Parts & Service

Smithco

Wayne, PA 19087 www.smithco.com

Sand Star Zee

Model 45-500-A Turf Application
Model 45-501-A Golf Application

SN: ZTR093

September 2015

Product Support: Hwy 55 & Poplar Ave; Cameron WI 54822
1-800-891-9435 productsupport@smithco.com

Introduction

Service

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Parts

Accessories

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

Read this manual and all other manuals pertaining to the Sand Star Zee carefully as they contain 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.

WARNING

CALIFORNIA
Proposition 65 Warning
Engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

WARNING

Failure to follow cautious operating practices can result in serious injury to the operator or other persons. The owner must understand these instructions, and must allow only trained persons who understand these instructions to operate this vehicle.

All ***Smithco*** machines have a Serial Number and Model Number. Both numbers are needed when ordering parts. Refer to engine manual for placement of engine serial number.

For product and accessory information, help finding a dealer, or to register your procuct please contact us at www.Smithco.com.

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

For easy access record your Serial and Model numbers here.

SMITHCO

WAYNE, PENNSYLVANIA 19087 USA
610-688-4009 Fax 610-688-6069

DATE OF MFG.

SERIAL NO.

kW/hp

MODEL NO.

kg/lb

SAFETY

Read and understand this manual and all safety signs before operating and maintaining. Review the safety instructions and precautions annually.

TAKE NOTE! THIS SAFETY ALERT SYMBOL FOUND THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY AND THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.

THIS SYMBOL MEANS

- **ATTENTION!**
- **BECOME ALERT!**
- **YOUR SAFETY IS INVOLVED!**

SAFETY SIGNAL WORDS

Note the use of the signal words DANGER, WARNING and CAUTION with the safety messages. The appropriate signal word for each has been selected using the following guidelines:

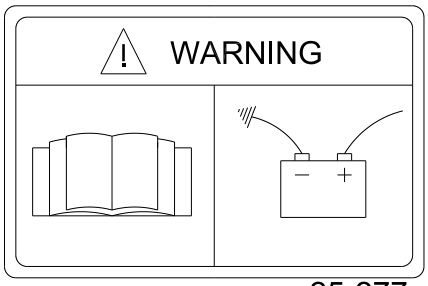
DANGER: Red. Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations typically for machine components which, for functional purposes, cannot be guarded.

WARNING: Orange. Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed. It may also be used to alert against unsafe practices.

CAUTION: Yellow. Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

SAFETY WARNING DECALS

REMEMBER: If Safety Signs have been damaged, removed, become illegible or parts replaced without decals, new decals must be applied. New decals are available from your authorized distributor or factory.



25-277

Warning! Read manual, battery positive and negative

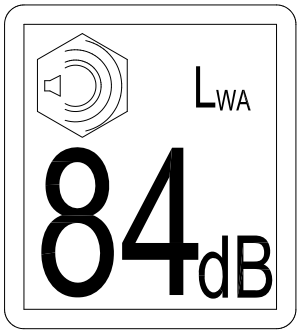
25-286

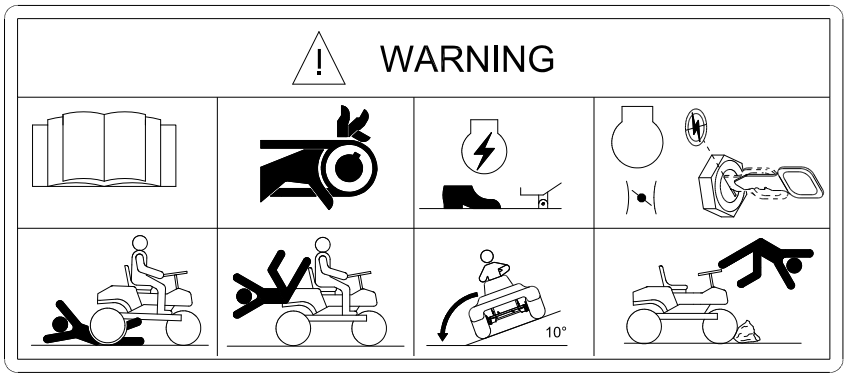
Warning! Pinch Points

25-298

Warning! Hot

Noise emision to the operators ear in accordance with European Directives





13-063

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 Personal Protective Equipment (PPE) on your head, eyes, ears, hands and feet. Operate the machine only in daylight or in good artificial light.
5. Inspect the area where the equipment will be used. Pick up all debris you can find before operating. Beware of overhead obstructions and underground obstacles. Stay alert for hidden hazards.
6. Never operate equipment that is not in perfect working order or without decals, guards, shields, or other protective devices in place.
7. Never disconnect or bypass any switch.
8. Carbon monoxide in the exhaust fumes can be fatal when inhaled, never operate a machine without proper ventilation.
9. Fuel is highly flammable, handle with care.
10. Keep engine clean. Allow the engine to cool before storing and always remove the ignition key.
11. 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.
13. Never use your hands to search for oil leaks. Hydraulic fluid under pressure can penetrate the skin and cause serious injury.
14. 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. Do not drive on slopes greater than 10°.
    D. Reduce speed on slopes and in sharp turns. Use caution when changing directions on slopes.
    E. Stay alert for holes in the terrain and other hidden hazards.
15. 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.
16. Keep hands, feet and clothing away from moving parts. Wait for all movement to stop before you clean, adjust or service the machine.
17. Keep the area of operation clear of all bystanders.
18. Never carry passengers.
19. Stop engine before making repairs/adjustments or checking/adding oil to the crankcase.
20. 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, sports turf, and any other area maintained turf and related trails, paths and lots. No guaranty as to the suitability for any task is expressed or implied.

SAND STAR SPECIFICATIONS

WEIGHTS AND DIMENSIONS	45-500	45-501
Length	75" (1,91 m)	75" (1,91 m)
Width	59" (1,50 m)	59" (1,50 m)
Height	67" (1,71 m)	70" (1,78 m)
Wheel Base	48" (1,22m)	48" (1,22m)
Ground Clearance	5.5" - 7" (13 -18 cm) - under cultivator depending on attachment	
Weight	880 lbs. (399 kg)	
SOUND LEVEL		
At Ear Level	82 dB	
ENGINE		
Make	Briggs and Stratton Commercial Turf	
Model#	44T677	
Type / Spec#	0001G1	
Horsepower	22HP (16.4 kW)	
Fuel	Unleaded 87 Octane Gasoline Minimum	
Lubrication System	Full Pressure	
Alternator	16 amp	
WHEELS & TIRE		
5 psi (.34 bar)	Two: 22 X 11 - 10.0 Rear Knobby Tire	Two: 25 X 10 - 12 Rear Knobby Tire
20 psi (1,38 bar)	One: 15 x 6.00 - 6 Front Castor	One: 16 x 7.50 - 8 Front Castor
SPEED		
Forward Speed	0 to 10 m.p.h. (0-16 kph)	
Reverse Speed	0 to 4 m.p.h. (0-6 kph)	
BATTERY	Automotive Type SP 35	
BCI Group	Size 35	
Cold Cranking Amps	300	
Ground Terminal Polarity	Negative (-)	
Maximum Length	7.5" (19 cm)	
Maximum Width	5" (12,7 cm)	
Maximum Height	7.5" (19 cm)	
FLUID CAPACITY		
Crankcase Oil	See Engine Manual	
Fuel	20 quarts (18,93 liters)	
Hydraulic Fluid	7 quarts (6,6 liters)	
Grade of Hydraulic Fluid	Parker Dura Clean Hydraulic Oil or Equivalent of AW32 minimum hydraulic oil	
ISO 21299	ROPs Certified	
OSHA 1928.51	Seat Restraint Certified	

OPERATION

STEERING CONTROL LEVERS

Acquaint yourself with the steering before operating the machine. This machine is equipped with two steering control levers (A) that make the machines speed and direction continuously variable. The steering controls can be moved forward or backward about a neutral position. The neutral position is locked when the steering control levers are moved outward and the machine will stand still.

Move in a straight line - By moving both controls an equal amount forward or backward, the machine will move in a straight line forward or backward respectively.

