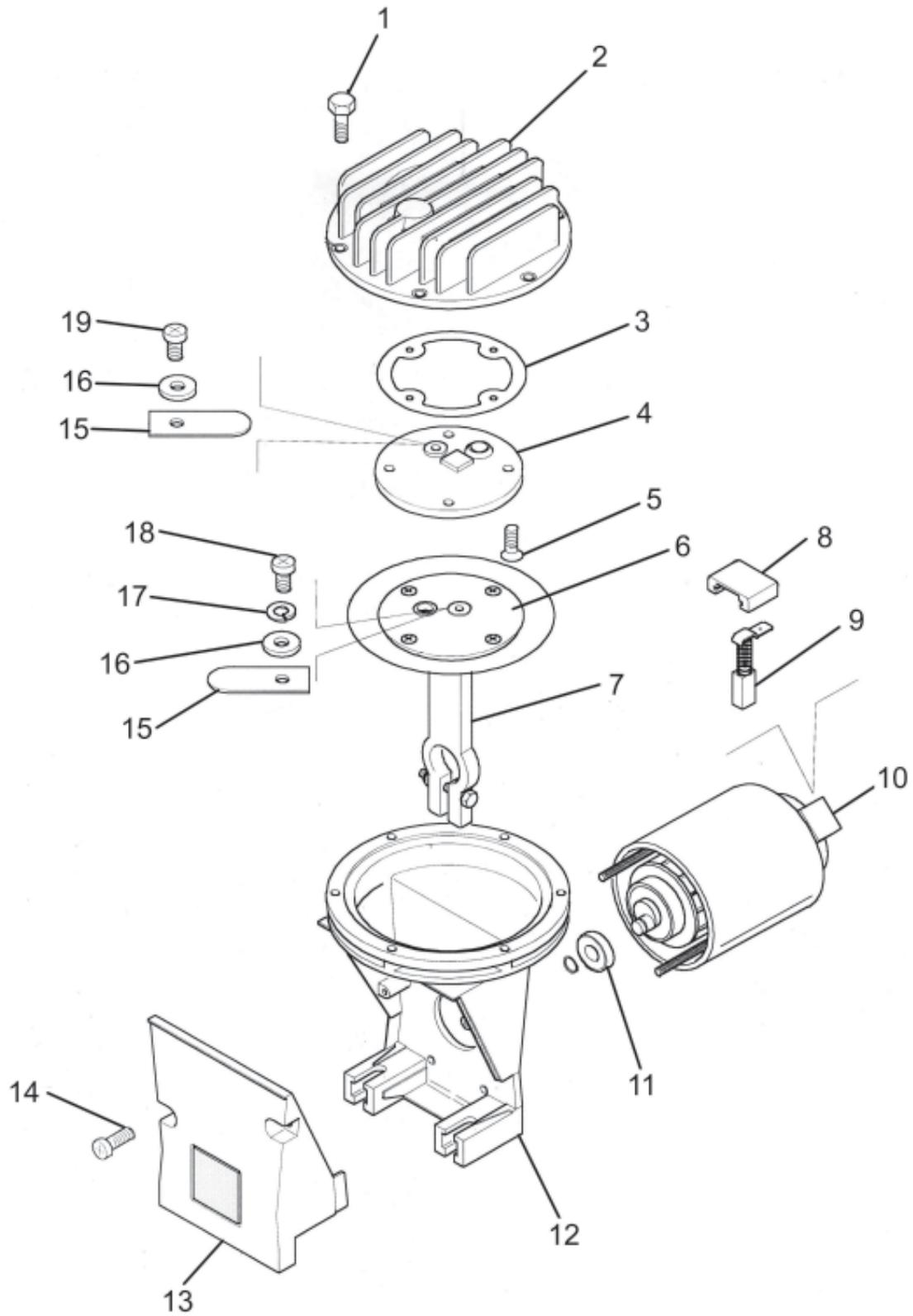


Accessories

14-284 FOAM MARKER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-507	Foamer Tubing	2
2	14-284-07	Tank	1
3	14-284-01	Black Cover	1
	14-284-03	Compressor	1
4	14-284-02	Cap Assembly	1
5	14-284-04	Tank Carrier	1
6	14-284-06	Switch Box	1
7	15-511	Foam Nozzle	1
8	15-510-01	Nozzle Mounting Rod	1
9	16-987	Foam Nozzle Mounting Kit	1

