

**SMITHCO**

Wayne, Pennsylvania 19087

# **PARTS & SERVICE MANUAL**

**Spray Star  
Model 1000**

**PRIME MOVER**

**Starting Serial #100100**

**November, 1998**

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

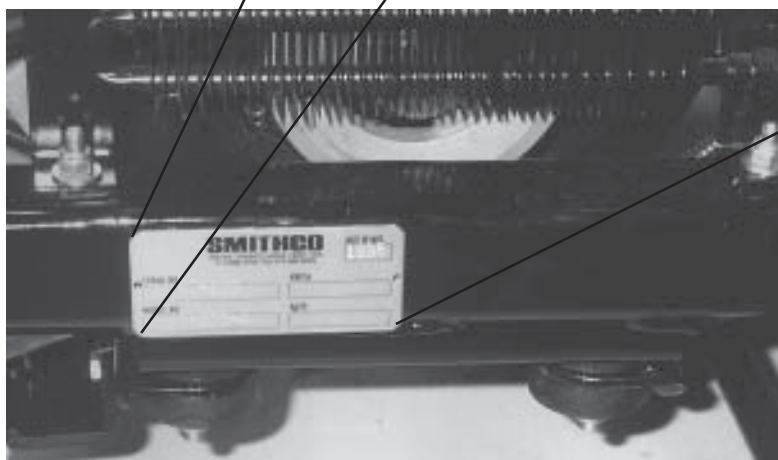
Read this manual and all other manuals pertaining to the Spray Star 1000 carefully as they have safety, operating, assembly and maintenance instructions. Failure to do so could result in personal injury or equipment damage.

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

All **SMITHCO** machines have a Serial Number and Model Number. Both numbers are needed when ordering parts. The serial number plate on the Spray Star 1000 is located on the right main frame, in front of the oil tank. Refer to engine manual for placement of engine serial number.

For easy access record your Serial and Model numbers here.

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



Information needed when ordering replacement parts:

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

## SAFE PRACTICES

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

***This machine is intended for turf maintenance. Other use is forbidden.***

## WEIGHTS AND DIMENSIONS

Length	112" (285 cm)
Width	70" (178 cm)
Width With Boom Open	15' (4.57 m)
Height	48" (122 cm)
Wheel Base	53" (135 cm)
Weight Empty	1283 lbs (582 kg)
Weight Full	2200 lbs (998 kg)

## SOUND LEVEL (DBA)

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

## ENGINE

Make	Kohler
Model#	Command CH25S
Type / Spec#	PA 68620
Horsepower	25HP (18 kw)
Fuel	Unleaded 87 Octane Gasoline Minimum
Cooling System	Air Cooled
Lubrication System	Full Pressure
Alternator	25 Amp

## WHEELS & TIRE

Front: Two 20 x 10.00 x 10 NHS Multi-Rib  
Rear: Two 24 x 12.00 x 12 NHS Multi-Trac

## BRAKES

Dynamic Through Hydrostat

## PARK BRAKE

Hand Operated Lever, Discs on Rear Axle

## SPEED

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

## BATTERY

	12 Volt Automotive type 24F
Cold Cranking Amps	700 minimum
Ground Terminal Polarity	Negative (-)
Maximum Length	10" (25.4 cm)
Maximum Width	7" (17.8 cm)
Maximum Height	9 1/2" (24.13 cm)

## FLUID CAPACITY

Crankcase Oil	See Engine Manual
Fuel	5 gallon (19 liters)
Hydraulic Fluid	5 gallon (19 liters)
Grade of Hydraulic Fluid	SAE 10W-40 API Service SG Motor Oil

# OPTIONAL EQUIPMENT

10-101	834 Spray System (1006)	10-106	Fresh Water Tank
10-102	Manual Spray System (1004)	10-107	Hose Reel Mounting Kit
10-103	Electric Actuator Lift Kit	10-108	Speedometer Kit
10-104	Hydraulic Actuator Lift Kit	10-110	440 Spray System (1008)
10-105	Foam Marker	10-160	15' Stainless Steel Boom
16-129	Hose Reel 200'(61 m) capacity (to be used with 10-107)		

## MAINTENANCE



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

### NOTE:

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

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

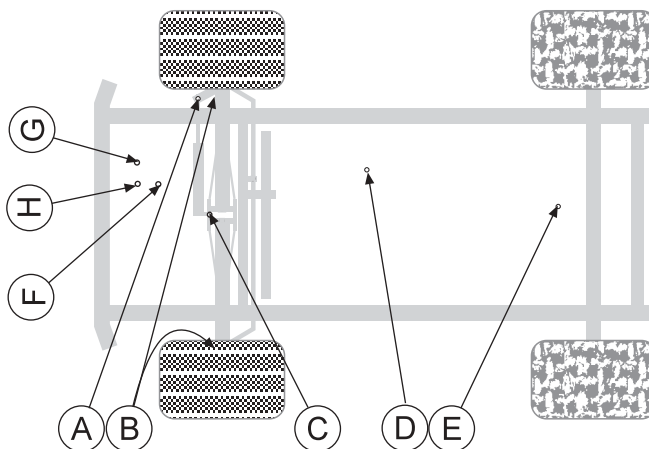
#### DAILY CHECKLIST

1. Check the engine oil level. Add as needed. **DO NOT OVERFILL**. Refer to engine owner's manual for oil grade and procedure.
2. Tire pressure should be 20 psi (1.4 bar) maximum in the rear tires; 22 psi (1.5 bar) maximum in the front tires.
3. Inspect the electrical system and battery cables for loose connections or frayed wiring. Replace any faulty equipment or tighten if loose.
4. Check hardware for loose or missing nuts, bolts, screws, etc., and tighten or replace as needed.
5. Inspect hydraulic lines for damage or leaks. Never use hands to inspect for leaks.
6. Check the hydraulic fluid level. The hydraulic fluid tank is located on the left side of the machine. The fluid level should be 2"-2½" (5 - 6.4 cm) from the top of the fill tube when cold. Use only SAE 10W-40 API Service SG Motor Oil.
7. Inspect the steering, throttle and shift linkages for good hookups and clear travel.
8. Check controls for smooth, proper working operation. Lubricate as needed.
9. Check park brake adjustments. Adjust as required.
10. Check anti-vibration mounts on engine frame.

#### LUBRICATION

Use No. 2 General purpose lithium base grease and lubricate every 100 hours. The Spray Star 1000 has 9 grease fittings.

- A. One on the rod end of hydraulic cylinder.
- B. One on each the right and left spindles.
- C. One on the center front pivot.
- D. One on the pump pivot.
- E. One on the brake relay.
- F. One on the pedal relay.
- G. One on the reverse pedal.
- H. One on the forward pedal.



#### ELECTRICAL CONNECTIONS

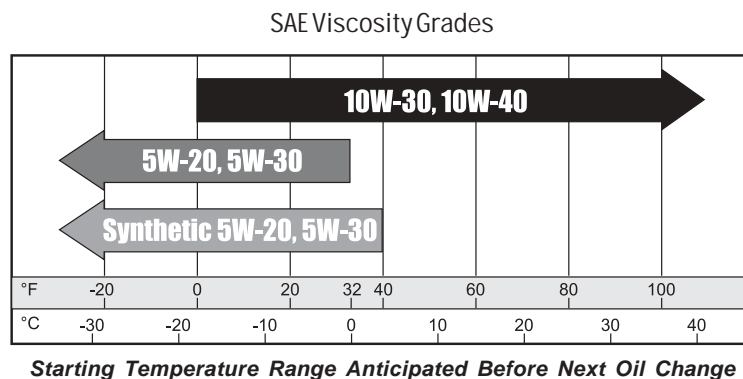
Use dielectric grease on all electrical connections.

# AIR CLEANER

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

# ENGINE OIL

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



# HYDRAULIC OIL

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

# 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.

## MAINTENANCE

### 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 (1.4bar) and rear tires should be 22 psi (1.5bar). Improper inflation will reduce tire life considerably.

### WHEEL MOUNTING PROCEDURE

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

### BATTERY

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

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

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

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

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



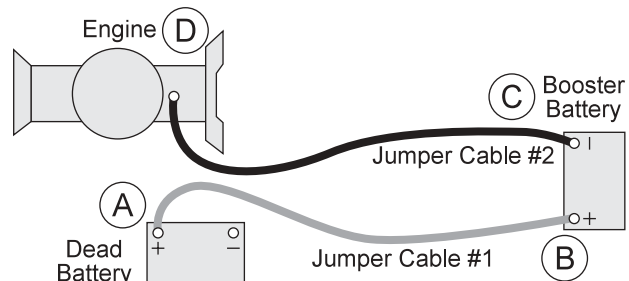
**WARNING**

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



**WARNING**

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



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

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

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



## SERVICE CHART KOHLER COMMAND 25HP



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



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

	Daily	As Required	100 Hours	200 Hours	250 Hours	300 Hours	400 Hours	Every 500 Hours/Yearly
⌘ Engine Oil w/ Filter 2.1qt. (2 l)	C		R	R		R	R	R
⌘ Engine Oil Filter				R			R	R
Engine for Leaks and Loose Parts	C		C	C		C	C	C
‡ Air Cleaner (Paper Element)		C	C	C		C	C	R
‡ Pre-Cleaner (Every 25 hours)		C	C	C	C	C	C	R
Spark Plugs		R		C			C	R
Idle Speed (1200 RPM)					C			C
‡ Cooling System		C	C	C		C	C	C
Belts and Hoses	C				C			C
* Tire Pressure	C		C	C		C	C	C
Visual Inspection of Tires	C		C	C		C	C	C
Fuel Level	C	C						
Fuel Filter		R						R
Hydraulic Oil	C		C	C		C	C	R
† Hydraulic Oil Filter					R			R
Hydraulic System for Leaks and Loose Parts	C		C	C		C	C	C
Battery Electrolyte Level			C	C		C	C	C
Clean Battery Terminals					C			C
§ Torque Lug Nuts				C			C	C
Lubricate			C	C		C	C	C

C=Check or Clean at specified intervals

R=Replace at specified intervals

\* Tire pressure: 20 psi (1.4 bar) Rear. 22 psi (1.5 bar) Front.

† Replace hydraulic filter after the first 20, 100, and every 250 there after.

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

⌘ Change Oil and Filter after first 5 hours.

‡ Clean more often under dusty conditions or when airborne debris is present , replace air cleaner parts, if very dirty.

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
Engine Oil w/ Filter								
Engine Oil Filter								
Engine for Leaks and Loose Parts								
Air Cleaner (Paper Element)								
Pre-Cleaner (Every 25 hours)								
Spark Plugs								
Idle Speed								
Cooling System								
Belts and Hoses								
Tire Pressure								
Visual Inspection of Tires								
Fuel Level								
Fuel Filter								
Hydraulic Oil								
Hydraulic Oil Filter								
Hydraulic System for Leaks and Loose Parts								
Battery Electrolyte Level								
Clean Battery Terminals								
Torque Lug Nuts								
Lubricate								

C=Check or Clean at specified intervals

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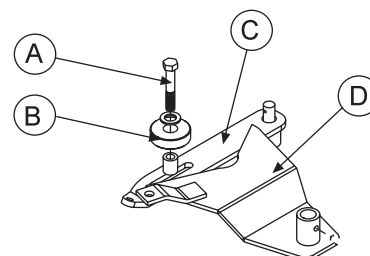
⌘ Change Oil and Filter after first 5 hours.

‡ Clean more often under dusty conditions or when airborne debris is present , replace air cleaner parts, if very dirty.

## WHEEL CREEP

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

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



## SPRAY PUMP WITH ELECTRIC CLUTCH BELT

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

## PARK BRAKE

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

## SPEED CALIBRATION NUMBERS

The speed calibration numbers for the Spray Star 1006 is 965.

The speed calibration numbers for Spray Star 1008 is 612.

# STORAGE

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

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

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

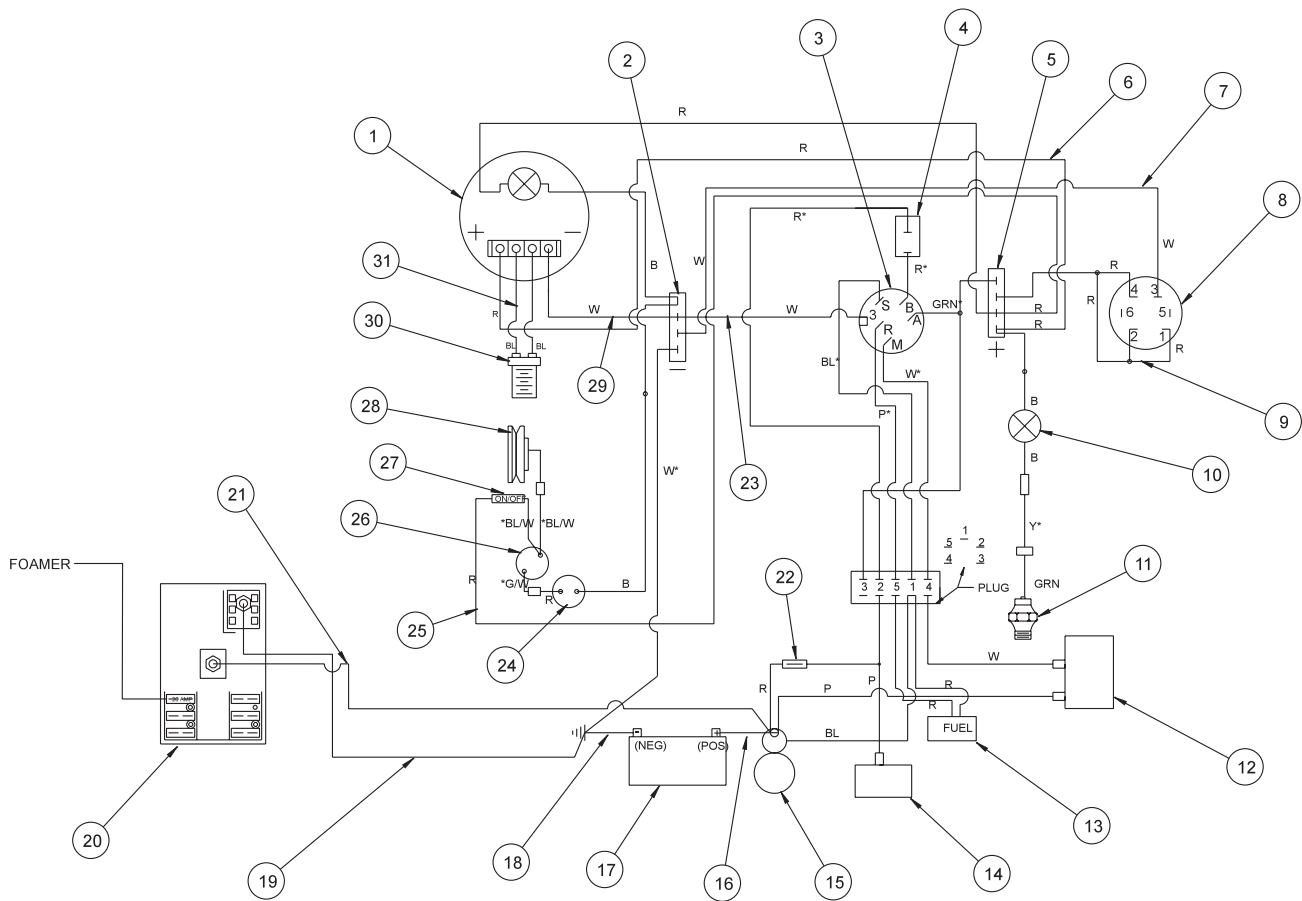
To empty the system, drain fuel tank and carburetor, or run engine until tank and system are empty.

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

# WIRING DIAGRAM

## Color Code Chart

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

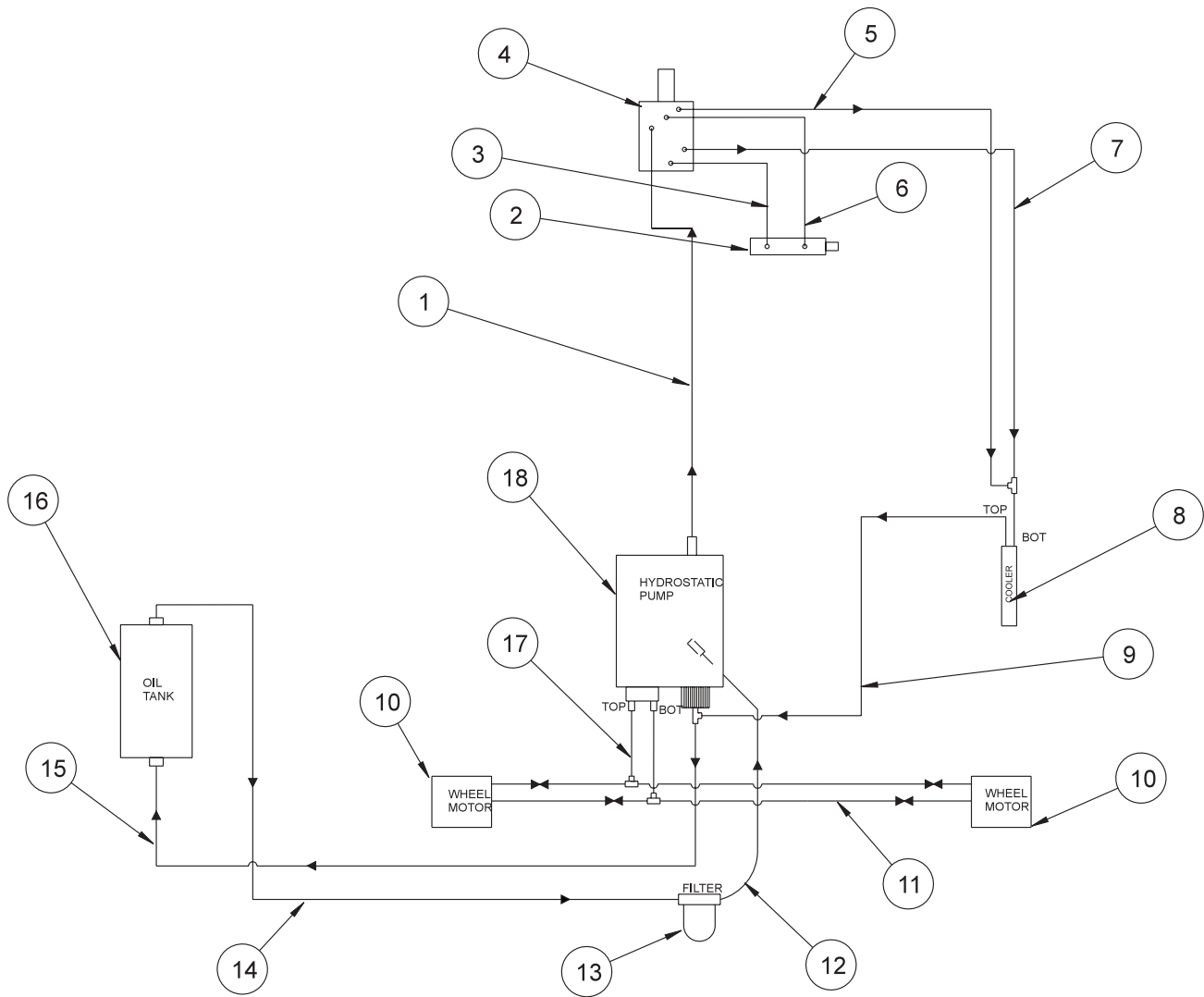


**Use dielectric grease on all electrical connections.**

# WIRING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1†	10-202	Speedometer	1
	8859	Ring Terminal <sup>3</sup> / <sub>16</sub>	2
	8962	Heat Shrink	2
2	8935	Buss Bar (-)	1
3	13-288	Ignition Switch (Kohler 25 099 04)	1
	76-310	Key Set	1
4	34-146	Panel Mounted Circuit Breaker	1
	34-145	Circuit Breaker Boot	1
5	8935	Buss Bar(+)	1
6§		Speedometer To (+) Buss Bar	
7§		(-) Buss Bar to Hour / Voltmeter	
8	42-064	Hour / Voltmeter Combo	1
9	10-182	Hot Wire Hour / Voltmeter	1
10	50-359	Oil Warning Light	1
	8849-2	Black Wire	1
	8860	String Connector	1
	8859	Ring Terminal <sup>3</sup> / <sub>16</sub>	1
	8853	Slide On Connector	1
	8962	Heat Shrink <sup>3</sup> / <sub>16</sub>	3
11		Oil Sender (Part Of Engine)	
12		Ignition Module (Part Of Engine)	
13		Fuel Shut-Off Solenoid (Part Of Engine)	
14		Rectifier (Part Of Engine)	
15		Starter (Part Of Engine)	
16	10-167	Red Battery Cable	1
17	22-073	Battery (Optional)	1
18	76-327	Ground Battery Cable	1
19	10-204	Fuse Block Ground Wire	1
20	33-271	Fuse Block	1
21	10-203	Fuse Block Hot Wire	1
22		Wire With Fuse (Part Of Engine)	
		Fuse AGC 30	
23§		(-) Buss Bar to Ignition Switch	
24	77-207	Buzzer	1
	8845-3.5	White Wire	1
	8860	String Connector	1
	8859	Ring Terminal <sup>3</sup> / <sub>16</sub>	1
	8853	Slide On Connector	1
	8962	Heat Shrink	3
25§		Wire Toggle Switch To (+) Buss Bar	
26	33-480	Pressure Switch	1
27	15-314	Toggle Switch	1
	15-472	Switch Boot	1
28	16-966	Hypro Pump With Electric Clutch	1
29†	10-183	Wire Speedometer Ground	1
30†	16-883	Magnetic Sensor	1
31†	10-209	Speedometer Wire Harness	1
	10-181	Wire Harness (Includes all wire colors with *)	1
§	10-224	Console Wire Harness	1
†	10-108	Speedometer Kit (optional)	

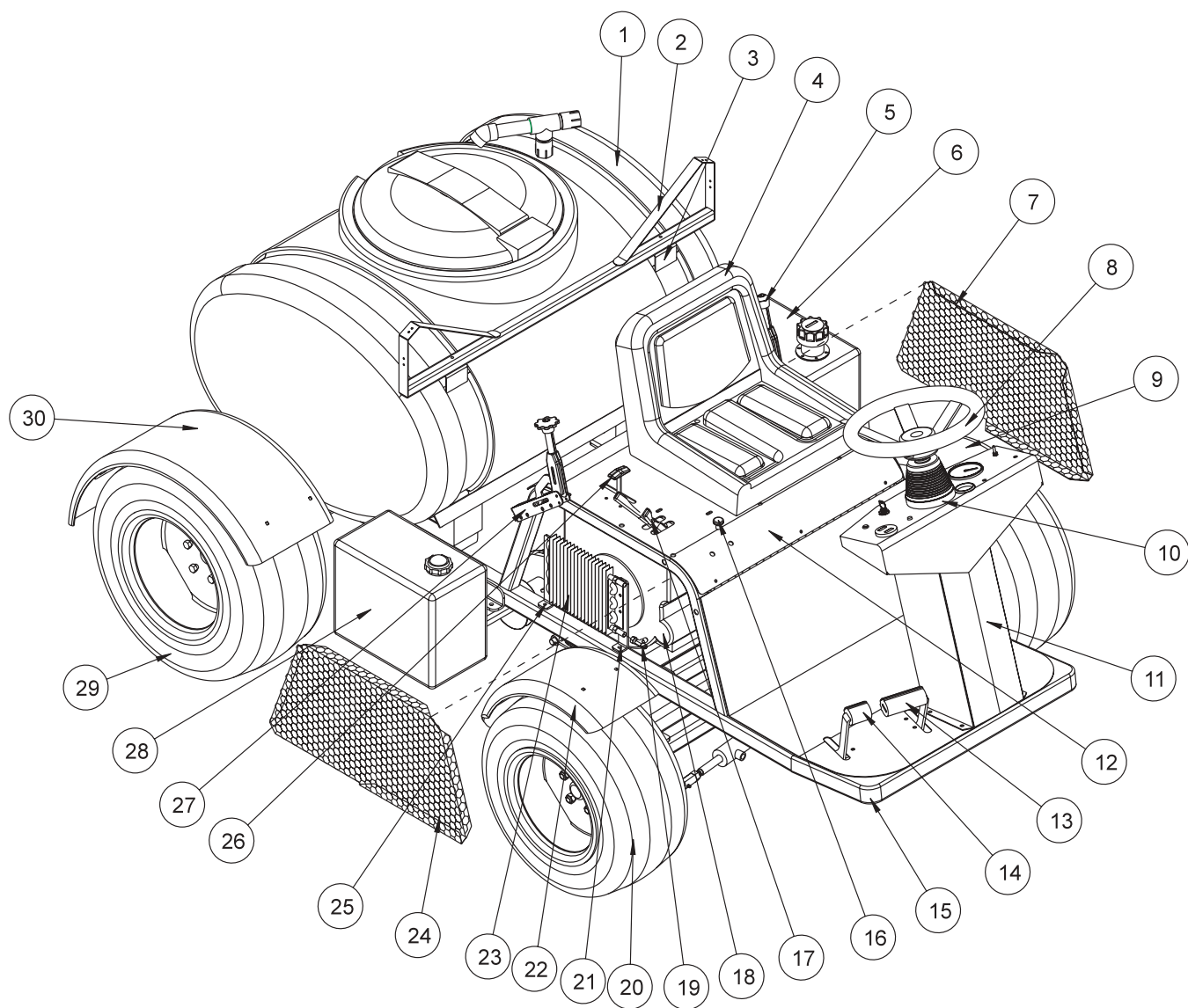
# HYDRAULIC DIAGRAM



## HYDRAULIC DIAGRAM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-143	Hydraulic Hose	2
2	10-135	Hydraulic Cylinder	1
3	10-141	Hydraulic Hose	1
4	34-103	Orbitrol Motor	1
5	10-144	Hydraulic Hose	1
6	10-142	Hydraulic Hose	1
7	18-190	Tee	1
8	34-105	Oil Cooler	1
9	10-145	Hydraulic Hose	1
10	10-116	Wheel Motor	2
11	10-123	Hydraulic Hose	4
12	8832-12	Hose $\frac{3}{4}$ ID	1
	18-222	Hose Clamp	2
13	23-006	Oil Filter	1
	23-031	Replacement Filter	
14	8832-14	Hose $\frac{3}{4}$ ID	1
	18-222	Hose Clamp	2
15	10-196	Hydraulic Hose	1
16	48-135	Oil Tank	1
17	10-140	Hydraulic Hose	2
18	10-117	Hydrostatic Pump	1