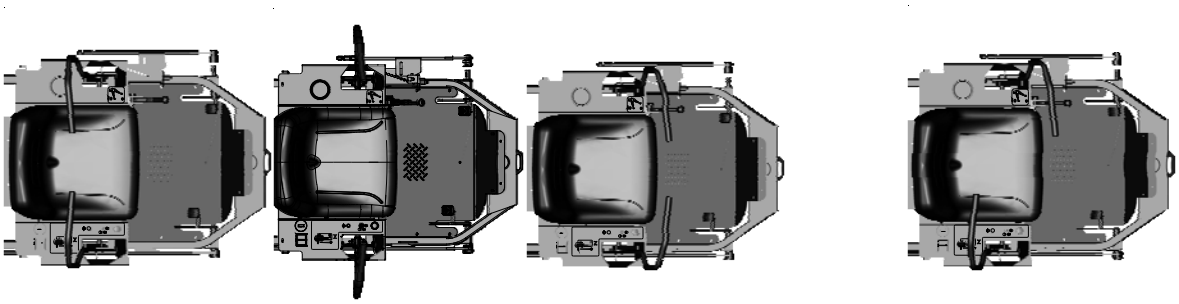
To turn right while going forward - Move right control lever towards the neutral position. This will cause the rotation of the right wheel to reduce which will result in the machine turning to the right.

To turn left while going forward - Move left control lever towards the neutral position. This will cause the rotation of the left wheel to reduce which will result in the machine turning to the left.

Zero Turn - Zero turn can be achieved by moving one control lever backward, behind neutral position, and ***carefully*** moving the other control lever forward from its neutral position. **The rotation direction is determined by the control lever that is moved backward behind the neutral position.** If left control lever is backward, machine will turn left. If right control lever is moved backward, machine will turn right.

WARNING! The machine can move rapidly if one steering control is moved much further than the other.

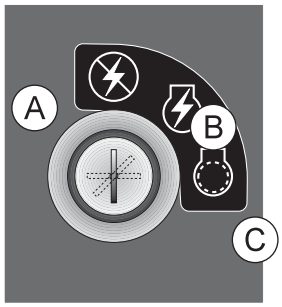
Reverse Neutral Forward Right Zero Turn



WARNING! Do not drive up and down hills with slopes greater than 10°. Do not drive across slopes.

STARTING ENGINE

Before operating this machine, become familiar with all controls and functions of these units. Also complete all maintenance requirements and read all safety warnings. By knowing the machine thoroughly, how it operates and by doing the prescribed maintenance steps, you can expect relatively trouble-free operation for years to come.



1. Set park brake. Start safety switch is on the park brake.
2. The ignition switch is a three position on gas and four position on diesel. Insert key (A) and turn clockwise until engine starts (C). Release key and it will return to run position (B). Use choke and hand throttle as necessary.
3. Allow engine to idle and warm up a few minutes before selecting a direction of travel.
4. To shut off engine on all gas machines turn key to the stop position.

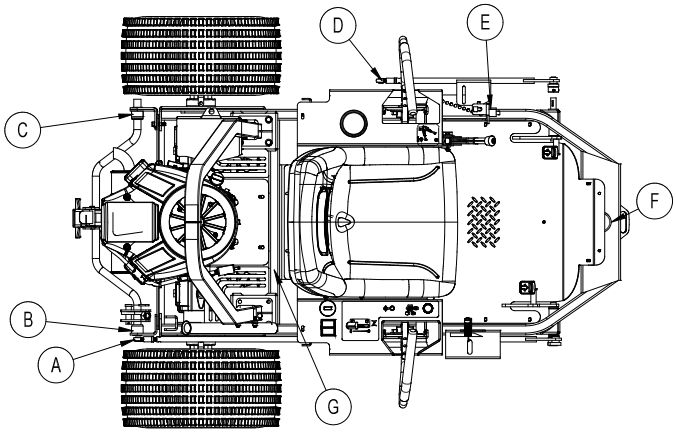
WARNING! Before servicing or making adjustments to machine, stop engine and remove key from ignition.

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

LUBRICATION

Machine should be greased before starting. Use general purpose No. 2 lithium base grease. Lubricate every 250 hours.

A. Rear attachment lift yoke.
B. Right attachment lift mount.
C. Left attachment lift mount.
D. Center attachment lift yoke.
E. Center lift lever.
F. Front fork.
G. Brake Relay (both ends)



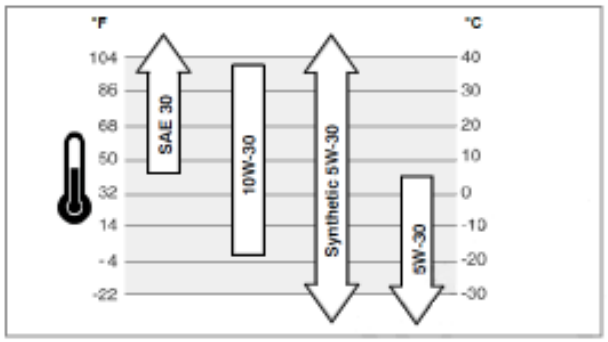
TIRE PRESSURE

Caution must be used when inflating a low tire to recommended pressure. Over inflating can cause tires to explode. Rear tires should be 5 psi (0.34 bar). The front castor wheel should be 20psi (1.38 bar). Improper inflation will reduce tire life considerably.

ENGINE

Change and add oil according to chart below. Do not overfill. Engine oil capacity is 2 quarts. We recommend high-quality detergent oils classified for service SF, SG, SH, SJ or higher. Do not use special additives. Outdoor temperatures determine the proper oil viscosity for the engine. Use the chart to select the best viscosity for the outdoor temperature range expected.

SAE VISCOSITY GRADES



A quick twist and pull motion to open, push to close.
Allows a quick and easy way to change oil without the mess

Engine Oil Drain Valve

Use of multi-viscosity oils (10W-30, etc.) above 80° F (27° C) will result in high oil consumption and possible engine damage. Check oil level more frequently if using these types of oils.

SAE 30 oil, if used below 40° F (4° C), will result in hard starting and possible engine bore damage due to inadequate lubrication.

MAINTENANCE

HYDRAULIC OIL

1. Use Parker Dura Clean Hydraulic Oil or equivalent of AW32 minimum hydraulic oil.
2. For proper warranty, change oil every 250 hours of use.
3. The oil level in reservoir should be 1-3" from the bottom of the dipstick 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 check 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 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. 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.

WHEEL MOUNTING PROCEDURE

1. 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. Re-torque after first 8 hours and every 250 hours thereafter.
7. Lower machine to ground and remove blocks and jack.

BATTERY

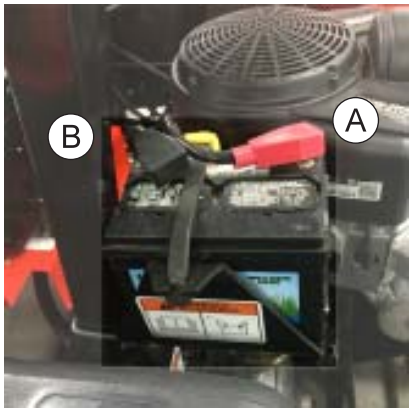
Batteries normally produce explosive gases which can cause personal injury. Do not allow flames, sparks or any ignited object to come near the battery. When charging or working near battery, always shield your eyes and always provide proper ventilation.

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

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

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

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



WARNING

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

WARNING

WARNING! Connecting battery cables to the wrong post could result in personal injury and/or damage to the electrical system. Make sure battery and cables do not interfere or rub on any moving part. Connect the red positive (+) cable (A) to the battery first. When disconnecting remove the black negative (-) cable (B) first.

JUMP STARTING

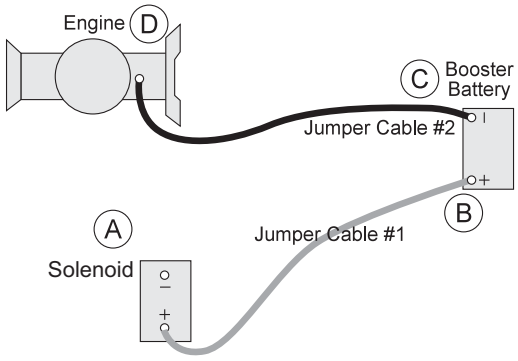
WARNING

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

To jump start (negative grounded battery):

1. Shield eyes.
2. Connect ends of one cable to positive (+) terminals of bottom post on solenoid first (A), then positive post of booster battery. (B).
3. Connect one end of other cable to negative (-) terminal of booster battery (C).
4. Connect other end of cable (D) to engine block on unit being started.