15-505 MOTOR SUB ASSEMBLY DRAWING

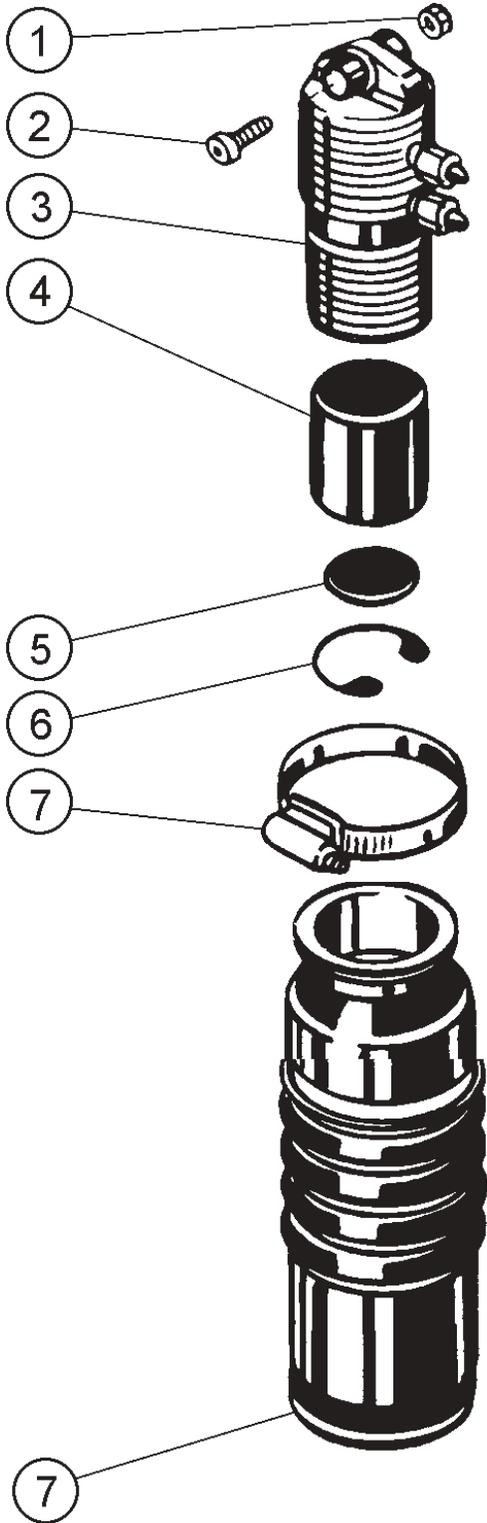


Accessories

15-505 MOTOR SUBASSEMBLY PARTS LIST

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

15-511 FOAM NOZZLE SUB ASSEMBLY DRAWING

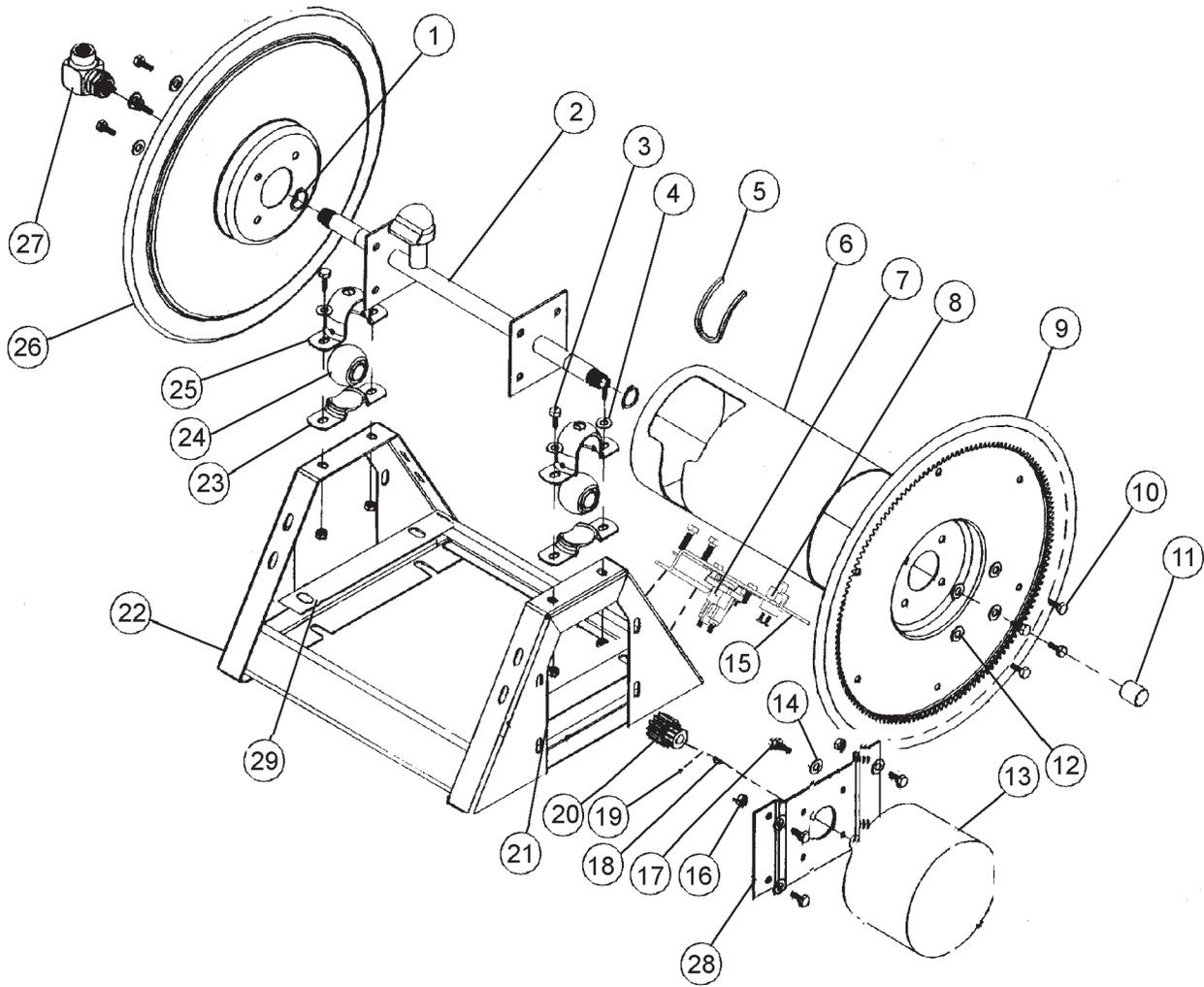


Accessories

15-511 FOAM NOZZLE SUB ASSEMBLY PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1†		Nut	1
2†		Screw	1
3†		Foam Nozzle Inlet Body	1
	15-510-01	Nozzle Mounting Rods	2
4*†	15-511-02	Foam Sponge	1
5*†		Stainless Steel Screen	1
6*†	15-511-04	Stainless Steel Snap Ring	1
7		Drop Tube	1
†	15-511-01	Foam Nozzle Inlet Sub Assembly	
*	15-511-06	Foam Kit (includes 2 each * items)	

