

Spray Star 1000
10-100-B
SN: 100325

February 2006

CONTENTS

Introduction

Introduction	1-3
Safe Practices	2
Specification	3
Optional Equipment	3

Service

Service	4-9
Maintenance	4-6
Service Chart	7
End User's Service Chart	8
Adjustments	9
Storage	9

Diagrams

Diagrams	10-13
Wiring Diagram	10-11
Hydraulic Diagram	12-13
Fitting Torque Charts	13

Parts

Parts	14-39
Body and Frame	14-17
Nose Cone	18-19
Front Axle	20-21
Fuel Tank	22-23
Hydraulic Tank	22-23
Foot Pedal Linkage	24-27
Engine, Pumps, and Exhaust	28-29
Park Brake and Rear Axle	30-31
Poly Tank	32-33
Turbo-Quad Agitator	32-33
34-103 Orbitrol	34-35
10-117 Hydraulic Pump	36-37
16-994 Hypro® Pump	38-39

Accessories

Reference

Accessories 40-109

1010 Plumbing (Manual Valve)	40-43
1008 Plumbing (Raven 440)	44-47
1002 Plumbing (Raven 203)	48-51
1008 Controls (Raven 440)	52-53
1002 Controls (Raven 203)	54-55
16-456 Flow Meter	54-55
16-524/16-995 Motorized Control Valve	56-57
16-968 Strainer	56-57
10-207 Manual Manifold Ball Valve	58-59
15-552 Manifold Ball Valve	60-61
16-986 Regulating Butterfly Valve	62-63
10-268 3 Way Manual Valve	64-65
10-160 Stainless Steel 15' Manual Boom	66-69
10-301 15' Terrain Following Boom	70-75
Nozzle Assembly	76-77
Wiring Diagram (for 10-301 Terrain Following Boom)	76-77
Turbo TurfJet Tips	78
XR TEEJET Tips	79
10-103 Electric Lift Kit	80-81
10-325 Hydraulic Lift Kit	82-85
16-906 Electric Hose Reel	86-87
16-129 Hose Reel	88-89
10-107 Hose Reel Mounting Instructions	90-91
Hose Reel Plumbing	92-93
Electric Hose Reel Wiring	94-95
Hose Reel Adjustments	94
10-350 Foam Marker Kit	96-101
14-291 Foam Marker	102-103
15-505 Motor	104-105
15-511 Foam Nozzle	106-107
10-106 Fresh Water Wash Tank	108-109

Reference 111-112

Decal List	111
Quick Reference Replacement Parts	112
Limited Warranty	Inside Back Cover

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

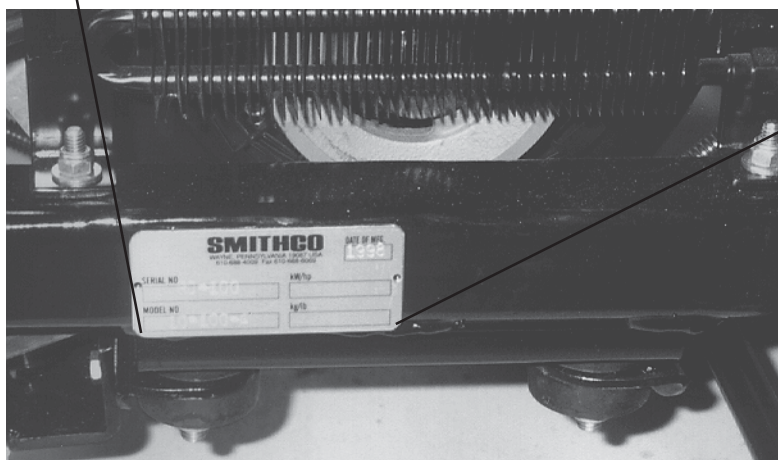
Read this manual and all other manuals pertaining to the Spray Star 1000 carefully as they have safety, operating, assembly and maintenance instructions. Failure to do so could result in personal injury or equipment damage.

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.

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



Information needed when ordering replacement parts:

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

SMITHCO CUSTOMER SERVICE 1-800-891-9435

SAFE PRACTICES

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

These machines are intended for professional maintenance on golf courses, sports turf, and any other area maintained turf and related trails, paths and lots. No guaranty as to the suitability for any task is expressed or implied.

SPECIFICATIONS SPRAY STAR 1000

WEIGHTS AND DIMENSIONS

Length	112" (285 cm)
Width	70" (178 cm)
Width With Boom Open	180" (457 m)
Height	48" (122 cm)
Wheel Base	53" (135 cm)
Weight Empty	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 68673
Horsepower	25HP (19 kw)
Fuel	Unleaded 87 Octane Gasoline Minimum
Cooling System	Air Cooled
Lubrication System	Full Pressure
Alternator	25 Amp

WHEELS & TIRE

Front: Two 20 x 10.00 x 10 NHS Multi-Rib; 20psi (1.4 bar)
Rear: Two 24 x 12.00 x 12 NHS Multi-Trac; 20 psi (1.4 bar)

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

	Automotive type 24F-12 Volt
BCI Group	Size 24
Cold Cranking Amps	575 minimum
Ground Terminal Polarity	Negative (-)
Maximum Length	10.25" (26 cm)
Maximum Width	6.88" (17 cm)
Maximum Height	10" (25 cm)

FLUID CAPACITY

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

OPTIONAL EQUIPMENT

10-260	203 Spray System (1002)	10-110	440 Spray System (1008)
10-106	Fresh Water Tank	10-270	3-Way Manual System (1010)
10-103	Electric Actuator Lift Kit	10-160	15' Stainless Steel Boom - manual
10-325	Hydraulic Actuator Lift Kit	10-301	15' Terrain Following Boom
10-350	Foam Marker	33-216	Battery Automotive Type 24F-12 volt
10-107	Hose Reel Mounting Kit		
16-129	Hose Reel 200'(61 m) Manual capacity (to be used with 10-107)		
16-906	Hose Reel 12 volt electric rewind 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.

LUBRICATION

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

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

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

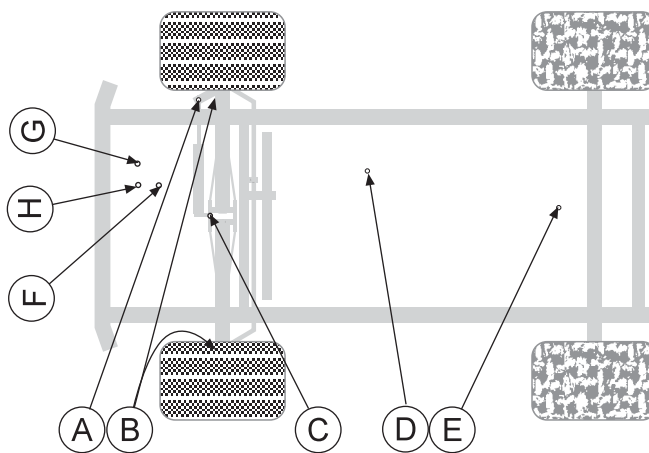
As you mount the pump back onto the engine, be certain the mating surfaces are clean and free of any foreign material and that the pump is correctly aligned.

ELECTRICAL CONNECTIONS

Use dielectric grease on all electrical connections.

FLOW METER MAINTENANCE AND ADJUSTMENT

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

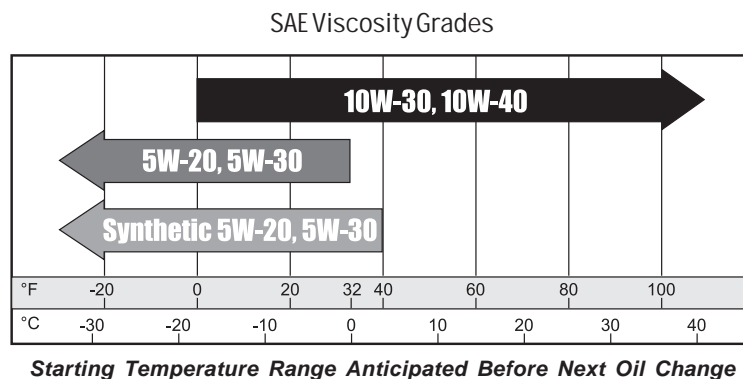


AIR CLEANER

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

ENGINE OIL

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



HYDRAULIC OIL

1. Use SAE 10W-40 API Service SJ or higher motor oil.
2. For proper warranty, change oil every 500 hours or annually, whichever is first.
3. Oil level should be 2-2½" (5-6.4cm) from top of the tank when fluid is cold. Do not overfill.
4. After changing oil, run the machine for a few minutes. Check oil level and for leaks.
5. Always use extreme caution when filling hydraulic oil tank or checking level to keep system free of contaminants. Check and service more frequently when operating in extremely cold, hot or dusty conditions.
6. If the natural color of the fluid has become black or smells burnt, it is possible that an overheating problem exists.
7. If fluid becomes milky, water contamination may be a problem.
8. If either of the above conditions happen, change oil immediately after fluid is cool and find the cause. Take fluid level readings when the system is cold.
9. In extreme temperatures you can use straight weight oil. We recommend SAE 30W API Service SG when hot (above 90°F (33°C)) and SAE 10W API Service SJ or higher when cold (below 32°F (0°C) ambient temperature. Use either motor oil or hydraulic oil, but do not mix.
10. Oil being added to the system must be the same as what is already in the tank. Mark the tank fill area as to which type you put in.

TIRE PRESSURE

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

MAINTENANCE

WHEEL MOUNTING PROCEDURE

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

BATTERY

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

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

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

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

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



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.

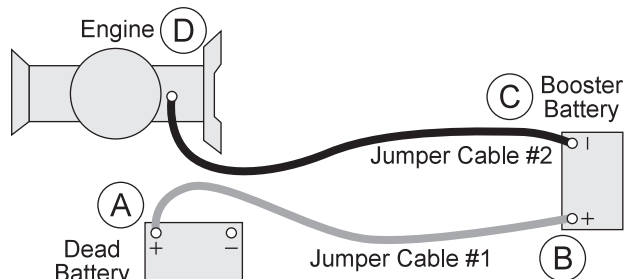


WARNING

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.

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.

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
Lubricate Splines on Hydrostatic Pump	Every 500 hours							

C=Check or Clean at specified intervals

R=Replace at specified intervals

* Tire pressure: 20 psi (1.4 bar) Front and Rear.

† 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
α Engine Oil w/ Filter 2.1qt. (2 l)								
α Engine Oil Filter								
Engine for Leaks and Loose Parts								
‡ Air Cleaner (Paper Element)								
‡ Pre-Cleaner (Every 25 hours)								
Spark Plugs								
Idle Speed (1200 RPM)								
‡ 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								
Lubricate Splines on Hydrostatic Pump								

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))

α Change Oil and Filter after first 5 hours.

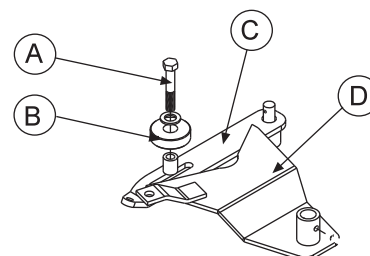
‡ Clean more often under dusty conditions or when airborne debris is present , replace air cleaner parts, if very dirty.



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

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

SPEED CALIBRATION NUMBERS

The speed calibration numbers for the Spray Star 1006 is 120.

The speed calibration numbers for Spray Star 1008 is 612.

MASTER BOOM SWITCH (FOOT SWITCH)

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

GROUND SPEED CONTROL (FOOT SWITCH)

The ground speed control does not work the same as an automotive type cruise. The ground speed control is located on the center floorboard and is used to lock forward speed.

TO ENGAGE:

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

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.



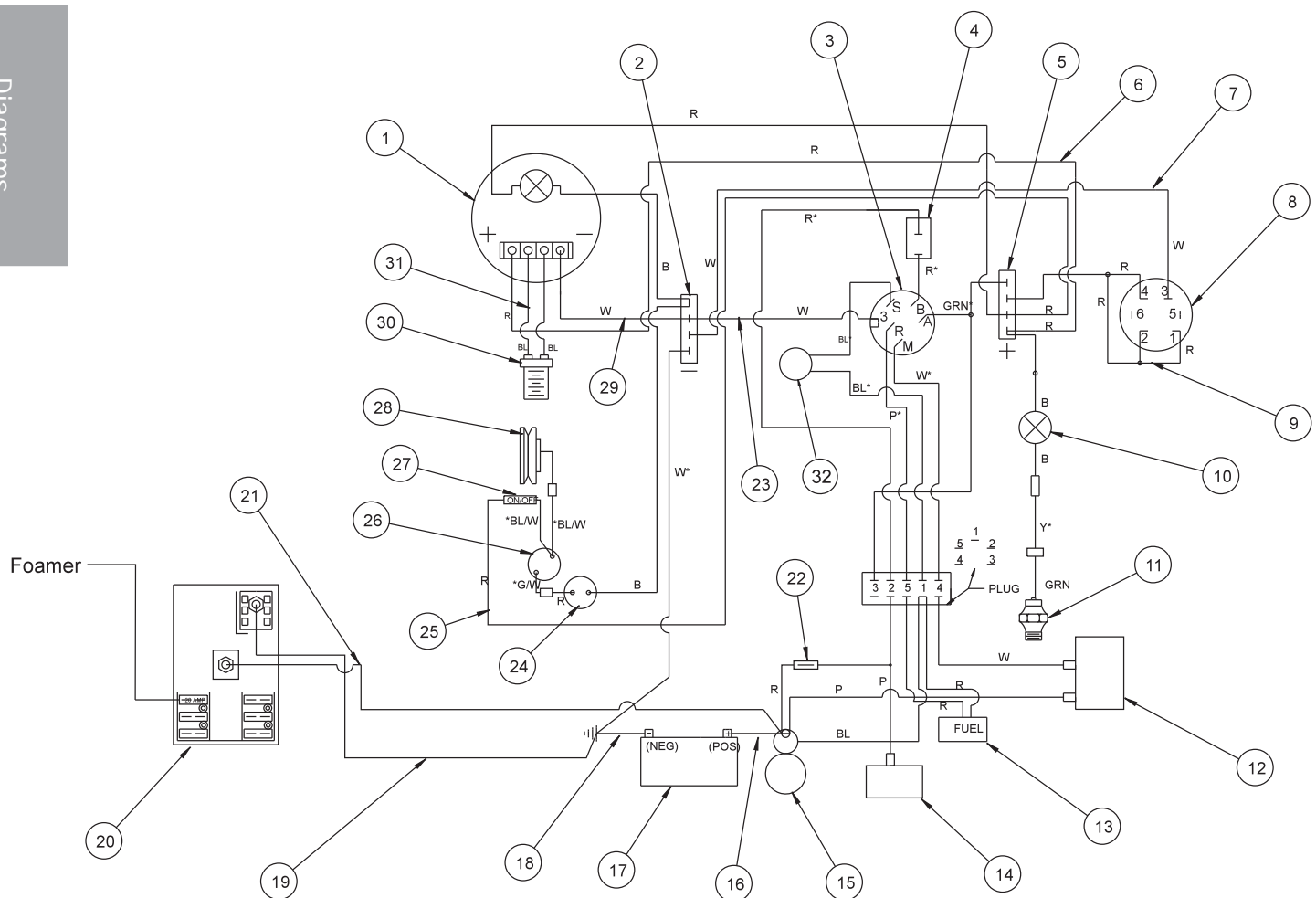
WIRING DIAGRAM

FUSES

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

Color Code Chart

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

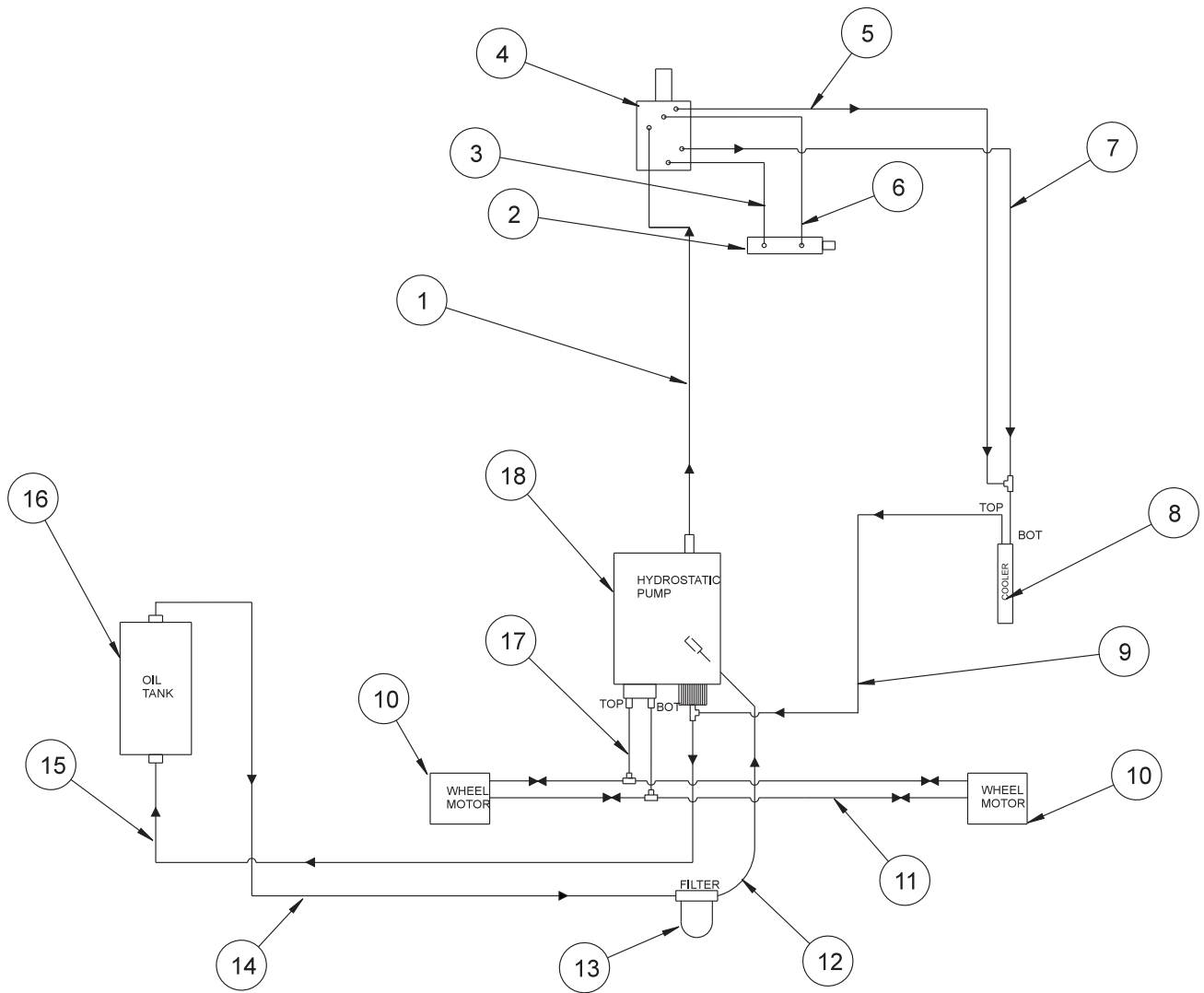


Use dielectric grease on all electrical connections.
To reset circuit breaker on ball valve, you must disconnect power to computer.

WIRING PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-202	Speedometer	1
	8859	Ring Terminal ³ / ₁₆	2
	8963	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	12-017	Hourmeter	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 ³ / ₁₆	1
	8853	Slide On Connector	1
	8963	Heat Shrink	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	33-216	Battery	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 ³ / ₁₆	1
	8853	Slide On Connector	1
	8963	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	16-994	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
32	14-272	Seat Switch	1
	10-262	Wire Harness (Includes all wire colors with *)	1
§	10-224	Console Wire Harness	1

HYDRAULIC DIAGRAM



HYDRAULIC DIAGRAM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-276	Hydraulic Hose	2
2	10-135	Hydraulic Cylinder	1
3	10-277	Hydraulic Hose	1
4	34-103	Orbitrol Motor	1
5	10-279	Hydraulic Hose	1
6	10-278	Hydraulic Hose	1
7	10-275	Hydraulic Hose	1
8	42-265	Oil Cooler	1
9	10-283	Hydraulic Hose	1
10	10-116	Wheel Motor	2
11	10-273	Hydraulic Hose	4
12	10-282	Hydraulic Hose	1
13	15-626	Oil Filter	1
	15-626-01	Replacement Filter	
14	10-281	Hydraulic Hose	1
15	10-275	Hydraulic Hose	1
16	15-627	Oil Tank	1
17	10-274	Hydraulic Hose	2
18	10-117	Hydrostatic Pump	1

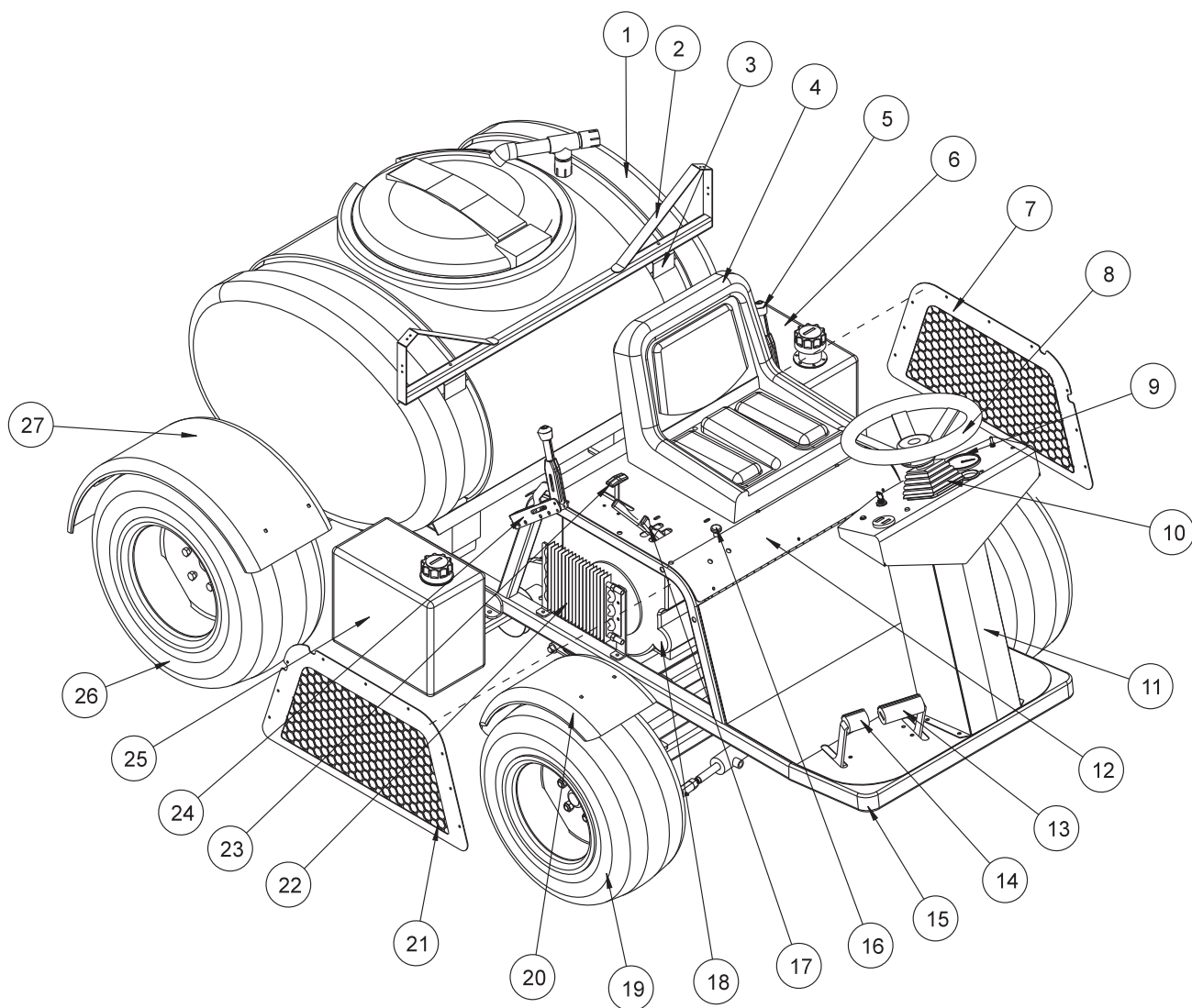
FITTING TORQUE CHARTS

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

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

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

BODY & FRAME DRAWING

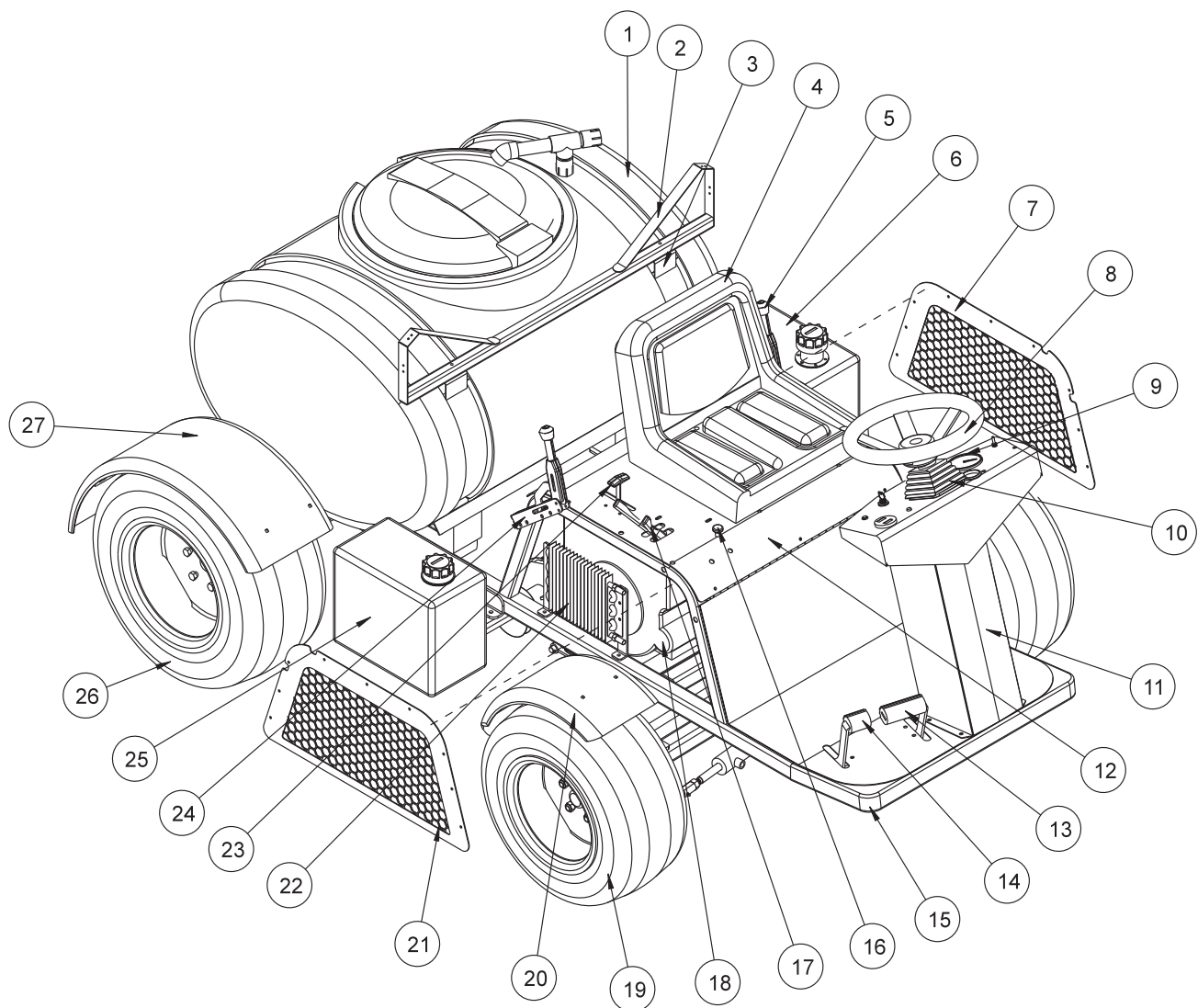


BODY & FRAME PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-111	110 Gallon Poly Tank	1
2	10-193	Horizontal Boom Support	1
3	10-191	Tank Strap	2
4	14-518	Seat	1
	14-272	Seat Switch	1
	42-098	Plastic Spacer	4
	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	15-627	Oil Tank	1
	23-095	Filler Breather	1
7	10-257	Left Side Panel	1
	HSDPS-14-075	Stainless Pan Head Drill Screw $\frac{1}{4}$ x $\frac{3}{4}$	9
8	13-718	Steering Wheel	1
9	10-202	Speedometer	1
10	76-364	Black Boot	1
11	10-113	Console	1
12	10-323	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*	42-220	Two Bank Valve	1
	42-226	Valve Handles	2
18	10-118	Kohler 25 hp Engine	1
19	16-857	Tire and Wheel	2
	16-857-01	Tire 20 x 10 - 10NHS 4 Ply	2
	16-857-02	Wheel	2
20	10-180	Front 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
21	10-258	Right Side Panel	1
	HSDPS-14-075	Stainless Pan Head Drill Screw $\frac{1}{4}$ x $\frac{3}{4}$	9
22	42-265	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
	10-129	Front Cooler Mount	1
	10-130	Rear Cooler Mount	1
	18-352	37° Female Swivel Fitting	2
*	10-325	Hydraulic Lift Kit	1

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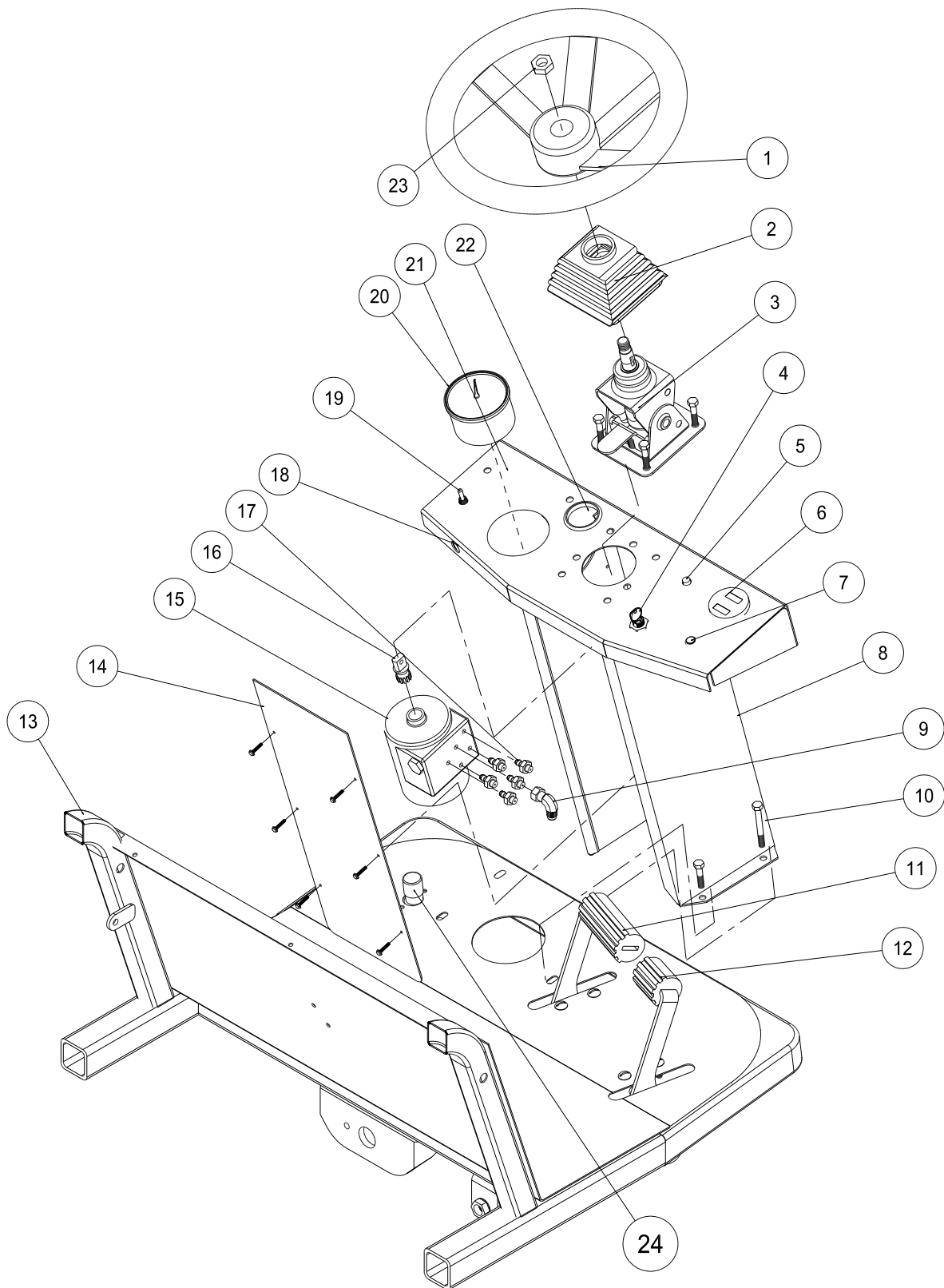
BODY & FRAME DRAWING