## BODY & FRAME DRAWING

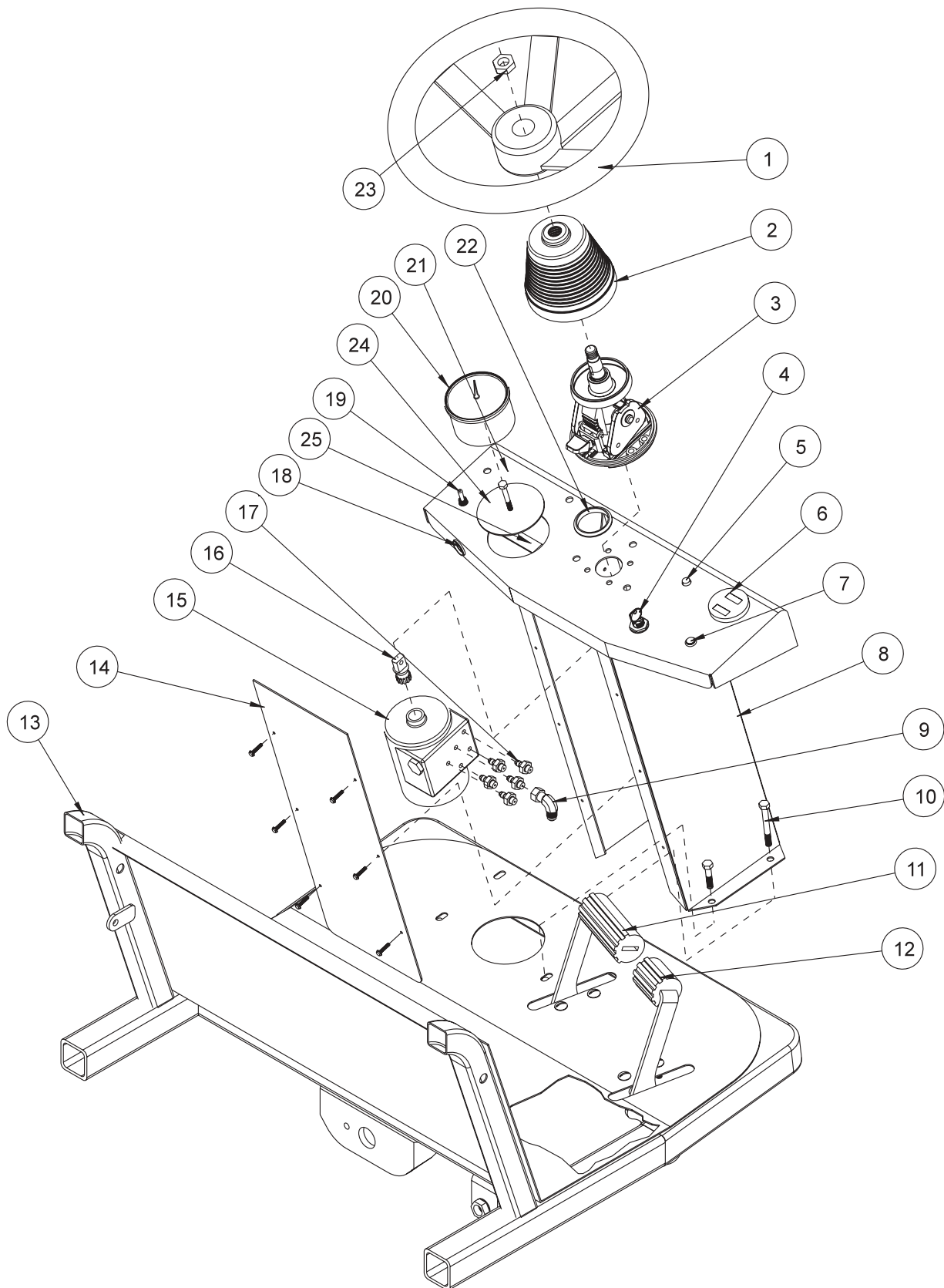




# BODY & FRAME PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-111	110 Gallon Poly Tank	1
2	10-193	Horizontal Boom Support	1
3	10-191	Tank Starp	2
4	14-269	Seat	1
	HB-516-18-125	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{4}$	4
	HW-516	Washer $\frac{5}{16}$	4
	HWL-516	Lock Washer $\frac{5}{16}$	4
	HN-516-18	Nut $\frac{5}{16}$ - 18	4
5	10-120	Park Brake Handle	1
6	48-135	Oil Tank	1
	23-095	Filler Breather	1
7	10-214	Left Screen	1
	HSD-14-075	Drill Screw $\frac{1}{4}$ x $\frac{3}{4}$	4
8	15-030	Steering Wheel	1
9	10-180	Left Front Fender	1
	HBC-516-18-100	Carriage Bolt $\frac{5}{16}$ - 18 x 1	4
	HW-516	Washer $\frac{5}{16}$	4
	HWL-516	Lock Washer $\frac{5}{16}$	4
	HN-516-18	Nut $\frac{5}{16}$ - 18	4
10	76-299	Black Boot	1
11	10-113	Console	1
12	10-201	Seat Panel	1
13	10-163	Forward Foot Pedal	1
14	10-164	Reverse Foot Pedal	1
15	10-137	Main Frame	1
16	11-086	Choke	1
17*	13-261	Two Bank Valve	1
	13-262	Valve Handles	1
18	10-118	Kohler 25hp Engine	1
19	18-190	Tee	1
20	16-857	Tire and Wheel	2
	16-857-01	Tire 20 x 10 - 10NHS 4Ply	2
	16-857-02	Wheel	2
21	10-129	Front Cooler Mount	1
22	10-159	Right Front Fender	1
	HBC-516-18-100	Carriage Bolt $\frac{5}{16}$ - 18 x 1	4
	HW-516	Washer $\frac{5}{16}$	4
	HWL-516	Lock Washer $\frac{5}{16}$	4
	HN-516-18	Nut $\frac{5}{16}$ - 18	4
23	34-105	Oil Cooler	1
	HB-14-20-100	Bolt $\frac{1}{4}$ - 20 x 1	4
	HWL-14	Lock Washer $\frac{1}{4}$	4
	HN-14-20	Nut $\frac{1}{4}$ - 20	4
24	10-215	Right Screen	1
	HSD-14-075	Drill Screw $\frac{1}{4}$ x $\frac{3}{4}$	4
25	10-130	Rear Cooler Mount	1
26	34-160	Throttle Control with Cable	1
27	10-228	Spray Boss Control	1
28	10-115	Gas Tank	1
	10-220	Gas Cap	1
29	10-114	Tire and Wheel	2
	10-114-01	Tire 24-12-12NHS	2
	10-114-02	Wheel	2
30	10-168	Rear Fender	2
	HBC-516-18-100	Carriage Bolt $\frac{5}{16}$ - 18 x 1	8
	HW-516	Washer $\frac{5}{16}$	8
	HWL-516	Lock Washer $\frac{5}{16}$	8
	HN-516-18	Nut $\frac{5}{16}$ - 18	8
*	10-104	Hydraulic Lift Kit	1

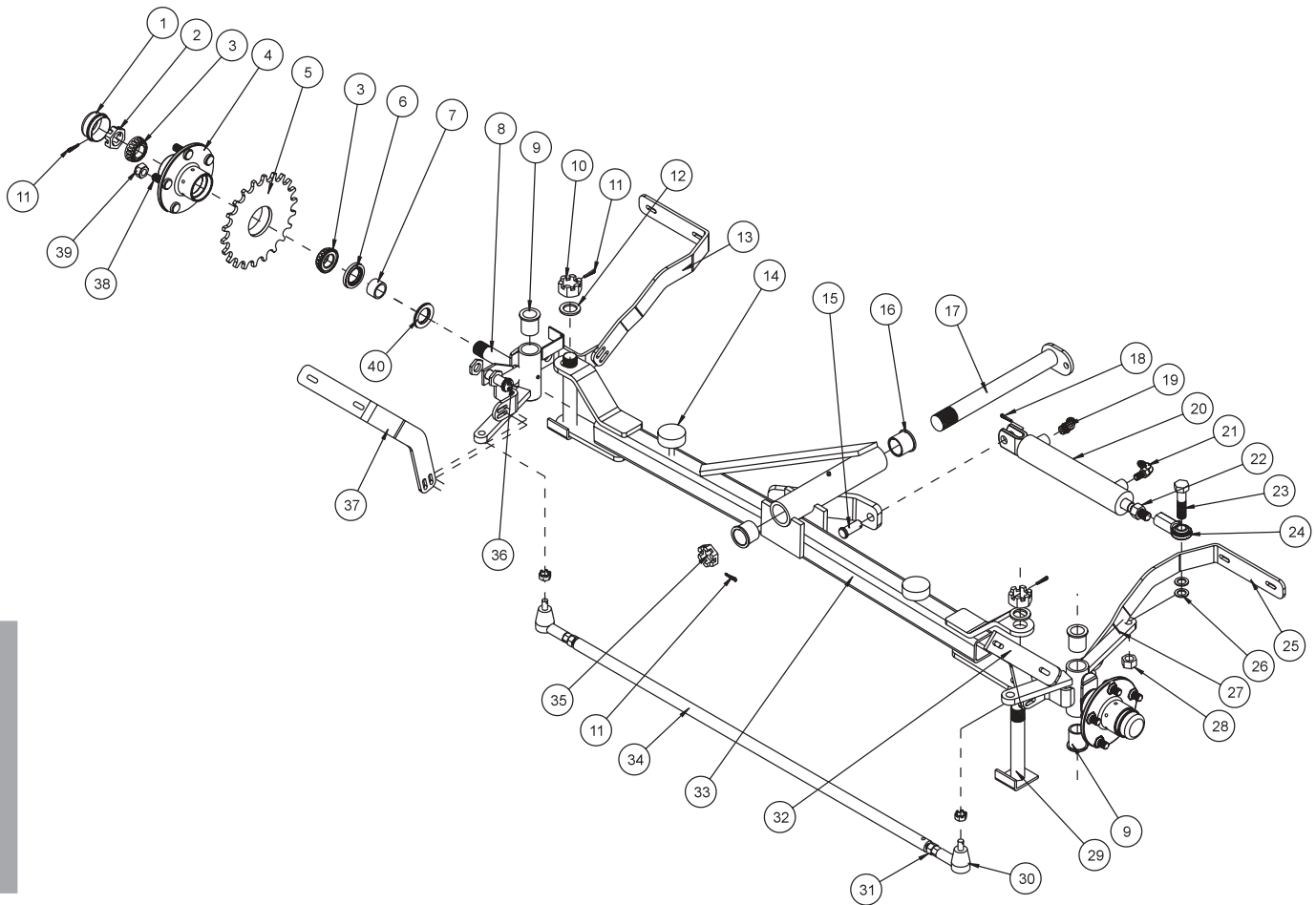
## NOSE CONE DRAWING



# NOSE CONE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-030	Steering Wheel with Cap	1
	15-031	Steering Wheel Cap(Replacement Only)	
2	76-294	90° Black Boot	1
3	76-293	Tilt Steering Mechanism	1
	HB-516-18-150	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{2}$	3
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	3
	HWK-316-075	Woodruff Key $\frac{3}{16}$ - $\frac{3}{4}$	1
4	13-288	Key Switch (with hardware Kohler 25 099 04)	1
	76-310	Key Set	1
5	34-146	Circuit Breaker	1
	34-145	Circuit Breaker Boot	1
6	42-064	Hour / Voltmeter	1
7	50-359	Oil Warning Indicator Light	1
8	10-113	Console	1
9	18-202	Elbow	1
10	HB-516-18-150	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{2}$	2
	HB-516-18-275	Bolt $\frac{5}{16}$ - 18 x $2\frac{3}{4}$	2
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
11	10-163	Forward Foot Pedal	1
	48-066	Pedal Pad	1
12	10-164	Reverse Pedal	1
	48-132	Short Pedal Pad	1
13	10-137	Main Frame	1
14	10-200	Tower Plate	1
	HSA-8-075	Tapping Screw #8 x $\frac{3}{4}$	6
15	34-103	Orbitrol	1
	HBM-6-1-16	Metric Bolt M6-1 x 16	4
	HWLM-6	Metric Lock Washer M6	4
16	34-167	Stub Shaft	1
17	18-169	Adapter $\frac{3}{8}$ SAE	5
18	77-207	Buzzer	1
19	15-314	Toggle Switch	1
	15-472	Switch Boot	1
20*	10-202	Speedometer (Optional)	1
21	25-347	Decal, Console	1
22	50-400	Rubber Grommet	1
23	HNJ-58-18	Jam Nut $\frac{5}{8}$ - 18	1
24	10-235	Speedometer Plug Button	1
	HBM-8-1.25-40	Metric Bolt M8-1.25 x 40	1
	HWLM-8	Metric Lock Washer M8	1
	HNM-8-32	Metric Nut M8-32	1
25	10-236	Strong Back	1
*	10-108	Speedometer Kit	1

# FRONT AXLE DRAWING

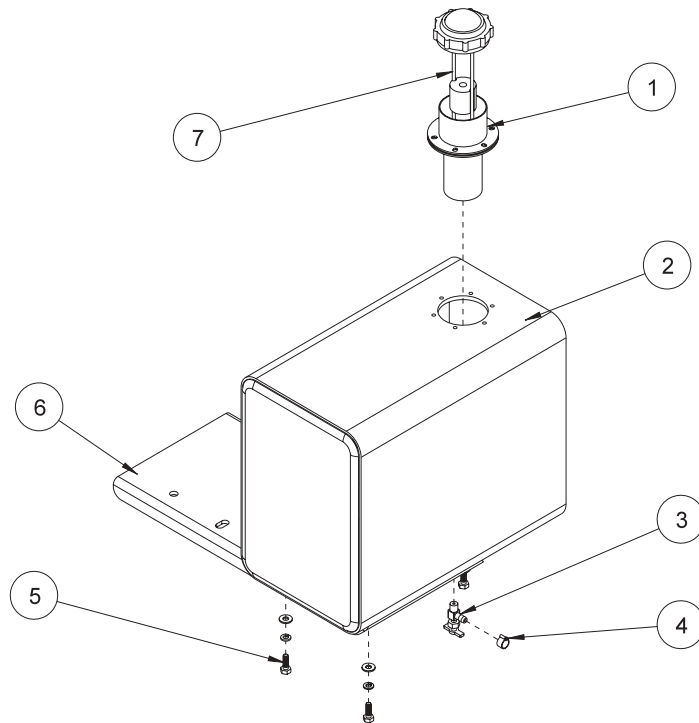


Parts

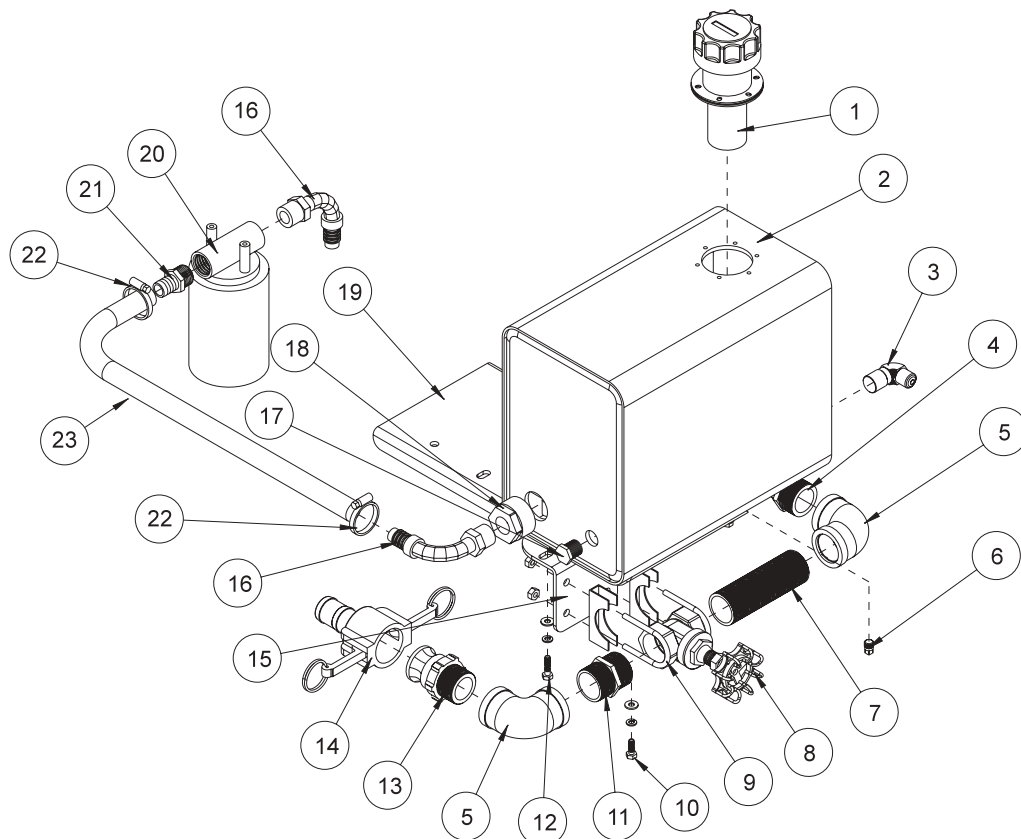
# FRONT AXLE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	80-167	Dust Cap	2
2	HNAR-100-14	Slotted Jam Nut 1 - 14	2
3	11-043	Bearing	4
4	80-019	Hub (includes Ref# 1,3,6,38 & 39)	2
5	10-186	Hub with Sprocket	1
	HSSHS-516-18-038	Socket Head Set Screw $\frac{5}{16}$ -18 x $\frac{3}{8}$	1
6	11-041	Oil Seal	2
7	11-042	Spacer	2
8	10-152	Left Spindle	1
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	1
9	18-035	Bushing	4
10	HNA-100-14	Slotted Nut 1 - 14	2
11	HP-18-150	Cotter Pin $\frac{1}{8}$ - $1\frac{1}{2}$	5
12	HMB-100-14	Machine Bushing 1 x 14GA	2
13	10-158	Left Front Fender Bracket - Front	1
14	50-081	Rubber Insulator	2
15	HCP-58-175	Clevis Pin $\frac{5}{8}$ - $1\frac{3}{4}$	1
16	18-153	Bushing	2
17	10-138	Axle Pin	1
18	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
19	18-188	45° Elbow	1
20	10-135	Hydraulic Cylinder	1
	14-267	Seal Kit	1
21	18-168	90° Elbow	1
22	HNJ-58-18	Jam Nut $\frac{5}{8}$ - 18	1
23	HB-58-11-250	Bolt $\frac{5}{8}$ - 11 x $2\frac{1}{2}$	1
24	18-154	Rod End	1
25	10-156	Right Front Fender Bracket - Front	1
26	HMB-58-14	Machine Bushing $\frac{5}{8}$ x 14GA	2
27	10-153	Right Spindle	1
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	1
28	HNTL-58-11	Lock Nut $\frac{5}{8}$ - 11	1
29	16-076	King Pin	2
30	16-565	Rod End	2
31	HNM-12-125	Metric Nut M12 - 1.25	2
32	10-155	Right Front Fender Bracket - Back	1
33	10-131	Front Axle	1
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	1
34	10-139	Tie Rod	1
35	HNAJ-114-12	Slotted Jam Nut $1\frac{1}{4}$ -12	1
36*	16-883	Magnetic Sensor (Optional)	1
	HNJ-34-16	Jam Nut $\frac{3}{4}$ - 16	1
37	10-157	Left Front Fender Bracket - Back	1
38	27-022-02	Stud $\frac{1}{2}$ - 20	10
39	HNL-12-20	Lug Nut $\frac{1}{2}$ - 20	10
40	HMB-100-10	Machine Bushing 1 X 10GA	2
*	10-108	Speedometer Kit	1

## FUEL TANK DRAWING



## OIL TANK & OIL FILTER DRAWING



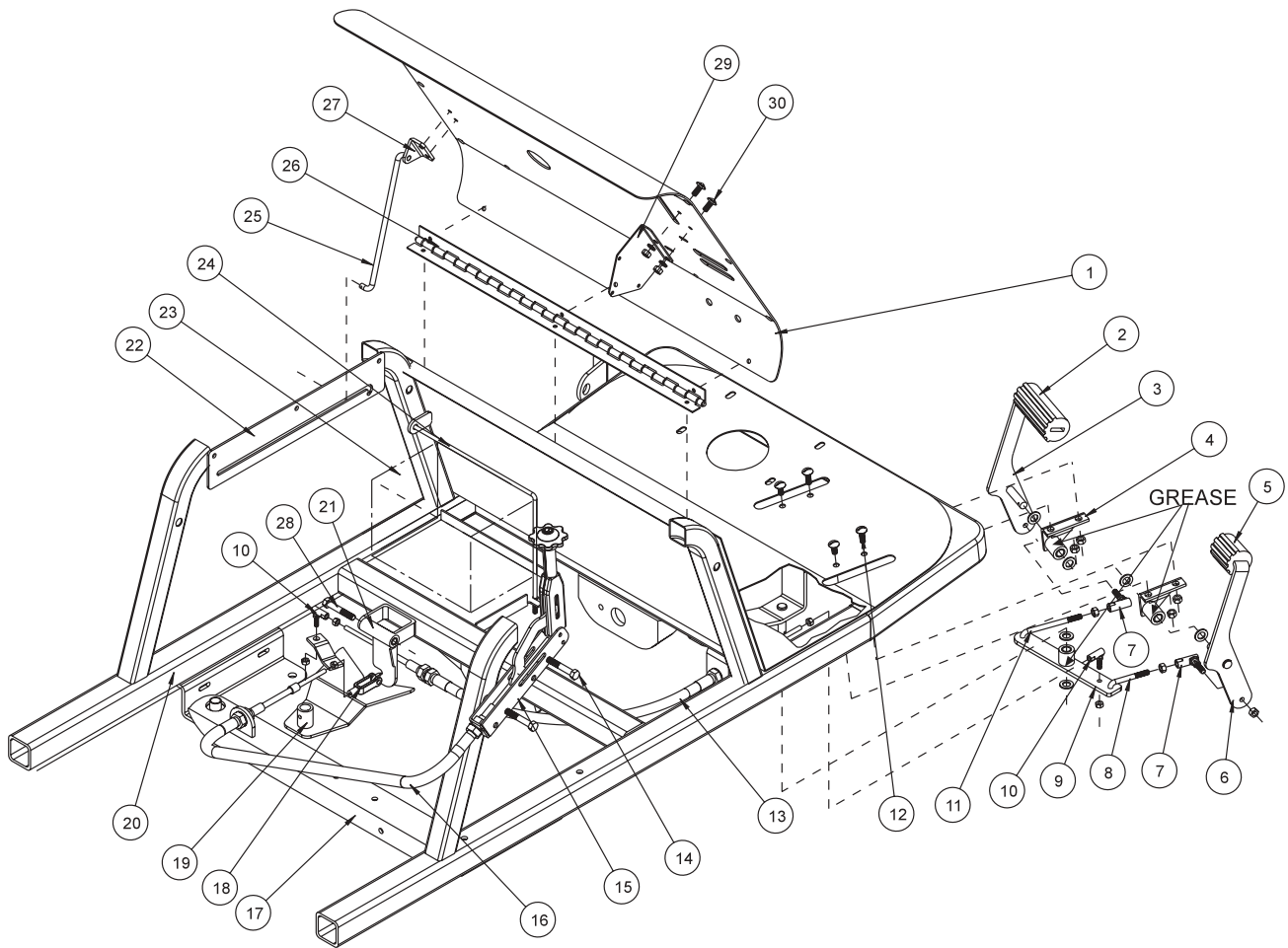
## FUEL TANK PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-231	Gas Tank Neck	1
2	10-115	Gas Tank	1
3	15-039	Fuel Valve	1
4	18-003	Hose Clamp $\frac{1}{4}$	2
	8800-28	Fuel Hose $\frac{1}{4}$	1
5	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	4
	HW-14	Washer $\frac{1}{4}$	4
	HWL-14	Lock Washer $\frac{1}{4}$	4
6	10-127	Tank Mount	1
7	10-220	Gas Cap with Gauge	1

## OIL TANK & OIL FILTER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	23-095	Breather	1
2	48-135	Oil Tank	1
3	18-246	Male Elbow	1
	10-196	Hydraulic Hose	1
4	16-161	Fitting $1\frac{1}{4}$ NPT x $1\frac{1}{4}$ HB(to spray tank)	1
5	16-182	Elbow	2
6	18-118	$\frac{1}{8}$ Pipe Plug	1
7	18-296	Black Pipe Nipple $1\frac{1}{4}$ x 5	1
8	16-170	Gate Valve $1\frac{1}{4}$	1
9	50-394	Muffler Clamp $1\frac{1}{4}$	2
10	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HW-14	Washer $\frac{1}{4}$	2
	HWL-14	Lock Washer $\frac{1}{4}$	2
11	16-880	Close Nipple $1\frac{1}{4}$	1
12	HB-14-20-100	Bolt $\frac{1}{4}$ - 20 x 1	2
	HW-14	Washer $\frac{1}{4}$	2
	HWL-14	Lock Washer $\frac{1}{4}$	2
13	16-180	Quick Coupler, $1\frac{1}{4}$ Male	1
14	16-181	Quick Coupler, $1\frac{1}{4}$ Female(to pump intake)	1
15	10-128	Valve Mount	1
16	34-123	Elbow	2
17	18-069	$\frac{1}{2}$ Pipe Plug	1
18	18-260	Reducer $1\frac{1}{4}$ x $\frac{3}{4}$	1
19	10-127	Tank Mount	1
20	23-006	Oil Filter	1
	23-031	Replacement Filter	
21	18-249	Barb Fitting	1
22	18-222	Hose Clamp $\frac{13}{16}$ - $1\frac{1}{2}$	2
23	8832-14	Hydraulic Hose $\frac{3}{4}$ ID	1