16-906 ELECTRIC HOSE REEL DRAWING

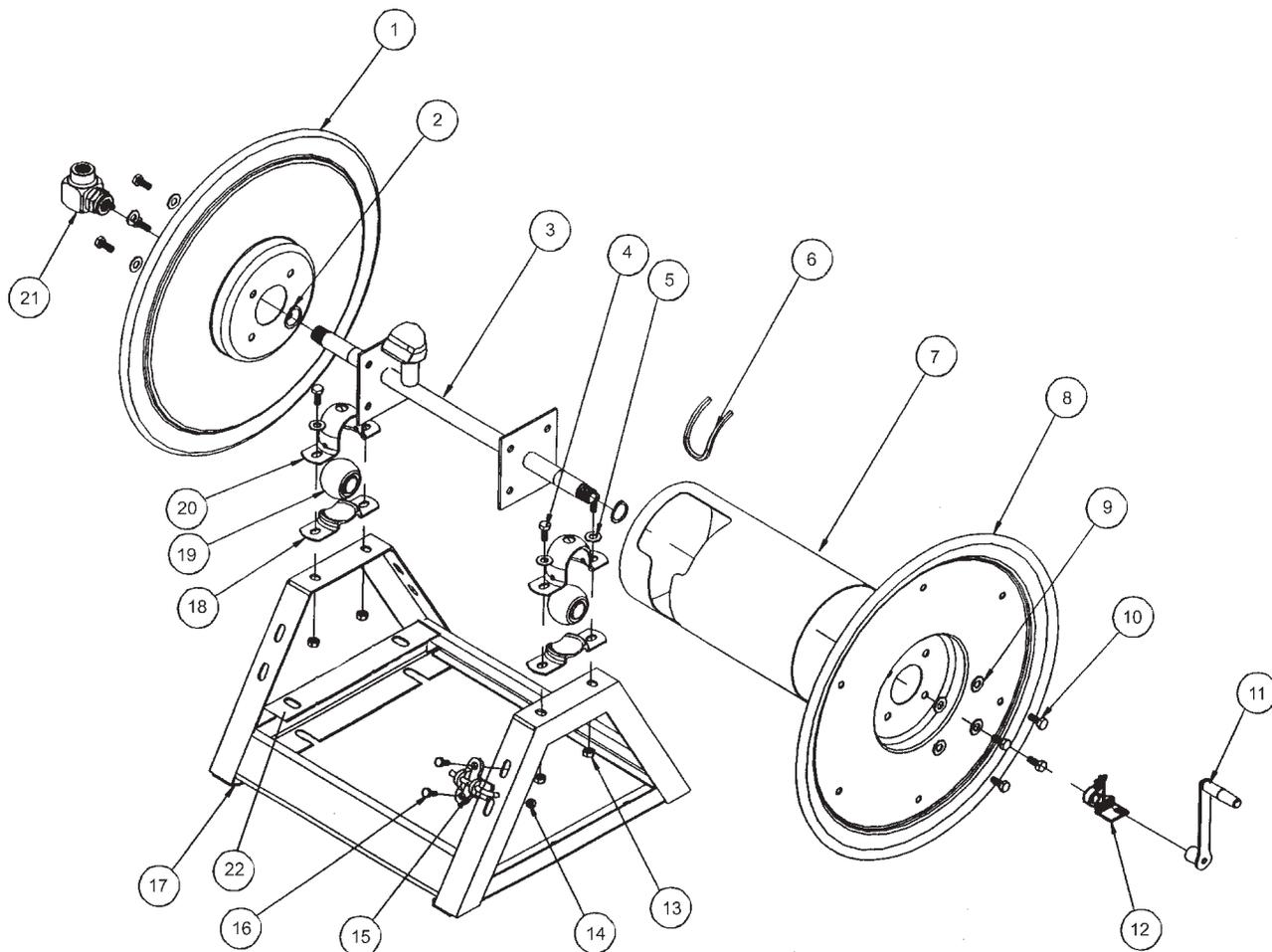


Accessories

16-906 ELECTRIC HOSE REEL PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-906-25	Retaining Ring	2
2	16-906-22	Axle Assembly	1
3	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	4
4	HW-38	Washer $\frac{3}{8}$	4
5	16-906-27	Trim, Drum Edge	1
6	16-906-21	Drum Center	1
7	12-015	Solenoid	1
	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HWL-14	Lockwasher $\frac{1}{4}$	2
	HN-14-20	Nut $\frac{1}{4}$ - 20	2
8	33-251	Switch	1
9	16-906-19	Disc and Gear Assembly	1
10	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	8
11	16-906-26	Pipe Cap $\frac{3}{4}$	1
12	HWL-516	Lockwasher $\frac{5}{16}$	8
13		Motor 12VDC	1
14	HW-516	Washer $\frac{5}{16}$	4
15	33-252	Switch and Solenoid Brkt	1
	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	2
	HW-516	Washer $\frac{5}{16}$	2
	HWL-516	Lockwasher $\frac{5}{16}$	2
	HN-516-18	Nut $\frac{5}{16}$ - 18	2
16	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
17	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	4
18	16-906-17	Key	1
19		Set Screw	2
20	16-906-29	Pinion	1
21	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
22	16-906-18	Frame Assembly	1
23	16-906-08	Mounting Pillow Block (Bottom)	2
24	16-906-24	Bearing	2
25	16-906-07	Mounting Pillow Block (Top)	2
26	16-906-20	Disc 17 $\frac{1}{2}$	1
27	16-906-23	Swivel Assembly $\frac{3}{4}$	1
	16-906-30	Seal Kit (For 16-906-23)	1
28	16-906-28	Bracket 12VDC	1
29	16-980	Mount Bracket	2
	HB-516-18-175	Bolt $\frac{5}{16}$ - 18 x 1 $\frac{3}{4}$	4
	HW-516	Washer $\frac{5}{16}$	4
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
	16-982	Electric Hose Reel (only)	1