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



DAILY CHECKLIST

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

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

DAILY CHECKLIST

1. Check park brake adjustment. Adjust as required.
2. Check engine oil level. Add as needed. DO NOT OVERFILL.
3. Tire pressure should be 5 psi (0.34 bar) maximum on rear tires and 20 psi (1.38 bar) on the front tire.
4. Inspect electrical system for loose connections or frayed wiring, including battery cables. Replace any faulty equipment or tighten if loose.
5. Check hardware for loose or missing nuts, bolts, screws, etc., and tighten or replace as needed.
6. Inspect hydraulic lines for damage or leaks. Never use hands to inspect leaks.
7. Check hydraulic oil level on the tank. The level should be 1-3" from the bottom of the dipstick. If level is low, Parker Dura Clean Hydraulic Oil or Equivalent of AW32 minimum hydraulic oil.
8. Inspect steering control levers, throttle and shift linkages for good hookups and clear travel.
9. Check controls for smooth, proper working operation.

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.

Maintenance Service Interval	Maintenance Procedure
After the first 8 operating hours	Torque the wheel lug nuts. (64-74 ft/lb (87-100 Nm))
	Change the engine oil filter.
Before each use daily	Check the engine oil level.
	Clean area around muffler and controls
	Check the hydraulic fluid level.
	Check tire pressure (5 psi)-Rear. 20 psi - Front.
	Check condition of hydraulic hoses and fittings.
	Inspect and clean the machine.
Every 25 hours	Clean air filter[1]
	Check battery terminals and electrolyte level
	Change oil when operating under heavy load or high ambient temperatures.
Every 50 hours	Change engine oil and filter
	Check muffler and spark arrestor
Every 100 hours	Lubricate machine
Every 250 hours	Change air filter
	Check tire wear
	Torque the wheel lug nuts. (64-74 ft/lb (87-100 Nm))
	Change hydrauilic oil and filter
Every 500 hours or yearly	Replace Pre Cleaner
	Replace spark plugs
	Clean air cooling system[1]
	Replace fuel filter
	Check engine valve clearance[2]

[1] In dusty conditions or when airborne debris is present, clean more often

[2] Not required unless engine performance problems are noted.

MAINTENANCE SERVICE CHART

Duplicate this page for routine use. Service

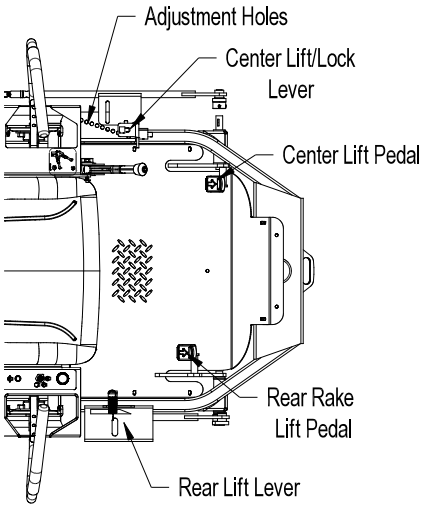
Clean more often under dusty conditions or when airborne debris is present , replace air cleaner parts, if very dirty.

Maintence Check Item	For the week of:						
	Mon	Tues.	Wed.	Thurs.	Fri.	Sat.	Sun.
Check the Safety Seat Switch							
Check Steering Operation							
Check the fuel level							
Check the engine oil level.							
Clean the air filter							
Clean the engine cooling fins.							
Check for unusual engine noises							
Check the hydraulic oil level							
Check hydraulic hoses and fittings for damage							
Check for fluid leaks.							
Check the tire pressure							
Check the Instrumentation							
Inspect electrical system for frayed wires							
Check park brake adjustment							
Change oil filter.							
Change oil.							
Lubricate Machine							
Ensure all warning decals are intact.							
Areas of Concern							
Inspection Performed by:							

Item	Date	Information

CENTER LIFT

Using the foot pedal on the left floorboard and the center lift lever you can raise and lower the center lift. To lift, push right foot pedal all the way down and the center lift lever will lock into place. To lower, place pressure on the foot pedal, place detent pin in hole for correct depth you are trying to obtain, push center lift lever inward and release pedal. Detent pin will stop center lift at selected depth.



MANUAL REAR LIFT (45-500)

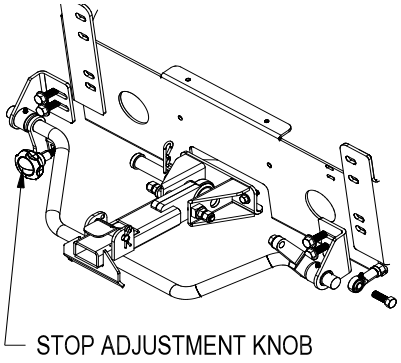
Using the foot pedal on the right floorboard. Push all the way down to lift. The arm will lock on the lever on the right floorboard. To lower, put some pressure on the right foot pedal and with your hand push lift lever outward and release foot pedal slowly.

MANUAL REAR LIFT STOP ADJUSTMENT (45-500)

The threaded adjustment knob, located on left side of rear lift bar can be used to limit the downward travel of rear attachment during wet conditions.

Wet Conditions - When the knob is threaded inward, the lift bar will hold the front of the attachment above the ground surface.

Dry Conditions - When working in dry conditions, turn the knob counterclockwise, all the way out.



ELECTRIC/HYDRAULIC REAR LIFT (45-501)

To lift and lower the rear attachments on the 45-501, use the rocker switch on the right control lever. Pushing the switch up will raise the rear attachment. Pushing the rocker switch down will lower the rear attachment.

ADJUSTMENTS

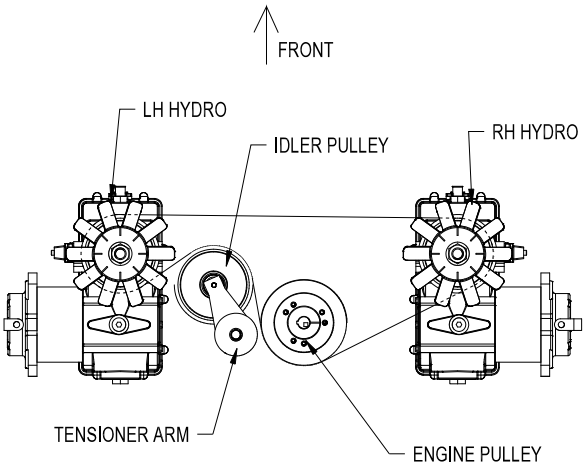
PARK BRAKE

The park brake is located on the left side of the machine and operates the brakes on the rear wheels. Push lever forward to dis-engage and pull back to engage.

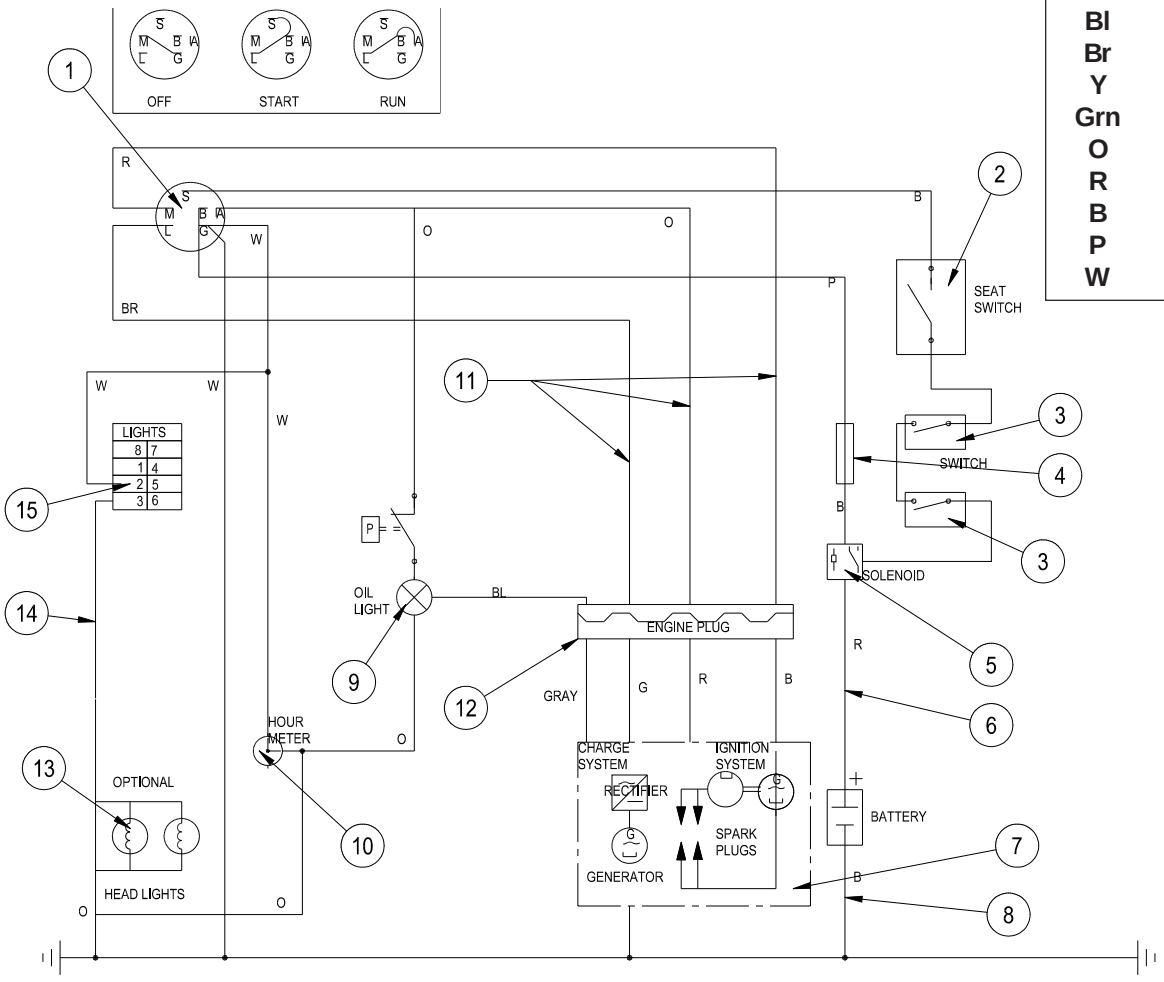
To adjust turn the knob on the end of the handle. For further adjustment you may turn the yokes clockwise to tighten and counter clockwise to loosen.

