



SUPREME LIQUID COOLED
35-000

SN: 101978

SUPREME AIR COOLED
36-000

SN: 201949

NOVEMBER 1999

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Reference

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

Read this manual and all other manuals pertaining to the Supreme 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 Supreme is located on the main frame under the seat hood. Refer to engine manual for placement of engine serial number.

For easy access record your Serial and Model numbers here.

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



Information needed when ordering replacement parts:

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

SAFE PRACTICES

1. It is your responsibility to read this manual and all publications associated with this machine (engine, accessories and attachments).
2. Never allow anyone to operate or service the machine or its attachments 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. 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. After engine has started, machine must not move. If movement is evident, the neutral mechanism is not adjusted correctly. Shut engine off and readjust so the machine does not move when in neutral position.
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 for any reason:
 - A. Disengage all drives.
 - B. Lower all attachments to the ground.
 - C. Set park brake.
 - D. Shut engine off and remove the ignition key.
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.

These machines are intended for professional maintenance on golf courses and baseball fields. Other use is forbidden.

WEIGHTS AND DIMENSIONS

Length	72" (183 cm)
Width	58" (147 cm)
Height	42" (107 cm)
Wheel Base	46" (117 cm)
Weight	1020 lbs (463 kg)Kawasaki LC 1020 lbs (463 kg) Kohler AC

SOUND LEVEL

At ear level	72 dB
At 3 ft (0.914 m)	75 dB
At 30 ft (9.14 m)	62 dB

ENGINE

Make	Kawasaki	Kohler
Model#	FD 620D BSO3	TH18S
Type / Spec#		PA-55271
Horsepower	20 hp (14.9kW)	18 hp (13.4 kW)
Fuel	Unleaded 87 Octane	Unleaded 87 Octane
	Gasoline Minimum	Gasoline Minimum
Cooling System	Liquid Cooled	Air Cooled
Lubrication System	Pressure Type	Full Pressure
Alternator	20 amp	15 amp

WHEELS & TIRE

Front: 21 x 11.00 x 8NHS 5 psi (.35 bar)
 Front tire filled to 60 lbs. total; 34.5 pints of windshield washer fluid or equivalent.
 Rear: 25 x 12.00 x 9TBC 5 psi (.35 bar)

SPEED

Forward Speed	0 to11 mph (0-18 kph)
Reverse Speed	0 to 5 mph (0-8 kph)

BATTERY

	Automotive Type 45-12 Volt
BCI Group	Size 45
Cold Cranking amps	480
Ground Terminal Polarity	Negative (-)
Maximum Length	9" (23 cm)
Maximum Width	5.38" (14 cm)
Maximum Height	9" (23 cm)

FLUID CAPACITY

Crankcase Oil	See Engine Manual
Fuel	15.6 quarts (14.8 liters)
Hydraulic Fluid	12.9 quarts (12.2 liters)
Grade of Hydraulic Fluid	SAE 10W-40 API Service SJ or higher Motor Oil

OPTIONAL EQUIPMENT

34-168	Sand Plow	13-606	Rake Assembly
34-188	Hydraulic Sand Plow (Factory Installed)	42-026	84" Stainless Steel Tournament Rake
34-189	Hydraulic Sand Plow (Dealer Installed)	42-128	72" Stainless Steel Tournament Rake
13-116	Weed Cultivator	13-298	Fan Rake For Sand Traps
13-199	Edger	34-190	Spiker
13-107	Infield Scarifier	34-191	Box Grader
13-577	Scarifier Vertical Blades	26-007	Professional Infield Finisher
13-438	Rake Assembly	26-008	Flex Action Field Finisher
		13-111	Drag Mat Kit (mat and carrier)

MAINTENANCE



CAUTION

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

NOTE:

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

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

LUBRICATION

Use No. 2 General purpose Lithium Base Grease and lubricate every 100 hours. The Supreme has two grease fittings. One is located on the belt idler arm and one on the rod end of the steering cylinder.

Every 500 hours of operation, separate the hydrostatic pump from 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 remount the pump to the engine, be certain the mating surface are clean and free of any foreign material and that the pump is correctly aligned.

AIR CLEANER ON ENGINE

1. Remove the thumb screws on top of the cover and remove the cover.
2. Carefully slide pre-cleaner off cartridge.

To service pre-cleaner, wash in liquid detergent and water. Squeeze dry in a clean cloth. Saturate in engine oil. Squeeze in clean, absorbent cloth to remove all excess oil. Replace if very dirty or damaged.

3. Carefully remove paper element to prevent debris from entering carburetor. To service, clean by tapping gently on flat surface. Do not oil paper element. Replace if very dirty or damaged.

NOTE: Do not use petroleum solvents, eg., kerosene, which will cause cartridge to deteriorate. Do not use pressurized air to clean cartridge. Pressurized air can damage cartridge.

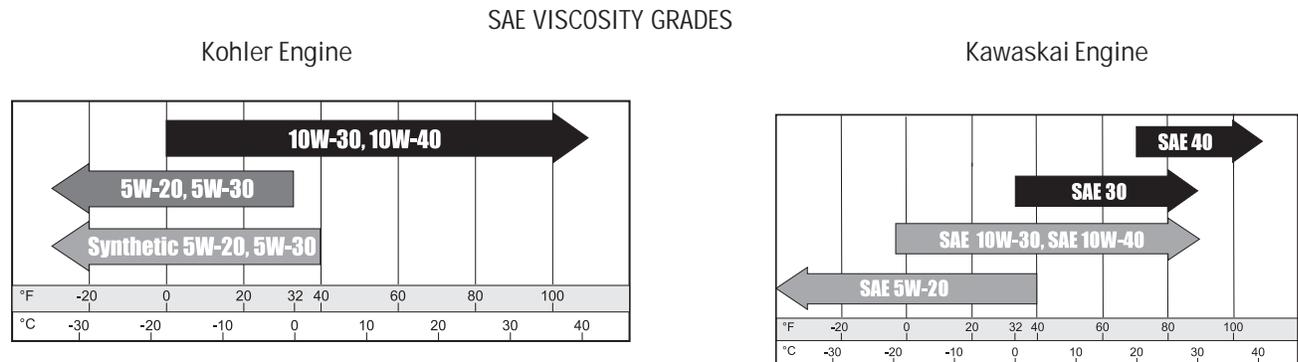
4. Re-install paper element.
5. Re-assemble the Pre-cleaner on the paper element.
6. Replace cover and reattach thumb screws.

TIRE PRESSURE

Caution must be used when inflating a low tire to recommended pressure. Over inflating can cause tires to explode. Tires should be 5 psi (0.35 bar). Improper inflation will reduce tire life considerably.

ENGINE OIL KAWASAKI

Change and add oil according to chart below. Do not overfill. Use a high quality detergent oil. For Kawasaki engine API Service Classification: SJ or higher. For Kohler engine use oil classified "For Service SJ or higher." Use no special additives with recommended oils. Do not mix oil with gasoline.



Starting Temperature Range Anticipated Before Next Oil Change

Use of multi-viscosity oils (10W-30, etc) will result in increased oil consumption. Check oil level more frequently if using these types of oils.

HYDRAULIC OIL

1. Use SAE 10W-40 API Service SJ or higher motor oil.
2. For proper warranty, change oil every 500 hours or annually, which ever is first and change filter after the first 20 hours, then at 100 hours, then every 250 hours thereafter.
3. The oil level should be 2" to 2¹/₂" from top of tank when fluid is cold. Do not overfill.
4. After changing oil and/or filter, run the machine for a few minutes. Check oil level and for leaks.
5. Always use 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 natural color of fluid is now 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 and filter immediately after fluid is cool and find cause. Take fluid level readings when system is cold.
9. In extreme temperatures you can use straight weight oil. We recommend SAE 30W API Service SJ or higher when hot (above 90°F (33°C)) and SAE 10W API Service SJ or higher when cold (below 32°F (0°C) ambient temperature. Use either motor oil or hydraulic oil, but do not mix.
10. Oil being added to the system must be the same as what is already in the tank. Mark tank fill area as to which type you put in.

TOWING

When it is necessary to move the Supreme without engine running, by-pass valve built into hydrostatic pump must be "open" by truning it counter-clockwise. The valve is located on top of the pump on the liquid cooled (Kawasaki) and the bottom of the pump on the air cooled (Kohler). An "open" valve allows fluid to pass through the wheels freely. When normal, driven, operation is desired, valve should be "closed" by turning it clockwise. Failure to "close" the valve with engine running means no power to wheels.

MAINTENANCE (CONTINUED)

WHEEL MOUNTING PROCEDURE

1. Set park brake. Turn machine off and remove key.
2. Block one of the other wheels.
3. Loosen nuts slightly on wheel to be removed.
4. Jack up machine being careful not to damage underside of machine.
5. Remove nuts. Remove wheel.
5. Place new wheel on hub lining up bolt holes.
6. Torque nuts to 64-74 ft/lb (87-100 Nm) 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.



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

JUMP STARTING

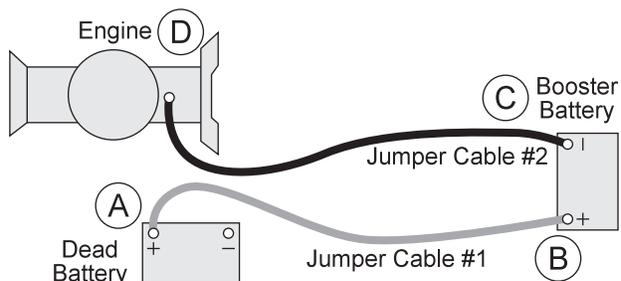


Use of booster battery and jumper cables. Particular care should be used when connecting a booster battery. Use proper polarity in order to prevent sparks.

To jump start (negative grounded battery):

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

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



SERVICE CHART



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	C	R	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)		R	C	C		R	C	R
‡ Air-Cleaner (Foam Element every 25 hours)		R	C	C	C	R	C	R
Spark Plugs (Clean and Gap/Replace)		R	C	C		C	C	R
Valve Clearance								C
Idle Speed		C			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 (AC On)	Every 500 hours							

C=Check or Clean at specified intervals

R=Replace at specified intervals

* Tire pressure: 5 psi (0.35 bar)

† 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 (87-100 Nm))

⌘ Kawasaki change oil after first 8 hours. Kohler change oil after first 5 hours.

£ Change oil every 25 hours when operating under heavy load or in high ambient temperatures.

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

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

END USER'S SERVICE CHART

	Daily	As Required	100 Hours	200 Hours	250 Hours	300 Hours	400 Hours	Every 500 Hours/Yearly
⌘ Engine Oil								
Engine Oil Filter								
Engine for Leaks and Loose Parts								
‡ Air Cleaner (Paper Element)								
‡ Air-Cleaner (Foam Element every 25 hours)								
Spark Plugs (Clean and Gap/Replace)								
Valve Clearance								
Idle Speed								
‡ Cooling System								
Belts and Hoses								
* Tire Pressure								
Visual Inspection of Tires								
Fuel Level								
Fuel Filter								
Hydraulic Oil								
† Hydraulic Oil Filter								
Hydraulic System for Leaks and Loose Parts								
Battery Electrolyte Level								
Clean Battery Terminals								
§ Torque Lug Nuts								
Lubricate								
Lubricate Splines on Hydrostatic Pump (AC Only)								

C=Check or Clean at specified intervals

R=Replace at specified intervals

* Tire pressure: 5 psi (0.35 bar)

† 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 (87-100 Nm))

⌘ Kawasaki change oil after first 8 hours. Kohler change oil after first 5 hours.

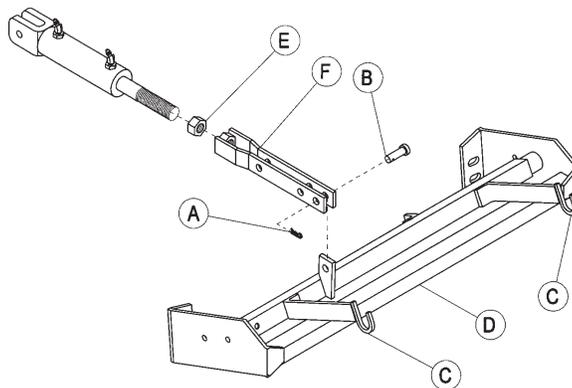
£ Change oil every 25 hours when operating under heavy load or in high ambient temperatures.

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

ADJUSTMENTS

RAKE LIFT CYLINDER

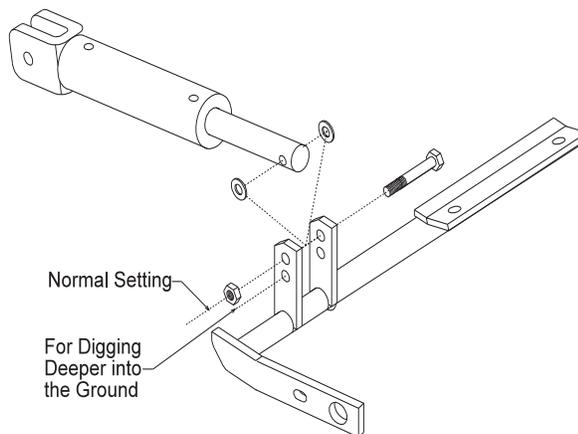
Completely lower Rake Lift. Remove cotter pin (A) and clevis pin (B). Place attachment lift arms (C) at $\frac{1}{16}$ " above cross member (D) on Rake Lift. Loosen jam nut (E). Twist cylinder extension (F) so clevis pin end of cylinder extension lines up with holes in attachment lift arm. Replace clevis and cotter pins. Tighten jam nut. Raise and lower Rake Lift to check for proper clearance.



When the rear rake attachment is lowered while the machine is in forward motion, the forward speed of the machine will slow drastically. Operator should be prepared for a rapid change in speed.

LIFT ASSEMBLY

When it is necessary to have attachment lift dig deeper or lower into ground, relocate cylinder rod of hydraulic cylinder which controls the lift distances, into lower set of holes in attachment lift swing arm. This new position forces attachment farther down.

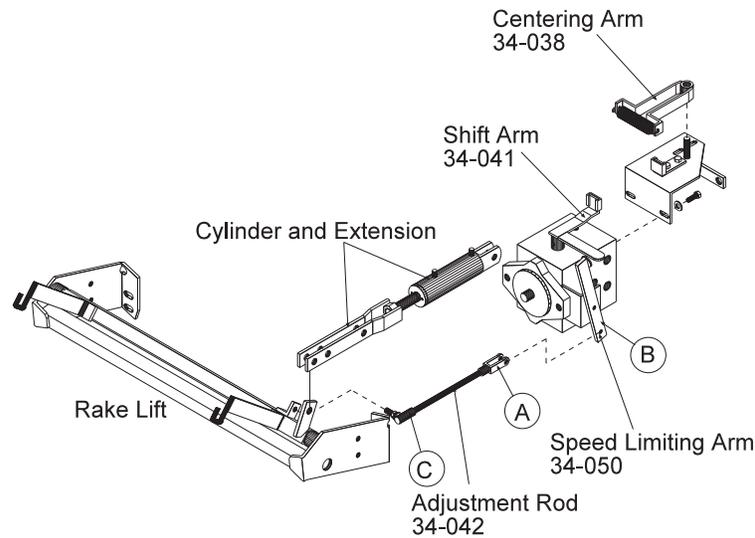


PARK BRAKE

By turning knob on end of lever you can tighten or loosen brake a small amount. If this is not enough turn clevis on brake cable to adjust length of cable.

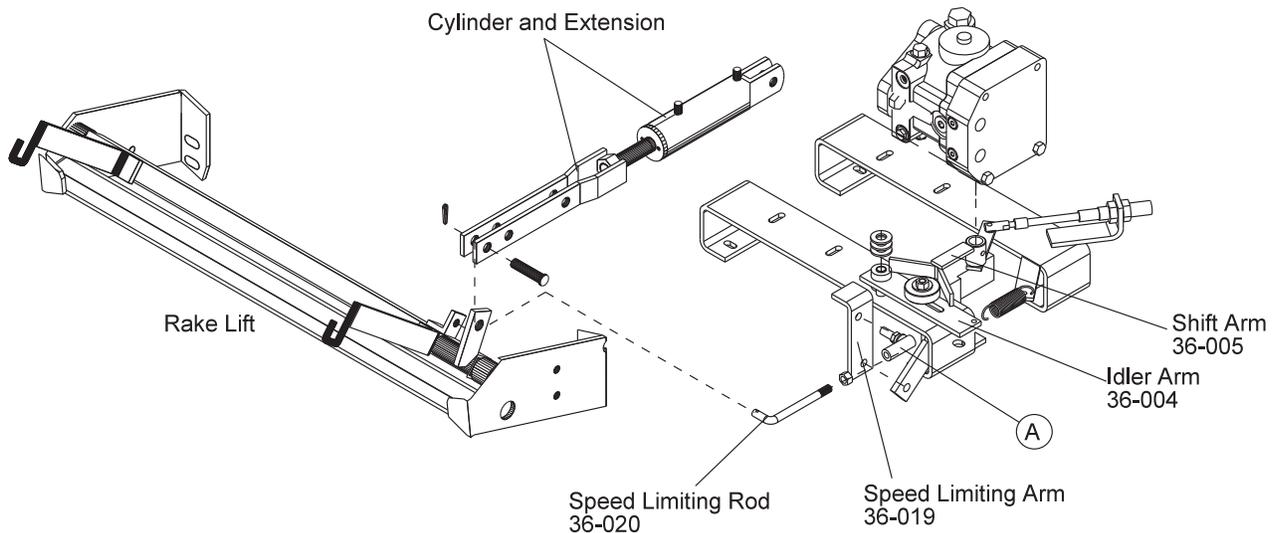
SPEED BOSS (KAWASAKI LIQUID COOLED)

Speed Boss allows the machine to operate at a proper speed while raking sand traps on golf courses. This speed boss has been factory set at an average speed of 3-4 mph (5-6.5 kph). The Speed Boss will only limit the speed while the rake is lowered into the operating position. The speed setting may be adjusted by removing the Yoke(A) from the Limiting Arm(B). Then loosen Jam Nut by ball fitting and Adjustment Rod(C). Turn Ball Joint clockwise to make the machine operate slower or turn counter clockwise to go faster. Tighten jam nut. Connect ball joint to limiting arm. Check to make sure nothing is binding and test drive to check desired speed.



SPEED BOSS (KOHLER AIR COOLED)

Speed Boss allows the machine to operate at a proper speed while raking sand traps on golf courses. This speed boss has been factory set at an average speed of 3-4 mph (5-6.5 kph). The Speed Boss will only limit the speed while the rake is lowered into the operating position. The speed setting may be adjusted by turning the Ball Joint(A) clockwise to make the machine operate slower or turn counter clockwise to go faster. Tighten jam nut. Check to make sure nothing is binding and test drive to check desired speed.

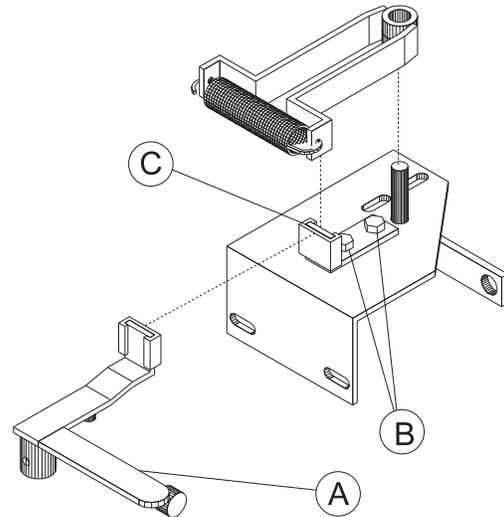


ADJUSTMENTS (CONTINUED)

WHEEL 'CREEP' ADJUSTMENT (KAWASAKI LIQUID COOLED)

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

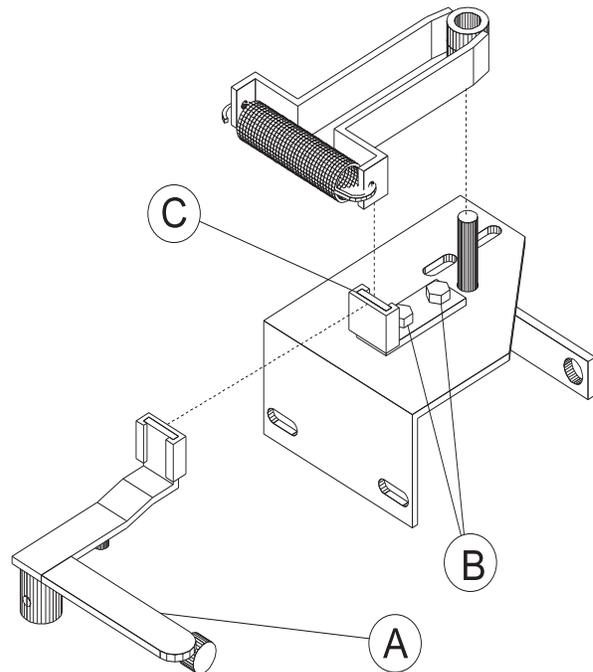
1. Lift up and support machine so all wheels are off the ground and can turn freely.
2. At rear of machine, on top of the hydrostatic transmission is the shift arm (A). Loosen bolts (B).
3. With engine running move stop (C) so it moves shift arm (A) to center and wheel creep stops.
4. Tighten all fasteners and test by using foot pedal linkage to see that the "creep" is removed.
5. Turn engine off and lower machine



WHEEL 'CREEP' ADJUSTMENT (KOHLER AIR COOLED)

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

1. Lift up and support machine so all wheels are off the ground and can turn freely.
2. At rear of machine, on the bottom of the hydrostatic transmission is the idler arm (B). Loosen bolt (A).
3. With engine running move ball bearing (C) so it centers on shift arm (D) and wheel creep stops.
4. Tighten all fasteners and test by using foot pedal linkage to see that the "creep" is removed.
5. Turn engine off and lower machine



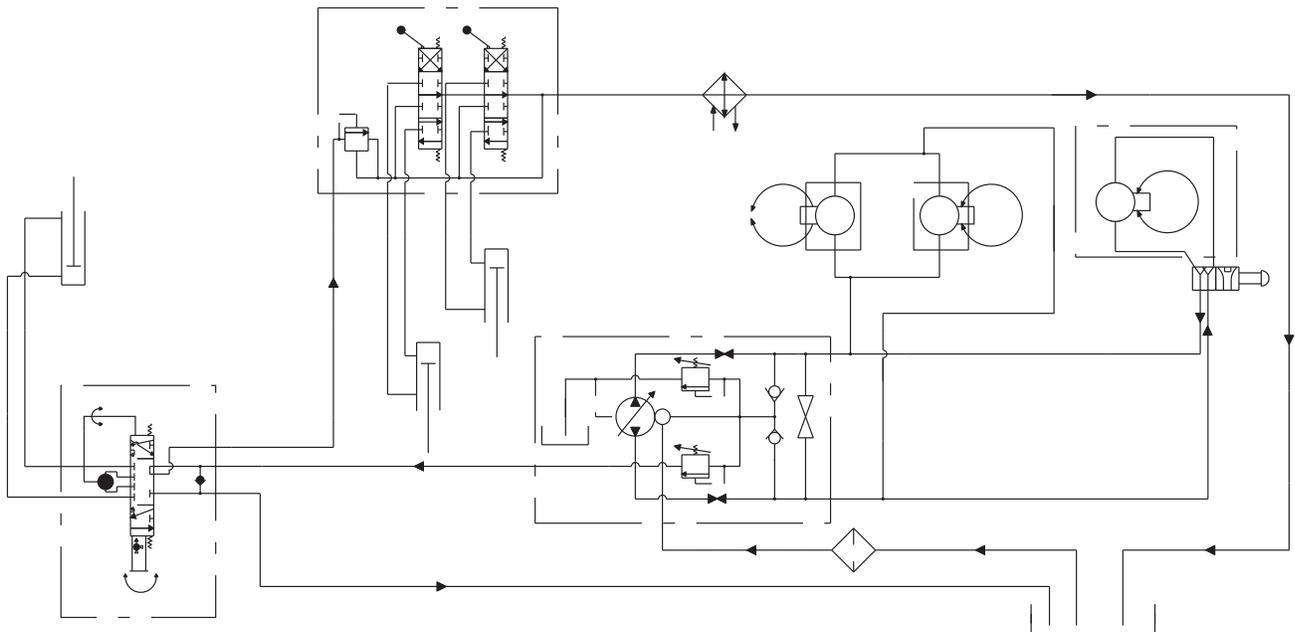
Engines stored over 30 days should be completely protected or drained of fuel to prevent gum from forming in a fuel system or on essential carburetor parts.

1. Clean every part of engine.
2. Be sure the engine key switch positioned at "OFF".
3. Close the fuel valve and remove the sediment bowl.
4. Put a pan under the fuel valve to receive the drained fuel, and open the fuel valve to drain the fuel from the fuel tank completely.
5. Install the sediment bowl.
6. Put a pan under the carburetor and loosen the drain screw of the carburetor to drain the fuel completely.
7. Tighten the drain screw.
8. Remove the spark plug and pour approximately 1-2mL (.06-.1 cu.in) of engine oil through the spark plug hole and then screw the spark plug in after running the engine a few times. Slowly turning the engine until you feel compression and then leave it there.
9. This blocks the air from coming into the cylinder and prevents rust inside the engine.
10. Change engine oil for next use after period of storage.
11. Wipe the body with an oily cloth.
12. Wrap the engine with plastic sheeting and store it in a dry place.



Drain the fuel in a well ventilated area. Store the drained fuel in a separate area.

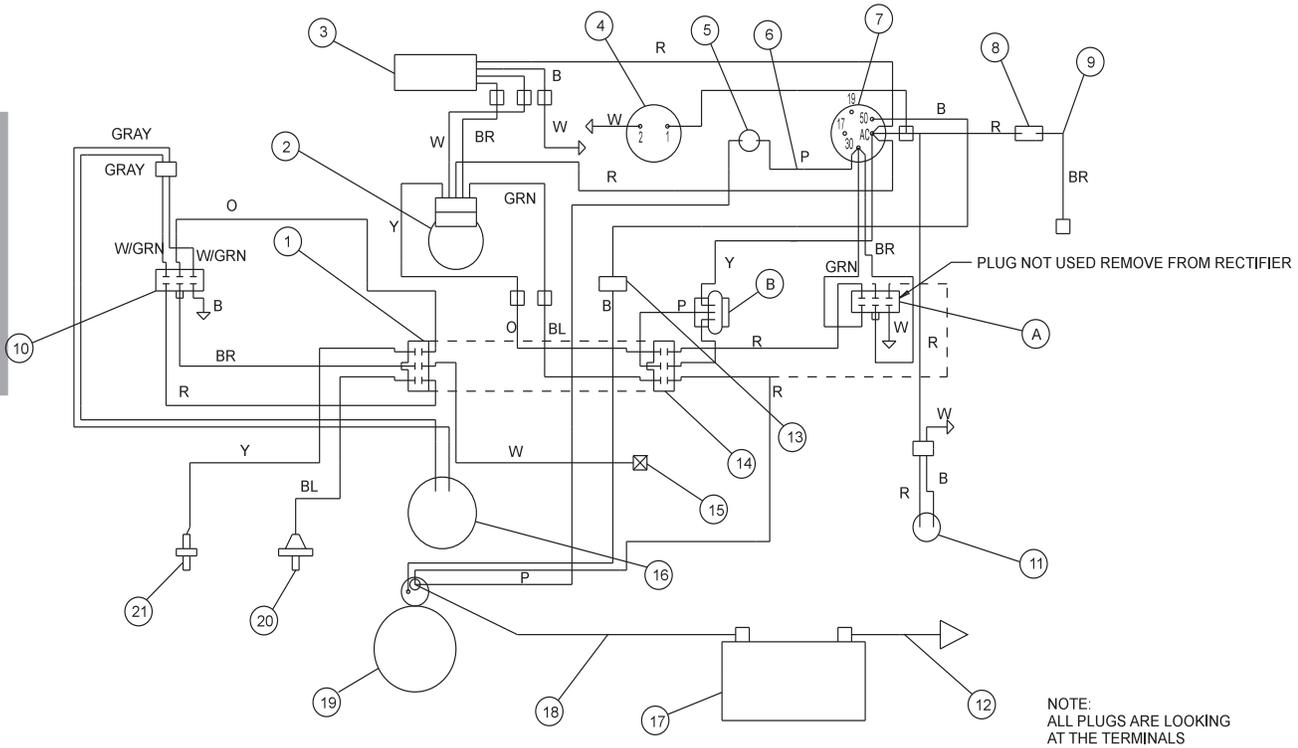
HYDRAULIC SCHEMATIC



WIRING DRAWING (KAWASAKI LIQUID COOLED)

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

Diagrams



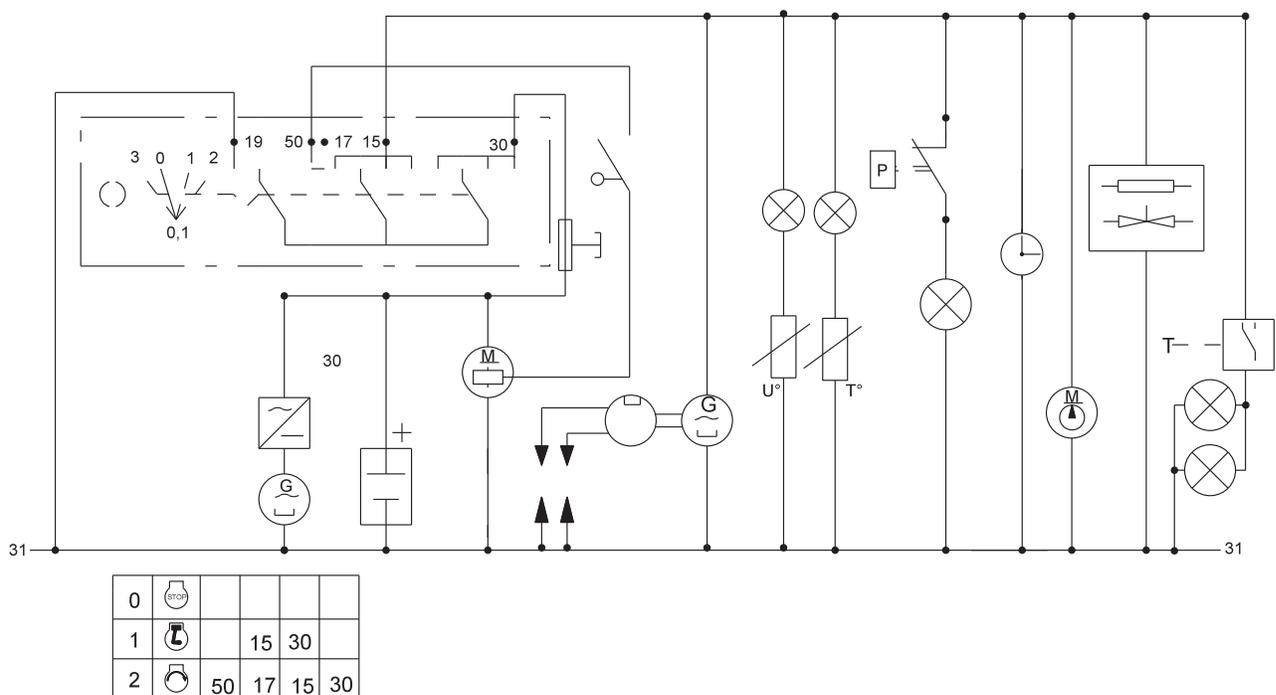
NOTE:
ALL PLUGS ARE LOOKING
AT THE TERMINALS

WIRING PARTS LIST (KAWASAKI LIQUID COOLED)

REF #	PART #	DESCRIPTION	QUANTITY
1		Plug-In Connector (Engine Wire Harness)	
2	34-205	Cluster Gauge	1
3	34-206	Low Battery Indicator Module with Wires	1
	33-096	Low Battery Indicator Module(only)	
4	12-017	Hour Meter	1
5	34-146	Circuit Breaker	1
	34-145	Circuit Breaker Boot	1
6	34-204	Wire Circuit Breaker To Switch # 30	1
7	17-068	Ignition Switch	1
	17-079	Key (only)	
8	12-003	Light Switch	1
	15-472	Boot	1
9	34-203	Wire Light Switch To Lights	1
10		Regulator Plug (Part of Engine)	
11		Fuel Pump (Part of Engine)	
12	22-054	Black Battery Cable (Battery to Ground)	1
13	22-002	Interlock Switch	1
14		Plug-In Connector (Main Wire Harness)	
15		Ignition (Part of Engine)	
16		Charging Coils (Part of Engine)	
17	22-073	Battery	1
18	50-323	Red Battery Cable (Battery to Starter)	1
19		Starter (Part of Engine)	
20		Oil Sender (Part of Engine)	
21		Temperature Sender (Part of Engine)	
	22-017	Ground Strap (Engine Frame to Main Frame)	1
	34-150	Wire Harness (contains all wires except Ref 6 & Ref 9)	1

Diagrams

WIRING SCHEMATIC

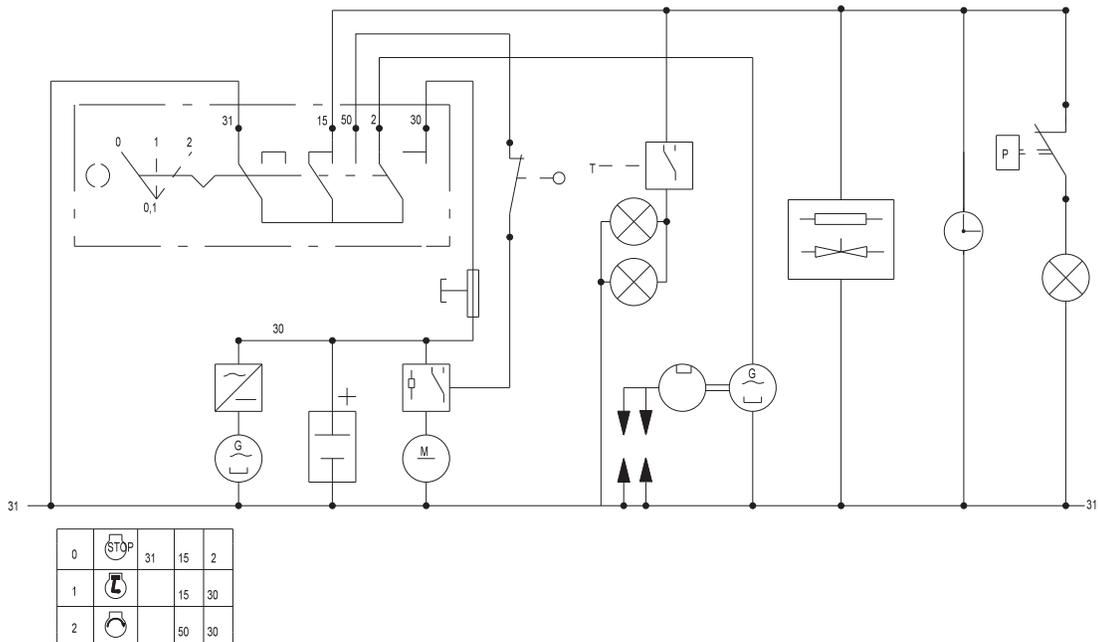


WIRING PARTS LIST (KOHLER AIR COOLED)

REF #	PART #	DESCRIPTION	QUANTITY
1	50-359	Oil Pressure Warning Indicator Light	1
	8874	Line Connector	1
	8875	Bullet Terminal	1
2	22-002	Interlock Switch	1
3	13-288	Key Switch with Hardware(Kohler # 25 099 04)	1
	76-310	Key Set	1
4	34-146	Panel Mount Circuit Breaker	1
	34-145	Circuit Breaker Boot	1
5	12-017	Hour Meter	1
6		Plug-In Connector (Wire Harness & Engine Wire Harness)	
7		Ignition Module (Part of Engine)	
8		Fuel Shut-Off Solenoid (Part of Engine)	
9		Rectifier (Part of Engine)	
10		Oil Sender (Part of Engine)	
11		Starter (Part of Engine)	
12	75-518	Red Battery Cable	1
13	22-073	Battery	1
14	22-054	Black Battery Cable	1
15	42-113	Cranking Relay (Part of Engine Kohler # 25 435 02)	
	36-002	Wire Harness (Includes all wire colors with *)	1