16-129 MANUAL HOSE REEL DRAWING

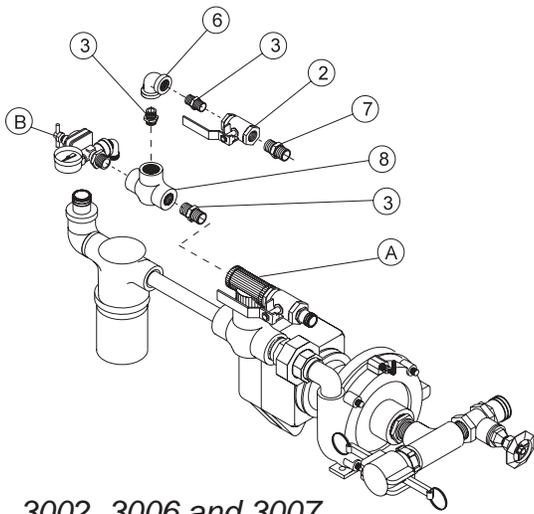


Accessories

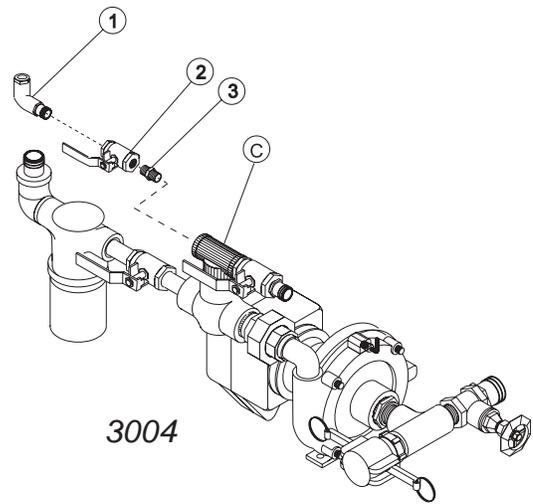
16-129 HOSE MANUAL REEL PARTS LIST

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

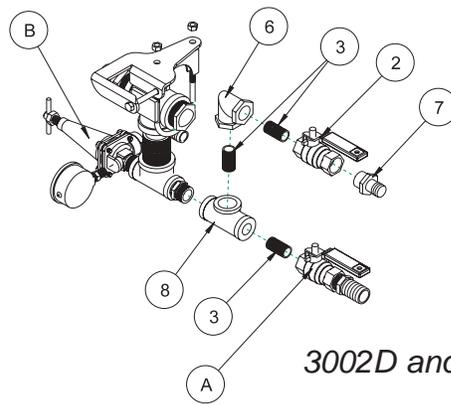
SPRAY STAR 3000 HOSE REEL PLUMBING DRAWING



3002, 3006 and 3007



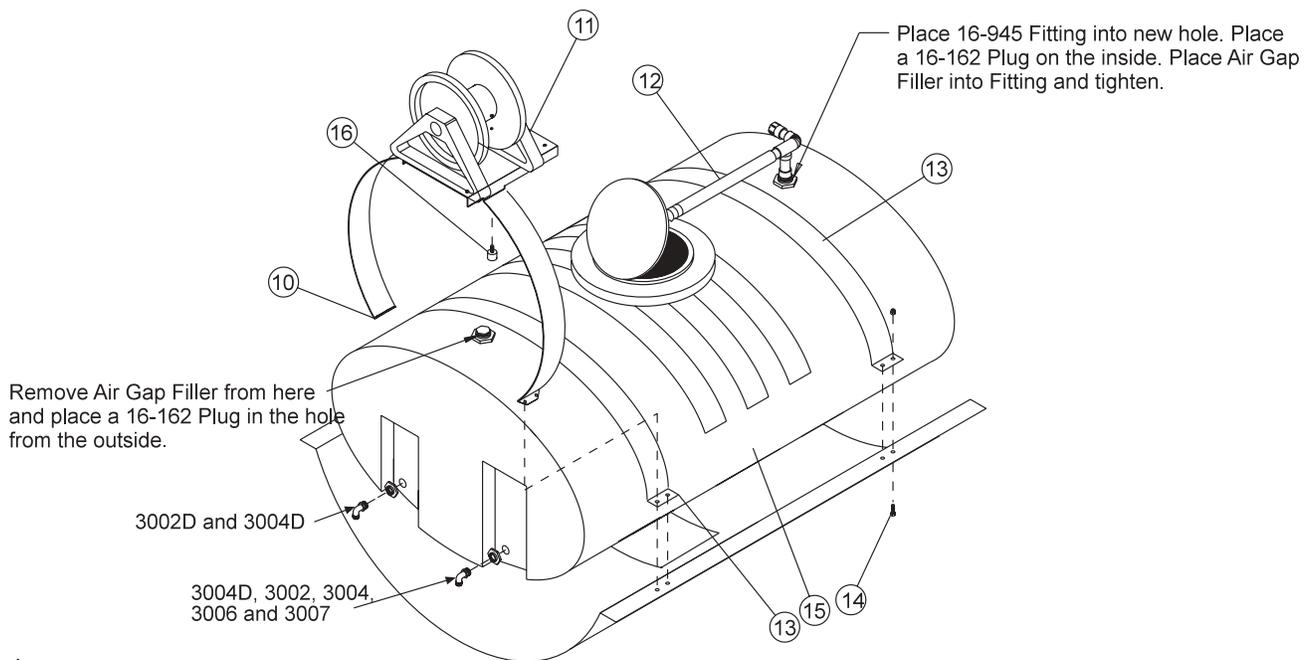
3004



3002D and 3004D

33-476 MOUNTING DIAGRAM

Accessories



SPRAY STAR 3000 HOSE REEL PARTS LIST

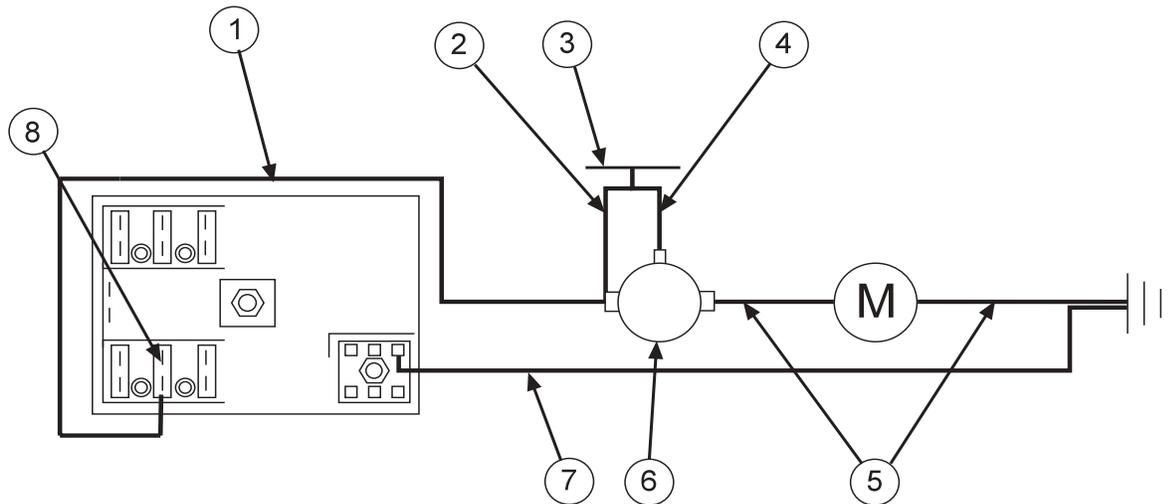
REF#	PART#	DESCRIPTION	QUANTITY
1	16-153	Elbow $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
2	16-859	Ball Valve $\frac{3}{4}$	1
3	18-073	Close Nipple $\frac{3}{4}$	3
6	16-151	Elbow $\frac{3}{4}$ FPT x $\frac{3}{4}$ HB	1
7	16-154	Barb Fitting $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
8	18-281	Black Pipe Tee $\frac{3}{4}$	1
10	33-477	Hose Reel Mount	1
11		Hose Reel	1
	18-249	Fitting $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
	HB-38-16-175	Bolt $\frac{3}{8}$ - 16 x $1\frac{3}{4}$	4
	HW-38	Washer $\frac{3}{8}$	8
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
12	33-249	Air Gap Filler Kit (part of machine)	1
	16-945	Fitting	1
13	33-192	Tank Strap (part of machine)	2
14	HB-38-16-225	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{4}$	4
	HB-38-16-250	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{2}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	8
	HW-38	Washer $\frac{3}{8}$	8
15	33-142	300 gal. Poly Tank (part of machine)	1
16	50-081	Rubber Bumper	1
	HWL-38	Lockwasher $\frac{3}{8}$	1
	HN-38-16	Nut $\frac{3}{8}$ - 16	1

HOSE REEL MOUNTING INSTRUCTIONS

1. Wear Protective clothing when draining the tank and taking apart the lines.
2. Drain the tank and spray system in a safe and approved method insuring that no chemical or water remain in it as you will be taking apart lines.
3. Before starting remove the key, set the park brake and block the wheels.
4. Remove the air gap filler and plug the hole from the outside with a 1" hex plug.
5. Remove the rear tank strap (Ref 13) and replace with the hose reel mount (Ref 10). Mount it with the long side of the platform to the rear of the machine. Use the same hardware from the tank strap.
6. Put the hose reel on the hose reel bracket with the fitting on the left hand side of the machine. Line up the slots over the holes in the legs of the hose reel bracket, put the $\frac{3}{8}$ washers over the slots and the $\frac{3}{8}$ - 16 x $1\frac{3}{4}$ bolts through with the $\frac{3}{8}$ washers and $\frac{3}{8}$ -16 locknuts on the bottom and tighten.
7. Use teflon tape and tighten all fittings as you are installing them.
8. **For 3002, 3006 or 3007:** Disconnect hose from elbow on (B) and disconnect (B) from (A) with reducer bushing remaining on (B). Reassemble with the new fittings as shown in the plumbing drawing. Reconnect hose onto elbow.
For 3004: Remove and discard hex plug from (C). Reassemble with new fittings as shown in plumbing drawing.
9. Put the 18-249 barb fitting into the hose reel and tighten.
10. Use 8887-48 hose to connect reel to ball valve, secure with 18-040 hose clamp.
11. Use 22-075 nylon ties to tie hose to main feed hose.