BODY & FRAME PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
23	34-160	Throttle Control with Cable	1
24	10-228	Spray Boss Control	1
25	10-115	Gas Tank	1
	10-220	Gas Cap	1
26	10-114	Tire and Wheel	2
	10-114-01	Tire 24-12-12NHS	2
	10-114-02	Wheel	2
27	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

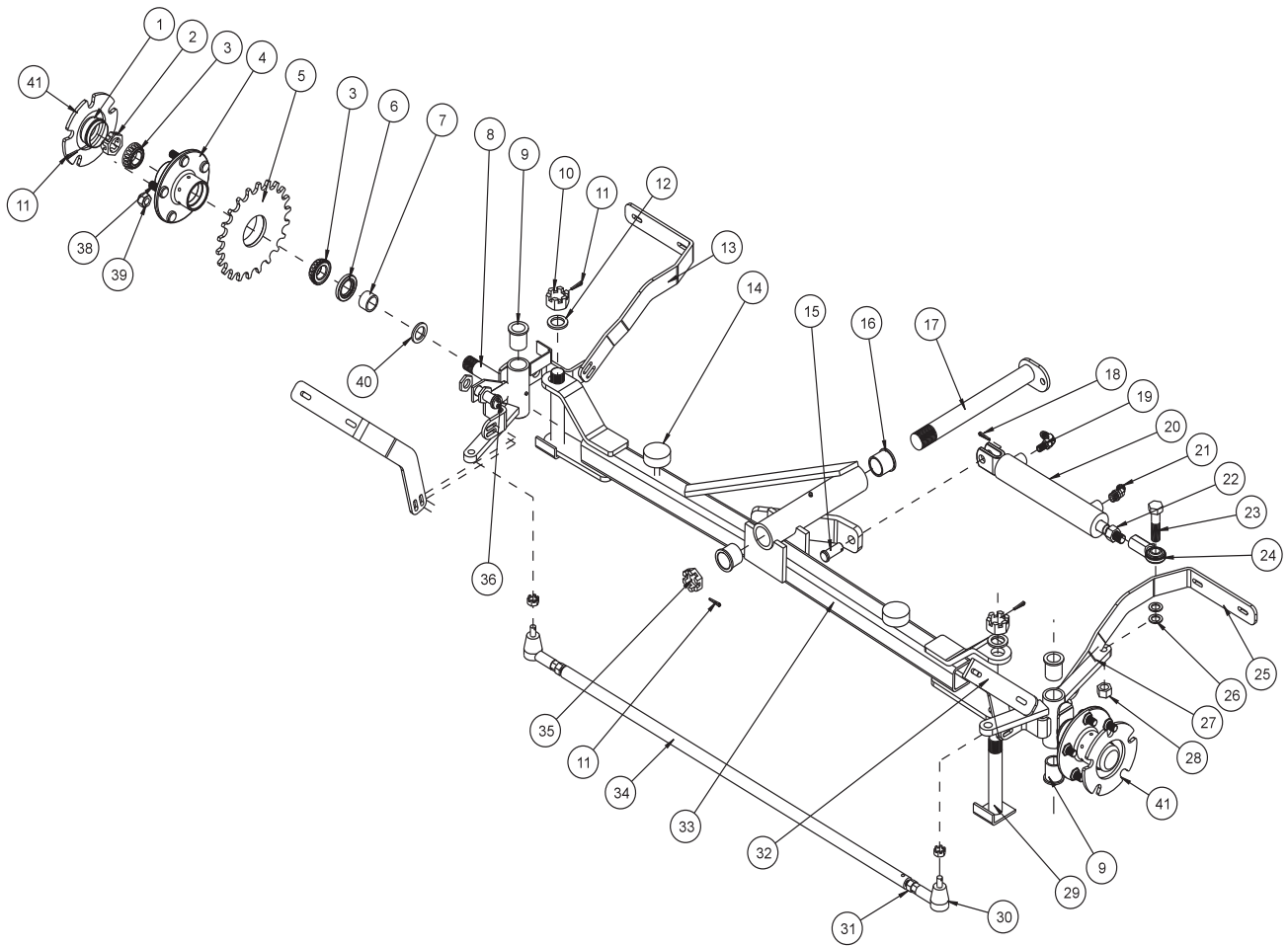
NOSE CONE DRAWING



NOSE CONE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	13-718	Steering Wheel	1
	13-726	Steering Wheel Cap	1
2	76-364	Black Boot	1
3	76-362	Mini Tilt Steering Mechanism	1
	HB-516-18-150	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{2}$	4
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
	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	12-017	Hour meter	1
7	50-359	Oil Warning Indicator Light	1
8	10-113	Console	1
9	18-309	$\frac{11}{16}$ Swivel Nut 90° 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	48-187	Stub Shaft	1
17	18-306	$\frac{11}{16}$ x $\frac{9}{16}$ Straight Thread Connector	5
18	77-207	Buzzer	1
19	15-314	Toggle Switch	1
	15-472	Switch Boot	1
20	10-202	Speedometer	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	33-509	Master Boom Switch	1

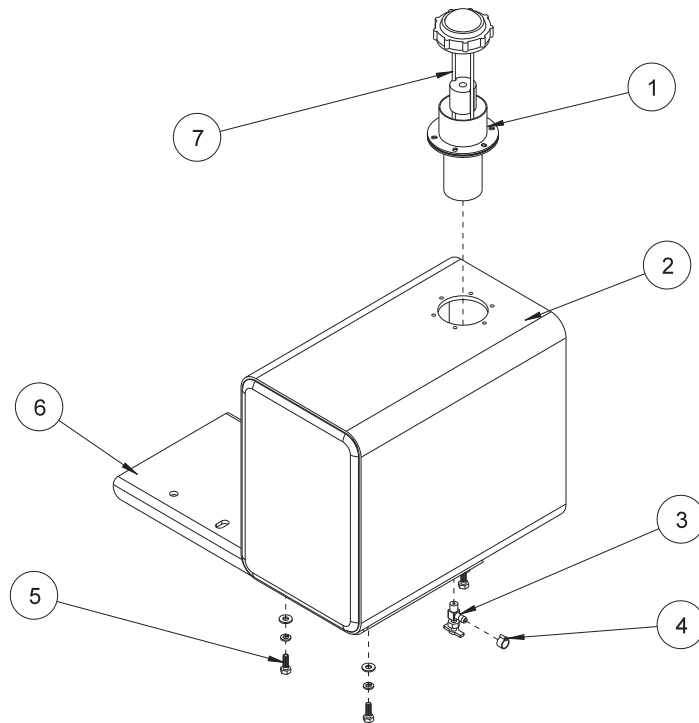
FRONT AXLE DRAWING



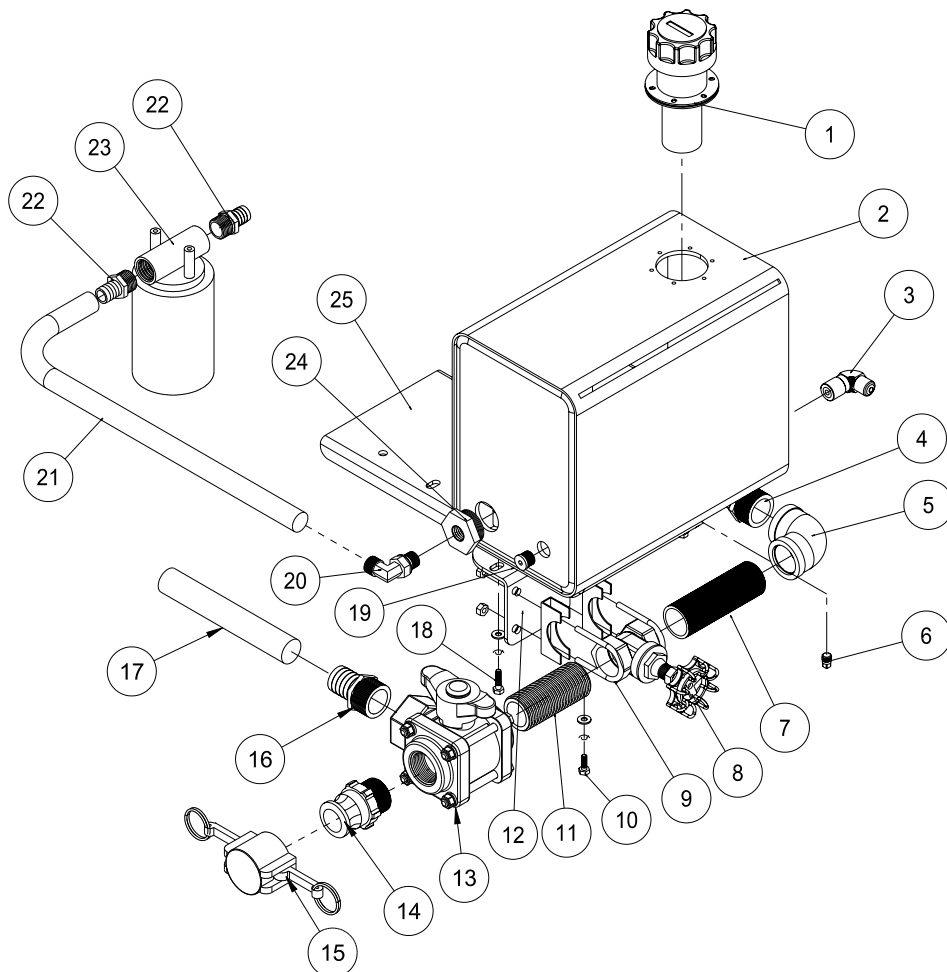
FRONT AXLE PARTS LIST

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	10-265	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	10-294	Left Spindle	1
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	1
9	33-086	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	18-307	$1\frac{1}{16}$ x $\frac{9}{16}$ 45° Straight Thread Elbow	1
20	10-135	Hydraulic Cylinder	1
	14-267	Seal Kit	1
21	18-171	$1\frac{1}{16}$ x $\frac{9}{16}$ 90° Straight Thread 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	10-295	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	HNAT-114-12	Thick Slotted 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
41	10-327	Shim	2
*	10-108	Speedometer Kit	1

FUEL TANK DRAWING



OIL TANK & OIL FILTER DRAWING



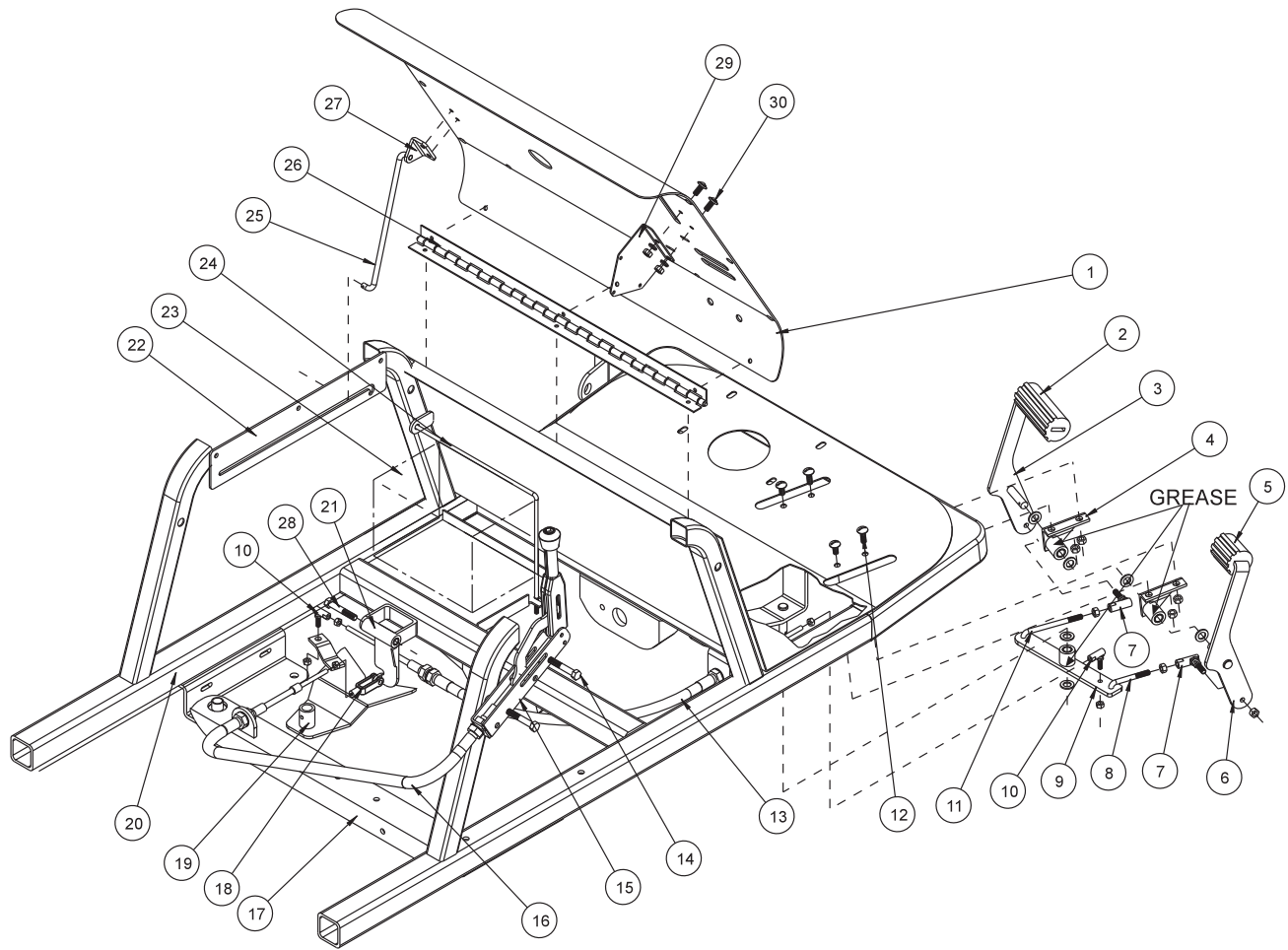
FUEL TANK PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	13-586-03	Gas Tank Neck	1
	13-586-02	Bottom gasket	1
	HMS-8-32-050	Machine Screw #8-32 x 1/2	6
	HWS-8	Star Washer #8	6
2	10-115	Gas Tank	1
3	15-039	Fuel Valve	1
4	18-186	Hose Clamp 1/4	2
	8800-28	Fuel Hose 1/4	1
5	HB-14-20-075	Bolt 1/4 - 20 x 3/4	4
	HW-14	Washer 1/4	4
	HWL-14	Lock Washer 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
	HMS-8-32-050	Machine Screw #8-32 x 1/2	6
	HWS-8	Star Washer #8	6
2	15-627	Oil Tank	1
3	10-305	Male Elbow	1
	10-275	Hydraulic Hose	1
4	16-161	Fitting 1 1/4 NPT x 1 1/4 HB (to spray tank)	1
5	16-182	Elbow	1
6	18-118	1/8 Pipe Plug	1
7	18-296	Black Pipe Nipple 1 1/4 x 5	1
8	16-170	Gate Valve 1 1/4	1
9	50-394	Muffler Clamp 1 3/4	2
10	HB-14-20-075	Bolt 1/4 - 20 x 3/4	2
	HW-14	Washer 1/4	2
	HWL-14	Lock Washer 1/4	2
11	18-236	3" Nipple	1
12	10-128	Valve Mount	1
13	18-372	3-Way Ball Valve	1
14	16-180	Quick Coupler, 1 1/4 Male	1
15	16-935	Cap	1
16	16-161	Barb Fitting 1 1/4	1
17	8889-26	1 1/4" Hose	1
18	HB-14-20-100	Bolt 1/4 - 20 x 1	2
	HW-14	Washer 1/4	2
	HWL-14	Lock Washer 1/4	2
19	18-228	Hollow Hex Plug	1
20	18-305	1 3/16 x 3/4 90° Straight Thread Elbow	1
21	10-281	Hydraulic Hose	1
22	18-311	1 3/16 x 1 1/16 Straight Thread Connector	2
23	15-626	Oil Filter	1
	15-626-01	Relacement Filter	
24	18-315	Reducer Bushing	1
25	10-127	Tank Mount	1

FOOT PEDAL LINKAGE DRAWING

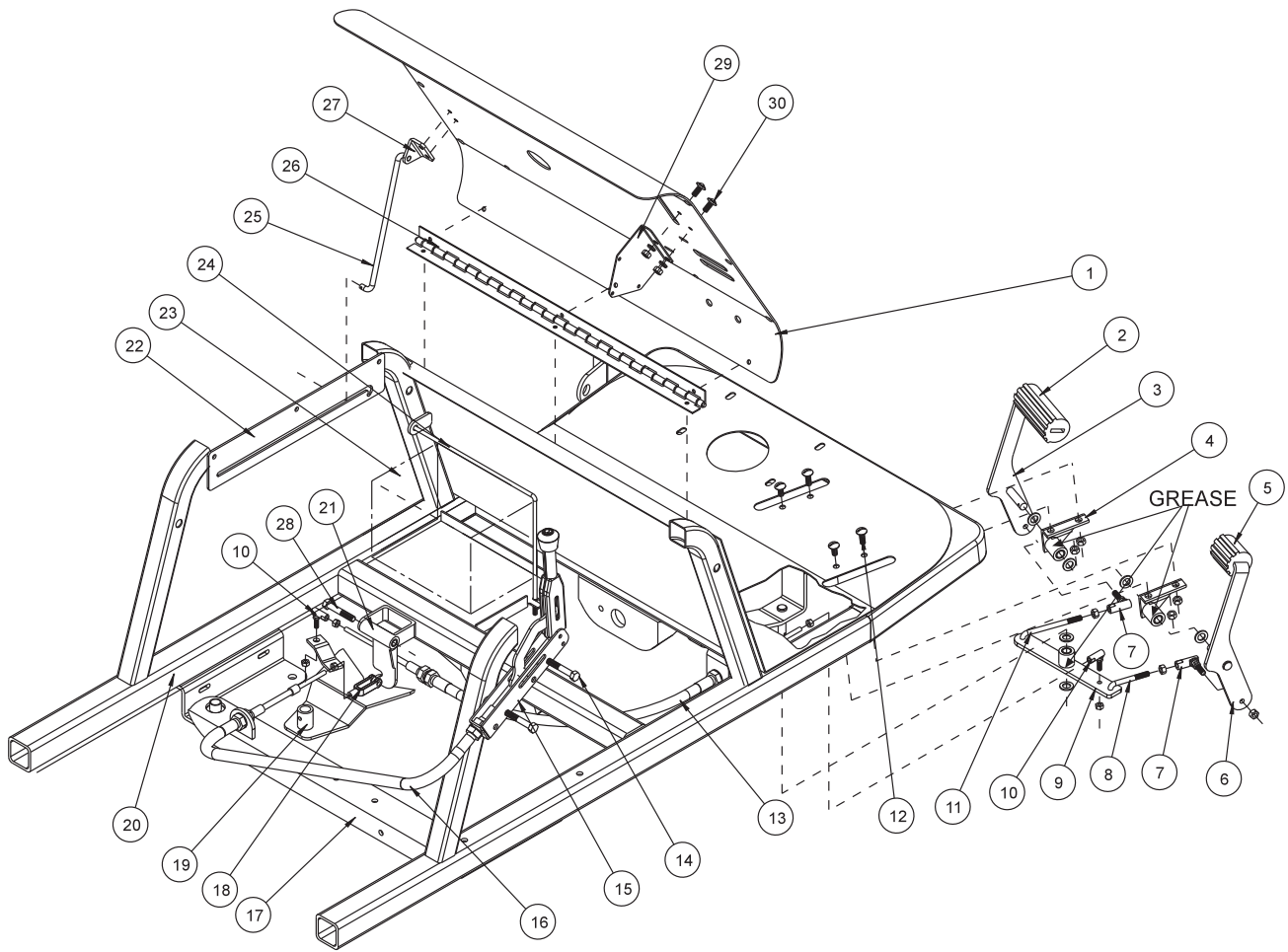


FOOT PEDAL LINKAGE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-323	Seat Panel	1
	10-326	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 $\frac{1}{2}$ x 14GA	2
	HP-18-075	Cotter Pin $\frac{1}{8}$ x $\frac{3}{4}$	1
4	76-296	Pedal Mount	2
	18-234	Bushing	4
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	2
5	48-132	Short Pedal Pad	1
6	10-164	Reverse Foot Pedal	1
	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	2
	HP-18-075	Cotter Pin $\frac{1}{8}$ x $\frac{3}{4}$	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 $\frac{1}{8}$ x $\frac{3}{4}$	1
9	10-178	Relay	1
	18-234	Bushing	2
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	1
	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	2
	HP-18-075	Cotter Pin $\frac{1}{8}$ x $\frac{3}{4}$	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	Forward Linkage	1
	HN-516-24	Nut $\frac{5}{16}$ - 24	1
	HP-18-075	Cotter Pin $\frac{1}{8}$ x $\frac{3}{4}$	1
12	HST-516-18-075	Truss Head Machine Screw $\frac{5}{16}$ -18 x $\frac{3}{4}$	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 x 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 $\frac{5}{16}$ x 1	2
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 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	33-216	Battery (Optional)	1

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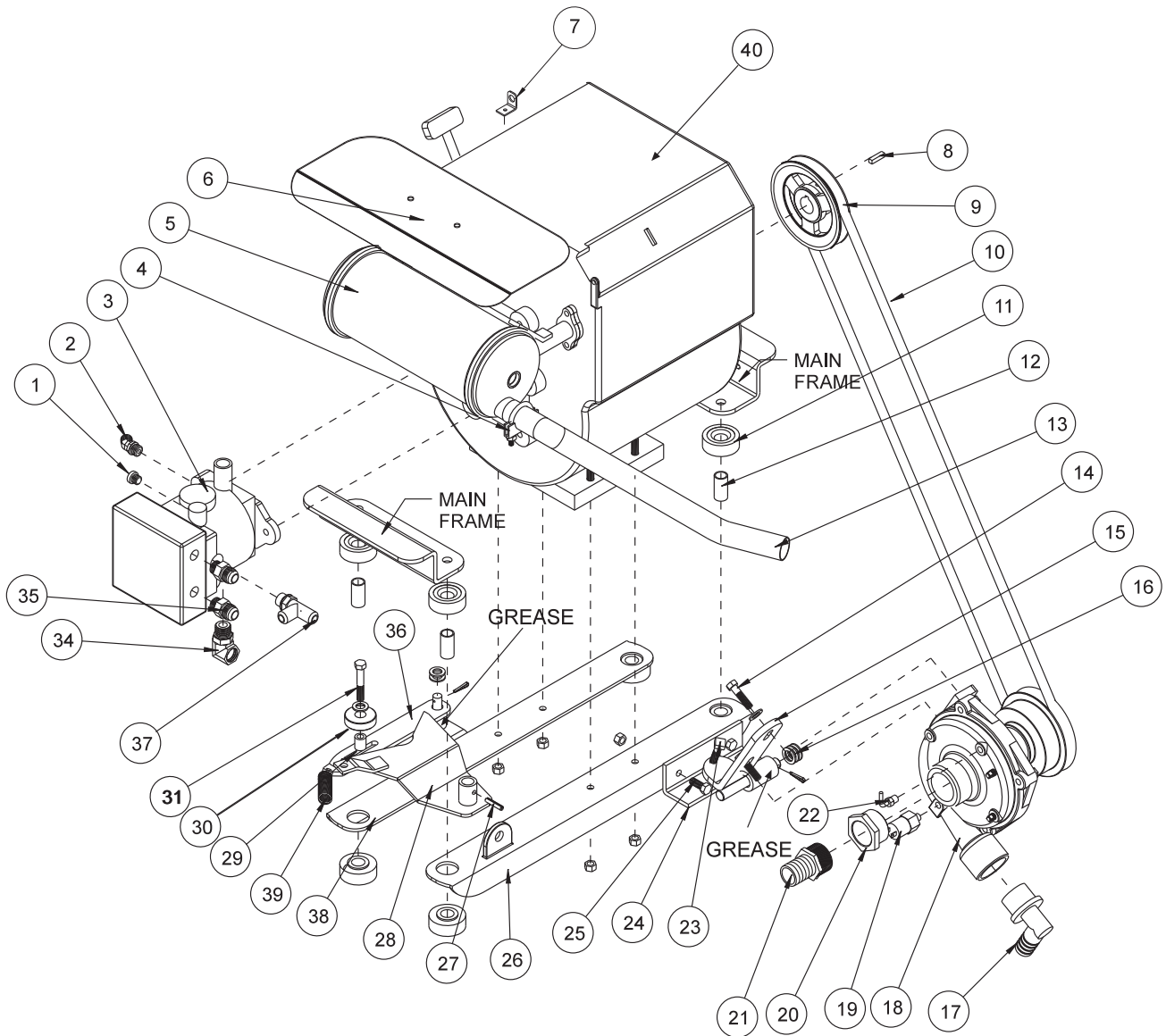
FOOT PEDAL LINKAGE DRAWING



Parts

FOOT PEDAL LINKAGE PARTS LIST

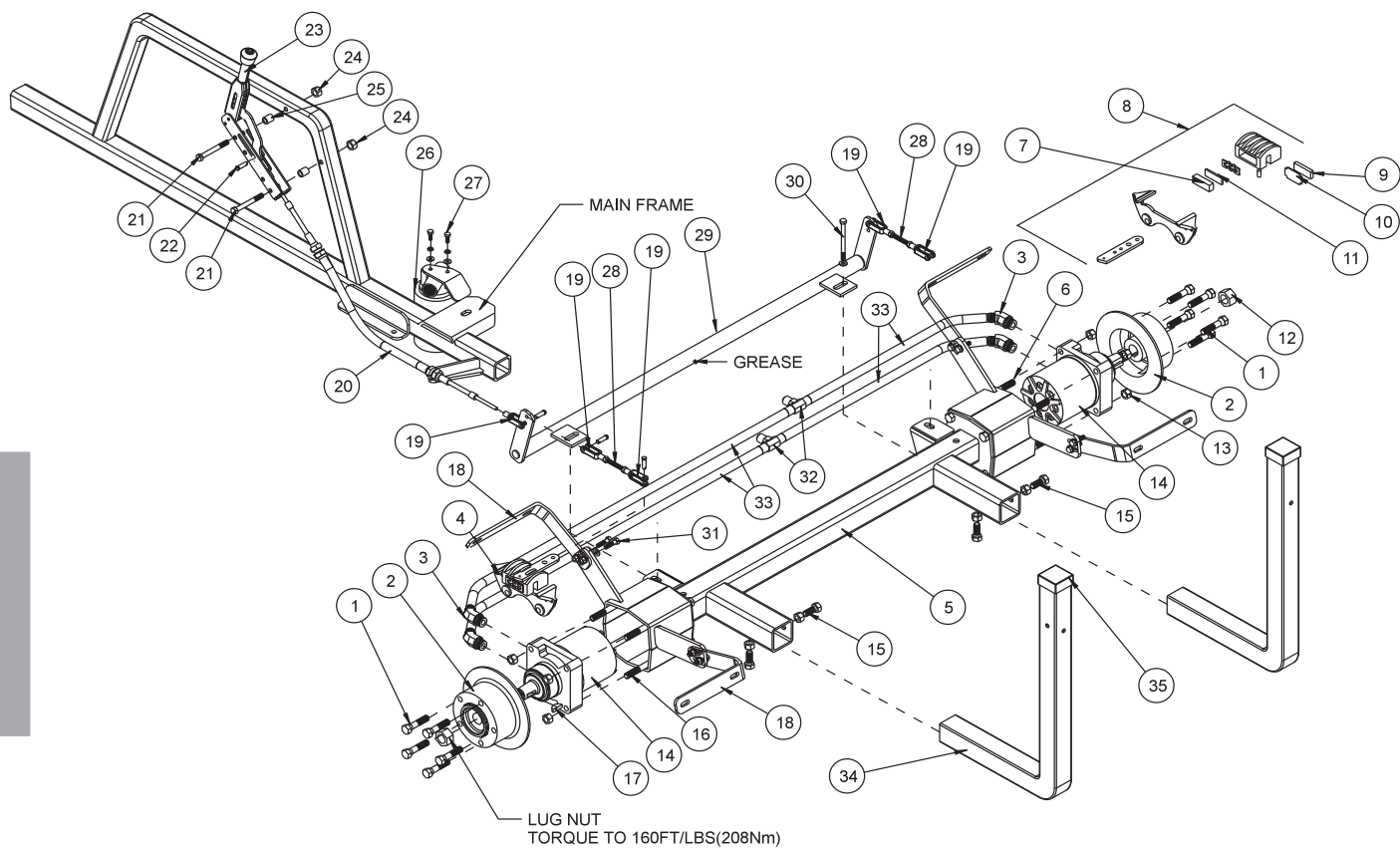
REF#	PART#	DESCRIPTION	QUANTITY
24	10-150	Battery Hold Down	1
	HN-14-20	Nut $\frac{1}{4}$ - 20	1
25	10-195	Hood Rod	1
	HW-516	Washer $\frac{5}{16}$	2
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	2
26	8929-26	Seat Hinge	1
	HSTP-14-20-075	Phillips Truss Head Machine Screw $\frac{1}{4}$ - 20 x $\frac{3}{4}$	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
	HSTP-14-20-075	Phillips 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-38-16-350	Bolt $\frac{3}{8}$ - 16 x $3\frac{1}{2}$	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	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	HSTP-14-20-075	Phillips 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	18-307	45° Straight Thread Elbow $1^{11}/_{16} \times 9^{9}/_{16}$	1
3	10-117	Hydrostatic Pump	1
	HSSH-12-13-175	Socket Screw $1^{1}/_{2} - 13 \times 1^{3}/_{4}$	2
4	18-220	Muffler Clamp $1^{1}/_{4}$	1
5	10-118-01	Muffler (Kohler 24 786 11)	1
6	10-229	Heat Shield	1
7	34-163	Cable Bracket	1
8	HKSQ-14-100	Machine Key $1^{1}/_{4} \times 1^{1}/_{4} \times 1$	1
9	10-212	Pulley BK57	1
10	10-179	Belt	1
11	60-107	Rubber Bushing	8
12	60-168	Spacer	4
13	10-197	Exhaust Pipe	1
14	HB-38-16-150	Bolt $3^{3}/_{8} - 16 \times 1^{1}/_{2}$	2
	HW-38	Washer $3^{3}/_{8}$	2
	HNTL-38-16	Lock Nut $3^{3}/_{8} - 16$	2
15	10-338	Pump Mount	1
16	HMB-58-14	Machine Bushing $5^{5}/_{8} \times 14\text{GA}$	3
	HP-18-100	Cotter Pin $1^{1}/_{8} \times 1$	1
17	16-168	Elbow $1^{1}/_{4} \text{MPT} \times 1 \text{ HB}$	1
18	16-994	Hypro® Pump	1
19	33-480	Pressure Switch	1
20	16-825	Stainless Steel Reducer Bushing $1^{1}/_{2} \times 1^{1}/_{4}$	1
21	16-161	Fitting $1^{1}/_{4} \text{MPT} \times 1^{1}/_{4} \text{HB}$	1
22	33-494	Male Elbow	1
23	HSSQ-38-16-150	Adjustment Screw $3^{3}/_{8} - 16 \times 1^{1}/_{2}$	1
	HN-38-16	Nut $3^{3}/_{8} - 16$	1
24	10-133	Pivot	1
	HG-14-28-180	Grease Fitting $1^{1}/_{4} - 28 \times 180^{\circ}$	1
	18-268	Bushing	2
25	HB-38-16-100	Bolt $3^{3}/_{8} - 16 \times 1$	2
	HNTL-38-16	Lock Nut $3^{3}/_{8} - 16$	2
26	10-166	Rear Engine Mount	1
27	HRP-14-100	Roll Pin $1^{1}/_{4} \times 1$	1
28	10-151	Swash Plate	1
29	10-134	Spacer	1
30	14-266	Ball Bearing $1^{3}/_{4} \text{OD} \times 5^{5}/_{8} \text{ID}$	1
	18-270	Oilite Bushing $5^{5}/_{8} \text{OD} \times 3^{3}/_{8} \text{ID}$	1
31	HB-38-16-225	Bolt $3^{3}/_{8} - 16 \times 2^{1}/_{4}$	1
	HNTL-38-16	Lock Nut $3^{3}/_{8} - 16$	1
34	18-313	90° Straight Thread Elbow $1^{3}/_{16} \times 3^{3}/_{4}$	1
35	18-303	Straight Thread Connector $1 \times 3^{3}/_{4}$	2
36	10-136	Idler Arm	1
	18-234	Oilite Bushing	2
	HG-14-28-180	Grease Fitting $1^{1}/_{4} - 28 \times 180^{\circ}$	1
	HMB-12-14	Machine Bushing $1^{1}/_{2} - 14\text{GA}$	2
	HP-18-100	Cotter Pin $1^{1}/_{8} \times 1$	1
37	18-304	Union Tee $1^{13}/_{16} \times 3^{3}/_{4} \times 1^{13}/_{16}$	1
38	10-177	Front Engine Mount	1
39	21-212	Spring	1
40	10-118	Engine Kohler 25 hp	1
	76-324-03	Crankshaft Splined Insert (part of engine)	1