## FOOT PEDAL LINKAGE DRAWING

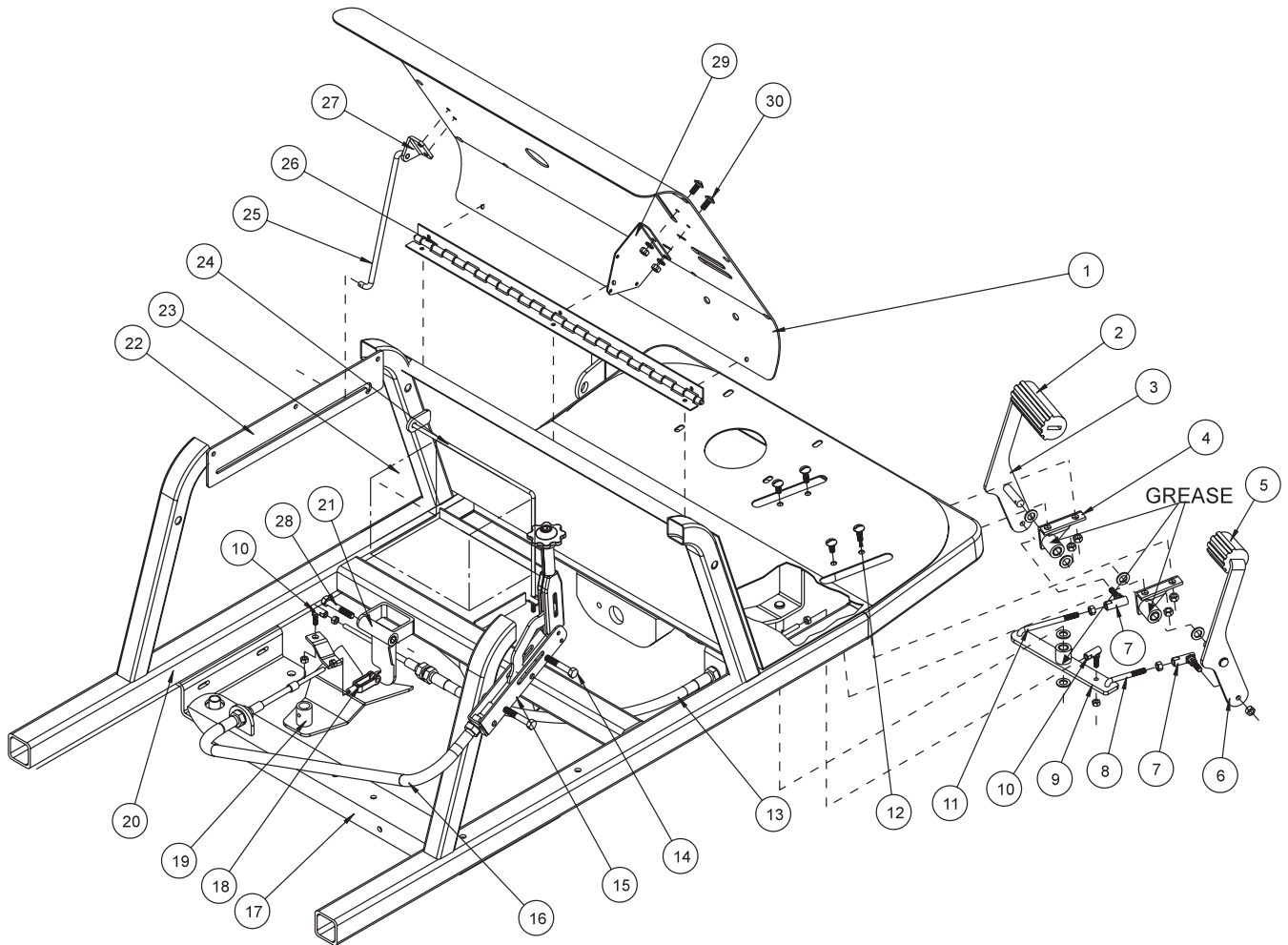




## FOOT PEDAL LINKAGE PARTS LIST

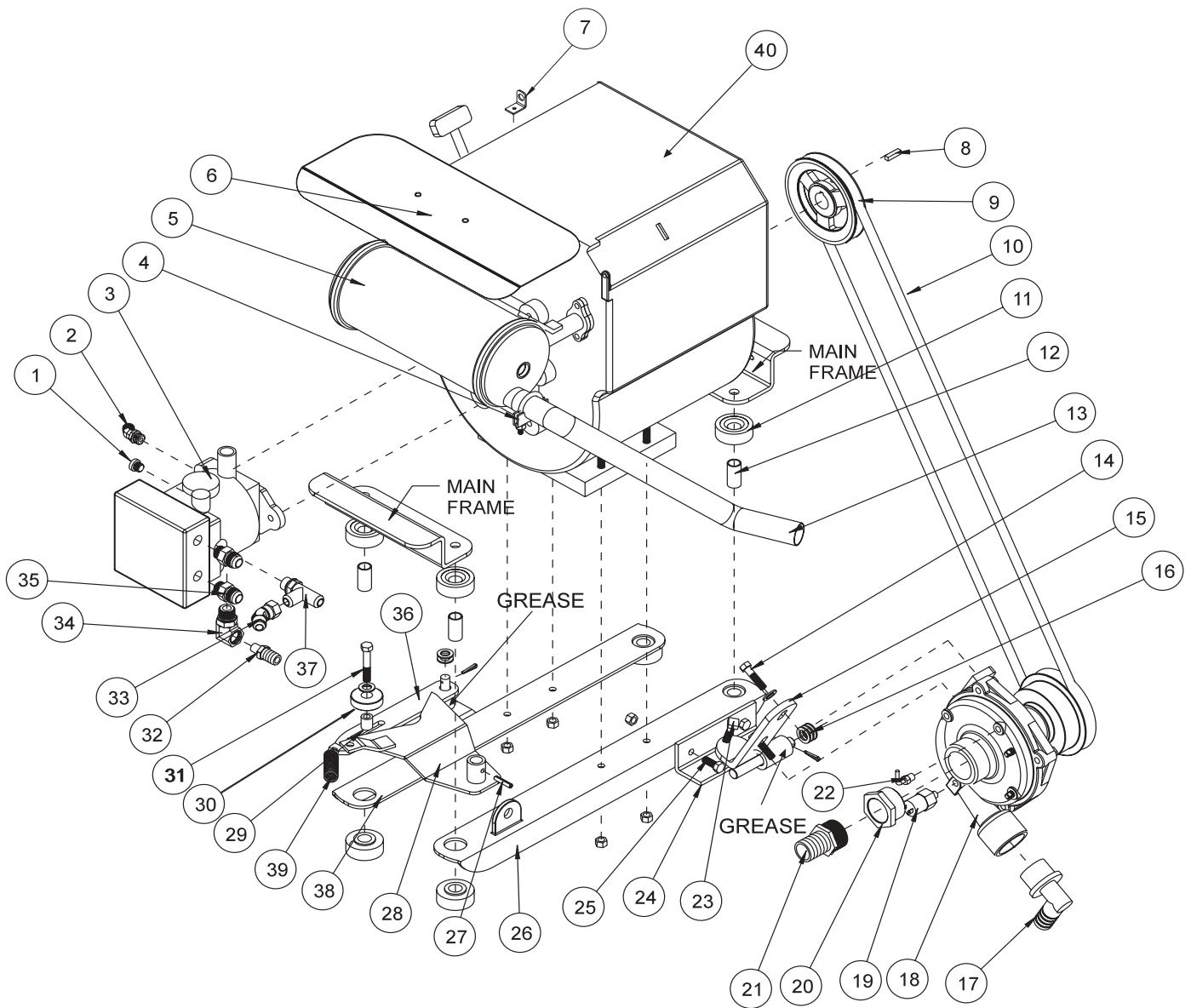
REF#	PART#	DESCRIPTION	QUANTITY
1	10-201	Seat Panel	1
	25-348	Decal, Control Panel	1
	42-116	Rubber Insert	6
2	48-066	Pedal Pad	1
3	10-163	Forward Foot Pedal	1
	HMB-12-14	Machine Bushing $\frac{1}{2} \times 14GA$	2
	HP-18-075	Cotter Pin $\frac{1}{8} \times \frac{3}{4}$	1
4	76-296	Pedal Mount	2
	18-234	Bushing	4
	HG-14-28-180	Grease Fitting $\frac{1}{4} - 28 \times 180^\circ$	2
5	48-132	Short Pedal Pad	1
6	10-164	Reverse Foot Pedal	1
	HMB-12-14	Machine Bushing $\frac{1}{2} \times 14GA$	2
	HP-18-075	Cotter Pin $\frac{1}{8} \times \frac{3}{4}$	1
7	21-462	Ball Joint	2
	HN-516-24	Nut $\frac{5}{16} - 24$	2
8	10-148	Reverse Linkage	1
	HN-516-24	Nut $\frac{5}{16} - 24$	1
	HP-18-075	Cotter Pin $\frac{1}{8} \times \frac{3}{4}$	1
9	10-178	Relay	1
	18-234	Bushing	2
	HG-14-28-180	Grease Fitting $\frac{1}{4} - 28 \times 180^\circ$	1
	HMB-12-14	Machine Bushing $\frac{1}{2} \times 14GA$	2
	HP-18-075	Cotter Pin $\frac{1}{8} \times \frac{3}{4}$	1
10	18-115	Ball Joint $\frac{1}{4} NF$	2
	HWL-14	Lock Washer $\frac{1}{4}$	2
	HN-14-28	Nut $\frac{1}{4} - 28$	4
11	10-149-M	Forward Linkage	1
	HN-516-24	Nut $\frac{5}{16} - 24$	1
	HP-18-075	Cotter Pin $\frac{1}{8} \times \frac{3}{4}$	1
12	HST-516-18-075	Truss Head Machine Screw $\frac{5}{16} - 18 \times \frac{3}{4}$	4
	HNTL-516-18	Lock Nut $\frac{5}{16} - 18$	4
13	42-063	Cable with Nuts	1
14	HB-516-18-400	Bolt $\frac{5}{16} - 18 \times 4$	2
	HNTL-516-18	Lock Nut $\frac{5}{16} - 18$	2
15	10-228	Spray Boss Control	1
	10-134	Spacer	2
16	10-190	Cable, Spray Boss Control	1
17	10-166	Rear Engine Mount	1
18	11-100	Yoke $\frac{5}{16}$	2
	HN-516-24	Nut $\frac{5}{16} - 24$	2
	HCP-516-100	Clevis Pin $\frac{5}{16} \times 1$	2
	HP-18-100	Cotter Pin $\frac{1}{8} \times 1$	2
19	10-151	Swash Plate	1
20	10-137	Main Frame	1
21	10-189	Speed Boss	1
	18-289	Bushing	2
22	10-206	Hood Rod Bracket	1
23	22-073	Battery (Optional)	

# FOOT PEDAL LINKAGE DRAWING



## FOOT PEDAL LINKAGE PARTS LIST

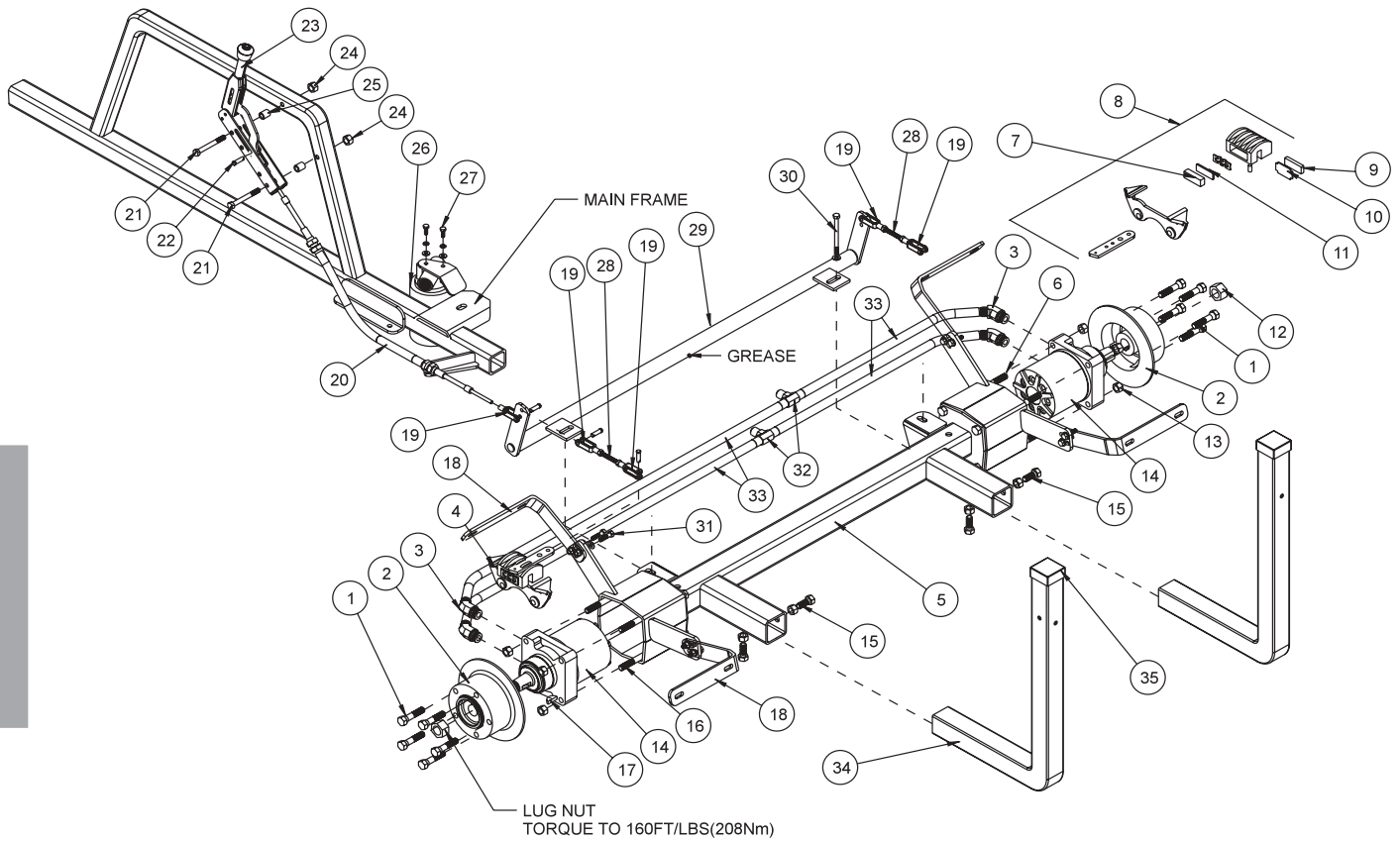
REF#	PART#	DESCRIPTION	QUANTITY
24	10-150	Battery Hold Down	1
	HN-14-20	Nut $\frac{1}{4}$ - 20	1
25	10-195	Hood Rod	1
	HW-516	Washer $\frac{5}{16}$	2
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	2
26	10-192	Seat Hinge	1
	HST-14-20-075	Truss Head Machine Screw $\frac{1}{4}$ - 20 x $\frac{3}{4}$	6
	HW-14	Washer $\frac{1}{4}$	6
	HWL-14	Lock Washer $\frac{1}{4}$	6
	HN-14-20	Nut $\frac{1}{4}$ - 20	6
27	10-211	Hood Rod Mount	1
	HST-14-20-075	Truss Head Machine Screw $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HWL-14	Lock Washer $\frac{1}{4}$	2
	HN-14-20	Nut $\frac{1}{4}$ - 20	2
28	HB-516-18-350	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{2}$	1
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	1
29	34-162	Throttle Bracket	1
	HSM-10-32-063	Machine Screw #10 - 32 x $\frac{5}{8}$	4
	HWL-10	Lock Washer #10	4
	HN-10-32	Nut #10 - 32	4
30	HST-14-20-075	Truss Head Machine Screw $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HWL-14	Lock Washer $\frac{1}{4}$	2
	HN-14-20	Nut $\frac{1}{4}$ - 20	2



## ENGINE, PUMPS AND EXHAUST PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	23-126	O-Ring Plug	1
2	18-188	45° Elbow	1
3	10-117	Hydrostat Pump	1
	HSSH-12-13-175	Socket Screw $\frac{1}{2}$ - 13 x $1\frac{3}{4}$	2
4	18-220	Muffler Clamp $1\frac{1}{4}$	1
5	10-118-01	Muffler (Kohler 24 786 11)	1
6	10-229	Heat Shield	1
7	34-163	Cable Bracket	1
8	HKSQ-14-100	Machine Key $\frac{1}{4}$ x $\frac{1}{4}$ x 1	1
9	10-212	Pulley BK57	1
10	10-179	Belt	1
11	60-107	Rubber Bushing	8
12	60-168	Spacer	4
13	10-197	Exhaust Pipe	1
14	HB-38-16-150	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
	HW-38	Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
15	10-245	Pump Mount	1
16	HMB-58-14	Machine Bushing $\frac{5}{8}$ x 14GA	3
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
17	16-168	Elbow $1\frac{1}{4}$ MPTx 1HB	1
18	16-966	Hypro® Pump	1
19	33-480	Pressure Switch	1
20	16-825	Reducer Bushing $1\frac{1}{2}$ x $1\frac{1}{4}$	1
21	16-161	Fitting $1\frac{1}{4}$ MPTx $1\frac{1}{4}$ HB	1
22	33-494	Male Elbow	1
23	HSSQ-38-16-150	Adjustment Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	1
	HN-38-16	Nut $\frac{3}{8}$ - 16	1
24	10-133	Pivot	1
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	1
	18-268	Bushing	2
25	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
26	10-166	Rear Engine Mount	1
27	HRP-14-100	Roll Pin $\frac{1}{4}$ x 1	1
28	10-151	Swash Plate	1
29	10-134	Spacer	1
30	14-266	Ball Bearing $1\frac{3}{4}$ OD x $\frac{5}{8}$ ID	1
	18-270	Oilite Bushing $\frac{5}{8}$ OD x $\frac{3}{8}$ ID	1
31	HB-38-16-225	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{4}$	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	1
32	18-133	Barb Fitting $\frac{1}{2}$ NPTx $\frac{3}{4}$ HB	1
33	34-044	Elbow	1
34	23-127	Elbow	1
35	18-267	Straight Thread Connector	2
36	10-136	Idler Arm	1
	18-234	Oilite Bushing	2
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	1
	HMB-12-14	Machine Bushing $\frac{1}{2}$ - 14GA	2
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
37	18-210	Tee	1
38	10-177	Front Engine Mount	1
39	21-212	Spring	1
40	10-118	Engine Kohler 25HP	1

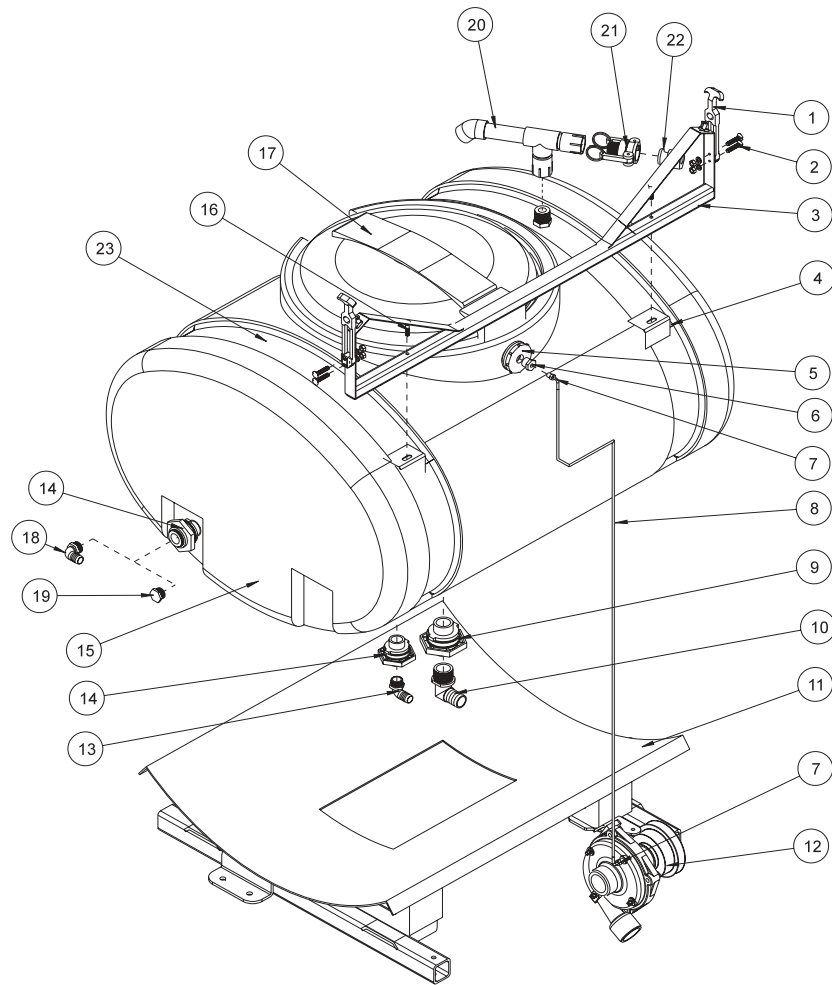
# PARK BRAKE AND REAR AXLE DRAWING



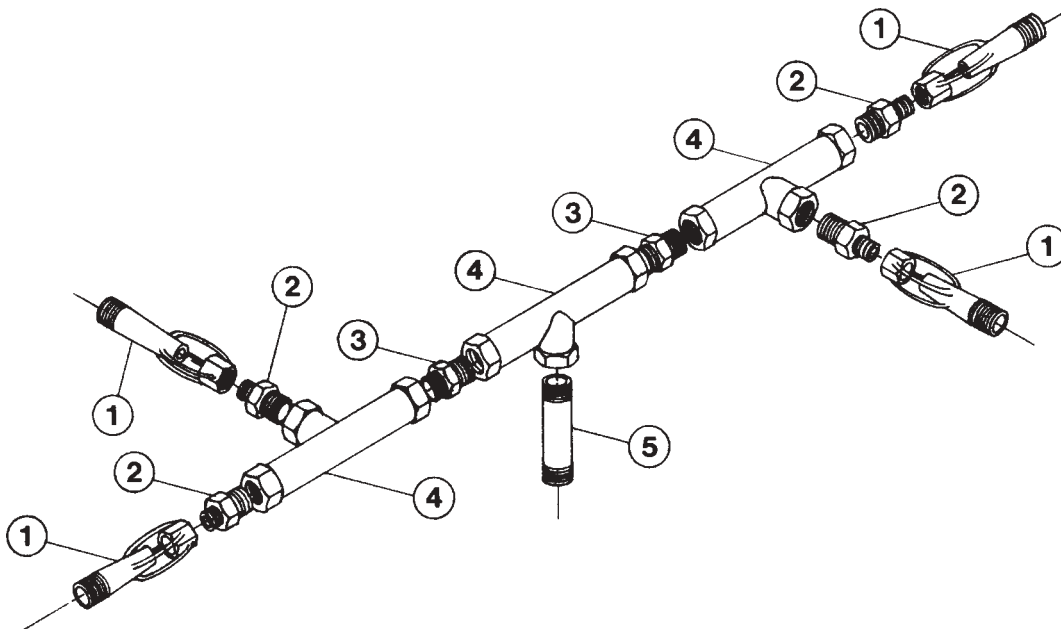
## PARK BRAKE AND REAR AXLE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	60-268	Lug Bolt $\frac{1}{4}$ - 20 x $1\frac{5}{16}$	10
2	76-239	8" Brake Disk (5 hole)	2
3	18-265	45° Elbow	4
4	76-240	Left Caliper (CCW)	1
5	10-124	Rear Axle	1
6	HB-12-13-800	Bolt $\frac{1}{2}$ - 13 x 8	4
7*		Cam Side Pad	1
8	76-241	Right Caliper (CW)	1
9*		Carrier Side Pad	1
10*		Carrier Side Pad Support	1
11*		Cam Side Pad Support	1
12	14-265	Nut 1 - 20 (included with Ref# 14)	2
13	HNTL-12-13	Lock Nut $\frac{1}{2}$ - 13	8
14	10-116	Wheel Motor (includes Ref# 12 & 17)	2
15	HB-12-13-125	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{4}$	4
	HNJ-12-13	Jam Nut $\frac{1}{2}$ - 13	4
16	HB-12-13-750	Bolt $\frac{1}{2}$ - 13 x $7\frac{1}{2}$	4
17	HWK-516-100	Woodruff Key $\frac{5}{16}$ x 1 (included with Ref# 14)	2
18	10-154	Fender Brackets	4
19	11-100	Linkage Yokes $\frac{5}{16}$	6
	HN-516-24	Nut $\frac{5}{16}$ - 24	12
	HCP-516-100	Clevis Pin $\frac{5}{16}$ x 1	5
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	5
20	10-121	Brake Cable with Nuts	1
21	HB-516-18-400	Bolt $\frac{5}{16}$ - 18 x 4	2
22	HCP-516-138	Clevis Pin $\frac{5}{16}$ x $1\frac{3}{8}$	1
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
23	10-120	Park Brake Handle	1
24	HN-516-18	Nut $\frac{5}{16}$ - 16	2
25	10-134	Spacer	2
26	23-006	Oil Filter	1
	23-031	Replacement Filter	
27	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HW-14	Washer $\frac{1}{4}$	2
	HWL-14	Lock Washer $\frac{1}{4}$	2
28	10-126	Brake Rod $\frac{5}{16}$ - 24	2
29	10-125	Brake Relay	1
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	1
30	HB-12-13-150	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{2}$	2
	HW-12	Washer $\frac{1}{2}$	4
	HNTL-12-13	Lock Nut $\frac{1}{2}$ - 13	2
31	HB-516-18-125	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{4}$	8
	HW-516	Washer $\frac{5}{16}$	16
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	8
32	34-057	Tee	2
33	10-123	Hydraulic Hose	4
34	10-205	Boom Carrier	2
35	16-557	Square Cap	2
*	34-101-02	Pad Kit with 2 Pads and Steel Backing Plates	2 Kits Req'd/Axle

## TANK DRAWING



## TURBO-QUAD AGITAOR DRAWING





## TANK PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-437	Latch	2
2	HSM-8-32-100	Machine Screw #8 - 32 x 1	4
	HWL-8	Lock Washer #8	4
	HN-8-32	Nut #8 - 32	4
3	10-193	Horizontal Boom Support	1
4	10-191	Tank Strap	2
	HB-38-16-400	Bolt $\frac{3}{8}$ - 16 x 4	2
	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
5	33-495	Bulkhead Fitting	1
6	33-496	Reducer Bushing $\frac{1}{2}$ x $\frac{1}{8}$	1
7	33-494	Male Elbow	1
8	8954-30	Clear Hose $\frac{3}{16}$ ID	1
9*	16-194	Anti-Vortex Fitting $1\frac{1}{4}$	1
10	16-156	Elbow $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	1
11	10-112	Tank Carrier	1
12	16-966	Hypro Pump	1
13	16-153	Elbow $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
14*	16-150	Double Threaded Fitting $\frac{3}{4}$	2
15*	10-111	110 Gallon Poly Tank	1
16	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
17*	16-953	16" Hinged Lid/Well with Gasket	1
	16-953-01	Gasket for 16-953	1
	16-169	Strainer Basket 16"	1
18	16-155	Elbow $\frac{3}{4}$ MPT x 1 HB	1

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

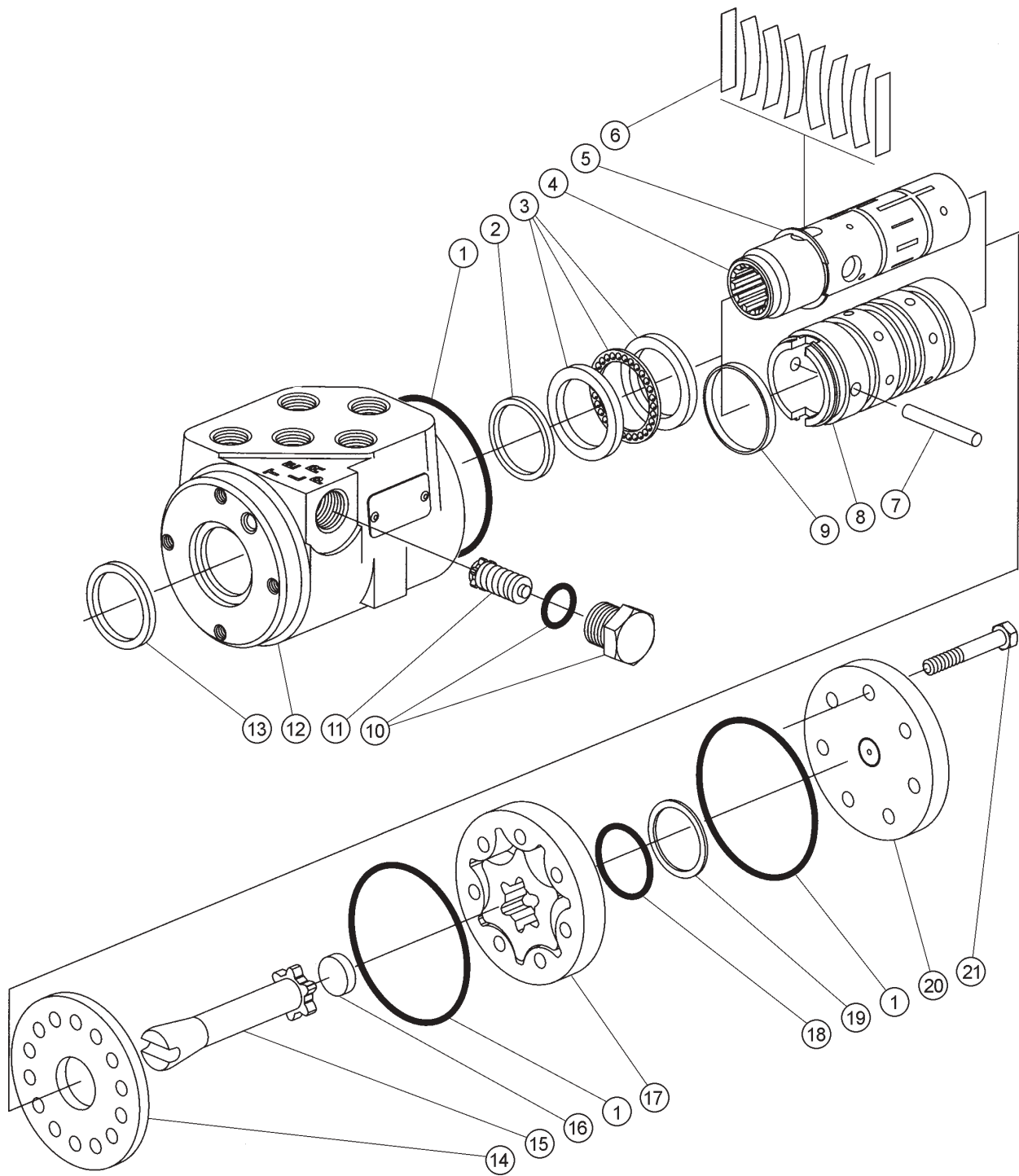
Parts

## TURBO-QUAD AGITATOR PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-036	Agitator Jet (factory installed large orifice, $\frac{3}{4}$ ) (Set of 4)	1
	16-036-01	Interchangable Orifices $\frac{1}{8}$	1
	16-036-02	Interchangable Orifices $\frac{5}{32}$	1
	16-036-03	Interchangable Orifices $\frac{3}{16}$	1
2	16-173	Reducer $\frac{3}{4}$ x $\frac{1}{2}$	4
3	16-158	Close Nipple $\frac{3}{4}$ x $\frac{3}{4}$	2
4	16-157	Female Pipe Thread Tee $\frac{3}{4}$ x $\frac{3}{4}$ x $\frac{3}{4}$	3
5	16-172	Nylon Nipple $\frac{3}{4}$ NPT x $3\frac{1}{2}$	1