ADJUSTMENT OF BELT TENSIONER

The belt tensioner controls the tension on the belt from the engine to the left and right hydro units. The proper tension of the idler should be in the third notch on the side of the tensioner. Over tightening the belt will shorten the life of the belt and the machine may not perform to the best of its ability. To adjust belt tensioner, loosen the bolt holding the tensioner. Bring idler pulley tight to the belt and turn tensioner into belt to the third notch. Using a pair of channel lock pliers, rotate the upper half of the tensioner clockwise until the indicator is at the theird notch. Tighten bolt on tensioner.



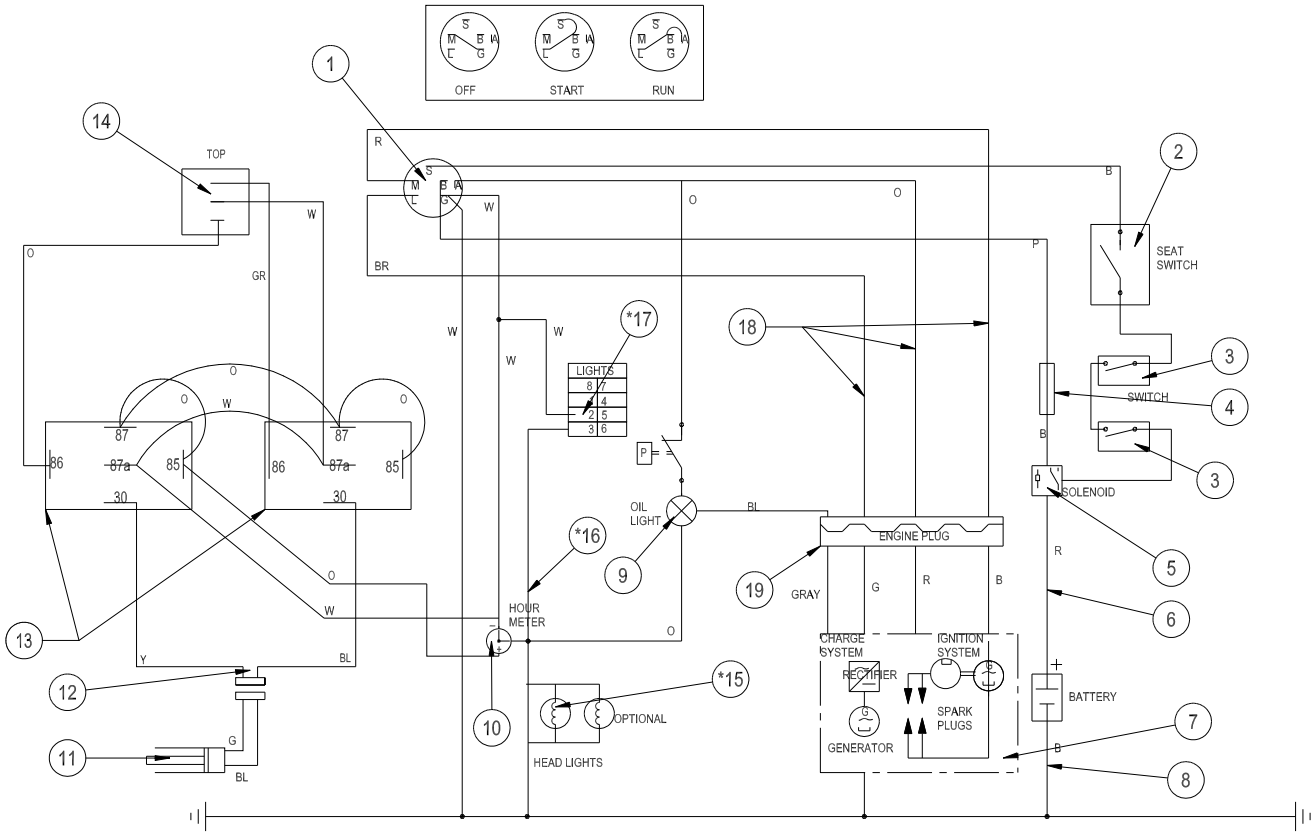
Color Code Chart	
Bl	Blue
Br	Brown
Y	Yellow
Grn	Green
O	Orange
R	Red
B	Black
P	Purple
W	White



REF#	PART#	DESCRIPTION	QUANTITY
1	13-488	Ignition Switch	1
2	45-529-01	Replacement Seat Switch	1
3	45-523	Relay Switch	2
4	8975	30AMP Circuit Breaker	1
	8977	Circuit Breaker Boot	1
5	13-750	Solenoid with Connector	1
6	45-563	Red Battery Boot	1
	13-215	Starter Cable	1
7	45-520	22HP Briggs & Stratton Engine	1
8	12-031	Black Battery Boot	1
	22-065	Starter Cable	1
9	50-359	Waring Light	1
10	12-017	Hour Meter	1
11	45-521	Main Wire Harness	1
12	45-628	4-Contat Body Connector (engine side)	2
OPTIONAL			
13	45-627	Light	1
14	45-614	Light Wire Harness	1
15	15-727	Rocker Switch, no light	1
	15-782	Switch Body, Unlit, On-None-Off	1