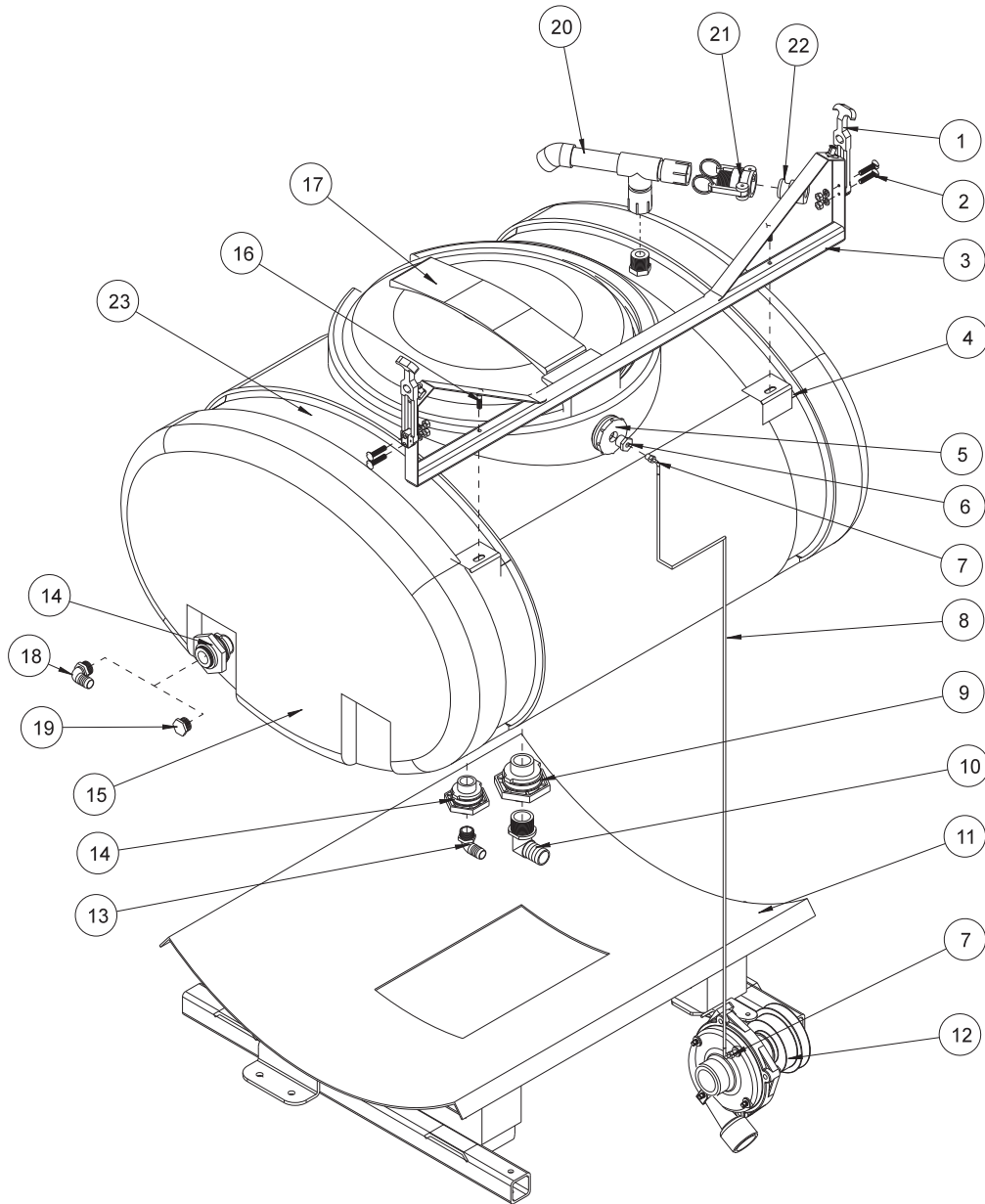
PARK BRAKE AND REAR AXLE DRAWING



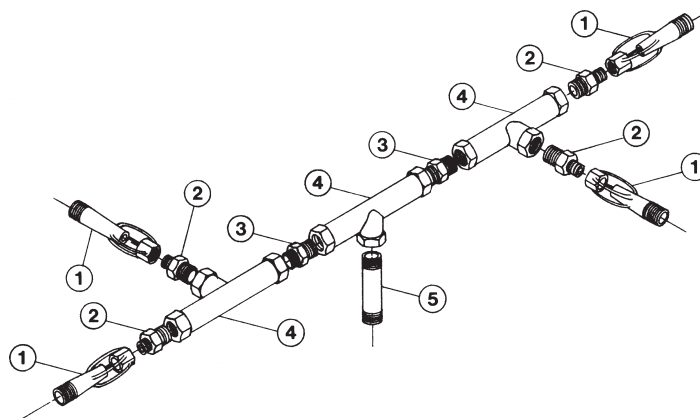
PARK BRAKE AND REAR AXLE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	60-268	Lug Bolt $\frac{1}{2}$ - 20 x $\frac{1}{16}$	10
2	76-239	8" Brake Disk (5 hole)	2
3	18-301	45° Straight Thread Elbow 1" x $\frac{7}{8}$	4
4	76-240	Left Caliper (CCW)	1
5	10-124	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	15-626	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	18-302	Union Tee 1"	2
33	10-273	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 AGITATOR DRAWING



TANK PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	15-437	Latch	2
2	HSM-8-32-100	Machine Screw #8 - 32 x 1	6
	HWL-8	Lock Washer #8	6
	HN-8-32	Nut #8 - 32	6
3	10-193	Horizontal Boom Support	1
4	10-253	Right Tank Strap	1
	HB-38-16-400	Bolt $\frac{3}{8}$ - 16 x 4	1
	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
5	33-495	Bulkhead Fitting	1
	16-937	Elbow (inside tank)	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	16-994	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-38-16-200	Bolt $\frac{3}{8}$ - 16 x 2	2
	HW-38	Washer $\frac{3}{8}$	2
	HWL-38	Lock Washer $\frac{3}{8}$	2
	HN-38-16	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 (use on 1002, 1004, 1010 & 1006)	1
19	16-166	$\frac{3}{4}$ Plug (use on 1008)	1
20	10-254	Air Gap Filler	1
21	16-962	Aluminum Coupler 1" Male Thread	1
22	16-961	Aluminum Adapter 1" Female Thread	1
23	10-191	Left Tank Strap	1
	HB-38-16-400	Bolt $\frac{3}{8}$ - 16 x 4	1
	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2

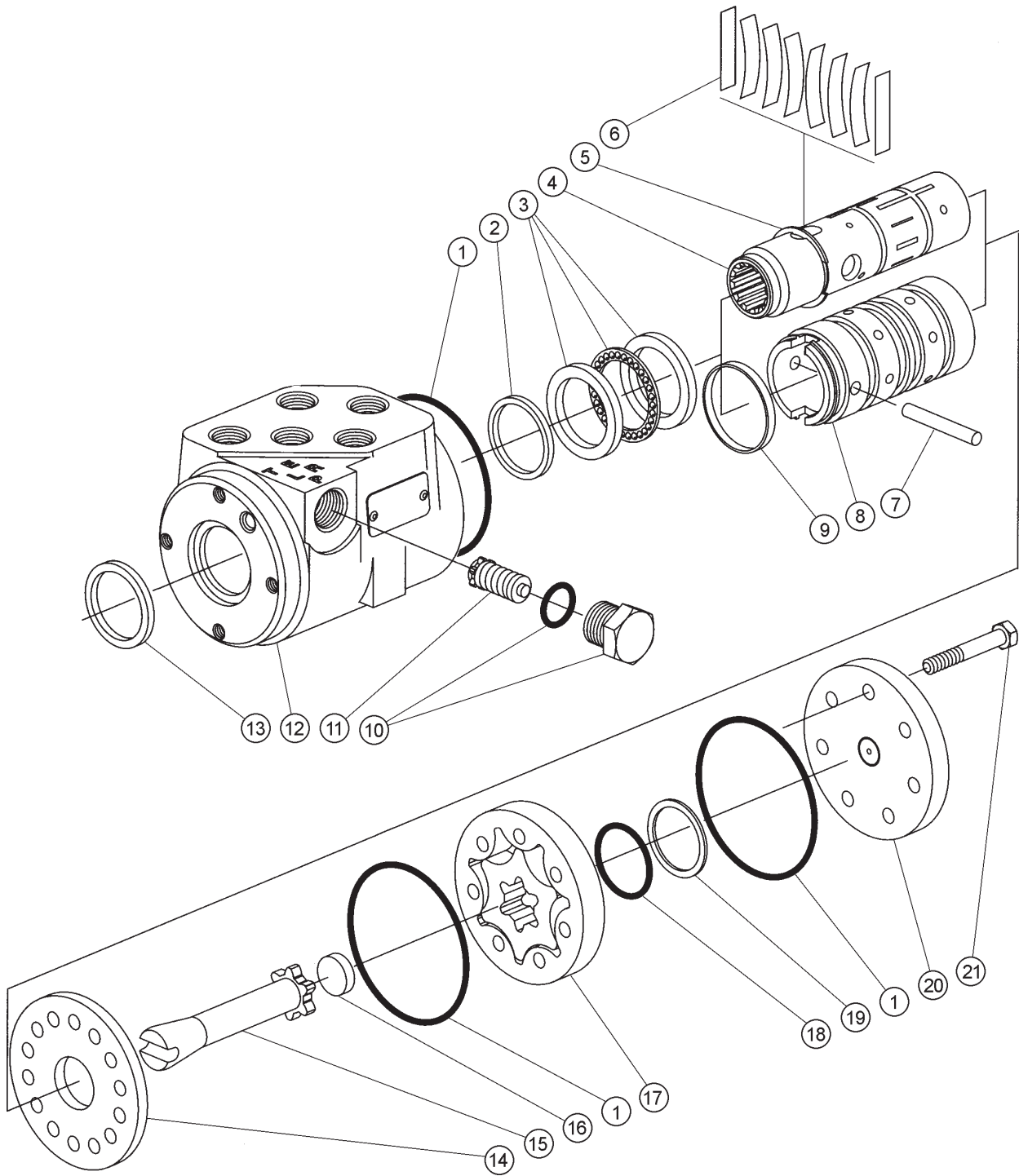
* Comes with 110 Gallon Poly Tank (only one 16-150 Double Threaded Fitting in bottom of tank)

TURBO-QUAD AGITATOR PARTS LIST

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

34-103 ORBITROL DRAWING

Parts

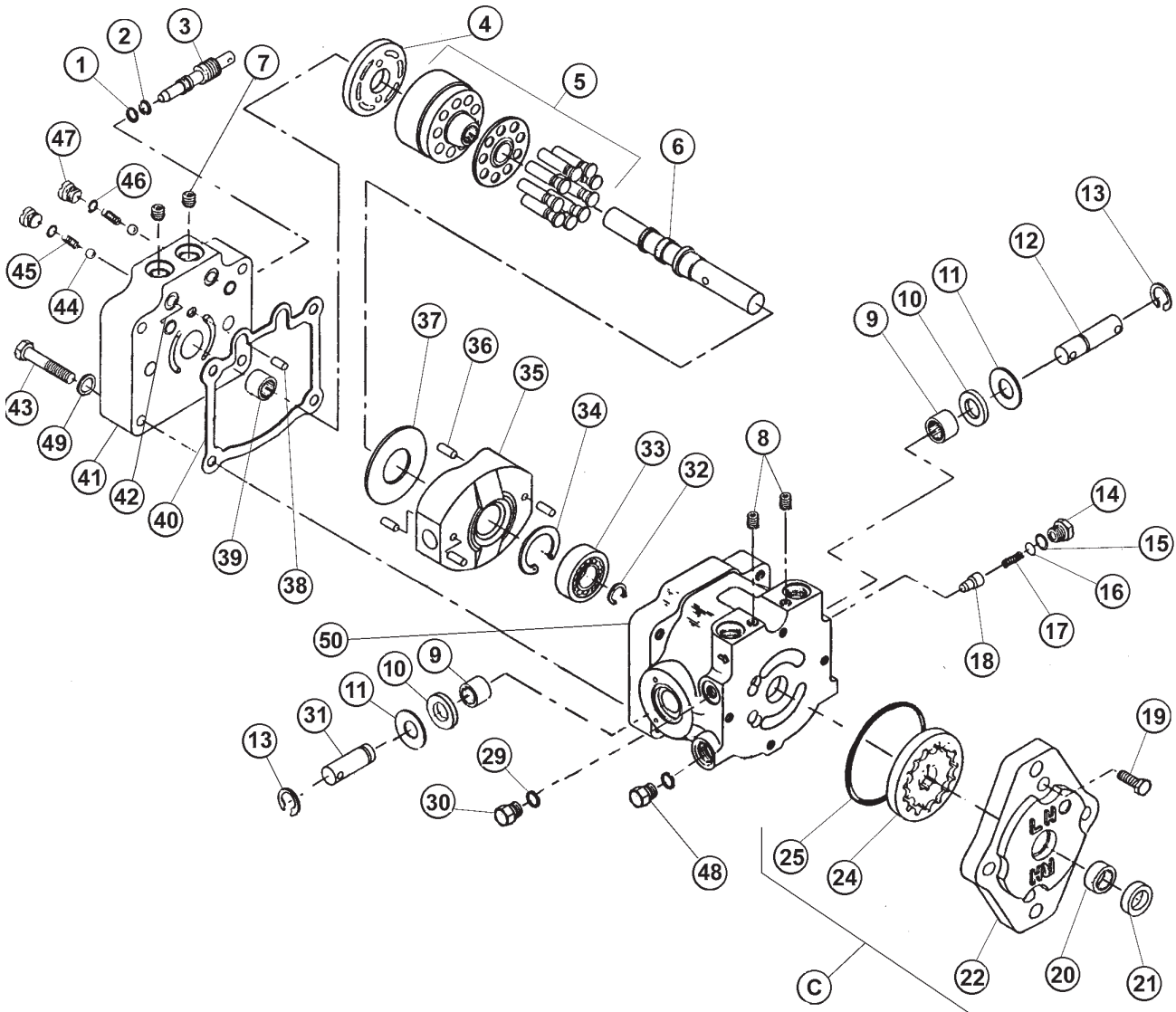


REF #	PART #	DESCRIPTION	QUANTITY
1*		O-Ring Seal	3
2*		Quad Seal	1
3	15-301-14	Bearing Kit	1
		Bearing Race	2
		Bearing	1
4		Spool	1
5	15-301-13	External Retaining Ring	1
6	15-301-15	Spring Centering Kit (Includes Ref# 9)	1
		Spring Spacer	2
		Centering Spring	6
		Spring Retaining Ring	1
7	15-301-08	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 (70 bar)
Maximum Back Pressure	150 psi (10 bar)
Maximum System Operating Temperature.	200°F (93°C)
Maximum Flow	4 gpm (15 lpm)
Maximum Temperature Differential between Steering Unit and System.	50°F (28°C)
Input Torque Powered	15-25 lb/in @ 100 psi tank pressure (2-3 Nm @ 7 bar)
Input Torque Maximum Non-powered	60 lb/ft (81 Nm)
Rotation Limits	None
Fluid	SAE 10W-40 API Service SG
Check Valve for Manual Steering	Yes
Relief Valve Setting	1015 psi (70 bar)
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

16-998 HYPRO PUMP DRAWING

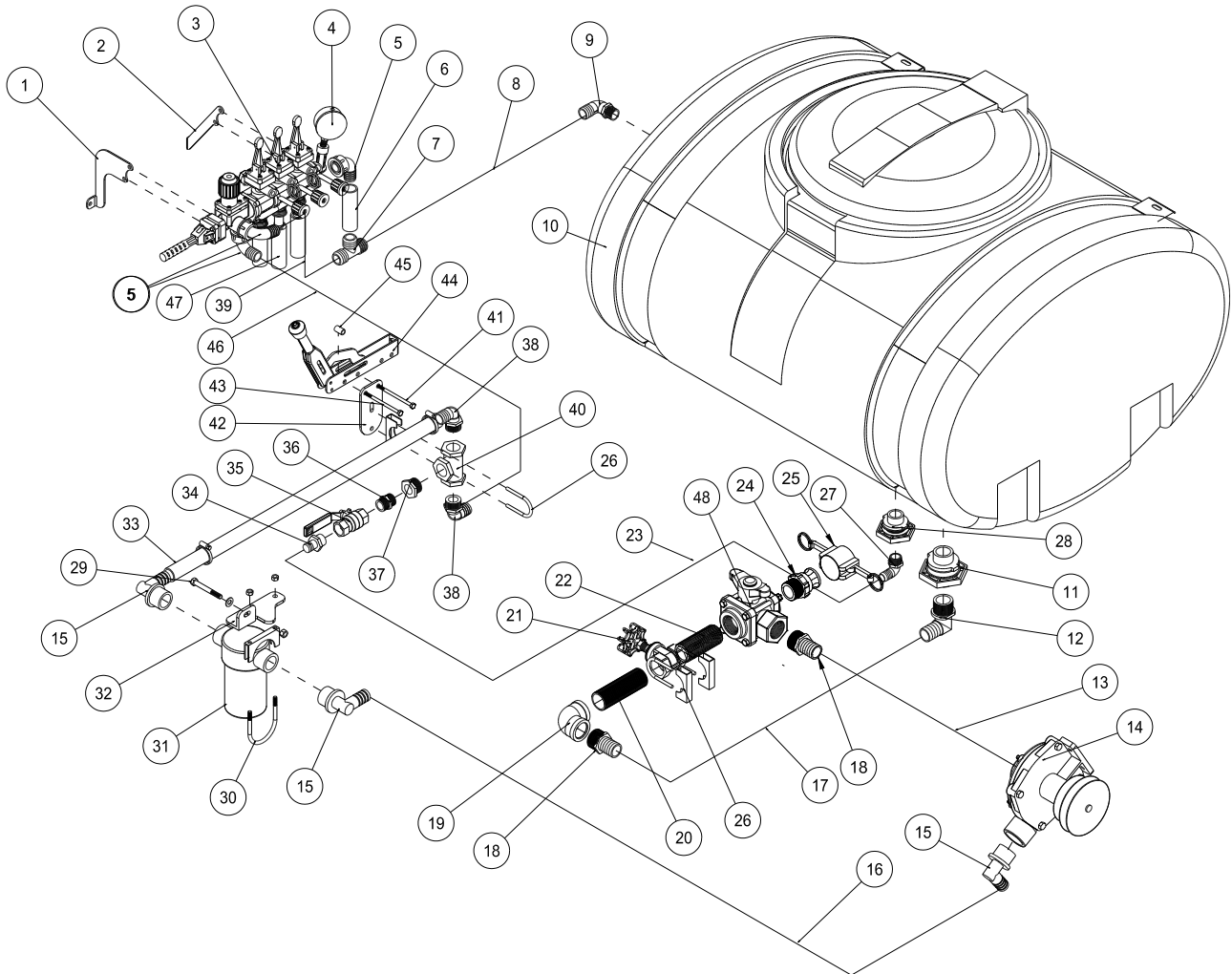
16-998 HYPRO® PUMP PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-998-01	Drain Plug	4
2	16-998-02	Pump Casing	1
3	16-998-03	Impeller Nut	1
4	16-966-16	Impeller	1
5*	16-998-04	O-Ring	1
6*	16-998-05	Mechanical Seal (Silicon Carbide)	1
8*	16-966-06	Slinger Ring	1
9	16-998-06	Mounting Flange	1
11	16-998-07	Bolt	4
12	16-966-10	Ball Bearing	2
13	16-998-08	Key	1
14	16-998-09	Pump Shaft	1
15	16-822-20	Key	1
16	16-966-13	Bearing Retainer	1
17*	16-998-10	Gasket	1
18	16-994-01	Clutch	1
*	16-967	Silicone - Carbon Seal Kit	

NOTE:

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

1010 (3-WAY MANUAL) PLUMBING DRAWING



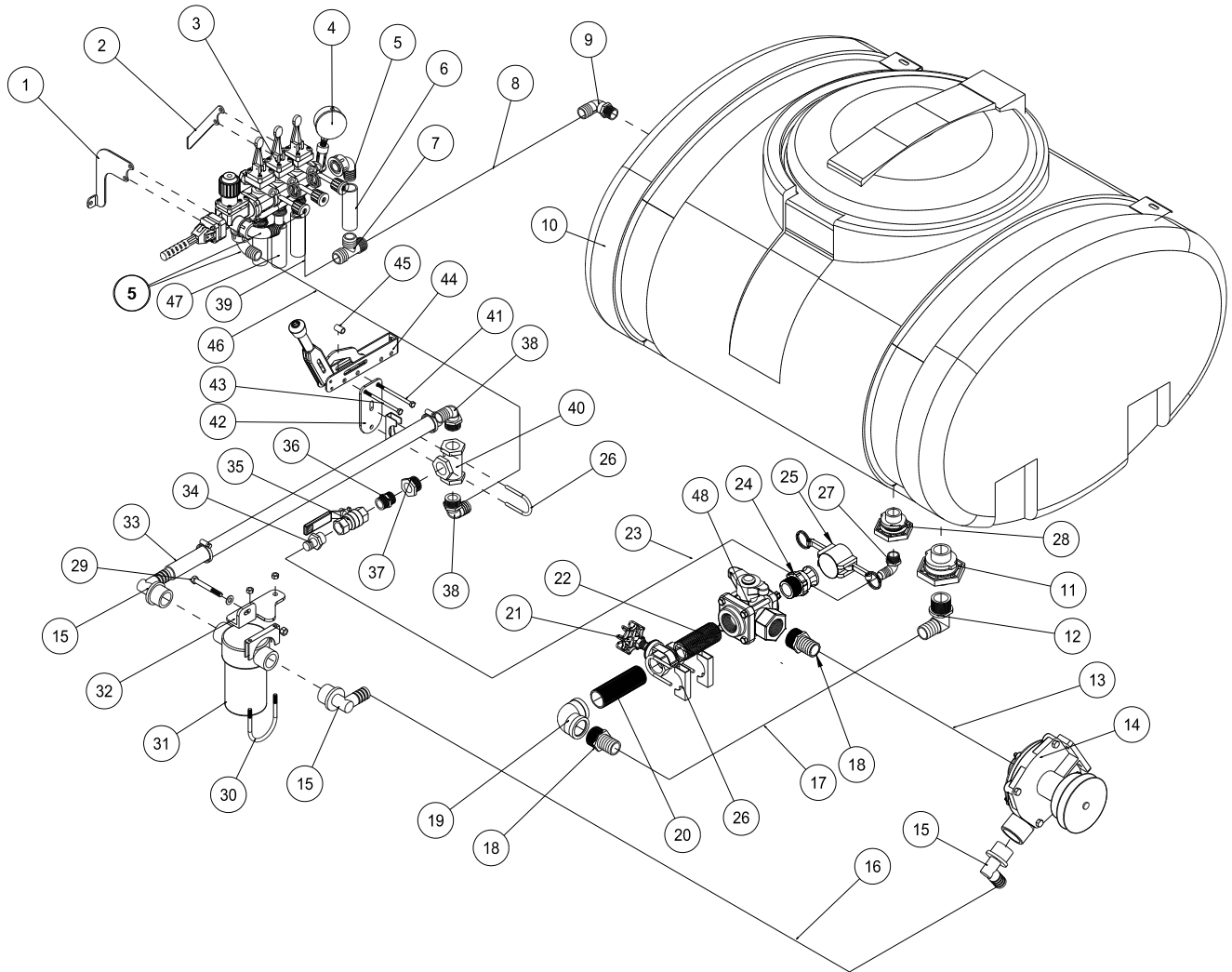
1010 (3-WAY MANUAL) PLUMBING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-263	Front Valve Bracket	1
	HB-516-18-200	Bolt $\frac{5}{16}$ - 18 x 2	1
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	1
2	10-264	Rear Valve Bracket	1
	HB-516-18-200	Bolt $\frac{5}{16}$ - 18 x 2	1
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	1
3	10-268	Valve 3-Way	1
4	16-281	Liquid Filled Gauge	1
5	10-268-13	90° Elbow (comes with 10-268)	3
6	8896-4	Discharge Hose 1" x 4"	1
	18-222	Hose Clamp	2
7	10-269	Plastic Tee	1
8	8896-22	Discharge Hose 1" x 22"	1
	18-222	Hose Clamp	2
9	16-155	Elbow $\frac{3}{4}$ MPT x 1 HB	1
10†	10-111	110 Gallon Poly Tank	1
11†	16-194	Anti-Vortex Fitting $1\frac{1}{4}$	1
12	16-156	Elbow $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	1
13	8889-26	Suction Hose $1\frac{1}{4}$ x 26"	1
	18-116	Hose Clamp	2
14	16-994	Hypro® Pump	1
15	16-168	Elbow $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	3
16	8896-51	Discharge Hose 1" x 51"	1
	18-222	Hose Clamp	2
17	8889-29	Suction Hose $1\frac{1}{4}$	1
	18-116	Hose Clamp	2
18	16-161	Fitting $1\frac{1}{4}$ NPT x $1\frac{1}{4}$ HB	2
19	16-182	Elbow	1
20	18-296	Black Pipe Nipple $1\frac{1}{4}$ x 5	1
21	16-170	Gate Valve $1\frac{1}{4}$	1
22	18-236	3" Nipple	1
23	8887-33	$\frac{3}{4}$ Orange PVC Hose $\frac{3}{4}$ x 33	1
	18-040	Hose Clamp	2
24	16-180	Quick Coupler $1\frac{1}{4}$ Male	1
25	16-935	Quick Coupler $1\frac{1}{4}$ Cap	1
26	50-394	Muffler Clamp $1\frac{3}{4}$	2
27	16-153	Elbow $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
28†	16-150	Double Thread Fitting	1
29	HB-38-16-300	Bolt $\frac{3}{8}$ - 16 x 3	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	1
30	10-147	Muffler Clamp $2\frac{1}{2}$	1
31	16-968	Strainer 50 Mesh	1
32	10-210	Strainer Mount	1
33	8896-48	Discharge Hose 1" x 48"	1
	18-222	Hose Clamp	2

† Comes with 110 Gallon Poly Tank

(Continued on next page)