34-103 ORBITROL DRAWING

Parts

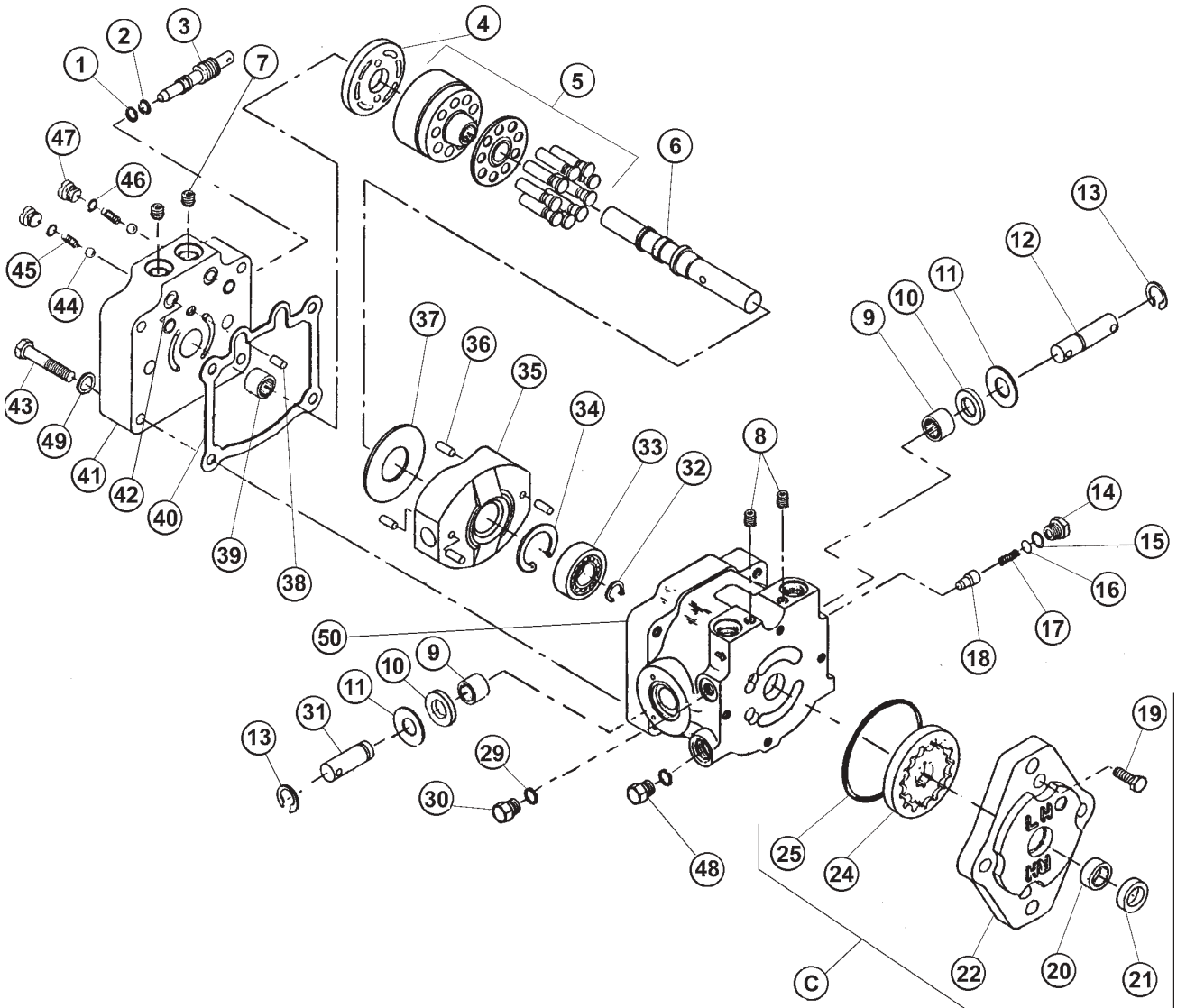


REF #	PART #	DESCRIPTION	QUANTITY
1*		O-Ring Seal	3
2*		Quad Seal	1
3	15-301-14	Bearing Kit	1
		Bearing Race	2
		Bearing	1
4		Spool	1
5	15-301-13	External Retaining Ring	1
6	15-301-15	Spring Centering Kit (Includes Ref# 9)	1
		Spring Spacer	2
		Centering Spring	6
		Spring Retaining Ring	1
7	15-301-08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

## 15-301 ORBITOR SPECIFICATIONS

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

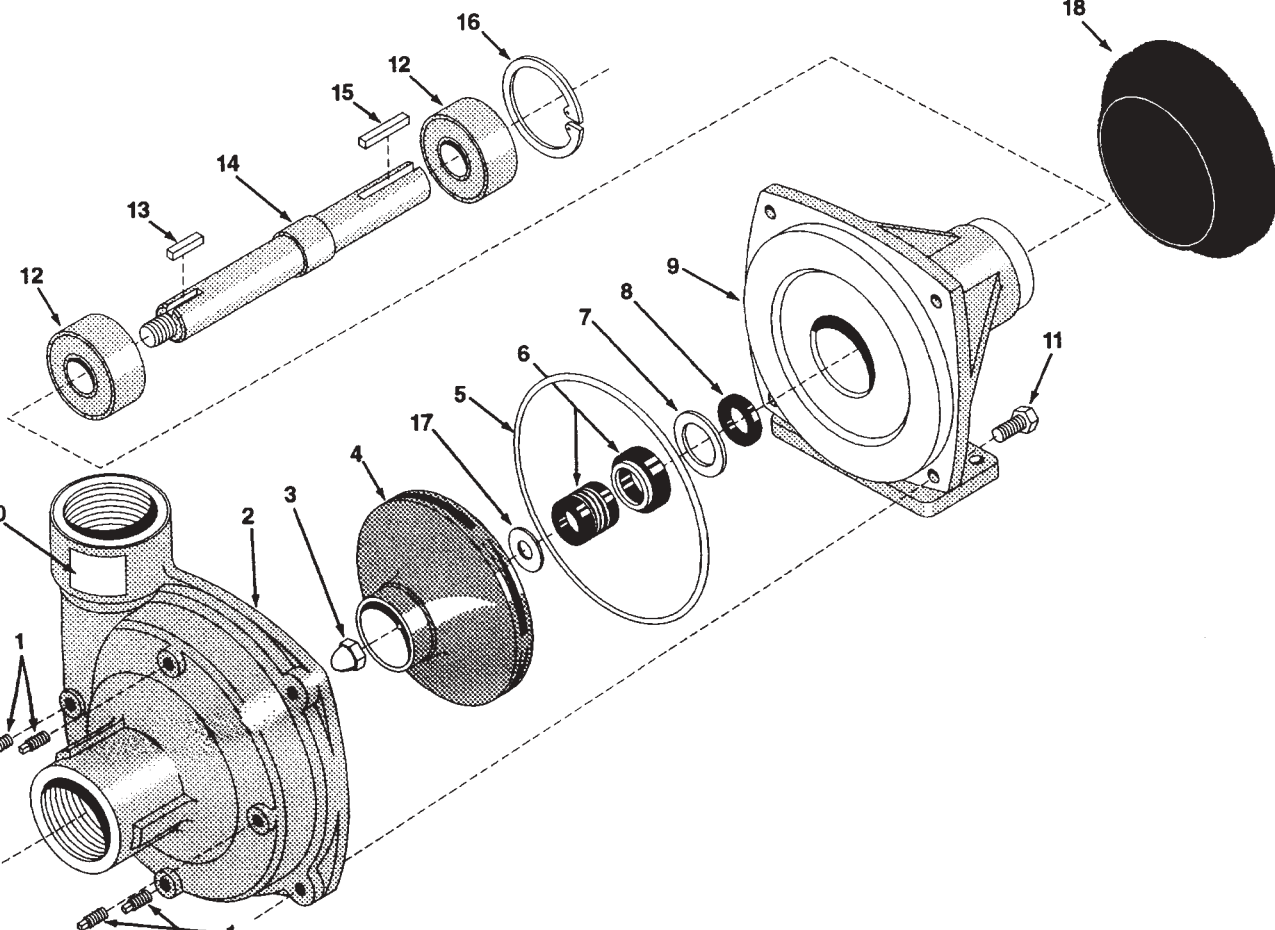
# 10-117 HYDRAULIC PUMP DRAWING



## 10-117 HYDRAULIC PUMP PARTS LIST

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

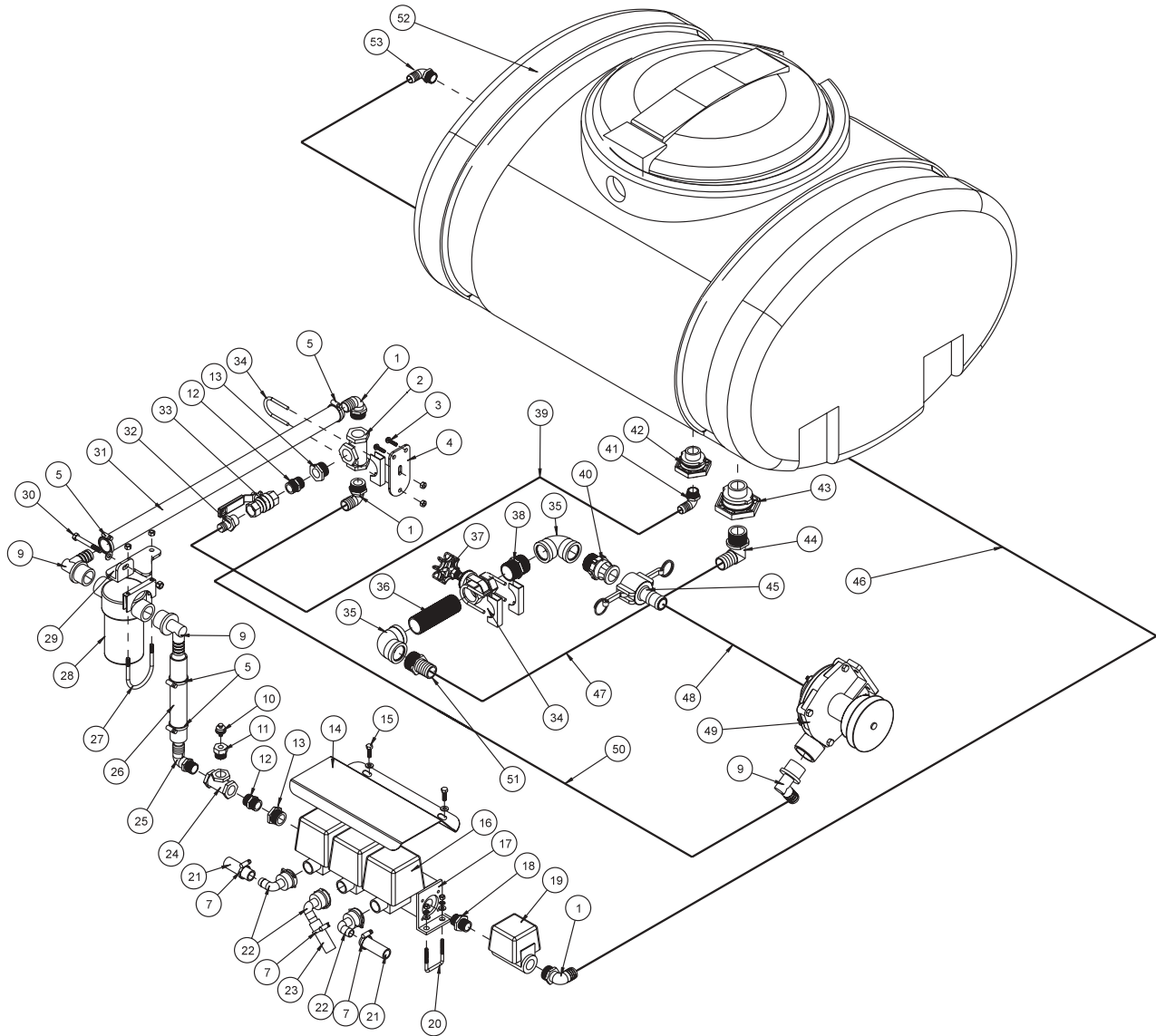
## 16-966 HYPRO® PUMP DRAWING



## Parts

## 16-966 HYPRO® PUMP PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-966-01	Drain Plug	4
2	16-966-02	Pump Casing	1
3	16-966-03	Impeller Nut	1
4	16-966-04	Impeller	1
5	*	O-Ring	1
6	*	Mechanical Seal (Silicon Carbide)	1
7	16-966-05	Seal Retainer	1
8	*16-966-06	Slinger Ring	1
9	16-966-07	Mounting Flange	1
10	16-966-08	Name Plate	1
11	16-966-09	Bolt	4
12	16-966-10	Ball Bearing	2
13	16-966-11	Key	1
14	16-966-12	Pump Shaft	1
15	16-822-20	Key	1
16	16-966-13	Bearing Retainer	1
17	*	Gasket	1
18	16-966-14	Clutch	1
*	16-967	Silicone - Carbon Seal Kit	
	16-966-15	Pump Only	

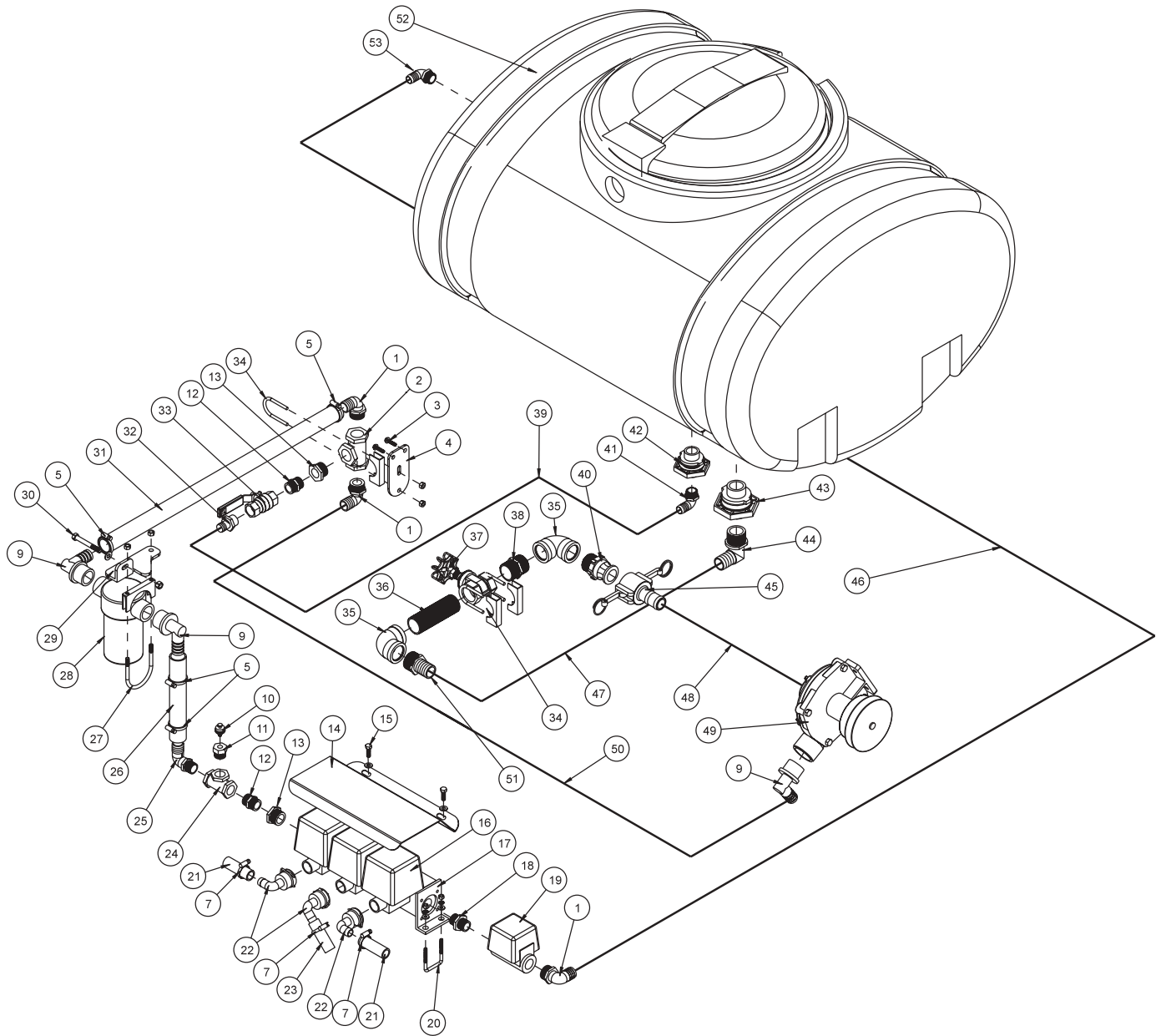




REF#	PART#	DESCRIPTION	QUANTITY
1	16-164	Elbow 1" MPT x 1" HB	3
2	16-183	Tee, FPT 1 x 1 x 1	1
3	HSD-14-100	Drill Screw 1/4 x 1	2
4	10-226	Valve Mount	1
5	18-222	Hose Clamp	4
7	18-040	Hose Clamp	3
9	16-168	Elbow 1 1/4 MPT x 1 HB	3
10*	15-569	Pressure Transducer	1
11	16-288	Reducer Bushing 3/4 x 1/4	1
12	16-158	Close Nipple 3/4 x 3/4	2
13	16-163	Reducer Bushing 1 x 3/4	2
14	10-199	Shield	1
15	HB-516-18-100	Bolt 5/16 - 18 x 1	2
	HW-516	Washer 5/16	2
	HNTL-516-18	Lock Nut 5/16 - 18	2
16	15-552	Manifold Ball Valve	1
17	15-552-07	Steel Mounting Bracket (comes with Ref# 16)	2
18	16-851	Close Nipple 1"	1
19	15-531	Pressure Regulating Valve	1
20	10-194	U-bolt	2
	HW-14	Washer 1/4	4
	HWL-14	Lock Washer 1/4	4
	HN-14-20	Nut 1/4 - 20	4
21	8887-40	Orange PVC Hose 3/4" (to right and left boom)	2
22	15-553	3/4 - 90° Hose Barb	3
23	8887-35	Orange PVC Hose 3/4" (to center boom)	1
24	16-157	Tee, FPT 3/4 x 3/4 x 3/4	1
25	16-155	Elbow 3/4 MPT x 1 HB	1
26	8896-9	Discharge Hose 1"	1
27	10-147	Muffler Clamp 2 1/2	1
28	16-968	Strainer 50 Mesh	1
29	10-210	Strainer Mount	1
30	HB-38-16-300	Bolt 3/8 - 16 x 3	1
	HW-38	Washer 3/8	1
	HNTL-38-16	Lock Nut 3/8 - 16	1
31	8896-62	Discharge Hose 1"	1
32	16-154	Fitting 3/4 MPT x 3/4 HB	1
33	16-859	Ball Valve 3/4 Brass	1
34	50-394	Muffler Clamp 1 3/4	3
35	16-182	Elbow	2
36	18-296	Black Pipe Nipple 1 1/4 x 5	1
37	16-170	Gate Valve 1 1/4	1
38	16-880	Close Nipple 1 1/4	1
39	8887-37	Orange PVC Hose 3/4"	1
	18-040	Hose Clamp	2

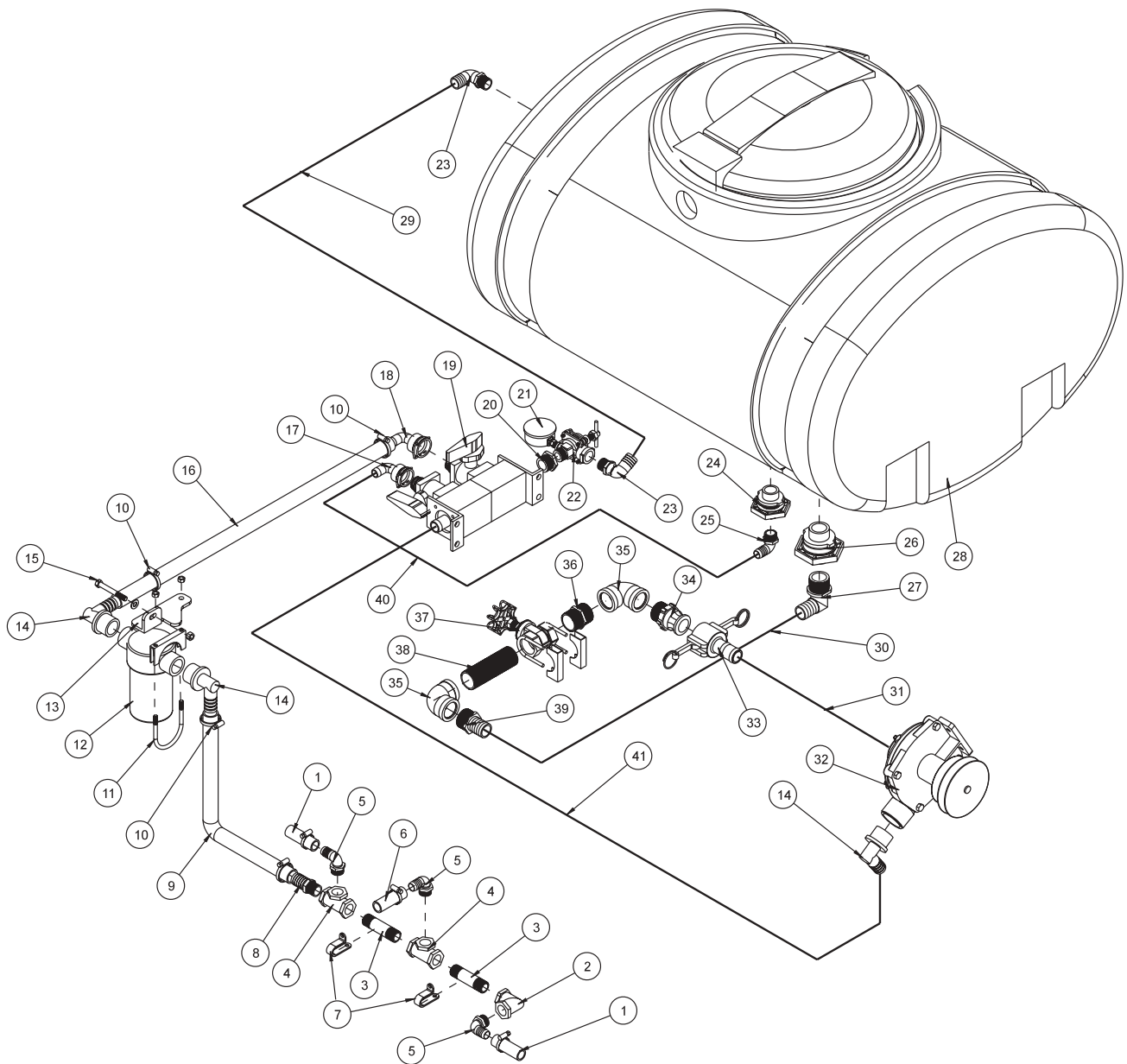
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*	10-227	834 Sprayer Control Kit	1
†	Comes with 110 Gallon Poly Tank		



# 1006 (834) PLUMBING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
40	16-180	Quick Coupler, 1 <sup>1</sup> / <sub>4</sub> Male	1
41	16-153	Elbow <sup>3</sup> / <sub>4</sub> MPT x <sup>3</sup> / <sub>4</sub> HB	1
42†	16-150	Double Threaded Fitting <sup>3</sup> / <sub>4</sub>	1
43†	16-194	Anti-Vortex Fitting 1 <sup>1</sup> / <sub>4</sub>	1
44	16-156	Elbow 1 <sup>1</sup> / <sub>4</sub> MPT x 1 <sup>1</sup> / <sub>4</sub> HB	1
45	16-181	Quick Coupler, 1 <sup>1</sup> / <sub>4</sub> Female	1
46	8896-65	Discharge Hose 1"	1
	18-222	Hose Clamp	2
47	8889-27	Suction Hose 1 <sup>1</sup> / <sub>4</sub>	1
	18-116	Hose Clamp	2
48	8889-24	Suction Hose 1 <sup>1</sup> / <sub>4</sub>	1
	18-116	Hose Clamp	2
49	16-966	Hypro® Pump	1
50	8896-45	Discharge Hose 1"	1
	18-222	Hose Clamp	2
51	16-161	Fitting 1 <sup>1</sup> / <sub>4</sub> NPT x 1 <sup>1</sup> / <sub>4</sub> HB	1
52†	10-111	110 Gallon Poly Tank	1
	16-953	16" Hinged Lid/Well with Gasket	1
	16-953-01	Gasket for 16-953	1
	16-169	Strainer Basket 16"	1
53	16-155	Elbow <sup>1</sup> / <sub>4</sub> MPT x <sup>1</sup> / <sub>4</sub> HB	1
*	10-227	834 Sprayer Control Kit	1
†	Comes with 110 Gallon Poly Tank		



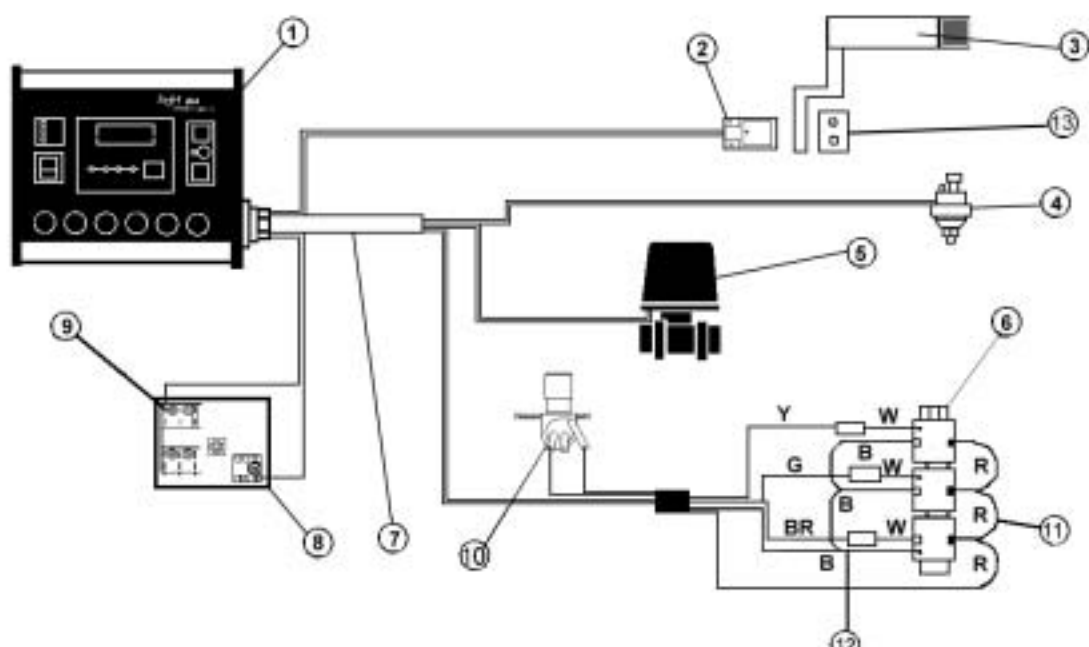
# 1004 MANUAL PLUMBING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	8887-40	Orange PVC Hose 3/4" (to right and left boom)	2
	18-040	Hose Clamp	4
2	16-151	Elbow FPT 3/4 x 3/4	1
3	16-172	Nylon Nipple 3/4 x 3 1/2	2
4	16-157	Tee FPT 3/4 x 3/4 x 3/4	2
5	16-153	Elbow 3/4 MPT x 3/4 HB	3
6	8887-35	Orange PVC Hose 3/4" (to center boom)	1
	18-040	Hose Clamp	2
7	HLC-100	Loom Clamp 1"	2
	HSD-14-075	Drill Screw 1/4 x 3/4	2
8	16-196	Hose Barb 3/4 MPT x 1 HB	1
9	8896-16	Discharge Hose 1"	1
10	18-222	Hose Clamp	4
11	10-147	Muffler Clamp 2 1/2	1
12	16-968	Strainer 50 Mesh	1
13	10-210	Strainer Mount	1
14	16-168	Elbow 1 1/4 MPT x 1 HB	3
15	HB-38-16-300	Bolt 3/8 - 16 x 3	1
	HNTL-38-16	Lock Nut 3/8 - 16	1
16	8896-65	Discharge Hose 1"	1
17*	15-553	3/4 - 90° Hose Barb	1
18*	10-208	1 - 90° Hose Barb	1
19*	10-207	Manual Ball Valve	1
	HB-14-20-250	Bolt 1/4 - 20 x 2 1/2	2
	HNTL-14-20	Lock Nut 1/4 - 20	2
20	16-163	Reducer Bushing 1 x 3/4	1
21	16-281	Liquid Filled Gauge	1
22	16-034	Throttling Valve	1
23	16-155	Elbow 3/4 MPT x 1 HB	2
24†	16-150	Double Threaded Fitting	1
25	16-153	Elbow 3/4 MPT x 3/4 HB	1
26†	16-194	Anti-Vortex Fitting 1 1/4	1
27	16-156	Elbow 1 1/4 MPT x 1 1/4 HB	1
28†	10-111	110 Gallon Poly Tank	1
	16-953	16" Hinged Lid/Well with Gasket	1
	16-953-01	Gasket for 16-953	1
	16-169	Strainer Basket 16"	1
29	8896-35	Discharge Hose 1"	1
	18-222	Hose Clamp	2
30	8889-27	Suction Hose 1 1/4"	1
	18-116	Hose Clamp	2
31	8889-24	Suction Hose 1 1/4"	1
	18-116	Hose Clamp	2
32	16-966	Hyprow® Pump	1
33	16-181	Quick Coupler 1 1/4 Female	1
34	16-180	Quick Coupler 1 1/4 Male	1
35	16-182	Elbow	2
36	16-880	Close Nipple 1 1/4	1
37	16-170	Gate Valve 1 1/4	1
38	18-296	Black Pipe Nipple 1 1/4 x 5	1
39	16-161	Fitting 1 1/4 NPT x 1 1/4 HB	1
40	8887-44	Orange PVC Hose 3/4	1
	18-040	Hose Clamp	2
41	8896-45	Discharge Hose 1"	1
	18-222	Hose Clamp	2