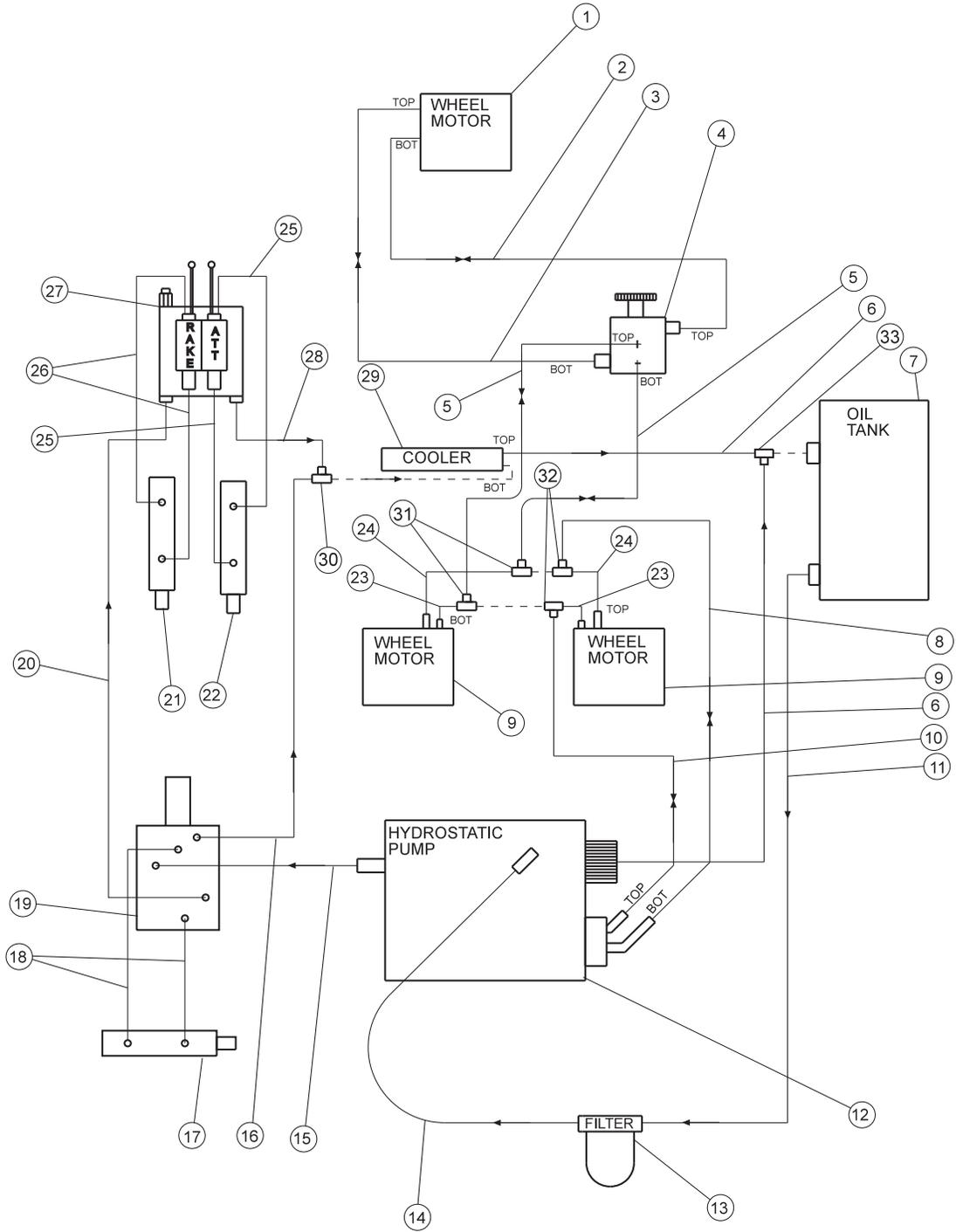
Diagrams

WIRING SCHEMATIC



HYDRAULIC DRAWING (KAWASAKI LIQUID COOLED)

Diagrams



HYDRAULIC PARTS LIST (KAWASAKI LIQUID COOLED)

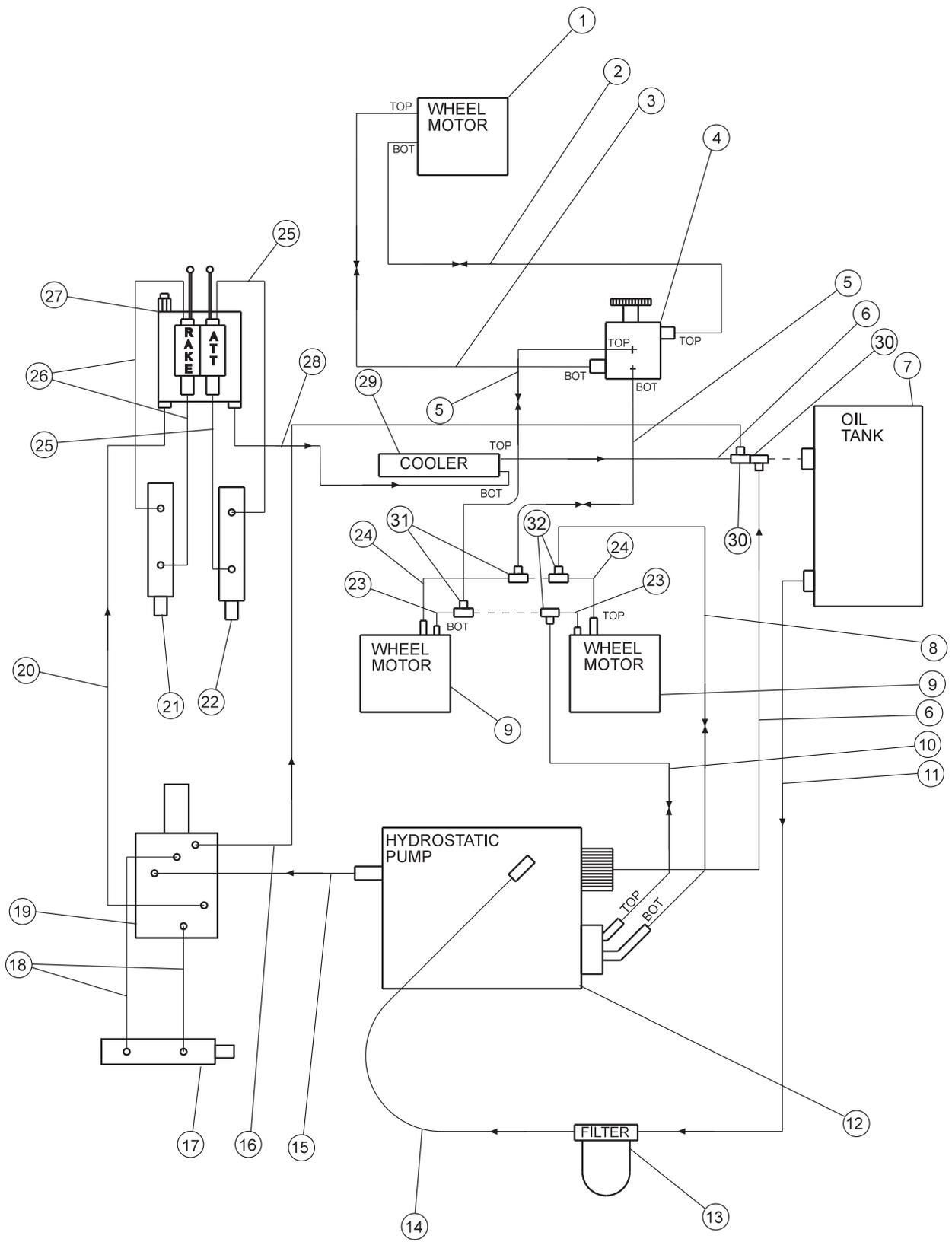
REF #	PART #	DESCRIPTION	QUANTITY
1	13-032	Wheel Motor	1
2	13-424	Hydraulic Hose	1
3	13-425	Hydraulic Hose	1
4	13-409	On-Off Valve	1
5	34-174	Hydraulic Hose	2
6	34-140	Hydraulic Hose	2
7	13-584	Oil Tank	1
	23-095	Filler Breather	1
8	34-171	Hydraulic Hose	1
9	34-102	Wheel Motor	2
10	34-170	Hydraulic Hose	1
11	8832-6	Hose	1
	18-222	Hose Clamp	2
12	34-109	Hydrostatic Pump	1
13	23-006	Oil Filter	1
	23-031	Replacement Filter Only	
14	8832-13	Suction Hose	1
	18-222	Hose Clamp	2
15	34-131	Hydraulic Hose	1
16	34-132	Hydraulic Hose	1
17	75-714	Cylinder (steering)	1
18	34-130	Hydraulic Hose	2
19	34-103	Orbitrol Motor	1
20	34-133	Hydraulic Hose	1
21	13-357	Hydraulic Cylinder	1
22	13-292	Hydraulic Cylinder	1
23	34-172	Hydraulic Tube (short)	2
24	34-173	Hydraulic Tube (long)	2
25	34-144	Hydraulic Hose	2
26	34-136	Hydraulic Hose	2
27	13-261	Hydraulic Valve (2 bank)	1
	34-110	Valve Handle Set (2 bank)	1
28	34-142	Hydraulic Hose	1
29	34-105	Oil Cooler	1
30	18-190	Tee	1
31	34-057	Tee	2
32	34-058	Swivel Tee	2
33	17-018	Tee, Male Branch	1

HYDRAULIC PRESSURES

Pump Displacement	.913 in. ³ / rev
Pump Input Speed (up to)	3600 rpm
Max. Operating Pressure	3500 psi, 4500 Peak psi
Charge Pump Displacement	.33 in. ³ / rev
Max. Inlet Vacuum	5 in. Hg
Max. Case Pressure	25 psi
Implement Setting	700 - 1000 psi
Relief Valve Pressure (set at)	3600 psi
13-261 Hydraulic Valve (2 bank)	1500 psi

HYDRAULIC DRAWING (KOHLER AIR COOLED)

Diagrams



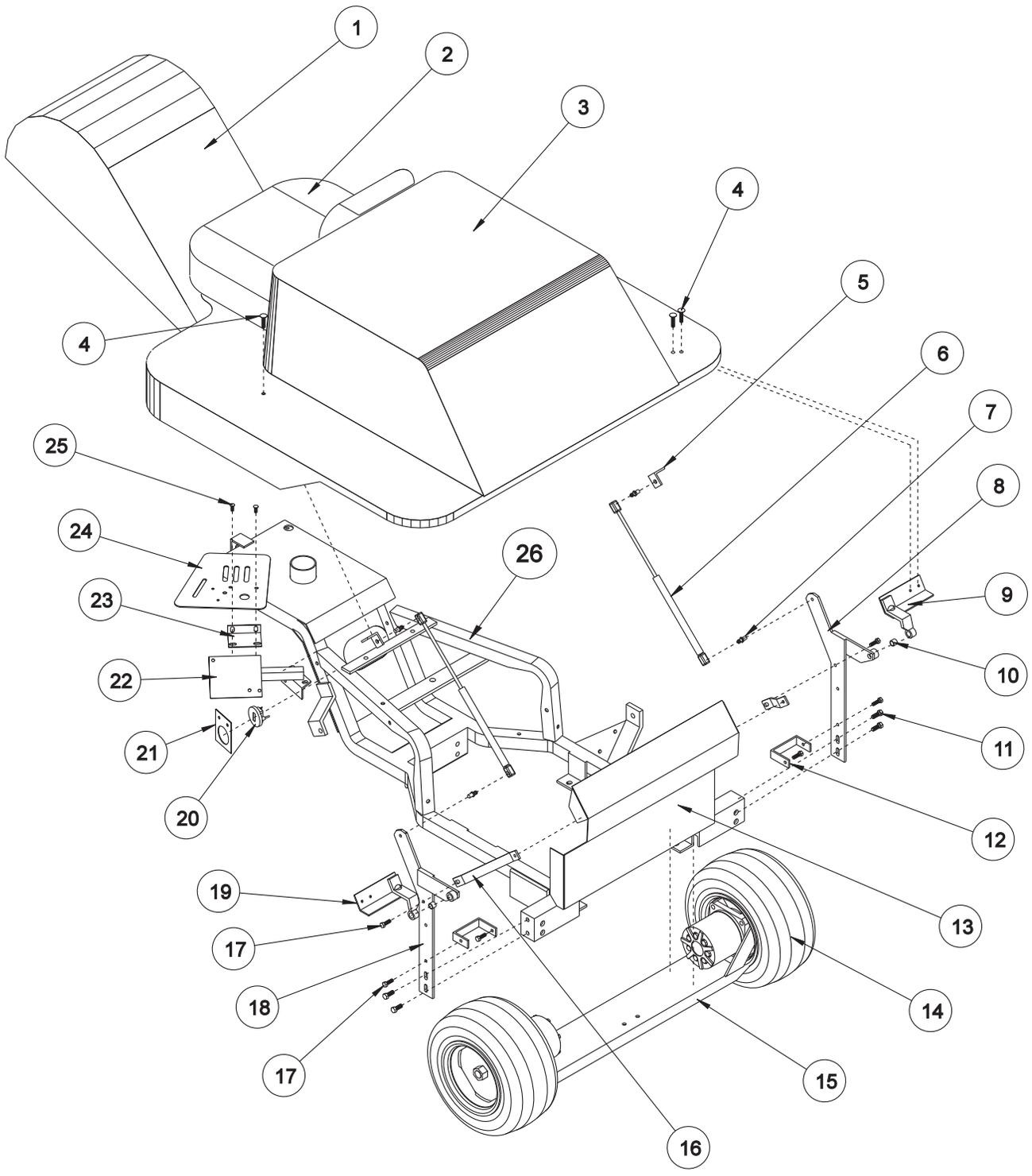
HYDRAULIC PARTS LIST (KOHLER AIR COOLED)

REF #	PART #	DESCRIPTION	QUANTITY
1	13-032	Wheel Motor	1
2	13-424	Hydraulic Hose	1
3	13-425	Hydraulic Hose	1
4	13-409	On-Off Valve	1
5	34-174	Hydraulic Hose	2
6	34-140	Hydraulic Hose	2
7	13-584	Oil Tank	1
	23-095	Filler Breather	1
8	34-171	Hydraulic Hose	1
9	34-102	Wheel Motor	2
10	34-170	Hydraulic Hose	1
11	8832-32	Hose ³ / ₄	1
	18-222	Hose Clamp	2
12	42-003	Hydrostatic Pump	1
13	23-006	Oil Filter	1
	23-031	Replacement Filter Only	
14	8917-18	Suction Hose ⁵ / ₈	1
15	34-131	Hydraulic Hose	1
16	34-132	Hydraulic Hose	1
17	75-714	Cylinder (steering)	1
18	34-130	Hydraulic Hose	2
19	34-103	Orbitrol Motor	1
20	34-133	Hydraulic Hose	1
21	13-357	Hydraulic Cylinder	1
22	13-292	Hydraulic Cylinder	1
23	34-172	Hydraulic Tube (short)	2
24	34-173	Hydraulic Tube (long)	2
25	34-144	Hydraulic Hose	2
26	34-136	Hydraulic Hose	2
27	13-261	Hydraulic Valve (2 bank)	1
	34-110	Valve Handle Set (2 bank)	1
28	34-142	Hydraulic Hose	1
29	34-105	Oil Cooler	1
30	18-190	Swivel Tee	2
31	34-057	Tee	2
32	34-058	Swivel Tee	2

HYDRAULIC PRESSURES

Pump Displacement	.913 in. ³ / rev
Pump Input Speed (up to)	3600 rpm
Max. Operating Pressure	3500 psi, 4500 Peek psi
Charge Pump Displacement	.33 in. ³ / rev
Max. Inlet Vacuum	5 in. Hg
Max. Case Pressure	25 psi
Relief Valve Pressure (set at)	3600 psi
13-261 Hydraulic Valve (2 bank)	700 psi

MAIN DRAWING



Parts

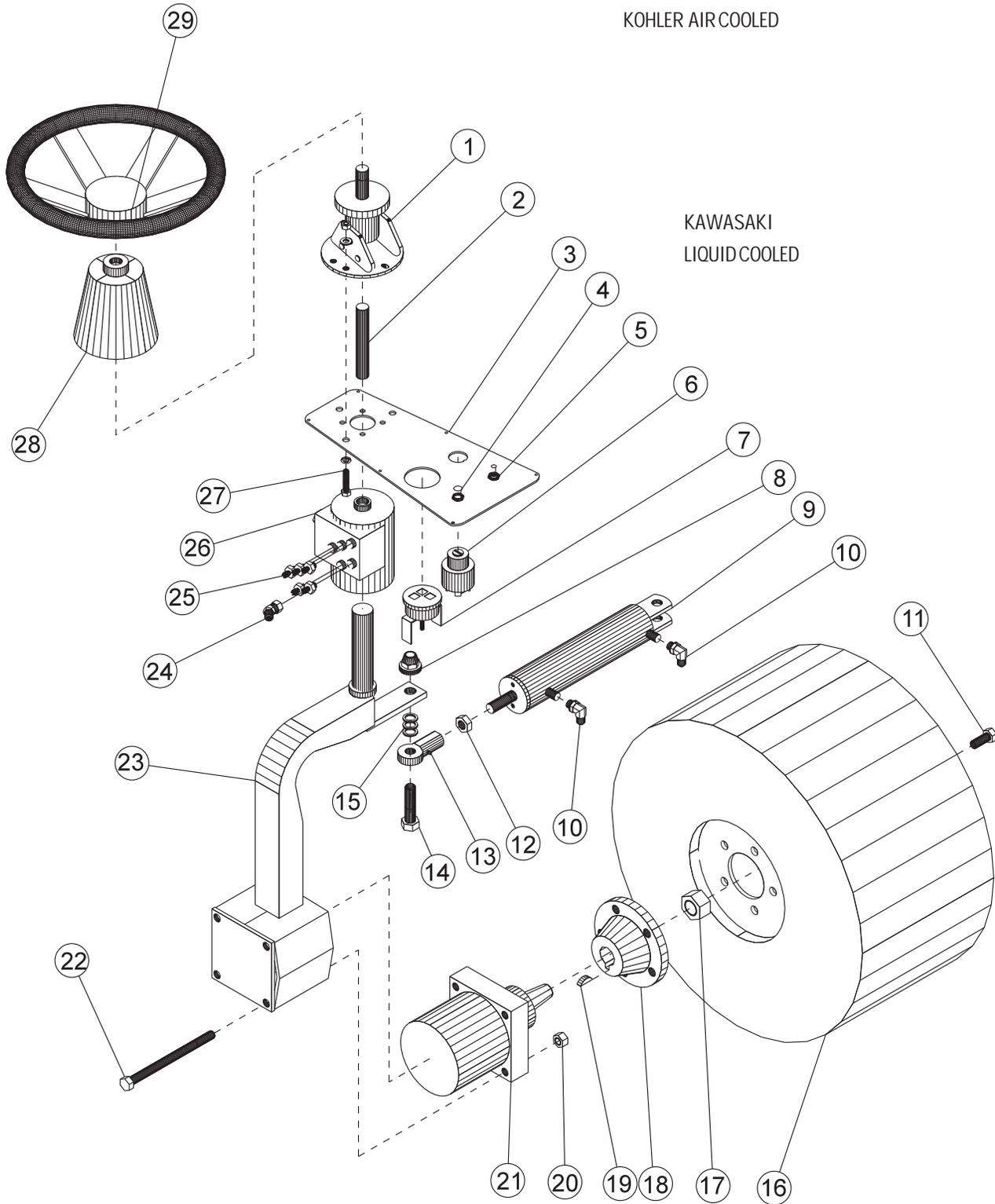
MAIN PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	34-155	Nose Cone	1
2	76-285	Seat Asssembly	1
	27-058	Trash Bag	1
	27-058-01	Screws for Trash Bag	2
3	34-157	Rear Engine Cover(Kawasaki Liquid Cooled)	1
	36-022	Rear Engine Cover(Kohler Air Cooled)	1
4	HST-516-18-150	Truss Head Machine Screw $\frac{5}{16}$ - 18 x 1 $\frac{1}{2}$	6
	HWL-516	Lockwasher $\frac{5}{16}$	6
	HN-516-18	Nut $\frac{5}{16}$ - 18	6
5	10-299	Shock Mount	2
6	13-569	Gas Spring 60#	2
7	26-034	Ball Stud 10MM	4
8	34-183	Right Hood Support	1
9	34-185	Right Hinge Bracket	1
	HCP-12-200	Clevis Pin $\frac{1}{2}$ x 2	2
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	2
	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	2
10	18-234	Oilite Bushing	4
11	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	4
	HW-38	Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
12	34-196	Bottom Belt Guard Bracket (liquid cooled)	2
13	34-027	Belt Guard (liquid cooled)	1
14	34-113	Tire and Wheel	2
	34-113-01	Tire	2
	34-113-02	Wheel	2
15	34-010	Rear Axle	1
16	34-195	Top Belt Guard Bracket (liquid cooled)	2
17	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1 (liquid cooled)	8
	HW-516	Washer $\frac{5}{16}$ (liquid cooled)	8
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18 (liquid cooled)	8
18	34-184	Left Hood Support	1
19	34-186	Left Hinge Bracket	1
20	12-017	Hour Meter (liquid cooled)	1
21	34-046	Hour Meter Bracket (liquid cooled)	1
22	34-227	2-Way Valve Mount	1
	HB-38-16-250	Bolt $\frac{3}{8}$ - 16 x 2 $\frac{1}{2}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
23	34-228	Control Panel Bracket	1
	HB-38-16-250	Bolt $\frac{3}{8}$ - 16 x 2 $\frac{1}{2}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
24	34-034	Control Panel	1
	34-181	Decal Control Panel	1
25	HST-14-20-075	Truss Head Machine Screw $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HW-14	Washer $\frac{1}{4}$	2
	HWL-14	Lockwasher $\frac{1}{4}$	2
	HN-14-20	Nut $\frac{1}{4}$ - 20	2
26	34-018	Main Frame	1

FRONT FORK DRAWING

KOHLER AIR COOLED

KAWASAKI
LIQUID COOLED



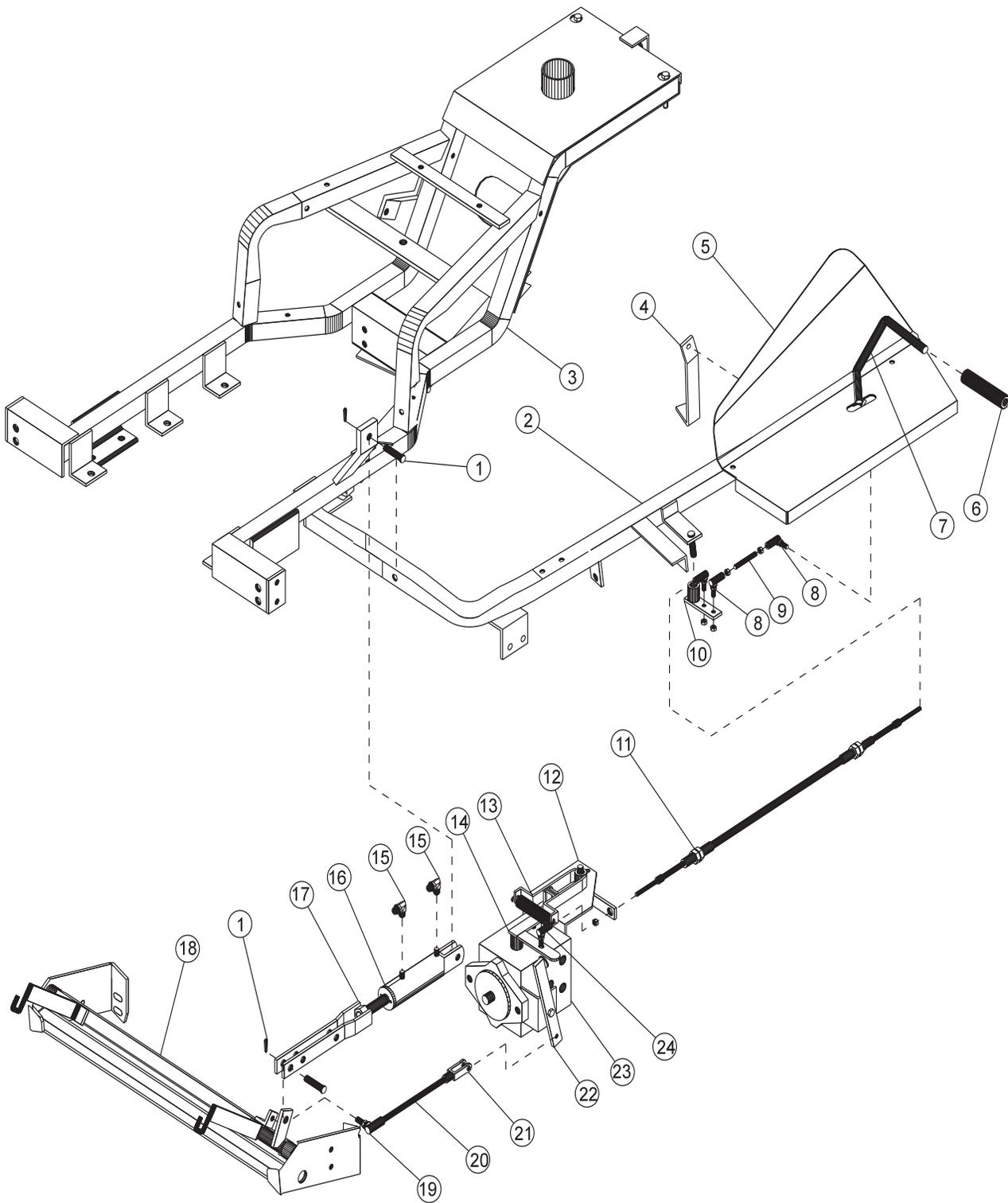
Parts

FRONT FORK PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	76-293	Tilt Steering Mechanism	1
2	34-167	Stub Shaft	1
3	34-049	Dashboard (liquid cooled)	1
	HSA-8-100	Tapping Screw #8 x 1	6
	34-180	Decal, Dashboard	1
4	34-146	Panel Mount Circuit Breaker	1
	34-145	Circuit Breaker Boot	1
5	12-003	Toggle Switch (liquid cooled)	1
	15-472	Switch Boot (liquid cooled)	1
6	17-068	Key Switch (liquid cooled)	1
7	33-094	Cluster Gauge with Wiring(Alt-Oil-Temp) liquid cooled	1
8	HNTL-58-18	Lock Nut $\frac{5}{8}$ - 18	1
9	75-714	Hydraulic Cylinder 2" OD x 7	1
10	18-169	Elbow $\frac{3}{8}$ Straight Thread	2
11	60-268	Adapter $\frac{3}{8}$	5
12	HNJ-58-18	Jam Nut $\frac{5}{8}$ - 18	1
13	18-154	Rod End	1
14	HB-58-18-250	Bolt $\frac{5}{8}$ - 18 x 2 $\frac{1}{2}$	1
15	HMB-58-14	Machine Bushing $\frac{5}{8}$ x 14GA	3
16	11-005	Tire and Wheel(front tire and wheel filled to 60lbs. total)	1
	11-005-01	Tire 21 x 11.00 x 8	1
	11-005-02	Wheel	1
	8839	Windshield Washer Fluid or Equivalent	34.5 pints
17	14-265	Nut 1 - 20	1
18	13-033	Hub	1
19	HWK-516-075	Woodruff Key $\frac{5}{16}$ x $\frac{3}{4}$	1
20	HNCL-12-13	Center Lock Nut $\frac{1}{2}$ - 13	4
21	13-032	Wheel Motor	1
	18-171	Seal Lock $\frac{3}{8}$	2
	18-172	Reducer $\frac{5}{8}$ x $\frac{3}{8}$	2
22	HB-12-13-700	Bolt $\frac{1}{2}$ - 13 x 7	4
23	34-012	Front Fork	1
	20-141	Spacer	2
	20-142	Oil Seal	2
	20-143	Bearing	2
	76-301	Rubber Cap	1
25	18-169	Adapter $\frac{3}{8}$ SAE	5
26	34-103	Orbitrol	1
27	HB-516-18-150	Bolt $\frac{5}{16}$ - 18 x 1 $\frac{1}{2}$	3
	HW-516	Washer $\frac{5}{16}$	3
	HWL-516	Lockwasher $\frac{5}{16}$	3
	HN-5/16-18	Nut $\frac{5}{16}$ - 18	3
28	76-294	Black Boot	1
29	15-030	Steering Wheel	1
	HWK-316-075	Woodruff Key $\frac{3}{16}$ - $\frac{3}{4}$	1
	HNJ-58-18	Jam Nut $\frac{5}{8}$ - 18	1
30	36-012	Dashboard (air cooled)	1
	36-014	Decal Dashboard	1
31	50-359	Warning Indicator Light (air cooled)	1
32	13-288	Ignition Switch (air cooled) (Kohler # 25 099 04)	1
33	12-017	Hour Meter (air cooled)	1



RIGHT FLOORBOARD DRAWING

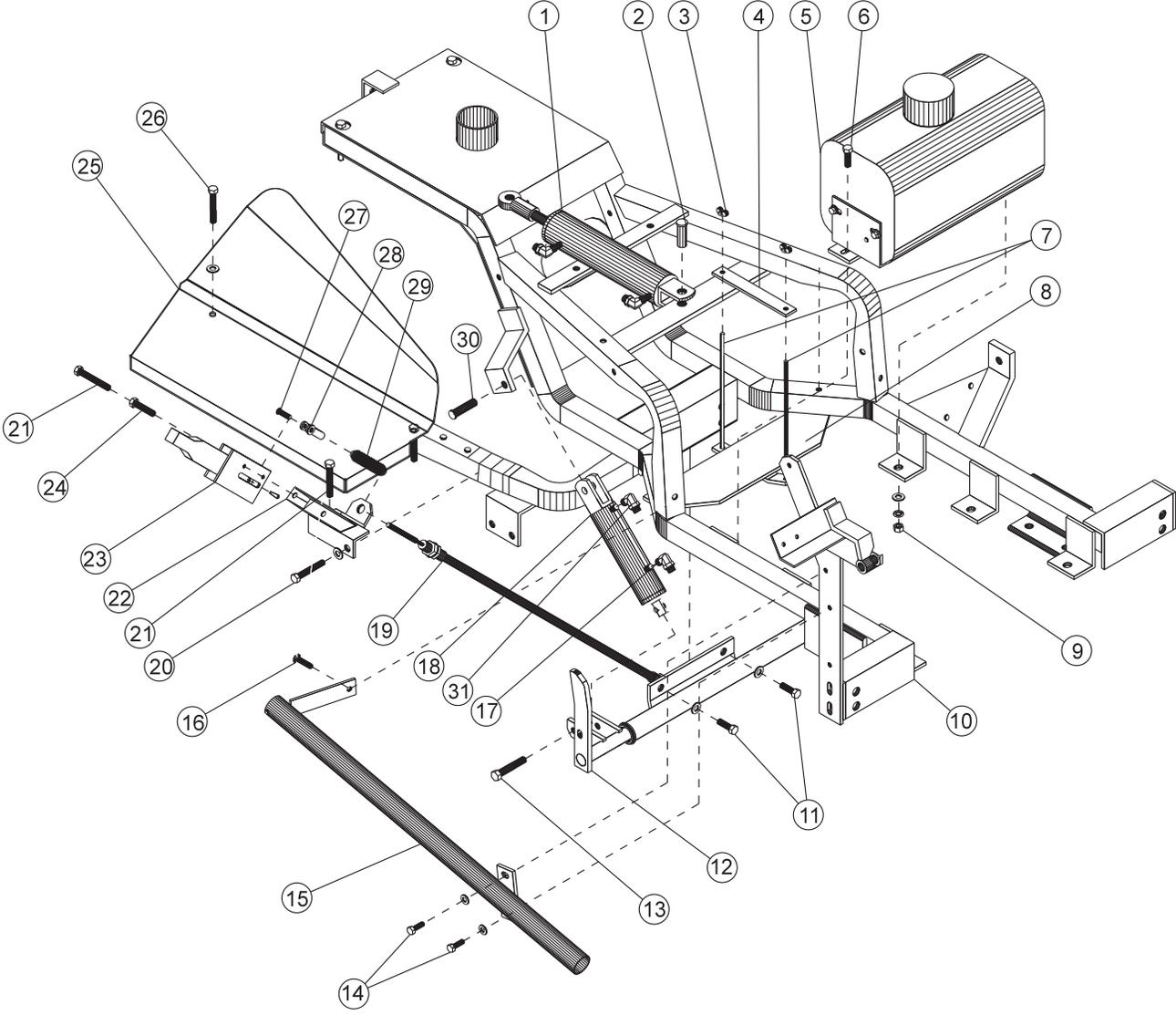


Parts

RIGHT FLOORBOARD PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HCP-12-150	Clevis Pin 1/2 x 1 1/2	2
	HP-18-100	Cotter Pin 1/8 x 1	2
2	34-016	Floorboard Support	1
3	34-018	Main Frame	1
4	34-017	Right Floorboard Support	1
	HB-38-16-250	Bolt 3/8 - 16 x 2 1/2	2
	HNTL-38-16	Lock Nut 3/8 - 16	2
5	34-013	Right Floorboard	1
	34-207	Rubber Matting Right Hand	1
6	48-066	Pedal Pad Long	1
7	34-225	Foot Pedal	1
	34-226	Shoulder Bolt	1
	HW-516	Washer 5/16	1
	HNCL-516-18	Center Lock Nut 5/16 - 18	1
8	21-462	Ball Joint 5/16 - 24	2
	HWL-516	Lock Washer 5/16	2
	HN-516-24	Nut 5/16 - 24	4
9	34-021	Foot Pedal Rod	1
10	34-022	Relay	1
	10-007	Bushing	1
	HP-18-100	Cotter Pin 1/8 x 1	1
11	13-632	Push/Pull Cable	1
15	18-168	Elbow 3/8 Straight Thread	2
16	13-357	Hydraulic Cylinder	1
	HNJ-34-16	Jam Nut 3/4 - 16	1
17	13-366	Cylinder Extension	1
18	34-047	Rake lift	1
35	48-132	Pedal Pad Short	1
KAWASAKI LIQUID COOLED ONLY			
12	34-060	Filter Bracket	1
13	34-038	Centering Arm	2
	18-234	Bushing	2
14	34-041	Shift Arm	1
19	21-173	Ball Joint 3/8 - 24	1
	HN-38-24	Nut 3/8 - 24	2
20	34-042	Adjustment Rod	1
21	21-351	Linkage Yoke 3/8 - 24	1
	HN-38-24	Nut 3/8 - 24	1
	HCP-516-100	Clevis Pin 5/16 x 1	1
	HP-18-100	Cotter Pin 1/8 x 1	1
22	34-050	Speed Limiting Arm	1
23	34-109	Pump	1
24	18-115	Ball Joint 1/4 NF	2
	HN-14-28	Nut 1/4 - 28	4
KOHLER AIR COOLED ONLY			
25	42-003	Hydrostatic Pump	1
26	36-009	Front Engine Mount	1
27	36-005	Shift Arm	1
28	36-010	Rear Engine Mount	1
29	36-019	Speed Limiting Arm	1
30	36-020	Speed Limiting Rod	1
31	HN-38-24	Nut 3/8 - 24	1
	HP-18-100	Cotter Pin 1/8 x 1	1
32	21-173	Ball Joint 3/8 - 24	1
33	36-004	Idler Arm	1
	18-036	Oilite Bushing	1
34	11-050	Extension Spring	1