NOTE: To reinstall the Air Gap Filler, see the next page.

ELECTRIC HOSE REEL WIRING DIAGRAM



HOSE REEL ADJUSTMENTS

OPERATIONAL CHECK:

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

SPRING TENSION ADJUSTMENT:

Reels are shipped with three winds of tension adequate for most application. However, if your usage requires either more or less initial tension, perform the following:

1. Make sure spring is locked.
2. Disconnect inlet hose to permit the hose to go around the drum.
3. To adjust the spring tension, add or remove the wraps of the hose from the drum, one wrap at a time, until the desired tension is obtained.

ROLLER BRACKET ADJUSTMENT:

All hose reels are shipped with the roller bracket in the ceiling mount position. For either floor or wall mount, simply remove the guide arm that is attached to the support frame and rotate it 90°, then reinstall.

HOSE REPLACEMENT PROCEDURE:

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

ELECTRIC HOSE REEL WIRING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
	8843-132	Flexguard $\frac{3}{8}$ " ID	1
1	8919-144	10GA Red Wire 144"	1
	8901	Slide-On Connector	1
2	16-979	Wire, Switch to Solenoid Hot Terminal	1
3	33-251	Push Button Switch	1
4	16-978	Wire, Switch to Solenoid Start Terminal	1
6	12-015	Solenoid	1
SOLENOID TERMINALS			
	HN -516-24	$\frac{5}{16}$ " - 24 Hex Nut	2
	HN -10-32	10 - 32 Hex Nut	1
7	8931-144	10GA White Wire 144"	1
	8901	Slide-On Connector	1
8	33-273	Auto Blade Type Fuse 30Amp	1