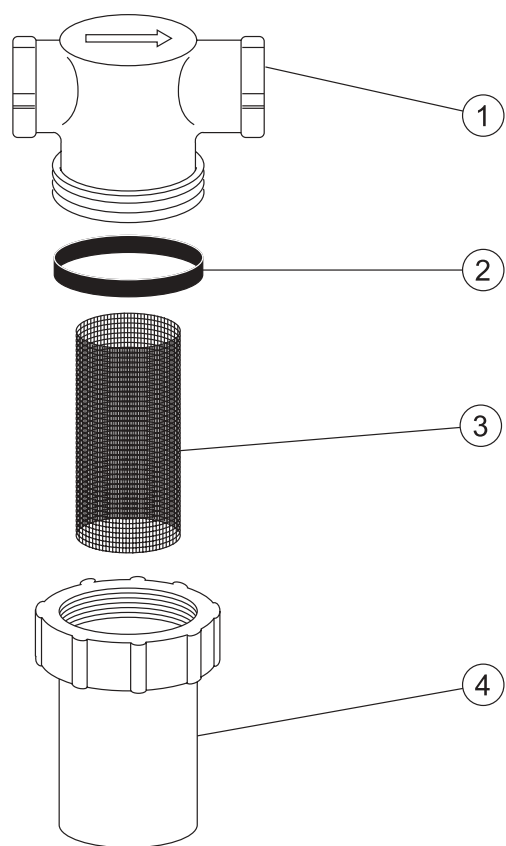
\* Comes with 10-207 Manual Ball Valve

† Comes with 10-111 110 Gallon Poly Tank

## CONTROL 1006 (834) SYSTEM DRAWING



## 16-968 STRAINER DRAWING



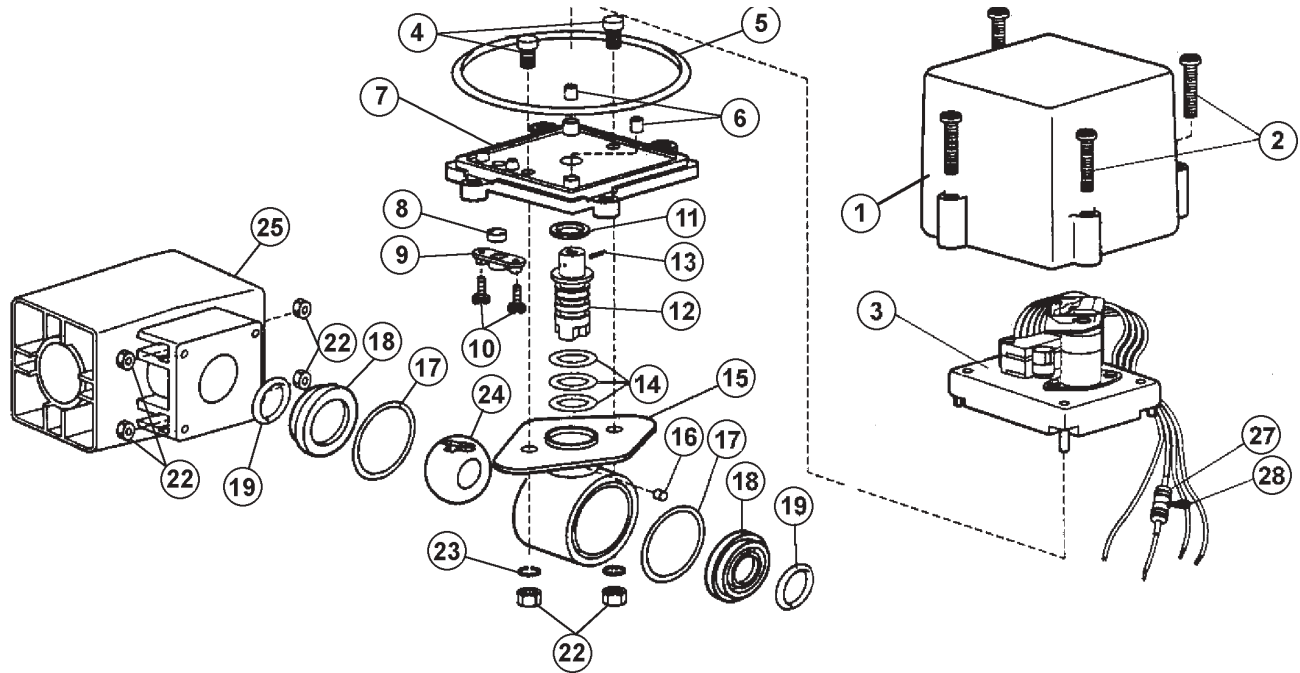
## CONTROLS 1006 (834) SYSTEM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	10-233	834 Console(only)	1
2	10-232	Speed Sensor	1
3	10-152	Left Spindle	1
4*	15-569	Pressure Transducer	1
5	15-531	Pressure Regulating Valve	1
6	15-552	Manifold Ball Valve	1
7*	15-527	Power Cord	1
8	33-271	Fuse Block	1
9	33-508	Auto Blade Type Fuse 15 AMP	2
*	10-227	834 Sprayer Control Kit	1

## 16-968 STRAINER PARTS LIST

RE87F#	PART#	DESCRIPTION	QUANTITY
1	16-968-01	Head 1 <sup>1</sup> / <sub>4</sub>	1
2	16-968-02	Gasket	1
3	16-968-03	Screen	1
4	16-968-04	Bowl	1

## 15-552 MANIFOLD BALL VALVE (3 UNIT) DRAWING



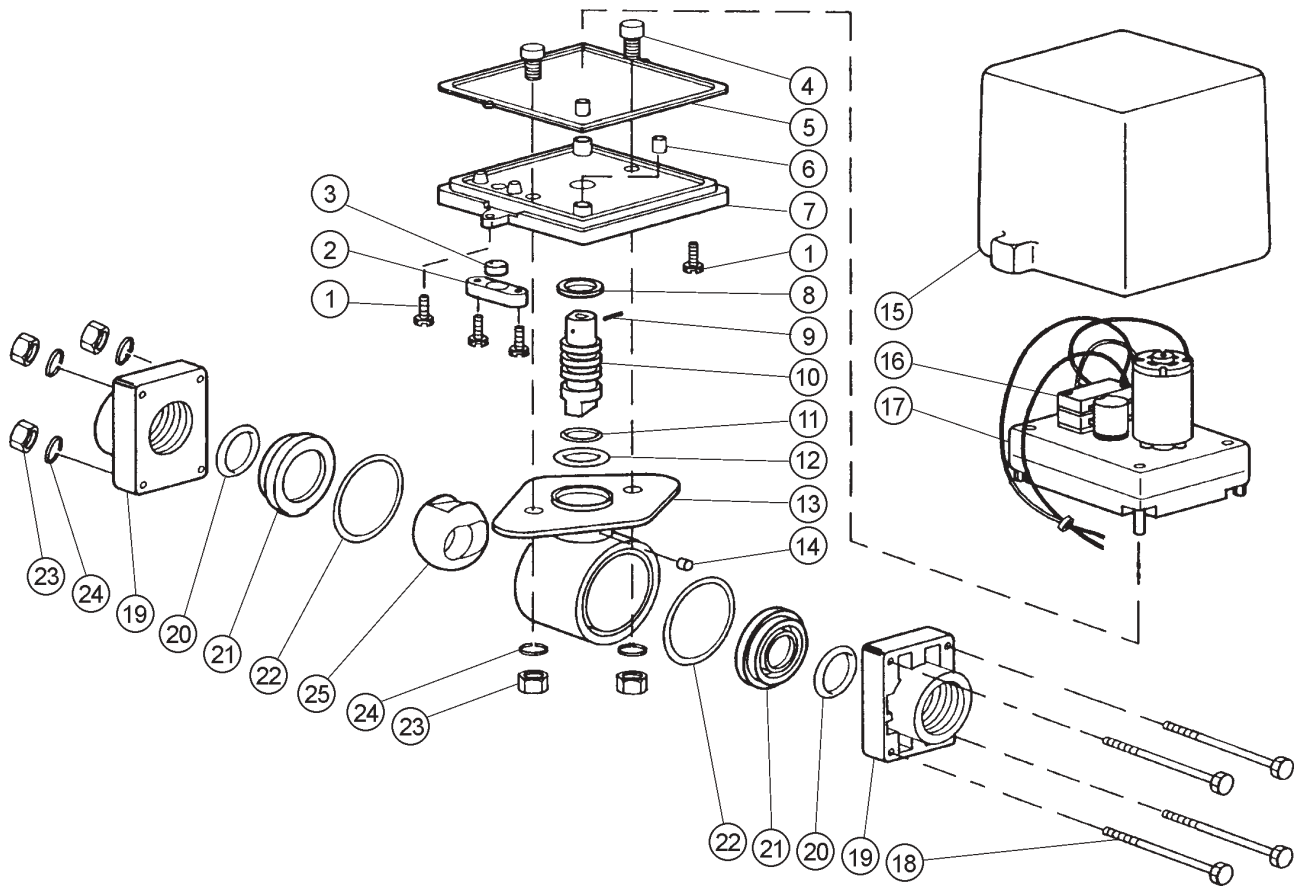


## 15-552 MANIFOLD BALL VALVE (3 UNIT) PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-531-06	Polypropylene Cover	1
2	15-552-12	Stainless Steel Phillips/Square Pan Head Screw	4
3	15-552-06	Motor Sub Assembly	1
4	15-517-04	Stainless Steel Self Cinching Stud	2
5	15-552-03	Cell Sponge Rubber Gasket	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	Stainless Steel Ball Valve Stem	1
13	15-517-13	Stainless Steel Spring Pin	1
14*	15-552-05	Teflon Coated 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	Carbon Filled Teflon Seal	2
19*	15-517-20	Viton O-ring	2
20	15-552-08	Nylon End Cap	1
21	15-517-22	Stainless Steel Hex Head Cap Screw	4
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
27	15-517-31	Fuse Holder	1
28	15-517-32	Glass Fuse	1
29	15-552-07	Steel Mounting Bracket	2
.	15-552-10	Spare Parts Kit	
	15-552-01	Single Unit	

*Comes with three 15-553<sup>3/4</sup> - 90° Hose Barbs*

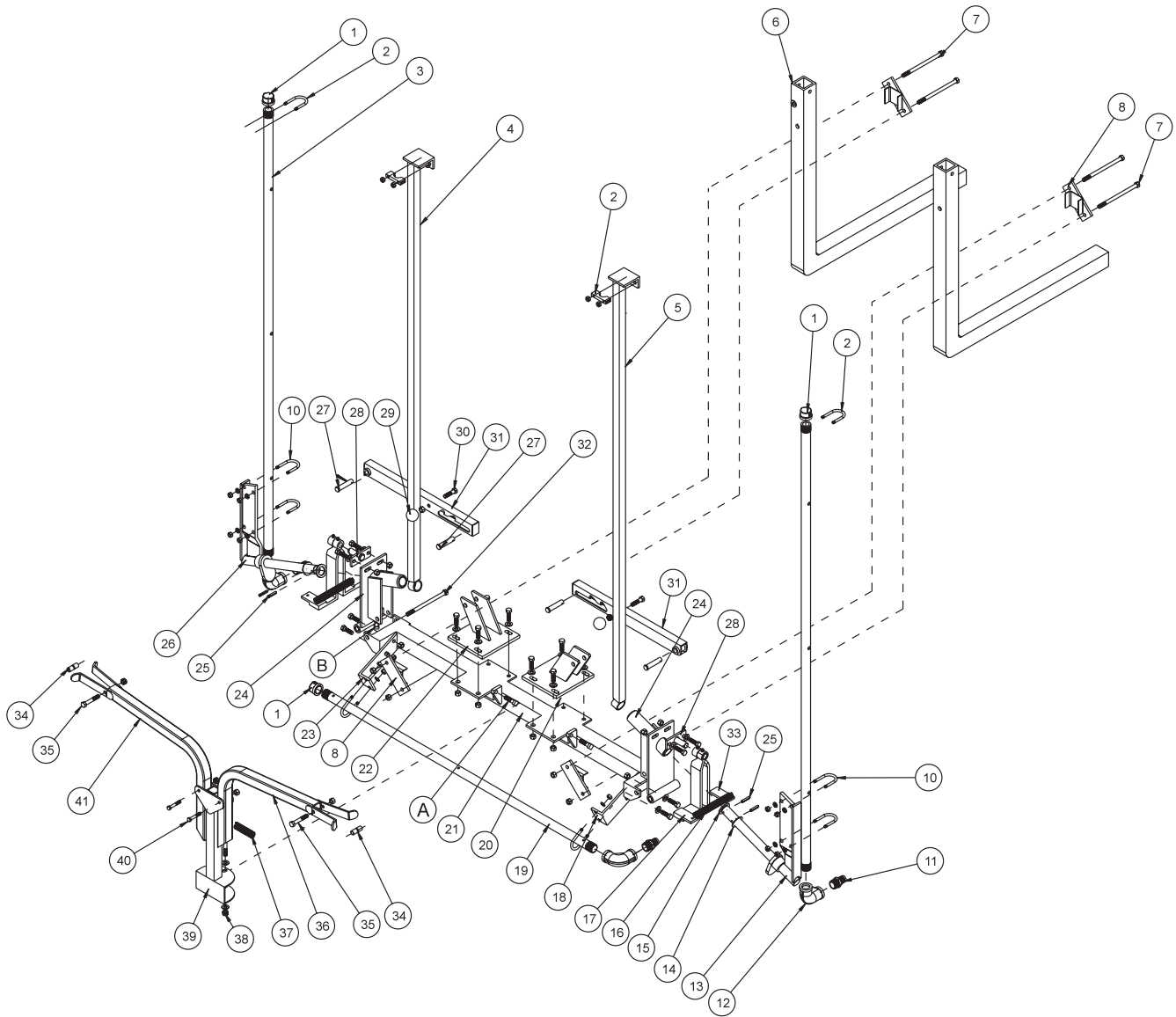
## 15-531 CONTROL VALVE DRAWING



## 15-531 CONTROL VALVE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-517-10	Stainless Steel Slotted Hex Washer Screw	4
2	15-517-09	Polypropylene Grommet Retainer	1
3	15-517-08	EPDM Rubber Grommet	1
4	15-517-04	Stainless Steel Self Cinching Stud	2
5	15-517-05	Cell Sponge Rubber Gasket	1
6	15-517-06	Neoprene Motor Mount	2
7	15-517-07	Nylon Mounting Plate	1
8*	15-517-11	Teflon Thrust Washer	1
9	15-517-13	Stainless Steel Spring Pin	1
10*	15-531-04	Nylon Ball Valve Stem	1
11*	15-517-14	Viton O-ring	1
12*	15-517-15	Teflon Coated Viton O-ring	1
13	15-517-16	Nylon Body	1
14*	15-517-17	Dense Felt Dust Plug	1
15	15-531-06	Polypropylene Cover	1
16	15-517-26	Phoneolic Limit Switch	1
17	15-531-05	Motor Sub Assembly	1
18	15-517-22	Stainless Steel Hex Head Cap Screw	4
19	15-531-03	Nylon End Cap	2
20*	15-517-20	Viton O-ring	2
21*	15-517-19	Carbon Filled Teflon Seal	2
22*	15-517-18	Viton O-ring	2
23	15-517-23	Stainless Steel Hex Nut	6
24	15-517-24	Stainless Steel Lockwasher	6
25*	15-531-02	Polypropylene Ball	1
*	15-531-01	Spare Parts Kit	

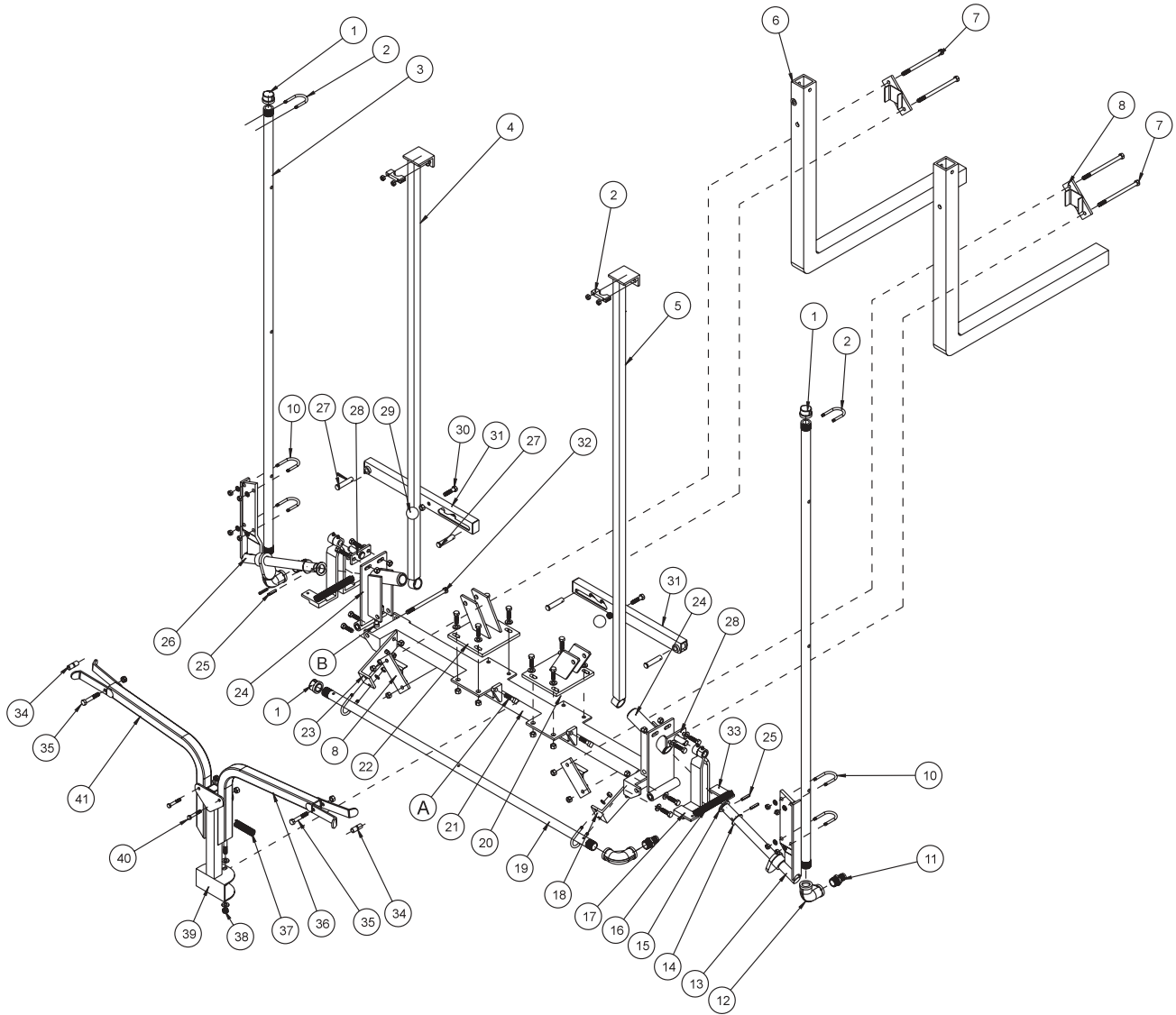
## 10-160 STAINLESS STEEL BOOM DRAWING



## 10-160 STAINLESS STEEL BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-926	Stainless Steel Cap $\frac{3}{4}$	3
2	13-498	U-Bolt Kit $1\frac{1}{8}$	2
3	15-562	Right and Left Boom Tube	2
4	15-565	Left Brush Guard	1
5	15-564	Right Brush Guard	1
6	10-205	Boom Carrier(part of the truck)	2
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
9	HSSQ-38-16-150	Square Head Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2
10	16-024	U-Bolt $\frac{5}{16}$ - 24	6
	HWS-516	Stainless Steel Washer $\frac{5}{16}$	12
	HN-516-24	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	2
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	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
22	33-331	Left Actuator Bracket	1
	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HW-38	Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
23	33-309	Left Center Tube Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
24	33-295	Pivot Bracket	2
	15-494	Nylon Flange Bushing	4
	18-036	Oilite Bushing	4
	HSSQ-38-16-150	Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
25	HRP-14-150	Roll Pin $\frac{1}{4}$ x $1\frac{1}{2}$	4
26	33-302	Left Pivot Bracket	1
27	HCPS-12-225	Stainless Steel Clevis Pin $\frac{1}{2}$ x $2\frac{1}{4}$	4
	HPS-18-100	Stainless Steel Cotter Pin $\frac{1}{8}$ x 1	4
28	33-305	Pivot	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

## 10-160 STAINLESS STEEL BOOM DRAWING (CONTINUED)



## 10-160 STAINLESS STEEL BOOM PARTS LIST (CONTINUED)

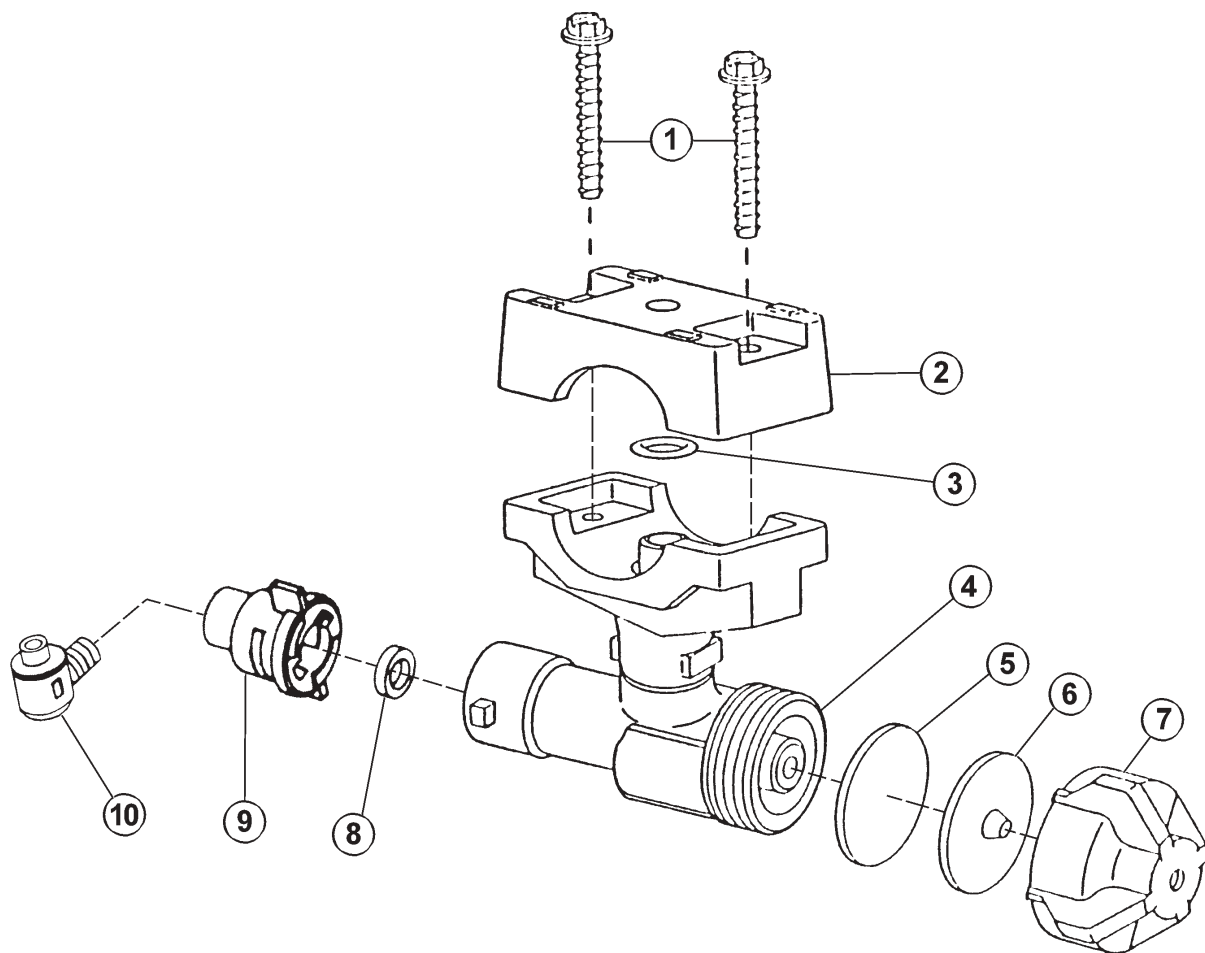
REF#	PART#	DESCRIPTION	QUANTITY
29	15-014	Shift Knob	2
30	HB-38-16-175	Bolt $\frac{3}{8}$ - 16 x $1\frac{3}{4}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2
31	15-561	Boom Lift	2
32	HBS-12-13-550	Stainless Steel Bolt $\frac{1}{2}$ - 13 x $5\frac{1}{2}$	2
	HNTL-12-13	Lock Nut $\frac{1}{2}$ - 13	2
33	33-307	Left Cam Stop (must also order 33-306)	2
	18-268	Oilite Bushing	2
34	18-289	Bushing $\frac{3}{8}$ ID - $\frac{1}{2}$ OD x $\frac{5}{8}$	4
35	HB-38-16-225	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{4}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
36	10-247	Right Boom Stabilizer	1
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

## INSTALLATION INSTRUCTIONS

For best result use plumber's 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# 24). 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 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" (51cm) nozzle height) and center. Tighten bolts.
3. Take right boom and slide pivot bracket (Ref# 13) in center mount (Ref# 24) 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.
4. Install boom lifts (Ref# 31) using clevis pin and cotter pin (Ref# 27) so the slotted end hooks to the pivot bracket (Ref# 24) and the bushing end hooks to the actuator bracket (Ref# 20 & 22).
5. 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.
6. Use the adjustment slots on the boom lifts to completely lift and lower booms.
7. Using set screws (Ref# 9) 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.
8. Rubber boom carrier and latch are located on the horizontal boom support on top of tank.

## NOZZLE ASSEMBLY DRAWING





## NOZZLE ASSEMBLY PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	16-920-01	Screw	2
2*	16-920-02	Upper Clamp	1
3*	16-920-03	O-Ring	1
4*	16-920-04	Body with Lower Clamp	1
5*	16-920-05	Diaphragm Teflon (Optional)	1
6*	16-920-06	Diaphragm EPDM Rubber (Standard)	1
*	16-920-07	Diaphragm Viton (Optional)	1
7*	16-798	Chemsaver End Cap	1
8	16-800	Gasket Viton	1
9	16-921	Cap	1
10	16-805	Raindrop Tip 1/4 RA8	1
*	16-920	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" (51cm) apart on the right, left, and center tubes (16-927 and 16-928). There are pre-drilled holes in all tubes. The Nozzle should be at a 45° angle to the ground for proper application.

## RA RAINDROP® TIPS

This is a wide-angle (120°), 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 RA2 - 1/4 RA15.
- Uniform spray distribution.
- A large orifice opening and passages minimize clogging.
- The Raindrop 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.
- Maximum recommended pressure for Nylon is 100 psi (70bar).
- Maximum recommended temperature is 120°F (50°C).

### NOZZLE TILT

Delavan's extensive research on spray patterns has proven that a tilt of about 45° for flood Nozzles or tips, RA Raindrop® and WRW Whirl-Rain® nozzles 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

100% overlap of spray pattern is recommended for RA Raindrop® and WRW Whirl-Rain® Nozzles for uniform coverage. Nozzle height is determined by measuring the width of the spray pattern as it hits the ground. This width should be 100% greater or twice as wide as the nozzle spacing. 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.