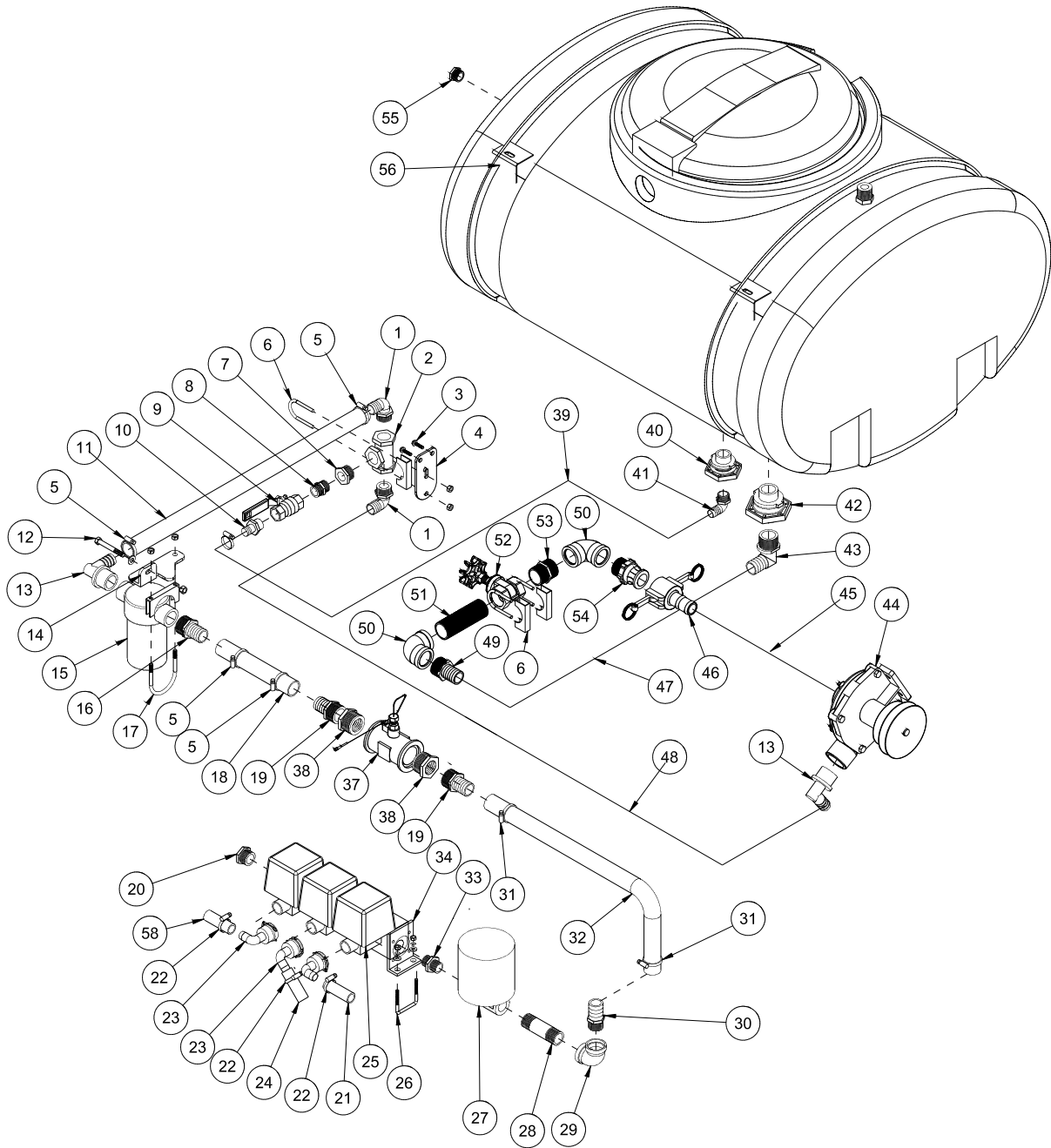
1010 (3-WAY MANUAL) PLUMBING DRAWING



1010 (3-WAY MANUAL) PLUMBING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
34	16-154	Fitting $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
35	16-859	Ball Valve $\frac{3}{4}$ Brass	1
36	16-158	Close Nipple $\frac{3}{4}$ x $\frac{3}{4}$	1
37	16-163	Reducer Bushing 1 x $\frac{3}{4}$	1
38	16-164	Elbow 1 MPT X 1 HB	2
39	8896-10	Discharge Hose 1" x 10	1
	18-222	Hose Clamp	2
40	16-183	Tee FPT 1 x 1 x 1	1
41	HB-516-18-175	Bolt $\frac{5}{16}$ - 18 x $1\frac{3}{4}$	1
	HNTL-516-18	$\frac{5}{16}$ - 18	1
42	10-226	Valve Mount	1
43	HB-516-18-225	Bolt $\frac{5}{16}$ - 18 x $2\frac{1}{4}$	1
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	1
44	10-120	Park Brake Handle	1
45	10-271	Spacer	1
46	8896-10.5	Discharge Hose 1" x $10\frac{1}{2}$ "	1
	18-222	Hose Clamp	2
47	8887-106	Orange PVC Hose $\frac{3}{4}$ " (to right boom)	1
	8887-93.50	Orange PVC Hose $\frac{3}{4}$ " (to center boom)	1
	8887-106	Orange PVC Hose $\frac{3}{4}$ " (to left boom)	1
	18-040	Hose Clamp	3
48	18-372	3-Way Ball Valve	1

1008 PLUMBING DRAWING (RAVEN 440)



1008 PLUMBING PARTS LIST (RAVEN 440)

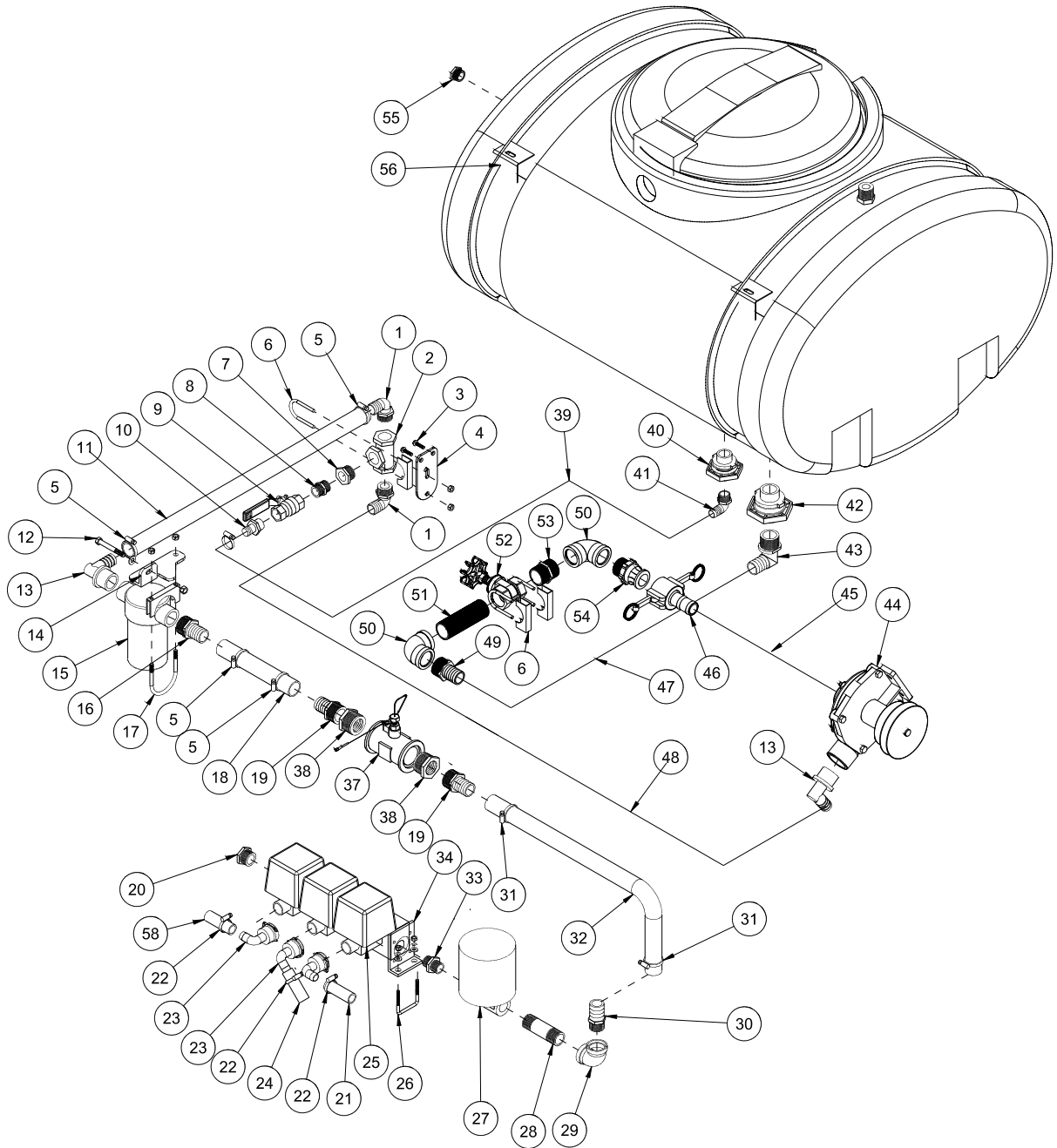
REF#	PART#	DESCRIPTION	QUANTITY
1	16-164	Elbow 1" MPT x 1" HB	2
2	16-183	Tee, FPT 1 x 1 x 1	1
3	HSDPS-14-100	Stainless Steel Pan Head Drill Screw 1/4 x 1	2
4	10-226	Valve Mount	1
5	18-222	Hose Clamp	4
6	50-394	Muffler Clamp 1 3/4	3
7	16-163	Reducer Bushing 1 x 3/4	1
8	16-158	Close Nipple 3/4 x 3/4	1
9	16-859	Ball Valve 3/4 Brass	1
10	16-154	Fitting 3/4 MPT x 3/4 HB	1
11	8896-58	Discharge Hose 1"	1
12	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
13	16-168	Elbow 1 1/4 MPT x 1 HB	2
14	10-210	Strainer Mount	1
15	16-968	Strainer 50 Mesh	1
16	16-161	Fitting 1 1/4 MPT x 1 1/4 HB	1
17	10-147	Muffler Clamp 2 1/2	1
18	8897-11	Discharge Hose 1 1/4"	1
19	16-161	Fitting 1 1/4 MPT x 1 1/4 HB	2
20	16-162	Hex Plug 1"	1
21	8887-40	Orange PVC Hose 3/4" (to right boom)	1
22	18-040	Hose Clamp	3
23	15-553	3/4 -90° Hose Barb (comes with Ref# 25)	3
	15-553-01	Clip	3
	15-553-02	O-Ring	3
24	8887-35	Orange PVC Hose 3/4" (to center boom)	1
25	15-552	Manifold Ball Valve	1
26	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
27*	16-524	Motorized Control Valve	1
28	18-293	Pipe Nipple 1" x 4"	1
29	18-050	Black Elbow 1 NPT x 90°	1
30	16-159	Fitting 1 MPT x 1 1/4 HB	1
31	18-116	Hose Clamp	2
32	8897-17	Discharge Hose 1 1/4"	1
33	16-851	Close Nipple 1"	1
34	15-552-07	Steel Mounting Bracket (comes with Ref# 25)	2

* 10-252 440 Sprayer Control Kit 1

† Comes with 110 Gallon Poly Tank

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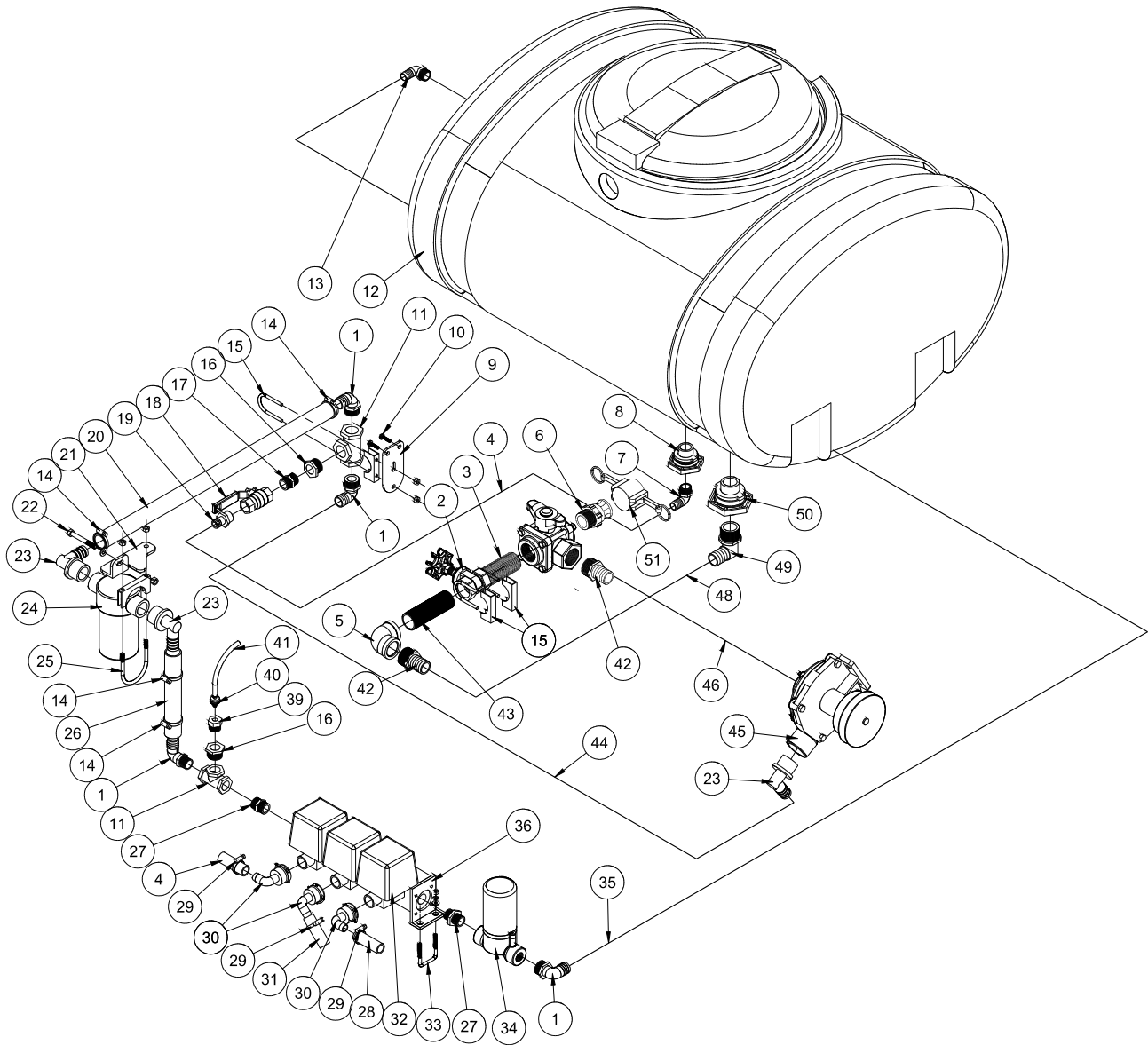
1008 PLUMBING DRAWING (RAVEN 440)



Accessories

1008 PLUMBING PARTS LIST (RAVEN 440)

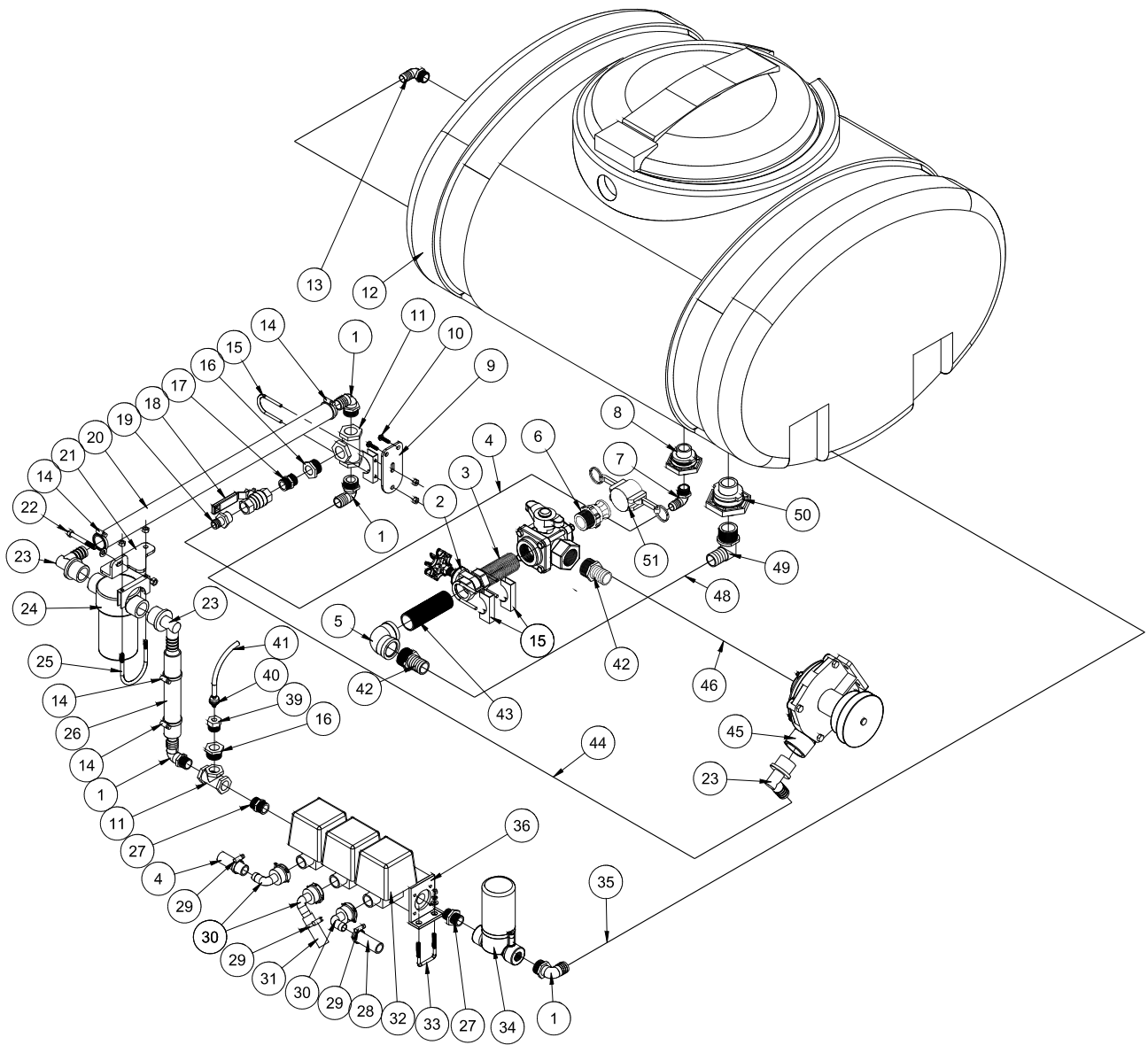
REF#	PART#	DESCRIPTION	QUANTITY
37*	18-373	Flow Meter	1
38	16-973	Reducer	2
39	8887-42	Orange PVC Hose $\frac{3}{4}$ "	1
	18-040	Hose Clamp	2
40†	16-150	Double Thread Fitting $\frac{3}{4}$ "	1
41	16-153	Elbow $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
42†	16-194	Anti Vortex Fitting	1
43	16-156	Elbow $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	1
44	16-994	Hypro® Pump	1
45	8889-26	Suction Hose $1\frac{1}{4}$	1
	18-116	Hose Clamp	2
46	16-935	Quick Coupler $1\frac{1}{4}$ Cap	1
47	8889-29	Suction Hose $1\frac{1}{4}$	1
	18-116	Hose Clamp	2
48	8896-42	Discharge Hose 1"	1
	18-222	Hose Clamp	2
49	16-161	Fitting $1\frac{1}{4}$ NPT x $1\frac{1}{4}$ HB	2
50	16-182	Elbow	1
51	18-296	Black Pipe Nipple $1\frac{1}{4}$ x 5	1
52	16-170	Gate Valve $1\frac{1}{4}$	1
53	18-236	3" Nipple	1
54	16-180	Quick Coupler $1\frac{1}{4}$ Male	1
55	16-166	Hex Plug $\frac{3}{4}$ "	1
56†	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
57	18-372	3-Way Ball Valve	1
58	8887-37	Orange PVC Hose $\frac{3}{4}$ " (to left boom)	1
*	10-252	440 Sprayer Control Kit	1
†	Comes with 110 Gallon Poly Tank		



1002 PLUMBING PARTS LIST (RAVEN 203)

REF#	PART#	DESCRIPTION	QUANTITY
1	16-164	Elbow 1" MPT x 1" HB	4
2	16-170	Gate Valve 1 ¹ / ₄	1
3	18-236	3" Nipple	1
4	8887-37	Orange PVC Hose 3 ³ / ₄ "	2
	18-040	Hose Clamp	2
5	16-182	Elbow FPT 1 ¹ / ₄ x 1 ¹ / ₄	1
6	16-180	Quick Coupler, 1 ¹ / ₄ Male	1
7	16-153	Elbow 3 ³ / ₄ MPT x 3 ³ / ₄ HB	1
8†	16-150	Double Threaded Fitting 3 ³ / ₄	1
9	10-226	Valve Mount	1
10	HSDPS-14-100	Stainless Steel Pan Head Drill Screw 1 ¹ / ₄ x 1	2
11	16-183	Tee FPT 1 x 1 x 1	2
12†	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
13	16-155	Elbow 3 ³ / ₄ MPT x 1 HB	1
14	18-222	Hose Clamp	4
15	50-394	Muffler Clamp 1 ³ / ₄	3
16	16-163	Reducer Bushing 1 x 3 ³ / ₄	2
17	16-158	Close Nipple 3 ³ / ₄ x 3 ³ / ₄	1
18	16-859	Ball Valve 3 ³ / ₄ Brass	1
19	16-154	Fitting 3 ³ / ₄ MPT x 3 ³ / ₄ HB	1
20	8896-62	Discharge Hose 1"	1
21	10-210	Strainer Mount	1
22	HB-38-16-300	Bolt 3 ³ / ₈ - 16 x 3	1
	HW-38	Washer 3 ³ / ₈	1
	HNTL-38-16	Lock Nut 3 ³ / ₈ - 16	1
23	16-168	Elbow 1 ¹ / ₄ MPT x 1 HB	3
24	16-968	Strainer 50 Mesh	1
25	10-147	Muffler Clamp 2 ¹ / ₂	1
26	8896-9	Discharge Hose 1"	1
27	16-851	Close Nipple 1"	1
28	8887-40	Orange PVC Hose 3 ³ / ₄ " (to right boom)	1
29	18-040	Hose Clamp	3
30	15-553	3 ³ / ₄ - 90° Hose Barb (comes with 15-552 ball valve)	3
	15-553-01	Clip (part of 15-553)	3
	15-553-02	O-ring (part of 15-553)	3
31	8887-35	Orange PVC Hose 3 ³ / ₄ " (to center boom)	1
32	15-552	Manifold Ball Valve	1
33	10-194	U-Bolt	2
	HW-14	Washer 1 ¹ / ₄	4
	HWL-14	Lock Washer 1 ¹ / ₄	4
	HN-14-20	Nut 1 ¹ / ₄ - 20	4
34*	16-995	Motorized Control Valve	1
*	16-852	203 Spray Controller	1
†	Comes with 110 Gallon Poly Tank		

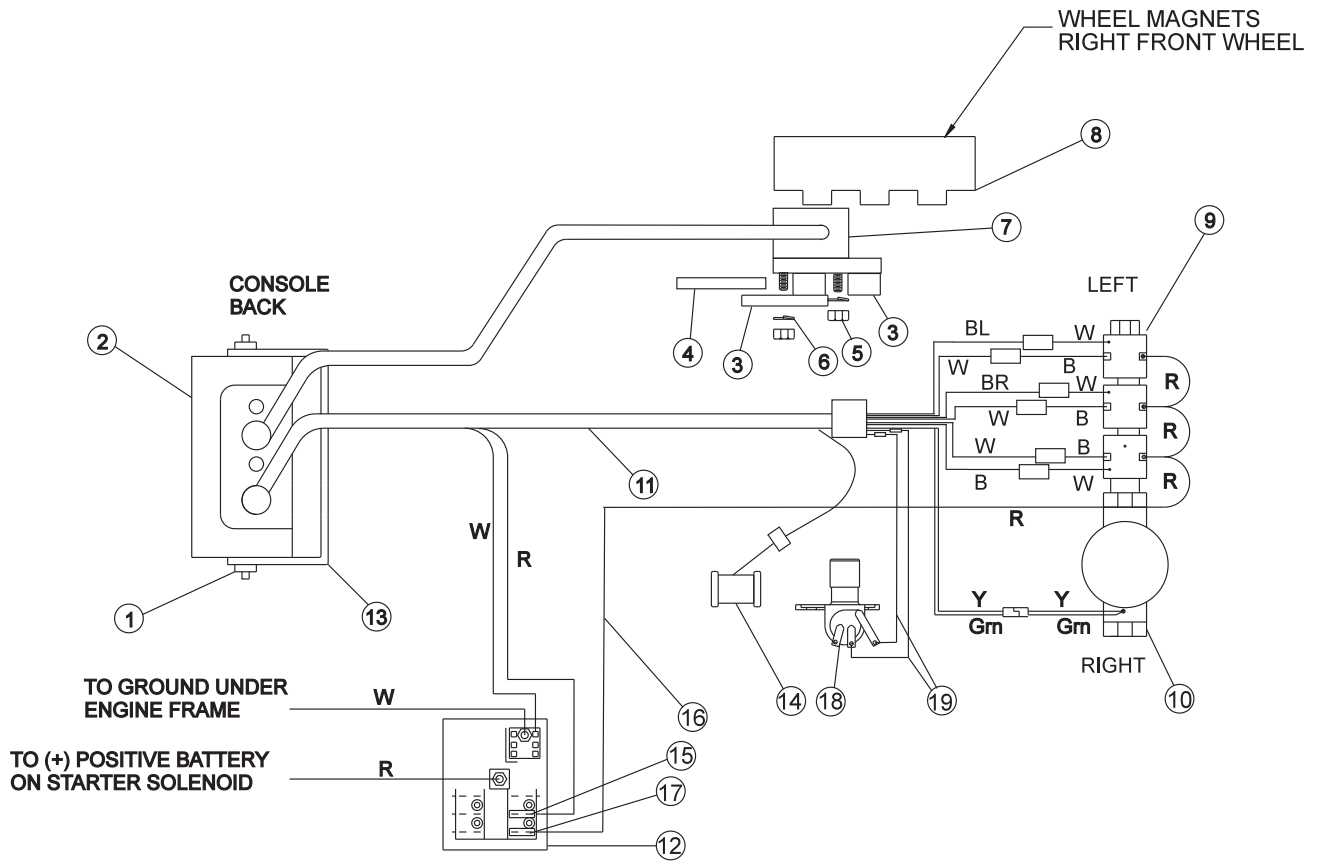
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1002 PLUMBING PARTS LIST (RAVEN 203)

REF#	PART#	DESCRIPTION	QUANTITY
35	8896-65	Discharge Hose 1"	1
	18-222	Hose Clamp	2
36	15-552-07	Steel Mounting Bracket (comes with Ref# 32)	2
39	16-288	Reducer Bushing $\frac{3}{4}$ x $\frac{1}{4}$	1
40*	16-958-07	Male Fitting	1
41*	16-955	Tube	1
42	16-161	Fitting $1\frac{1}{4}$ NPT x $1\frac{1}{4}$ HB	2
43	18-296	Black Pipe Nipple $1\frac{1}{4}$ x 5	1
44	8896-45	Discharge Hose 1"	1
	18-222	Hose Clamp	2
45	16-994	Hypro® Pump	1
46	8889-26	Suction Hose $1\frac{1}{4}$	1
	18-116	Hose Clamp	2
47	16-181	Quick Coupler, $1\frac{1}{4}$ Female	1
48	8889-29	Suction Hose $1\frac{1}{4}$	1
	18-116	Hose Clamp	2
49	16-156	Elbow $1\frac{1}{4}$ MPT x $1\frac{1}{4}$ HB	1
50†	16-194	Anti-Vortex Fitting $1\frac{1}{4}$	1
51	18-372	3-Way Ball Valve	1
*	16-852	203 Spray Controller	1
†	Comes with 110 Gallon Poly Tank		

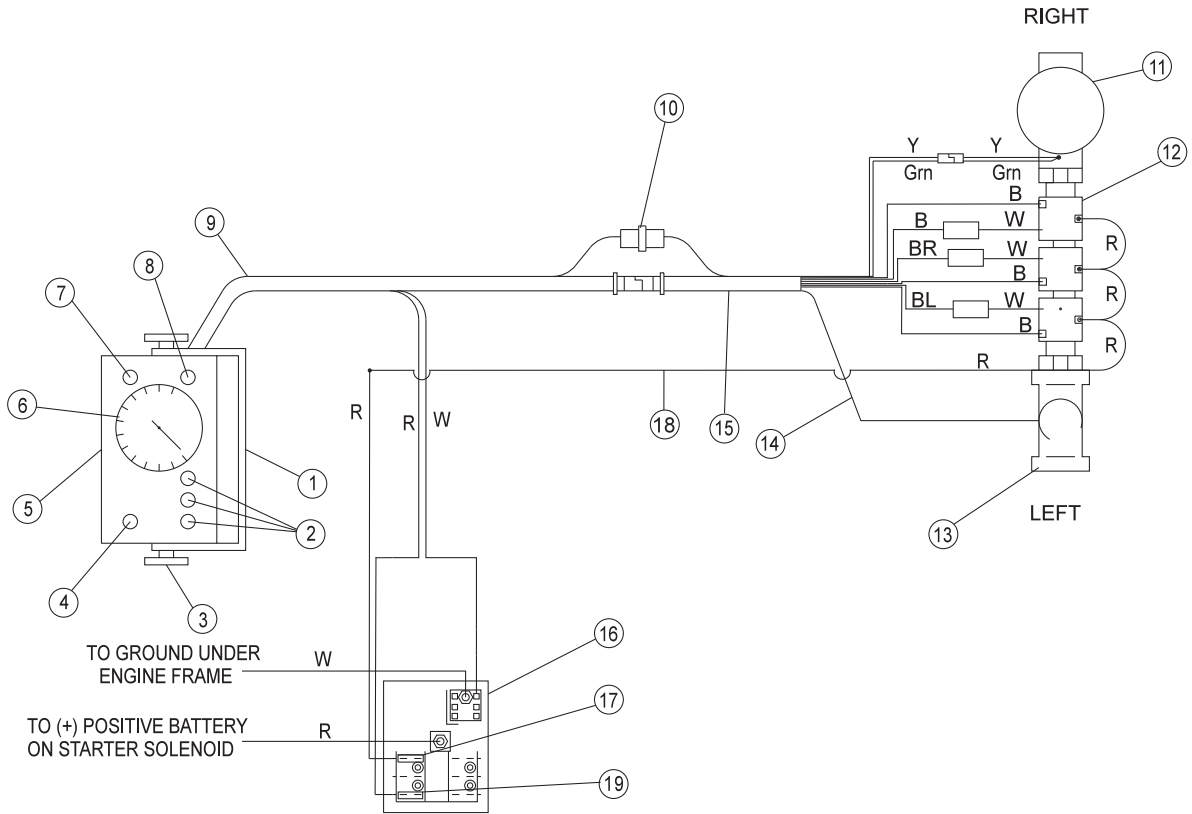
CONTROL 1008 SYSTEM DRAWING (RAVEN 440)



CONTROL 1008 SYSTEM PARTS LIST (RAVEN 440)

REF#	PART#	DESCRIPTION	QUANTITY
1*	16-558	Mounting Knob	2
2*	16-525	Console (only)	1
	16-234	Console Cover	1
3*	15-370-03	Turret Assembly	2
4*	10-252-01	Speed Sensor Rod	1
5	HN-14-20	Nut, 1/4 - 20	2
6	HWL-14	Lockwasher, 1/4	2
7*	16-139	Sensor Assembly	1
8*	33-089-04	Red Magnet Assembly	2
	33-089-05	Black Magnet Assembly	2
9	15-552	Manifold Ball Valve	1
10*	16-524	Motorized Control Valve	1
11*	33-089-01	Console Control Cable	1
12	33-271	Fuse Block	1
13	10-237	Mounting Bracket	1
14*	18-373	Flow Meter	1
15	33-284	Auto Blade Type Fuse 5 amp	1
16	10-225	Ball Valve Power Wire	1
17	33-508	Auto Blade Type Fuse 15 AMP	1
18	33-509	Master Boom Control Switch	1
19	8851-72	14GA Brown Wire	1
	8854	Fork Terminal	2
	8860	String Connector	2
	8963	Heat Shrink	4
*	10-252	440 Sprayer Control Kit (includes all * items)	

CONTROL 1002 SYSTEM DRAWING (RAVEN 203)