45-501 WIRING DIAGRAM

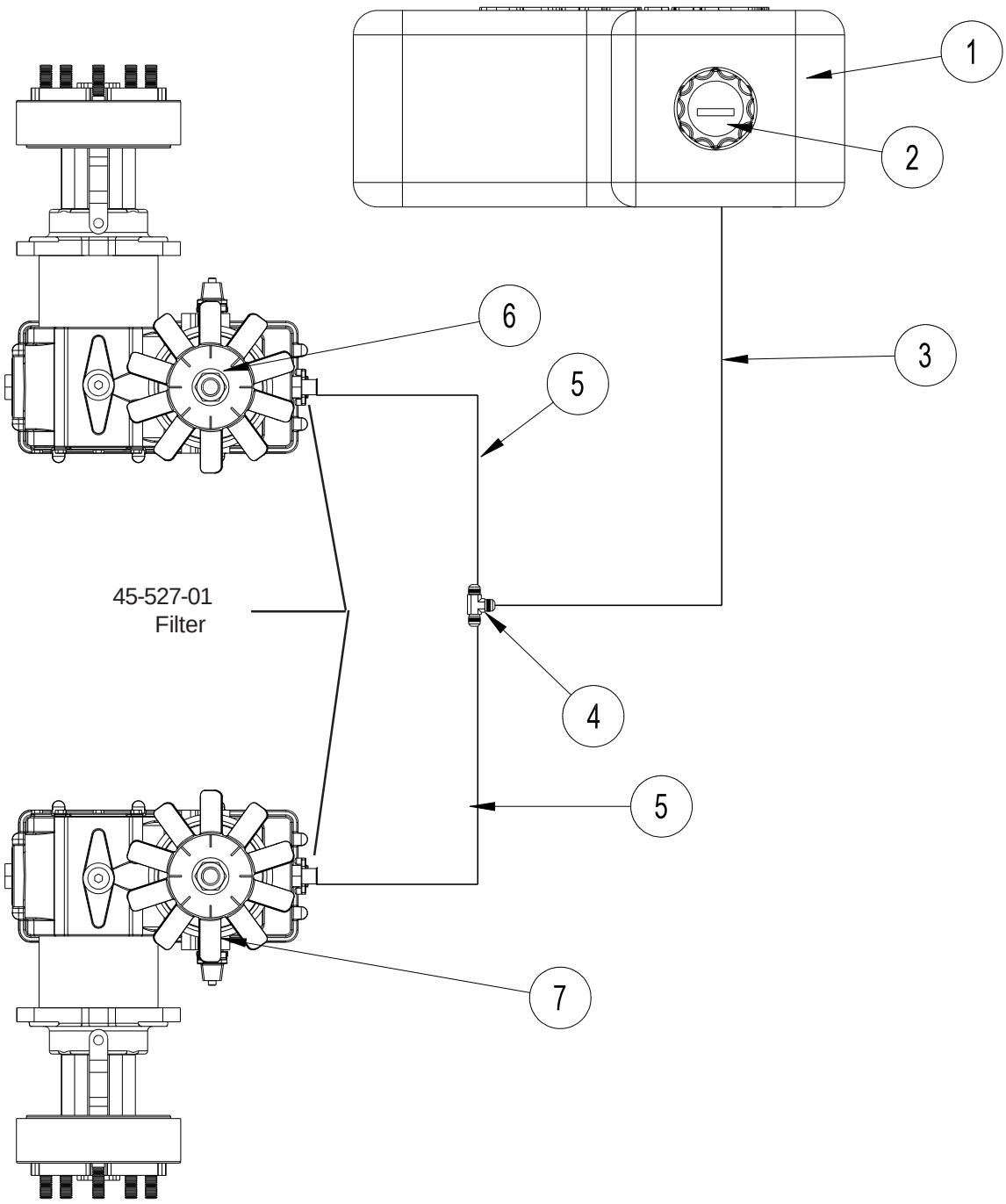
Color Code Chart	
Bl	Blue
Br	Brown
Y	Yellow
Grn	Green
O	Orange
R	Red
B	Black
P	Purple
W	White



REF#	PART#	DESCRIPTION	QUANTITY
1	13-488	Ignition Switch	1
2	14-272	Replacement Seat Switch	1
3	45-523	Relay Switch	2
4	8975	30AMP Circuit Breaker	1
	8977	Circuit Breaker Boot	1
5	13-750	Solenoid with Connector	1
6	45-563	Red Battery Boot	1
	13-215	Starter Cable	1
7	45-520	22HP Briggs & Stratton Engine	1
8	12-031	Black Battery Boot	1
	22-065	Starter Cable	1
9	50-359	Waring Light	1
10	12-017	Hour Meter	1
11	45-631	Electric/Hydraulic Actuator w/ Connector	1
12	45-592	Wire Harness	1
13	30-042-06	Relay	2
14	45-625	Rocker Switch Momentary On-Off-On	1
15*	45-627	Light	1
16*	45-614	Light Wire Harness	1
17*	15-727	Rocker Switch, no light	1
	15-782	Non-Lighted Switch, On-None-Off	1
18	45-521	Main Wire Harness	1
19	45-628	4-Contact Body Connector (engine side)	2