### NOZZLE TYPE DROPLET SIZE COMPARISONS

(Volume median diameter in microns)

For Nozzles with a 0.5 gpm Output	Spraying Pressure	
	20 psi	40 psi
RA Raindrop® Drift Reduction Nozzle	810	810
LF Flat Fan Tip	510	400
D Flooding Tip	450	315
WRW Whirl-Rain® Cone Spray Nozzle	350	2251

### DRIFTABLE FINES PRODUCED

(0.5 gpm at 40 psi)

Nozzle (.5 gpm Output)	Percent of Spray Volume less than 200 microns
RA Raindrop® Drift Reduction Nozzle	0.7%
LF Flat Fan Tip	7-20%
	(depending on spray angle)

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.

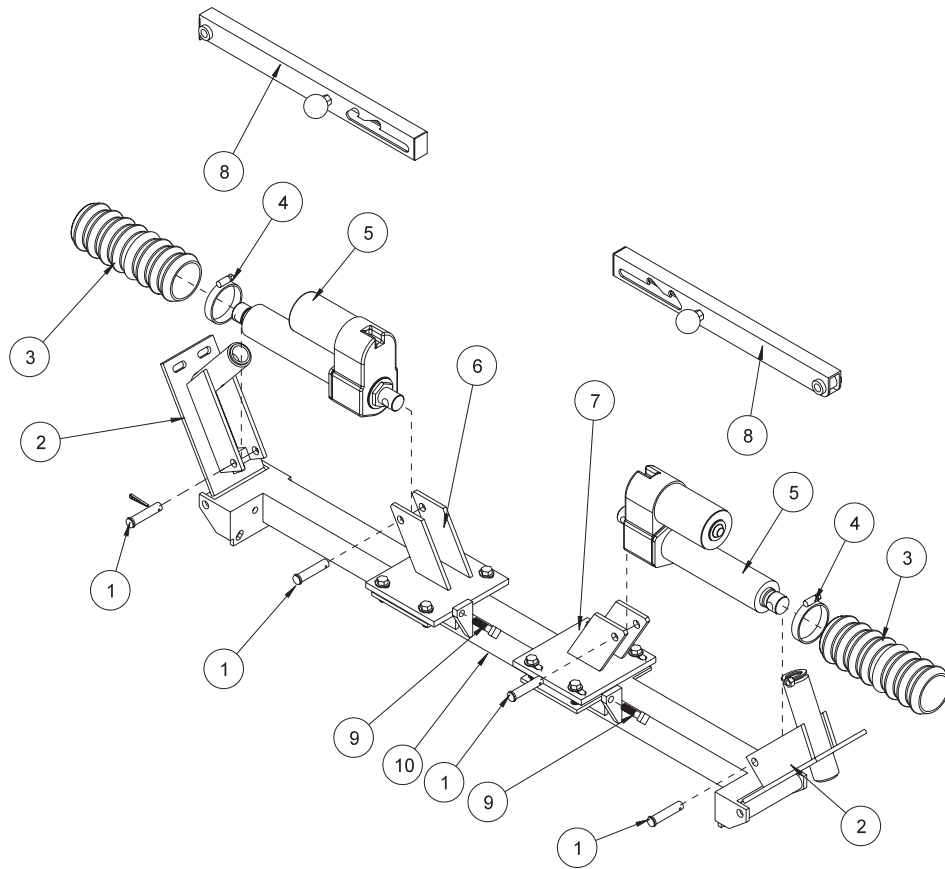
#### RECOMMENDED OVERLAP

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

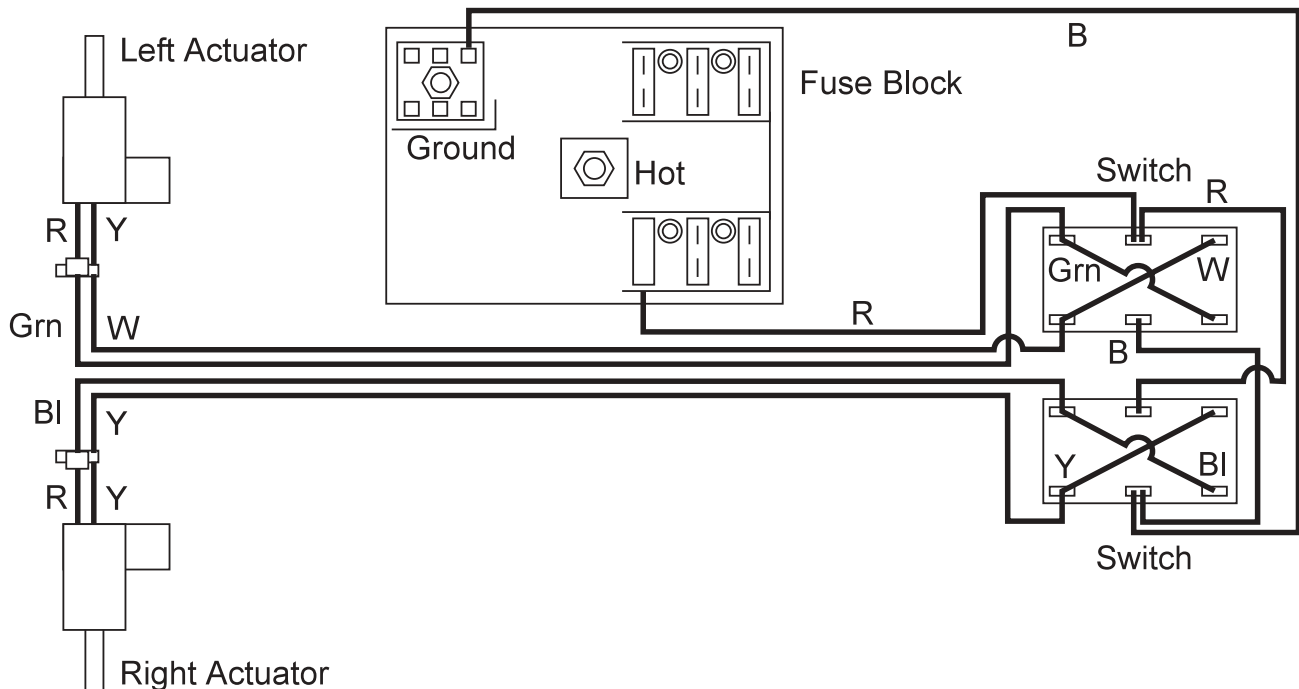
#### NOZZLE HEIGHT

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".

## 10-103 ELECTRIC LIFT KIT DRAWING



## 10-103 ELECTRIC LIFT WIRING



## 10-103 ELECTRIC LIFT KIT PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	HCPS-12-225	Stainless Steel Clevis Pin $\frac{1}{2} \times 2\frac{1}{4}$	4
	HPS-18-100	Stainless Steel Cotter Pin $\frac{1}{8} \times 1$	4
2	33-295	Pivot Brakcet	2
3	16-919	Black Boot	2
	22-069	Nylon Tie 8"	2
4	18-123	Hose Clamp	2
5	11-158	Linear actuator	2
	11-158-01	Seal Kit	1 per
6*	33-331	Left Actuator Bracket	1
7*	33-330	Right Actuator Bracket	1
8*	15-561	Boom Lift	2
	15-014	Shift Knob	2
	HB-38-16-175	Bolt $\frac{3}{8}$ - 16 x $1\frac{3}{4}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2
9*	HSSQ-38-16-150	Square Head Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2
10*	33-329	Center Mount	1

\* Part of 10-160 Boom

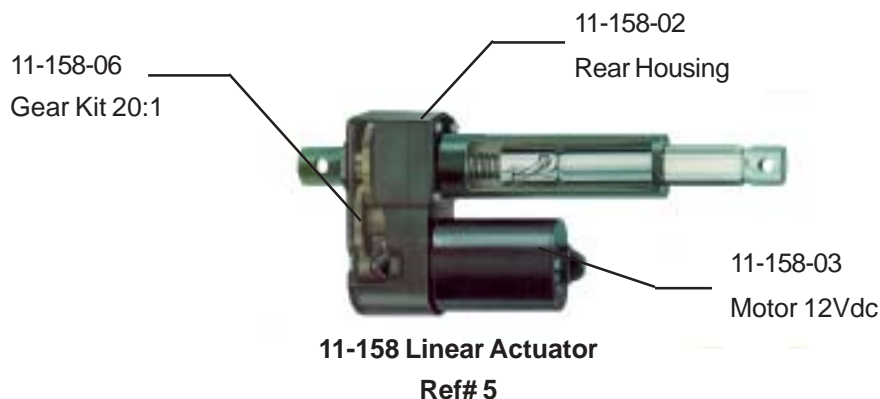
### INSTALLATION INSTRUCTIONS

Remove Boom Lift(Ref# 8)from boom and replace with the Linear Actuators(Ref# 5). Use the existing hardware. Refer to the wiring diagram below to hook up the wire harness. The switches mount in the seat panel on the right side. Refer to the decal for correct placement. Use the  $14\frac{1}{2}$  Nylon Ties to bind wire harness to main frame so that it does not drag.

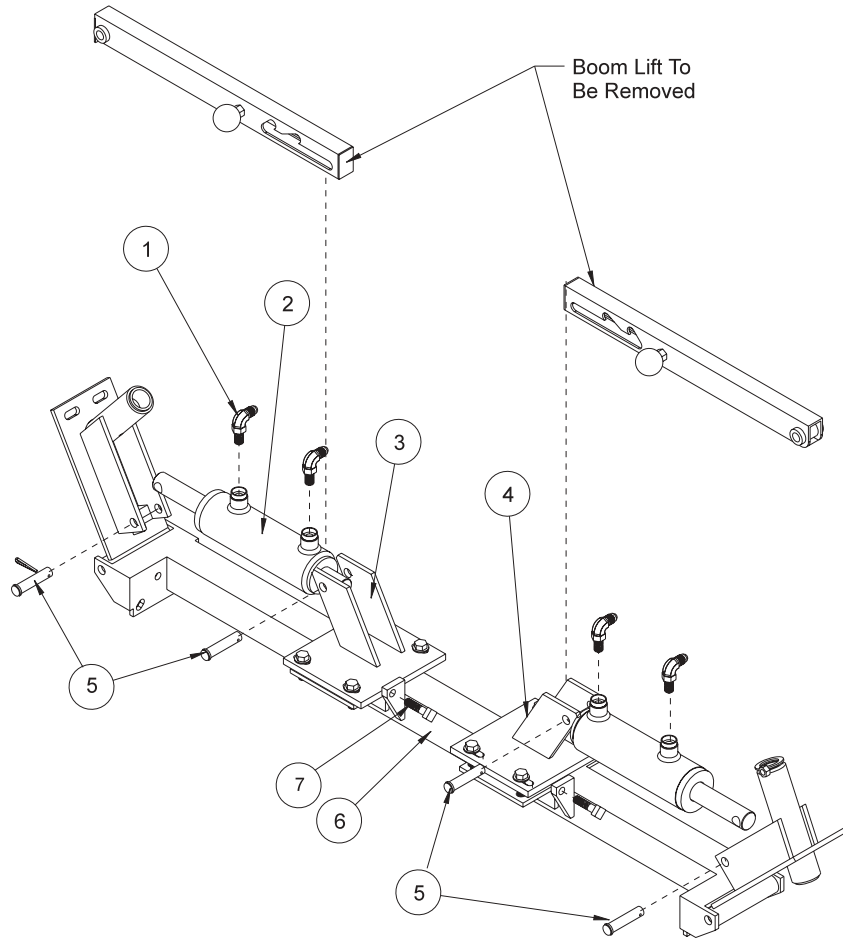
Use dielectric grease on all electrical connections.

## 10-103 ELECTRIC LIFT WIRING PARTS LIST

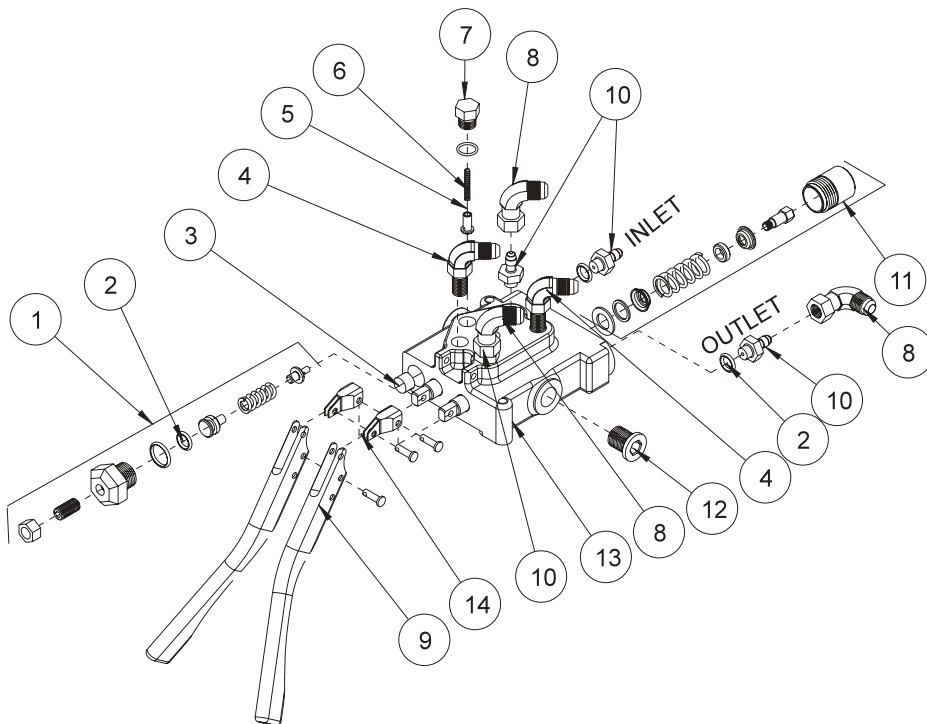
PART#	DESCRIPTION	QUANTITY
8853	Female Spade Connectors	2
15-472	Switch Boot	2
11-158	Linear Actuator with 4" stroke	2
16-755	Switch	2
16-810	Wiring Harness	1
22-075	Nylon Tie $14\frac{1}{2}$	12
33-272	Fuse 20Amp	1



## 10-104 HYRAULIC LIFT KIT DRAWING



## 13-261 HYDRAULIC VALVE DRAWING



## 10-104 HYDRAULIC LIFT KIT PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	18-168	Elbow $\frac{3}{8}$ Straight Thread	4
2	10-187	Hydraulic Cylinder	2
	14-273	Seal Kit	1 per
3*	33-331	Left Actuator Bracket	1
4*	33-330	Right Actuator Bracket	1
5*	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
6*	33-329	Center Mount	1
7*	HSSQ-38-16-150	Square Head Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2

\* Part of 10-160 Boom

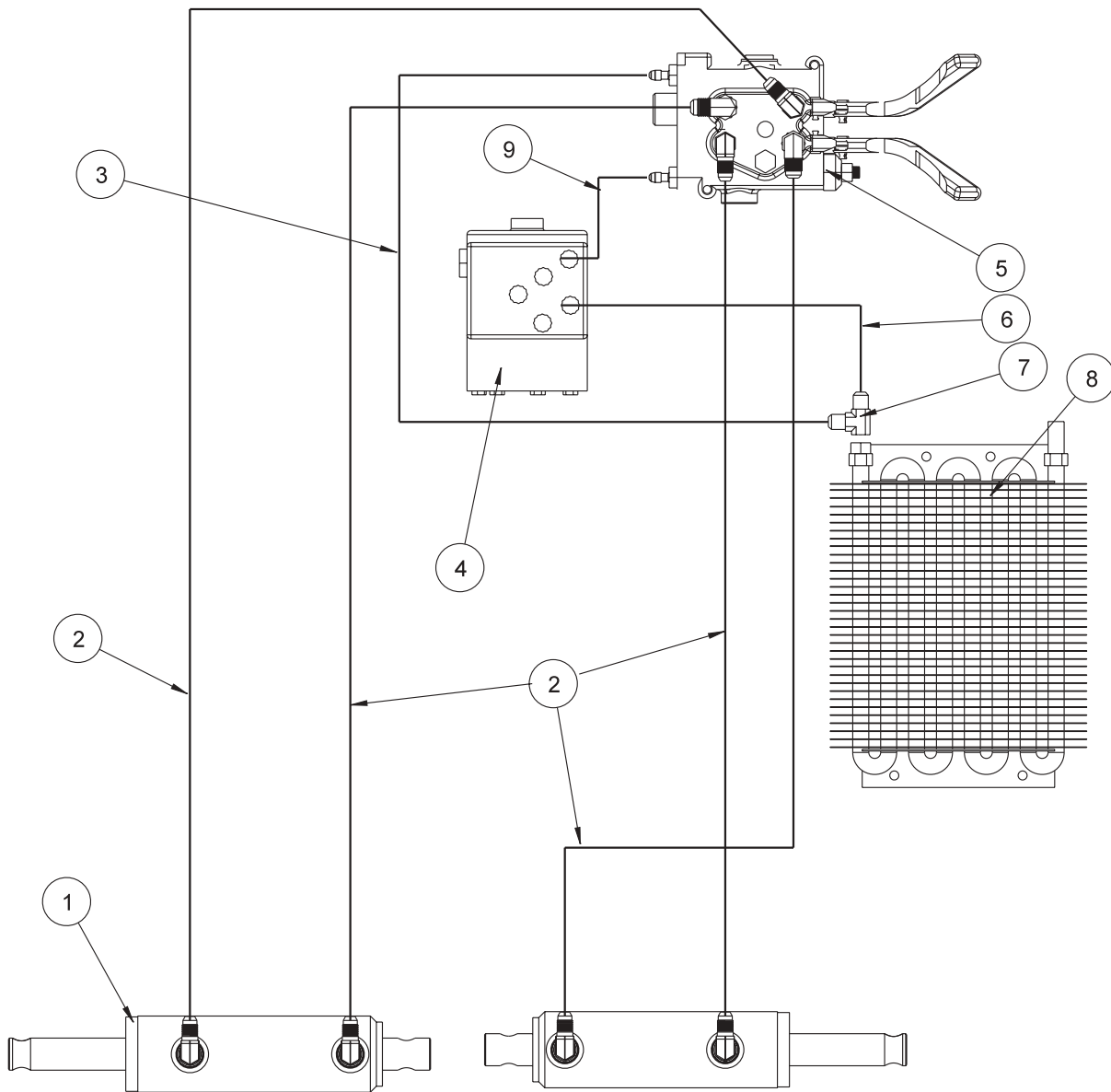
### INSTALLATION INSTRUCTIONS

1. Shut machine off. Set park brake. Allow system to cool down.
2. Remove the boom lifts from boom and replace with hydraulic cylinder(Ref# 2). Use the existing hardware.
3. Refer to the valve drawing for placement of fittings. The valve mounts in the seat panel on the right side. Use two  $\frac{1}{4}$  - 20 x 2 bolts, washers, lock washers, and nuts. Refer to the decal for correct placement.
4. Remove the hose from the bottom of the oil cooler that comes out of the top of the tee. This hose traces back to the top of the orbitrol. Place that hose to the inlet side of the hydraulic valve.
5. Use the short hose 10-146(Ref# 3) to connect the outlet side of the valve to the tee on the oil cooler.
6. Use the four other hoses to connect the valve to the hydraulic cylinders. Refer to the hydraulic drawing.

## 13-261 HYDRAULIC VALVE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	14-106	Relief Assembly Kit	1
2*	14-062	Seal Kit	1
3*	13-261-03	N.R.Plug	1
4	18-168	Elbow $\frac{3}{8}$ Straight Thread	2
5*	13-261-07	Plunger	2
6*	13-261-06	Spring	2
7*	13-261-05	Plug	2
8	18-202	Elbow	3
9	13-262	Handle (set of 2)	1
10	18-169	Adapter $\frac{3}{8}$ SAE	4
11*	14-203	Spring Center Kit	1 Per Bank
12*	13-261-02	Plug	1
13*	13-261-01	Housing	1
14*	14-204	Linkage Kit (includes hitch pin, clevis pin and link)	2
*	13-261	Hydraulic Valve	2-Bank

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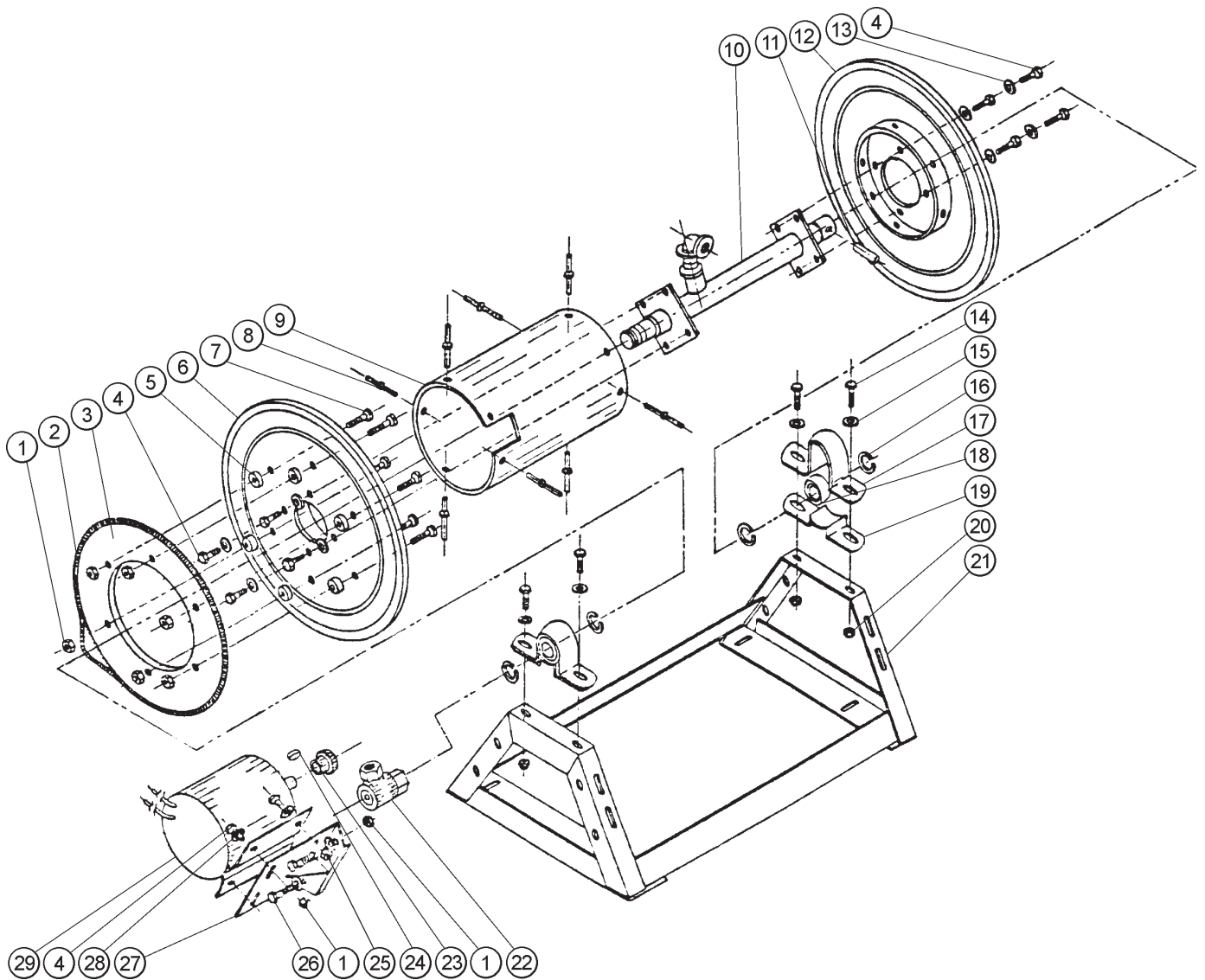
## 10-104 HYDRAULIC DRAWING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	10-187	Hydraulic Cylinder	2
	14-273	Seal Kit	1 per
2*	10-230	Hydraulic Hose 108"	4
3*	10-146	Hose 28"	1
4	34-103	Orbitrol	1
5*	13-261	Valve	1
	13-262	Handle (set of 2)	1
6	10-143	Hydraulic Hose	1
7	18-190	Tee	1
8	34-105	Oil Cooler	1
9	10-144	Hydraulic Hose	1
*	10-104	Hydraulic Lift Kit	

### INSTALLATION INSTRUCTIONS

1. Shut machine off. Set park brake. Allow system to cool down.
2. Remove the boom lifts from boom and replace with hydraulic cylinder(Ref# 2). Use the existing hardware.
3. Refer to the valve drawing for placement of fittings. The valve mounts in the seat panel on the right side. Use two  $\frac{1}{4}$ " - 20 x 2 bolts, washers, lock washers, and nuts. Refer to the decal for correct placement.
4. Remove the hose from the bottom of the oil cooler that comes out of the top of the tee. This hose traces back to the top of the orbitrol. Place that hose to the inlet side of the hydraulic valve.
5. Use the short hose 10-146(Ref# 3) to connect the outlet side of the valve to the tee on the oil cooler.
6. Use the four other hoses to connect the valve to the hydraulic cylinders. Refer to the hydraulic drawing.