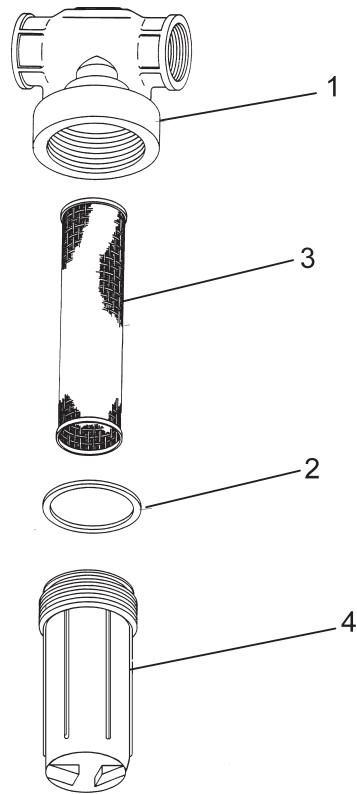


CONTROL 1002 SYSTEM PARTS LIST (RAVEN 203)

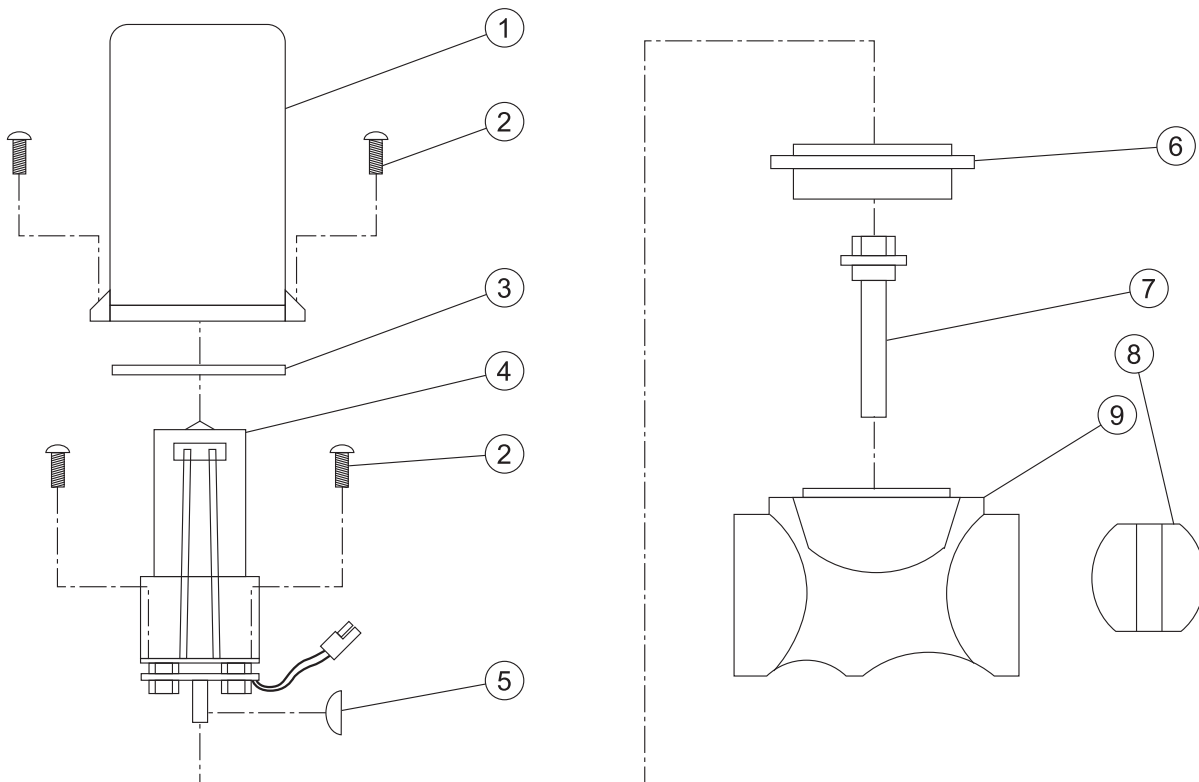
REF#	PART#	DESCRIPTION	QUANTITY
1	10-259	Mounting Bracket	1
2	16-898	Boom Switch	3
3	16-900	Mounting Knob	2
4	16-899	Master Switch	1
5*	16-958	Console (only)	1
6	33-090-02	Liquid Filled Pressure Gauge	1
7	16-958-02	Fuse Holder	1
	16-525-03	Fuse 15 AMP	1
8	16-895	Pressure Switch	1
9*	16-958-04	Cable Assembly 8ft Enclosure Hook-Up	1
10*	16-958-05	Union Fitting	1
11*	16-995	Motorized Control Valve	1
12	15-552	Manifold Ball Valve	1
13	16-183	Tee FPT 1 x 1 x 1	1
14*	16-955	Tubing	1
15*	16-902	Cable Assembly 72" Solenoid Hook-Up	1
16	33-271	Fuse Block	1
17	33-284	Auto Blade Type Fuse 5 amp	1
18	10-225	Wire Harness (fuse block to electric valve)	1
19	33-508	Auto Blade Type Fuse 15 Amp	1
*	16-852	203 Sprayer Control Kit (includes all * items)	

Use Dielectric Grease On All Electrical Connections

16-968 STRAINER DRAWING



16-524 AND 16-995 MOTORIZED CONTROL VALVE DRAWING



16-968 STRAINER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-968-01	Head 1 ¹ / ₄	1
2	16-968-02	Gasket	1
3	16-968-03	Screen	1
4	16-968-04	Bowl	1

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

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

WHEN SERVICING VALVE:

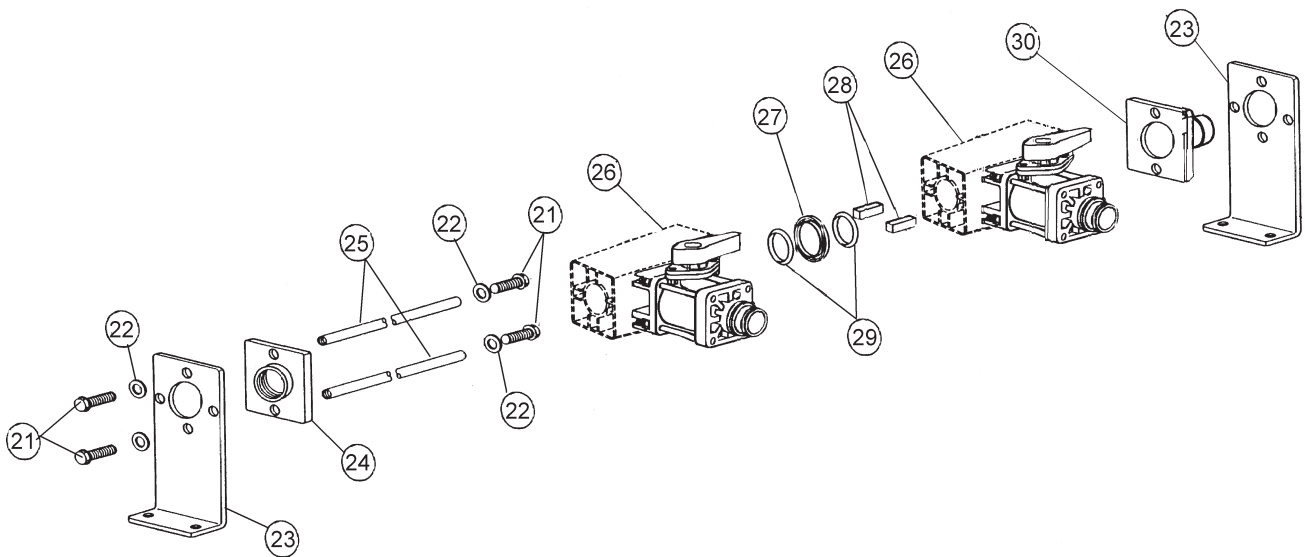
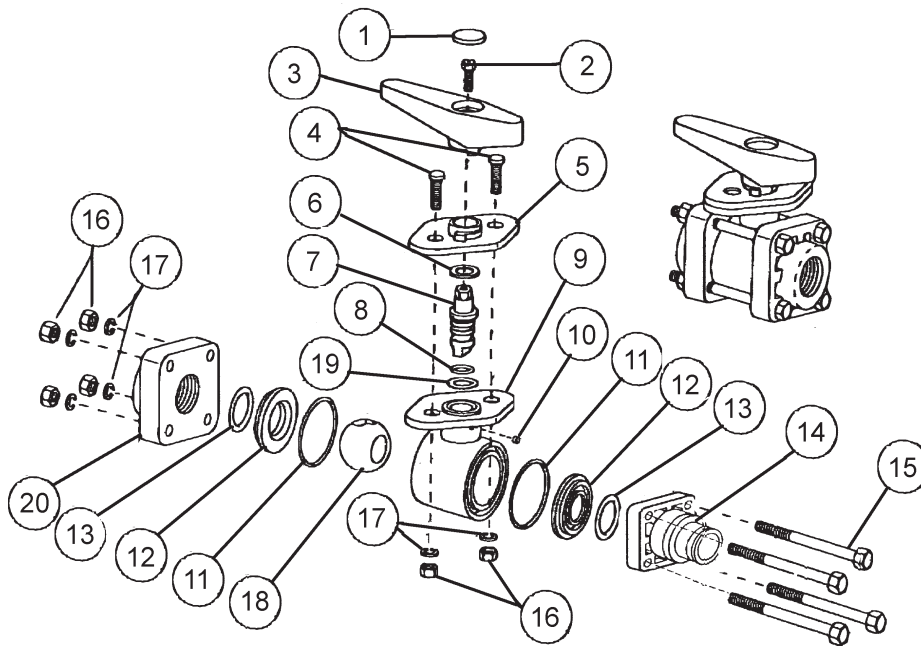
Replace valve body with ISO-Body Kit if valve has been leaking internally.

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

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

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

10-207 MANUAL BALL VALVE DRAWING

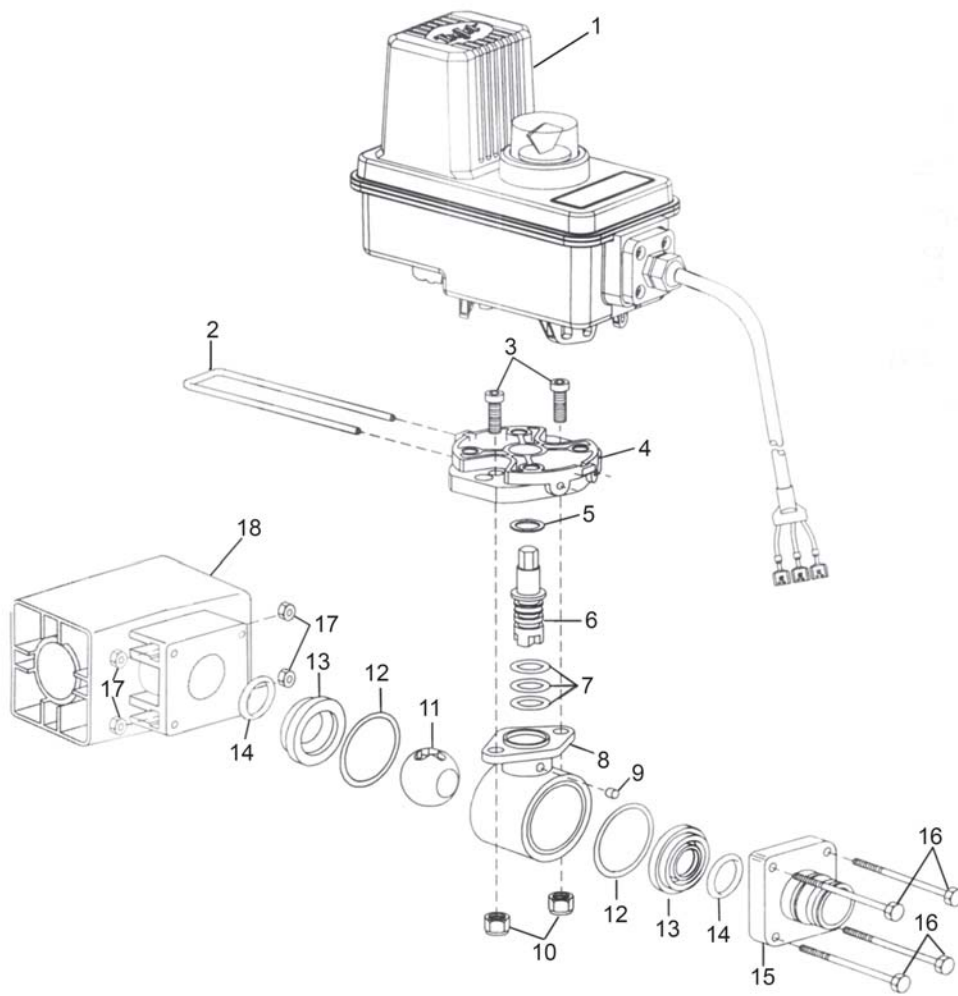


10-207 MANUAL BALL VALVE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-207-02	Handle Plug	1
2	15-517-10	Stainless Steel Slotted Hex Washer Screw	1
3	10-207-03	Polypropylene Handle	1
4	15-517-04	Stainless Steel Self Cinching Stud	2
5	10-207-04	Polypropylene Mounting Plate	1
*6	15-517-11	Teflon Thrust Washer	1
7	15-552-04	Nylon Ball Valve Stem	1
*8	15-517-14	Viton O-ring	1
9	15-517-16	Nylon Body	1
*10	15-517-17	Dense Felt Dust Plug	1
*11	15-552-13	Viton Gasket	2
*12	15-517-19	Teflon Seal	2
*13	15-517-20	Viton O-ring	2
14	15-552-17	Quick End Cap	1
15	15-517-22	Stainless Steel Hex Head Cap Screw	4
16	15-517-23	Stainless Steel Hex Nut	6
17	15-517-24	Stainless Steel Lockwasher	6
*18	15-552-09	Polypropylene Ball	1
*19	15-552-05	Teflon Coated Viton Oring	1
20	15-552-08	Nylon End Cap	1
21	15-552-22	Hex Head Bolt, Stainless Steel	4
22	15-552-21	Flat Washer, Stainless Steel	4
23	15-552-07	Steel Mounting Bracket	2
24	15-552-20	1" NPT Female Threaded Inlet Body, Polypropylene	2
25	15-552-18	Connecting Stud, Stainless Steel	2
26	10-207-01	Single Unit	3
27	15-552-14	Inner Connector, Polypropylene	2
28	15-552-16	Alignment Insert, Polypropylene	4
29	15-552-15	O-Ring, Viton	6
30	10-207-05	1" Hose Shank Inlet	1
*	10-207-06	Spare Parts Kit (includes all * items)	1

Comes with two 10-208 1" -90° Hose Barbs

15-552 VALVE DRAWING

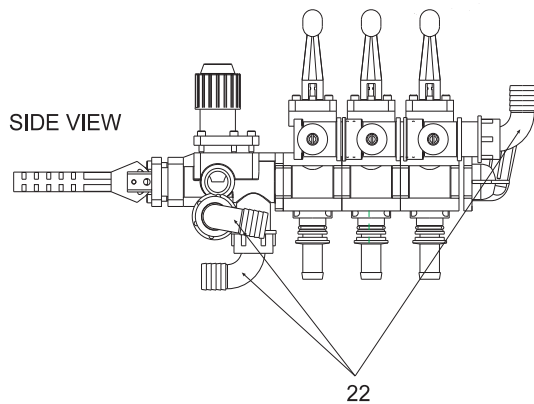
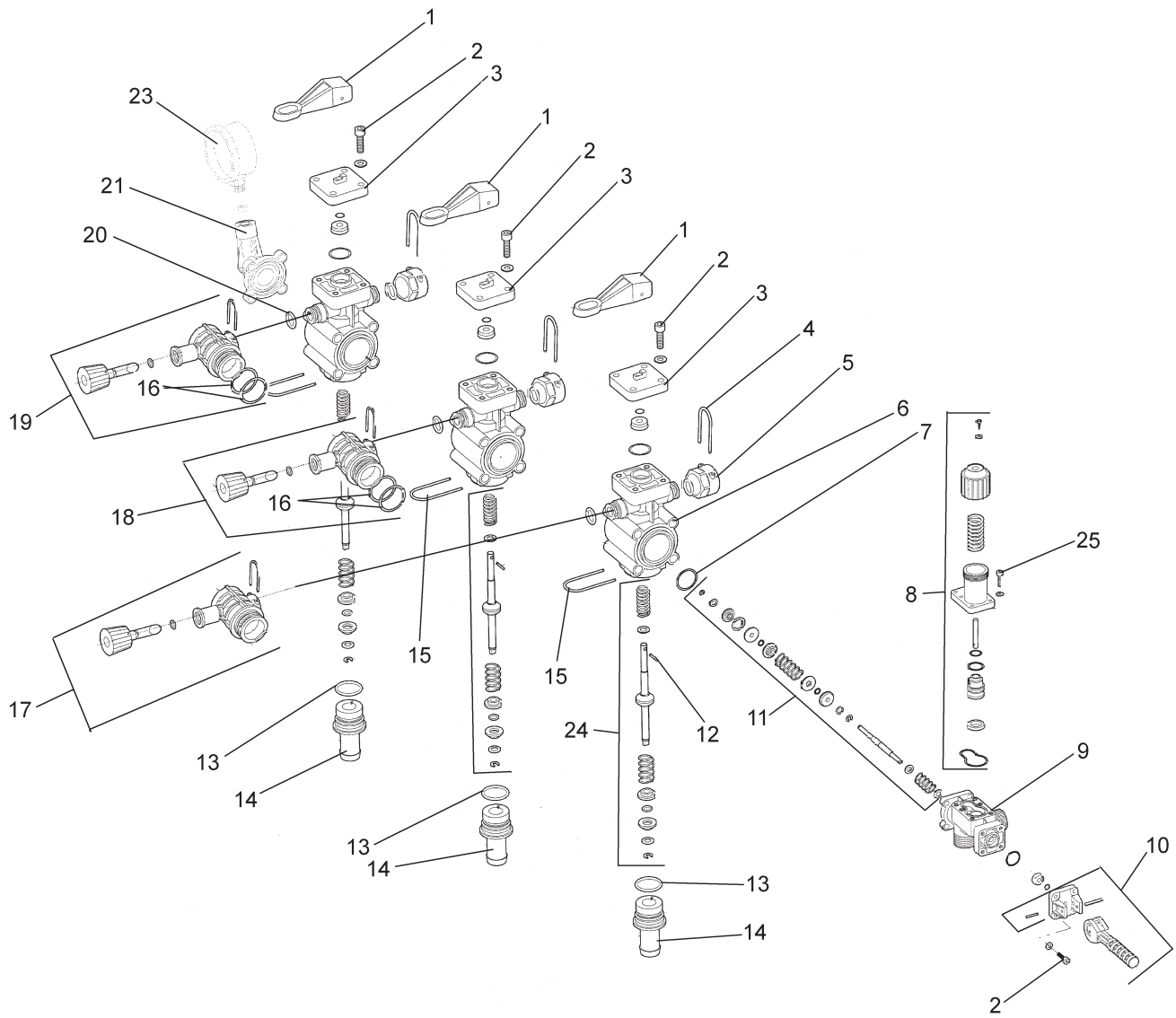


REF#	PART#	DESCRIPTION	QUANTITY
1	15-552-23	Motor	
2	15-552-24	Retaining Clip	1
3	15-552-25	Socket Head Cap Screw, Stainless Steel	2
4	15-552-26	Motor Adapter, Polypropylene	1
5*	15-517-11	Thrust Washer, Teflon	1
6	15-552-27	Stem, Stainless Steel	1
7*	15-552-05	O-ring, Viton	3
8	15-517-16	Body, Nylon	1
9*	15-517-17	Dust Plug, Felt	1
10		Lock Nut, Stainless Steel	2
11	15-552-09	Ball, Polypropylene	1
12*	15-552-13	Gasket, Viton	2
13*	15-517-19	Seal, teflon	2
14*	15-517-20	O-ring, Viton	2
15	15-552-17	End Cap	1
16	15-517-22	Hex Head Cap Screw, Stainless Steel	4
17	15-517-23	Hex Nut, Stainless Steel	4
18	15-552-11	Manifold Body	1

* 15-552-10 Spare Parts Kit (includes all * items)

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

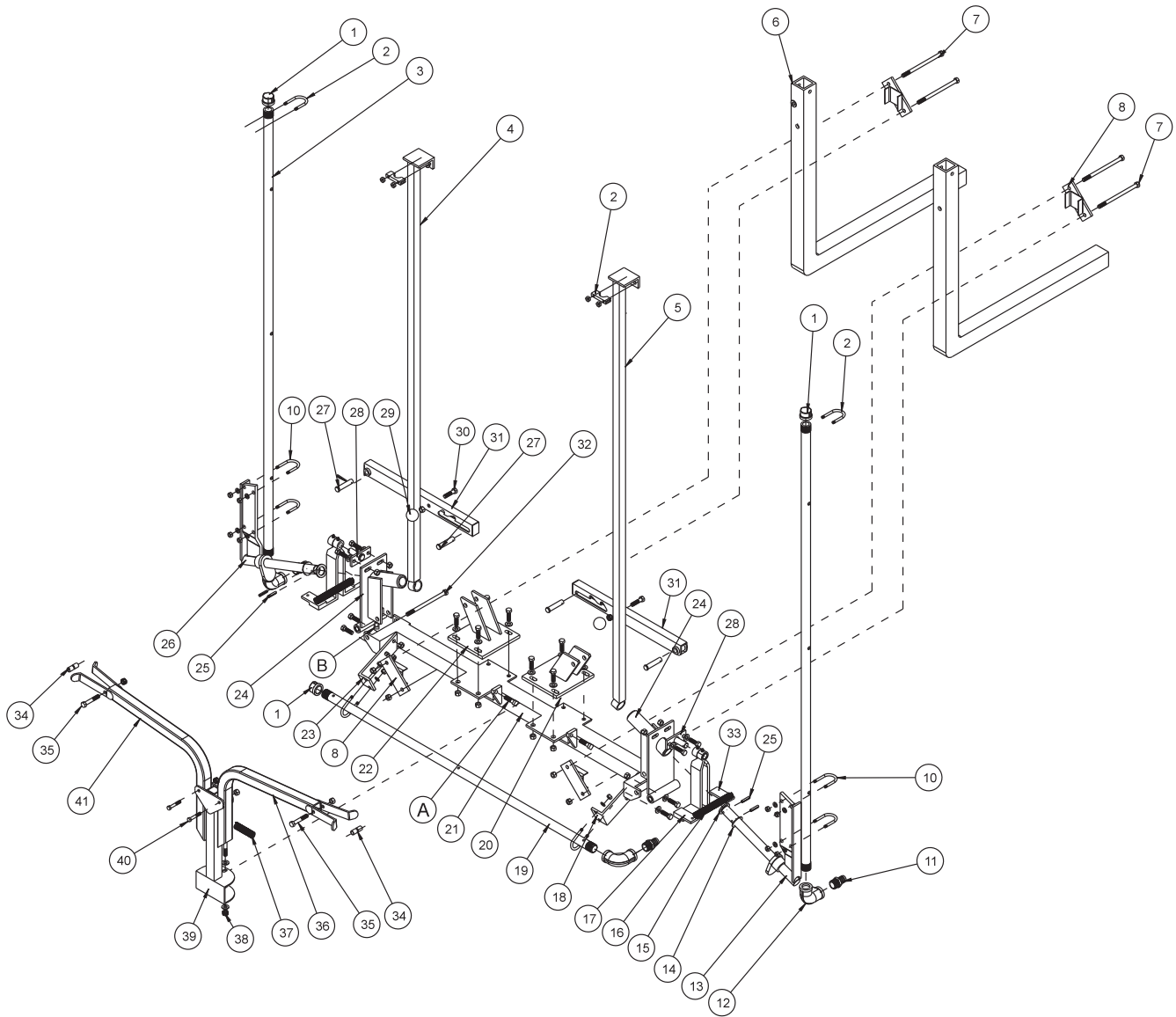
10-268 3-WAY MANUAL VALVE DRAWING



10-268 3-WAY MANUAL VALVE PARTS LIST

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

10-160 STAINLESS STEEL 15' MANUAL BOOM DRAWING



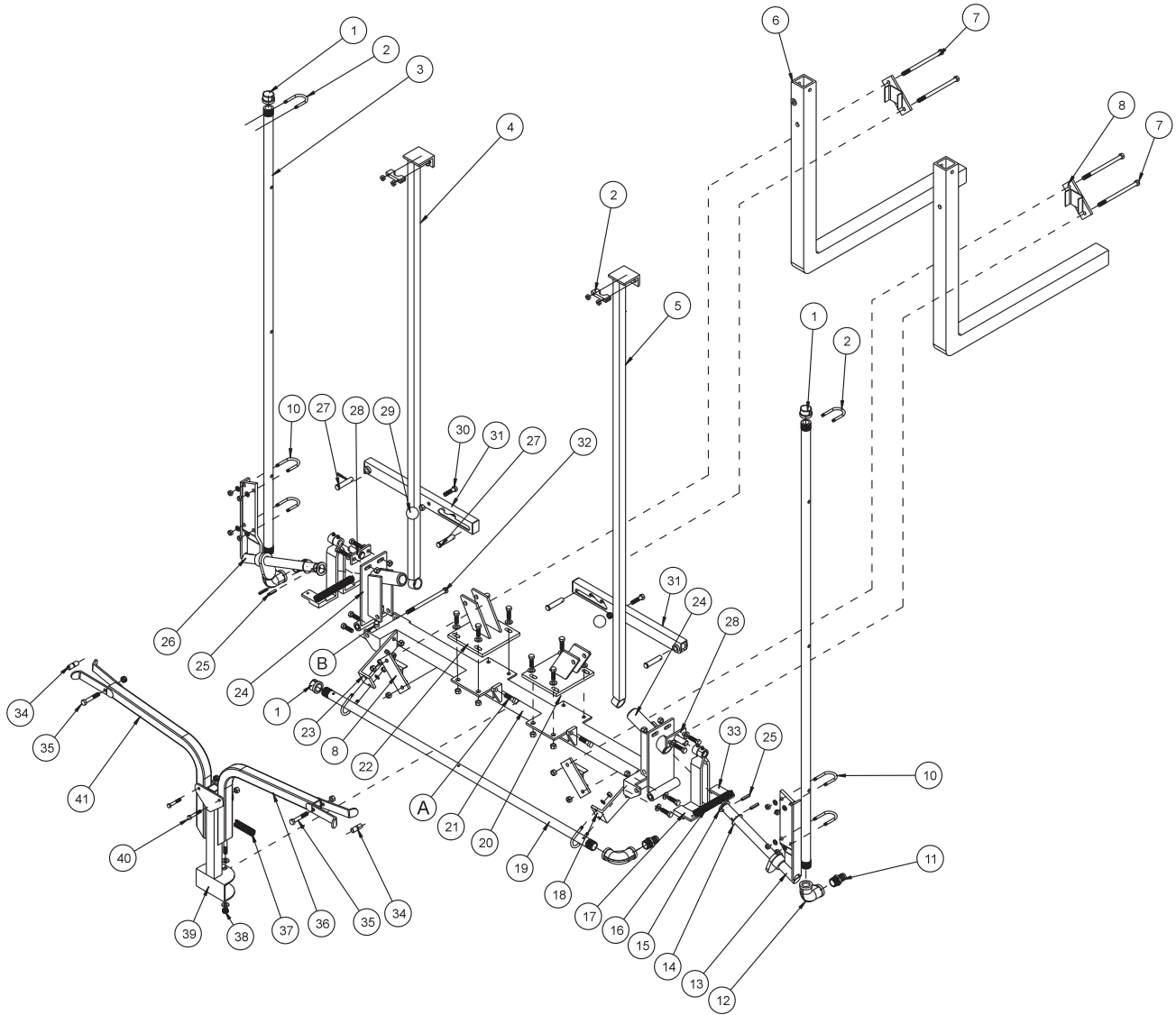
Accessories

10-160 STAINLESS STEEL 15' MANUAL BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	16-926	Stainless Steel Cap $\frac{3}{4}$	3
2	13-498	U-Bolt Kit $1\frac{1}{8}$	2
3	15-562	Right and Left Boom Tube	2
4	15-565	Left Brush Guard	1
5	15-564	Right Brush Guard	1
6		Boom Carrier (part of the truck)	
7	HBS-38-16-550	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $5\frac{1}{2}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
8	16-761	Boom Brackets	4
10	16-024	U-Bolt $\frac{5}{16}$ - 24	6
	HWS-516	Stainless Steel Washer $\frac{5}{16}$	12
	HNS-516-24	Stainless Steel Nut $\frac{5}{16}$ - 24	12
11	18-249	Barb Fitting	3
	18-040	Hose Clamp	3
12	16-925	Stainless Steel Pipe Elbow $\frac{3}{4}$ x 90°	3
13	33-301	Right Pivot Bracket	1
14	HMB-100-14	Machine Bushing 1 x 14GA	4
15	HMB-100-10	Machine Bushing 1 x 10GA	2
16	15-495	Extension Spring	2
17	15-812	Right Cam Stop (must also order 15-811)	2
	18-268	Oilite Bushing	2
18	33-308	Right, Center Tube Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
19	16-927	Center Tube	1
20	33-330	Right Actuator Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
21	33-329	Center Mount	1
A	HSSQS-38-16-150	Stainless Steel Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$ (part of 33-329)	2
	HN-38-16	Nut $\frac{3}{8}$ - 16 (part of 33-329)	2
22	33-331	Left Actuator Bracket	1
	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HW-38	Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
23	33-309	Left Center Tube Bracket	1
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
24	15-813	Pivot Bracket	2
	15-494	Nylon Flange Bushing	4
	18-036	Oilite Bushing	4
B	HSSQS-38-16-150	Stainless Steel Set Screw $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2
25	HRPS-14-150	Stainless Steel Roll Pin $\frac{1}{4}$ x $1\frac{1}{2}$	4
26	33-302	Left Pivot Bracket	1
27	HCPS-12-225	Stainless Steel Clevis Pin $\frac{1}{2}$ x $2\frac{1}{4}$	4
	HPS-18-100	Stainless Steel Cotter Pin $\frac{1}{8}$ x 1	4
28	15-810	Pivot	2
	HMB-58-14	Machine Bushing $\frac{5}{8}$ x 14GA	8
	HPS-18-100	Cotter Pin $\frac{1}{8}$ x 1	2
	HBS-38-16-125	Stainless Steel Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HWS-38	Stainless Steel Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4

(Continued on next page)

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



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

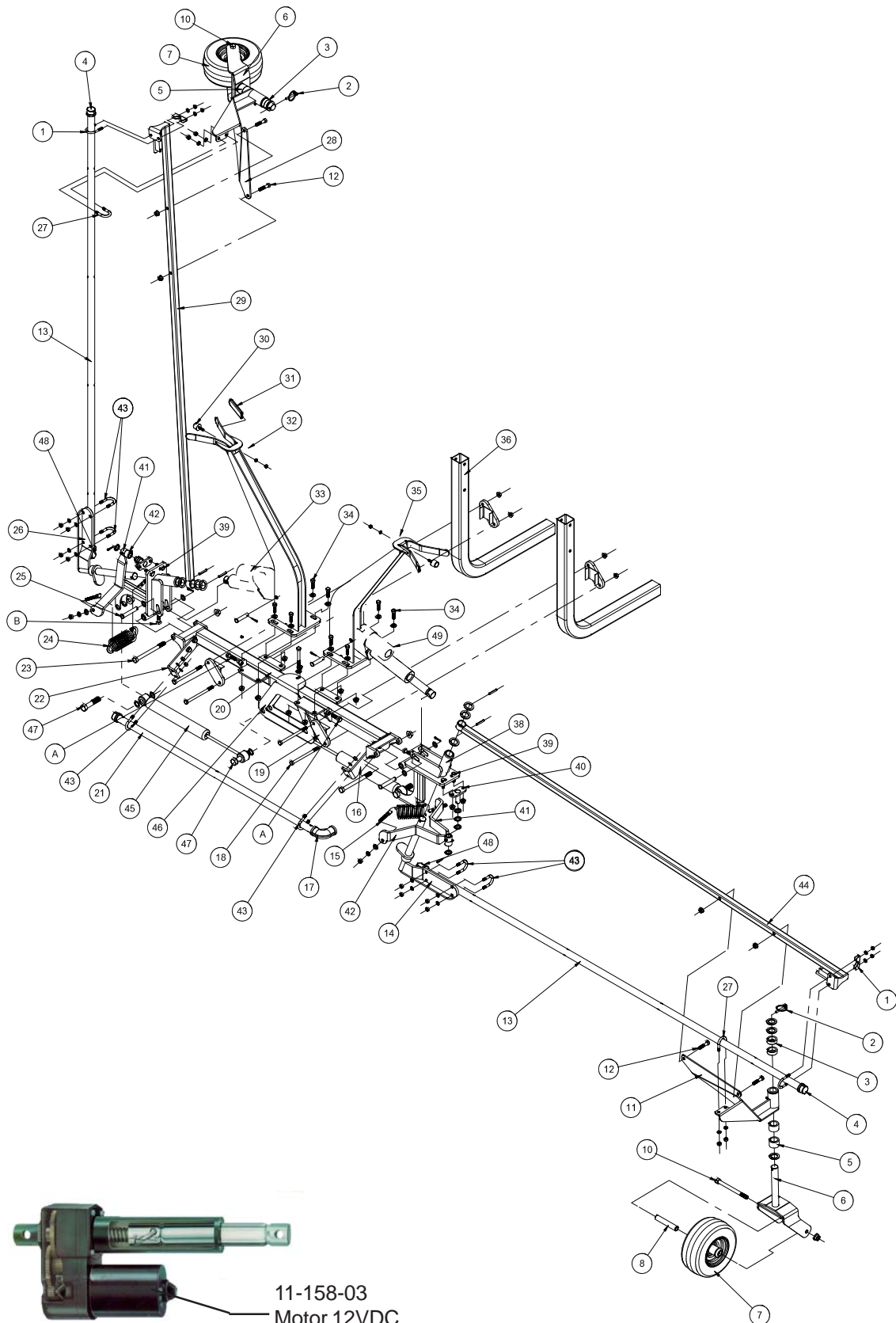
REF#	PART#	DESCRIPTION	QUANTITY
29	15-014	Shift Knob	2
30	HB-38-16-175	Bolt $\frac{3}{8}$ - 16 x $1\frac{3}{4}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2
31	15-561	Boom Lift	2
32	HBS-12-13-550	Stainless Steel Bolt $\frac{1}{2}$ - 13 x $5\frac{1}{2}$	2
	HNCL-12-13	Center Lock Nut $\frac{1}{2}$ - 13	2
33	15-811	Left Cam Stop (must also order 15-812)	1
	18-268	Oilite Bushing	2
34	18-289	Bushing $\frac{3}{8}$ ID - $\frac{1}{2}$ OD x $\frac{5}{8}$	4
35	HB-38-16-225	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{4}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
36	10-247	Right Boom Stabilizer	1
	15-020	Hand Grip	2
37	21-212	Extension Spring	1
38	HB-38-16-300	Bolt $\frac{3}{8}$ - 16 x 3	1
	HW-38	Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	1
39	10-162	Boom Support	1
40	HB-516-18-225	Bolt $\frac{5}{16}$ - 18 x $2\frac{1}{4}$	2
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	2
41	10-246	Left Boom Stabilizer	1
	15-020	Hand Grip	2

INSTALLATION INSTRUCTIONS

For best result use Teflon® tape on all fittings.