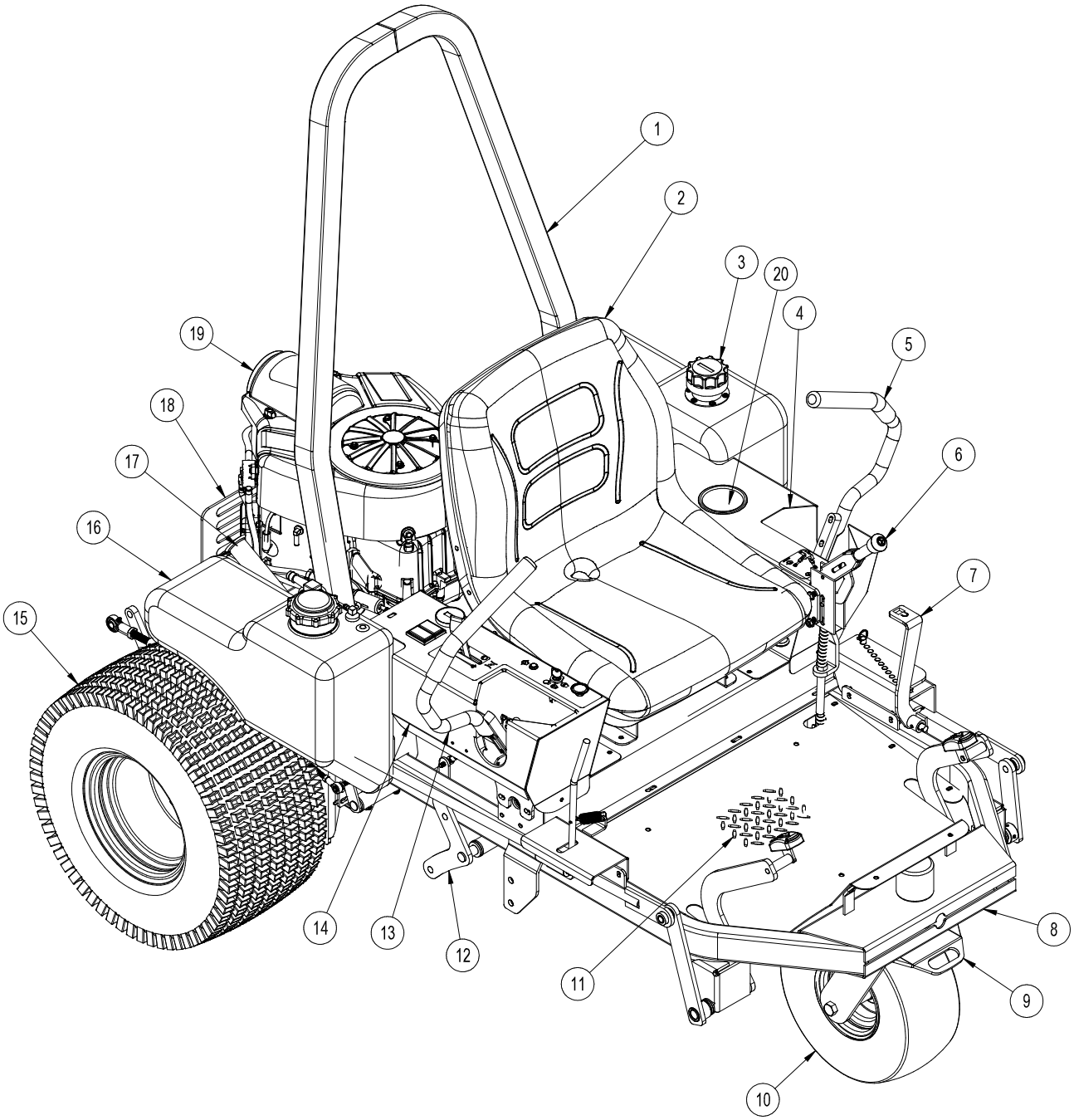
* OPTIONAL

HYDRAULIC DIAGRAM



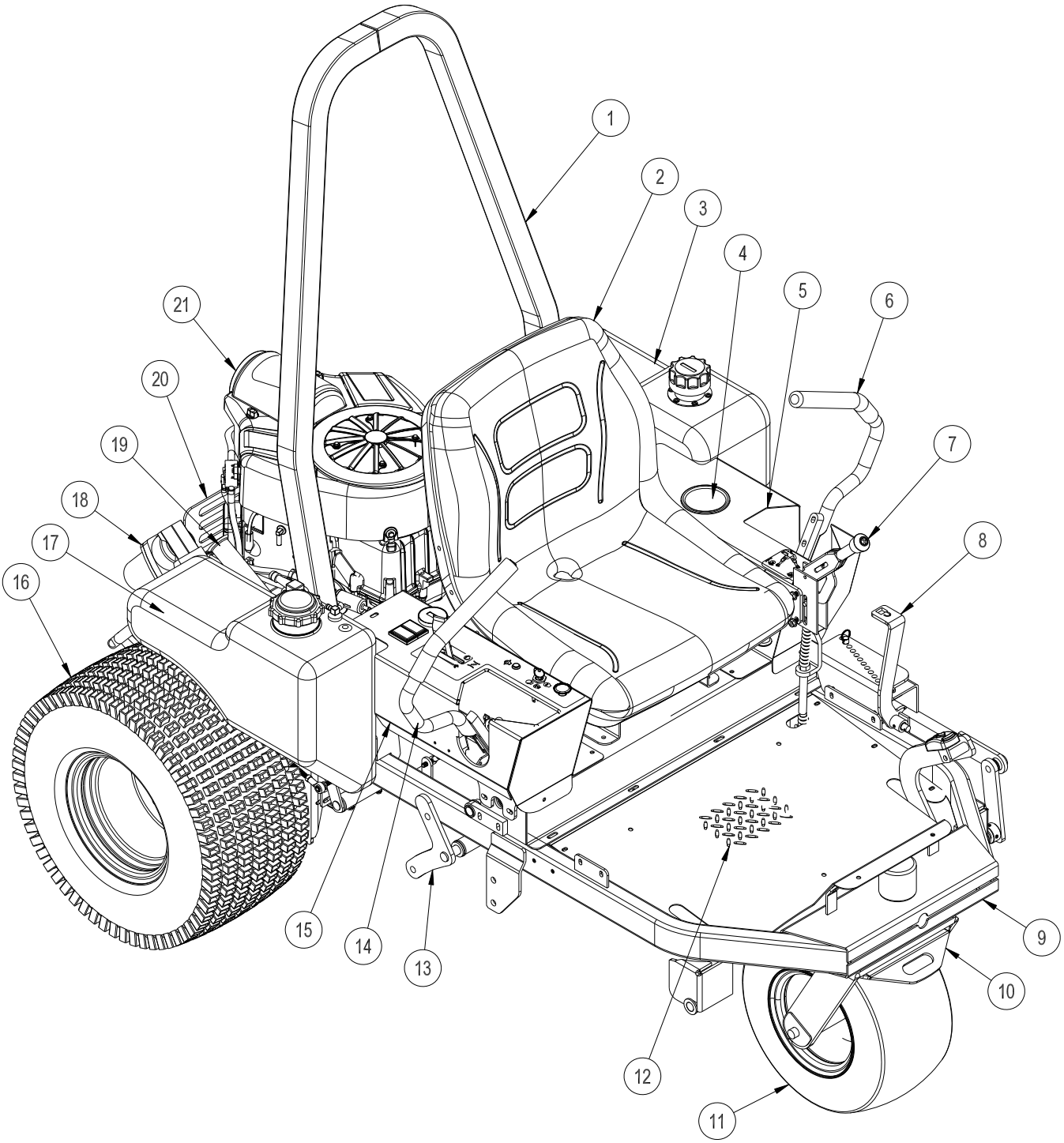
REF#	PART#	DESCRIPTION	QUANTITY
1	42-005	Oil Tank	1
2	45-594	Filler Breather	1
3	8810-24	5/8" Hose x 24	1
4	18-463	Tee Fitting	1
5	8810-16	5/8" Hose x 16	2
6	45-527	LH Hydro	1
7	45-528	RH Hydro	1
		Hydraulic Fluid	7 quarts
		Parker Dura Clean Hydraulic Oil	6.6 liters
		or equivalent of AW32 minimum hydraulic oil.	
	45-527-01	Hydro Filter	

45-500 TURF ZTR MAIN DRAWING



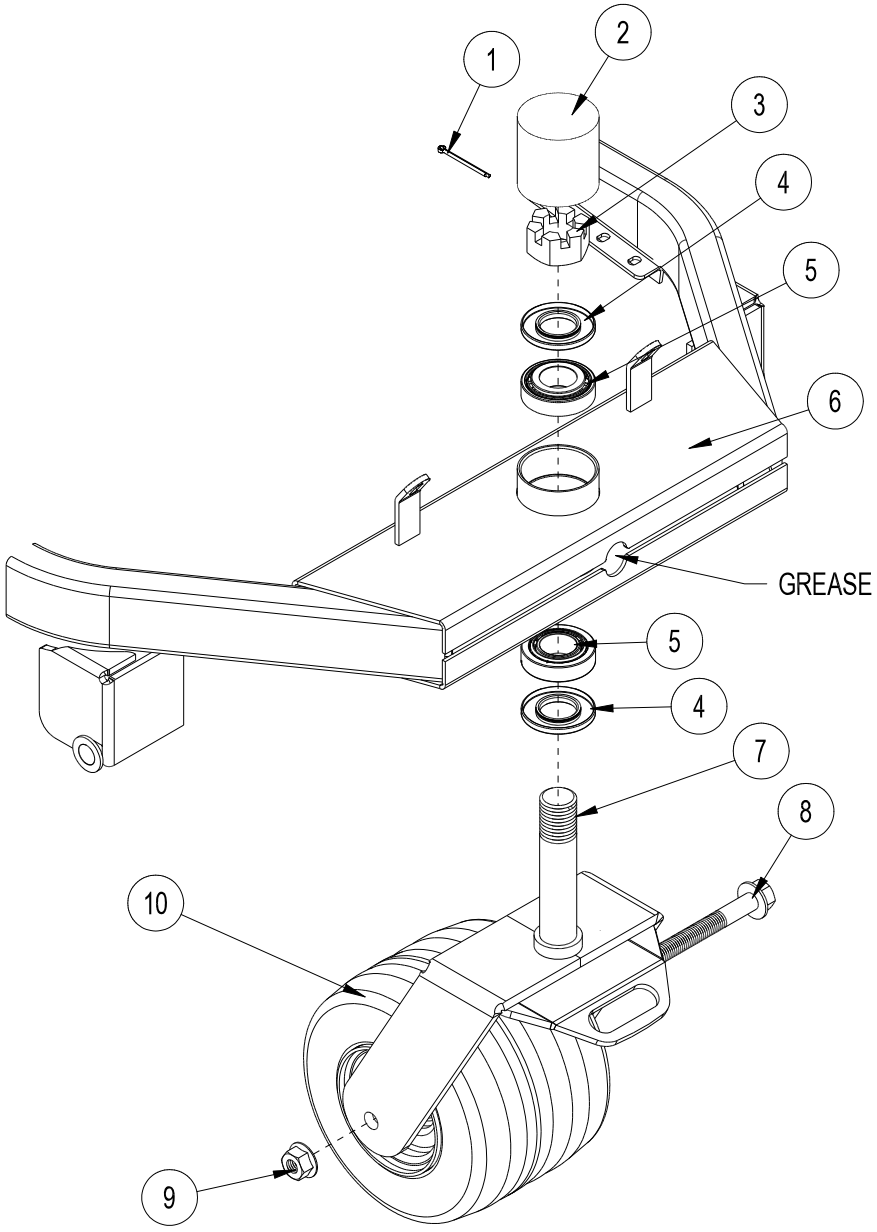
REF#	PART#	DESCRIPTION	QUANTITY
1	45-609	Roll Bar	1
2	45-529	Seat	1
3	45-594	Filler Breather w/ Dipstick	1
	42-005	Oil Tank	1
4	45-552	LH Control Panel	1
	8803-36	Black Trim x 36"	1
5	45-535	LH Steering Lever	1
6	60-106	Park Brake	1
7	45-608	Center Lift Lock	1
8	45-560	Main Frame	1
9	45-548	Caster Fork	1
10	45-555	Caster Wheel	1
11	45-612	Floorboard	1
12	43-141	Lift Arm	1
13	45-536	RH Steering Lever	1
14	45-551	RH Control Panel	1
15	45-021	Tire and Wheel	2
	45-021-01	Tire 22 x 11.00 x 10	2
	45-021-02	Wheel	2
16	42-833	CARB Gas Tank	1
17	45-542	Rake Holder	1
18	45-604	Rear Shield	1
19	45-520	22HP Briggs & Stratton Engine	1
20	15-781	XLG Drink Cup Holder	1