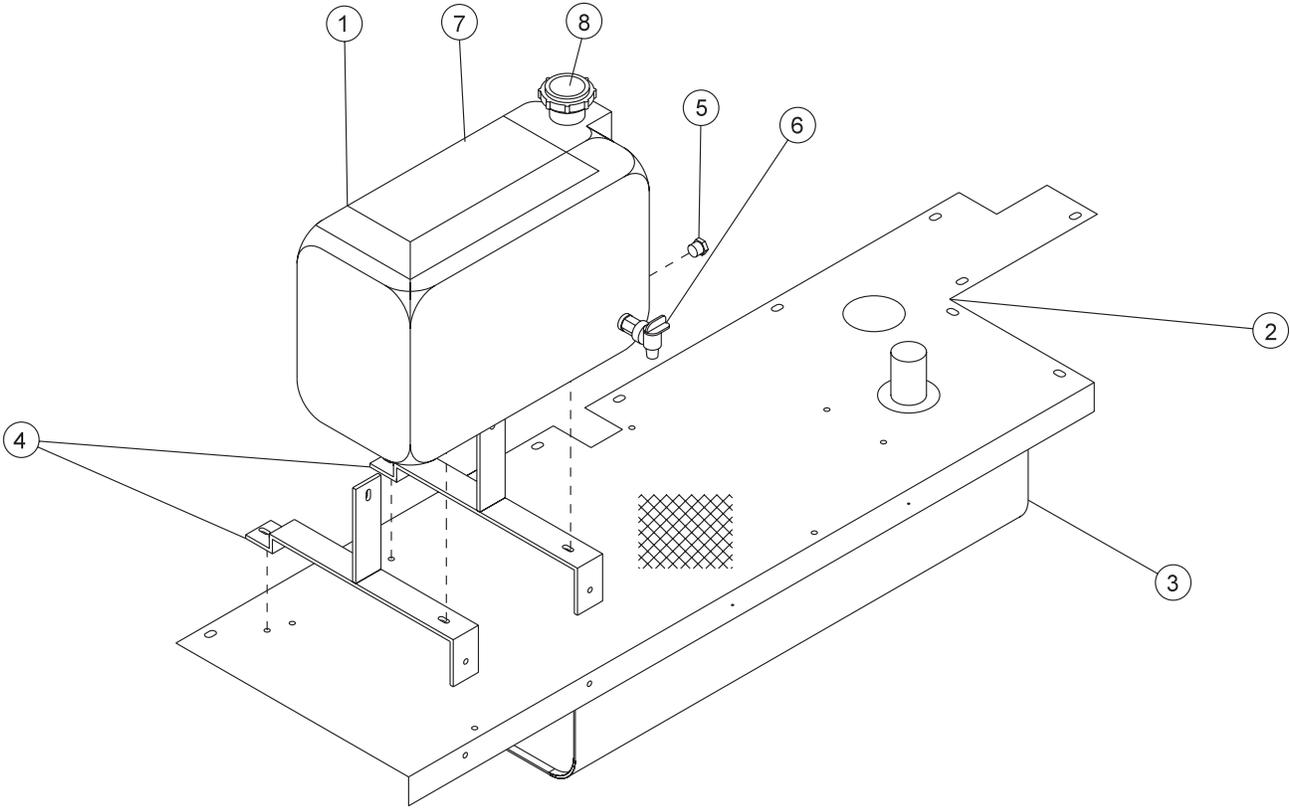
CONNECTION INSTRUCTIONS

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



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

33-275 FRESH WATER WASH TANK DRAWING



Accessories

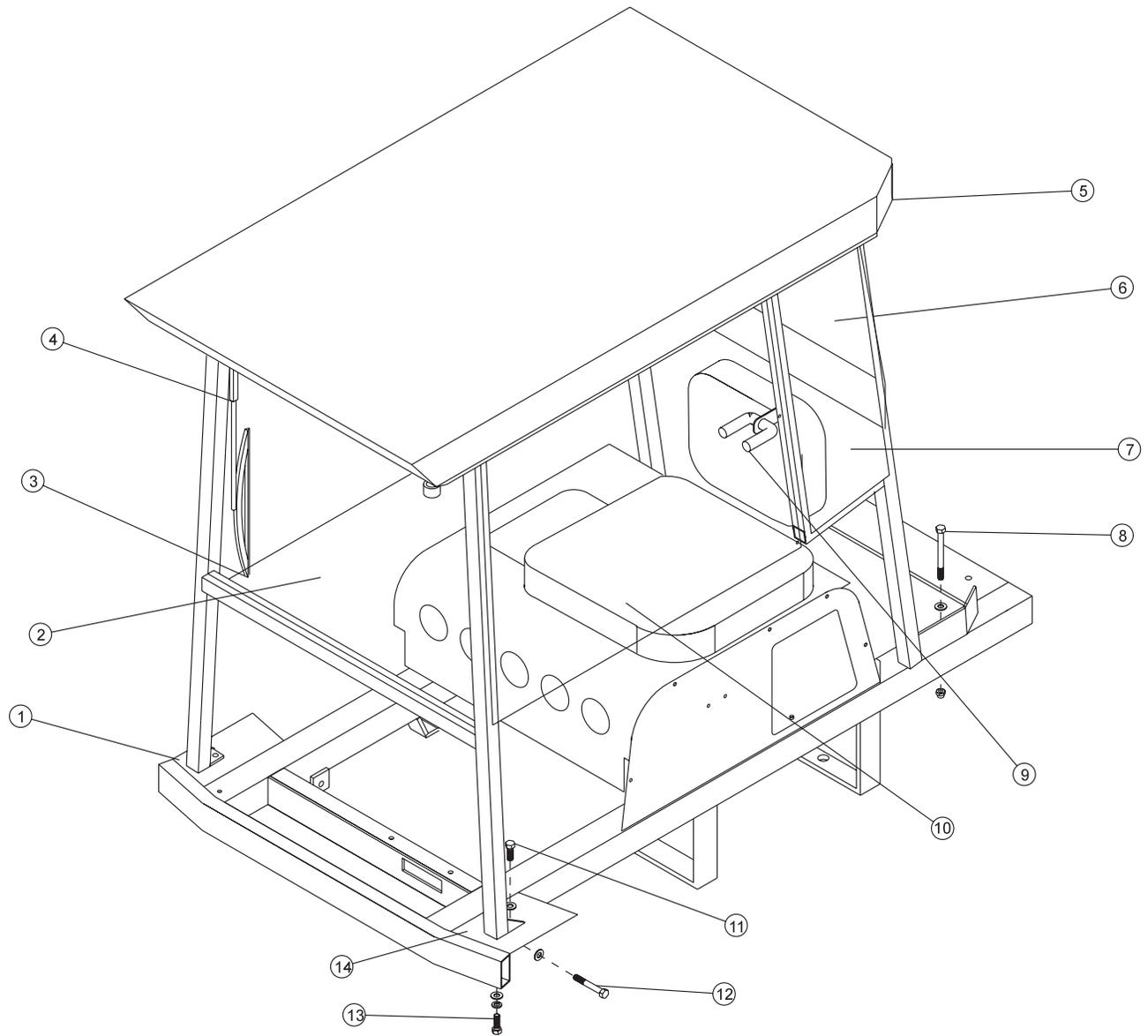
33-275 FRESH WATER WASH TANK PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-488	5 Gallon Wash Tank (includes * items)	1
2	33-118	Right Tank Bracket (part of machine)	1
3	33-079	Gas Tank (part of machine)	1
4	33-286	Tank Mounting Bracket	2
	HB-516-18-075	Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$	4
	HB-516-18-100	Bolt, $\frac{5}{16}$ - 18 x 1	4
	HNCL-516-18	Lock Nut, $\frac{5}{16}$ - 18	4
	HWL-516	Lockwasher, $\frac{5}{16}$	4
5	16-166	Plastic Hex Plug $\frac{3}{4}$ "	2
6*	16-960	Spigot	1
7*	15-488-02	Cover Assembly	1
8*	15-488-01	Cap	1

33-275 FRESH WATER WASH TANK INSTRUCTIONS

1. Be sure the machine is shut off and the park brake is set.
2. Mount the wash tank to the tank mounting brackets with the spigot facing outward or forward. Use the four $\frac{3}{4}$ " bolts and the lockwashers.
3. Now mount the mounting brackets with the wash tank attached to the right side floor plate (fuel tank side). Use the four 1" bolts and the lock nuts.
4. Be sure the two plugs are in the tank before filling. One plug is located next to the spigot facing the front of the machine and the other is located on top of the tank next to the filler neck.
5. This is for fresh water only. For your safety, please keep full of fresh clean water. Change as often as needed.