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

10-301 15' TERRAIN FOLLOWING BOOM DRAWING



11-158-03
Motor 12VDC

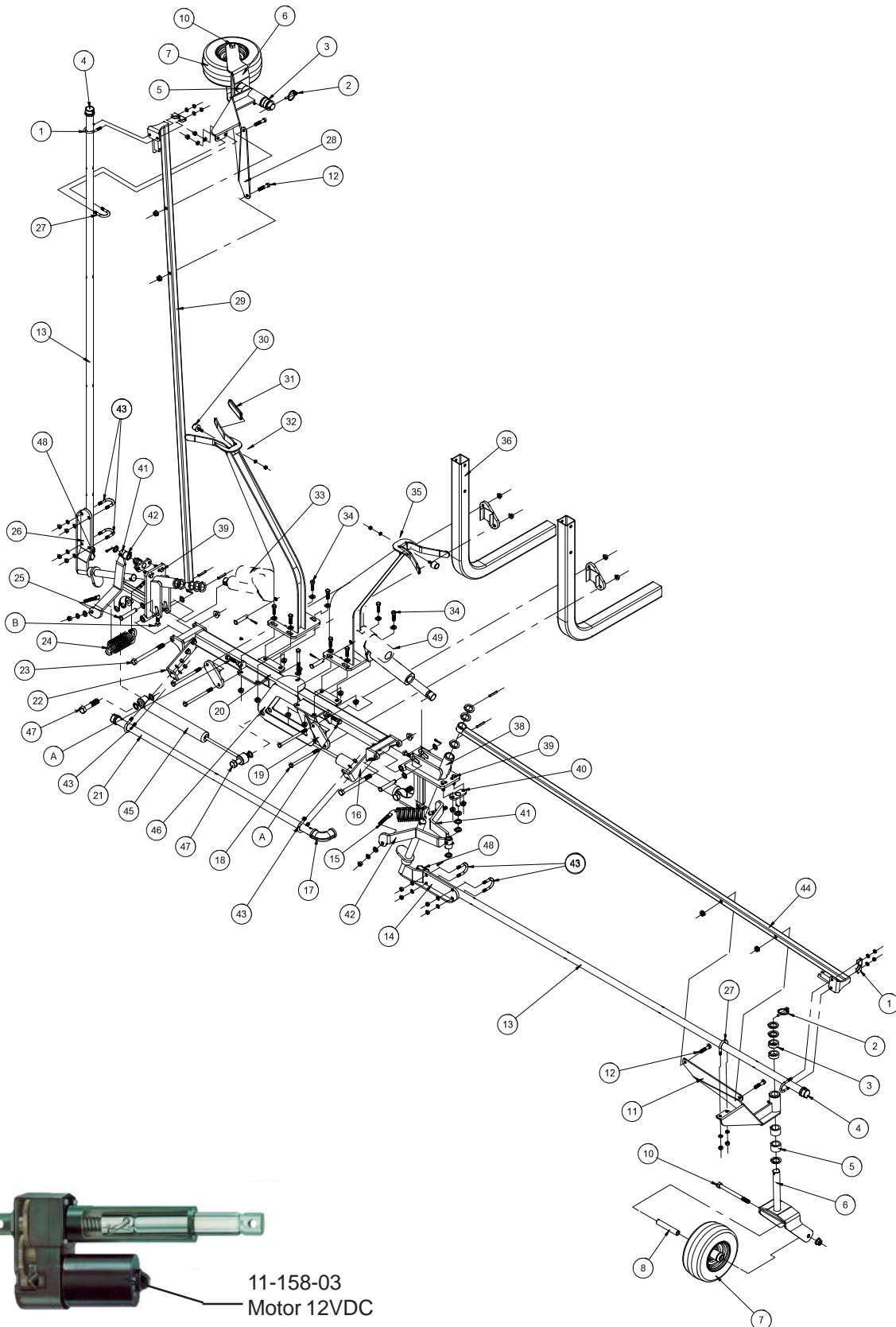
11-158 Linear Actuator

10-301 15' TERRAIN FOLLOWING BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	13-498	Muffler Clamp 1 ^{1/8}	2
	HWL-516	Lockwasher 5/16	4
	HN-516-18	Nut 5/16 - 18 (part of 13-498)	4
2	42-539	Lynch Pin 1/4	2
3	29-584	1/2" Spacer	4
4	16-926	Stainless Steel Cap	3
5	29-585	1" Spacer	4
6	10-312	Castor Fork	2
	HMB-100-10	Machine Bushing 1 x 10GA (3 per fork)	6
7	42-202	Tire and Wheel	2
8	33-338	Axle Bearing	2
10	HBS-12-13-600	Stainless Steel Bolt 1/2 - 13 x 6	2
	HNTL-12-13	Lock Nut 1/2 - 13	2
11	10-310	Right Castor Wheel Bracket	1
	18-035	Bushing (part of 10-310)	2
	HG-14-28-180	Grease Fitting 1/4 - 28 x 180° (part of 10-310)	1
12	HBS-38-16-175	Stainless Steel Bolt 3/8 - 16 x 1 3/4	4
	HNTL-38-16	Lock Nut 3/8 - 16	4
13	15-562	Right and Left Tube	2
14	33-301	Right Pivot Bracket	1
	HMBS-100-10	Stainless Steel Machine Bushing 1 x 10GA	1
	HMBS-100-14	Stainless Steel Machine Bushing 1 x 14GA	2
	HRPS-14-150	Stainless Steel Roll Pin 1/4 x 1 1/2	2
15	42-537	Spade Bolt 3/8 - 16	4
	HW-38	Washer 3/8	4
	HWL-38	Lockwasher 3/8	4
	HN-38-16	Nut 3/8 - 16	4
16	33-308	Right Center Tube Mount	1
	HBS-38-16-125	Stainless Steel Bolt 3/8 - 16 x 1 1/4	2
	HWS-38	Stainless Steel Washer 3/8	2
	HNTL-38-16	Lock Nut 3/8 - 16	2
17	16-925	Stainless Steel Pipe Elbow 3/4 x 90°	3
	18-249	Barb Fitting	3
	18-040	Hose Clamp HS-12	3
18	HBS-38-16-550	Stainless Steel Bolt 3/8 - 16 x 5 1/2	4
	HNTL-38-16	Lock Nut 3/8 - 16	4
19	10-304	Boom Bracket	4
20	10-305	Center Boom Mount	1
21	16-927	Center Tube	1
A	HSSQS-38-16-150	Stainless Steel Set Screw 3/8 - 16 x 1 1/2 (part of 10-305)	2
	HN-38-16	Nut 3/8 - 16 (part of 10-305)	2
22	33-309	Left Center Tube Mount	1
	HBS-38-16-125	Stainless Steel Bolt 3/8 - 16 x 1 1/4	2
	HWS-38	Stainless Steel Washer 3/8	2
	HNTL-38-16	Lock Nut 3/8 - 16	2
23	HBS-12-13-600	Stainless Steel Bolt 1/2 - 13 x 6	2
	HNTL-12-13	Lock Nut 1/2 - 13	2
24	10-313	Extension Spring	2
25	HCPS-12-275	Stainless Steel Clevis Pin 1/2 x 2 3/4	2
	HMB-12-14	Machine Bushing 1/2 x 14GA	4
	HPS-18-100	Stainless Steel Cotter Pin 1/8 x 1	2

(Continue on Next Page)

10-301 15' TERRAIN FOLLOWING BOOM DRAWING

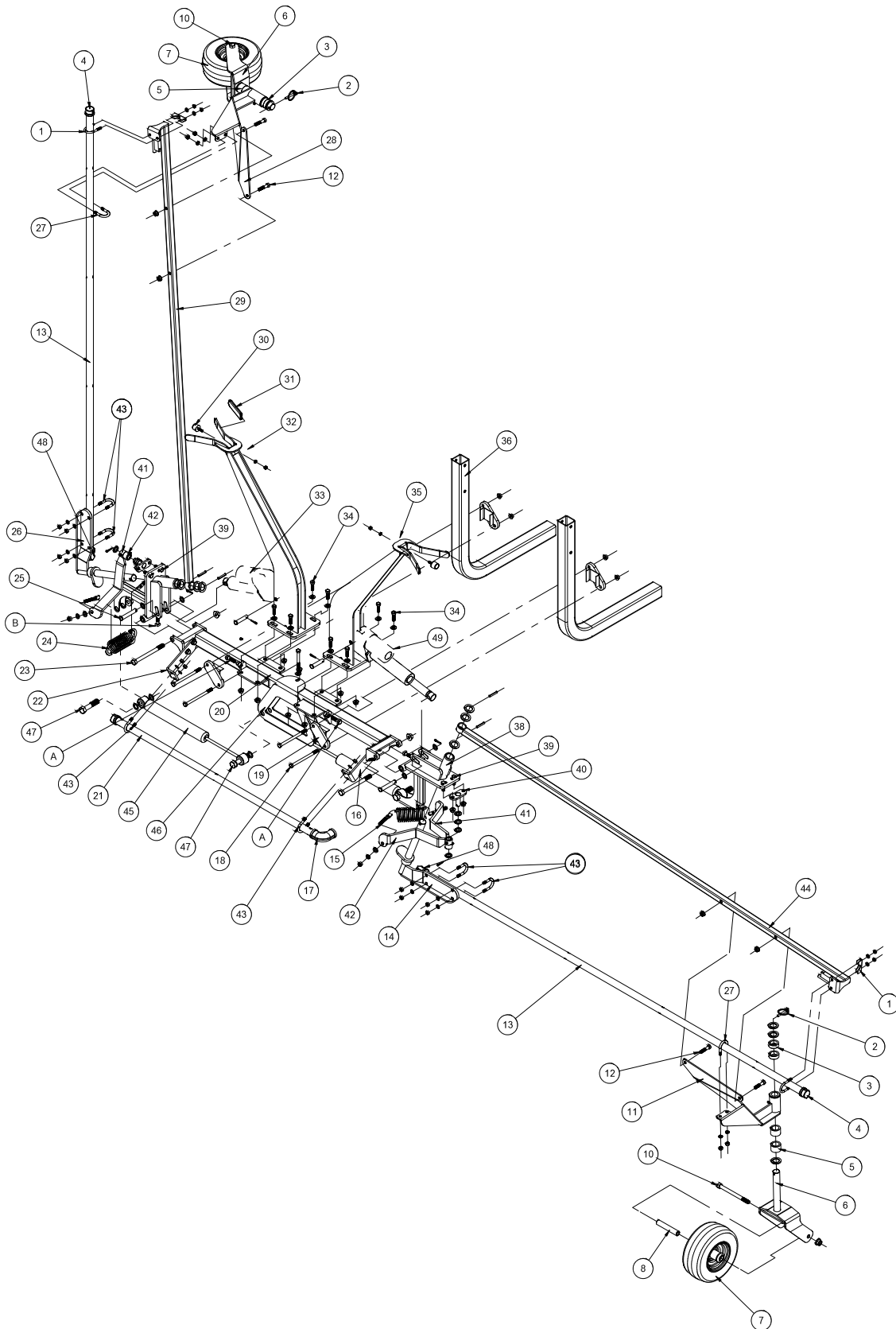


11-158 Linear Actuator

10-301 15' TERRAIN FOLLOWING BOOM PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
26	33-302	Left Pivot Bracket	1
	HMBS-100-10	Stainless Steel Machine Bushing 1 x 10GA	1
	HMBS-100-14	Stainless Steel Machine Bushing 1 x 14GA	2
	HRPS-14-150	Stainless Steel Roll Pin 1/4 x 1 1/2	2
27	16-024	U-Bolt 5/16 - 24	2
	HWLS-516	Stainless Steel Lockwasher 5/16	4
	HNS-516-24	Stainless Steel Nut 5/16 - 24	4
28	10-311	Left Castor Wheel Bracket	1
	18-035	Bushing (part of 10-311)	2
	HG-14-28-180	Grease Fitting 1/4 - 2 8 x 180° (part of 10-311)	1
29	10-315	Left Brush Guard	1
30	15-013	Rubber Bumper	2
	HWL-14	Lockwasher 1/4	2
	HN-14-20	Nut 1/4 - 20	2
31	10-318	Grip Pad	4
32	10-316	Left Boom Holder	1
33	11-158	Linear Actuator	2
	HCPS-12-200	Stainless Steel Clevis Pin 1/2 x 2	2
	HPS-18-100	Stainless Steel Cotter Pin 1/8 x 1	2
34	HBS-38-16-125	Stainless Steel Bolt 3/8 - 16 x 1 1/4	8
	HWS-38	Stainless Steel Washer 3/8	8
	HNTL-38-16	Lock Nut 3/8 - 16	8
35	10-317	Right Boom Holder	1
36		Boom Carrier (part of machine)	
38	10-330	Pivot Bracket	2
	15-494	Nylon Flange Bushing 1" ID (2 per 10-330)	4
	18-036	Oilite Bushing 1/2 ID (2 per 10-330)	4
	HG-14-28-180	Grease Fitting 1/4 - 28 x 180° (2 per 10-330)	4
	HN-38-16	Nut 3/8 - 16 (1 per 10-330)	2
B	HSSQS-38-16-150	Stainless Steel Set Screw 3/8 - 16 x 1 1/2 (1 per 10-330)	2
39	HBS-38-16-125	Stainless Steel Bolt 3/8 - 16 x 1 1/4	4
	HWS-38	Stainless Steel Washer 3/8	4
	HNTL-38-16	Lock Nut 3/8 - 16	4
40	10-303	Pivot	2
	HMBS-58-14	Stainless Steel Machine Bushing 5/8 x 14GA	8
	HPS-18-100	Stainless Steel Cotter Pin 1/8 x 1	2
41	10-309	Left Cam Stop (must also order 10-308)	2
	18-268	Oilite Bushing (part of 10-309)	2
	HG-14-28-180	Grease Fitting 1/4 - 28 x 180° (part of 10-309)	2
42	10-308	Right Cam Stop (must also order 10-309)	2
	18-268	Oilite Bushing (part of 10-308)	2
	HG-14-28-180	Grease Fitting 1/4 - 28 x 180° (part of 10-308)	2
43	16-024	U-Bolt 5/16 - 24	6
	HWLS-516	Stainless Steel Lockwasher 5/16	12
	HNS-516-24	Stainless Steel Nut 5/16 - 24	12
44	10-314	Right Brush Guard	1
45	10-332	Stabilizer	2
46	10-331	Center Stabilizer Mount	1
	HB-38-16-300	Bolt 3/8 - 16 x 3	1
	HW-38	Washer 3/8	2
	HNTL-38-16	Lock Nut 3/8 - 16	1
47	HB-58-11-300	Bolt 5/8 - 11 x 3	4
	HMB-58-14	Machine Bushing 5/8 x 14GA	8
	HNTL-58-11	Lock Nut 5/8 - 11	4

10-301 15' TERRAIN FOLLOWING BOOM DRAWING



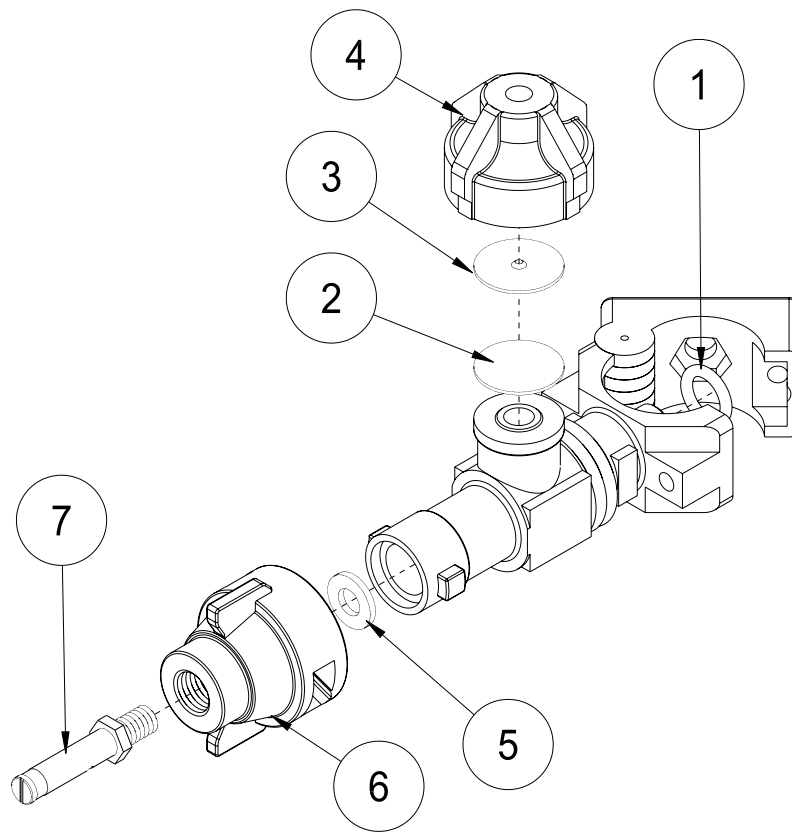
For best results use Teflon® Tape on all fittings.

1. The three boom assemblies are not on the packing list but are in carton. You can NOT order these boom assemblies as one unit. Please refer to parts drawing for individual parts. The long boom assemblies are the right and left booms. The labels are located on right and left pivot brackets (Ref 14 and 26). The small boom assembly is the center boom. Each assembly is shipped with the nozzle bodies (16-996). The remainder parts of the nozzles need to be installed.
2. Mount small boom assembly to the boom carriers on sprayer, using the four boom brackets (Ref 19), four $\frac{3}{8}$ - 16 x 5 $\frac{1}{2}$ bolts and lock nuts (Ref 18). One boom bracket should go on boom assembly and one on boom carrier. Do the same for right and left side. Place boom at desired level (approximately 20" (51 cm) and be sure it is centered. Tighten bolts.
3. Put the boom holders (Ref 32 and 35) on the center mount (Ref 20) using $\frac{3}{8}$ - 16 x 1 $\frac{1}{4}$ bolts, washers and lock nuts (Ref 34), with washers next to slots. Center the bolts in the slots and tighten. The set screws (Ref A) on the center mount should be tightened to the stop. It is used to set the up and down movement of the boom at the castor wheel. **The range of the boom is approximately 25" total (12.5" up and 12.5" down).** This can be adjusted by moving the boom holders. In will increase the up range. Out will increase the down range.
4. Take right boom and slide pivot bracket (Ref 38) in the center mount (Ref 20) and hold in place with $\frac{1}{2}$ - 13 x 6 bolt and lock nut (Ref 23). Do not over tighten, boom must be able to move up and down. Repeat for left boom. You may need to loosen the pivot (Ref 40) to install $\frac{1}{2}$ - 13 x 6 bolt due to interference with the cam stops (Ref 41 and 42).
5. Mount the actuator (Ref 33) with the fixed end to the right and left boom holders (Ref 35 and 32) using $\frac{1}{2}$ x 2 clevis pin and cotter pin. Mount the ram end to the pivot brackets (Ref 38) using $\frac{1}{2}$ x 2 $\frac{3}{4}$ clevis pin and cotter pin (Ref 25) with the $\frac{1}{2}$ x 14GA machine bushing on the outside of the pivot brackets.
6. Hook hoses to the respective fittings using hose clamps (18-040). The hose coming from the right side of the sprayer goes to the straight fitting on the right boom. The center hose from the sprayer goes to the straight fitting on the center boom. The left hose from the sprayer goes to the straight fitting on the left boom. Be sure all hose clamps are tight.
7. Now install the wiring harness. Refer to the wiring diagram.
8. Lower the booms so that the ends are at a height that you can work at.
9. Put the left castor wheel bracket (Ref 28) onto the left boom as shown. Using two $\frac{3}{8}$ - 16 x 1 $\frac{3}{4}$ bolts and lock nuts (Ref 12) and one u-bolt, two $\frac{5}{16}$ stainless steel lockwashers and stainless steel $\frac{5}{16}$ - 24 nuts (Ref 27). Repeat for the right boom with the right castor wheel bracket (Ref 11) using the same hardware.
10. Put the assembled castor forks into the castor wheel brackets, adjusting the spacers to get the boom height you desire.
11. Make certain set screws (Ref B) on both sides are completely screwed in. Raise booms with boom switches all the way up. Adjust set screws (Ref B) so they contact the stop and lock.
12. Install center stabilizer mount (Ref 45) onto center boom (Ref 20) with the $\frac{3}{8}$ - 16 x 3 bolt, washers and lock nuts.
13. Place stabilizers (Ref 46) into pivot brackets (Ref 38) with $\frac{5}{8}$ - 11 x 3 bolts, machine bushings and lock nuts (Ref 47). Place rod end of stabilizers into center stabilizer mount. Make sure all bolts are tight.

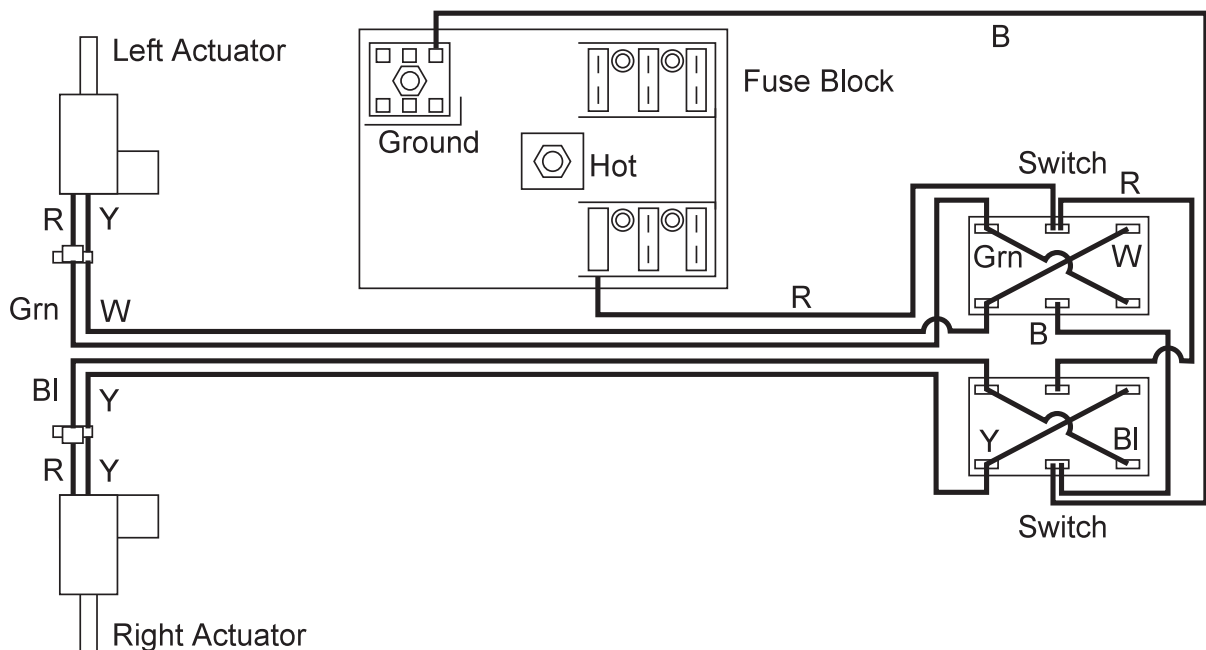
NOTE:

We do not recommend putting these booms into the forward position.

NOZZLE ASSEMBLY DRAWING



BOOM WIRING DIAGRAM (for 10-301 Boom)



NOZZLE ASSEMBLY PARTS LIST

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

NOTE:

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

NOTE:

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

NOTE:

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

(for 10-301 Booms) BOOM WIRING PARTS LIST

PART#	DESCRIPTION	QUANTITY
8853	Slide on Connectors	2
8963	Heat Shrink 1/4"	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	12
33-273	Fuse 30 amp	1

Use Dielectric Grease On All Electrical Connections

WIRING INSTRUCTIONS

1. Mount the two switches on the control on the right hand side of the machine. Connect the wiring harness (16-810) to the switches (16-755) and fuse block as shown in the boom wiring diagram. Put 20 amp fuse (33-272) into the fuse block as shown.
2. Run the wire harness back to the boom along the main frame keeping it away from hot or moving parts. Use the nylon tie (22-075) to hold it in place.
3. Connect the wiring harness to the linear actuator (11-178) as shown. Use a nylon tie on each actuator to hold the wires to the fixed end of actuators.