LEFT FLOORBOARD DRAWING



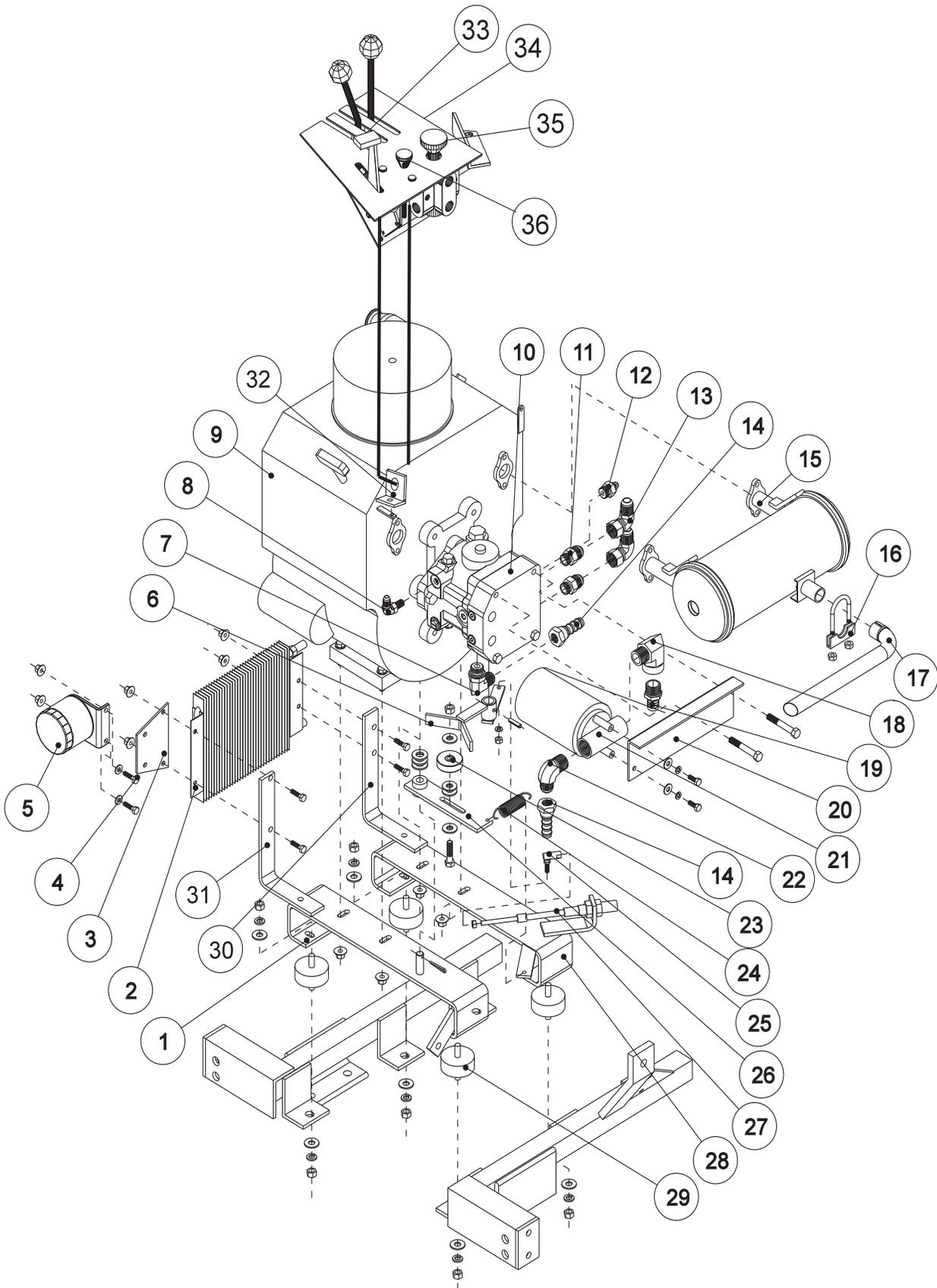
Parts

LEFT FLOORBOARD PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	75-714	Hydraulic Cylinder (steering)	1
2	HCP-58-175	Clevis Pin $\frac{5}{8}$ x $1\frac{3}{4}$	1
	HP-18-200	Cotter Pin $\frac{1}{8}$ x 2	1
3	HNW-14-20	Wing Nut $\frac{1}{4}$ - 20	2
4	34-032	Battery Hold-Down	1
5	13-584	Oil Tank	1
6	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
7	34-023	Battery Hold-Down Rod	2
8	34-031	Battery Plate	1
9	HW-38	Washer $\frac{3}{8}$	2
	HWL-38	Lockwasher $\frac{3}{8}$	2
	HN-38-16	Nut $\frac{3}{8}$ - 16	2
10	34-018	Main Frame	1
11	HB-12-13-125	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{4}$	2
	HW-12	Washer $\frac{1}{2}$	2
	HNTL-12-13	Lock Nut $\frac{1}{2}$ - 13	2
12	13-146	Attachment Lift	1
13	HB-38-16-200	Bolt $\frac{3}{8}$ - 16 x 2	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	1
14	HB-516-18-100	Bolt $\frac{5}{16}$ -18 x 1	2
	HW-516	Washer $\frac{5}{16}$	2
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	2
15	34-194	Rake Tube	1
16	HSD-14-100	Drill Screw $\frac{1}{4}$ x 1	1
17	18-168	Elbow $\frac{3}{8}$ Straight Thread	1
18	13-292	Hydraulic Cylinder $1\frac{1}{2}$ x $3\frac{1}{2}$ (attachment lift)	1
19	50-264	Brake Cable	1
20	HB-38-16-250	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{2}$	1
	HW-38	Washer $\frac{3}{8}$	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	1
21	HB-38-16-250	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{2}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
22	34-026	Park Brake Bracket	1
23	60-106	Park Brake Handle	1
24	HB-38-16-175	Bolt $\frac{3}{8}$ - 16 x $1\frac{3}{4}$ (top)	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	1
25	34-014	Left Floorboard	1
	34-015	Left Floorboard Support	1
	34-208	Left Rubber Matting	1
	13-099	Hose Clamp	1
26	HB-38-16-225	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{4}$	2
	HW-38	Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
27	HCP-516-125	Clevis Pin $\frac{5}{16}$ x $1\frac{1}{4}$	1
	HP-18-075	Cotter Pin $\frac{1}{8}$ x $\frac{3}{4}$	1
28	11-100	Linkage Yoke $\frac{5}{16}$	1
	HN-516-24	Nut $\frac{5}{16}$ - 24	1
29	60-536	Bellow	1
30	HCP-12-150	Clevis Pin $\frac{1}{2}$ x $1\frac{1}{2}$	1
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
31	18-290	90° Elbow with Office	1

ENGINE DRAWING (KAWASAKI LIQUID COOLED)

Parts



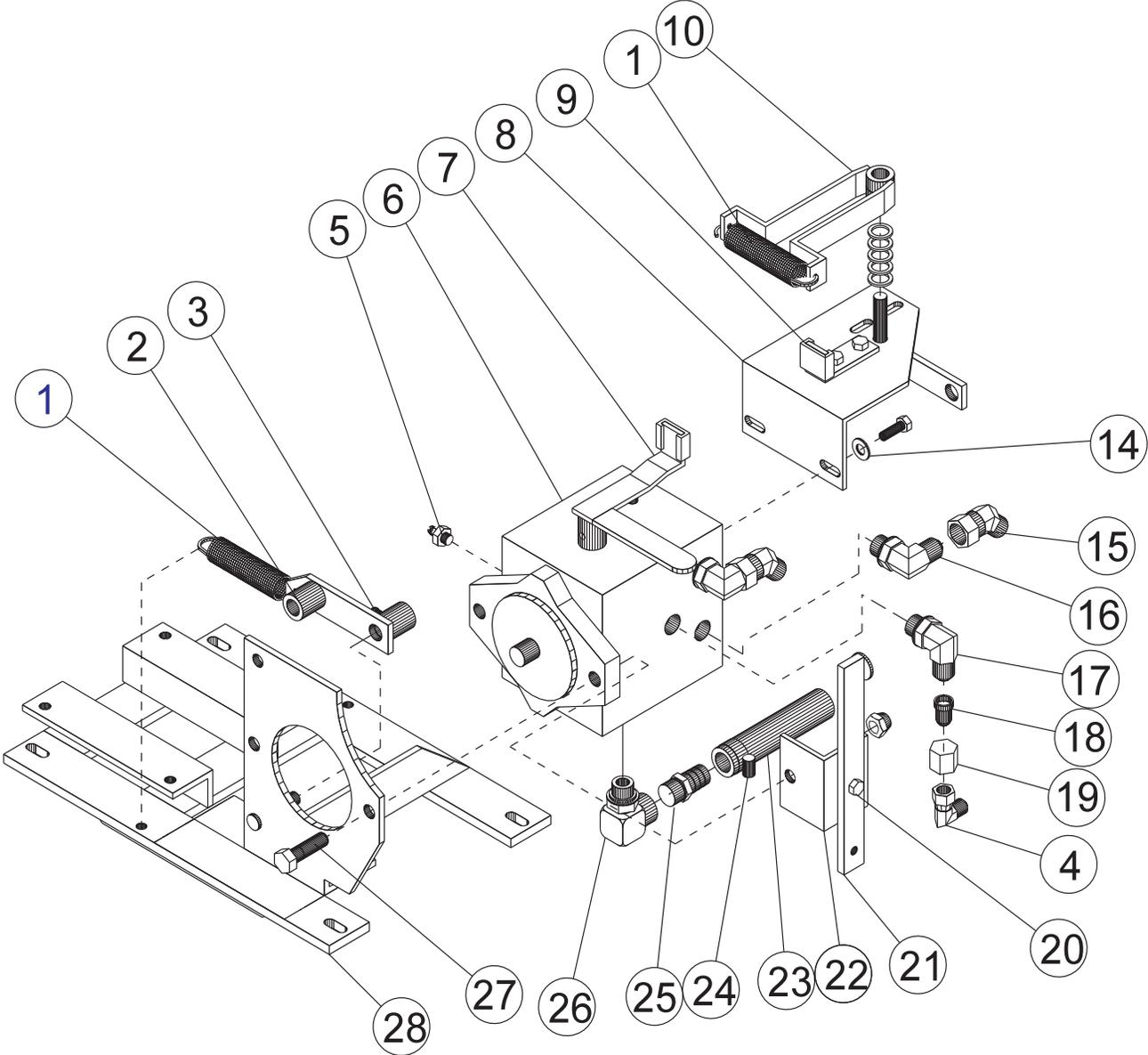
ENGINE PARTS LIST (KAWASAKI LIQUID COOLED)

REF#	PART#	DESCRIPTION	QUANTITY
1	34-105	Oil Cooler	1
2	18-202	Elbow	2
3	34-039	Cooler Mount	2
	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	4
	HW-14	Washer $\frac{1}{4}$	4
	HWL-14	Lockwasher $\frac{1}{4}$	4
	HN-14-20	Nut $\frac{1}{4}$ - 20	4
4	18-190	Tee	1
5	34-161	Throttle	1
	34-159	Throttle Mount Bracket	1
	21-161	Wire Block	1
6	34-034	Control Panel	1
	34-181	Decal Control Panel	1
7	80-020	Choke	1
	21-067	Choke Clip	1
8	34-197	Rectifier Mount	1
	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
9	34-123	Elbow	2
10	34-060	Filter Bracket	1
11	23-006	Oil Filter	1
	23-031	Hydraulic Oil Filter Element	1
12	34-109	Pump	1
13	34-025	Engine Frame	1
14	34-115	Hub $\frac{3}{4}$	1
	14-131	Woodruff Key	1
15	34-120	Belt BP42	2
16	34-114	Pulley	2
17	HB-12-13-300	Bolt $\frac{1}{2}$ - 13 x 3	1
	HNTL-12-13	Lock Nut $\frac{1}{2}$ - 13	1
18	16-013	Idler Pulley	1
19	34-048	Spacer	1
	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	2
20	34-117	Hub $1\frac{1}{8}$	1
21	11-021	Engine Mount	4
22	34-011	Idler Arm	1
	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	2
23	HKSQ-14-150	Machine Key $\frac{1}{4}$ x $1\frac{1}{2}$	1
24	34-230	Throttle Wire 3"	1
25	34-112	20HP Kawasaki Engine	1
	8800-36	Fuel Hose $\frac{1}{4}$ " x 36"	1
	18-186	Hose Clamp $\frac{1}{4}$	2
26	13-409	On-Off Valve	1
27	34-169	Coolant Tank	1
Not Illustrated			
	34-210	Tailpipe	1
	13-498	Muffler Clamp	1



PUMP DRAWING (KAWASAKI LIQUID COOLED)

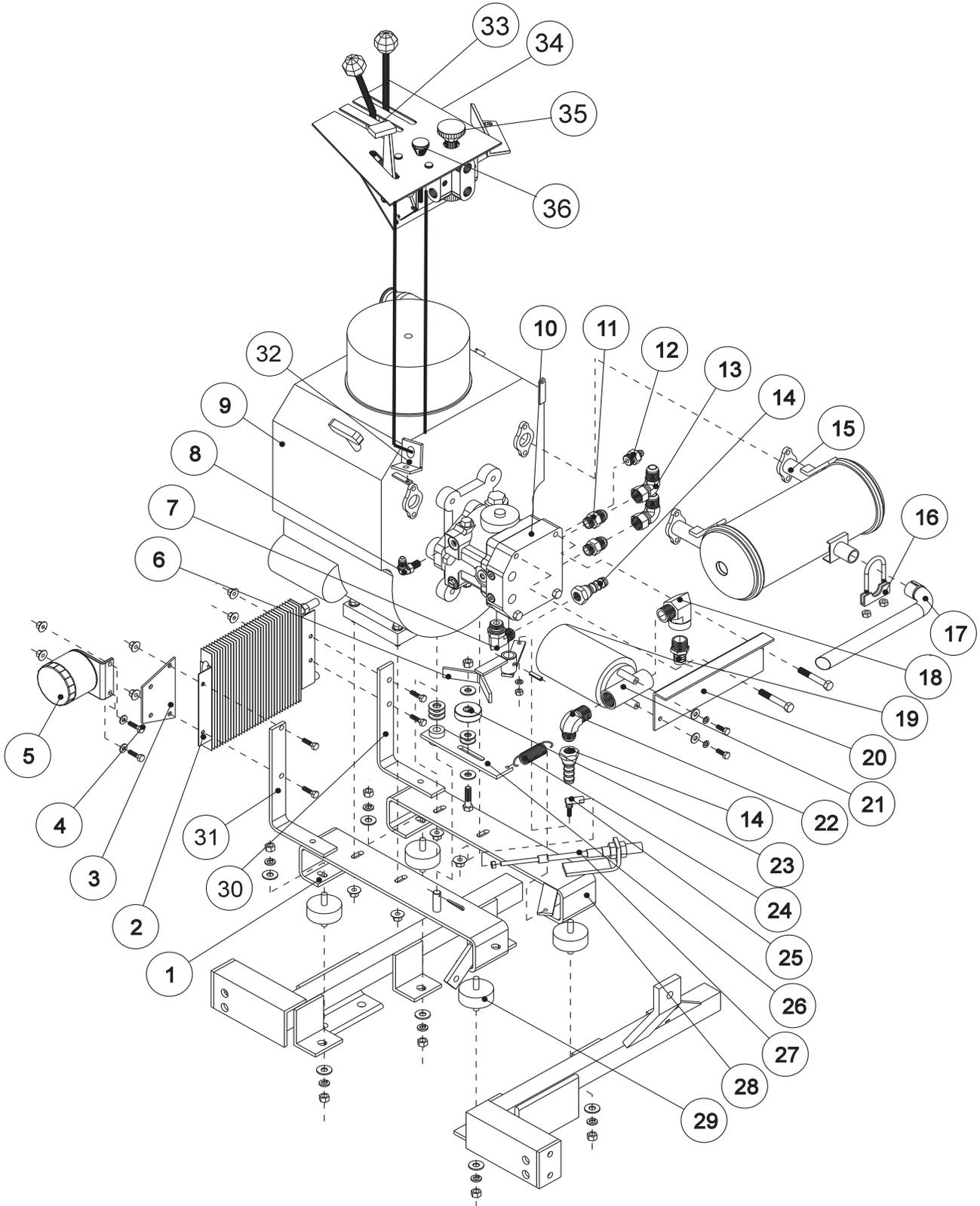
Parts



PUMP PARTS LIST (KAWASAKI LIQUID COOLED)

REF#	PART#	DESCRIPTION	QUANTITY
1	11-050	Extension Spring	2
2	34-048	Spacer	1
3	34-011	Idler Arm	1
	18-234	Bushing	2
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	1
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
4	18-202	Elbow (bottom port)	1
5	18-169	Adapter $\frac{3}{8}$ SAE (bottom port)	1
6	34-109	Variable Pump (left hand rotation)	1
7	34-041	Shift Arm	1
	8946-1.5	Plastic Wear Strip	1
	HRS-316-050	Rivet $\frac{3}{16}$ x $\frac{1}{2}$	1
	HRP-14-100	Roll Pin $\frac{1}{4}$ x 1	1
8	34-060	Filter Bracket	1
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
9	13-624-01	Stop	1
	HRS-316-050	Rivet $\frac{3}{16}$ x $\frac{1}{2}$	1
	8946-1.5	Plastic Wear Strip	1
	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
10	34-038	Centering Arm	2
	18-234	Bushing	2
	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	5
11	34-197	Rectifier Mount	1
12	HB-14-20-125	Bolt $\frac{1}{4}$ - 20 x $1\frac{1}{4}$	2
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	2
13	HB-14-20-075	Bolt $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HW-14	Washer $\frac{1}{4}$	2
	HWL-14	Lockwasher $\frac{1}{4}$	2
14	HW-38	Washer $\frac{3}{8}$	2
15	18-273	Fitting	2
16	18-161	Elbow Straight Thread	2
17	18-174	Elbow $\frac{1}{2}$ " Straight Thread	1
18	34-128	Adapter	1
19	23-120	$\frac{1}{2}$ " Tube Nut	1
20	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	1
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	1
21	34-050	Speed Limiting Arm	1
22	34-059	Mounting Bracket	1
23	8832-13	$\frac{3}{4}$ " Hose x 13"	1
24	18-222	Hose Clamp	2
25	18-133	Barb Fitting $\frac{1}{2}$ NPT x $\frac{3}{4}$ HB	1
26	23-130	Elbow	1
27	HB-12-13-175	Bolt $\frac{1}{2}$ - 13 x $1\frac{3}{4}$	2
	HNTL-12-13	Lock Nut $\frac{1}{2}$ - 13	2
28	34-025	Engine Frame	1

ENGINE AND PUMP DRAWING (KOHLER AIR COOLED)



Parts

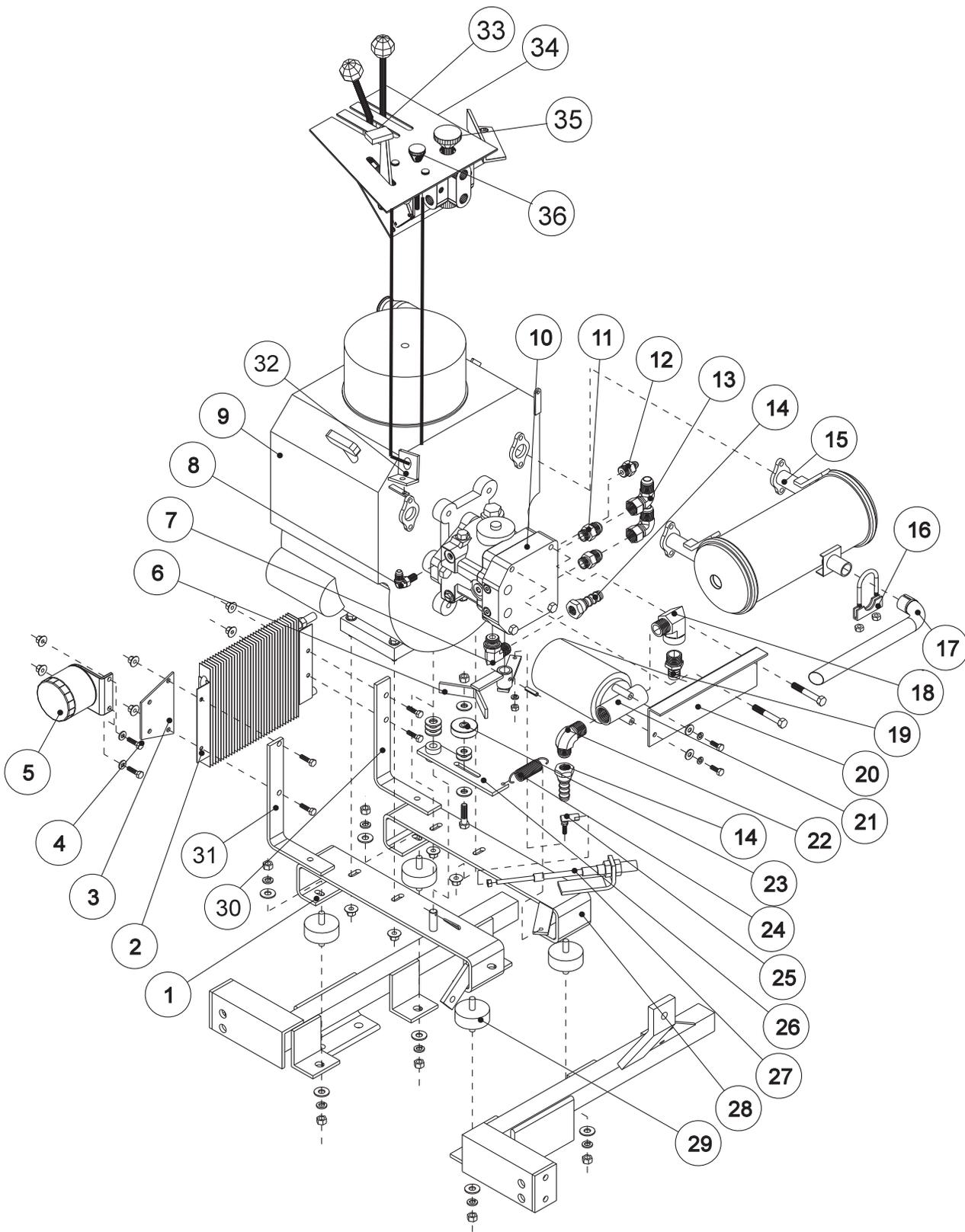
ENGINE AND PUMP PARTS LIST (KOHLER AIR COOLED)

REF#	PART#	DESCRIPTION	QUANTITY
1	36-010	Rear Engine Mount	1
2	34-105	Oil Cooler	1
	HB-14-20-100	Bolt $\frac{1}{4}$ - 20 x 1	4
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	4
3	36-011	Engine Oil Filter Bracket	1
4	HB-14-20-100	Bolt $\frac{1}{4}$ - 20 x 1	2
	HW-14	Washer $\frac{1}{4}$	2
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	2
5	78-090	Engine Oil Filter Element (Kohler # 12 050 01)(part of engine)	1
6	36-005	Shift Arm	1
	HRP-14-100	Roll Pin $\frac{1}{4}$ x 1	1
7	34-122	Elbow	1
8	18-168	Straight Thread Elbow $\frac{3}{8}$	1
9	36-021	Kohler Engine TH18S	1
	76-324-03	Crankshaft Splined Insert (Kohler # 48 755 23-S)(part of engine)	1
	42-113	Solenoid (Kohler # 25 435 02)(part of engine)	1
	18-286	Elbow $\frac{3}{8}$	1
	18-287	Pipe Nipple $\frac{3}{8}$ x 2	2
	18-288	Pipe Cap $\frac{3}{8}$	1
	HB-516-18-150	Bolt $\frac{5}{16}$ - 18 x $1\frac{1}{2}$	4
	HW-516	Washer $\frac{5}{16}$	4
	HNTL-516-18	Lock Nut $\frac{5}{16}$	4
10	42-003	Hydraulic Pump	1
	HSSH-12-13-175	Socket Head Cap Screw $\frac{1}{2}$ - 13 x $1\frac{3}{4}$	2
	HWL-12	Lock Washer $\frac{1}{2}$	2
11	18-267	Straight Thread Connector	2
12	18-241	Straight Thread Connector	1
13	18-285	Swivel Nut Elbow	2
14	18-239	Swivel Fitting $\frac{5}{8}$	2
15	48-106	Muffler	1
16	13-498	Muffler Clamp	1
17	13-493	Tail Pipe	1
18	18-140	Straight Elbow $\frac{3}{4}$ NPT x 90°	1
19	18-249	Barb Fitting	1
20	36-006	Oil Filter Bracket	1
21	23-006	Hydraulic Oil Filter	1
	23-031	Hydraulic Oil Filter Element	1
	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
22	23-071	Male Connector	1
23	14-266	Ball Bearing $\frac{5}{8}$ ID x $1\frac{3}{4}$ OD	1
	18-270	Bushing	1
	HB-38-16-150	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{2}$	1
	HW-38	Washer $\frac{3}{8}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	1
24	11-050	Extension Spring	1
25	18-115	Ball Joint $\frac{1}{4}$	1
	HWL-14	Lock Washer $\frac{1}{4}$	1
	HN-14-28	Nut $\frac{1}{4}$ - 28	1



ENGINE AND PUMP DRAWING (KOHLER AIR COOLED)

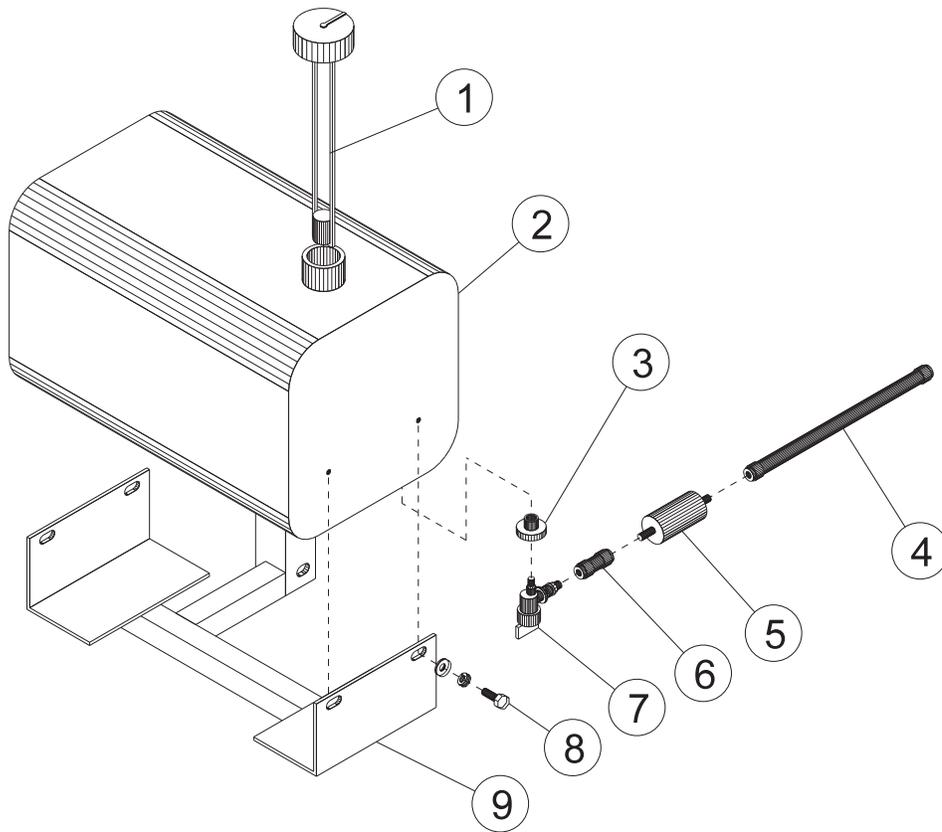
Parts



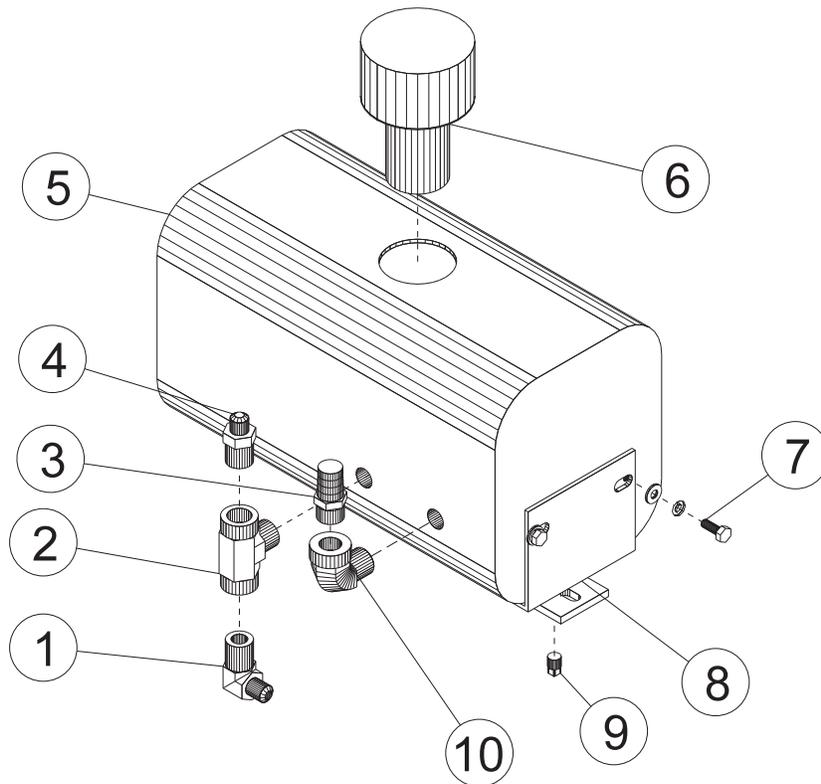
ENGINE AND PUMP PARTS LIST (KOHLER AIR COOLED)

REF#	PART#	DESCRIPTION	QUANTITY
26	36-004	Idler Arm	1
	18-036	Oilite Bushing	1
	HMB-12-14	Machine Bushing 1/2 x 14GA	3
	HP-18-100	Cotter Pin 1/8 x 1	1
27	13-632	Push Pull Cable	1
	HN-14-28	Nut 1/4 - 28	1
28	36-009	Front Engine Mount	1
29	11-021	Motor Mount	4
	HW-38	Washer 3/8	8
	HWL-38	Lock Washer 3/8	8
	HN-38-24	Nut 3/8 - 24	8
30	36-007	Front Cooler Mount	1
31	36-008	Rear Cooler Mount	1
32	34-163	Cable Bracket	1
33	34-161	Throttle	1
	34-159	Throttle Mount Bracket	1
	21-161	Wire Block	1
	34-034	Control Panel	1
34	34-181	Decal, Control Panel	1
	13-409	On-Off Valve	1
36	80-020	Choke	1
	21-067	Choke Clip	1
	18-118	Pipe Plug 1/8	1
38	42-004-01	Remote Air Cleaner (Kohler 25 048 01; body and end cap)	1
	42-004-03	Band (replacement part Kohler 25 126 01)	1
	42-004-02	Hood (replacement part Kohler 25 324 01)	1
	42-004-04	Remote Replacement Filter (Kohler 25 083 02)	1
	42-004-05	Safety Filter (replacement part Kohler 25 083 03)	1

GAS TANK DRAWING (KAWASAKI LIQUID COOLED)



HYDRAULIC OIL TANK DRAWING (KAWASAKI LIQUID COOLED)



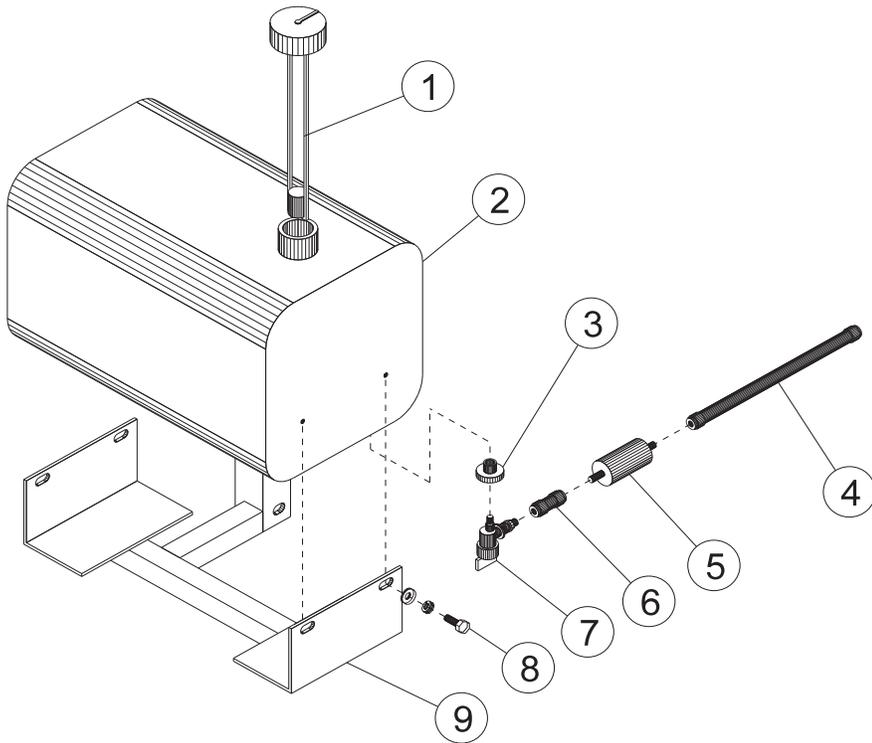
GAS TANK PARTS LIST (KAWASAKI LIQUID COOLED)

REF#	PART#	DESCRIPTION	QUANTITY
1	13-588	Replacement Cap for 13-585 Gas Tank	1
2	13-585	Gas Tank with Cap	1
3	26-054	Bushing Insert	1
4	8800-10	1/4" Fuel Hose	1
5	50-403	Inline Gas Filter	1
6	18-003	1/4" Hose Clamp	3
7	26-055	Shut-Off Valve	1
8	HB-14-20-075	Bolt 1/4 - 20 x 3/4	4
	HW-14	Washer 1/4	4
	HWL-14	Lockwasher 1/4	4
9	34-036	Gas Tank Bracket	1

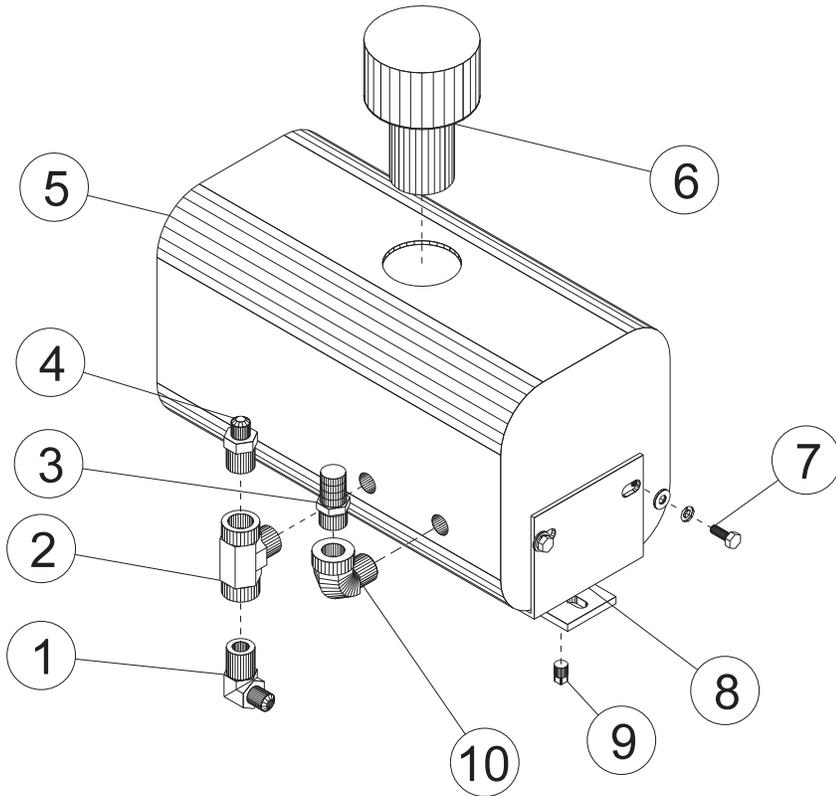
HYDRAULIC OIL TANK PARTS LIST (KAWASAKI LIQUID COOLED)

REF#	PART#	DESCRIPTION	QUANTITY
1	17-019	Male Elbow	1
2	17-018	Male Branch Tee	1
3	18-133	Barb Fitting 1/2 NPT x 3/4 HB	1
4	23-184	Male Connector	1
5	13-584	Oil Tank	1
6	13-699	Filler Breather	1
	HMS-8-32-050	Machine Screw #8-32 x 1/2	6
	HWS-8	Star Washer #8	6
7	HB-14-20-075	Bolt 1/4 - 20 x 3/4	4
	HW-14	Washer 1/4	4
	HWL-14	Lockwasher 1/4	4
8	34-028	Oil Tank Bracket	1
9	18-118	1/8 Pipe Plug	1
10	18-009	Straight Elbow	1

GAS TANK DRAWING (KOHLER AIR COOLED)



HYDRAULIC OIL TANK DRAWING (KOHLER AIR COOLED)



Parts

GAS TANK PARTS LIST (KOHLER AIR COOLED)