45-501 GOLF ZTR MAIN DRAWING

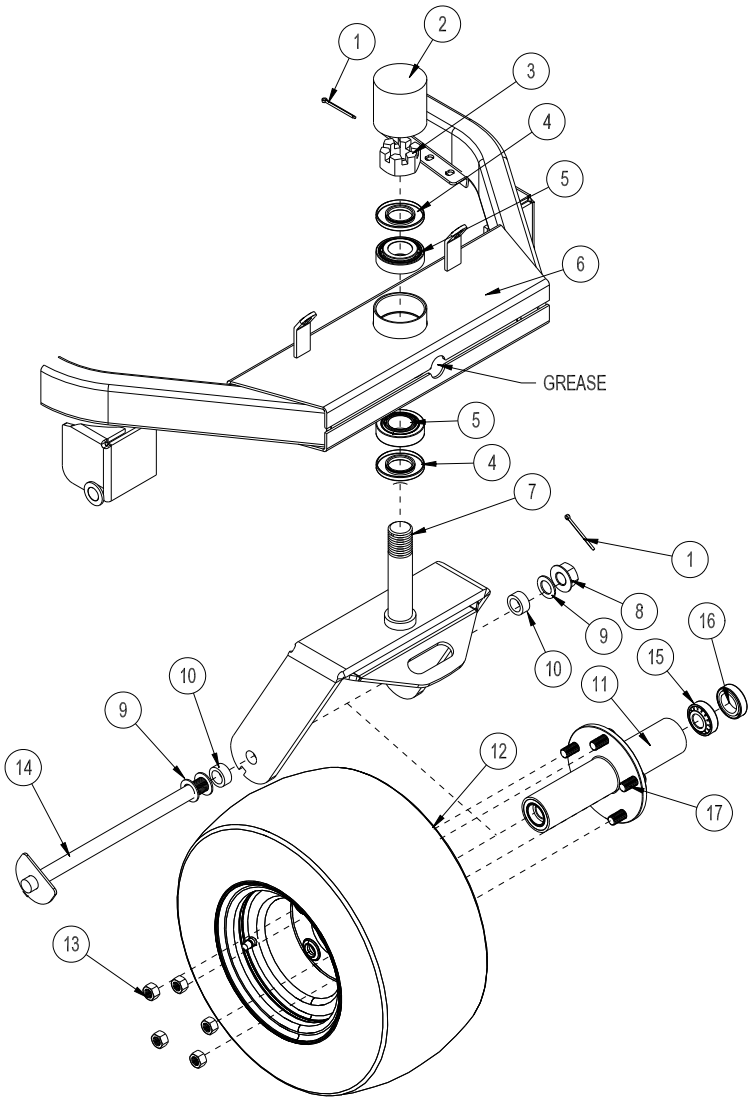


REF#	PART#	DESCRIPTION	QUANTITY
1	45-609	Roll Bar	1
2	45-529	Seat	1
3	42-005	Oil Tank	1
	45-594	Filler Breather w/ Dipstick	1
4	15-781	XLG Drink Cup Holder	1
5	45-552	LH Control Panel	1
	8803-36	Black Trim x 36"	1
6	45-535	LH Steering Lever	1
7	60-106	Park Brake	1
8	45-608	Center Lift Lock	1
9	45-560	Main Frame	1
10	45-613	Caster Fork	1
11	45-616	Caster Wheel	1
12	45-612	Floorboard	1
13	45-582	Center Lift	1
14	45-624	RH Steering Lever	1
15	45-551	RH Control Panel	1
16	45-617	Tire and Wheel	2
	45-617-01	Tire 25 x 10.00 x 12	2
	45-617-02	Wheel	2
17	42-833	CARB Gas Tank	1
18	45-631	Elec/Hyd Actuator	1
19	45-542	Rake Holder	1
20	45-604	Rear Shield	1
21	45-520	22HP Briggs & Stratton Engine	1

45-500 FRONT FORK DRAWING

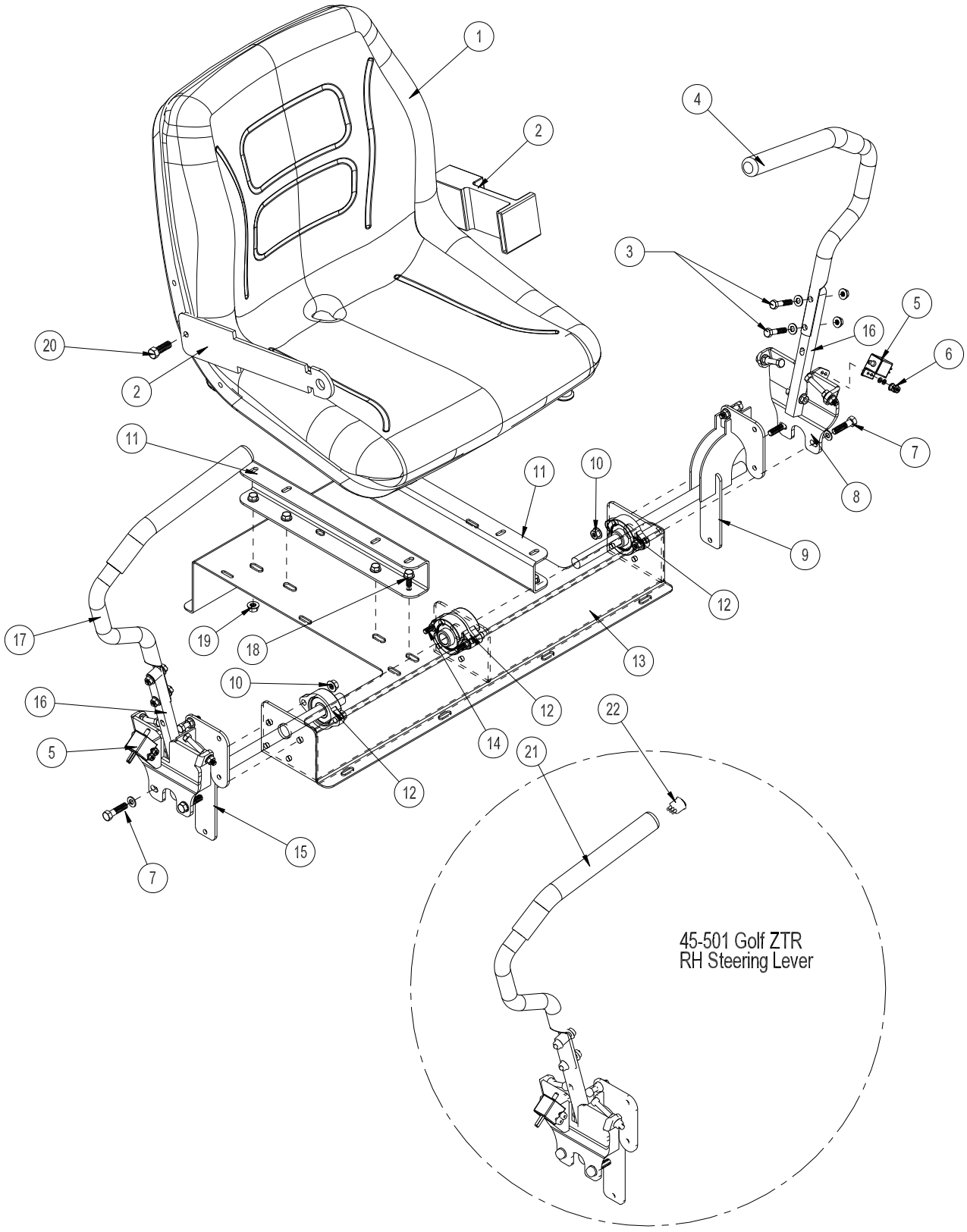


REF#	PART#	DESCRIPTION	QUANTITY
1	HP-18-200	Cotter Pin, 1/8 x 2	1
2	76-301	Rubber Cap	1
3	HNAR-114-12	Slotted Jam Nut, 1 1/4 - 12	1
4	20-142	Oil Seal	2
5	20-143	Bearing with Race	2
6	45-560	Main Frame	1
7	45-548	Caster Fork	1
8	HB-58-11-900	Bolt, 5/8 - 11 x 9	1
9	HNTL-58-11	Lock Nut, 5/8 - 11	1
10	45-555	Caster Wheel	1
	25-356	Decal, 20 PSI	1