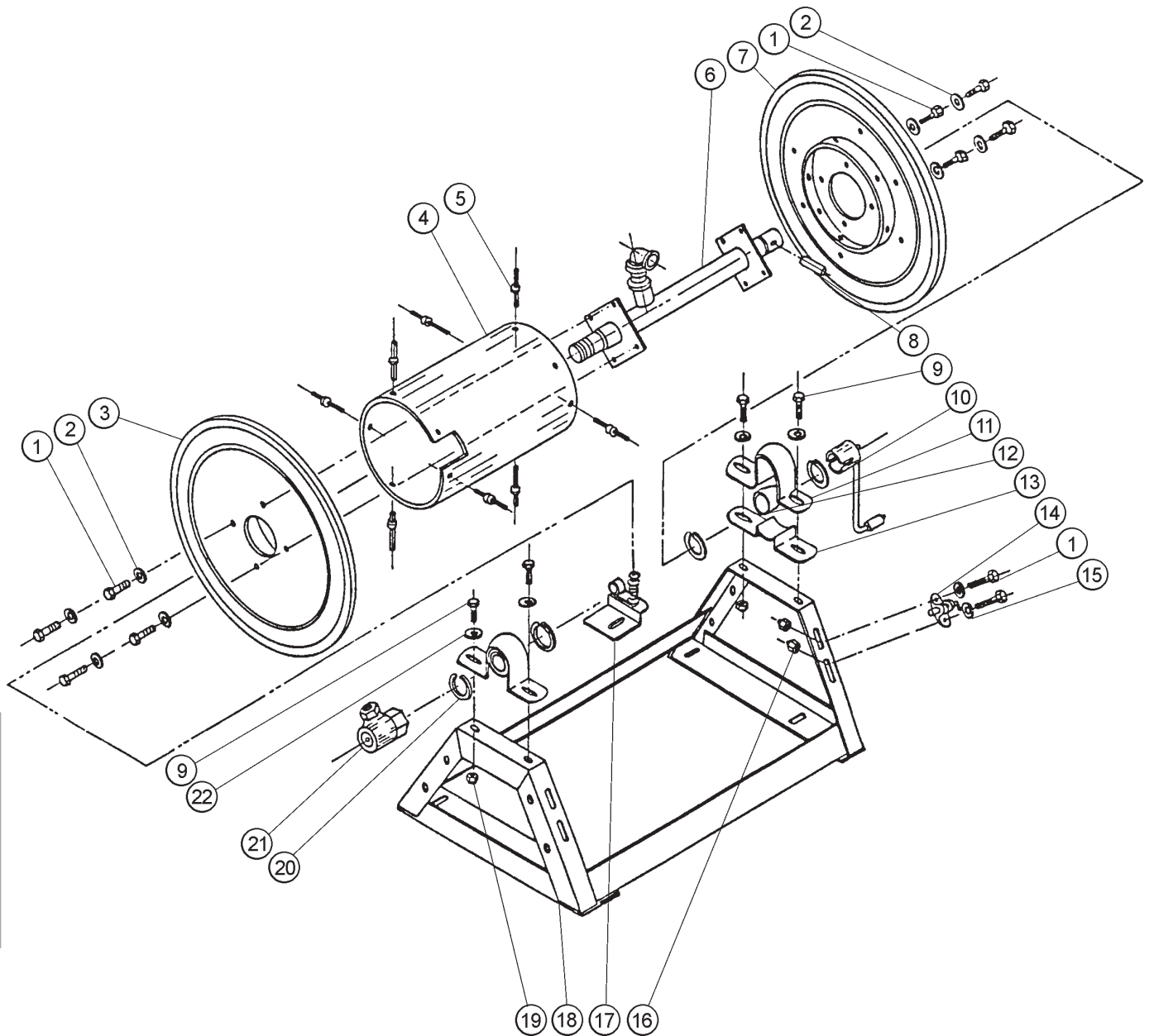
# 16-906 ELECTRIC HOSE REEL DRAWING



## 16-906 ELECTRIC HOSE REEL PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HNCL-516-18	Lock Nut $\frac{5}{16}$ - 18	12
2	16-906-12	Chain Assembly	1
3	16-906-11	Sprocket	1
4	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	12
5	16-906-13	Spacer	6
6	16-906-03	Disc Assembly	1
7	HB-516-18-125	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{4}$	6
8		Pop Rivet	8
9	16-906-04	Drum Center	1
10	16-906-05	Axle Assembly	1
11	HRP-25-200	Roll Pin $\frac{1}{4}$ x 2	1
12	16-906-02	Disc Assembly	1
13	HW-516	Lockwasher $\frac{5}{16}$	8
14	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	4
15	HW-38	Washer $\frac{3}{8}$	4
16	16-906-10	Retaining Ring	4
17	16-906-07	Mounting Pillow Block (Top)	2
18	16-906-09	Bearing	2
19	16-906-08	Mounting Pillow Block (Bottom)	2
20	HNCL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
21	16-906-01	Frame Assembly	1
22	16-906-06	Swivel	1
	16-129-06	Seal Kit (for swivel)	1
23	16-906-16	Sprocket	1
24	16-906-17	Key	1
25	HW-516	Washer $\frac{5}{16}$	6
26	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	2
27	16-906-14	Mounting Bracket	1
28	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	4
29		Electric Motor 12VDC	1

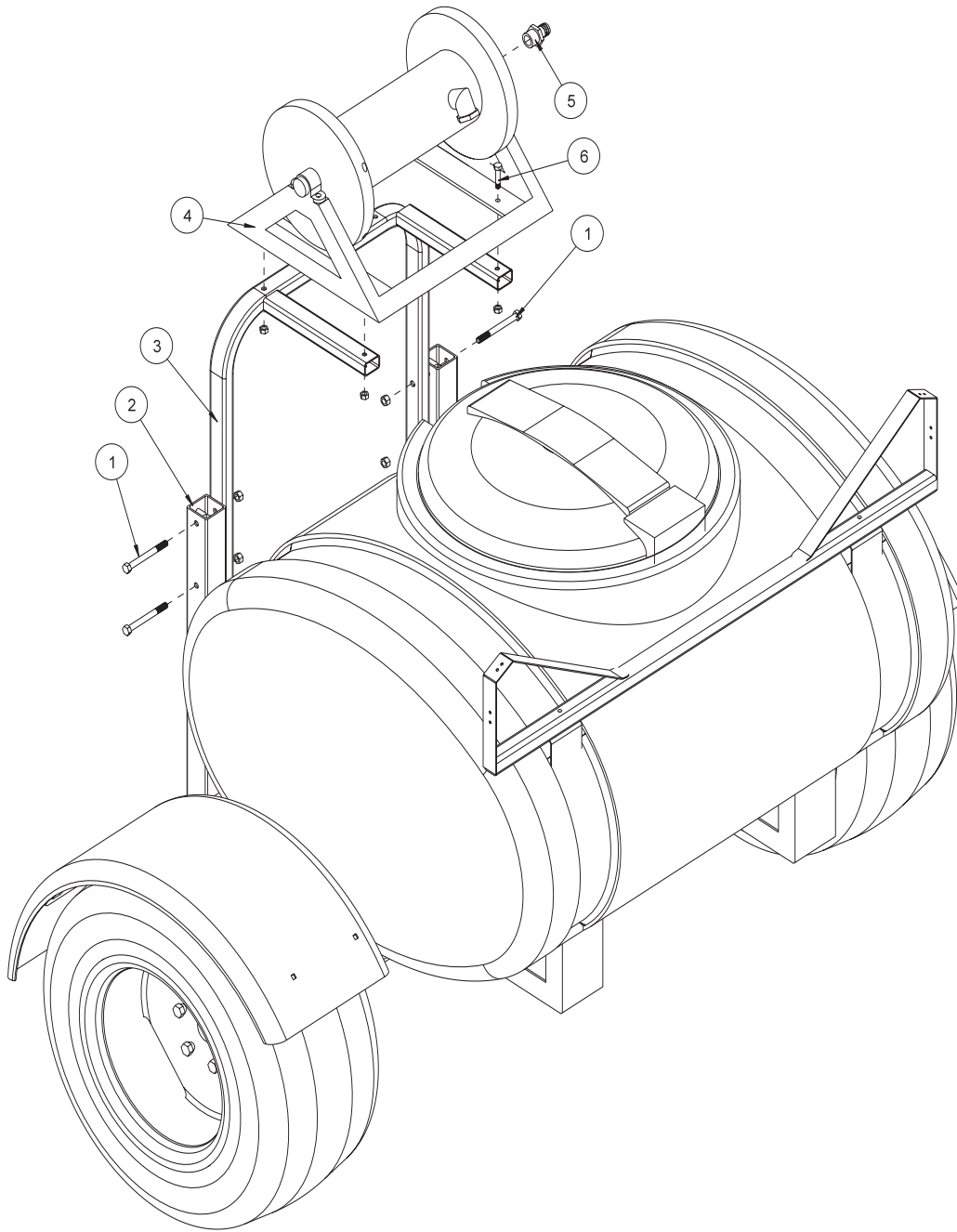
## 16-129 HOSE REEL DRAWING



## 16-129 HOSE REEL PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	10
2	HWL-516	Lockwasher $\frac{5}{16}$	8
3	16-129-01	Disc Assembly	1
4	16-906-04	Drum center	1
5		Pop Rivet	8
6	16-906-05	Axle Assembly	1
7	16-906-02	Disc Assembly	1
8	HRP-25-200	Roll Pin $\frac{1}{4}$ x 2	1
9	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	4
10	16-129-04	Hand Crank	1
11	16-906-07	Mounting Pillow Block (Top)	2
12	16-906-09	Bearing	2
13	16-906-08	Mounting Pillow Block (Bottom)	2
14	16-129-03	Lock Pin Assembly	1
15	HW-516	Washer $\frac{5}{16}$	2
16	HNCL-516-18	Lock Nut $\frac{5}{16}$ - 18	2
17	16-129-05	Brake Assembly	1
18	16-906-01	Frame Assembly	1
19	HNCL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
20	16-906-10	Retaining Ring	4
21	16-129-02	Swivel	1
	16-129-06	Seal Kit (for swivel)	1
22	HW-38	Washer $\frac{3}{8}$	4

## 10-107 HOSE REEL MOUNT DRAWING



## HOSE REEL MOUNT PARTS LIST

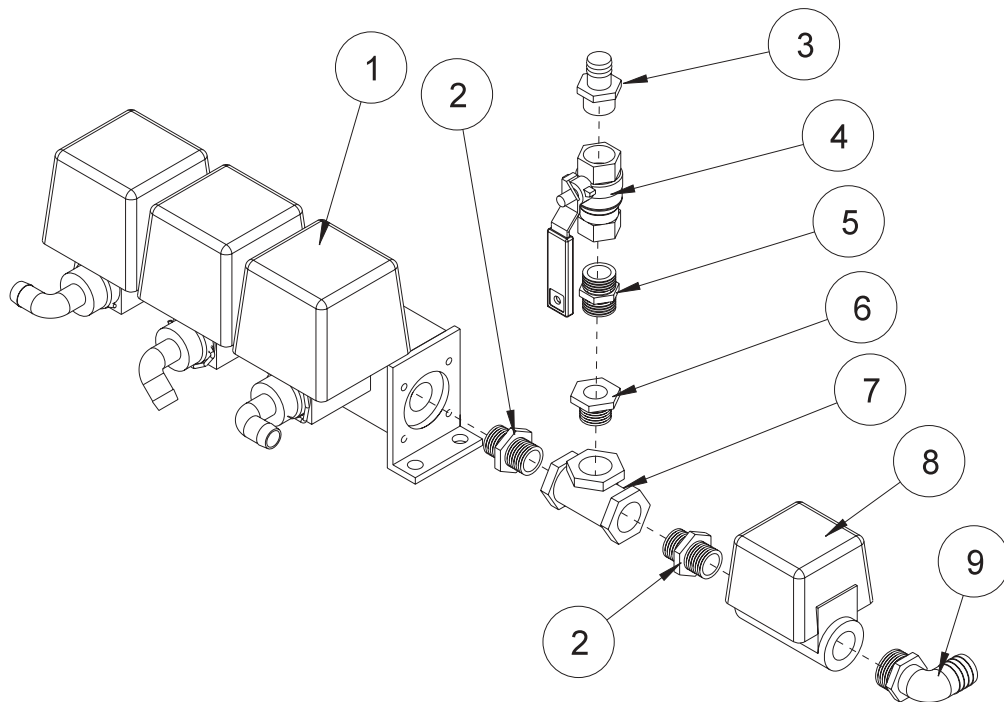
REF#	PART#	DESCRIPTION	QUANTITY
1	HB-38-16-375	Bolt $\frac{3}{8}$ - 16 x $3\frac{3}{4}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
2	10-205	Boom Carrier	2
3	10-221	Hose Reel Mount	1
4	16-906	Electric Hose Reel	1
	16-129	Manual Hose Reel	1
5	18-249	Brass Fitting $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
6	HB-516-18-150	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{2}$	4
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4

## HOSE REEL MOUNTING INSTRUCTIONS

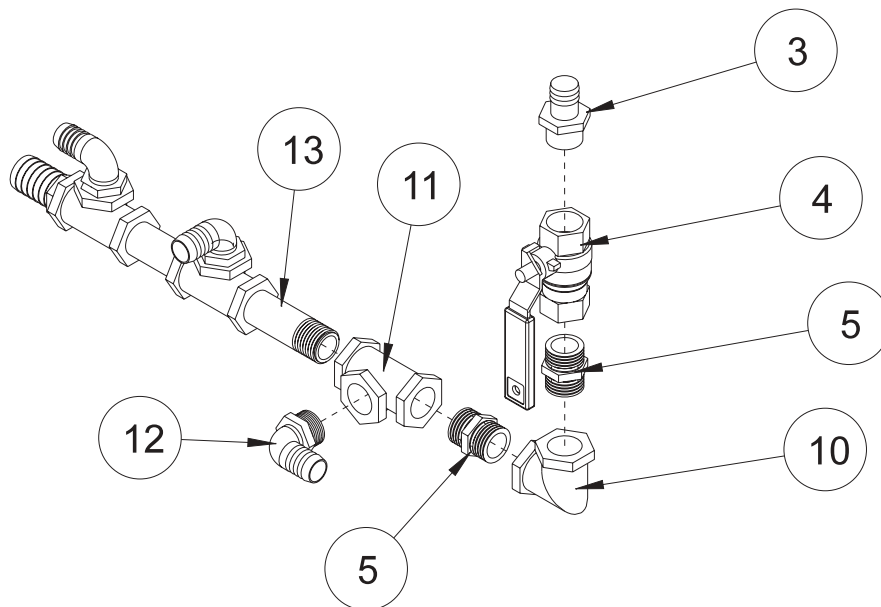
1. Wear protective clothing when draining the tank and taking apart the lines.
2. Drain tank and spray system in a safe and approved method insuring that no chemical or water remain in tank as you will be taking apart lines.
3. Remove key from ignition, set park brake and block wheels.
4. Remove square rubber covers on boom carriers.
5. Place hose reel bracket inside the boom carrier tubes with arms pointing toward front of machine..
6. Lower bracket until top hole in bracket lines up with hole in upright. Use four  $\frac{3}{8}$  - 16 x  $3\frac{3}{4}$  bolts and four  $\frac{3}{8}$  - 16 lock nuts with nuts on inside of uprights.
7. Put hose reel on hose reel bracket with fitting on left side of machine. Use four bolts  $\frac{5}{16}$  - 18 x  $1\frac{1}{2}$  and four  $\frac{5}{16}$  - 18 lock nuts to hold in place. Tighten bolts.
8. To put handle on, drive roll pin out of the shaft on right side, put handle over shaft and line up holes and replace the roll pin.
9. Put 18-249 fitting into hose reel.
10. *For 1006 System:* Remove pressure regulating valve from manifold ball valve . Use a 1" close nipple on each side of the tee. Place reducer bushing ,  $\frac{3}{4}$  close nipple, ball valve, and hose barb into tee pointing upward.
11. *For 1004 System:* From the back of the machine remove the two elbows at the end of the spray fittings. Insert the  $\frac{3}{4}$ " tee pointing toward the back of the machine. Insert the  $\frac{3}{4}$ " hose barb elbow into the top of the tee. This goes the the right boom section. Place a  $\frac{3}{4}$ " close nipple into the open end of the tee and add the  $\frac{3}{4}$ " FPT elbow pointing upward. Insert the  $\frac{3}{4}$ " reducer bushing, ball valve, and hose barb.
12. Use 8887-46 hose to connect reel to ball valve, clamp with 18-040 hose clamps.
13. Use 22-075 cable ties to tie hose to main feed hose.

(Continued on next page)

## 1006 HOSE REEL PLUMBING DRAWING



## 1004 HOSE REEL PLUMBING DRAWING





## HOSE REEL PLUMBING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-552	Manifold Ball Valve	1
2*	16-851	Close Nipple 1" (1006 only)	2
3*	16-154	Fitting $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
4*	16-859	Ball Valve $\frac{3}{4}$ Brass	1
5*	16-158	Close Nipple $\frac{3}{4}$ "	2
6*	16-163	Reducer Bushing 1 x $\frac{3}{4}$ (1006 only)	1
7*	16-183	Tee FPT 1 x 1 x 1 (1006 only)	1
8	15-531	Pressure Regulating Valve	1
9	16-164	Elbow 1" MPT x 1" HB	1
10	16-151	Elbow FPT $\frac{3}{4}$ x $\frac{3}{4}$	1
11*	16-157	Tee FPT $\frac{3}{4}$ x $\frac{3}{4}$ x $\frac{3}{4}$ (1004 only)	1
12	16-153	Elbow $\frac{3}{4}$ " MPT x $\frac{3}{4}$ " HB	1
13	16-172	Nylon Nipple $\frac{3}{4}$ x 3 $\frac{1}{2}$	1
*	10-107	Hose Reel Mounting Kit (includes only (1) 16-851 Close Nipple)	

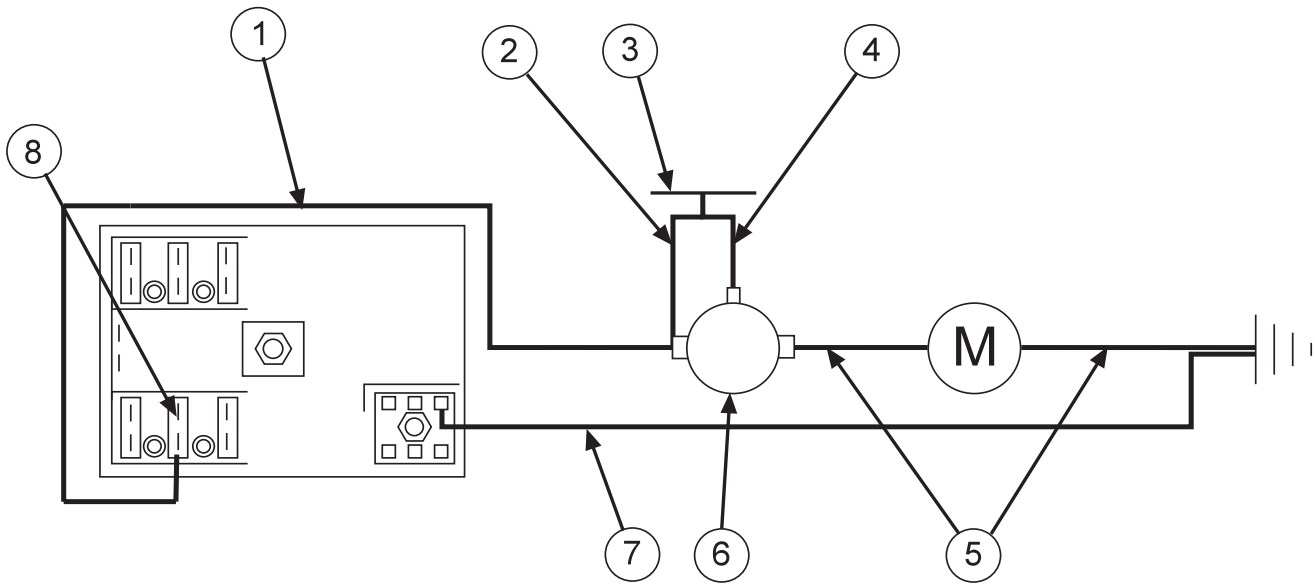
## HOSE REEL MOUNTING INSTRUCTIONS

1. Wear protective clothing when draining the tank and taking apart the lines.
2. Drain tank and spray system in a safe and approved method insuring that no chemical or water remain in tank as you will be taking apart lines.
3. Remove key from ignition, set park brake and block wheels.
4. Remove square rubber covers on boom carriers.
5. Place hose reel bracket inside the boom carrier tubes with arms pointing toward front of machine..
6. Lower bracket until top hole in bracket lines up with hole in upright. Use four  $\frac{3}{8}$  - 16 x  $3\frac{3}{4}$  bolts and four  $\frac{3}{8}$  - 16 lock nuts with nuts on inside of uprights.
7. Put hose reel on hose reel bracket with fitting on left side of machine. Use four bolts  $\frac{5}{16}$  - 18 x  $1\frac{1}{2}$  and four  $\frac{5}{16}$  - 18 lock nuts to hold in place. Tighten bolts.
8. To put handle on, drive roll pin out of the shaft on right side, put handle over shaft and line up holes and replace the roll pin.
9. Put 16-153 elbow into hose reel.
10. *For 1006 System:* Remove pressure regulating valve from manifold ball valve . Use a 1" close nipple on each side of the tee. Place reducer bushing ,  $\frac{3}{4}$  close nipple, ball valve, and hose barb into tee pointing upward.
11. *For 1004 System:* From the back of the machine remove the two elbows at the end of the spray fittings. Insert the  $\frac{3}{4}$ " tee pointing toward the back of the machine. Insert the  $\frac{3}{4}$ " hose barb elbow into the middle of the tee. This goes the the right boom section. Place a  $\frac{3}{4}$ " close nipple into the open end of the tee and add the  $\frac{3}{4}$ " FPT elbow pointing upward. Insert the  $\frac{3}{4}$ " close nipple, ball valve, and hose barb.
12. Use 8887-46 hose to connect reel to ball valve, clamp with 18-040 hose clamps.
13. Use 22-075 cable ties to tie hose to main feed hose.

(Continued on next page)



## ELECTRIC HOSE REEL WIRING DIAGRAM



## HOSE REEL ADJUSTMENTS

### OPERATIONAL CHECK:

1. Pull hose off drum at least on 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
1	8879-132	Flexguard 1/2 ID	1
	8919-144	10GA Red Wire 144"	1
	8928	5/16 Wire Terminal Yellow	1
	8901	Slide-On Yellow Connector	1
2	8850-4	14GA Red Wire 4"	1
	8859	3/16 Wire Terminal Blue	2
3	33-251	Push Button Switch	1
4	8850-4	14GA Red Wire 4"	1
	8859	3/16 Wire Terminal Blue	1
	8857	5/16 Wire Terminal Blue	1
5	8928	5/16 Wire Terminal Yellow (On Motor Leads)	2
6	12-015	Solenoid	1
	33-252	Switch and Solenoid Mounting Bracket	1
<b>BOLT BRACKET TO FRAME</b>			
	HB-516-18-075	5/16 - 18 x 3/4 Hex Bolt	2
	HN -516-18	5/16 - 18 Hex Nut	2
	HW-516	5/16 Flat Washer	2
	HWL-516	5/16 Lockwasher	2
<b>BOLT SOLENOID TO BRACKET</b>			
	HB-14-20-075	1/4 - 20 x 3/4 Hex Bolt	2
	HN -14-20	1/4 - 20 Hex Nut	2
	HW-14	1/4 Flat Washer	2
	HWL-14	1/4 Lockwasher	2
<b>SOLENOID TERMINALS</b>			
	HN -516-24	5/16 - 24 Hex Nut	2
	HW-516	5/16 Lockwasher	2
	HN -10-32	10 - 32 Hex Nut	1
	HWL-10	#10 Lockwasher	1
7	8931-144	10GA White Wire 144"	1
	8928	5/16 Wire Terminal Yellow	1
	8901	Slide-On Yellow Connector	1
8	33-273	Auto Blade Type Fuse 30Amp	1

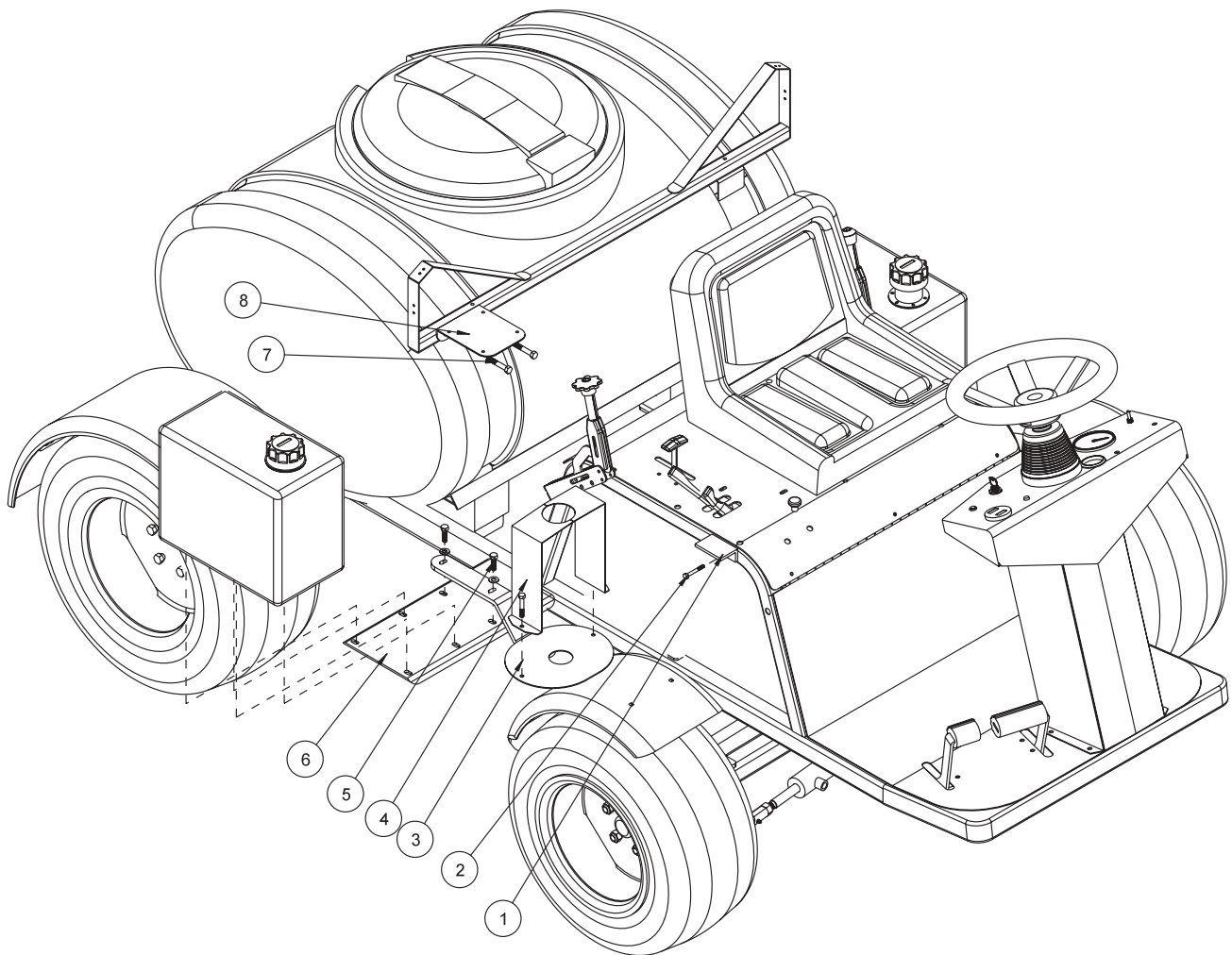
### CONNECTION INSTRUCTIONS

Route wire harness along side of tank and over to battery taking care to stay clear of moving parts or hot engine components. Cut off excess wire and strip back 3/8". Place one 8901 slide-on yellow connector on red wire and one on the white wire. Connect the two wires to the fuse block first the red to the (+) positive and the white to the (-) negative. Use dielectric grease on all electrical connections.



**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.**

## 10-105 FOAM MARKER MOUNTING DRAWING



## 10-105 FOAM MARKER PARTS LIST

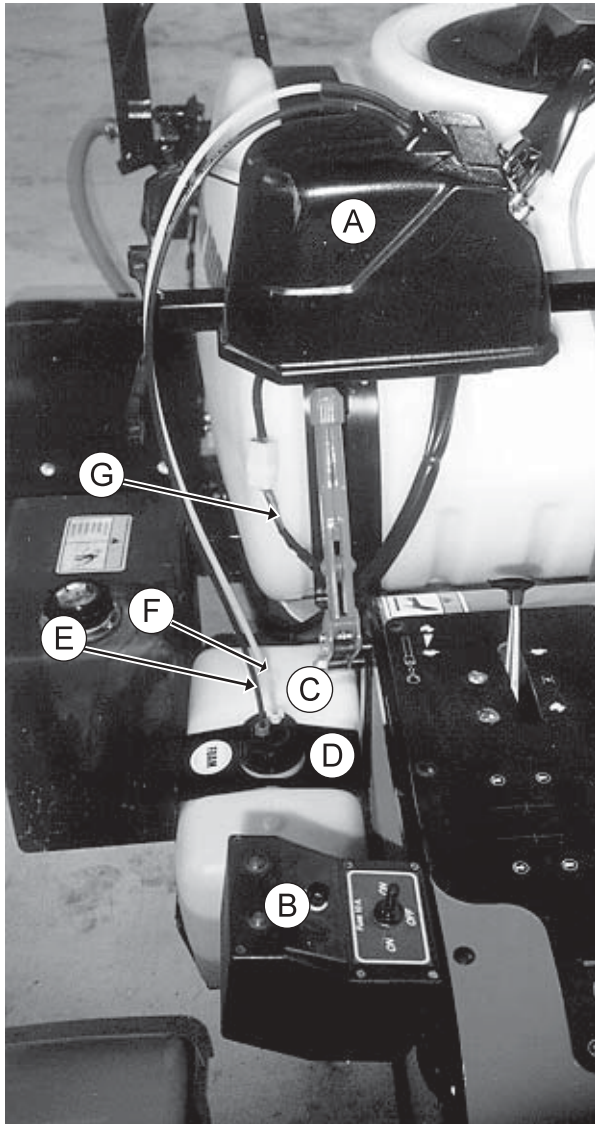
REF#	PART#	DESCRIPTION	QUANTITY
1		Control Box Bracket	1
2	HB-14-20-225	Bolt $\frac{1}{4}$ - 20 x $2\frac{1}{4}$	1
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	1
3	10-198	Foamer Tank Bracket	1
4	16-939	Tank Strap	1
	HB-516-18-200	Bolt $\frac{5}{16}$ - 18 x 2	2
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	2
5	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HW-38	Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
6	10-127	Tank Mount	1
7	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
8	10-213	Foamer Compressor Bracket	1

## FOAM MARKER INSTALLATION

1. Before working on machine stop engine, set park brake, remove key from ignition and block wheels. Disconnect negative (-) battery terminal.
2. To mount the control box on the right side tube, you need to drill a  $\frac{9}{32}$  hole in the center of the tube even with the seat. Use a  $\frac{1}{4}$  - 20 x  $2\frac{1}{4}$  bolt and lock nut to bolt the bracket (Ref# 1) that comes with the control box to the side panel.
3. Now mount the foamer compressor bracket (Ref# 8) to the horizontal boom support. Use two  $\frac{3}{8}$  - 16 x  $2\frac{1}{4}$  bolts and lock nuts.
4. Remove the original mounting bracket from the compressor, saving the hardware, and mount the compressor on the bracket you just put on the boom support. Use existing hardware.
5. Use the extension wire (10-222) to connect the compressor to the control box.
6. Between the gas tank and the machine there are extra holes in the gas tank mount (Ref# 6). Place the foamer tank bracket (Ref# 3) on top of the gas tank mount and bolt down with  $\frac{3}{8}$  - 16 x  $1\frac{1}{4}$  bolts, washers, and lock nuts.
7. Place the foamer tank (21-464) on the foamer tank bracket (Ref# 3) and hold in place with the tank strap (Ref# 4) using two  $\frac{5}{16}$  - 18 x 2 bolts and lock nuts.