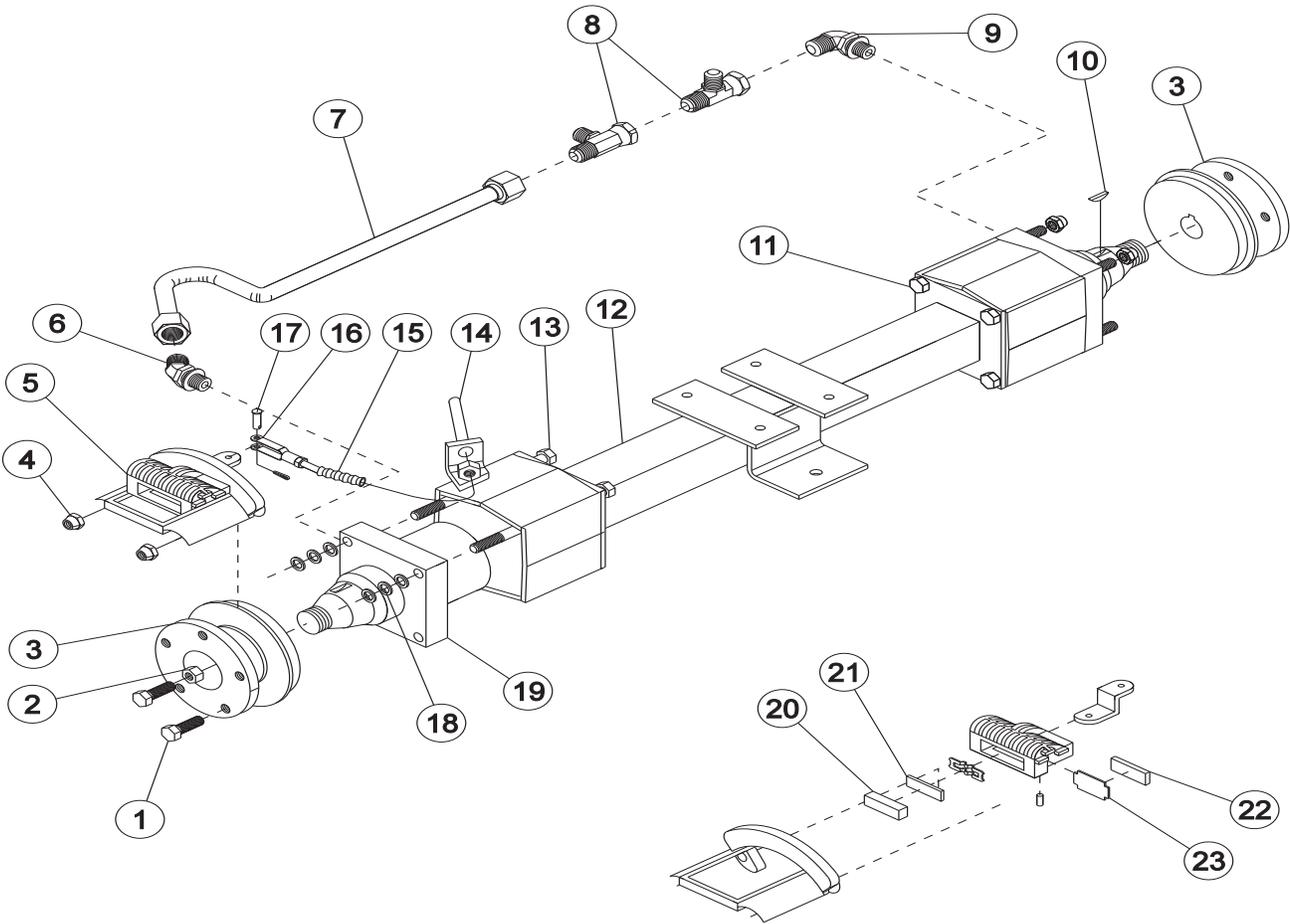
REF#	PART#	DESCRIPTION	QUANTITY
1	13-588	Replacement Cap for 13-585 Gas Tank	1
2	13-585	Gas Tank with Cap	1
3	26-054	Bushing Insert	1
4	8800-48	1/4" Fuel Hose	1
5	50-403	Inline Gas Filter	1
6	18-186	1/4" Hose Clamp	3
7	26-055	Shut-Off Valve	1
8	HB-14-20-075	Bolt 1/4 - 20 x 3/4	4
	HW-14	Washer 1/4	4
	HWL-14	Lockwasher 1/4	4
9	34-036	Gas Tank Bracket	1

HYDRAULIC OIL TANK PARTS LIST (KOHLER AIR COOLED)

REF#	PART#	DESCRIPTION	QUANTITY
1	18-009	Male Elbow	1
2	23-184	Male Connector	2
3	18-133	Barb Fitting	1
4	17-018	Tee	1
5	18-190	Swivel Tee	1
6	13-584	Oil Tank	1
7	23-095	Filler Breather	1
	HMS-8-32-050	Machine Screw #8-32 x 1/2	6
	HWS-8	Star Washer #8	6
	HB-14-20-075	Bolt 1/4 - 20 x 3/4	4
	HW-14	Washer 1/4	4
	HWL-14	Lockwasher 1/4	4
9	34-028	Oil Tank Bracket	1
10	18-118	1/8 Pipe Plug	1
11	18-072	45° Elbow	1

REAR AXLE DRAWING

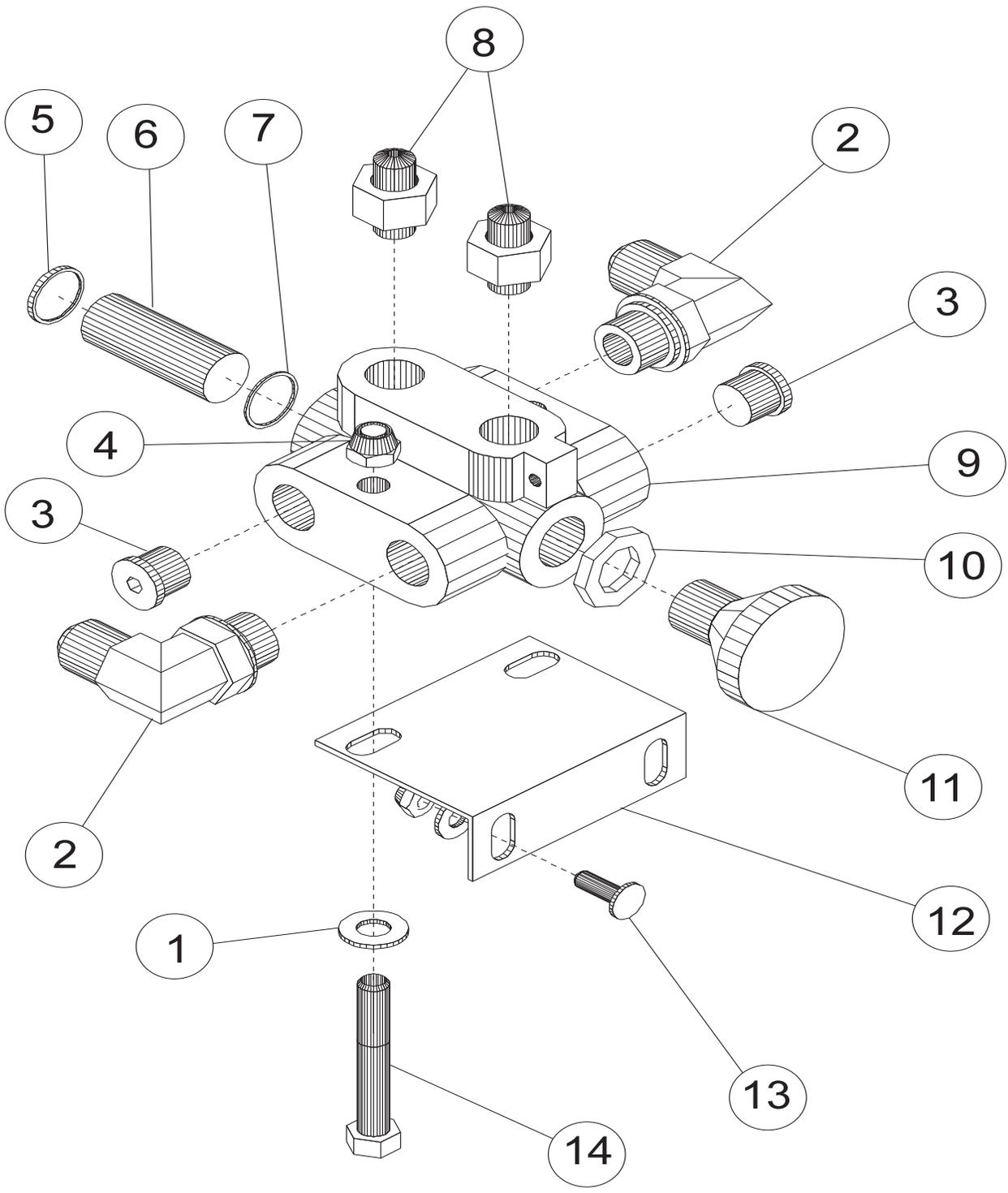
Parts



REAR AXLE PARTSLIST

REF#	PART#	DESCRIPTION	QUANTITY
1	34-100	Hub and Disc 5-Hole $\frac{1}{2}$ - 20	2
2	34-172	Hydraulic Tube (short)	2
3	34-173	Hydraulic Tube (long)	2
4	34-057	Tee	2
5	50-264	Brake Cable	1
6	34-058	Swivel Tee	2
7	18-265	Fitting	4
8	HB-12-13-250	Bolt $\frac{1}{2}$ - 13 x $2\frac{1}{2}$	6
9	HNTL-12-13	Lock Nut $\frac{1}{2}$ - 13	8
10	HWK-516-100	Woodruff Key $\frac{5}{16}$ x 1	2
11	34-113	Tire and Wheel	2
	34-113-01	Tire 25 x 12.00 x 9	2
	34-113-02	Wheel	2
12	34-010	Rear Axle	1
13	34-019	Hitch	1
	HB-3/8-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HW-38	Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
14	HB-12-13-275	Bolt $\frac{1}{2}$ - 13 x $2\frac{3}{4}$	2
15	60-536	Bellows	2
16	HN-516-24	Nut $\frac{5}{16}$ - 24	2
17	11-100	Linkage Yoke $\frac{5}{16}$	2
18	HCP-516-100	Clevis Pin $\frac{5}{16}$ x 1	2
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	2
19	34-101	Brake	1
20	34-102	Wheel Motor	2
21	60-268	Lug Bolt $\frac{1}{2}$ - 20 x $1\frac{5}{16}$	10
22	14-265	Nut 1-20	2
23	34-035	Safety Switch Stop	1
24	22-002	Safety Switch	1
25*		Cam Side Pad	1
26*		Cam Side Pad Support	1
27*		Carrier Side Pad Support	1
28*		Carrier Side Pad	1
	34-101-02	Pad Kit with 2 Pads and Steel Backing Plates	1

ON-OFF VALVE DRAWING

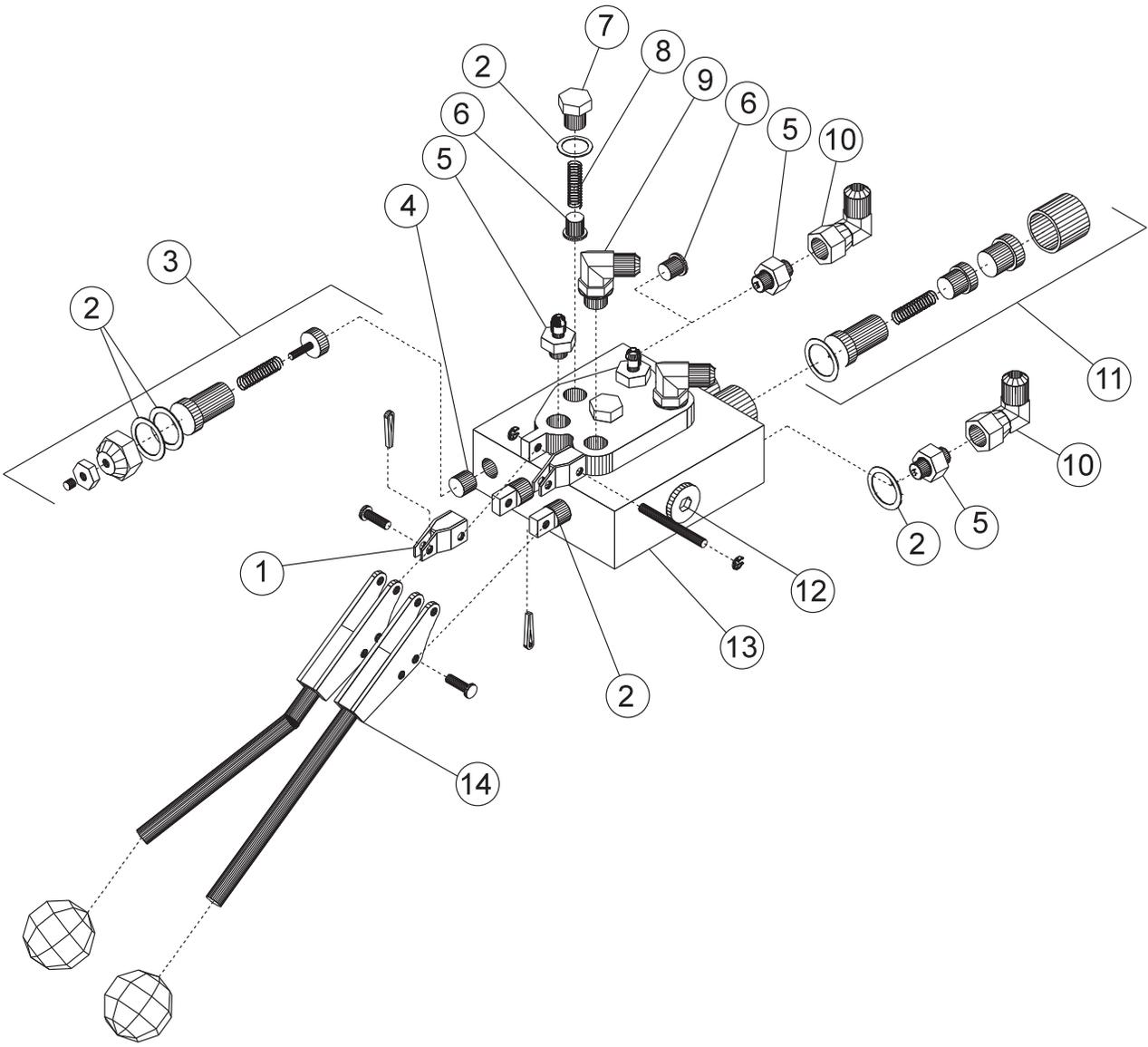


Parts

ON-OFF PARTSLIST

REF #	PART #	DESCRIPTION	QUANTITY
1	HW-38	Washer $\frac{3}{8}$	2
2	18-174	Elbow	2
3	18-228	Hollow Hex Plug	2
4	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
5*	14-242	Snap Ring	2
6*	14-243	Spool	1
7*	14-244	Quad Seal	2
8	18-227	Straight Thread Connector	2
9*		Valve Body	1
10*	14-245	Lock Washer	1
11*	14-246	Knob	1
12	34-033	Control Panel Bracket	1
13	HST-14-20-075	Truss Machine Screw $\frac{1}{4}$ - 20 x $\frac{3}{4}$	2
	HW-14	Washer $\frac{1}{4}$	2
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	2
14	HB-38-16-250	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{2}$	2
15	18-229	Tube Fitting $\frac{1}{2}$	1
*	13-409	On-Off Valve	

HYDRAULIC VALVE DRAWING

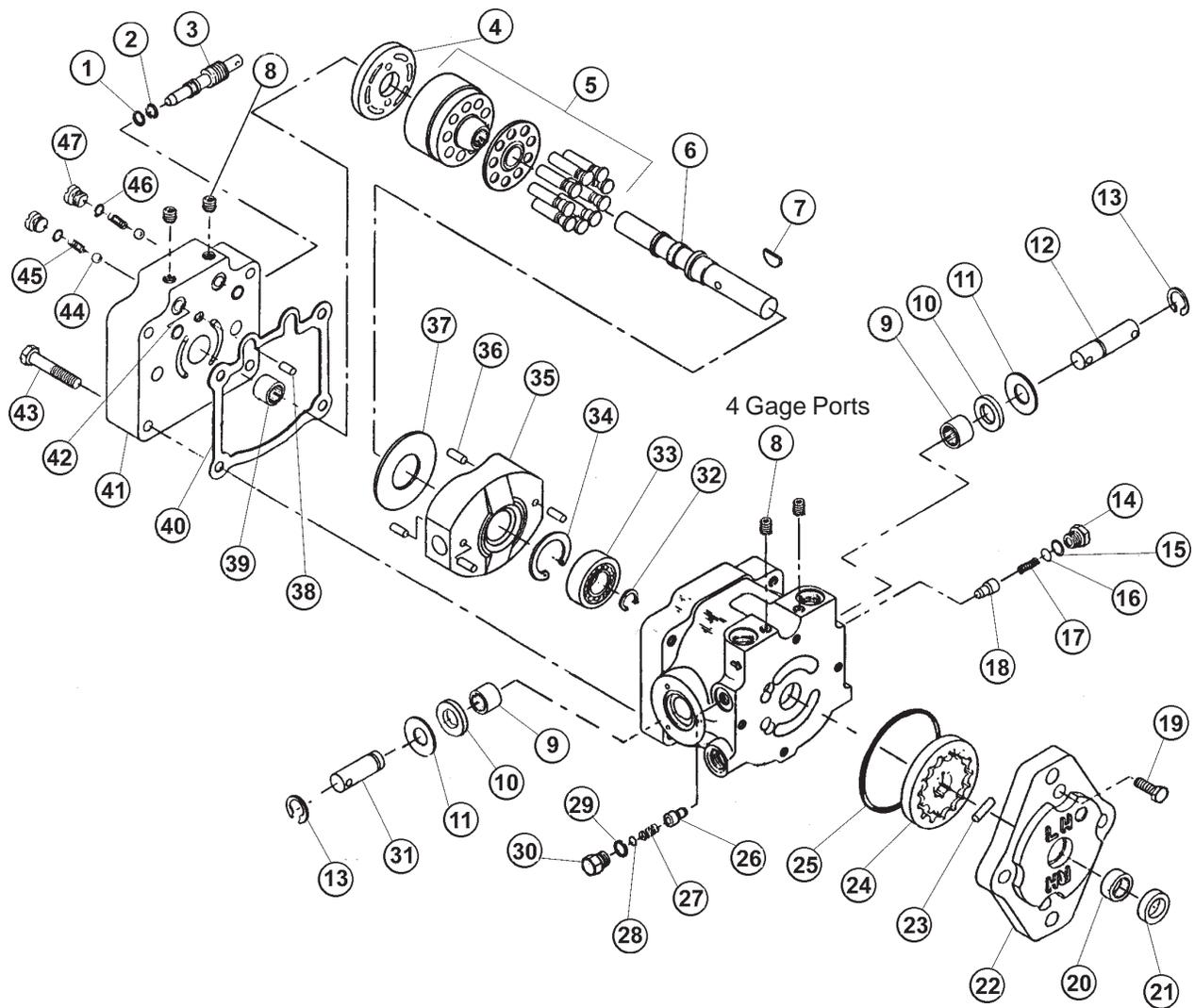


Parts

HYDRAULIC VALVE PARTS LIST

REF #	PART #	DESCRIPTION	QUANTITY
1	14-204	Linkage Kit (includes Hitch Pin, Clevis Pin and Link)	2
2*	14-062	Seal Kit	1
3*	14-106	Relief Assembly Kit	1
4*	13-261-03	N.R. Plug	1
5	18-169	Adapter ³ / ₈ SAE	4
6*	13-261-07	Plunger	2
7*	13-261-05	Plug	2
8*	13-261-06	Spring	2
9	18-168	Elbow ³ / ₈ Straight Thread	2
10	18-202	Elbow	1
11*	14-203	Spring Center Kit	One Per Bank
12*	13-261-02	Plug	1
13*	13-261-01	Housing	1
14	34-110	Handle (set of 2)	1
*	13-261	Hydraulic Valve	2-Bank

34-109 VARIABLE PUMP DRAWING (KAWASAKI LIQUID COOLED)



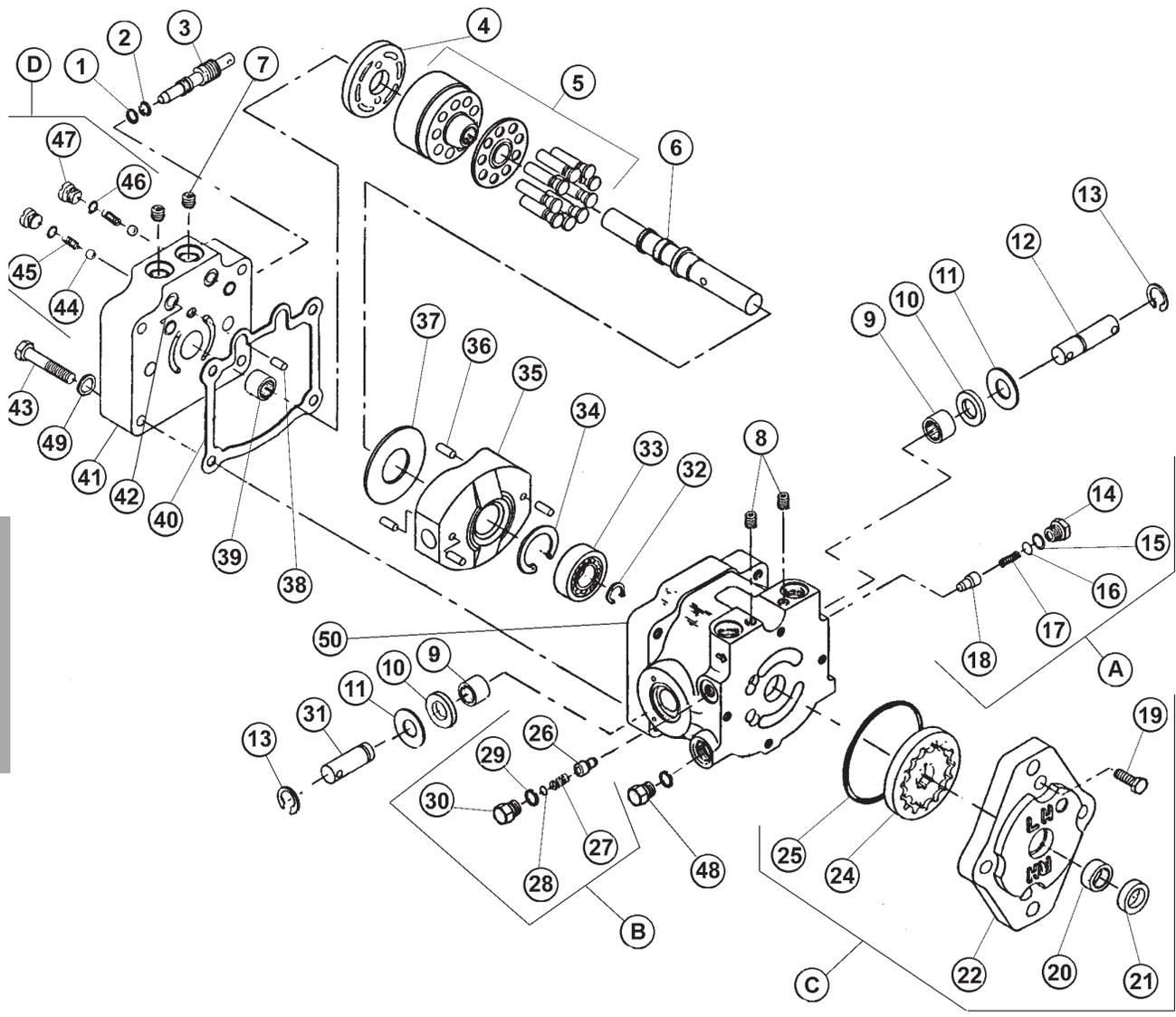
Parts

34-109 VARIABLE PUMP PARTS LIST (KAWASAKI LIQUID COOLED)

REF #	PART #	DESCRIPTION	QUANTITY
1	14-222	O-Ring	1
2	14-130	Ring	1
3	13-110-01	By-Pass Valve	1
4	34-109-01	Valve Plate	1
5†		Cylinder Block	1
6	14-084	Pump Shaft with Bearing	1
7	14-131	Woodruff Key	1
8	13-110-05	Pipe Plug	4
9	14-069	Needle Bearing	2
10*	14-014	Lip Seal	2
11	14-113	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	34-109-02	Shim Pack Kit	1
17	14-263	Release Valve Spring	1
18	13-110-11	Release Valve Cone	1
19§	13-110-14	Hex Head Screw	4
20§	14-129	Needle Bearing	1
21*§	14-054	Lip Seal	1
22§	13-110-13	Charge Pump Housing	1
23§	14-135	Straight Pin	1
24§	14-136	Gerotor Assembly	1
25*§		O-Ring	1
26	14-235	Release Valve Cone	1
27	14-234	Check Release Valve Spring	1
28	34-109-03	Shim Pack Kit	1
29*		O-Ring	1
30	13-110-10	Plug	1
31	14-212	Truncated Shaft (short 1 hole)	1
32	14-133	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	3
37	14-114	Thrust Plate	1
38	14-215	Pin	1
39		Roller Bearing (comes with 14-084 Ref# 6)	1
40*	14-107	Gasket	1
41†		Pump End Cap	1
42*		O-Ring	2
43	13-110-04	Hex Head Screw	4
44▣	13-110-09	Ball	2
45▣	13-110-08	Check Valve Spring	2
46*▣		O-Ring	2
47▣	13-110-07	Check Valve Plug	2

- * 14-098 Seal Kit 1
- † Parts are not available. Replace with new unit.
- § 13-110-15 Charge Pump 1
- ▣ 13-110-16 Check Valve Kit 2

42-003 HYDROSTATIC PUMP DRAWING (KOHLER AIR COOLED)

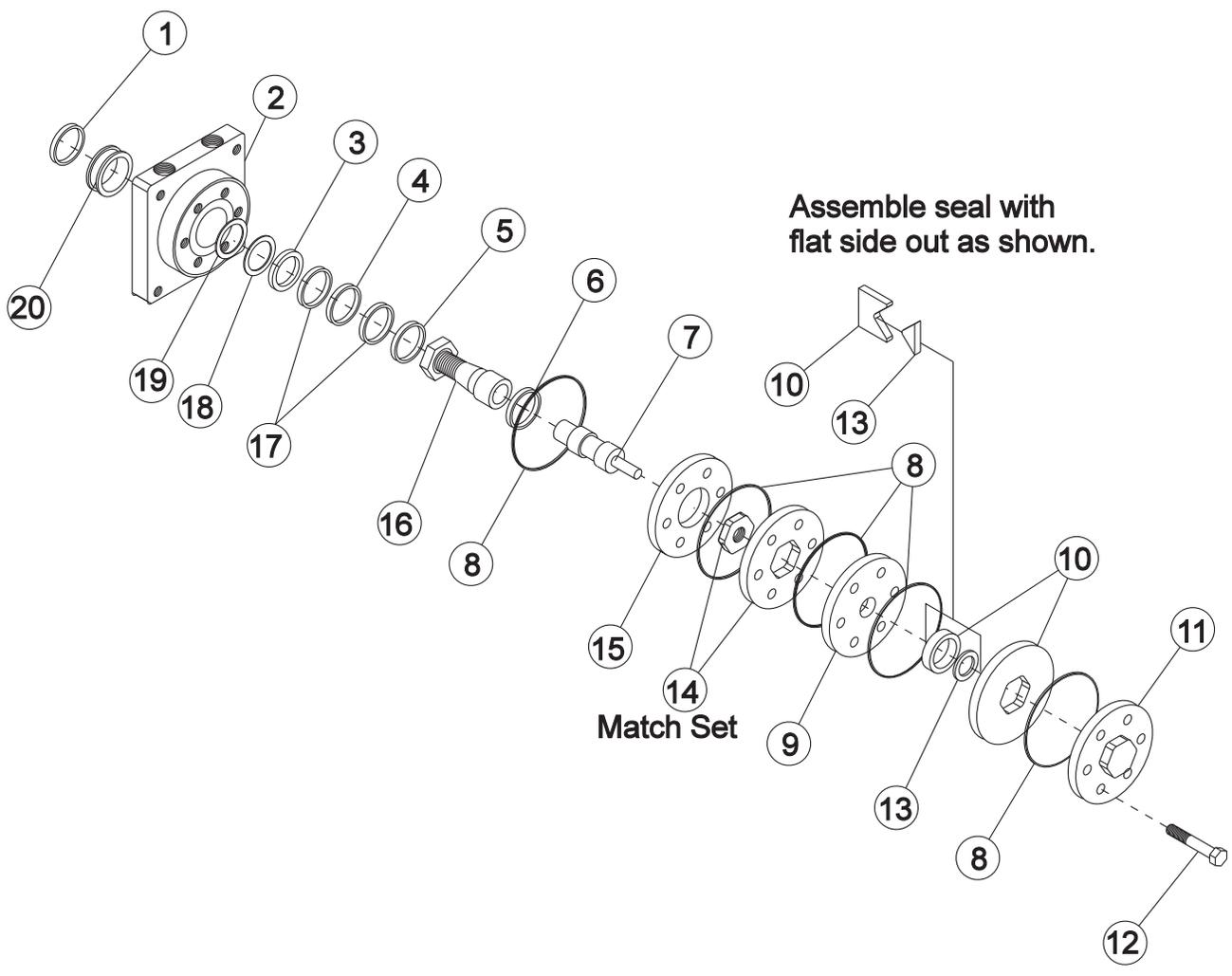


Parts

42-003 HYDROSTATIC PUMP PARTS LIST (KOHLER AIR COOLED)

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 (part of Ref 50)	2
10*	42-003-04	Lip Seal (part of Ref 50)	2
11	42-003-05	Washer	2
12	14-220	Truncated Shaft (long 2 holes)	1
13	14-105	Retaining Ring	2
14A	13-110-10	Plug	1
15*A		O-Ring	1
16A	14-219	Shim Pack Kit	1
17A	14-263	Release Valve Spring	1
18A	42-003-06	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	Gerotor	1
25*C		O-Ring	1
26B	14-235	Release Valve Cone	1
27B	14-234	Check Release Valve Spring	1
28B	14-219	Shim Pack Kit	1
29*B		O-Ring	1
30B	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	42-003-15	Pump End Cap	1
42*		O-Ring	2
43	42-003-11	Hex Head Screw	4
44D	13-110-09	Ball	2
45D	13-110-08	Check Valve Spring	2
46*D		O-Ring	2
47D	13-110-07	Check Valve Plug	2
48	42-003-12	Plug	2
49	42-003-13	Washer	1
50	42-003-17	Housing Assembly (includes Ref 9 & 10)	1
*	14-098	Seal Kit	1
A	13-110-17	Implement Valve Kit	1
B	14-214	Charge Pump Valve Kit	1
C	42-003-14	Charge Pump	1
D	13-110-16	Check Valve Kit	2

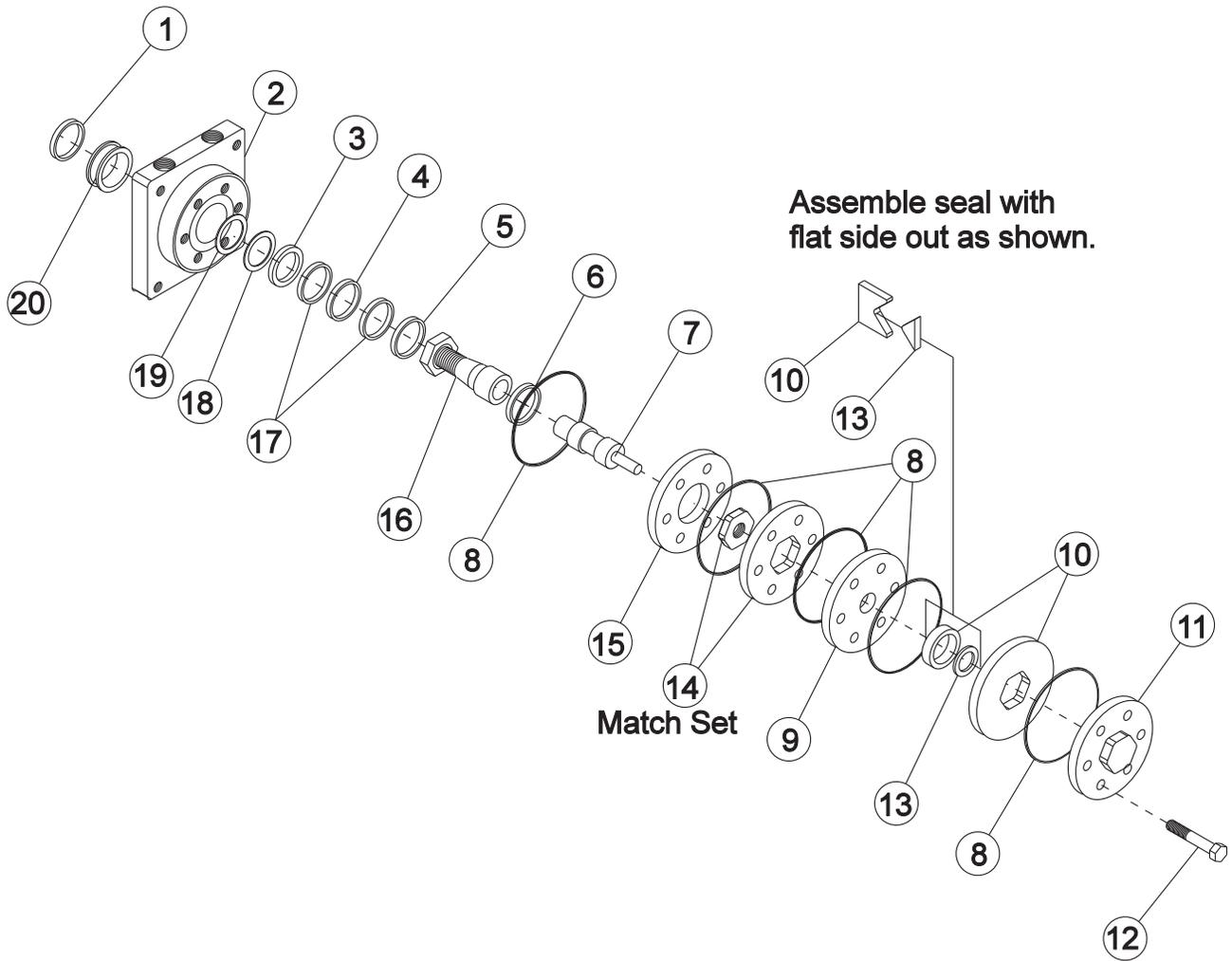
34-102 REAR WHEEL MOTOR (8.6 C.I.) DRAWING



34-102 REAR WHEEL MOTOR (8.6 C.I.) PARTS LIST

REF #	PART #	DESCRIPTION	QUANTITY
1*		Water & Dirt Seal	1
2	34-102-01	Service Housing Assembly (Includes Ref 4, 5, 17 (2req'd) and 20)	1
3*		Inner Seal	1
4	13-032-27	Thrust Bearing	1
5	13-032-28	Inner Bearing	1
6	13-032-29	Thrust Bearing	1
7	13-615-03	Drive Link	1
8*		Ring Seal	5
9	13-032-31	Manifold	1
10	13-032-32	Commutator Assembly (matched set)	1
11	13-032-33	End Cover	1
12	34-102-02	Bolt	7
13*		Commutator Seal (matches with Ref 10)	1
14	13-615-02	Rotor Set (matched set)	1
15	13-032-35	Plate Wear	1
16	34-102-03	Coupling Shaft	1
	HWK-516-100	Woodruff Key ⁵ / ₁₆ x 1	1
	14-265	Nut 1 - 20	1
17	13-032-37	Thrust Washer	2
18*		Backup Washer	1
19*		Backup Washer	1
20	13-032-38	Outer Bearing	1
*	14-080	Seal Kit	1

13-032 FRONT WHEEL MOTOR (4.9 C.I.) DRAWING



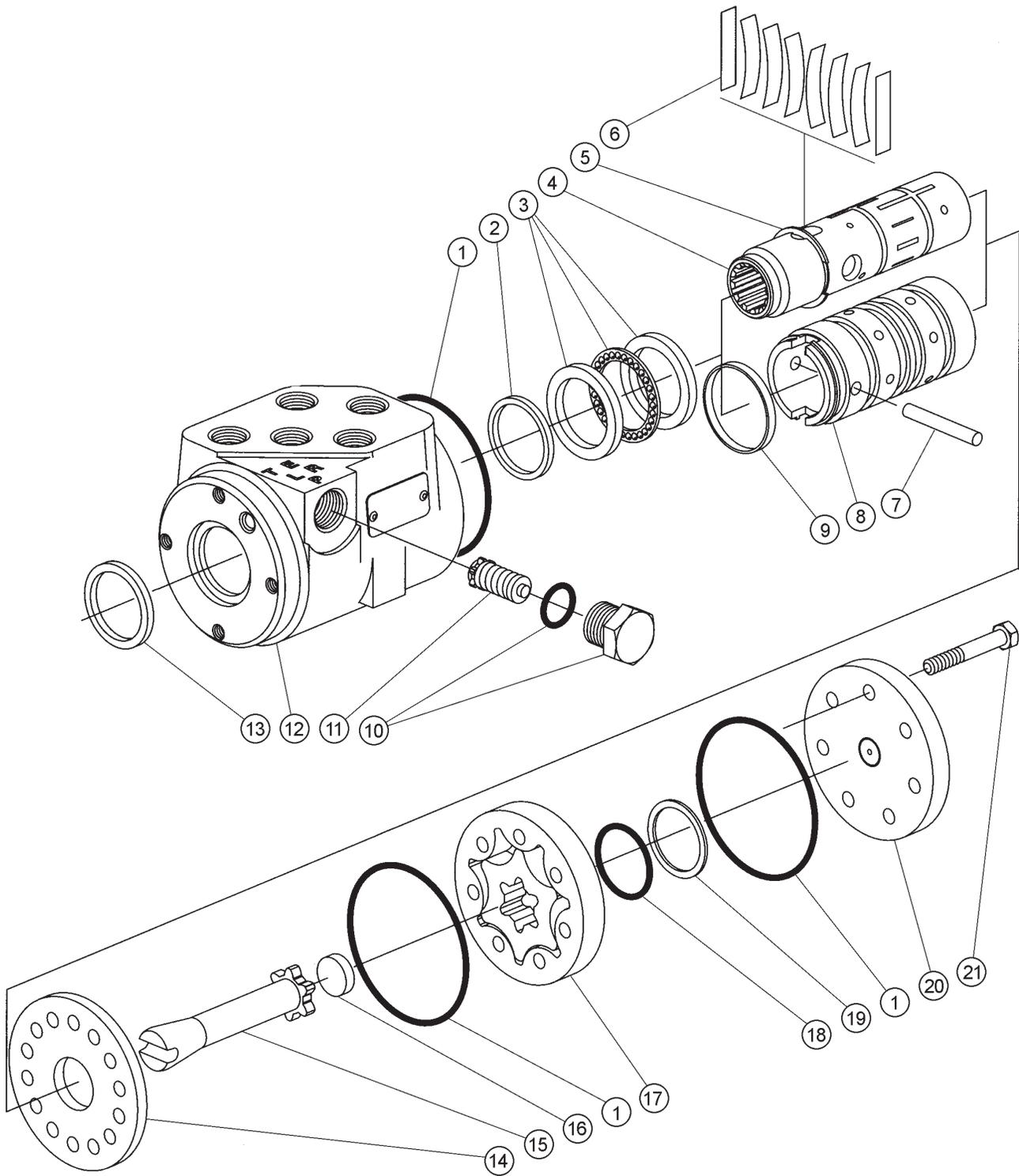
Parts

13-032 FRONT WHEEL MOTOR (4.9 C.I.) PARTS LIST

REF #	PART #	DESCRIPTION	QUANTITY
1*		Water & Dirt Seal	1
2		Service Housing Assembly	1
3*		Inner Seal	1
4	13-032-27	Thrust Bearing	1
5	13-032-28	Inner Bearing	1
6	13-032-29	Thrust Bearing	1
7	13-032-30	Drive Link	1
8*		Ring Seal	5
9	13-032-31	Manifold	1
10	13-032-32	Commutator Assembly (matched set)	1
11	13-032-33	End Cover	1
12	14-134	Bolt	7
13*		Commutator Seal (matches with Ref 10)	1
14	13-032-34	Rotor Set (matched set)	1
15	13-032-35	Plate Wear	1
16	13-032-36	Coupling Shaft	1
	HWK-516-100	Woodruff Key ⁵ / ₁₆ x 1	1
	14-265	Nut 1 - 20	1
17	13-032-37	Thrust Washer	2
18*		Backup Washer	1
19*		Backup Washer	1
20	13-032-38	Outer Bearing	1
*	14-080	Seal Kit	1