33-262 CAB DRAWING



Accessories

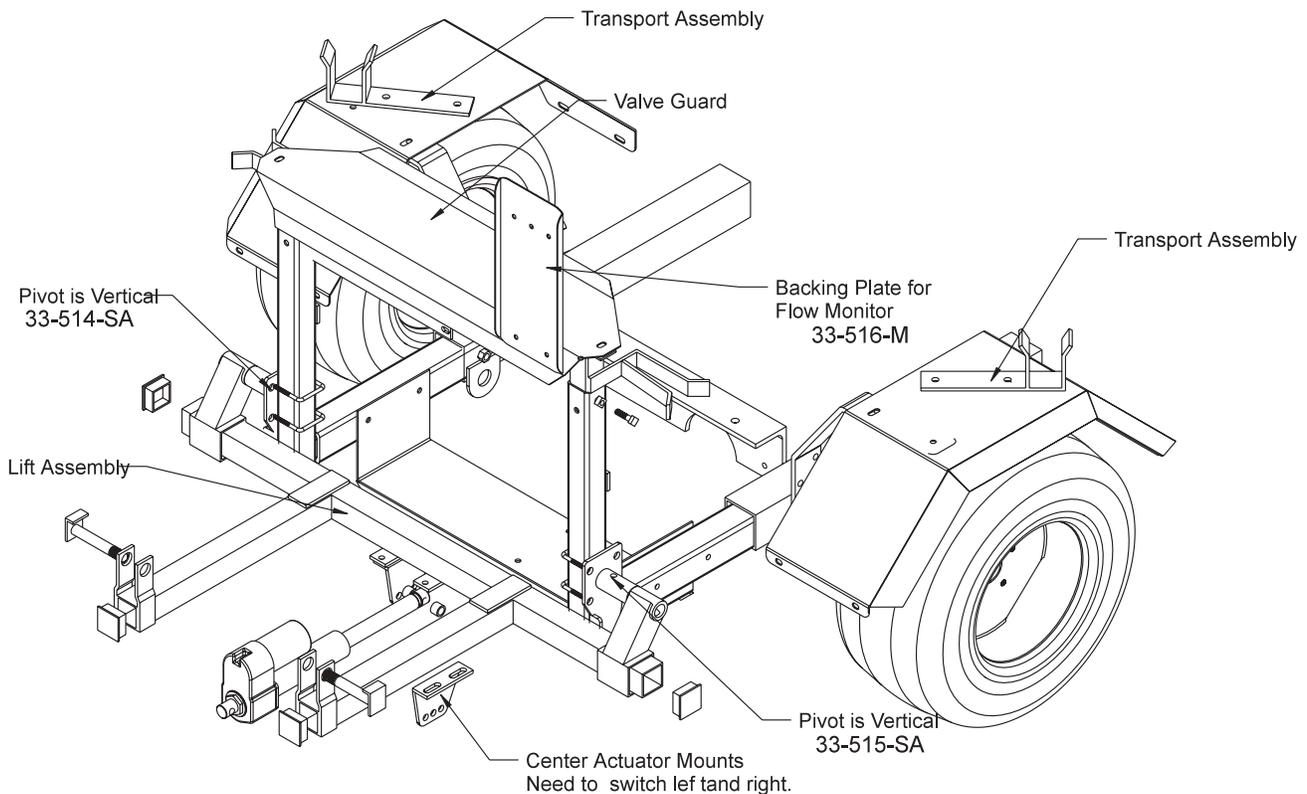
33-262 CAB PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	33-262-19	Right Front Mount	1
2	33-262-12	Windshield	1
	15-429-23	Clamp	1
	33-262-08	Decal, Cautions not ROPS	1
3	15-429-03	Wiper Blade	1
4	15-429-02	Wiper Arm	1
	15-429-01	Wiper Motor	1
5	33-262-18	Roof	1
	33-262-04	Inside Top	1
	33-262-17	Fan Panel	1
	15-429-05	Blower Switch	1
	15-429-06	Blower Switch Knob	1
	15-429-04	Louvers	5
	15-429-14	Filter Clamps	2
	15-429-07	Black Plastic Knob	2
6	33-262-14	Back Window	1
	15-429-23	Clamp	1
7	33-262-13	Rear Side Window	2
8	HB-12-13-500	Bolt 1/2 - 13 x 5	
	HW-12	Washer 1/2	
	HNTL-12-13	Nut 1/2 - 13	
9	33-262-01	Handle	4
	33-262-02	Cam Latch	2
	33-262-16	Shaft Assembly	2
10	33-262-11	Door	2
	33-262-07	Self Adhesive Rubber (12 ft.)	1
	33-262-15	Door Stiffen	4
11	HB-12-13-150	Bolt 1/2 - 13 x 1 1/2	2
	HW-12	Washer 1/2	2
	HNTL-12-13	Nut 1/2 - 13	2
12	HB-12-13-450	Bolt 1/2 - 12 x 4 1/2	4
	HWL-12	Lockwasher 1/2	8
	HNTL-12-13	Lock Nut 1/2 - 13	4
13	HB-12-13-150	Bolt 1/2 - 13 x 1 1/2	2
	HWL-12	Lockwasher 1/2	2
	HW-12	Washer 1/2	2
14	33-262-20	Left Front Mount	1
	15-429-11	Trim Seal, Bubble (19 1/4 ft.) (on sides of windshield and windows; between windows and cabs)	1
	33-262-06	Single Felt Channel (14 1/2 ft.)(inside window channels)	1
	33-262-05	Clip on Rubber Trim (25 ft.)(window sides)	1
	16-909	Cab Fresh Air Filter	1

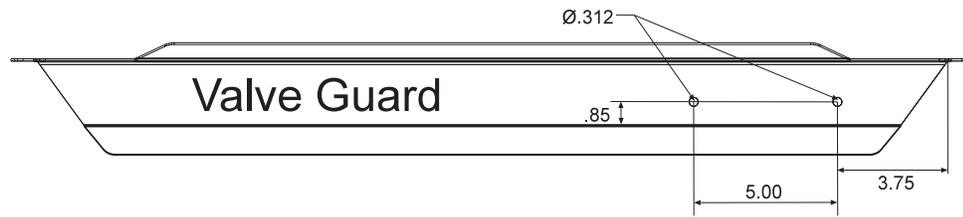
ENGINE AIR FILTER PART

33-321	Air Cleaner (Housing & Element)
33-321-01	Air Cleaner Element
33-322	Air Inlet Hood
33-323	Mounting Band

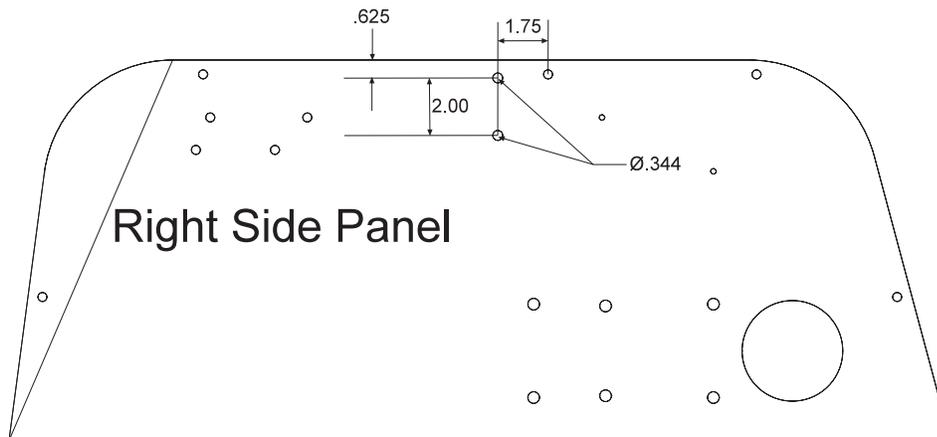
STAR SHIELD MOUNTING INSTRUCTIONS



1. Insert and pin the two castor wheels on the center frame. Place the $\frac{1}{2}$ " bushing on the bottom and one $\frac{1}{2}$ " and $\frac{3}{4}$ " bushing on top just below the pin. (If you are using triple nozzle bodies, the $\frac{3}{4}$ " bushing would also be placed on the bottom). The spacers may be moved from top to bottom to allow adjusting the spray height.
2. Attach and pin the two wings to the lift frame at the breakaway pivot. Snap wings into breakaway catch. Install castor wheels as with center.
3. SPRAY STAR 3000 - Place the Star Shield main lift frame across the rear boom carrier bars. Adjust the pivot arm positioning by loosening the two lock bolts and sliding over the tubing of the main lift frame. Lock the pivot arm into place by tightening the bolts and locking with the jam nut.
4. Attach actuators. For the Spray Star 3000 use the closest pin hole. Face the motor end of the actuator towards the frame of the Star Shield. Make sure the actuator motor is turned upwards to avoid any chance of scalping. Make sure there is a spacer on each side of the actuator shaft, otherwise severe damage could occur to the actuator. For the wing actuators, the moving end of the actuator belongs on the wing.
5. When all three booms are in the spray position, adjust the booms to be level with the ground. Loosen the four nuts holding the center actuator pin plates and adjust position by sliding plates on slot and tighten securely. NOTE: Center actuator should be fully retracted while adjusting.
6. Attach curtains to booms. Use generous amounts of lubricant while in transport position. Spray silicone recommended.
7. Attach hoses and secure them with plastic quick clamps. Take care to align $\frac{1}{2}$ " hose to appropriate column of flow indicator and $\frac{3}{4}$ " hose to appropriate solenoid.
8. Before spraying, check to make sure all nozzles are clear and aligned.