(Continued On Next Page)

## 10-105 FOAM MARKER INSTALLATION



- A. 15-504 Compressor Sub-Assembly
- B. 15-506 Switch Box
- C. 21-464 Foamer Tank
- D. 16-939 Tank Strap
- E. Blue Tube
- F. Clear Tube
- G. 10-222 Extension Wire

### CONNECTING THE CAP ASSEMBLY

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

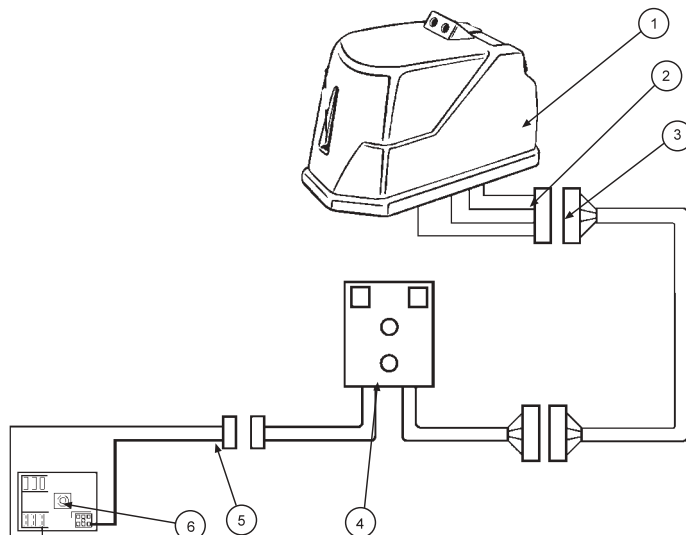
### HOSES

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

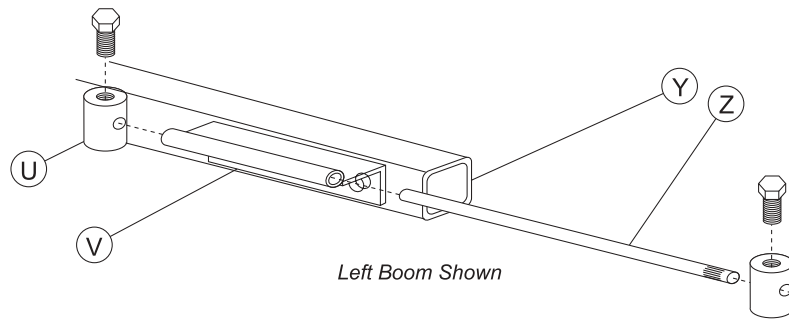
Route the tubing along underside of main frame using tie downs as necessary.

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

## 10-105 FOAM MARKER WIRING DRAWING



## 10-105 FOAM MARKER INSTALLATION



### FOAMER NOZZLE ASSEMBLY

Slide hose clamp onto drop tube and attach restrictor bell.

### FOAMER NOZZLE MOUNTING

Place splined end of rod (Z) into top of foam nozzle assembly. Slide one locking collar (U) onto rod. Slide rod into mounting bracket (V) on boom. Slide second locking collar onto rod. Adjust locking collars and rod so nozzle assembly will clear end of boom. Tighten lock collar bolts to prevent side to side movement.

### HOSE GUARD

Hose's must be routed on bottom of square tubing.

Mark 8 1/2 inches in from cap on end of square tubing (front side).

Clamp hose guard flush with top of square tubing with edge on previous mark. The channel covers hoses.

Install using 3 drill screws (you may drill a 3/16 pilot hole first).

Place another hose guard against first and install in same manner.

Repeat process for other boom.

### WIRING

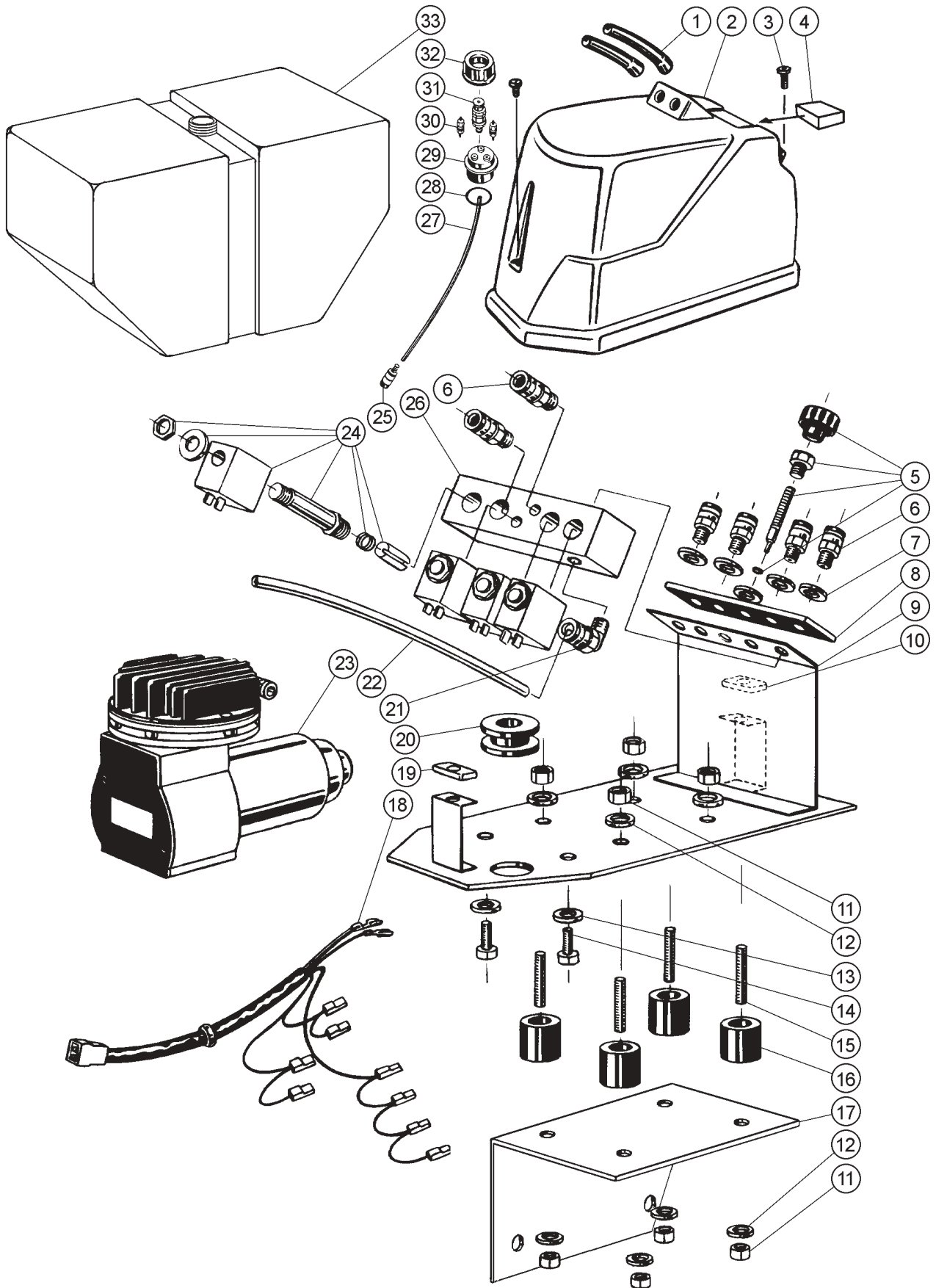
Use dielectric grease on all electrical connections. Connect extension wire(10-222) to the pig tail on the switch box and compressor. Connect power cable (15-509) to the switch box. Turn the switch off. Route the power wire to the fuse block(on the inside of the engine cover) out of the way of any heat 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 10AMP fuse into slot which has red wire attached to it.

## 10-105 FOAM MARKER WIRING PARTS LIST

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



# 15-504 COMPRESSOR SUB ASSEMBLY DRAWING





## 15-504 COMPRESSOR SUB ASSEMBLY PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*		Tubing Cover Seal	2
2*	15-504-01	Compressor Cover	1
3*		Cover Screw	2
4*	15-504-03	Air Filter	1
5†	15-504-07	Needle Valve Sub Assembly	1
6†		Tubing Connectors	6
7		Gasket	4
8		Manifold Cover Gasket	1
9		Mounting Plate	1
10		Front Foam Pad	1
11		Nut	8
12		Washer	8
13		Washer	2
14		Bolt	2
15		Threaded Rod	4
16		Bushing	4
17		Bracket (Discard Original Bracket Use 15-524)	1
	15-525	Switch Box Mount	1
18	15-504-04	Wiring Harness	1
19		Rear Foam Pad	1
20		Grommet	1
21†		L-Tubing Connector	1
22†		Tube 4"	1
23	15-505	Motor Sub Assembly	1
24†	15-504-06	Solenoid Valve Sub Assembly	4
25	15-512-02	Strainer	1
26†		Manifold Block	1
27		Tube	1
28	15-512-01	O-ring EPR Rubber	1
29	15-504-10	Body	1
30	15-504-09	Tubing Connector	2
31	15-504-08	Pressure Relief Valve	1
32	15-512	Cap	1
33	21-464	Tank(includes 26-054 Bushing & 26-055 Shut off Valve)	1
	15-506	Switch Box	
	15-507	Tubing	
	15-508	Compressor Extension Cable (Optional)	
	15-509	Power Cable (Also Order Two 8853 Female Connectors)	
	15-510	Boom Mounting Bracket Accessories (Includes Two 15-510-01 Nozzle Mounting Rods and Four Lock Collars with Bolts)	
*	15-504-01	Cover Sub Assembly	
†	15-504-05	Valve Manifold Sub Assembly	

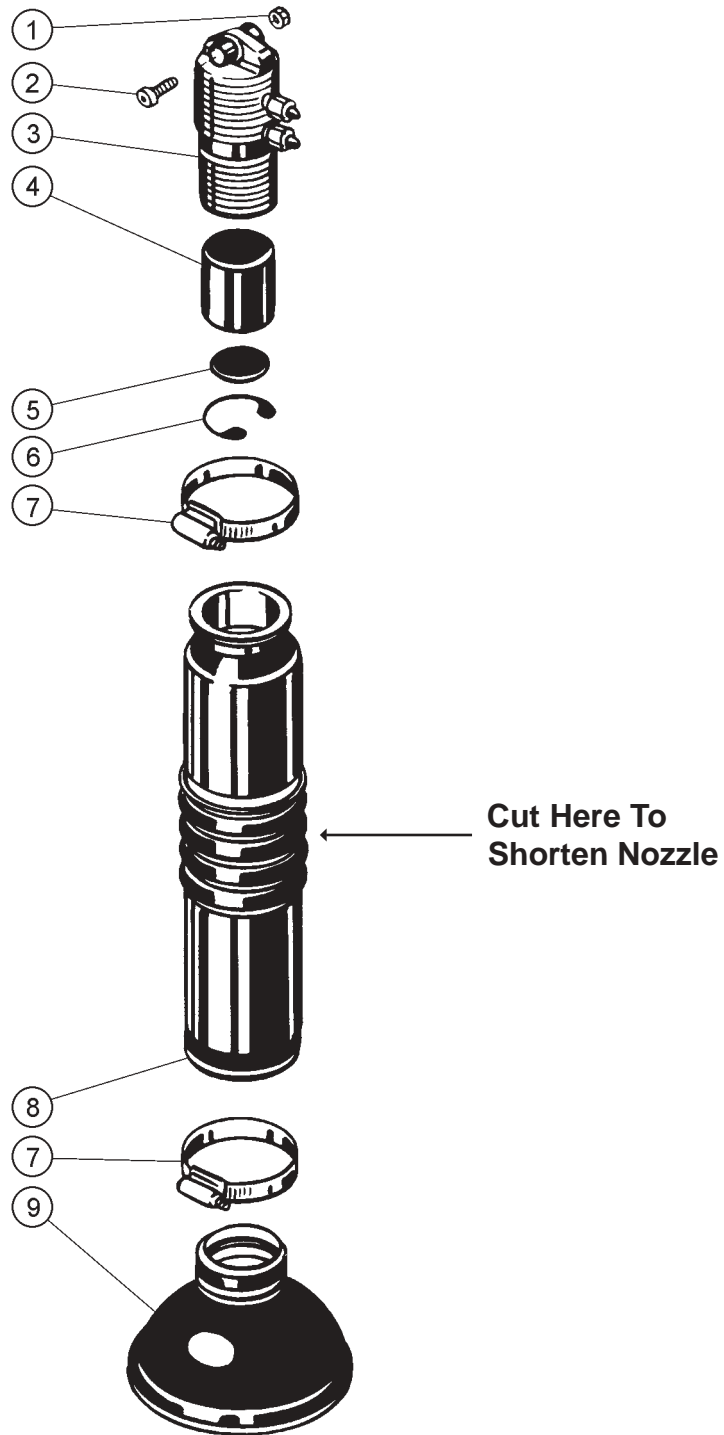
15-505 MOTOR SUB ASSEMBLY DRAWING



## 15-505 MOTOR SUB ASSEMBLY PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1†		Manifold Screw	8
2		Exhaust Manifold	1
3*		Exhaust Reed Valve	1
4*†		Washer	2
5*		Exhaust Valve Screw	1
6	15-505-01	Exhaust Manifold Gasket	1
7		Head	1
8		Bolt	6
9		L-Tubing Connector	1
10*†		Intake Valve Screw	1
11*†		Split Lockwasher	1
12*†		Intake Reed Valve	1
13†	15-505-03	Diaphragm	1
14†		Piston	1
15†		Connecting Rod Nut	1
16†		Connecting Rod Bolt	1
17		Brush Retainer	2
18	15-505-06	Brush	2
19		12 Volt Electric Motor	1
20	15-505-05	Stainless Steel Bearing	1
21		Block	1
22		Motor Bolt	2
23		Motor Nut	2
24		Cover	1
25		Cover Screw	2
*	15-505-02	Intake Exhaust Valve Sub Assembly	
†	15-505-04	Intake Piston Sub Assembly	

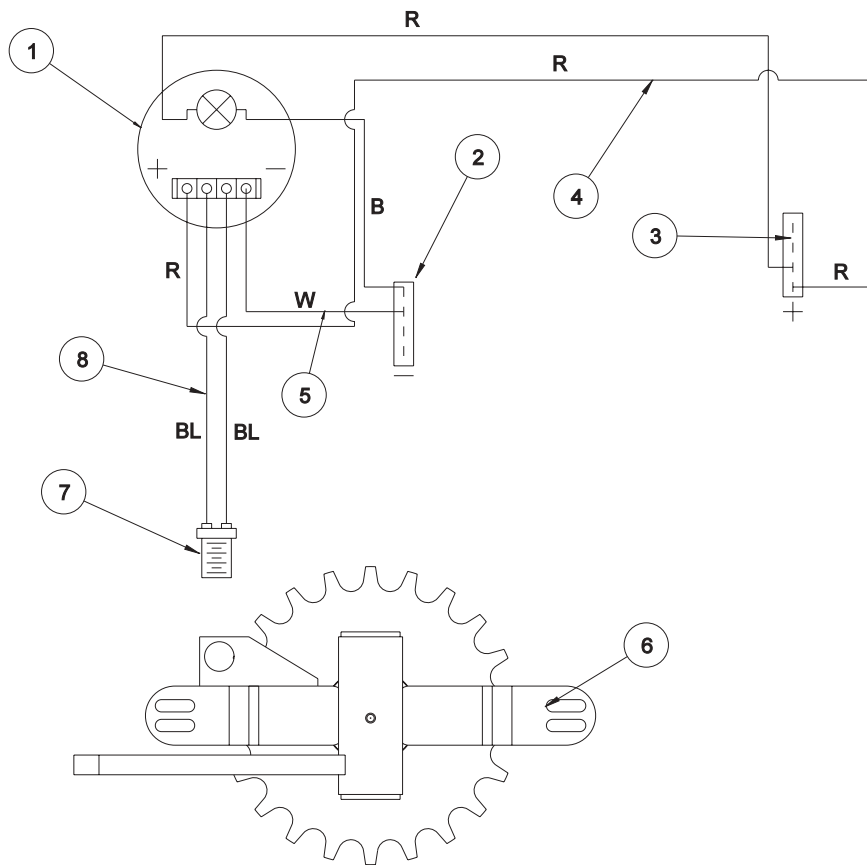
## FOAM NOZZLE SUB ASSEMBLY DRAWING



## FOAM NOZZLE SUB ASSEMBLY PARTS LIST

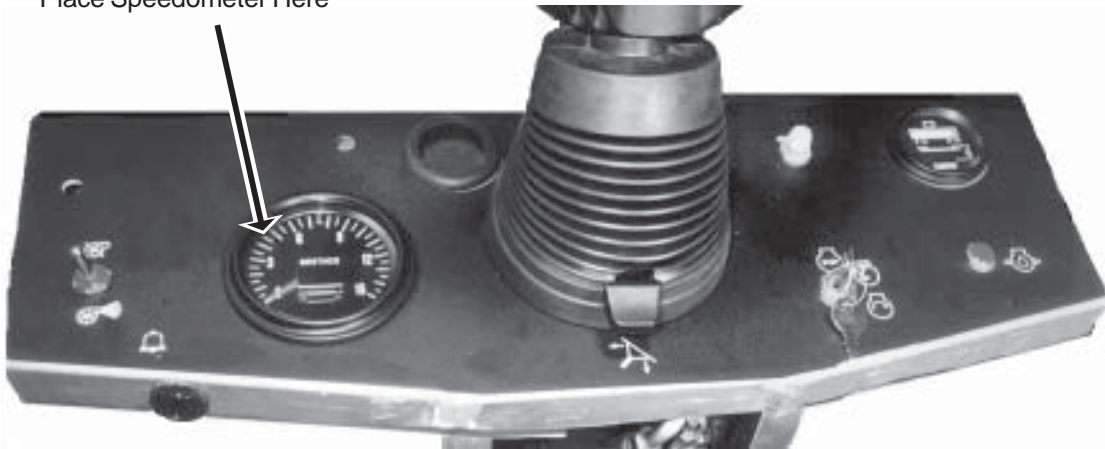
REF#	PART#	DESCRIPTION	QUANTITY
1*†		Nut	1
2*†		Screw	1
3*†		Foam Nozzle Inlet Body	1
	15-510-01	Nozzle Mounting Rods	2
4*†	15-511-02	Foam Sponge	1
5*†	15-511-03	Stainless Steel Screen	1
6*†	15-511-04	Stainless Steel Snap Ring	1
7*	18-123	Hose Clamp	2
8*		Drop Tube	1
9	15-511-05	Restrictor Bell	1
*	15-511	Foam Nozzle Sub Assembly (Only one #7)	
†	15-511-01	Foam Nozzle Inlet Sub Assembly	

## 10-108 SPEEDOMETER KIT DRAWING



## SPEEDOMETER LOCATION

Place Speedometer Here



## 10-108 SPEEDOMETER KIT PARTS LIST

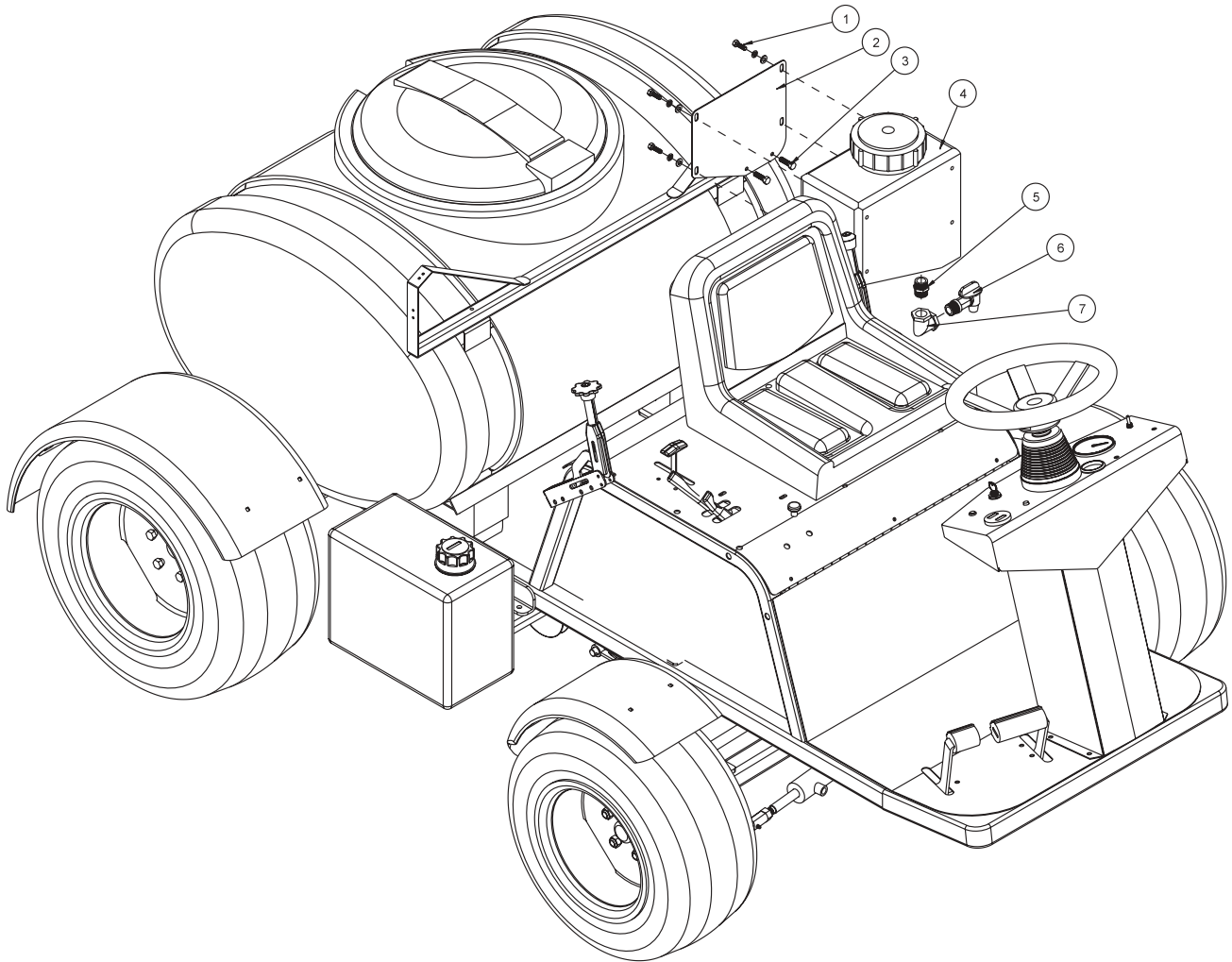
REF#	PART#	DESCRIPTION	QUANTITY
1*	10-202	Speedometer	1
	8854	Fork Terminal	2
	8962	Heat Shrink	2
2	8935	Buss Bar(-)	1
3	8935	Buss Bar(+)	1
4		Speedometer to Buss Bar(+)(Part of console wire harness 10-224)	
5*	10-183	Speedometer Ground Wire	1
6	10-152	Left Spindle	1
7*	16-883	Magnetic Sensor	1
8*	10-209	Speedometer Wire Harness	1

\* Part of 10-108 Speedometer Kit

## SPEEDOMETER KIT INSTALLATION

1. Shut off machine, remove key, set park brake, remove negative(-) battery cable from battery.
2. Using a utility knife, cut out decal covering hole on left side of dashboard. Remove plug from speedometer hole.
3. Put the heat shrink on the red and black wires on speedometer. Put the fork terminals on the wires, slide heat shrink over the ends of terminals and apply heat to shrink. Connect the ground wire 10-183 to the negative (-) terminal on the speedometer using the fork terminal. Use dielectric grease on all electrical connections.
4. Turn the steering wheel all the way to the right. On the inside of the left front wheel there is a sprocket. From the rear of the machine, place the magnetic sensor into the hole on the bracket of the spindle that lines up with the teeth on the sprocket. Adjust the magnetic sensor so that it is between  $\frac{1}{8}$  and  $\frac{3}{16}$  inch away from the sprocket.
5. Connect the ring terminals on the wire harness to the terminals on the magnetic sensor. Run the wire harness to the center of the machine, along the front axle, up through the hole in the floorboard, up the console and through the hole for the speedometer. Use the nylon ties to tie the wire harness to the axle so that it will not hang loose or rub on anything. Cut off the excess ties.
6. Bring the speedometer up to the dashboard. Connect the speedometer wire harness to the center terminal of the speedometer.
7. Under the dashboard there is a red wire with a fork terminal that is not connected to anything. Bring it up to the speedometer and connect it to the positive(+) terminal.
8. Remove the hold down from the speedometer and slide the speedometer through the hole. Make sure that the speedometer is straight. Put the holddown back on, keeping the speedometer straight and not touching any of the wires.
9. Connect the white ground wire from the speedometer to the ground (-) buss bar on the left hand side of the steering column.
10. Reconnect the negative (-) battery cable. Speedometer should work. If not, check sensor clearing.

## 10-106 CLEAR WATER TANK DRAWING





## 10-106 CLEAR WATER TANK PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HB-516-18-075	Bolt $\frac{5}{16}$ - 18 x $\frac{3}{4}$	4
	HWL-516	Lock Washer $\frac{5}{16}$	4
	HW-516	Washer $\frac{5}{16}$	4
2	10-216	Clear Water Tank Bracket	1
3	HB-38-16-150	Bolt $\frac{3}{8}$ -16 x $1\frac{1}{2}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ -16	2
4	10-234	3 Gallon Rectangular Tank	1
5	16-158	Close Nipple $\frac{3}{4}$ x $\frac{3}{4}$	1
6	16-960	Spigot $\frac{3}{4}$ NPT	1
7	16-151	Elbow FPT $\frac{3}{4}$ x $\frac{3}{4}$	1

## CLEAR WATER TANK INSTALLATION

1. Clear Water Tank mounts on the left side of the horizontal boom support.
2. Insert the close nipple into the bottom of the tank. Then place the elbow on the close nipple so it is pointing away from the machine. Place the spigot into the elbow. For best results use plumbers tape on all fittings.
3. Place the mount bracket onto the boom support using the two  $\frac{3}{8}$  bolts and lock nuts.
4. Line holes on the tank with holes on the mount bracket and use the  $\frac{5}{16}$  bolts to fasten tank to mount bracket.
5. Rinse tank with clear water and check for leaks around fittings.



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

**WARNING**



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

25-344	Decal, 3" Star	Front Nose Cone
75-699	Decal, Smithco	Front Nose Cone
25-347	Decal, Dash	Dashboard
25-322	Decal, Made in USA	Dashboard
25-348	Decal, Control Panel	Control Panel
13-063	Decal, Warnings	In Front of Seat
25-298	Decal, Warning Hot	Hood - Bak Edge, Both Sides
27-092	Decal, Lift Hood	Hood - Back Edge, Middle
16-231	Decal, Computer Cables	Front Edge
25-308	Decal, Engine RPM	Engine
76-304	Decal, Crush Pinch	Front Side of Tank
25-345	Decal, Spray Star 1000	Right and Left Tank Sides
25-307	Decal, Gas	Gas Tank

## QUICK REFERENCE REPLACEMENT PARTS

### REPLACEMENT FILTERS

23-031	Hydraulic Oil Filter	
78-090	Oil Filter	Kohler # 12 050 01
76-311	Air Filter Element	Kohler # 24 083 03
76-312	Pre-Cleaner	Kohler # 24-083-05
13-288	Key Switch	

### REPLACEMENT BELTS

10-179	Belt
--------	------

### SEAL KITS

34-103	Orbitor
15-315-01	Repair Kit
10-135	Hydraulic Cylinder
14-267	Seal Kit
10-116	Wheel Motor
10-117	Pump
10-187	Hydraulic Cylinder
14-273	Seal Kit

### FLUIDS

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

### OTHER PARTS

16-953	Hinged Cover On Tank with Gasket	
16-953-01	Gasket For Cover	
	Spark Plugs	Champion type RC12YC (Gap 0.030 inch (.76mm))

## 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