34-103 ORBITOR DRAWING

Parts



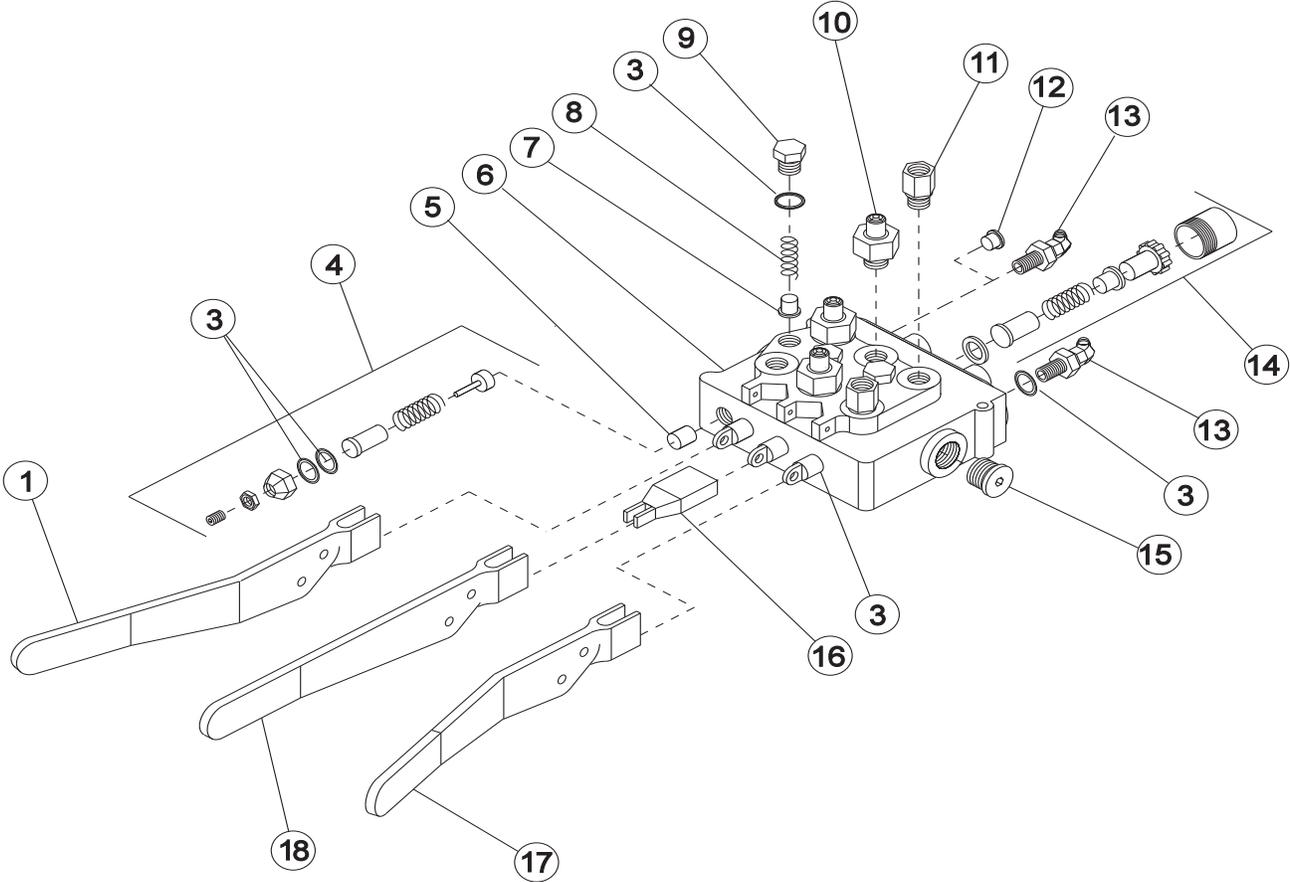
34-103 ORBITOR PARTS LIST

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 (70 bar))	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 SJ or higher
Check Valve for Manual Steering	Yes
Relief Valve Setting	1015 psi (70 bar)
Ports	$\frac{9}{16}$ - 18 SAE O-Ring five
Displacement	61 cu. in/ R (100 cu cm/R)

13-355 HYDRAULIC 3-BANK VALVE DRAWING



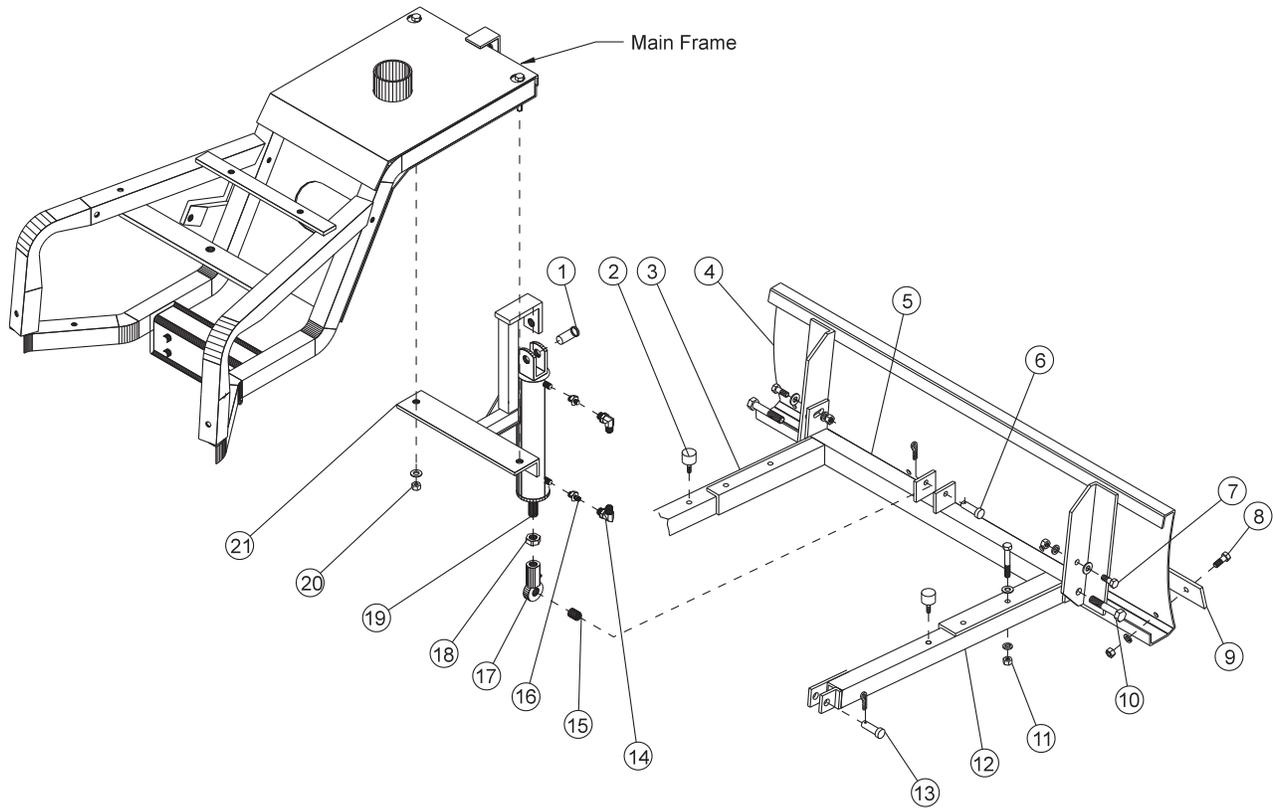
Accessories

13-355 HYDRAULIC 3-BANK VALVE PARTS LIST

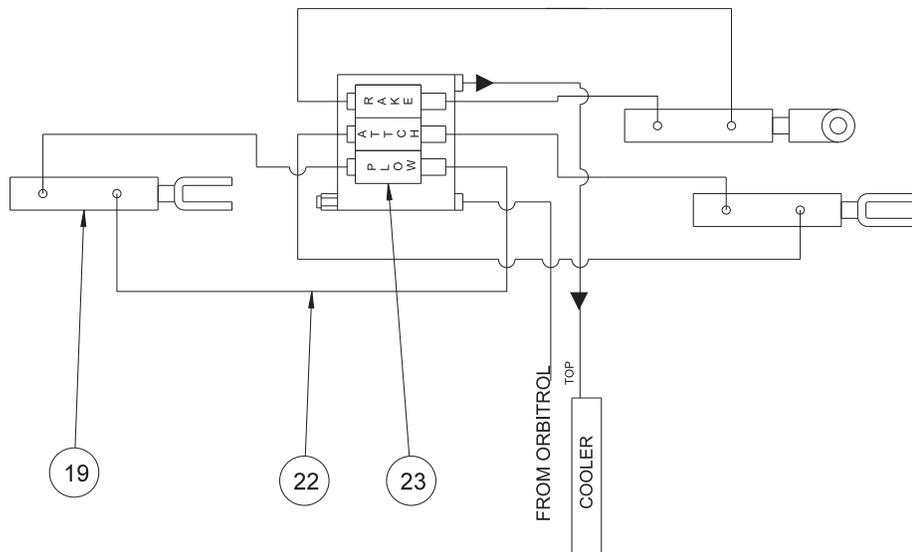
REF #	PART #	DESCRIPTION	QUANTITY
1*	14-205	Seal Kit	1
2*	14-106	Relief Assembly Kit	1
3*	13-261-03	N.R. Plug	1
4*	13-355-01	Housing	1
5	18-169	Adapter ³ / ₈ SAE	6
6*	13-261-06	Spring	3
7*	13-261-05	Plug	3
8*	13-261-07	Plunger	3
9*	13-261-04	Plug Cap	8 (shipping only)
10	18-168	Elbow	2
11*	14-203	Spring Center Kit	1 Per Bank
12*	13-261-02	Plug	1
13	34-111	Handle	1
14	76-025	Linkage Kit (includes Hitch Pin, Clevis Pin and Link)	1
15	18-202	Elbow	1
16	34-110	Handle (set of 2)	1
17	18-214	45° Elbow	1
*	13-355	Hydraulic Valve 3-Bank	

34-188 HYDRAULIC SAND PLOW DRAWING (FACTORY INSTALLED)

34-189 HYDRAULIC SAND PLOW DRAWING (DEALER INSTALLED)



HYDRAULIC VALVE PLUMBING



Accessories

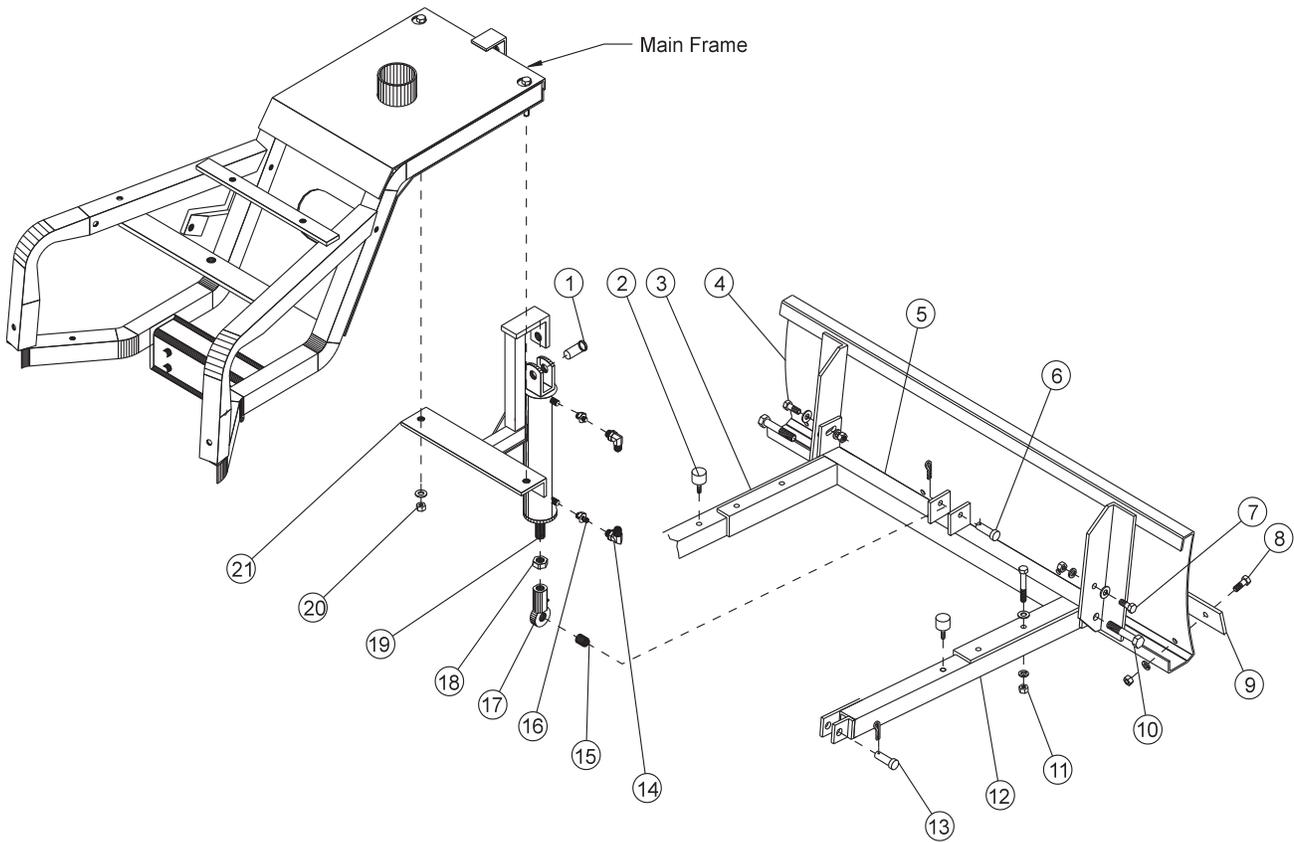
34-188 HYDRAULIC SAND PLOW PARTS LIST (FACTORY INSTALLED)

34-189 HYDRAULIC SAND PLOW PARTS LIST (DEALER INSTALLED)

REF#	PART#	DESCRIPTION	QUANTITY
1	HCP-58-150	Clevis Pin $\frac{5}{8}$ x $1\frac{1}{2}$	1
	HHP-18	Bridge Pin $\frac{1}{8}$	1
2	15-013	Rubber Bumper	2
3	13-168	Left Pusher Bar	1
4	13-352	Sand Plow	1
5	13-322	Lift Bar	1
6	HCP-12-200	Clevis Pin $\frac{1}{2}$ x 2	1
	HHP-18	Bridge Pin $\frac{1}{8}$	1
7	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	2
	HW-38	Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
8	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
9	13-167	Wear Blade	1
10	HB-12-13-300	Bolt $\frac{1}{2}$ - 13 x 3	2
	HNTL-12-13	Lock Nut $\frac{1}{2}$ - 13	2
11	HB-38-16-225	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{4}$	4
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	4
12	13-169	Right Pusher Bar	1
13	HCP-12-150	Clevis Pin $\frac{1}{2}$ x $1\frac{1}{2}$	2
	HHP-18	Bridge Pin $\frac{1}{8}$	2
14	18-168	Elbow	2
15	18-235	Oilite Bushing	1
16	18-169	Adapter	2
17	18-154	Rod End	1
18	HNJ-58-18	Jam Nut $\frac{5}{8}$ - 18	1
19	13-406	Hydraulic Cylinder	1
20	HW-38	Washer $\frac{3}{8}$	2
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	2
21	34-211	Cylinder Bracket	1
22	15-307	Hydraulic Hose	2
	13-099	Hose Clamp	1
	HST-516-18-100	Truss Head Machine Screw $\frac{5}{16}$ - 18 x 1	1
	HNTL-516-18	Lock Nut $\frac{5}{16}$ - 18	1
23	13-355	3 Bank Hydraulic Valve	1

34-188 HYDRAULIC SAND PLOW DRAWING (DEALER INSTALLED)

34-189 HYDRAULIC SAND PLOW DRAWING (FACTORY INSTALLED)



Accessories

34-188 HYDRAULIC SAND PLOW INSTRUCTION (DEALER INSTALLED)

34-189 HYDRAULIC SAND PLOW INSTRUCTION (FACTORY INSTALLED)

1. Bolt bracket (Ref 21), to the bolts welded in the bottom of the main frame. Use $\frac{3}{8}$ washer and lock nut (Ref 20) to hold in place.
2. Fasten pusher bars (Ref 3 and 12) to the sand plow (Ref 4), as shown. Leave loose.
3. Fasten lift bar (Ref 5) to the pusher bars, as shown. Leave loose.
4. Put the plow in front of the trap rake and slide it back so that the pusher bars can be connected to the tabs on the frame with clevis pin and bridge pin (Ref 13).
5. Tighten the bolts and nuts holding the left bar to the pusher bars.
6. Set the plow at the desired angle and tighten the bolts and nuts holding it to the pusher bars.
7. Attach the hydraulic cylinder to the cylinder bracket with the $\frac{5}{8} \times 1\frac{3}{4}$ clevis pin and one $\frac{1}{8}$ bridge pin. The ports on the cylinder must point to the right side of the machine.
8. Thread the jam nut and the rod end onto the cylinder rod end and leave them loose to find the required length.
9. Either extend the rod or raise the plow up and fasten them together with $\frac{1}{2} \times 2$ clevis pin and $\frac{1}{8}$ bridge pin (Ref 6). Place oilite bushing (Ref 15) in rod end and slide clevis pin through.
10. Remove the handles from the 2-bank valve and put them on the 3-bank valve. The extra handle shipped with the plow goes on the outside.
11. Mark the hoses on the 2-bank valve that is on the machine so that they can be put in the same position on the 3-bank valve.
12. Disconnect the negative (-) ground battery cable from the battery. Place a drain pan under the valve in the machine. Be sure engine is cool before disconnecting the hoses. Remove the 2-bank valve.
13. Remove the fittings from the 2-bank valve and put them into the 3-bank valve (with the outside bank for the sand plow). Put the 16-169 adapters in first and then the 18-168 elbows and the 18-202 elbow.
14. Put the 3-bank valve into the machine and reconnect the hoses. The outside bank is for the sand plow; middle bank is the rake lift; the inside bank is for the attachment lift.
15. Drill a $\frac{3}{8}$ diameter hole in the right floorboard, 12 inches from the rear edge and $3\frac{1}{2}$ inches down from the top.
16. Connect the two hoses to the cylinder using the ridge end first. Route the hose along the right floorboard and in front of battery up to the valve being careful to leave clearance by moving parts. Tighten all fittings.
17. Secure the two hoses to the inside of the right floorboard using 13-099 hose clamp. Place the $\frac{5}{16} - 18 \times 1\frac{1}{2}$ truss machine screw through the hole you drilled with one hose on each side of the screw. Place the hose strap over the screw and hoses, tighten $\frac{5}{16} - 18$ lock nut.
18. Reconnect the negative (-) ground battery cable to battery.
19. Make sure that everything is clear of the machine. Start the machine, work the valve so that the plow will both raise and lower. Also, do this with both the attachment lift and the rake lift. Work the lift a number of times until all air works out of the plow circuit and the cylinder works smoothly. At this time look for hydraulic leaks. If there are leaks, turn engine off and repair, start up and check again.
20. Double check all fasteners and fittings, be sure they are tight.
21. Check the hydraulic oil level. The level should be 2" to $2\frac{1}{2}$ " from the top of the tank. If more is needed, use SAE 10W-40 API service SJ or higher motor oil.

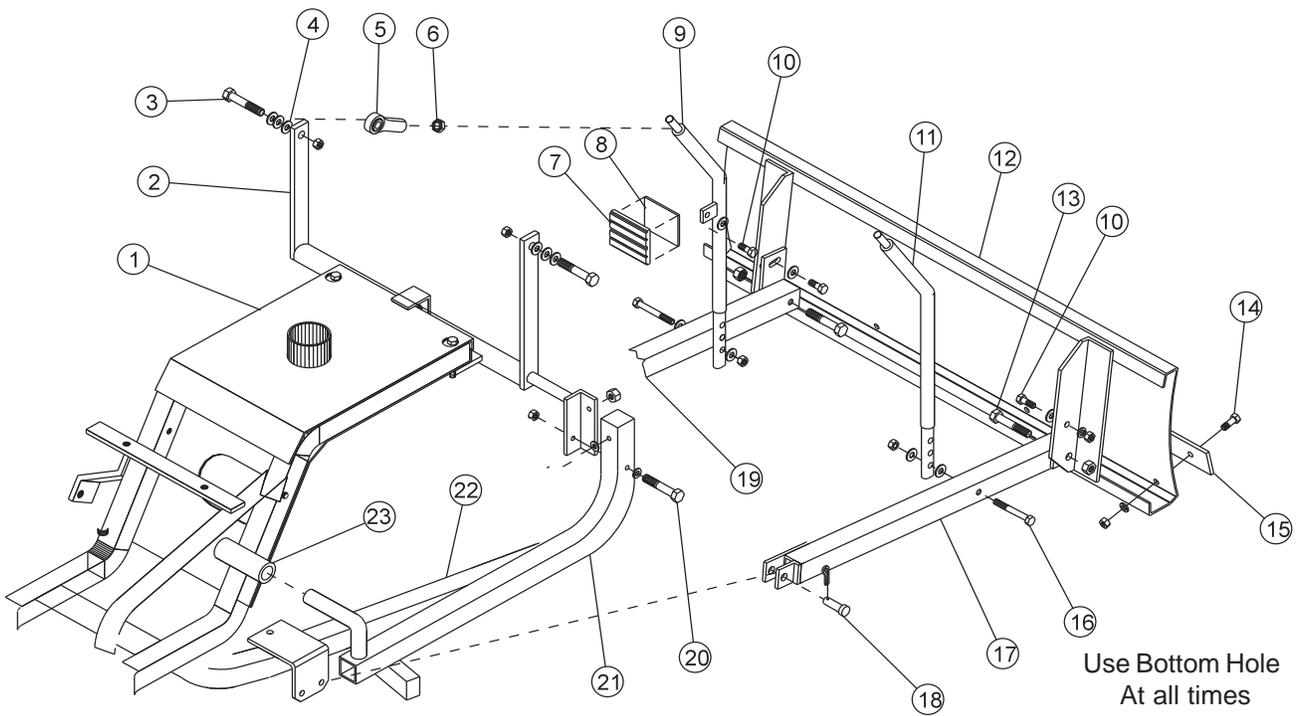


34-168 SAND PLOW DRAWING

WHEN ORDERING:

SAND PLOW WITH STEEL BLADE USE #34-168-SB.

SAND PLOW WITH ALUMINUM BLADE USE #34-168-AB



Accessories

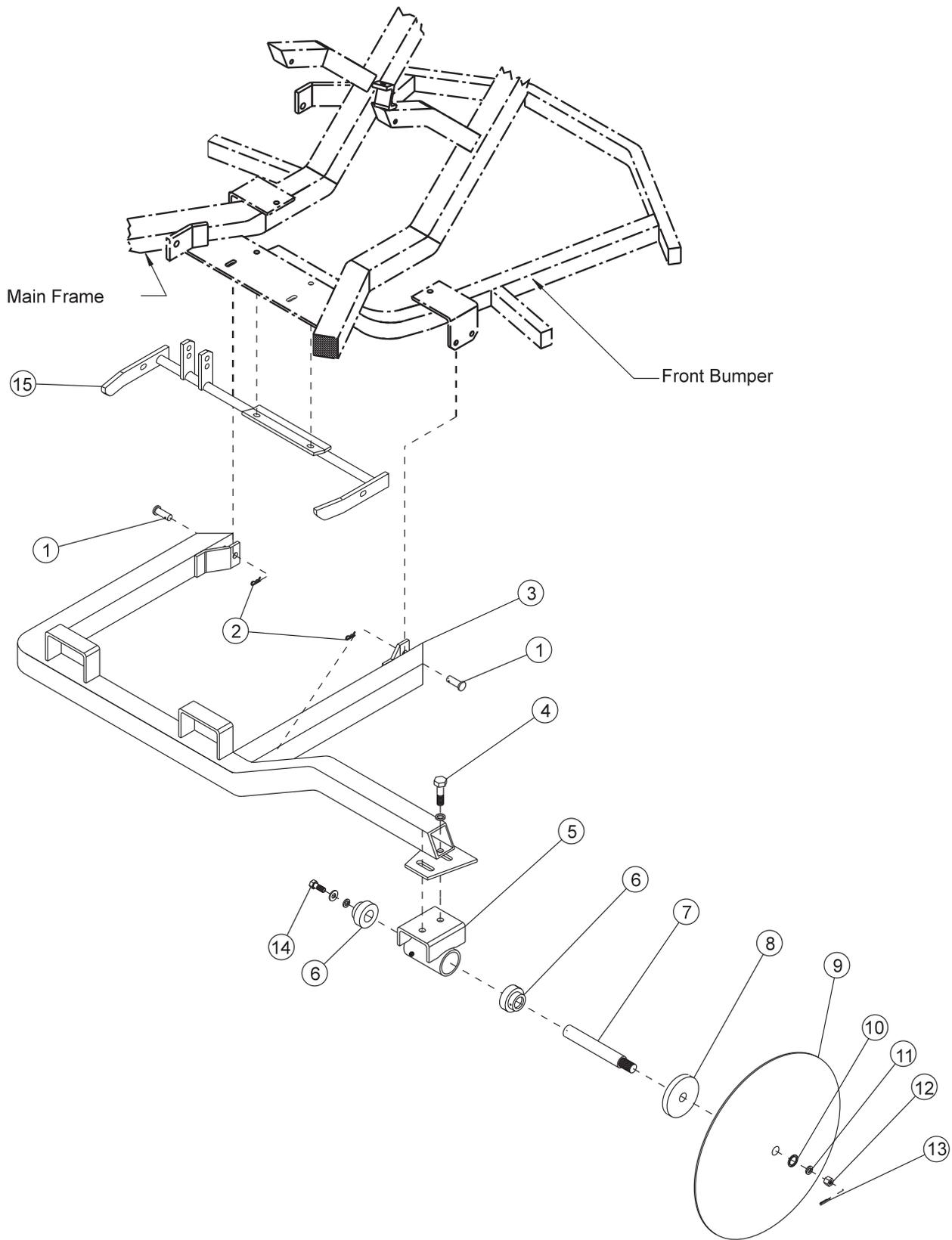
34-168 SAND PLOW PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	34-018	Main Frame	1
2	34-192	Lift Handle	2
3	HB-12-13-200	Bolt 1/2 - 13 x 2	2
	HNCL-12-13	Center Lock Nut 1/2 - 13	2
4	HMB-12-14	Machine Bushing 1/2 x 14GA	6
5	80-006	Rod End	2
6	HNJ-12-20	Jam Nut 1/2 - 20	2
7	15-015	Pedal Pad	1
8	16-062	Pedal Pad Plate	1
9	13-643	Left Lift Rod	1
10	HB-38-16-100	Bolt 3/8 - 16 x 1	2
	HW-38	Washer 3/8	2
	HWL-38	Lock Washer 3/8	2
	HN-38-16	Nut 3/8 - 16	2
11	27-073	Right Lift Rod	1
12	27-017	Aluminum Sand Plow Blade	1
	13-352	Steel Sand Plow Blade	1
13	HB-12-13-275	Bolt 1/2 - 13 x 2 3/4	2
	HNCL-12-13	Center Lock Nut 1/2 - 13	2
14	HB-38-16 -100	Bolt 3/8 - 16 x 1	4
	HWL-38	Lock Washer 3/8	4
	HN-38-16	Nut 3/8 - 16	4
15	13-167	Wear Blade	1
16	HB-38-16-300	Bolt 3/8 - 16 x 3	2
	HW-38	Washer 3/8	4
	HNTL-38-16	Lock Nut 3/8 - 16	2
17	13-169	Right Pusher Bar	1
18	HCP-12-150	Clevis Pin	2
	HHP-18	Bridge Pin 1/8	2
19	13-168	Left Pusher Bar	1
20	HB-516-18-225	Bolt 5/16 - 18 x 2 1/4	2
	HW-516	Washer 5/16	2
	HNTL-516-18	Lock Nut 5/16 - 18	2
21	34-193	Handle	1
22	34-016	Floorboard Support	1
23	15-019	Hand Grip	1

INSTALLATION INSTRUCTIONS

1. Disconnect the negative (-) ground battery cable from the battery.
2. Place the tabs on lift handle (Ref 2) over the bolts on the bottom of the bearing plate on the main frame with the angle on the lift handle to the right side of the machine. Use two 3/8 lock nuts and flat washers. Tighten the two nuts at this time.
3. Bolt handle (Ref 21) to lift handle using bolts, washers and lock nuts (Ref 20).
4. Put hand grip (Ref 23) onto the handle.
5. Assemble pusher bars (Ref 17 and 19) to plow (Ref 12) using hardware (Ref 10 and 13). There are two holes to bolt hardware (Ref 10) in. Using hole closest to the blade will result in a shallow cut, whereas using the hole furthest from the blade will result in a deeper cut. The slot on the pusher bar is for a more fine tuned adjustment.
6. Put pedal pad and pedal pad plate (Ref 7 and 8) into left lift rod (Ref 9) using hardware (Ref 10).
7. Put rod ends (Ref 5) onto lift rods with jam nuts (Ref 6) first. Adjust to equal lengths. Bolt lift rods (the one with the pedal to the left side of the machine) to lift arms with the ball joints to the outside. Bolt from the outside with hardware (Ref 3) with the 1/2" machine bushing between rod end and lift arm.
8. Slide plow under machine and connect to machine as shown. Use clevis pin and cotter pin (Ref 18).
9. Connect lift rods to pusher bars using hardware (Ref 16) as shown. The three holes in the lift rods are for adjusting the position of the hand lever. **The Supreme can only use the bottom hole.**

13-199 EDGER KIT DRAWING



Accessories

13-199 EDGER KIT PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HCP-12-150	Clevis Pin, $\frac{1}{2} \times 1\frac{1}{2}$	2
2	HHP-18	Bridge Pin, $\frac{1}{8}$	2
3	13-200	Edger Frame	1
4	HB-12-13-150	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{2}$	2
	HW-12	Washer $\frac{1}{2}$	2
	HWL-12	Lockwasher $\frac{1}{2}$	2
	HN-12-13	Nut $\frac{1}{2}$ - 13	2
5	13-203	Spindle Tube	1
	HG-14-28-180	Grease Fitting $\frac{1}{4}$ - 28 x 180°	1
6	21-169	Bearing & Collar	2
7	13-206	Spindle Shaft	1
8	13-205	$\frac{1}{2}$ Disc Flange	1
9	13-204	Disc	1
10	HMB-34-14	Machine Bushing $\frac{3}{4} \times 14GA$	2
11	HWL-34	Lockwasher $\frac{3}{4}$	1
12	HNA-34-16	Axle nut $\frac{3}{4}$ - 16	1
13	HP-18-150	Cotter Pin $\frac{1}{8} \times 1\frac{1}{2}$	1
14	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	1
	HWL-38	Lockwasher $\frac{3}{8}$	1
	HW-516	Washer $\frac{5}{16}$	1
	HW-716	Washer $\frac{7}{16}$	1
15		Attachment Lift (Part of Lift Assembly)	
16		Main Frame (Part of Trap Rake)	

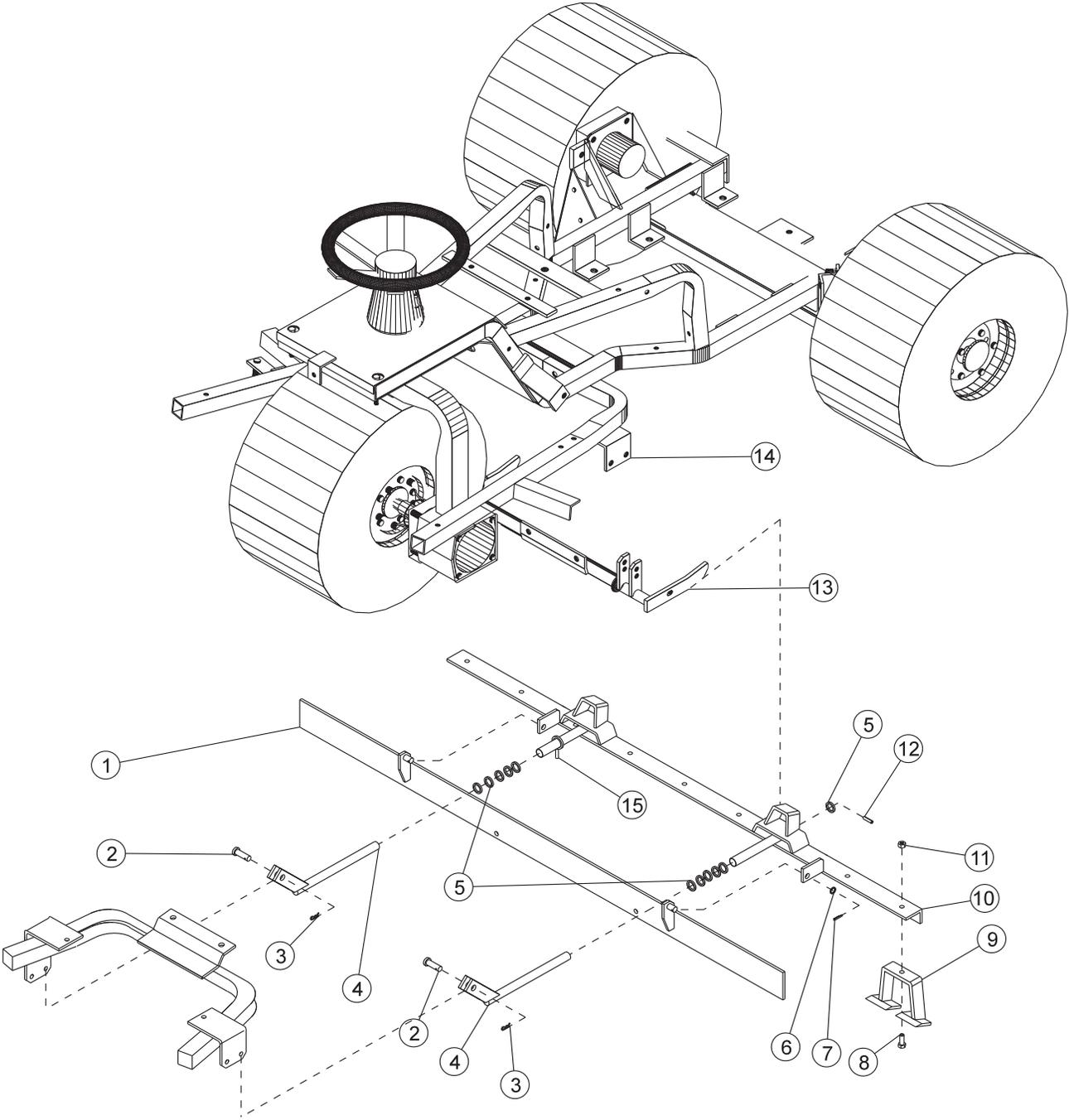
INSTALLATION INSTRUCTIONS

Optional Lift Assembly 13-505 must be installed before installing this unit on Super 2

- For initial assembly, bolt spindle tube (Ref 5) to edger frame (Ref 3) at a 60° to 70° angle. Use bolts, washers and nuts (Ref 4).
- Next, make sure $\frac{1}{2}$ " thick by $3\frac{1}{2}$ " round spacer (Ref 8) is on spindle shaft up to shoulder. Then place disc (Ref 9) onto the shaft followed by two $\frac{3}{4}$ machine bushings (Ref 10), one $\frac{3}{4}$ lockwasher and one $\frac{3}{4}$ - 16 axle nut (Ref 12). Tighten nut and use $\frac{1}{8} \times 1\frac{1}{2}$ cotter pin (Ref 13) to lock it.
- The edger unit mounts under the center of trap rake, fastening to attachment lift assembly, 13-146.
- Start engine and lower attachment lift FULLY. Stop engine.
- Slide Edger unit under trap rake from right side.
- Position lift brackets (pockets) of edger on lift bars, both sides at once or one side at a time if only one person is working on this.
- Start engine again and raise lift bars until horizontal with ground. Stop engine.
- Slide edger frame arms forward until holes of arms match rear holes of attachment bracket on main frame of trap rake. Secure them with two each; $\frac{1}{2} \times 1\frac{1}{2}$ clevis pins and $\frac{1}{8}$ bridge pins.
- Start engine and test lift and edger to make sure that all works well.
- To remove edger, lower lift until horizontal, undo the clevis and bridge pins, and slide edger off lift arms. Use CAUTION when releasing unit so it will not come down too fast on anyone's toes, fingers or legs.