Hole Placement for 3000 Spray Star



Read all instructions before starting.

1. Mount the control box mount (33-512) where shown on right side panel. Controller should be conveniently located with easy access to operator. Note: As you sit in the operators seat facing forward the switch labeled left boom control operates the boom on the left and switch control labeled right operates the right boom.
2. Connect the red wire to the positive (+) battery post first. Then connect the white wire to the negative (-) battery post. Carefully route all wires along frame avoiding any pinch points. Tie down to vehicle ensuring that no loose wire may catch on operator or equipment
Connect the 3 wires as follows:
 - a) Wire marked with red tape is connected to the right boom actuator.
 - b) Wire marked with yellow tape is connected to left boom actuator.
 - c) The unmarked wire is connected to the center boom actuator.
 When connecting the two wires, just snap into place and secure any excess cable.
3. Drill two holes in the valve guard and place new back plate (33-516) for flow monitor on the valve guard using the existing hardware. Remove existing hose and add the 60" hoses that are provided.
4. Transport assemblies are to be installed last. With the boom raised all the way up (all three sections) pull the right and left sections down into the transporting position. Place the transport assemblies on the rear fender so that they will hold the boom. Drill the two $\frac{13}{32}$ holes on both sides. Bolt transport assemblies on.

This is a list of decals located on the Spray Star 3000. Part number, description and location will help in reordering a decals.

13-556	Console Panel	Steering Column Top
15-462	Hang Tag	Hang From Steering Wheel
15-463	Spray Pump	Seat Panel
16-088	Moving Parts Hot	Left Behind Seat Facing Out
16-090	Bowl and Screen	Tank Strainer
16-227	Tank Cleaning & Flush	Strainer
16-228	Not A Motor Vehicle	Right Side Of Seat In Front Of Control Panel Facing Toward Operator
16-858	Power Steering	Steering Column Middle
25-277	Battery	Battery Box Cover Inside
25-279	Safety Warning- Moving Parts & Hydraulics	Inside Seat Cover
25-286	Pinch Point	Right & Left Side Panel
25-298	Warning Hot	Rear Seat Panel
25-307	Gasoline Refuel	Side Gas Tank
25-309	Throttle Payload Adjustment	Steering Column Bottom
25-322	Made In USA	Right Dashboard
25-340	Low Pressure	Hang Tag From Steering Wheel
25-356	Tire Pressure 20 psi	Front Tires
25-355	Tire Pressure 18 psi	Back Tires
25-361	Technical Assistance	Main Frame
27-074	Ignition	Igniton Plate
27-077	Smithco	Steering Wheel
27-093	Hydraulic Oil Level	Left Side Panel Above Oil Tank
27-097	No Step	Right & Left Front Fender
33-160	Control Panel	Control Panel
33-174	Dashboard	Dashboard
33-523	Spray Star 3000	Front
33-245	10W40	Hydraulic Oil Tank Cover
25-359	SMITHCO	Right & Left Side Of Tank

QUICK REFERENCE REPLACEMENT PARTS

REPLACEMENT FILTERS

60-334	Large Hydraulic Oil Filter	
23-031	Small Hydraulic Oil Filter	
60-602-01	Air Cleaner Element	
33-253	Fuel Filter	MotorCraft# FG795-A
33-270	In-line Fuel Filter	AC#ACGF61
33-257	Engine Oil Filter	MotorCraft# FL400A

REPLACEMENT BELTS

33-255	Governor Belt	MotorCraft # E9JL-8620-A2A
33-254	Alternator Belt	MotorCraft # C9PZ-8620-E

SEAL KITS

33-058	Hydrostatic Pump with neutral lockout switch and side band neutral	
33-058-01	Seal Repair Kit	
33-060	Hydraulic Motor with built in hot oil shuttle valve	
33-060-01	Motor Rear Seal Kit	
33-060-02	Shaft Seal Kit	
33-326	Hydraulic Gear Pump with 3 gpm priority flow and 1500 psi relief	
33-326-08	Seal Kit	
33-062	Power Steering Orbital Motor	
33-062-01	Seal Kit	
33-062-02	Needle Bearing Kit	
33-062-03	End Cap Kit	
33-062-04	Centering Spring Kit	
75-714	Hydraulic Cylinder	
14-268	Seal Kit	
11-158	Linear Actuator with 4" Stroke	
16-754	Linear Actuator with 8" Stroke	
11-158-01	Seal Kit	

FLUIDS

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

OTHER PARTS

16-909	Cab Fresh Air Filter	
16-953	Hinged Cover On Tank with Gasket	
16-953-01	Gasket For Cover	
	Spark Plugs	AGSF 22C (Gap 0.040 inch (1.0 mm))

LIMITED WARRANTY

SMITHCO warrants this product to be free from defects in material and workmanship under normal use for one year from the date of purchase by the original user. (60 days if product is used for rental purposes.) All warranty claims must be handled through a SMITHCO authorized dealer or by SMITHCO, INC. All transportation charges must be paid by the purchaser.

There is no further express warranty. All implied warranties, including those of merchantability and fitness for a particular purpose, are limited to one year, (60 days if product is used for rental purposes) from the date of purchase by the original user, and to the extent permitted by law any and all implied warranties are excluded and disclaimed after the expiration of such period.

All incidental and consequential damages, including pickup and delivery of the unit, communication, mileage charges and/or rental of a replacement unit during repair, are not covered under this warranty, nor is any loss of income and/or other loss resulting from the failure of the product to function due to a warranty defect.

The following items are not covered under the SMITHCO warranty, and are warranted by their respective manufacturer.

- (a) Engine and engine parts, including starters, generators, alternators and filters.
- (b) Transaxle, differentials, gear boxes and mechanical pumps.
- (c) Hydrostatic transmissions, hydraulic pumps and motors.
- (d) Batteries.
- (e) Wheels and tires.

A copy of the warranty for the above items is furnished if necessary with each SMITHCO product.

Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitations of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights and you may also have other rights, which may vary from state to state.

Federal law now requires disclosure of the warranty which applies to this product prior to the sale to a customer. Please leave this statement attached to the product and allow the buyer to remove it after purchase.

SMITHCO

Wayne, Pennsylvania 19087