TURBO TURFJET TIPS

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

FEATURES:

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

NOZZLE TILT

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

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

RECOMMENDED OVERLAP AND NOZZLE HEIGHT

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

DRIFTABLE FINES PRODUCED

(0.5 gpm at 40 psi)

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

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

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

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

FEATURES:

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

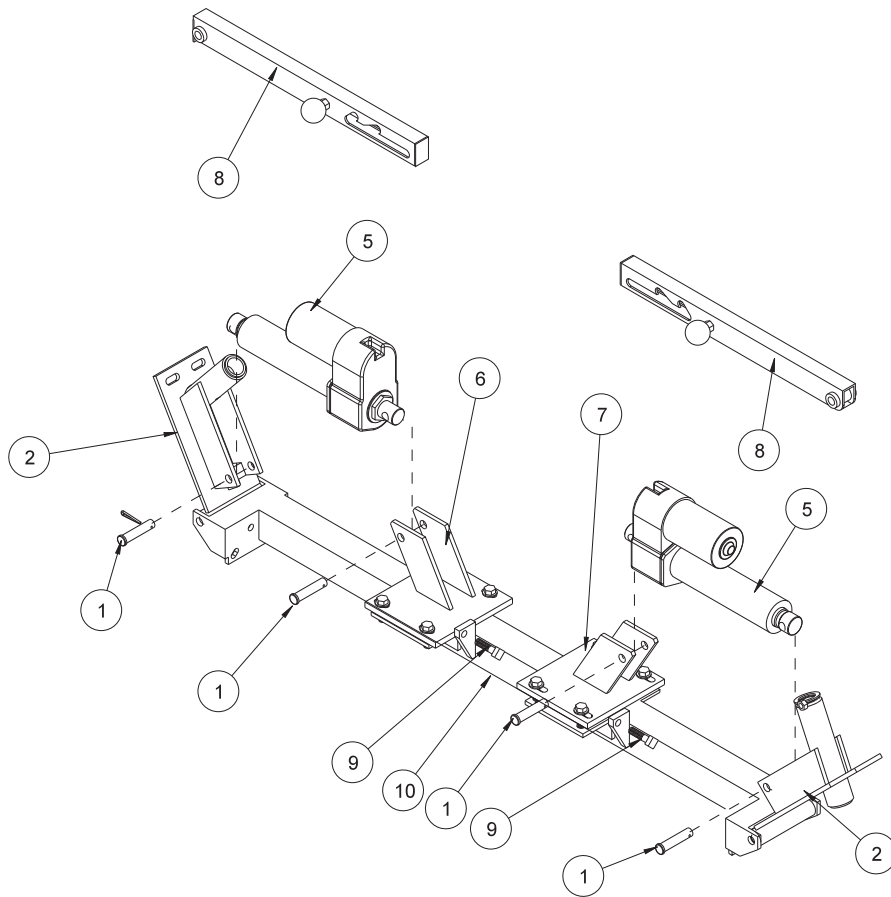
RECOMMENDED OVERLAP

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

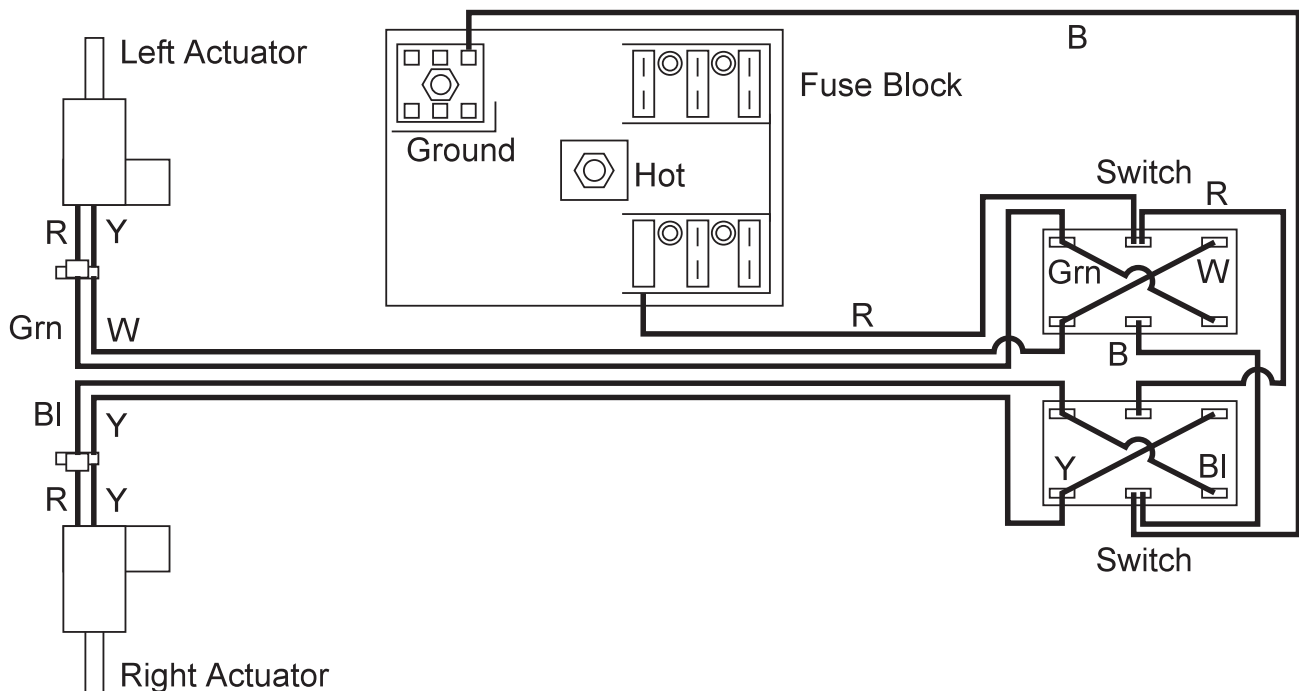
NOZZLE HEIGHT

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

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 Bracket	2
5	11-158	Linear actuator	2
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		

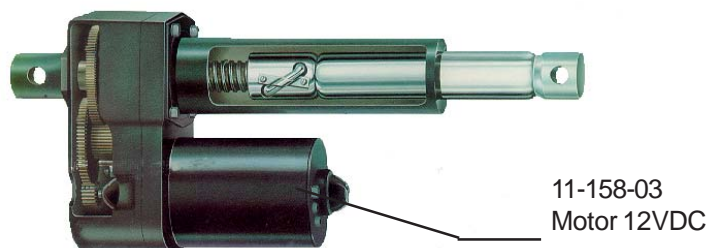
INSTALLATION INSTRUCTIONS

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.

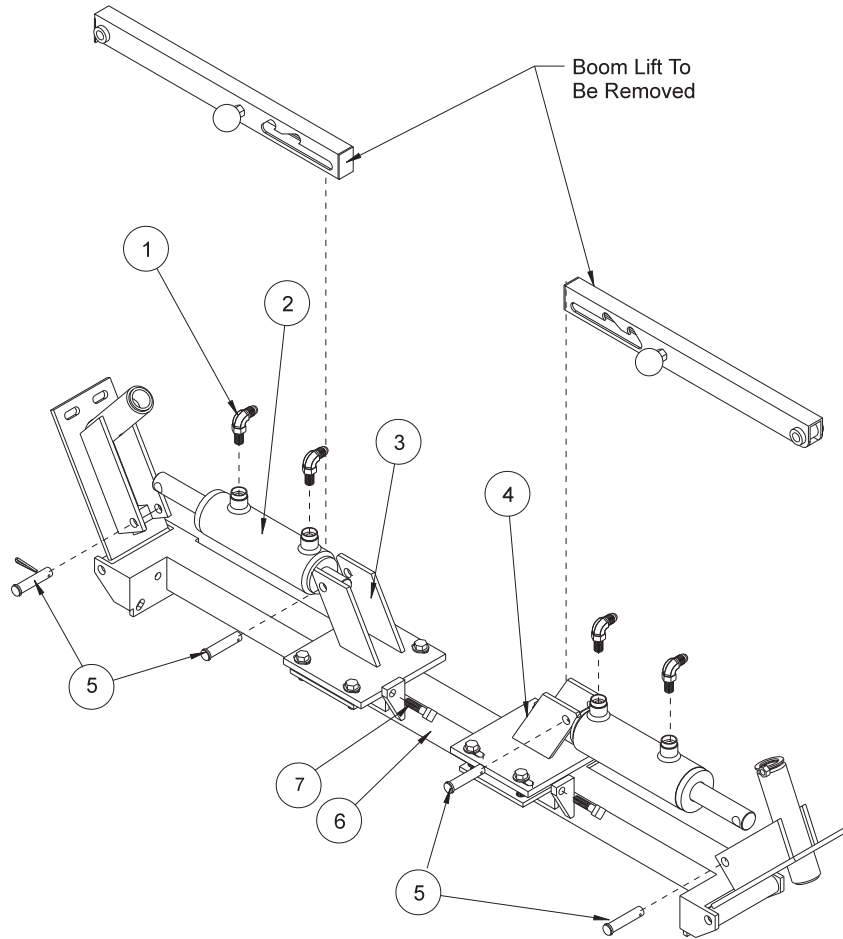
10-103 ELECTRIC LIFT WIRING PARTS LIST

PART#	DESCRIPTION	QUANTITY
8853	Slide on Connectors	2
8963	$\frac{1}{4}$ " Heat Shrink	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
33-273	Fuse 30 amp	1

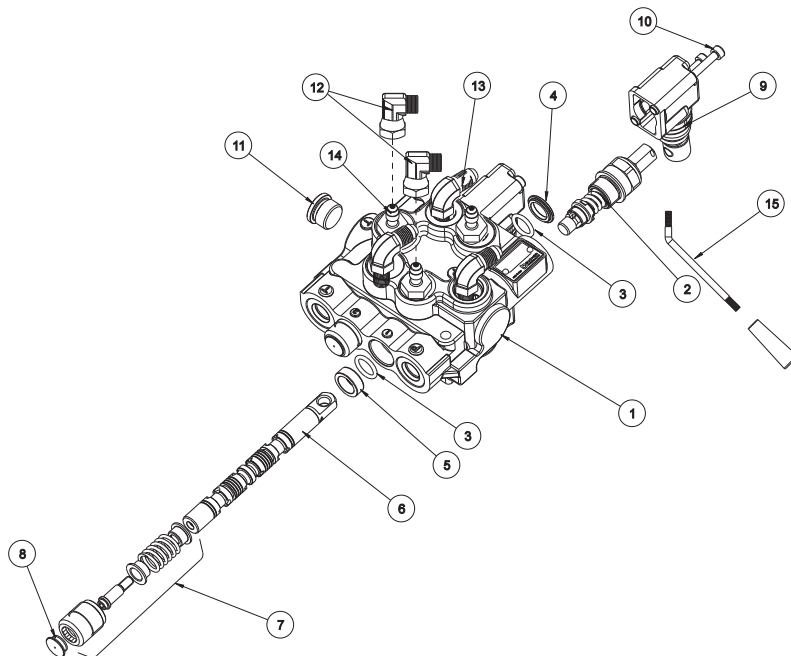


11-158 Linear Actuator

10-325 HYDRAULIC LIFT KIT DRAWING



13-729 HYDRAULIC VALVE DRAWING



10-325 HYDRAULIC LIFT KIT PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	18-171	$11/16 \times 9/16$ Straight Thread 90° Elbow	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 $1/2 \times 2 1/4$	4
	HPS-18-100	Stainless Steel Cotter Pin $1/8 \times 1$	4
6*	33-329	Center Mount	1
7*	HSSQ-38-16-150	Square Head Set Screw $3/8 - 16 \times 1 1/2$	2
	HN-38-16	Nut $3/8 - 16$	2

* Part of 10-160 Boom

INSTALLATION INSTRUCTIONS

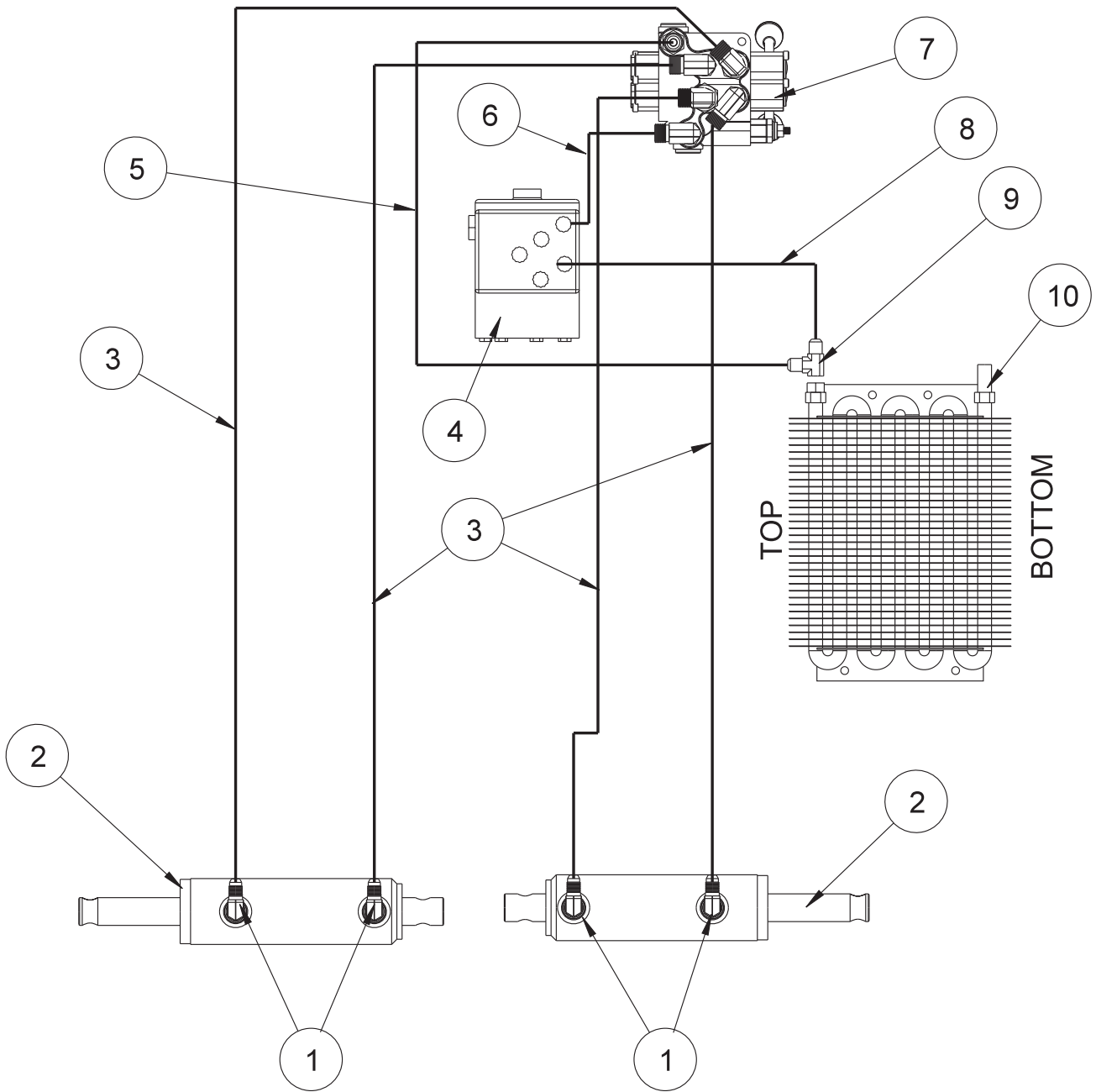
1. Shut machine off. Set park brake. Allow system to cool down.
2. Remove the boom lifts from boom and replace with hydraulic cylinder (Ref 2). Use the existing hardware.
3. Refer to the valve drawing for placement of fittings. The valve mounts in the seat panel on the right side. Use two $1/4 - 20 \times 2$ 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.

13-729 2-BANK HYDRAULIC VALVE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1*	78-415-01	Body (complete with spacer and check valve)	1
2*	78-415-02	Spool HDM10	1
3*	78-415-03	O-Ring Seal	6
4*	78-415-04	Flanged Washer HDM10	3
5*	78-415-05	Spacer	3
6*	78-415-06	A Type Spool HDS11	3
7*	78-415-11	Positioner	2
8*	78-415-08	Plug	3
9*	78-415-09	Lever Group HDS11	3
10*	78-415-10	Metric Socket Screw M5 x .8 x 45	6
11*	78-415-13	$3/4 - 16$ SAE 8 Screw Plug	1
12	18-309	$11/16$ Swivel Nut 90° Elbow	2
13	18-171	$11/16 \times 9/16$ Straight Thread Elbow	3
14	18-306	$11/16 \times 9/16$ Straight Thread Connector	3
15	78-418	Bent Handle	2

* 13-729 2 – Bank Hydraulic Valve (includes all * items)

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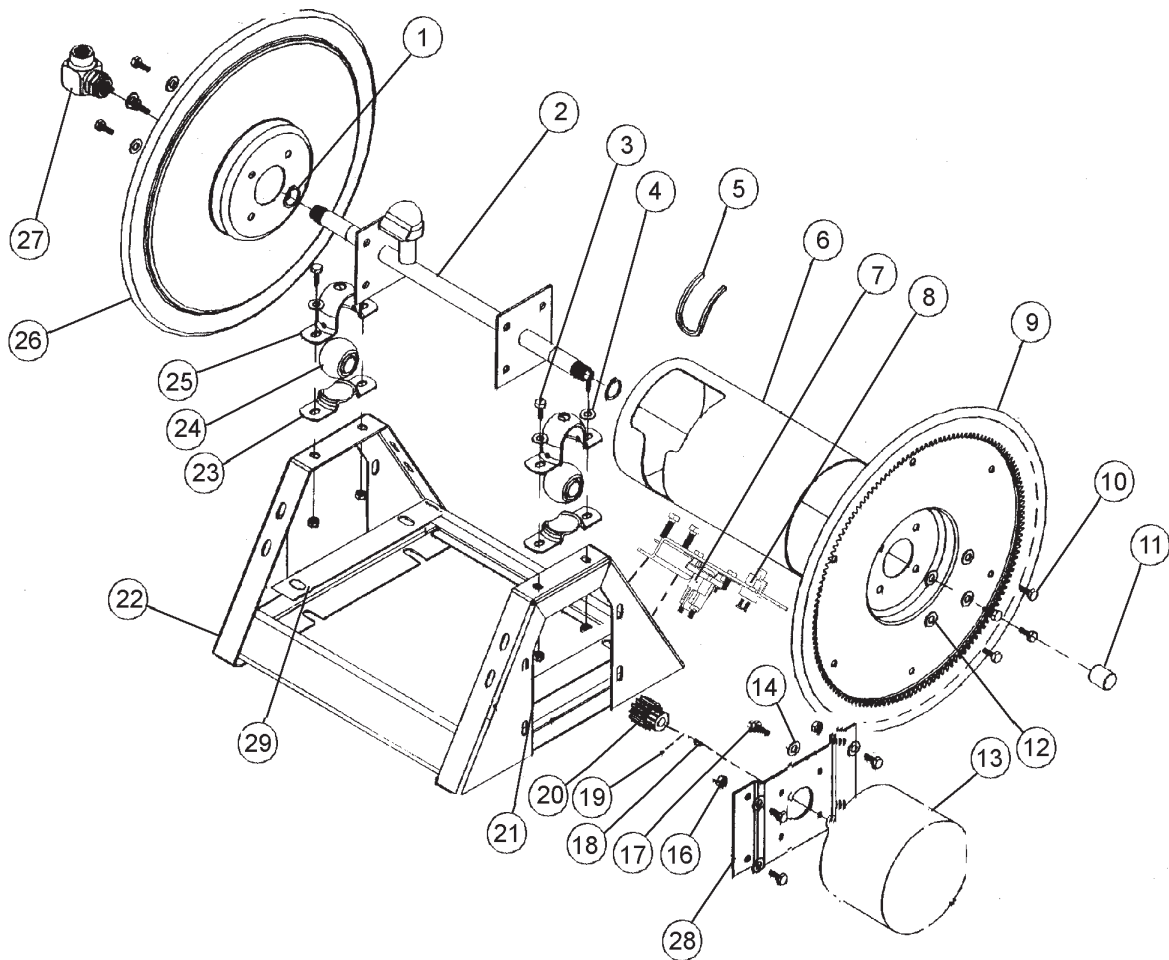
10-325 HYDRAULIC DRAWING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	18-310	$1\frac{1}{16} \times \frac{9}{16}$ Straight Thread 90° Elbow	2
2*	10-187	Hydraulic Cylinder	2
	14-273	Seal Kit	1 per
3*	10-280	Hydraulic Hose 108"	4
4	34-103	Orbitrol	1
5*	10-284	Hose 28"	1
6	10-279	Hydraulic Hose	1
7*	13-729	Hydraulic Valve	1
	78-417	Valve Handle	2
8	10-276	Hydraulic Hose	1
9	18-304	$1\frac{3}{16} \times \frac{3}{4} \times 1\frac{3}{16}$ Straight Thread Run Tee	1
10	42-265	Oil Cooler	1
*	10-325	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 top of the oil cooler that comes out of the top of the tee. This hose traces back to the top of the orbital. Place that hose to the inlet side of the hydraulic valve.
5. Use the short hose 10-284 (Ref 5) 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.

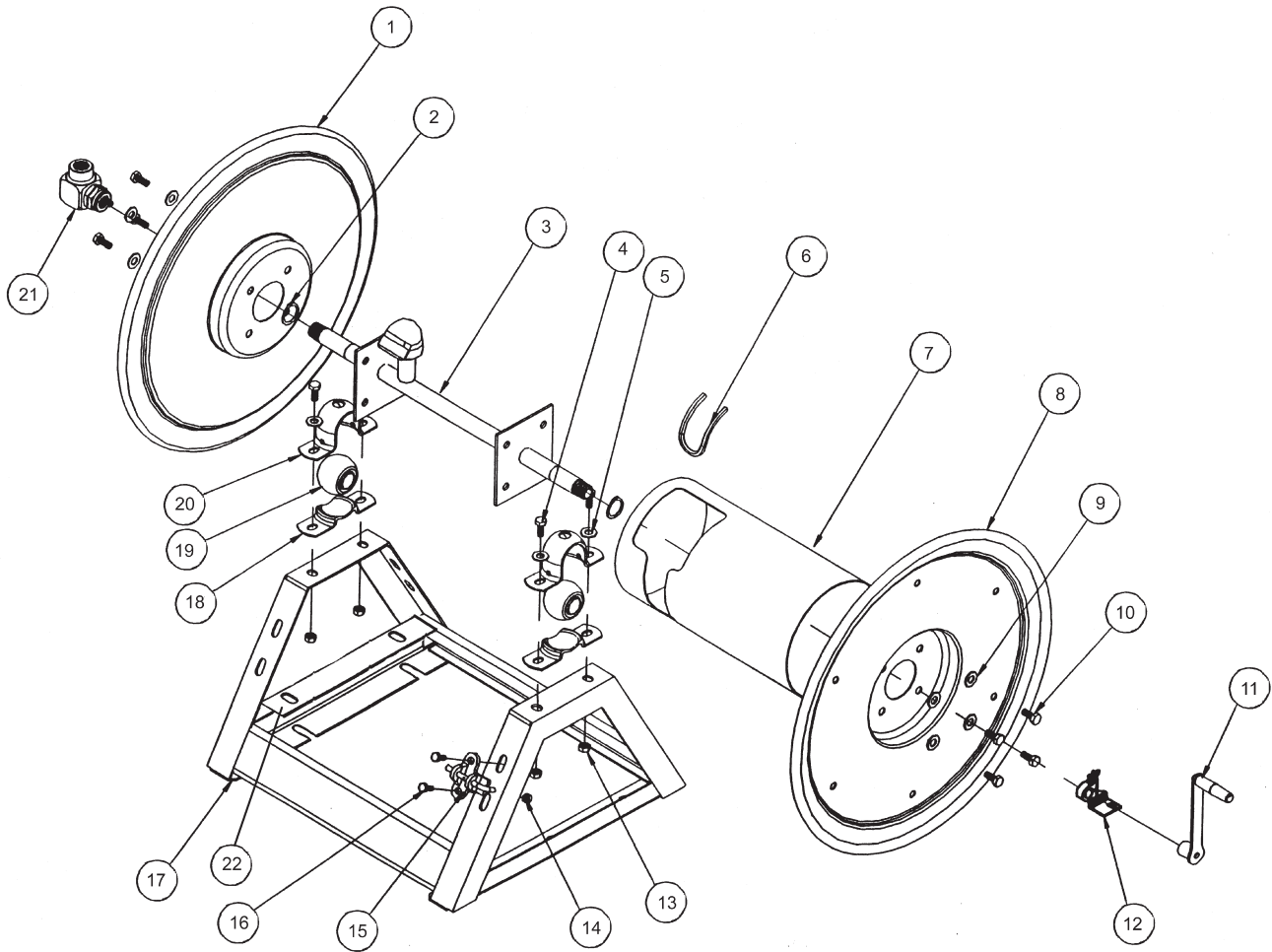
16-906 ELECTRIC HOSE REEL DRAWING



16-906 ELECTRIC HOSE REEL PARTS LIST

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

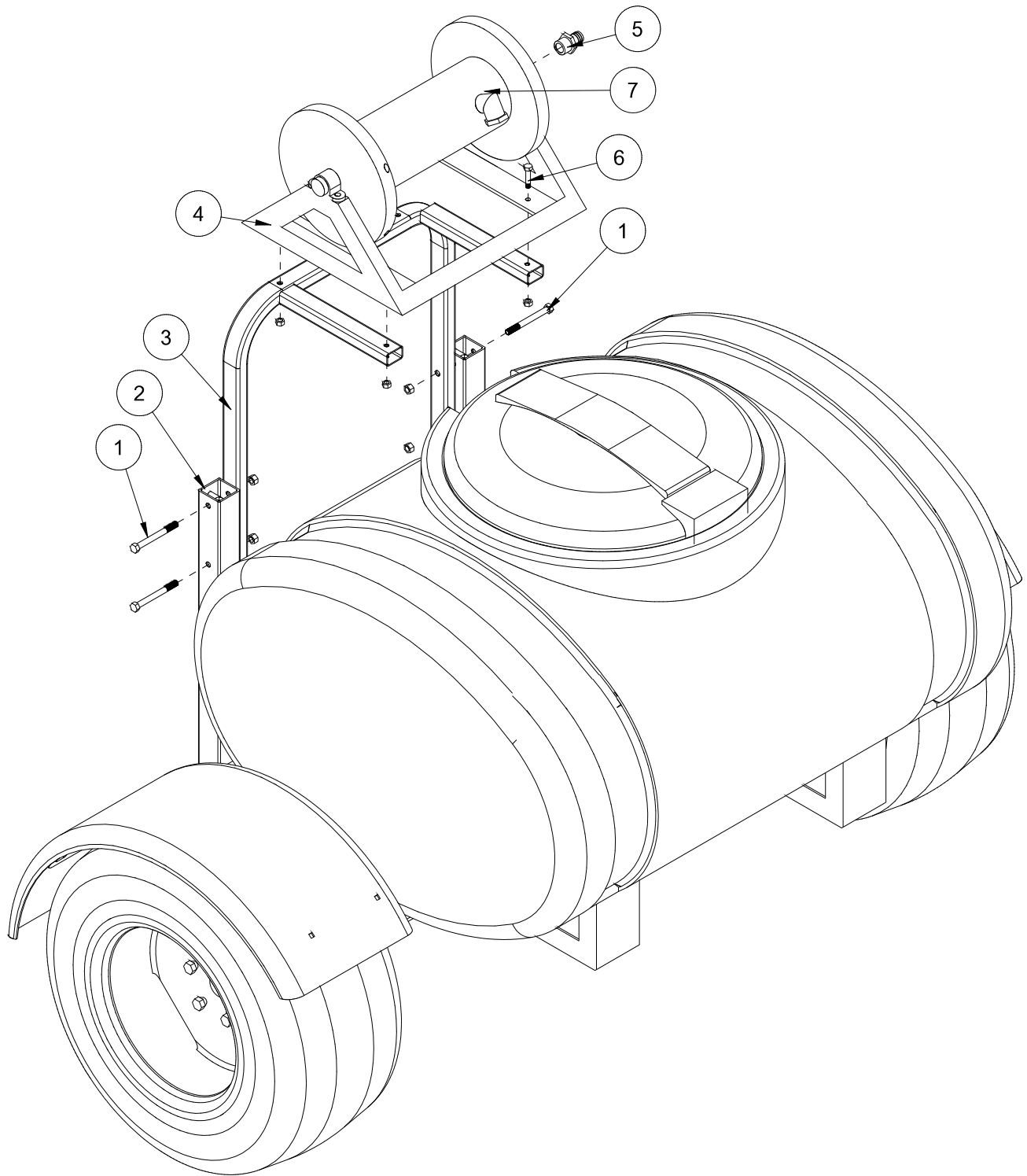
16-129 MANUAL HOSE REEL DRAWING



16-129 MANUAL HOSE REEL PARTS LIST

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

10-107 HOSE REEL MOUNT DRAWING



HOSE REEL MOUNT PARTS LIST

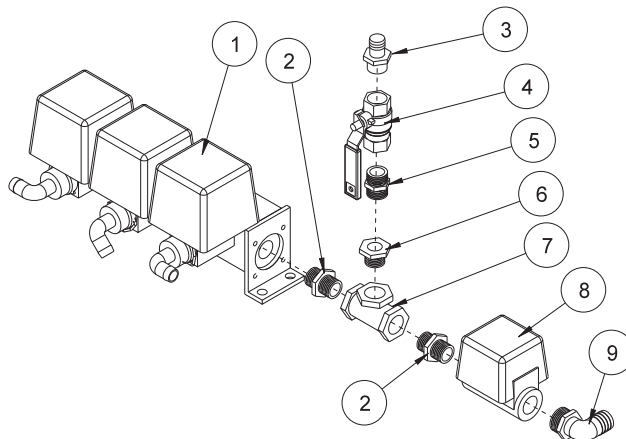
REF#	PART#	DESCRIPTION	QUANTITY
1	HB-38-16-375	Bolt $\frac{3}{8}$ - 16 x $3\frac{3}{4}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
2	10-205	Boom Carrier (part of machine)	2
3	10-221	Hose Reel Mount	1
4	16-906	Electric Hose Reel	1
	16-129	Manual Hose Reel	1
5	18-249	Barb Fitting $\frac{3}{4}$ MPT x $\frac{3}{4}$ HB	1
6	HB-516-18-150	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{2}$	4
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	4
7	16-295	Hose Fitting	1

HOSE REEL MOUNTING INSTRUCTIONS

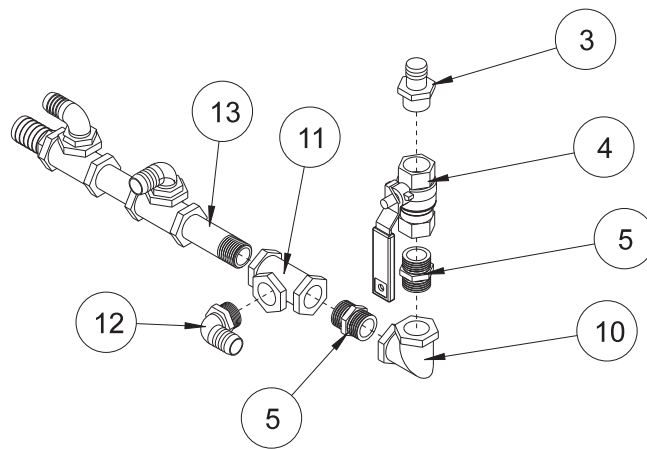
1. Wear protective clothing when draining the tank and taking apart the lines.
2. Drain tank and spray system in a safe and approved method insuring that no chemical or water remain in tank as you will be taking apart lines.
3. Remove key from ignition, set park brake and block wheels.
4. Remove square rubber covers on boom carriers. Cut a notch into the covers to clear the top bolt then put them back in.
5. Place hose reel bracket inside the boom carrier tubes with arms pointing toward front of machine.
6. Lower bracket until top hole in bracket lines up with hole in upright. Use four $\frac{3}{8}$ - 16 x $3\frac{3}{4}$ bolts and four $\frac{3}{8}$ - 16 lock nuts with nuts on inside of uprights.
7. Put hose reel on hose reel bracket with fitting on left side of machine. Use four bolts $\frac{5}{16}$ - 18 x $1\frac{1}{2}$ and four $\frac{5}{16}$ - 18 lock nuts to hold in place. Tighten bolts.
8. Put 18-249 barb fitting into hose reel.
9. **For 1002 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.
10. **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 to 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.
11. Use 8887-46 hose to connect reel to ball valve, clamp with 18-040 hose clamps.
12. Use 22-075 cable ties to tie hose to main feed hose.