13-107 INFIELD SCARIFIER DRAWING



Accessories

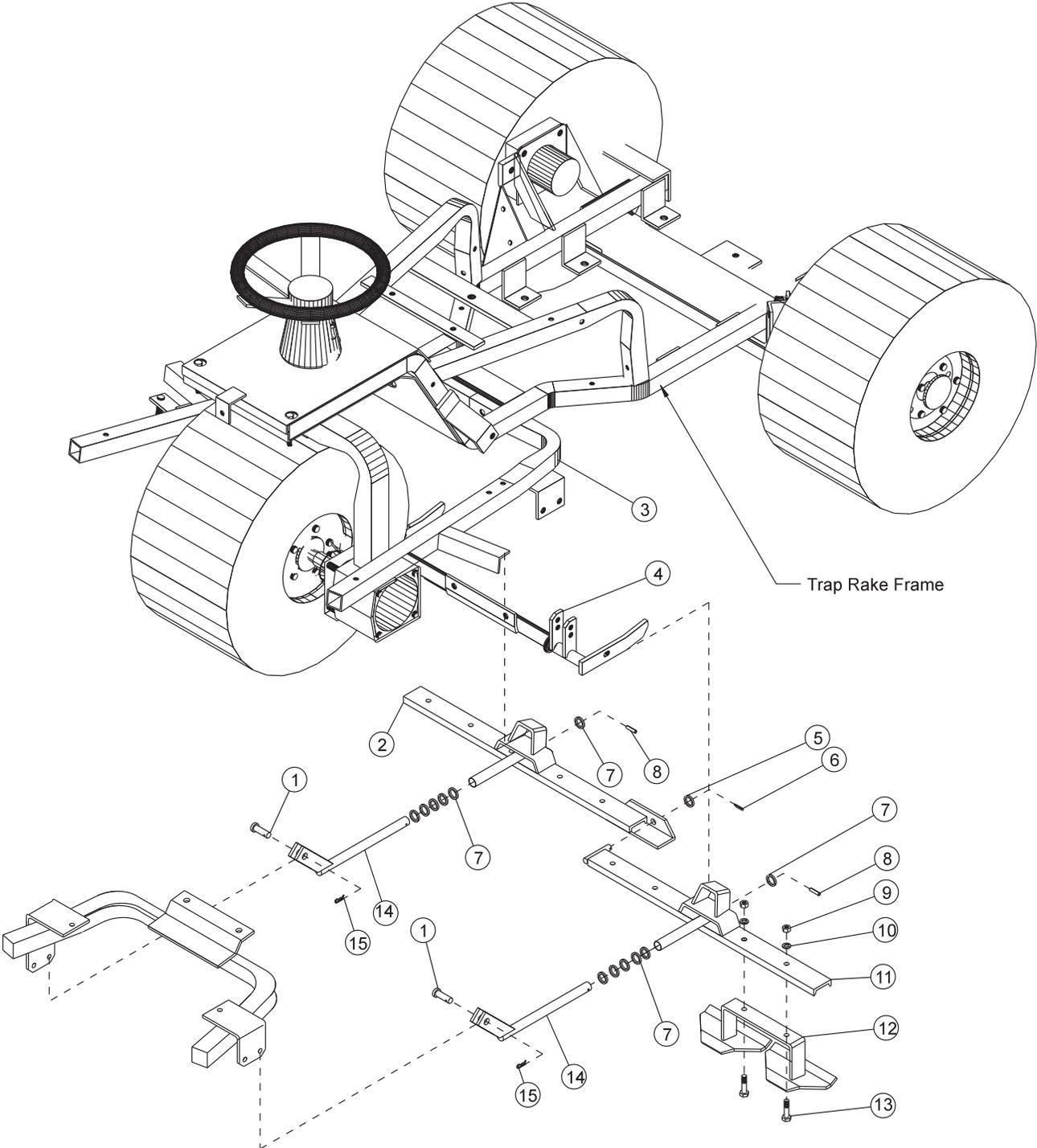
13-107 INFIELD SCARIFIER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	13-117	Grader Blade	1
2	HCP-12-150	Clevis Pin $\frac{1}{2}$ x $1\frac{1}{2}$	2
3	HHP-18	Bridge Pin $\frac{1}{8}$	3
4	13-115	Hitch (Pistols)	2
5	HMB-34-10	Machine Bushing $\frac{3}{4}$ x 10GA	12
6	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	4
7	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
8	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	9
9	13-114	Digger Blade	9
10	13-113	Frame	1
11	HNCL-38-16	Center Lock Nut $\frac{3}{8}$ - 16	9
12	HRP-14-100	Roll Pin $\frac{1}{4}$ x 1	2
13	13-146	Attachment Lift	
14	34-016	Floorboard Support	1
15	19-217	Transportation Hook	1

INSTALLATION INSTRUCTIONS

1. Slide transportation hook (Ref 15) over the right tube of the frame (Ref 10). Insert bridge pin (Ref 3) in hook for use when required later.
2. Using nine bolts (Ref 8) and nuts (Ref 11) attach digger blades (Ref 9) to the frame.
3. Insert hitch (pistols) (Ref 4) into tubes of frame with up to five machine bushings (Ref 5) in front and one bushing in the rear of tube. Secure pistols with roll pins (Ref 12). Check spacing before driving in roll pin all the way. For more tire clearance, machine bushings may be moved from front to rear.
4. Attach grader blade (Ref 1) to the frame as shown using machine bushing (Ref 6) and cotter pin (Ref 7).
5. Lift grader blade/frame unit (Ref 1 and 10) and hook pockets over the arms of attachment lift (Ref 13).
6. Attach pistols to the tabs of the trap rake frame undercarriage in the rear holes using clevis pins (Ref 2), machine bushings (Ref 3) and bridge pins (Ref 15).
7. Turn machine on and test for proper operation.

13-116 SAND CULTIVATOR DRAWING



Accessories

13-116 SAND CULTIVATOR PARTS LIST

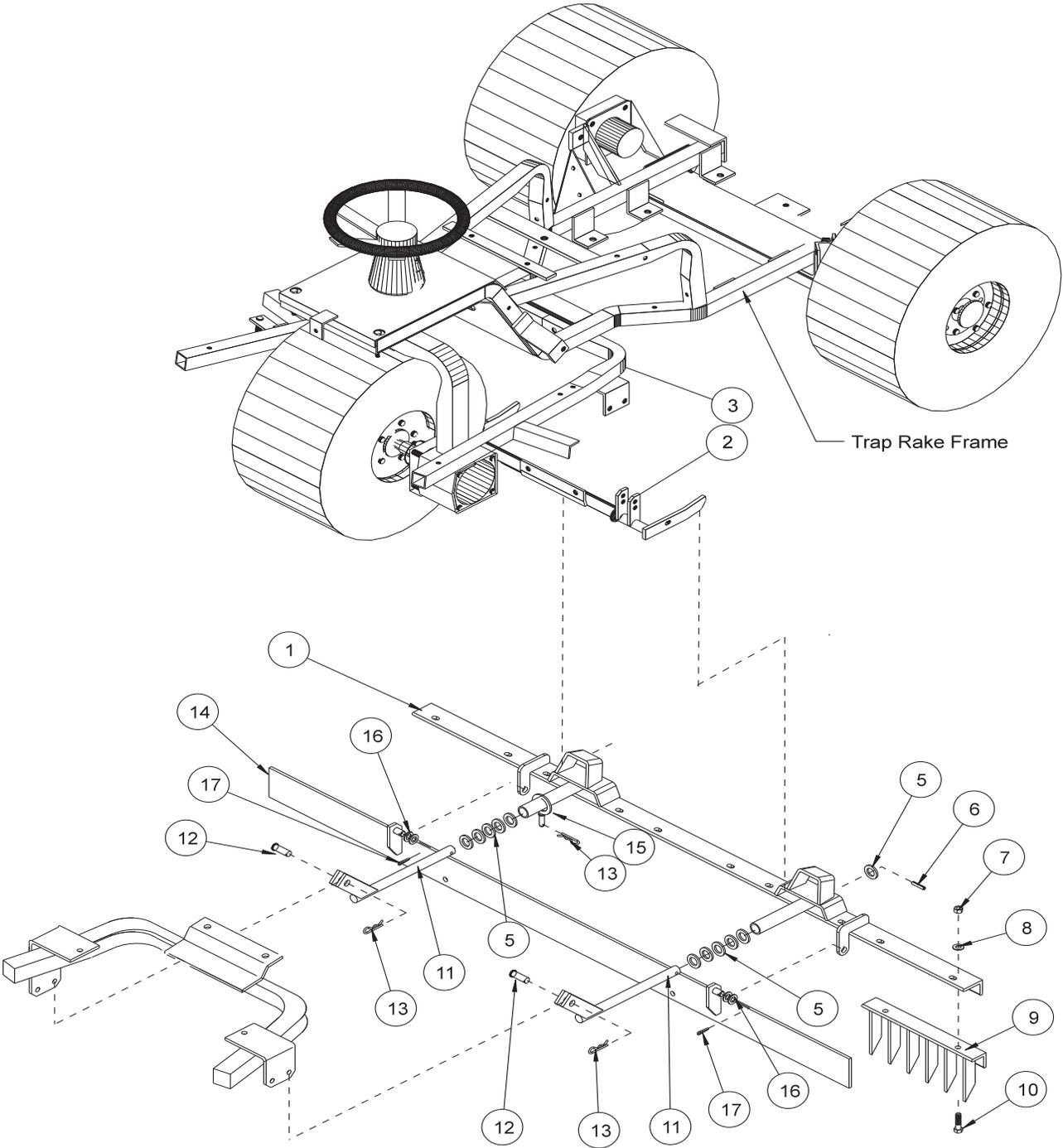
REF#	PART#	DESCRIPTION	QUANTITY
1	HCP-12-150	Clevis Pin $\frac{1}{2} \times 1\frac{1}{2}$	2
2	13-121	Right Frame Cultivator	1
3	34-016	Floorboard Support	1
4	13-146	Attachment Lift	
	HSSQ-38-16-200	Square Head Set Screw $\frac{3}{8}$ -16 x 2	1
	HN-38-16	Nut $\frac{3}{8}$ - 16	1
	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	1
	HW-38	Washer $\frac{3}{8}$	1
	HNTL-38-16	Lock Nut $\frac{3}{8}$ - 16	1
5	HMB-12-14	Machine Bushing $\frac{1}{2} \times 14$ GA	1
6	HP-18-100	Cotter Pin $\frac{1}{8} \times 1$	1
7	HMB-34-10	Machine Bushing $\frac{3}{4} \times 10$ GA	12
8	HRP-14-100	Roll Pin $\frac{1}{4} \times 1$	2
9	HN-38-16	Nut $\frac{3}{8}$ - 16	8
10	HWL-38	Lockwasher $\frac{3}{8}$	8
11	13-120	Left Frame Cultivator	1
12	13-096	Blade	4
13	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	8
14	13-115	Hitch (Pistols)	2
15	HHP-18	Bridge Pin $\frac{1}{8}$	2

INSTALLATION INSTRUCTIONS

1. Attach cultivator frames (Ref 11 and 2) together at center pin using machine bushings (Ref 5) and cotter pin (Ref 6).
2. Bolt four blade assemblies (Ref 12) to frames using eight bolts (Ref 13), lockwashers (Ref 10) and nuts (Ref 9). The blade points should angle down and forward.
3. Insert hitch, (pistols) (Ref 14) into tubes of frames (Ref 11 and 2) with up to five bushings (Ref 7) in front and one bushing in the rear of tube. Secure pistols with roll pins (Ref 8). Check spacing before driving roll pin in all the way. For more tire clearance, the machine bushing may be moved from front to rear.
4. Slide pockets of cultivator frames over arms of attachment lift (Ref 4).
5. Hook pistols up to tabs under trap rake frame by using rear holes with clevis pins (Ref 1) and bridge pin (Ref 15).
6. Start engine to test operation of cultivator. Raise and lower attachment checking for leaks and to see whether they are fairly level.



13-577 SCARIFIER VERTICAL BLADES DRAWING



Accessories

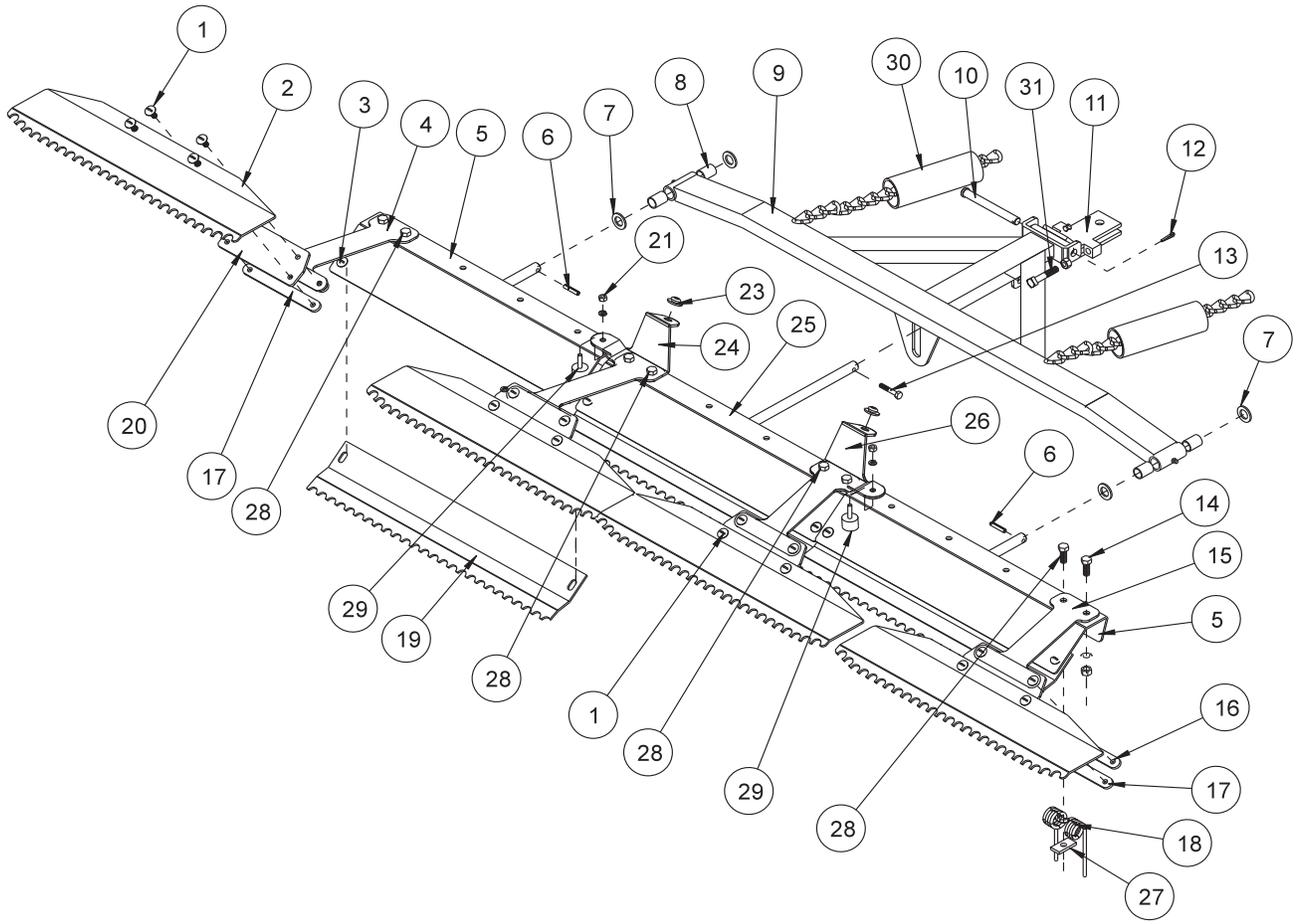
13-577 SCARIFIER VERTICAL BLADES PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	13-578	Frame	1
2	13-146	Attachment Lift	
3	34-016	Floorboard Support	1
5	HMB-34-10	Machine Bushing $\frac{3}{4}$ x 10GA	12
6	HRP-14-100	Roll Pin $\frac{1}{4}$ x 1	2
7	HN-38-16	Nut $\frac{3}{8}$ - 16	10
8	HWL-38	Lockwasher $\frac{3}{8}$	10
9	26-042	Tine Segment	5
10	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	10
11	13-115	Hitch (Pistols)	2
12	HCP-12-150	Clevis Pin $\frac{1}{2}$ x $1\frac{1}{2}$	2
13	HHP-18	Bridge Pin $\frac{1}{8}$	2

INSTALLATION INSTRUCTIONS

1. Bolt five tine segments (Ref 9) to frame (Ref 1) using ten bolts, lockwashers and nuts (Ref 7, 8 and 10) as shown on drawing.
2. Insert hitch (pistols) (Ref 11) into tubes of frame with up to five machine bushings (Ref 5) in front and one bushing in rear of the tube. Secure pistols with roll pins (Ref 6). Check the spacing before driving roll pin in all the way. For more tire clearance, machine bushings may be moved from front to rear.
3. Lift up the frame and hook pockets over the arms of attachment lift (Ref 2).
4. Attach pistols to the tabs of the trap rake frame undercarriage in the rear holes using clevis pins (Ref 12) and bridge pins (Ref 13).
5. Turn machine on and test for proper operation.

42-026 84" (213 CM) STAINLESS STEEL TOURNAMENT RAKE DRAWING

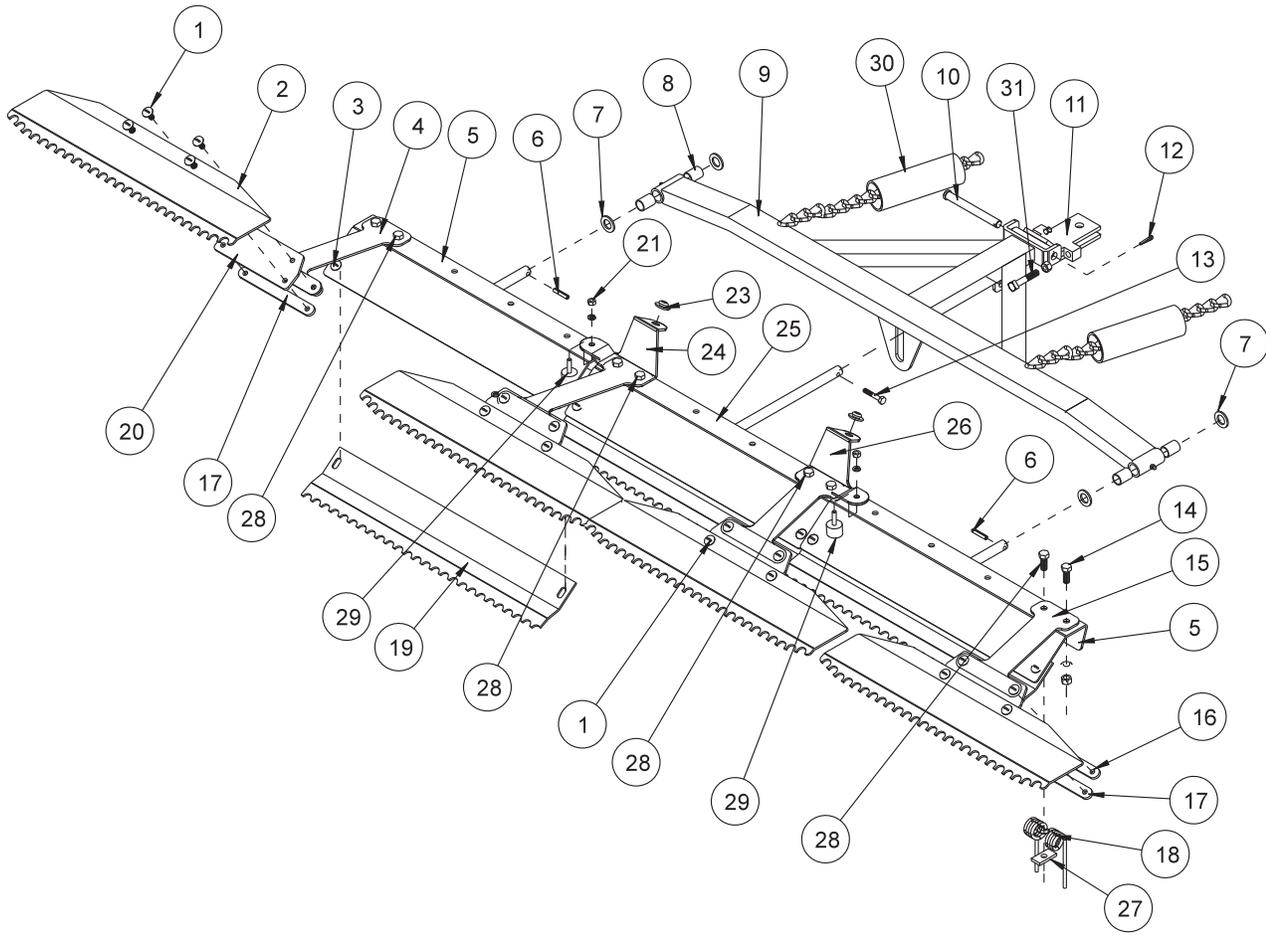


Accessories

42-026 84" (213 CM) STAINLESS STEEL TOURNAMENT RAKE DRAWING

REF#	PART#	DESCRIPTION	QUANTITY
1	HSTS-516-18-100	Stainless Truss Head Screw $5/16$ - 18 x 1	16
	HWL-516	Lockwasher $5/16$	16
	HN-516-18	Nut $5/16$ - 18	16
2	42-104	Finishing Blades	4
3	HSTS-516-18-075	Stainless Truss Head Screw $5/16$ - 18 x $3/4$	6
	HW-516	Washer $5/16$	6
	HWL-516	Lockwasher $5/16$	6
	HN-516-18	Nut $5/16$ - 18	6
4	42-111	Left Outside Mount	1
5	42-102	Outside Rake	2
6	HRP-14-100	Roll Pin $1/4$ x 1	2
7	HMB-58-14	Machine Bushing $5/8$ x 14GA	4
8	20-018	Oilite Bushing (comes with drawbar)	4
9	42-100	Draw Bar	1
10	HCP-12-450	Clevis Pin $1/2$ x $4 1/2$	1
11	13-647	Hitch	1
	HCP-12-150	Clevis Pin $1/2$ x $1 1/2$	1
	HHP-18	Bridge Pin $1/8$	1
12	HP-18	Cotter Pin $1/8$ x 1	1
13	HB-14-20-175	Bolt $1/4$ - 20 x $1 3/4$	1
	HNTL-14-20	Lock Nut $1/4$ - 20	1
14	HSTS-38-16-100	Stainless Steel Truss Head Screw $3/8$ - 16 x 1	4
	HWL-38	Lockwasher $3/8$	4
	HN-38-16	Nut $3/8$ - 16	4
15	42-109	Right Outside Mount	1
16	42-105	Top Strap	4
17	42-106	Bottom Strap	4
18	42-122	Rake Spring	12
19	42-103	Groomer Blades	3
20	42-107	Matting	4
21	HNC-14-20	Cap Nut $1/4$ - 20	2
	HWL-14	Lockwasher $1/4$	2
23	42-116	Rubber insert	2
24	42-110	Left Inside Mount	1
25	42-101	Center Rake	1
26	42-108	Right Inside Mount	1
27	42-177	Spring Holder	12
28	HSTS-38-16-125	Stainless Steel Truss Head Screw $3/8$ - 16 x $1 1/4$	12
	HWL-38	Lockwasher $3/8$	12
	HN-38-16	Nut $3/8$ - 16	12
29	15-013	Rubber Bumper	2
30	8892-6	Hose Wrap $1/4$ "	2
31	HSSQ-38-16-200	Square Head Set Screw $3/8$ - 16 x 2 (comes with 13-647)	2
	HN-38-16	Nut $3/8$ - 16 (comes with 13-647)	2

42-026 84" (213 CM) STAINLESS STEEL TOURNAMENT RAKE DRAWING

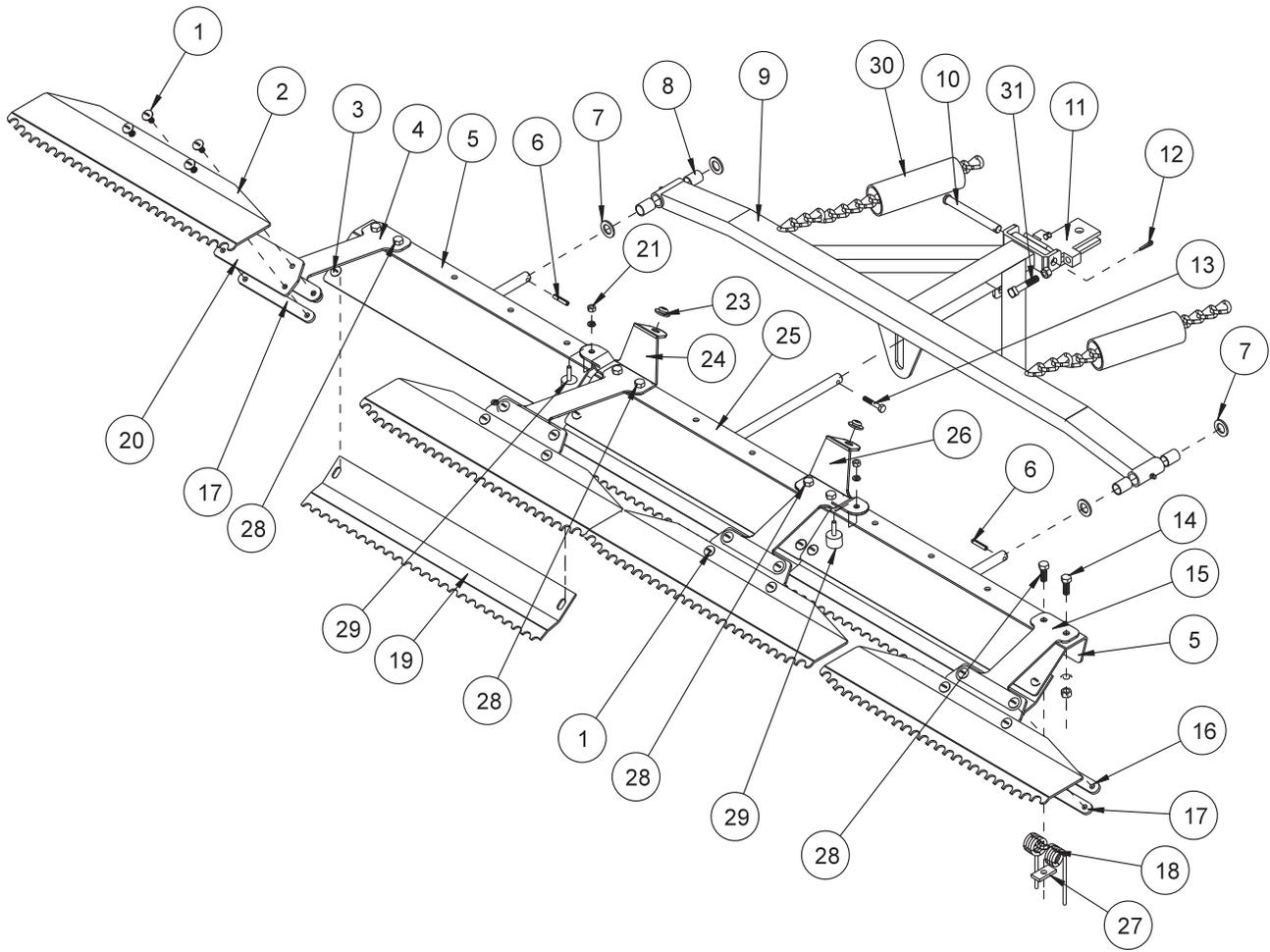


Accessories

INSTALLATION INSTRUCTIONS

1. Attach drawbar (Ref 9) to hitch (Ref 11) using clevis pin (Ref 10) and cotter pin (Ref 12).
 2. Attach rubber bumper (Ref 29) using cap nut and lock washer (Ref 21). Attach the rubber inserts (Ref 23) to the inside mounts (Ref 24 and 26).
 3. Attach the left outside mount (Ref 4), the left inside mount (Ref 24), the outside trowel mount (Ref 15), and the inside trowel mount (Ref 26) to the outside and center rakes (Ref 5 and 25) as shown. Use the 1" stainless steel truss head screws (Ref 14) on the outside hole of each rake.
 4. Use the spring holder (Ref 27) and the 1 $\frac{1}{4}$ " stainless steel truss head screws (Ref 28) to attach rake springs (Ref 18) to the rakes.
 5. Slide a machine bushing onto outside rake frames then slide the outside rake frames (Ref 5) into the tubing on the end of the drawbar. Hold in place with another machine bushing and a roll pin (Ref 6).
 6. Attach center rake (Ref 25) to draw bar (Ref 9) as shown, using the $\frac{1}{4}$ - 20 - 1 $\frac{3}{4}$ bolt and lock nut (Ref 13) with the shaft of the center rake between the tabs on the bottom of the drawbar.
 7. Attach the matting (Ref 20) and the top strap (Ref 16) to the inside and outside mounts using stainless steel truss head screw $\frac{5}{16}$ - 18 x 1 (Ref 1). Attach four finishing blades (Ref 2) to the matting on the inside and outside mounts with the stainless steel truss head screw $\frac{5}{16}$ - 18 x 1 (Ref 1) going through the finishing blade, matting, and bottom strap (Ref 17).
 8. Place the three groomer blades (Ref 19) under the three rake assemblies as shown, using (Ref 3).
 9. Attach the rake hitch (Ref 11) to the trap rake hitch.
 10. The end links of chain on the drawbar are to be hooked to the hooks of the trap rake lift.
 11. With the rake on the ground pull the rake to the right side until it is 2-3 inches from the tire.
 12. Using the adjustment screw (Ref 31) on the right side of hitch, adjust the screw until it hits the trap rake hitch, located on rear axle. Lock nut so adjustment will not change.
 13. Repeat steps 8 and 9 on left side.
 14. Turn machine on and test for operation of rake assembly by raising and lowering the rake assembly. Also with rake down, turn sharp corners to check that rake does not touch wheels.
- NOTE:** Test rake in sand to assure tire tracks are covered by the rake when turning sharp corners in either direction. If there are tire tracks, readjust using the adjusting screws on the hitch, so the rake comes closer to the tire.

42-128 72" (183CM) STAINLESS STEEL TOURNAMENT RAKE DRAWING

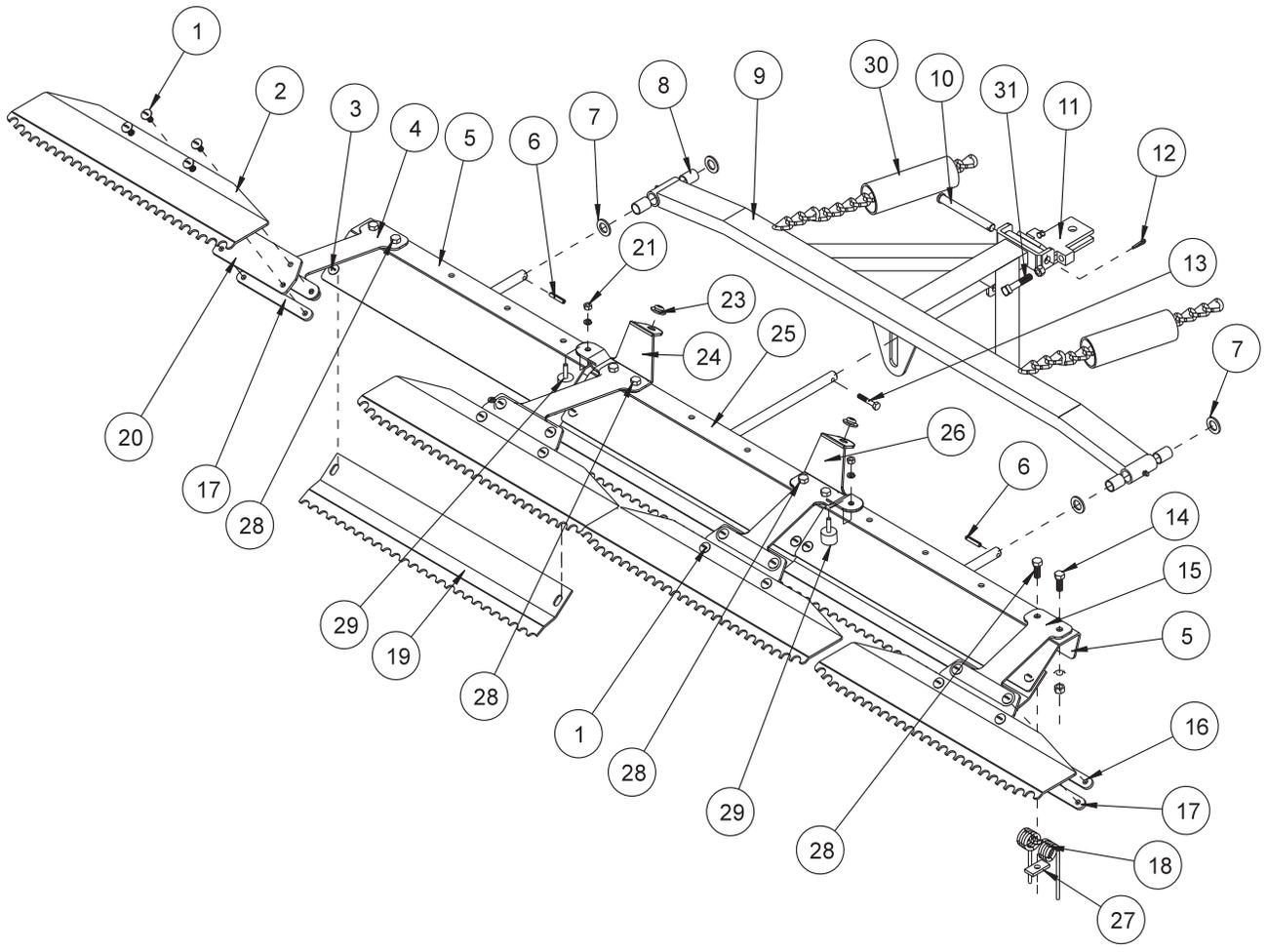


Accessories

42-128 72" (183CM) STAINLESS STEEL TOURNAMENT RAKE PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HSTS-516-18-100	Stainless Steel Truss Head Screw $\frac{5}{16}$ - 18 x 1	16
	HWL-516	Lock Washer $\frac{5}{16}$	16
	HN-516-18	Nut $\frac{5}{16}$ - 18	16
2	42-137	Finishing Blades	4
3	HSTS-516-18-075	Stainless Steel Truss Head Screw $\frac{5}{16}$ - 18 x $\frac{3}{4}$	6
	HW-516	Washer $\frac{5}{16}$	6
	HWL-516	Lock Washer $\frac{5}{16}$	6
	HN-516-18	Nut $\frac{5}{16}$ - 18	6
4	42-111	Left Outside Mount	1
5	42-140	Outside Rake	2
6	HRP-14-100	Roll Pin $\frac{1}{4}$ x 1	2
7	HMB-58-14	Machine Bushing $\frac{5}{8}$ x 14GA	4
8	20-018	Oilite Bushing (comes with 42-141)	4
9	42-141	Draw Bar	1
10	HCP-12-450	Clevis Pin $\frac{1}{2}$ x $4\frac{1}{2}$	1
11	13-647	Hitch	1
	HCP-12-150	Clevis Pin $\frac{1}{2}$ x $1\frac{1}{2}$	1
	HHP-18	Bridge Pin $\frac{1}{8}$	1
12	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
13	HB-14-20-175	Bolt $\frac{1}{4}$ - 20 x $1\frac{3}{4}$	1
	HNTL-14-20	Lock Nut $\frac{1}{4}$ - 20	1
14	HSTS-38-16-100	Stainless Steel Truss Head Screw $\frac{3}{8}$ - 16 x 1	4
	HWL-38	Lock Washer $\frac{3}{8}$	4
	HN-38-16	Nut $\frac{3}{8}$ - 16	4
15	42-109	Outside Trowel Mount	1
16	42-105	Top Strap	4
17	42-106	Bottom Strap	4
18	42-122	Rake Spring	12
19	42-138	Groomer Blades	3
20	42-107	Matting	4
21	HNC-14-20	Cap Nut $\frac{1}{4}$ - 20	2
	HWL-14	Lock Washer $\frac{1}{4}$	2
23	42-116	Rubber Insert	2
24	42-110	Left Inside Mount	1
25	42-139	Center Rake	1
26	42-108	Inside Trowel Mount	1
27	42-177	Spring Holder	12
28	HSTS-38-16-125	Stainless Steel Truss Head Screw $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	12
	HWL-38	Lock Washer $\frac{3}{8}$	12
	HN-38-16	Nut $\frac{3}{8}$ - 16	12
29	15-013	Rubber Bumper	2
30	8892-6	Hose Wrap	2
31	HSSQ-38-16-200	Square Head Set Screw $\frac{3}{8}$ - 16 x 2 (comes with 13-647)	2
	HN-38-16	Nut $\frac{3}{8}$ - 16 (comes with 13-647)	2

42-128 72" (183CM) STAINLESS STEEL TOURNAMENT RAKE DRAWING

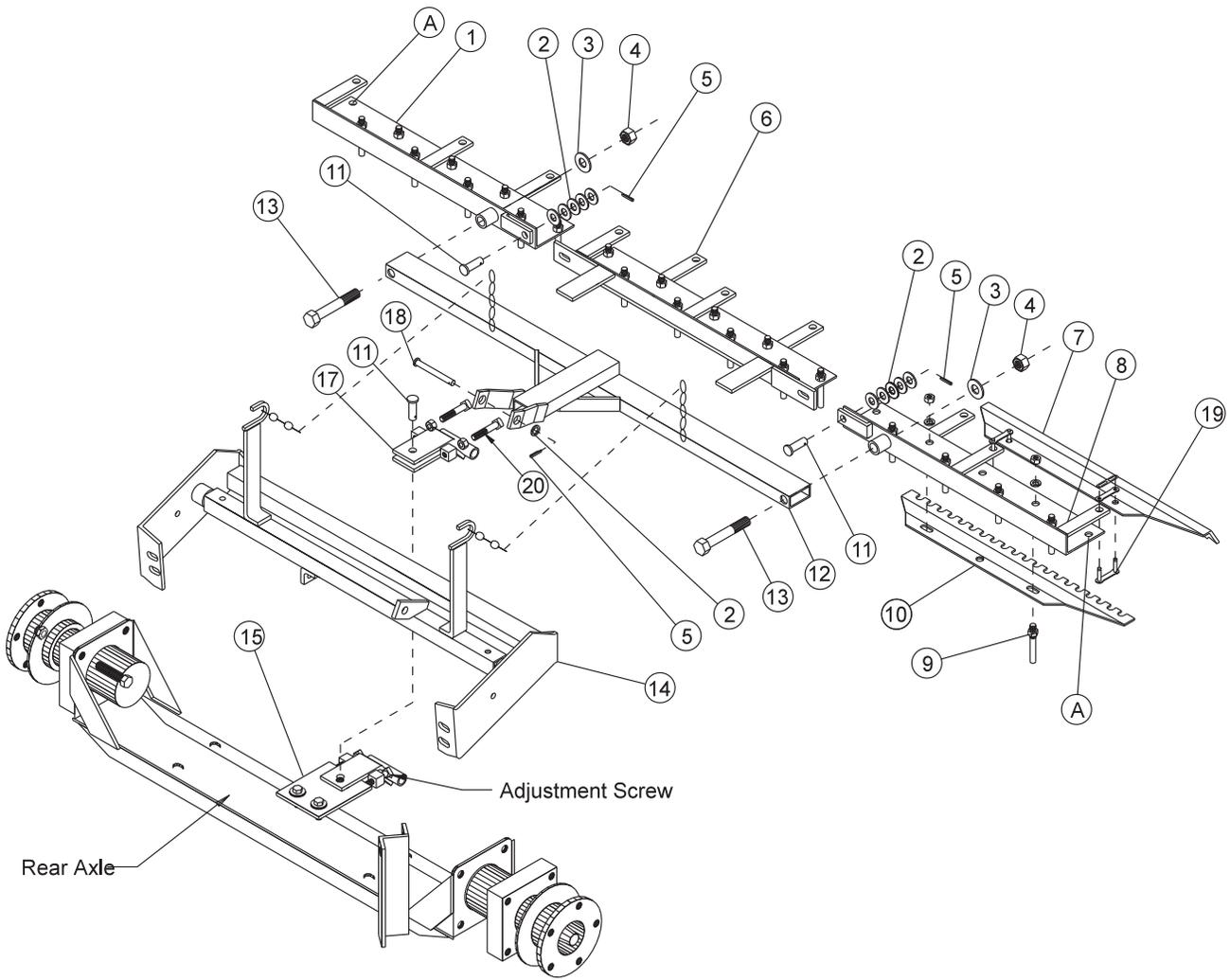


Accessories

INSTALLATION INSTRUCTIONS

1. Attach drawbar (Ref 9) to hitch (Ref 11) using clevis pin (Ref 10) and cotter pin (Ref 12).
 2. Attach rubber bumper (Ref 29) using cap nut and lock washer (Ref 21). Attach the rubber inserts (Ref 23) to the inside mounts (Ref 24 and 26).
 3. Attach the left outside mount (Ref 4), the left inside mount (Ref 24), the outside trowel mount (Ref 15), and the inside trowel mount (Ref 26) to the outside and center rakes (Ref 5 and 25) as shown. Use the 1" stainless steel truss head screws (Ref 14) on the outside hole of each rake.
 4. Use the spring holder (Ref 27) and the 1 $\frac{1}{4}$ " stainless steel truss head screws (Ref 28) to attach rake springs (Ref 18) to the rakes.
 5. Slide a machine bushing onto outside rake frames then slide the outside rake frames (Ref 5) into the tubing on the end of the drawbar. Hold in place with another machine bushing and a roll pin (Ref 6).
 6. Attach center rake (Ref 25) to draw bar (Ref 9) as shown, using the $\frac{1}{4}$ - 20 - 1 $\frac{3}{4}$ bolt and lock nut (Ref 13) with the shaft of the center rake between the tabs on the bottom of the drawbar.
 7. Attach the matting (Ref 20) and the top strap (Ref 16) to the inside and outside mounts using stainless steel truss head screw $\frac{5}{16}$ - 18 x 1 (Ref 1). Attach four finishing blades (Ref 2) to the matting on the inside and outside mounts with the stainless steel truss head screw $\frac{5}{16}$ - 18 x 1 (Ref 1) going through the finishing blade, matting, and bottom strap (Ref 17).
 8. Place the three groomer blades (Ref 19) under the three rake assemblies as shown, using (Ref 3).
 9. Attach the rake hitch (Ref 11) to the trap rake hitch.
 10. The end links of chain on the drawbar are to be hooked to the hooks of the trap rake lift.
 11. With the rake on the ground pull the rake to the right side until it is 2-3 inches from the tire.
 12. Using the adjustment screw (Ref 31) on the right side of hitch, adjust the screw until it hits the trap rake hitch, located on rear axle. Lock nut so adjustment will not change.
 13. Repeat steps 8 and 9 on left side.
 14. Turn machine on and test for operation of rake assembly by raising and lowering the rake assembly. Also with rake down, turn sharp corners to check that rake does not touch wheels.
- NOTE:** Test rake in sand to assure tire tracks are covered by the rake when turning sharp corners in either direction. If there are tire tracks, readjust using the adjusting screws on the hitch, so the rake comes closer to the tire.

13-438 RAKE ASSEMBLY WITH FINISHING BLADES DRAWING



Accessories

13-438 RAKE ASSEMBLY WITH FINISHING BLADES PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	13-441	Right Rake	1
2	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	11
3	HMB-58-14	Machine Bushing $\frac{5}{8}$ x 14GA	2
4	HNCL-58-11	Lock Nut $\frac{5}{8}$ - 11	2
5	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	3
6	13-440	Center Rake	1
7	13-443	Finishing Blade	5
8	13-439	Left Rake	1
9*	13-445	Rake teeth Kit (25 19-106 studs)	1
10	13-442	Groomer Blade	3
11	HCP-12-150	Clevis Pin $\frac{1}{2}$ - 1 $\frac{1}{2}$	3
	HHP-18	Bridge Pin $\frac{1}{8}$	1
12	13-365	Drawbar	1
13	HB-58-11-400	Bolt $\frac{5}{8}$ - 11 x 4	2
14	34-047	Rake Lift	
15	34-019	Hitch Attachment	1
17	13-647	Hitch (includes Ref 20)	1
18	HCP-12-450	Clevis Pin $\frac{1}{2}$ - 4 $\frac{1}{2}$	1
19	13-417	Connector Link	10
20	HSSQS-38-16-200	Stainless Steel Square Head Set Screw $\frac{3}{8}$ - 16 x 2	2
	HNS-38-16	Stainless Steel Nut $\frac{3}{8}$ - 16	2
*	19-106	Studs and Hardware used in Rake Teeth Kit	25

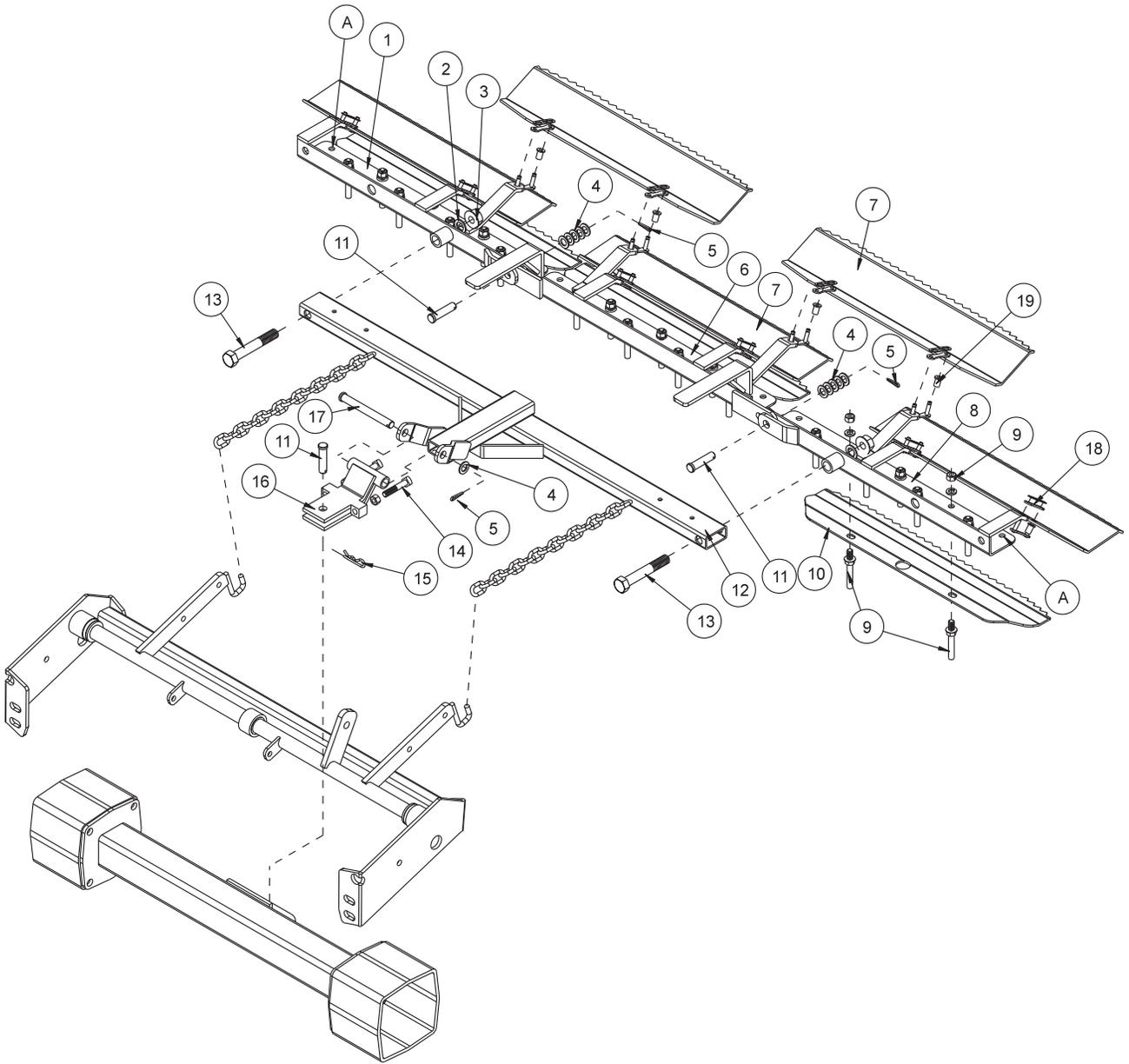
INSTALLATION INSTRUCTIONS

1. Attach drawbar (Ref 12) to hitch (Ref 17) using clevis pin (Ref 18), machine bushing (Ref 2) and cotter pin (Ref 5).
2. Bolt rake teeth (Ref 9) to frames, keeping all the same length. Leave the two outside holes on right and left rake open (Ref A).
3. Lay out rake frames (Ref 1,6 and 8). Connect them using clevis pin (Ref 11), machine bushing (Ref 2) and cotter pin (Ref 5).
4. Attach drawbar to left and right frames using bolt (Ref 13), machine bushing (Ref 3), and nut (Ref 4).
5. Attach five finishing blades (Ref 7) to the tabs of the rake frames using master link (Ref 19). Blades may be mounted with saw tooth up or down, depending on the desired finish of the sand trap.
6. Attach rake hitch (Ref 17) to trap rake hitch on the rear axle using a clevis pin (Ref 11) and bridge pin.
7. The end links of chain on drawbar (Ref 12) are to be hooked to the hooks of the trap rake lift (Ref 14).
8. With the rake on the ground pull the rake to the right side until it is 2-3 inches from the tire.
9. Using the adjustment screw (Ref 20) on the right, adjust the screw until it hits the trap rake hitch, located on rear axle. Lock jam nut so adjustment will not change.
10. Repeat steps 8 and 9 on left side.
11. Turn machine on and test for operation of rake assembly by raising and lowering the rake assembly. Also with rake down, turn sharp corners to check that rake does not touch wheels.
12. **NOTE:** Test rake in sand to assure tire tracks are covered by the rake when turning sharp corners in either direction. If there are tire tracks, readjust using the adjusting screws on the hitch, so the rake comes closer to the tire.

GROOMER BLADES - GOLF COURSE USE ONLY.

1. Place the three groomer blades (Ref 10) under the three rake assemblies (Ref 1, 6 and 8).
2. Center blades below rear most row of Rake teeth. The blade is designed to miss the outside two "teeth" and fit around the center "tooth".
3. Remove the two "teeth" that line up with slots of each groomer blade. Move blade up and into position and reattach "teeth". Blade thickness should be accounted for by shortening the "teeth" an equal length.

13-606 RAKE ASSEMBLY WITH LEXAN BLADES DRAWING



Accessories

13-606 RAKE ASSEMBLY WITH LEXAN BLADES PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	13-441	Right Rake	1
2	HMB-58-14	Machine Bushing $\frac{5}{8}$ x 14GA	2
3	HNCL-58-11	Lock Nut $\frac{5}{8}$ - 11	2
4	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	11
5	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	3
6	13-440	Center Rake	1
7	13-605	Lexan Blade (with weight & rivets)	5
8	13-439	Left Rake	1
9*	19-106	Rake teeth	25
10	13-442	Groomer Blade	3
11	HCP-12-150	Clevis Pin $\frac{1}{2}$ - $1\frac{1}{2}$	3
12	13-365	Drawbar	1
13	HB-58-11-400	Bolt $\frac{5}{8}$ - 11 x 4	2
14	HSSQS-38-16-200	Stainless Steel Square Head Set Screw $\frac{3}{8}$ - 16 x 2	2
	HNS-38-16	Stainless Steel Nut $\frac{3}{8}$ - 16	2
15	HHP-18	Bridge Pin $\frac{1}{8}$	1
16	13-647	Hitch (includes Ref 14)	1
17	HCP-12-450	Clevis Pin $\frac{1}{2}$ - $4\frac{1}{2}$	1
18	13-417	Connector Link	10
19	18-272	Nylon Bushing	10
*	13-445	Rake Teeth Kit (25 Studs and Hardware)	1

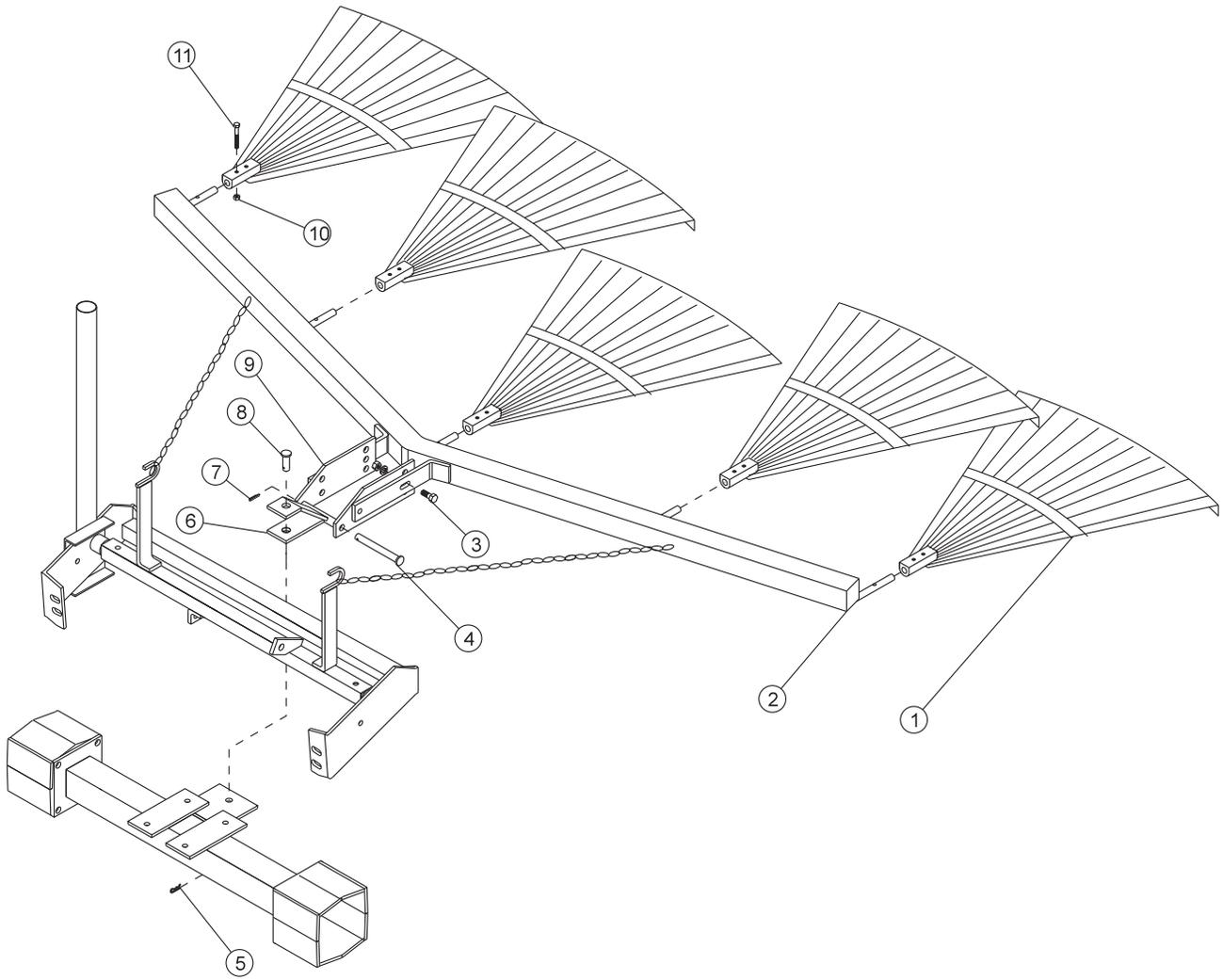
INSTALLATION INSTRUCTIONS

- Attach drawbar (Ref 12) to hitch (Ref 16) using clevis pin, machine bushing and cotter pin (Ref 17, 4 and 5).
- Bolt rake teeth (Ref 9) to frames, keeping all the same length. Leave the two outside holes on right and left rake open (Ref A).
- Lay out rake frames (Ref 1,6 and 8). Connect them using clevis pin, machine bushing and cotter pin (Ref 11, 4 and 5).
- Attach drawbar to left and right frames using bolt, machine bushing, and nut (Ref 13, 2 and 3).
- Attach five lexan blades (Ref 7) to the tabs of the rake frames using master link (Ref 18) and nylon bushings (Ref 19). Blades may be mounted with saw tooth up or down, depending on the desired finish of the sand trap.
- Attach the rake hitch (Ref 16) to trap rake hitch on the rear axle using a clevis pin and bridge pin (Ref 11 and 15).
- The end links of chain on the drawbar are to be hooked to the hooks of the trap rake lift.
- With the rake on the ground pull the rake to the right side until it is 2-3 inches from the tire.
- Using the adjustment screw (Ref 14) on the right, adjust the screw until it hits the trap rake hitch, located on rear axle. Lock jam nut so adjustment will not change.
- Repeat steps 8 and 9 on left side.
- Turn machine on and test for operation of rake assembly by raising and lowering the rake assembly. Also with rake down, turn sharp corners to check that rake does not touch wheels.
- NOTE:** Test rake in sand to assure tire tracks are covered by the rake when turning sharp corners in either direction. If there are tire tracks, readjust using the adjusting screws on the hitch, so the rake comes closer to the tire.

GROOMER BLADES - GOLF COURSE USE ONLY.

- Place the three groomer blades (Ref 10) under the three rake assemblies (Ref 1, 6 and 8).
- Center blades below rear most row of rake teeth. The blade is designed to miss the outside two "teeth" and fit around the center "tooth".
- Remove the two "teeth" that line up with slots of each groomer blade. Move blade up and into position and reattach "teeth". Blade thickness should be accounted for by shortening the "teeth" an equal length.

13-298 FAN RAKE ATTACHMENT DRAWING



Accessories

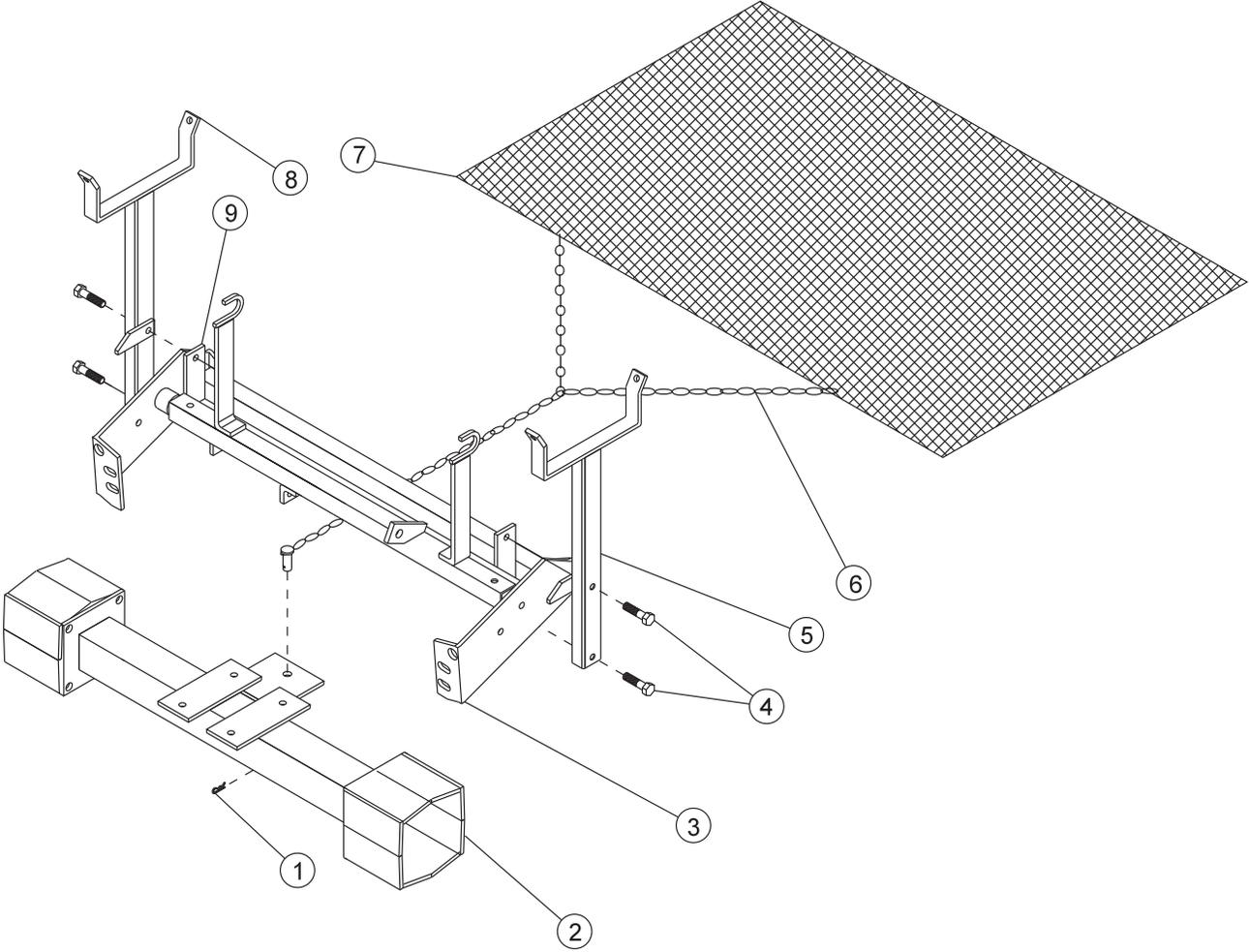
13-298 FAN RAKE ATTACHMENT PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	13-310	Rake	5
2	13-306	Frame	1
3	HB-38-16-100	Bolt $\frac{3}{8}$ - 16 x 1	4
	HN-38-16	Nut $\frac{3}{8}$ - 16	4
	HWL-38	Lockwasher $\frac{3}{8}$	4
4	HCP-12-450	Clevis Pin $\frac{1}{2}$ x $4\frac{1}{2}$	1
5	19-107	Drawbar	1
6	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
7	HCP-12-150	Clevis Pin $\frac{1}{2}$ x $1\frac{1}{2}$	1
	HHP-18	Bridge Pin $\frac{1}{8}$	1
8	13-307	Hitch	2
9	HNCL-14-20	Center Lock Nut $\frac{1}{4}$ - 20	5
10	HB-14-20-200	Bolt $\frac{1}{4}$ - 20 x 2	5

INSTALLATION INSTRUCTIONS

1. Remove the complete rake assembly from the trap rake. Replace the clevis pin and bridge pin in the hitch for future use with the rake.
2. Assemble hitch (Ref 8) to frame (Ref 2) using hardware (Ref 3). Assemble drawbar (Ref 5) to the hitch using clevis pin (Ref 4) and cotter pin (Ref 6), as shown. The different holes in the hitch are for adjusting the angle of the rakes.
3. Assemble the five rakes (Ref 1) to the frame using the bolt and center lock nuts (Ref 9 and 10). Slide the fan rake assembly under the rear of the trap rake to the hitch. Attach the drawbar to the hitch using the clevis pin and the bridge pin (Ref 7).
4. Hook the chains from the frame to the hooks on the rake lift.

13-111 DRAG MAT KIT DRAWING



Accessories

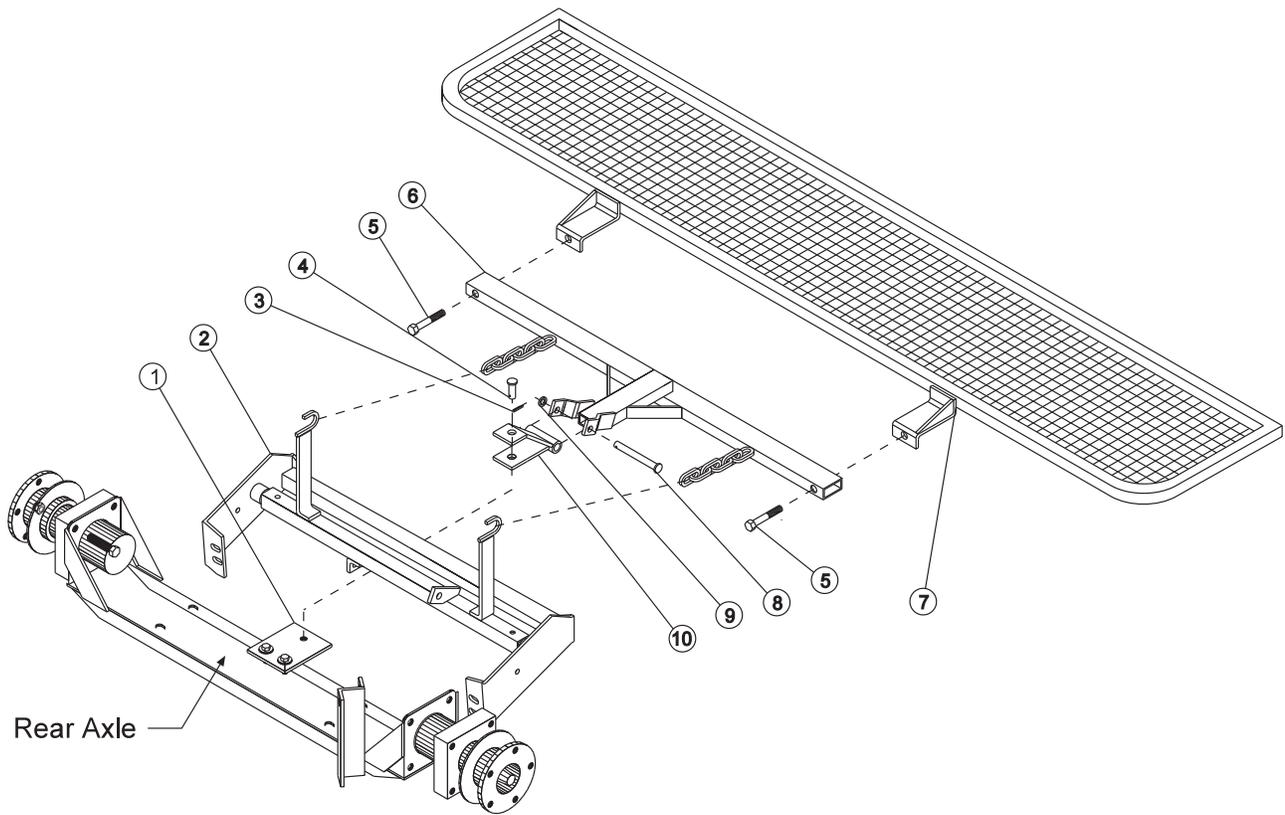
13-111 DRAG MAT KIT PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HHP-18	Bridge Pin $\frac{1}{8}$	1
2		Hitch (Part of Trap Rake)	1
3		Rake Lift (Part of Trap Rake)	1
4	HB-38-16-225	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{4}$	4
	HWL-38	Lockwasher $\frac{3}{8}$	4
	HN-38-16	Nut $\frac{3}{8}$ - 16	4
5	13-195	Left Mat Carrier Post	1
6	19-605	Drag Mat Chain	1
7	19-601	Drag Mat	1
8	13-156	Right Mat Carrier Post	1
9	13-157	Carrier Lock Strap	2
	13-112	Carrier Kit, posts with hardware	1

DRAG MAT KIT INSTALLATION

1. Looking from the rear of the trap rake, mount the (Ref# 8) Mat Carrier Post outside the right rear corner of the rake lift with the (Ref# 9) Lock Strap on the inside of the rake lift side plate. Bolt into place with two (Ref# 4) bolts, nuts and lockwashers.
2. Mount the (Ref# 5) Left Mat Carrier outside the left corner similar to the right side with the (Ref# 9) Lock Strap to the inside.
3. To carry the Mat, roll it up and place it in the brackets of the Carrier Posts.
4. To use the mat, unroll it flat and hook it up to the trap rake hitch with the clevis pin and bridge pin. 3. To use the Drag Mat, unroll the mat flat and hook it up to the Super Star hitch with the clevis pin in the chain and the bridge pin provided.

26-007 PROFESSIONAL INFIELD FINISHER DRAWING



Accessories

26-007 PROFESSIONAL INFIELD FINISHER PARTS LIST

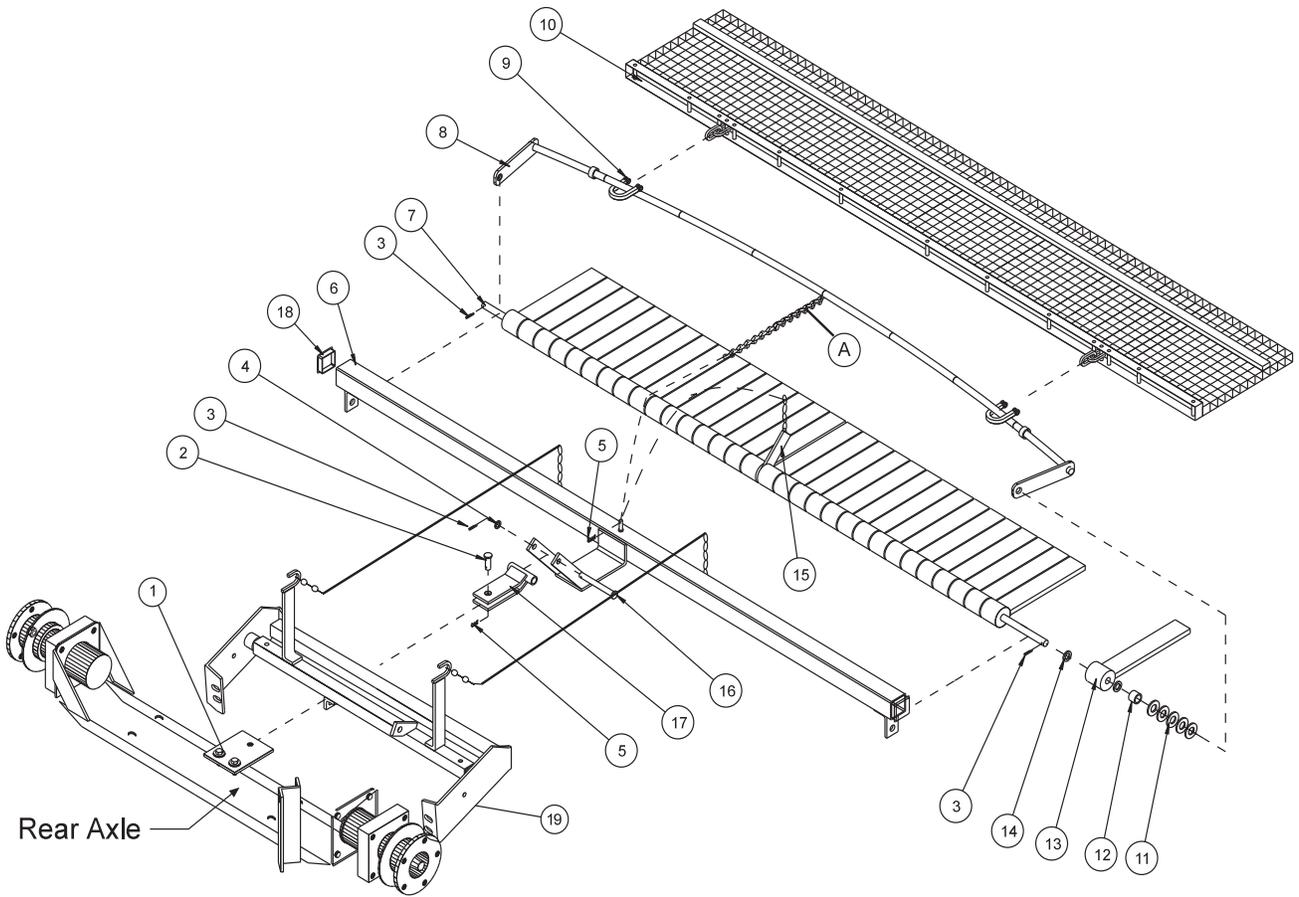
REF#	PART#	DESCRIPTION	QUANTITY
1	34-019	Attachment Hitch	1
2	34-047	Rake Lift	
3	HP-18-100	Cotter Pin $\frac{1}{8}$ x 1	1
4	HCP-12-150	Clevis Pin $\frac{1}{2}$ x $1\frac{1}{2}$	1
5	HB-58-11-300	Bolt $\frac{5}{8}$ - 11 x 3	2
	HNCL-58-11	Center Lock Nut $\frac{5}{8}$ - 11	2
6	13-365	Drawbar	1
7	26-045	Leveling Screen	1
8	HCP-12-450	Clevis Pin $\frac{1}{2}$ x $4\frac{1}{2}$	1
9	HMB-12-14	Machine Bushing $\frac{1}{2}$ x 14GA	1
10	19-107	Hitch	1
11	HHP-18	Bridge Pin $\frac{1}{8}$	1

INSTALLATION INSTRUCTIONS

The Professional Field Finisher is used for smoothing and leveling fields to professional standards.