(Continued on next page)

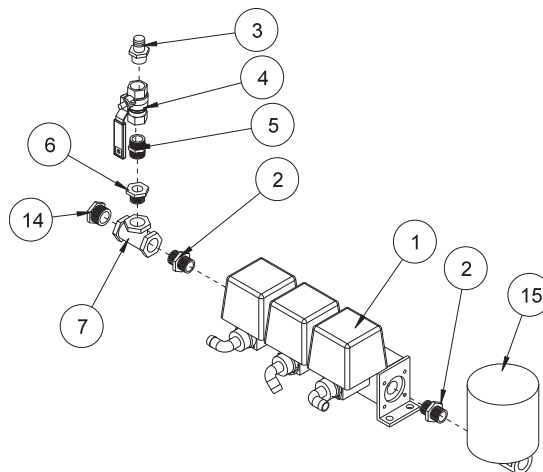
1006 & 1002 (834 & 203) HOSE REEL PLUMBING DRAWING



1004 (MANUAL) HOSE REEL PLUMBING DRAWING



1008 (440) HOSE REEL PLUMBING DRAWING



HOSE REEL PLUMBING PARTS LIST

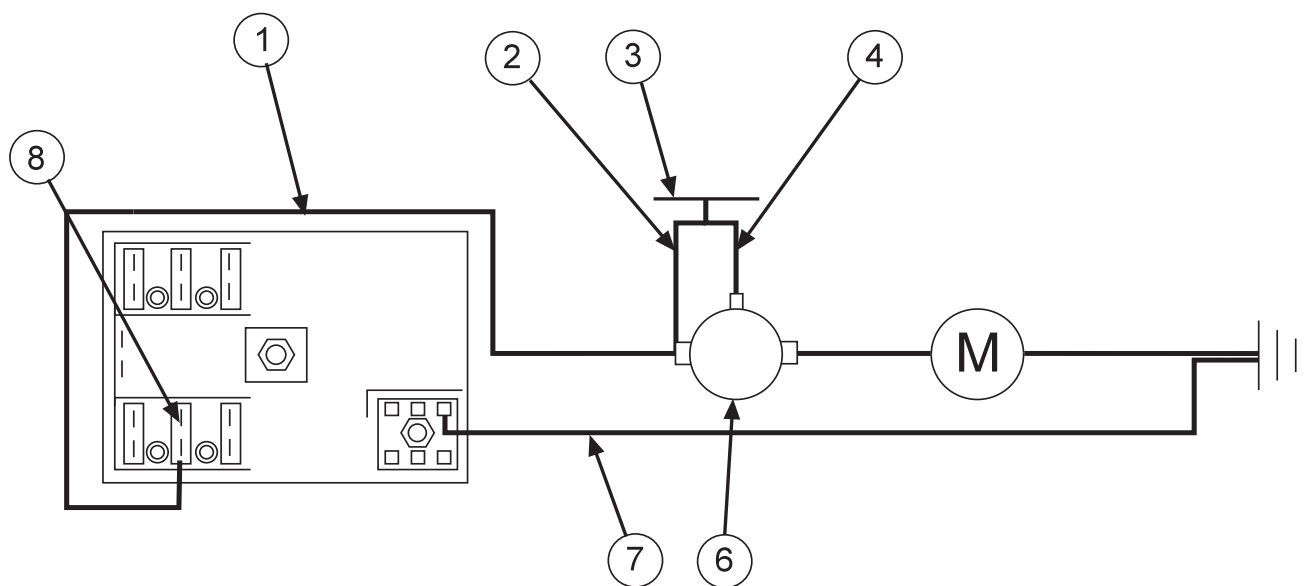
REF#	PART#	DESCRIPTION	QUANTITY
1	15-552	Manifold Ball Valve	1
2*	16-851	Close Nipple 1" (1006 and 1008 only)	2
3*	16-154	Fitting $\frac{3}{4}$ " MPT x $\frac{3}{4}$ " HB	1
4*	16-859	Ball Valve $\frac{3}{4}$ " Brass	1
5*	16-158	Close Nipple $\frac{3}{4}$ "	2
6*	16-163	Reducer Bushing 1 x $\frac{3}{4}$ " (1006 and 1008 only)	1
7*	16-183	Tee FPT 1 x 1 x 1 (1006 and 1008 only)	1
8	15-531	Pressure Regulating Valve (1006)	1
	16-886	Motorized Control Valve (1002)	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
14	16-162	Hex Plug	1
15	16-524	Motorized Control Valve	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. Put 18-249 barb fitting into hose reel.
9. **For 1006 & 1002 System:** Remove pressure regulating valve or motorized control 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.
10. **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 to 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.
11. Use 8887-46 hose to connect reel to ball valve, clamp with 18-040 hose clamps.
12. 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 one full revolution. A clicking noise should be heard from locking mechanism.
2. Let the hose retract.
3. Pull the hose off until the first click is heard. Drum should lock when the hose tension is removed.
4. Continue pulling the hose, no more than one revolution, until no clicking is heard. Hose should rewind when tension is removed.

HOSE REPLACEMENT PROCEDURE:

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

ELECTRIC HOSE REEL WIRING PARTS LIST

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

CONNECTION INSTRUCTIONS

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



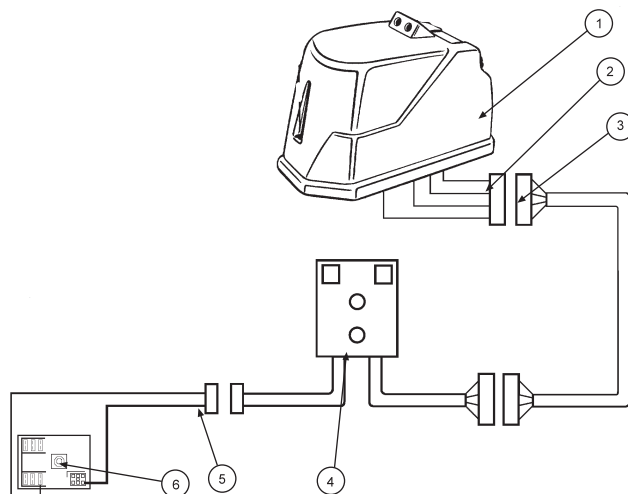
Make certain you are connecting positive (+) to positive; negative (-) to negative while attaching power leads. If you do not observe polarity, damage will result to electrical components.

Use Dielectric Grease On All Electrical Connections

10-350 FOAM MARKER FOR 1000 DRAWING



WIRING DRAWING



10-350 FOAM MARKER FOR 1000 PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
A*	14-291-05	Double Switch Box	1
	15-506-01	Fuse (F10A 250V)	1
	15-506-02	Switch	1
B*	14-291-02	Foamer Tank	1
	26-054	Bushing Insert	1
	26-055	Shut-off Valve	1
C*	14-291-03	Compressor Only	1
	14-291-01	Black Cover	1
*	14-291	Foamer	1

INSTALLATION INSTRUCTIONS

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

1. Mount the switch box on the front tank bracket facing towards the seat using the two wing nuts that came with the switch box.
2. Use the extension wire (10-222) to connect the compressor to the switch box.

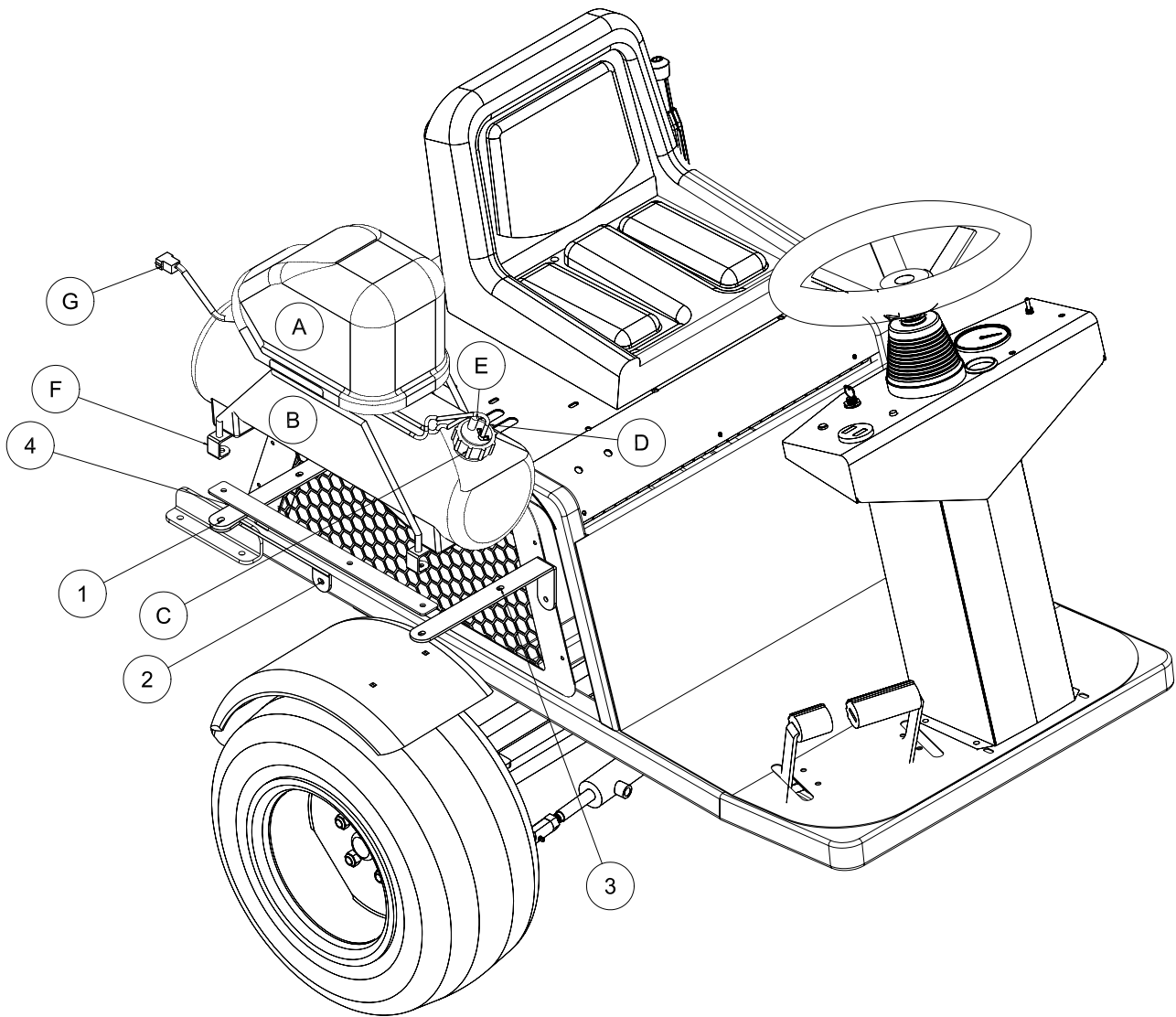
WIRING

Use dielectric grease on all electrical connections. Connect extension wire (10-222) to the pig tail on the switch box and compressor. Connect power cable (15-509) to the switch box. Turn the switch off. Route the power wire to the fuse block (on the inside of the engine cover) out of the way of any heat or moving parts. Use nylon ties as needed. Cut the power wire with enough length to connect the fuse block. Put the slide on terminal with heat shrink onto the wire ends and connect to fuse block. Red to positive(+), black to negative(-). Insert 10 amp fuse into slot which has red wire attached to it.

FOAM MARKER WIRING PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	14-291-03	Compressor	1
2	15-504-04	Wiring Harness	1
3	10-222	Extension Wire	1
4	14-291-05	Double Switch Box	1
	15-506-01	Fuse (F10A 250V)	1
	15-506-02	Switch	1
5	15-509	Power Cable	1
6	33-271	Fuse Block (part of machine)	1
	33-507	Auto Blade Type Fuse 10 amp	1

10-350FOAM MARKER FOR 1600 DRAWING



10-350 FOAM MARKER FOR 1600 PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	10-357	Rear Foamer Bracket	1
	HB-14-20-200	Bolt $\frac{1}{4}$ - 20 x 2	1
	HNFL-14-20	Flange Whiz Lock Nut $\frac{1}{4}$ - 20	1
2	10-356	Foamer Bracket	1
	HSDPS-14-20-075	Pan Head Drill Screw $\frac{1}{4}$ - 20 x $\frac{3}{4}$	1
3	10-358	Front Tank Mount	1
4	14-288	Cross Bar	1
	HSDPS-14-20-075	Pan Head Drill Screw $\frac{1}{4}$ - 20 x $\frac{3}{4}$	1
A*	14-291-03	Compressor Only	1
	14-291-01	Black Cover	1
B*	14-291-02	Foamer Tank	1
C*	14-284-02	Cap Assembly	1
D*		Blue Tube	1
E*		Clear Tube	1
F*	10-222	Extension Wire	1
G*	14-291-05	Tank Brackets	1
	HSTP-14-20-075	Phillips Machine Screw $\frac{1}{4}$ - 20 x $\frac{3}{4}$	3
	HSTP-14-20-100	Phillips Machine Screw $\frac{1}{4}$ - 20 x 1	1
	HNFL-14-20	Flange Whiz Lock Nut $\frac{1}{4}$ - 20	4
*	14-291	Foamer (includes all * items)	1

INSTALLATION INSTRUCTIONS

1. The mount rear foam bracket (Ref 1) to the side panel using one $\frac{1}{4}$ - 20 x2 bolt and flange whiz lock nut. Mount the foamer bracket (Ref 2) below the rear foam bracket using a drill screw too hold it in place.
2. Mount the front tank mount (Ref 3) to the side panel with a drill screw. Then mount cross bar (Ref 4).
3. Place foamer assembly (Ref 1) on the foamer brackets and bolt in place with three $\frac{1}{4}$ - 20 x $\frac{3}{4}$ phillips machine screws and flange whiz lock nuts.
4. Use the 1" phillips machine screw to mount the outside back tank hole to the rear foamer bracket (Ref 1) and the foamer bracket (Ref 2).
5. Make sure all bolts are tightened.

CONNECTING THE CAP ASSEMBLY

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

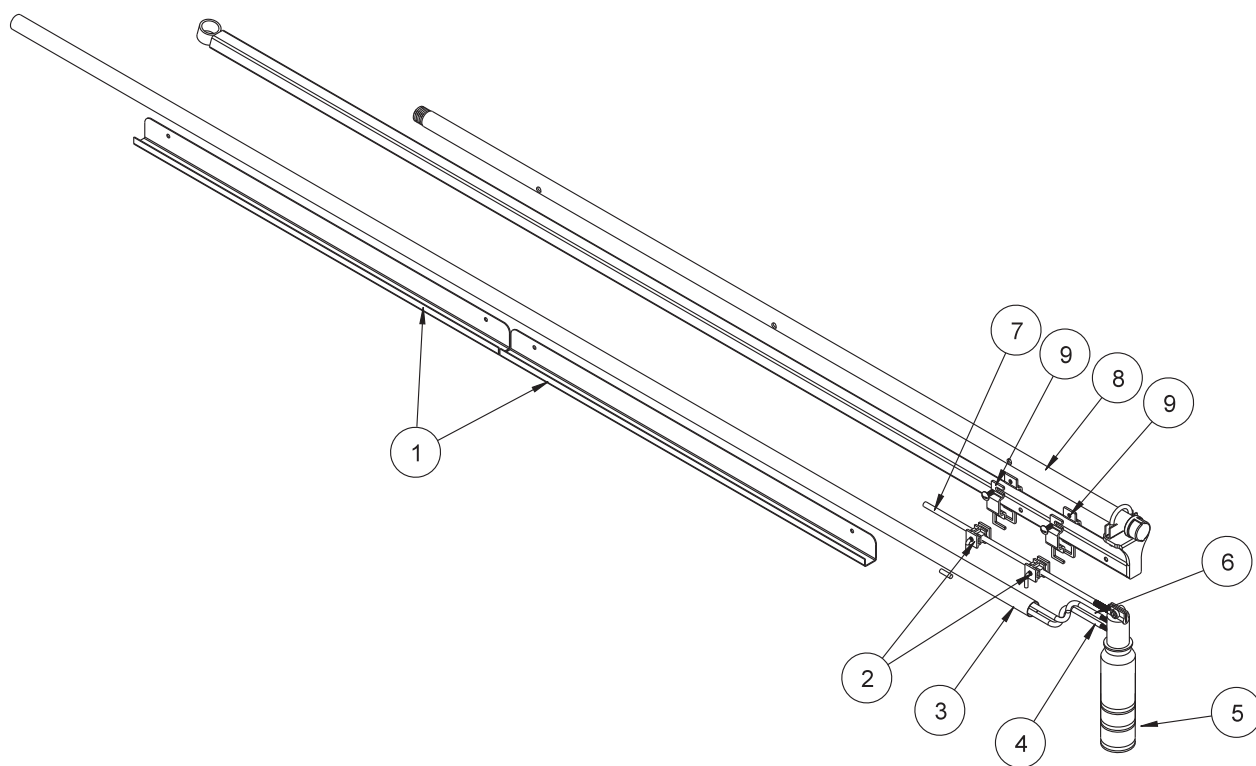
HOSES

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

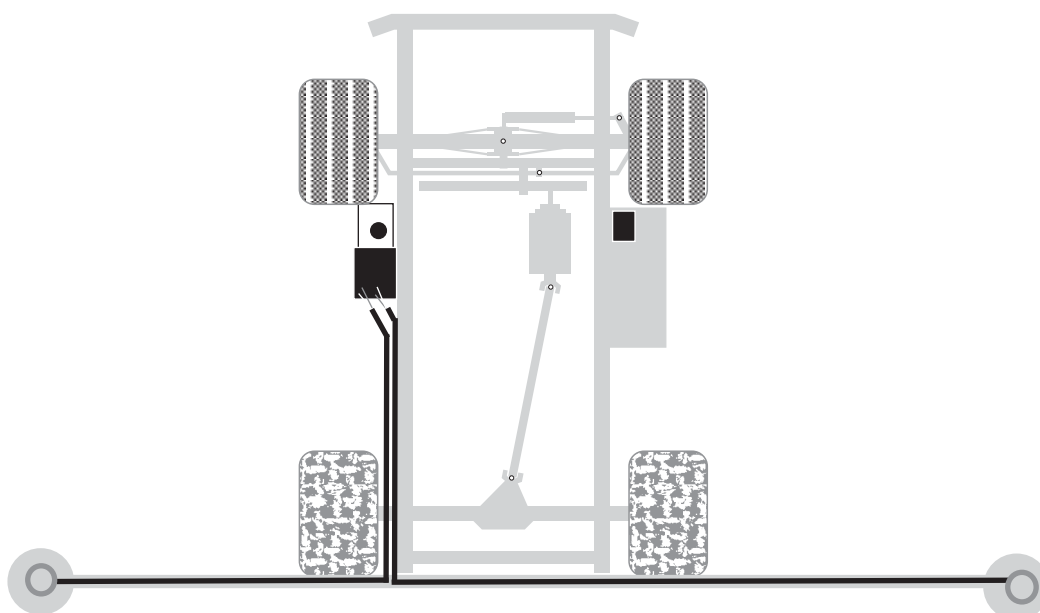
Route the tubing along underside of main frame using tie downs as necessary.

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

FOAMER NOZZLE MOUNT & HOSE GUARD MOUNT DRAWING



TUBING ROUTE



10-350 FOAM MARKER PARTS LIST

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

INSTALLATION INSTRUCTIONS

- Slide hose clamp onto drop tube of foam nozzle and attach restrictor bell.
- Place splined end of Nozzle mounting rod (Ref 7) into top of foam nozzle (Ref 5). Tighten screw.
- Slide two foam nozzle mounts (Ref 2) onto the rod. Place square clamps (Ref 9) on foam nozzle mounts and mount the square clamps to the boom (Ref 8). Adjust foam nozzle mounts and clamps so nozzle assembly will clear end of boom. Tighten foam nozzle mounts and square clamps to prevent side to side movement. Do the same to the other side.
- Being careful not to cut the tubing (Ref 3), cut the oversleeve back approximately 2" (5 cm) to expose blue (Ref 6) and clear tubing (Ref 4).
- Remove blue wing nut from top connector of foam nozzle and slide it on the blue tube with the threads facing toward end of tube. Slide blue tube all the way over the top of the small tube on foam nozzle. Slide wing nut back to the threads and hand tighten. Follow the same steps for the clear tube and tube nut.
- Route the tubing along underside of main frame using tie downs as necessary.
- Install opposite ends of air-liquid tubes to compressor, again cutting back the oversleeve approximately 2" (5 cm) and inserting blue and clear tubes for the left boom section into the tubing connectors (Ref A) on the right side of compressor as far as possible.
- Follow the same steps for the right boom tubing. Notice the right boom is inserted into left side of compressor. To release tubing from compressor, hold black ring around tubing, and pull tube out.
- Hose's must be routed on bottom of the boom square tubing.
- Mark 6 inches in from inside edge of foamer nozzle mounting bracket on square boom tubing.
- Place hose guard (Ref 1) flush with top of square tubing with edge on previous mark. The channel covers hoses on the bottom of the square tubing.
- Install hose guard using 2 drill screws (you may want to drill a $\frac{3}{16}$ pilot hole first).
- Place another hose guard against first and install in same manner.
- Repeat process for other boom side.
- Connect small plastic electrical plug under compressor to electrical extension cable.
- For *Spray Star 1600* route extension cable under engine along the mainframe cross bar, using tie downs as necessary.
- Cut cable and strip casing, allowing enough length to connect to fuse block.
- Strip and connect slide on connectors to each wire and use the heat shrink.
- Connect black negative (-) wire to the ground and connect red wire to the positive (+).
- Insert 10 amp fuse into slot which red wire was attached to.
- Insert 20 amp fuse into slot which red wire was attached to.

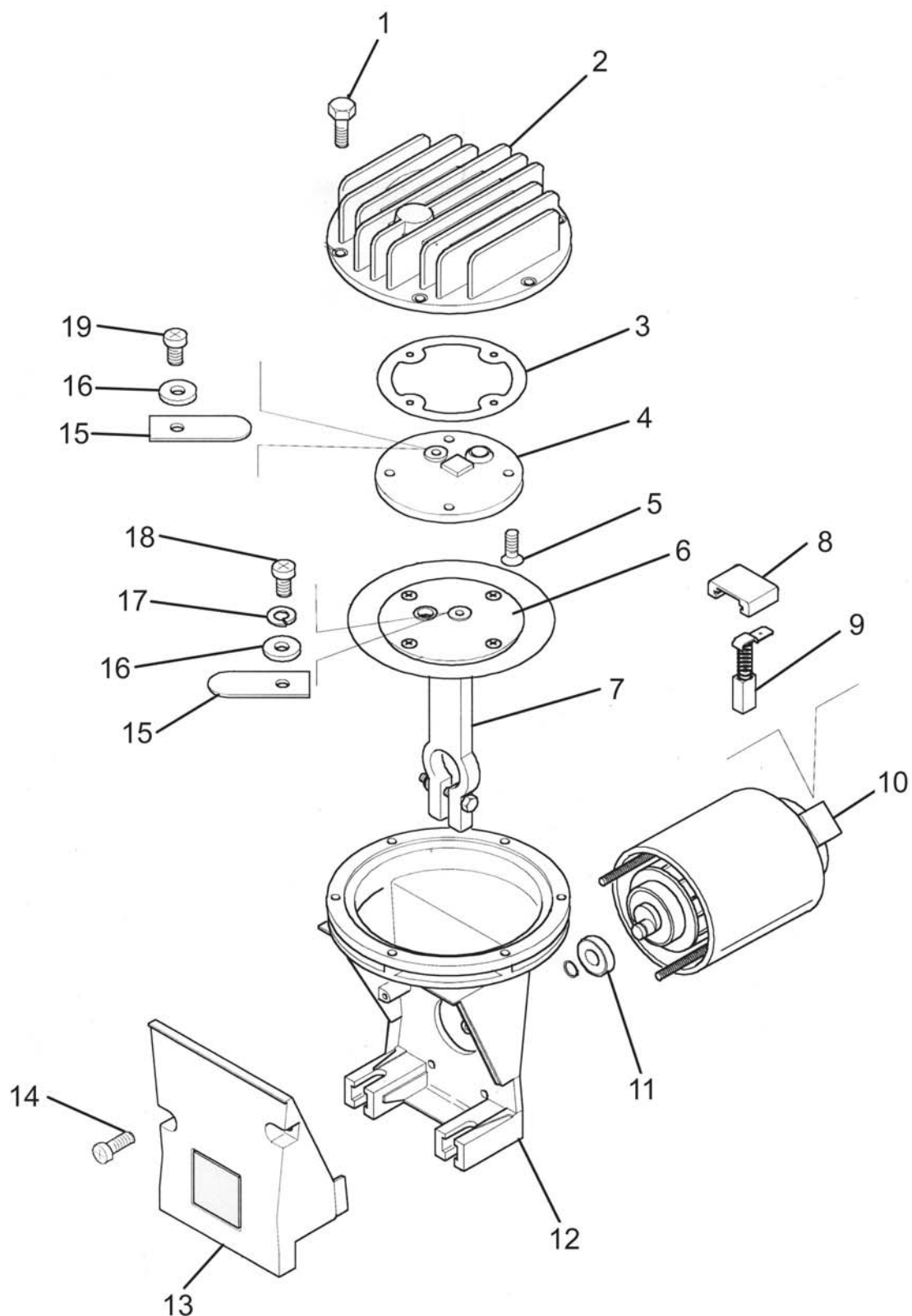
FOAM MARKER DRAWING



FOAM MARKER PARTS LIST

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

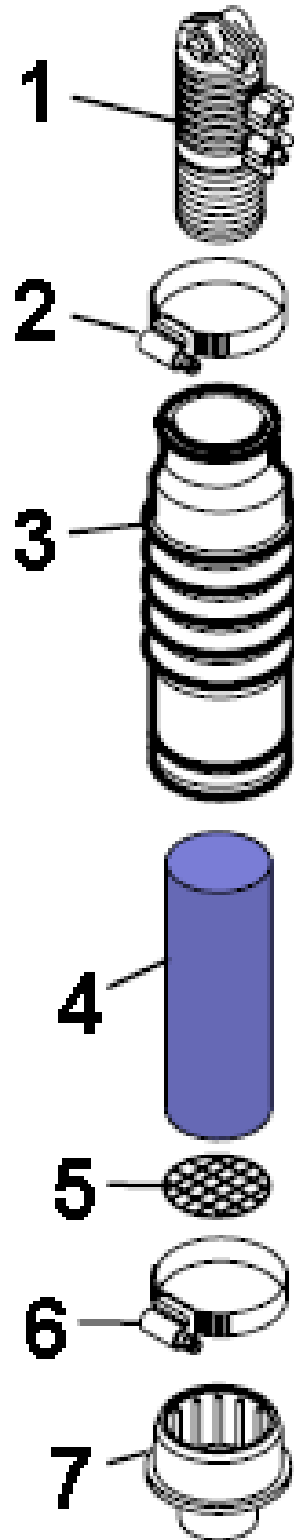
15-505 MOTOR SUB ASSEMBLY DRAWING



15-505 MOTOR SUB ASSEMBLY PARTS LIST

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

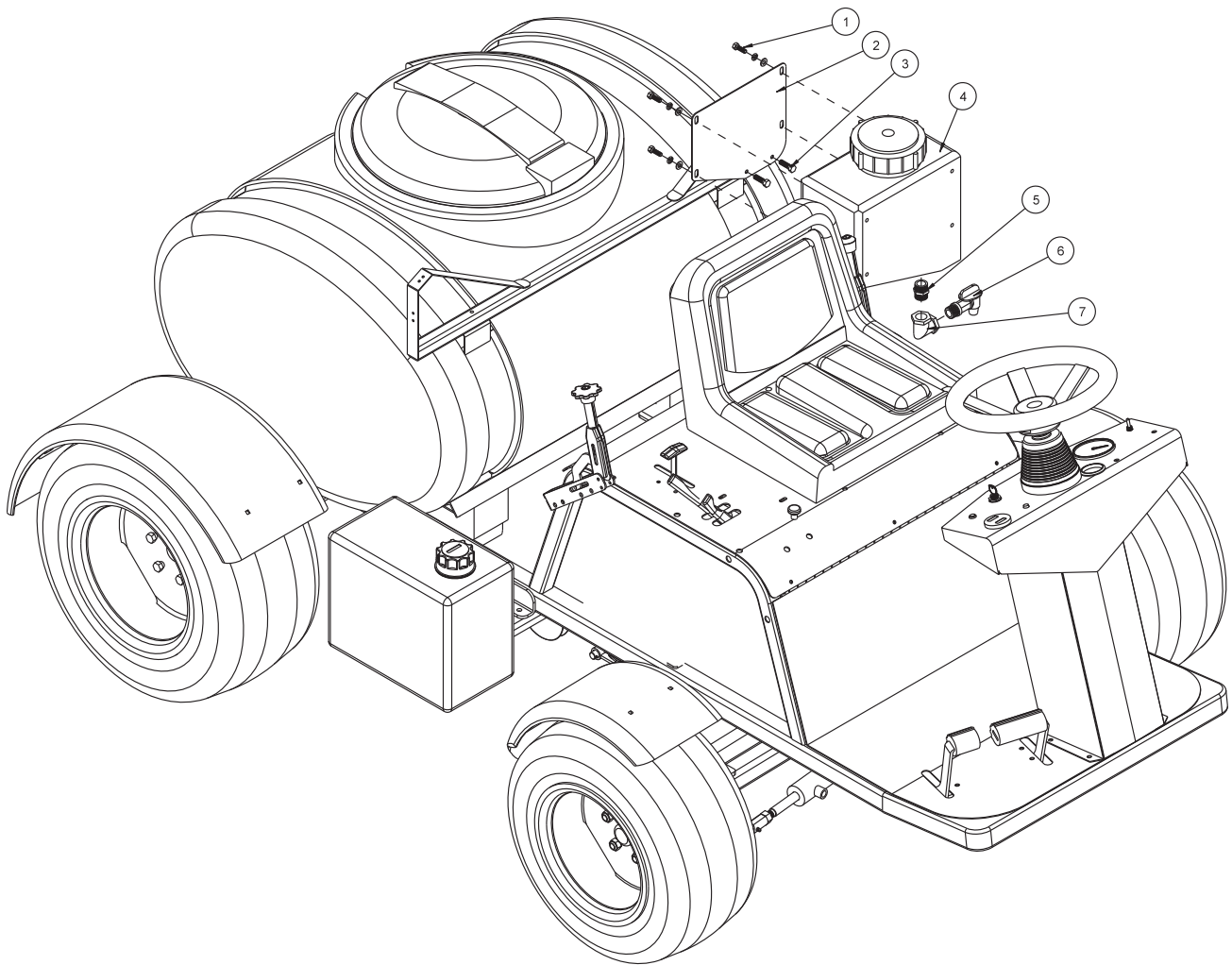
15-511 FOAM NOZZLE SUB ASSEMBLY DRAWING



15-511 FOAM NOZZLE SUB ASSEMBLY PARTS LIST

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

10-106 FRESH WATER WASH TANK DRAWING



10-106 FRESH WATER WASH TANK PARTSLIST

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	Fresh Water Tank Bracket	1
3	HB-38-16-200	Bolt $\frac{3}{8}$ -16 x 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

INSTALLATION INSTRUCTIONS

1. Fresh Water Wash 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.

25-373	Decal, Smithco	Front Nose Cone
25-347	Decal, Dash	Dashboard
10-326	Decal, Control Panel	Control Panel
13-063	Decal, Warnings	In Front of Seat
25-298	Decal, Warning Hot	Hood - Back Edge, Both Sides
27-092	Decal, Lift Hood	Hood - Back Edge, Middle
25-308	Decal, Engine RPM	Engine
76-304	Decal, Crush Pinch	Front Side of Tank
10-328	Decal, Spray Star 1000	Right and Left Tank Sides
25-307	Decal, Gas	Gas Tank
25-352	Decal, Bypass Valve	Hang Tag
25-353	Decal, Spray Boss	Hang Tag
25-356	Decal, Tire Pressure	All Wheels
25-370	Decal, 88 dba	Console
16-228	Decal, Not a Motor Vehicle	Front Seat Panel
15-463	Decal, Spray Pump	Seat Panel

QUICK REFERENCE REPLACEMENT PARTS

REPLACEMENT FILTERS

15-626-01	Hydraulic Oil Filter	
78-090	Oil Filter	Kohler # 12 050 01
76-311	Air Filter Element	Kohler # 24 083 03
76-312	Pre-Cleaner	Kohler # 24-083-05
13-288	Key Switch	
76-310	Key Set	

REPLACEMENT BELTS

10-179	Belt
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SEAL KITS

51-111	Orbital
15-301-01	Repair Kit
10-135	Hydraulic Cylinder
14-267	Seal Kit
10-116	Wheel Motor
10-116-13	Seal Kit
10-117	Pump
14-098	Seal Kit
10-187	Hydraulic Cylinder
14-273	Seal Kit
42-220	2-Bank Hydraulic Valve
14-062	Seal Kit

FLUIDS

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

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 (.76 mm))
Spline Grease	#77 Assembly Paste (Kohler # 25 357 12-s)	

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