1. Attach leveling screen (Ref 7) to drawbar (Ref 6) using two bolts and center lock nuts (Ref 5).
2. Attach hitch (Ref 10) to drawbar (Ref 6) using clevis pin (Ref 8), machine bushing (Ref 9) and a cotter pin (Ref 3).
3. Mount Professional Field Finisher to the hitch on the trap rake with a clevis pin (Ref 4) and bridge pin (Ref 11).
4. Hook chains from finisher to rake lift arms.
5. **NOTE:** When assembled properly, rake will angle down from front to back. If front of finisher is not higher than the back, damage will result to infield.

26-008 FLEX ACTION FIELD FINISHER DRAWING

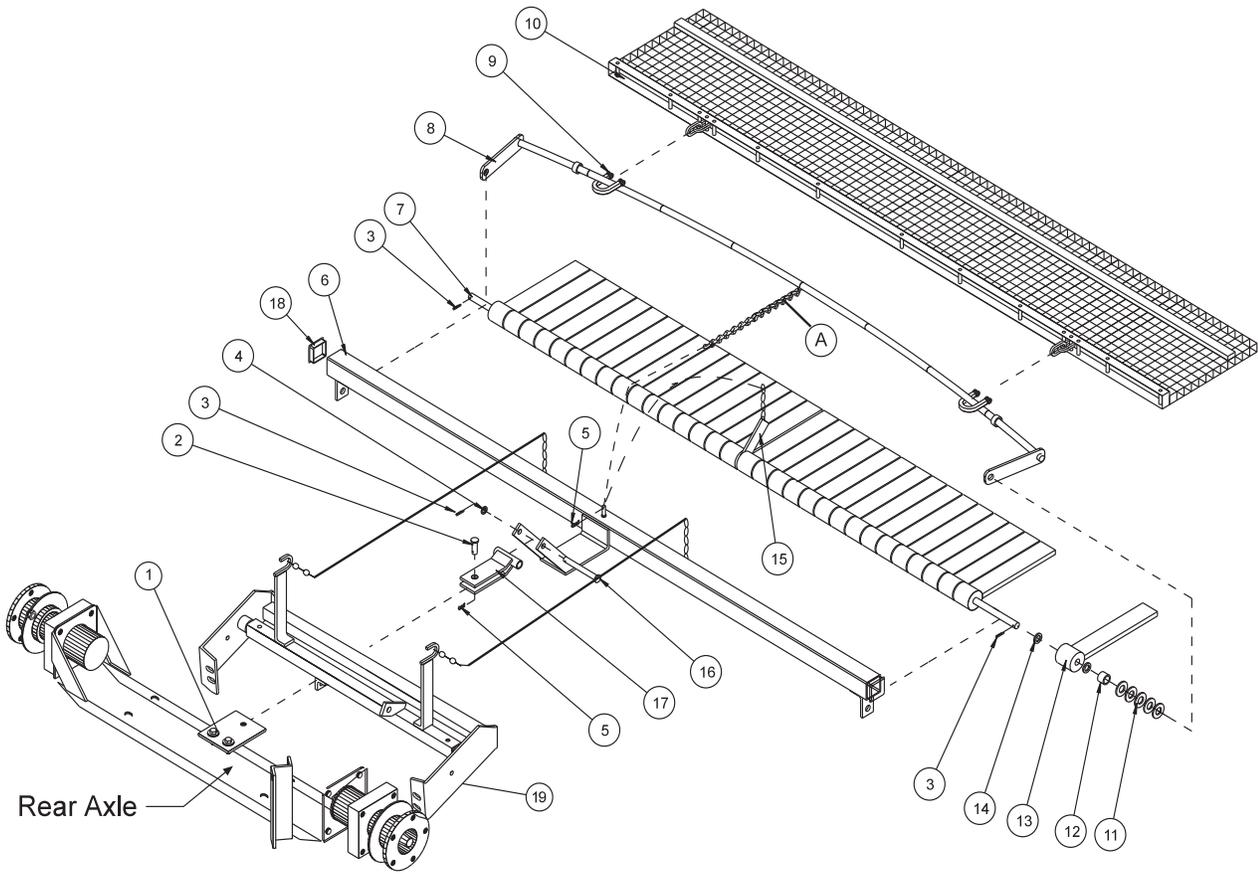


Accessories

26-008 FLEX ACTION FIELD FINISHER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1		Rake Lift	1
2	HCP-12-150	Clevis Pin $\frac{1}{2} \times 1\frac{1}{2}$	1
3	HP-18-100	Cotter Pin $\frac{1}{8} \times 1$	3
4	HMB-12-14	Machine Bushing $\frac{1}{2}$ - 14GA	1
5	HHP-18	Bridge Pin $\frac{1}{8}$	2
6	26-046	Frame	1
7	26-049	Mounting Bar	1
8	26-047	Leveler Bar	1
9	21-060	$\frac{3}{8}$ Chain Clevis	2
10	26-115	Mesh Finisher	1
11	HMB-58-14	Machine Bushing $\frac{5}{8} \times 14GA$	10
12	11-040	Spacer $\frac{3}{4}$ "	2
13	26-041	Rasp Flail	32
14	HW-58	Washer $\frac{5}{8}$	32
15	26-048	Flail Bar Strap	1
16	HCP-12-450	Clevis $\frac{1}{2} \times 4\frac{1}{2}$	1
17	19-107	Hitch	1
18	18-297	Cap Plug	2
19	HB-38-16-125	Bolt $\frac{3}{8}$ - 16 x $1\frac{1}{4}$	4
	HN-38-16	Nut $\frac{3}{8}$ - 16	4
20	26-116	Right Extension Arm	1
	26-117	Left Extension Arm	2

26-008 FLEX ACTION FIELD FINISHER DRAWING



Accessories

INSTALLATION INSTRUCTIONS

1. Install flail bar strap (Ref 15) to center of mounting bar (Ref 7) with chain on top of flail bar strap and mounting bar bent away from you. Apply a light coat of lubricant to overall length of mounting bar.
2. Install one rasp flail (Ref 13) with knobby side down adjacent to sides of flail bar strap (Ref 15). Now install a flat washer (Ref 14) so it sits adjacent with the outside of the rasp flail. Continue to install flails with knobby sides down with Washers between until you have 16 flails and washers on each side of bar strap. Force all flails tightly toward bar strap.
3. After all 32 Flails have been installed, place one spacer (Ref 12) to each end of mounting bar adjacent to washer.
4. Install leveler bar (Ref 8) to mounting bar, with curved leveler bar resting on top on the smooth sides of flails. If all flails and washers do not fit snugly at this time, remove leveler bar and install enough machine bushings to ensure a snug fit. Then reinstall leveler bar.
5. Lay the frame (Ref 6) on the floor or bench with weld tabs facing up. Install ends of assembled mounting bar, with knobby sides of flails up, into welded tabs on each end of frame and secure with cotter pin (Ref# 3).
6. Install flail bar strap (Ref 15) to center tab on frame with $\frac{3}{8}$ -16 x 1 bolt and $\frac{3}{8}$ -16 center lock nut. Loose fit is required. No not over tighten
7. Flip assembly over so knobby sides of flails are now facing down. Install hitch (Ref 17) to frame with clevis pin (Ref 16) and cotter pin (Ref 3). The hitch should be attached to the frame as shown.
8. Install bar strap chain over welded pin on frame. Install leveler bar chain on to pin and secure in place with bridge pin. Use last bridge pin and clevis pin to hitch field finisher to your machine.
9. Add extension arms (Ref 20) to rake lift. Use the two outside holes on the extension arms and four $1\frac{1}{4}$ bolts. Hook lift chains to extension arms.

OPERATING INSTRUCTIONS

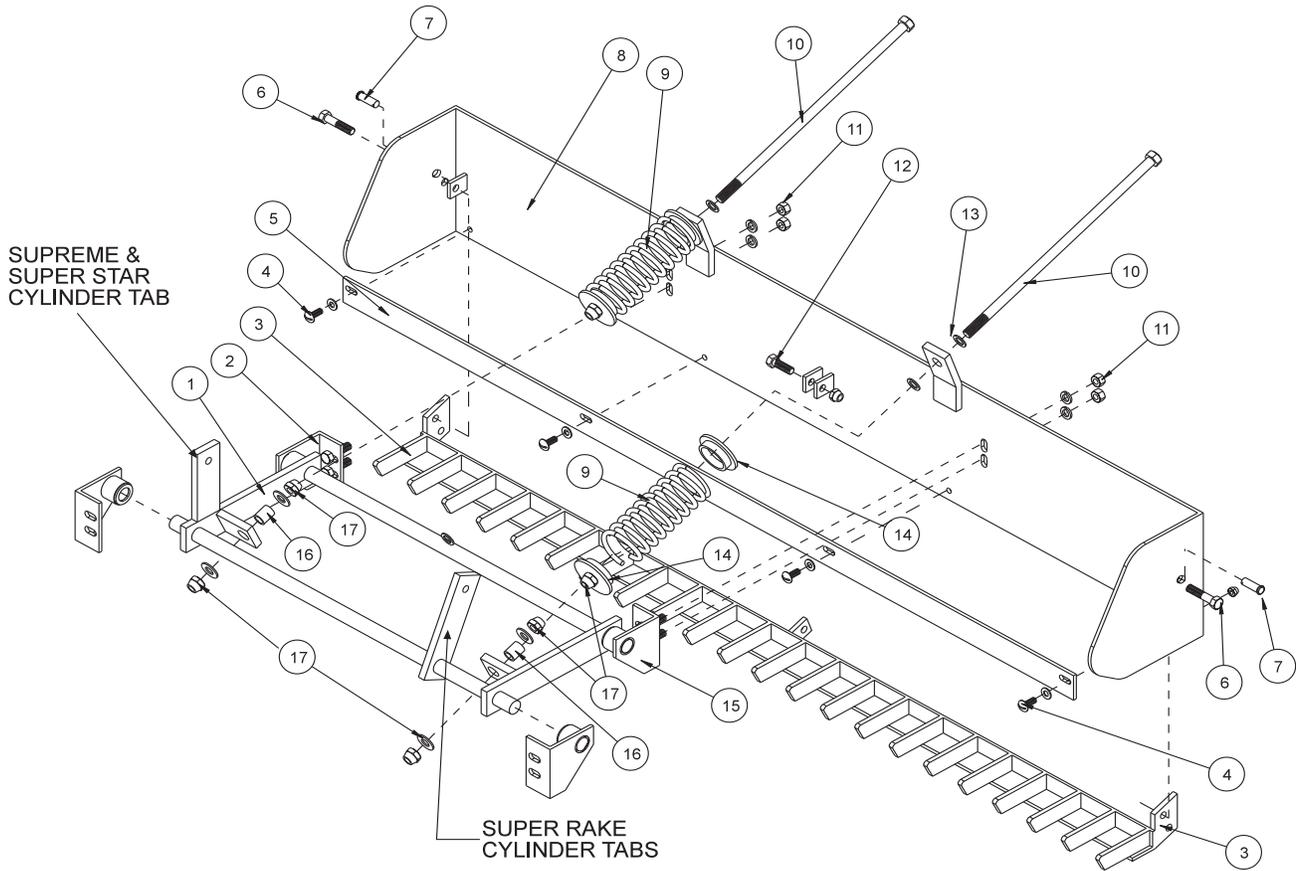
Running attachment with all flails down, flat on the surface, will provide a leveling function. Running attachment partially raised and flails at a 20° - 40° angle in relation to the level surface, will provide a finishing function. The flails increase down pressure for desired finish. Drive in wide circular patterns and increase or decrease ground speed to achieve desired finish.

MESHFINISHER

To get a smoother finish, Install a Mesh Finisher onto your Flex Action Field Finisher.

1. If the 26-008 Flex Action Field Finisher is on your machine, lower it to the ground. You may have to pull machine ahead slightly so the field finisher is lying flat on the ground or floor.
2. Lay mesh finisher behind field finisher with weight bar facing up and chain hooks towards field finisher.
3. Take the two chain clevis' and hook onto leveler bar and then thorough the chain hooks on mesh finisher. The clevis pin that comes with the chain clevis should go through the chain clevis, first link on chain hook (on the mesh finisher) and then through other side of the chain clevis. Insert the cotter pin.
4. Center mesh finisher with flex action field finisher.
5. Raise lift on your machine to insure proper ground clearance before driving your machine.
6. Chain length (Ref A) is to control amount of mesh trailing behind flails for wet or dry conditions. For wet conditions: Shorten chains (Ref A). For dry conditions: May use maximum amount of chain (Ref A) to make desired finish.

34-191 BOX GRADER DRAWING

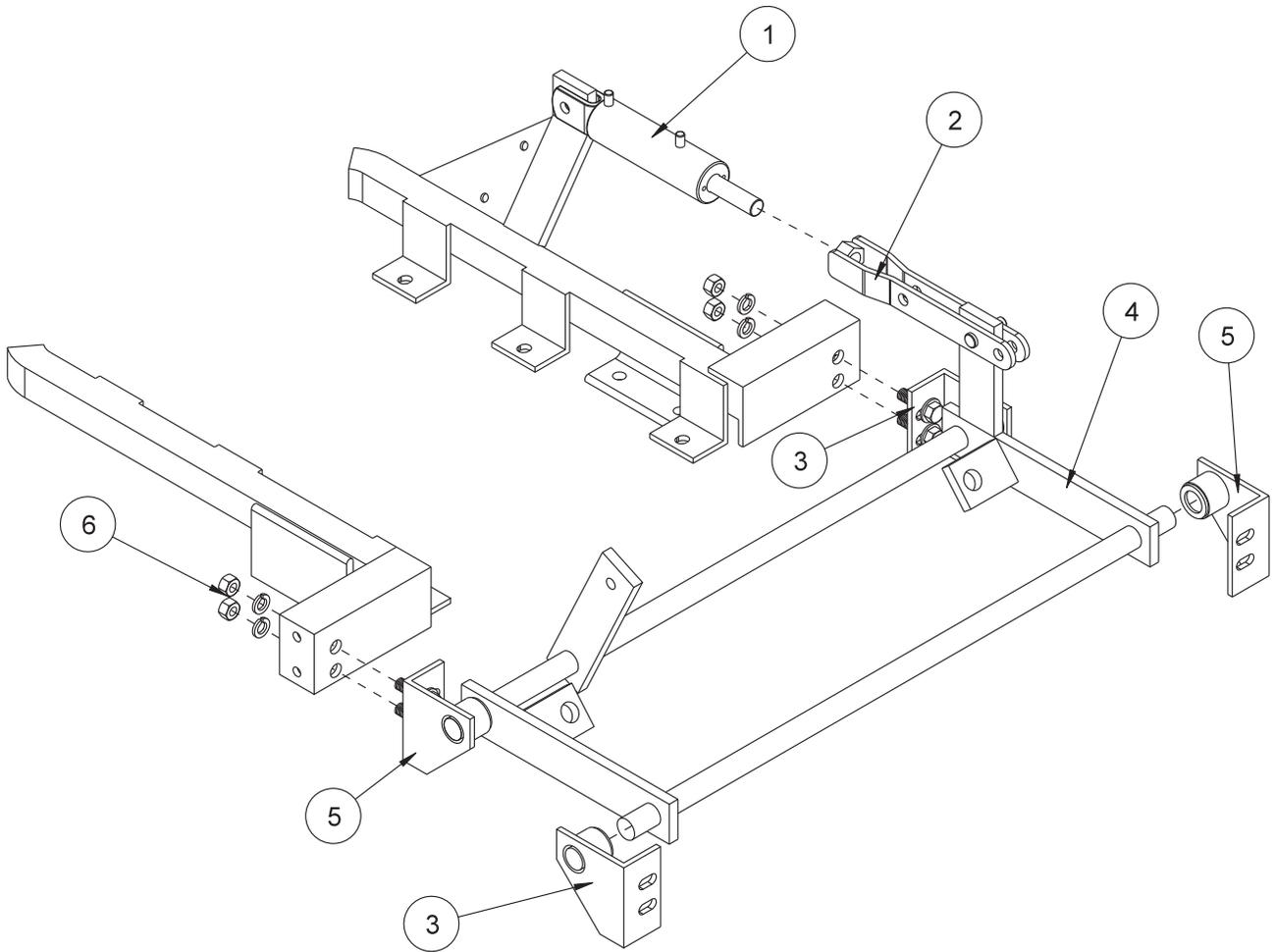


Accessories

34-191 BOX GRADER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	34-221	Lift Assembly	1
2	34-220	Right Pivot Bracket	2
	33-086	Bushing	2
3	34-217	Break Up Bar	1
4	HST-38-16-100	Truss Head Machine Screw $\frac{3}{8}$ - 16 x 1	4
	HW-38	Washer $\frac{3}{8}$	4
	HNCL-38-16	Center Lock Nut $\frac{3}{8}$ - 16	4
5	34-218	Cutter Blade	1
6	HB-12-13-250	Bolt $\frac{1}{2}$ - 13 x 2 $\frac{1}{2}$	2
	HNCL-12-13	Center Lock Nut $\frac{1}{2}$ - 13	2
7	HCP-12-150	Clevis Pin $\frac{1}{2}$ x 1 $\frac{1}{2}$	2
	HHP-18	Bridge Pin $\frac{1}{8}$	2
8	34-216	Blade Assembly	1
9	13-276	Compression Spring	2
10	34-214	Spring Rod	2
11	HB-12-13-125	Bolt $\frac{1}{2}$ - 13 x 1 $\frac{1}{4}$	4
	HW-12	Washer $\frac{1}{2}$	4
	HWL-12	Lockwasher $\frac{1}{2}$	4
	HN-12-13	Nut $\frac{1}{2}$ - 13	4
12	HB-12-13-150	Bolt $\frac{1}{2}$ - 13 x 1 $\frac{1}{2}$	1
	HNCL-12-13	Center Lock Nut $\frac{1}{2}$ - 13	1
13	HMB-58-14	Machine Bushing $\frac{5}{8}$ - 14GA	4
14	13-277	Spring Pad	4
15	34-219	Left Pivot Bracket	2
	33-086	Bushing	2
16	34-215	Threaded Spacer	2
17	HNCL-58-11	Center Lock Nut $\frac{5}{8}$ - 11	4

BOX GRADER LIFT ASSEMBLY



Accessories

BOX GRADER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	13-357	Hydraulic Cylinder (comes with machine)	1
	HNJ-34-16	Jam Nut $\frac{3}{4}$ - 16	1
2	13-366	Cylinder Extension (comes with machine)	1
3	34-219	Right Pivot Assembly	2
	18-218	Bushing	2
4	34-221	Lift Assembly	1
5	34-220	Right Pivot Bracket	2
	18-218	Bushing	2
6	HB-12-13-150	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{2}$ (comes with machine)	4
	HW-12	Washer $\frac{1}{2}$	4
	HWL-12	Lockwasher $\frac{1}{2}$	4
	HN-12-13	Nut $\frac{1}{2}$ - 13	4

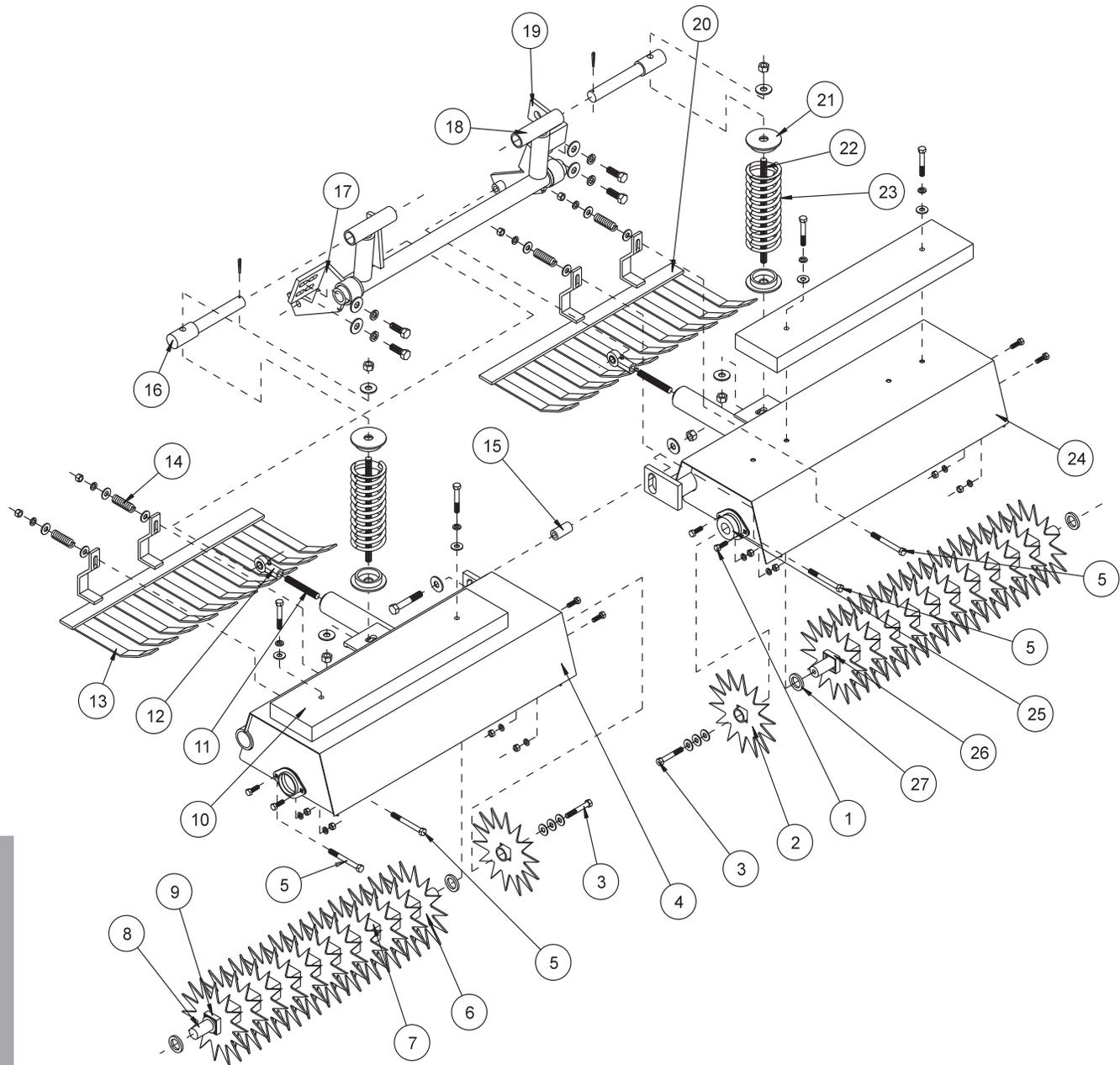
INSTALLATION INSTRUCTIONS

1. To mount Box Grader to Supreme you must remove the rake lift.
2. On all Supremes unhook the speed boss arm before removing the rake lift. Completely remove the linkage yoke, ball joint, and linkage rod from machine. The speed boss does not need to function when using the Box Grader.
3. Position the Box Grader unit at the rear of the trap rake, using the bolts (Ref 6) that held the rake lift on, bolt pivot brackets (Ref 3 & 5) to the frame. **Please note** the way the pivot brackets mount to the machine. Trim cuts point down and tabs bend in.
4. Loosen jam nut on cylinder and turn the cylinder extension (Ref 2) all the way on the cylinder shaft.
5. Attach the cylinder extension to the Box Grader using the second hole from the end.
6. Turn the trap rake on and test the operation of the cylinder lift several times to make sure the grader blade travels all the way up. To adjust, turn cylinder extension counterclockwise to lower and clockwise to raise.
7. Springs should be adjusted to a length of 7". Adjust tension to your preference. Tighten to increase trip pressure.
8. To lower break up bar, remove the two clevis pins from the sides of the Box Grader. The break up bar will tilt forward.

NOTE:

The speed boss is not used with Box Grader. Leave unhooked.

34-190 SPIKER DRAWING

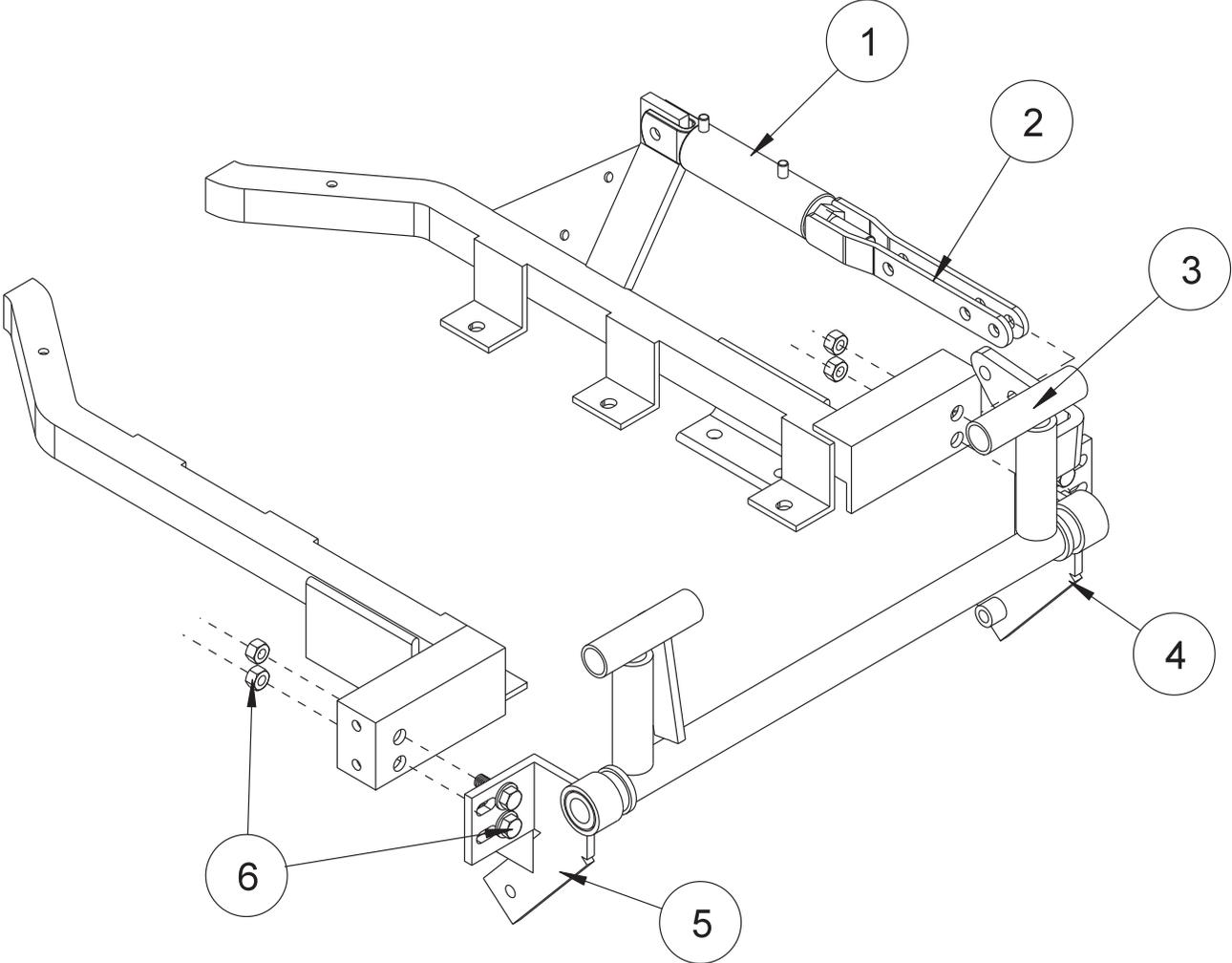


Accessories

34-190 SPIKER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	13-391	Bearing (2 each half)	4
	HB-516-18-100	Bolt $\frac{5}{16}$ - 18 x 1	8
	HWL-516	Lock Washer $\frac{5}{16}$	8
	HN-516-18	Nut $\frac{5}{16}$ - 18	8
2	13-661	Inside Spiker Blade	2
3	HB-38-16-250	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{2}$	2
	HW-38	Washer $\frac{3}{8}$	2
4	13-371	Left Spiker Box	1
5	HB-38-16-350	Bolt $\frac{3}{8}$ - 16 x $3\frac{1}{2}$	4
	HW-38	Washer $\frac{3}{8}$	8
	HWL-38	Lock Washer $\frac{3}{8}$	4
	HN-38-16	Nut $\frac{3}{8}$ - 16	4
6	13-378	Spiker Blade	22
7	13-381	Spacer (large)	20
8	13-379	Spiker Bar	2
9	13-399	Spacer $\frac{1}{2}$ "	2
10	13-384	Weight	2
	HB-38-16-250	Bolt $\frac{3}{8}$ - 16 x $2\frac{1}{2}$	4
	HWL-38	Lock Washer $\frac{3}{8}$	4
	HW-38	Washer $\frac{3}{8}$	4
11	13-372	Threaded Rod $\frac{1}{2}$ - 20 x 4	2
12	80-006	Rod End with Grease Fitting	2
	HB-12-13-275	Bolt $\frac{1}{2}$ - 13 x $2\frac{3}{4}$	2
	HN-12-13	Nut $\frac{1}{2}$ - 13	2
	HWL-12	Lock Washer $\frac{1}{2}$	2
13	13-385	Left Tine	1
14	11-055	Die Spring	4
15	13-660	Spacer	1
	HB-12-13-300	Bolt $\frac{1}{2}$ - 13 x 3	1
	HW-12	Washer $\frac{1}{2}$	2
	HN-12-13	Nut $\frac{1}{2}$ - 13	1
16	13-377	Spring Pivot Pin	2
	HP-18-100	Cotter Pin $\frac{1}{8}$ x 2	2
17	13-659	Left Pivot	1
	HB-12-13-150	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{2}$	2
	HW-12	Washer $\frac{1}{2}$	2
	HWL-12	Lock Washer $\frac{1}{2}$	2
	HN-12-13	Nut $\frac{1}{2}$ - 13	2
18	13-658	Right Pivot	1
	HB-12-13-150	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{2}$	2
	HW-12	Washer $\frac{1}{2}$	2
	HWL-12	Lock Washer $\frac{1}{2}$	2
	HN-12-13	Nut $\frac{1}{2}$ - 13	2
19	13-382	Cylinder Lift Frame	1
20	13-386	Right Tines	1
21	13-277	Spring Pad	4
22	13-375	Spring Adjustment Rod	2
	HN-12-13	Nut $\frac{1}{2}$ - 13	4
	HW-12	Washer $\frac{1}{2}$	4
23	13-276	Compression Spring	2
24	13-370	Right Spiker Box	1
25	13-387	Bearing Spacer (inside only)	2
26	13-380	Spacer (short)	2
27	HMB-100-10	Machine Bushing 1 x 10GA	4

SPIKER LIFT ASSEMBLY



Accessories

SPIKER LIFT PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	13-357	Hydraulic Cylinder	1
	HNJ-34-16	Jam Nut $\frac{3}{4}$ - 16	1
2	13-366	Cylinder Extension	1
3	13-382	Cylinder Lift Frame	1
4	13-658	Right Pivot Bracket	1
5	13-659	Left Pivot Bracket	1
6	HB-12-13-150	Bolt $\frac{1}{2}$ - 13 x $1\frac{1}{2}$	4
	HW-12	Washer $\frac{1}{2}$	4
	HWL-12	Lockwasher $\frac{1}{2}$	4
	HN-12-13	Nut $\frac{1}{2}$ - 13	4

INSTALLATION INSTRUCTIONS

1. To mount Spiker onto the Supreme you must remove the rake lift.
2. On all Supremes you have to unhook the speed boss arm before removing the rake lift. Completely remove the linkage yoke, ball joint and linkage rod from machine. The speed boss does not need to function when using the Spiker.
3. Set the spiker behind the machine. Bolt the Spiker to the main frame using the inside holes on the pivot brackets (Ref 4 & 5). Use the $\frac{1}{2}$ - 13 x $1\frac{1}{2}$ bolts, washers, lockwashers and nuts (Ref 6).
4. Thread the cylinder extension (Ref 2) all the way onto the cylinder (Ref 1). Tighten down with jam nut.
5. Using the second hole from the end of the cylinder extension, hook the cylinder extension (Ref 2) to the bottom hole on the cylinder tab on the cylinder lift frame (Ref 3).
6. Compression springs should be tightened to $5\frac{1}{2}$ " for best result.
7. Test spiker for ground penetration. If there is too much ground penetration loosen the springs. If you need more ground penetration, tighten springs.

NOTE:

The speed boss is not used with spiker. Leave unhooked.

DECAL LIST

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

13-556	Decal General Warning	1	Front Nose Cone
16-088	Decal Moving Parts/Hot	1	Engine Guard
25-004	Decal Serial Tag	1	Main Frame
25-277	Decal Battery	1	Cylinder Bracket Main Frame
25-298	Decal Hot	1	Rear Hood
25-307	Decal Gas	1	Right Hood
25-308	Decal Engine rpm	1	Engine
25-322	Decal Made In USA	1	Dashboard
25-329	Decal Smithco	2	Nose Cone (each side)
25-337	Decal Speed Boss	1	Hang Tag
25-338	Decal Speed Boss	1	Rake Lift
25-349	Decal Foot Pedal	1	Right Floorboard
25-352	Decal, Bypass Valve	1	Hang Tag
35-554	Decal, Tire Pressure 5 psi	3	Wheels
27-086	Decal CE	1	European Machines
27-077	Decal, Smithco	1	Steering Wheel
27-087	Decal Park Brake	1	Front Rear Hood
27-093	Decal Hydraulic Oil	1	Hydraulic Tank
34-147	Decal Smithco Star	1	Rear Cowling
34-180	Decal Dashboard (liquid cooled)	1	Dashboard
34-181	Decal Control Panel	1	Control Panel
34-182	Decal Supreme	2	Hood (each side)
34-222	Decal LC (liquid cooled)	2	Below Supreme
34-223	Decal AC (air cooled)	2	Below Supreme
36-014	Decal Dashboard (air cooled)	1	Dashboard

QUICK REFERENCE REPLACEMENT PARTS

REPLACEMENT FILTERS

23-031	Hydraulic Oil Filter Element	
50-403	In-Line Fuel Filter	
34-112-01	Engine Oil Filter Element	Kawasaki # 49065-2071
34-112-02	Air Filter Element Assembly	Kawasaki #11029-2005
78-090	Engine Oil Filter Element	Kohler # 12 050 01
78-088	Air Cleaner Element	Kohler # 47 083 03
78-089	Pre-Cleaner	Kohler # 24 083 0
42-004-04	Remote Replacement Filter	Kohler 25 083 02
42-004-05	Safety Filter	Kohler 25 083 03

REPLACEMENT BELTS

34-112-03	Fan Belt	Kawasaki #59011-2056
34-120	Pump Drive Belt	

SEAL KITS

13-032 & 34-102		Wheel Motors
14-080	Seal Kit	

34-109	Hydrostatic Pump (Kawasaki liquid cooled)
42-003	Hydrostatic Pump (Kohler air cooled)
14-098	Seal Kit

34-106	Hydraulic Valve
14-062	Seal Kit
14-106	Relief Assembly Kit
14-203	Spring Centering Assembly Kit (1 per bank)

75-714	Steering Cylinder
14-254	Seal Kit (Cylinder with retaining ring on rod end)
14-268	Seal Kit (Cylinder with spanner nut on rod end)

*13-292	Attachment Lift Cylinder
*13-357	Rake Lift Cylinder

*14-253	Seal Kit (for cylinders with retaining ring on rod end)
*14-267	Seal Kit (for cylinders with spanner nut on rod end)

34-103	Orbitrol Motor (steering)
15-301-01	Seal Kit

OTHER PARTS

	KAWASAKI LIQUID COOLED	KOHLER AIR COOLED
Spark Plug	NGK BMR6A or equivalent Gap .024-.028 in. (.6-.7 mm) Torque 17 Ft. Lbs. (23 Nm)	Champion Type RC12YC or equivalent Gap .030 (.76 mm) Torque 18/22 Ft. Lbs. (24/30 Nm)
Spline Grease # 77 Assembly Paste (Kohler # 25 357 12-s)		

FLUIDS

Engine Oil	Kawasaki SAE 10W-40 API Service SJ or higher Motor Oil Kohler SAE 10W-30 API Service SJ or higher Motor Oil
Hydraulic Fluid	SAE 10W-40 API Service SJ or higher Motor Oil
Coolant	Permanent Type Antifreeze. Green Colored. Mixed Ratio: 50% mixed

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