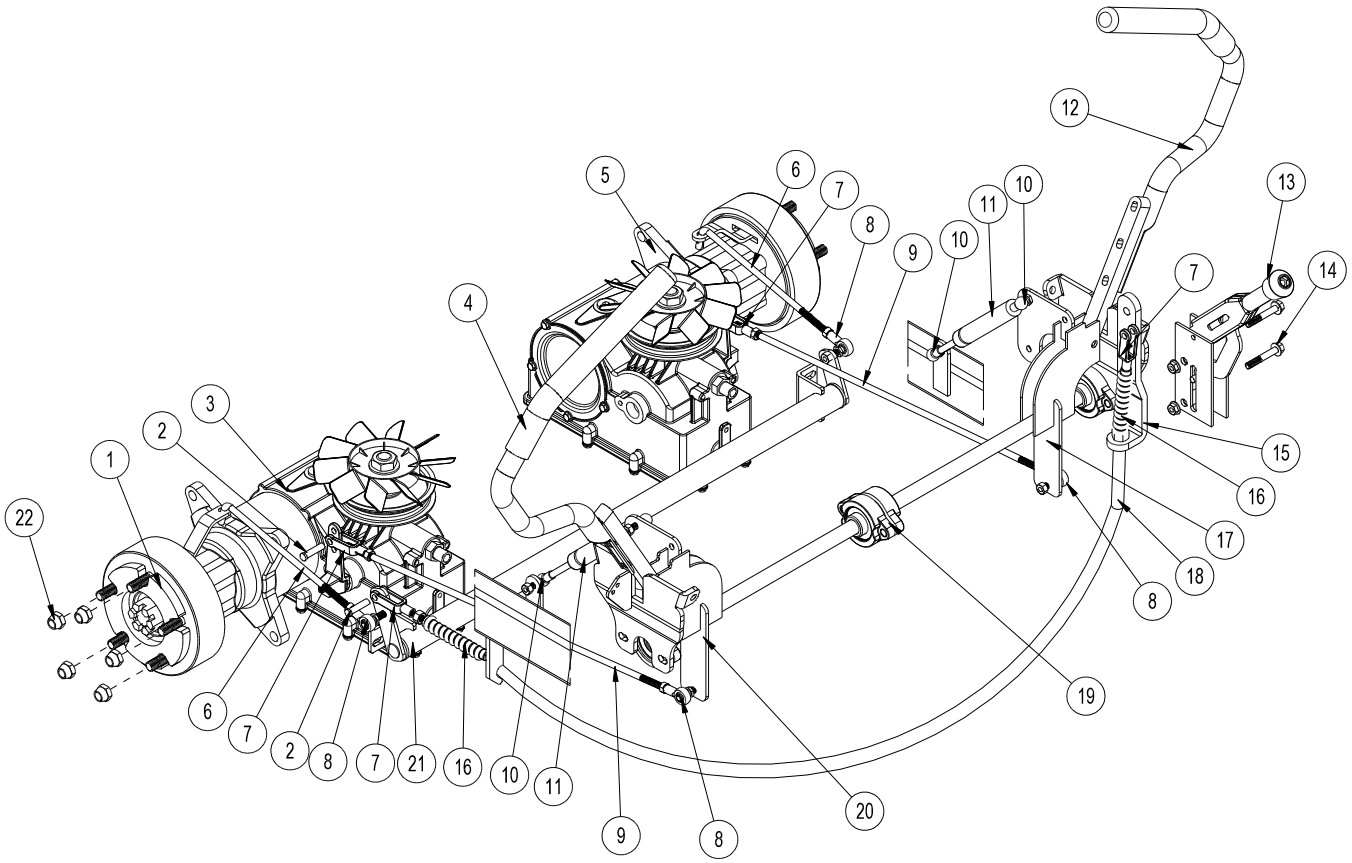
REF#	PART#	DESCRIPTION	QUANTITY
1	HP-18-200	Cotter Pin, 1/8 x 2	1
2	76-301	Rubber Cap	1
3	HNAR-114-12	Slotted Jam Nut, 1 1/4 - 12	1
4	20-142	Oil Seal	2
5	20-143	Bearing with Race	2
6	45-560	Main Frame	1
7	45-613	Caster Fork	1
8	HNA-34-16	Axle Nut, 3/4 - 16	1
9	HMB-34-14	Machine Bushing, 3/4 x 14GA	3
10	11-040	Spacer	2
11	11-010	Hub Assembly (includes * items)	1
12	45-616	Tire and Wheel	1
	25-356	Decal, 20 PSI	1
13	HNL-12-20	Axle Nut, 1/2 - 20	5
14	45-601	Castor Wheel Axle	1
15*	11-038	Bearing Cup and Cone	2
16*	11-039	Grease Seal	2
17*	22-022-02	Bolt Studs, 1/2 - 20 x 1 1/2	5

SEAT PANEL DRAWING



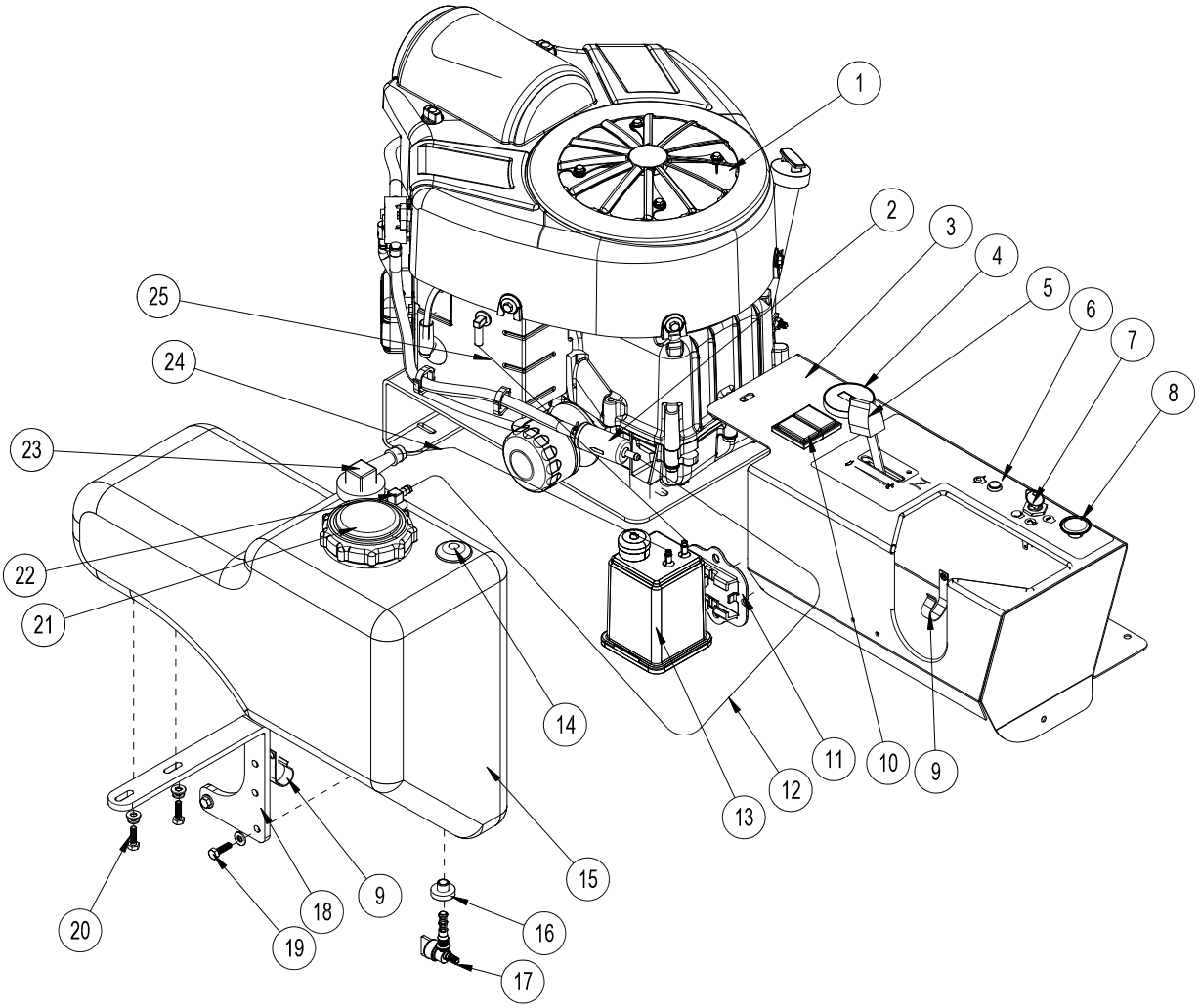
REF#	PART#	DESCRIPTION	QUANTITY
1	45-529	Seat	1
	45-529-01	Replacement Seat Switch	
2	76-198-03	Seat Belt	2
3	HB-516-18-175	Bolt, $^{5}/_{16}$ -18 x $1^{3}/_{4}$	4
	HW-516	Washer, $^{5}/_{16}$	4
	HNTL-516-18	Lock Nut, $^{5}/_{16}$ -18	4
4	45-535	LH Steering Lever	1
5	45-523	Switch	2
6	HSM-10-32-063	Machine Screw, #10 - 32 x $^{5}/_{8}$	4
	HWL-10	Lock Washer, #10	4
	HN-10-32	Nut, #10-32	4
7	HB-38-16-150	Bolt, $^{3}/_{8}$ - 16 x $1^{1}/_{2}$	4
	HW-38	Washer, $^{3}/_{8}$	4
8	45-543	Centering Bracket	2
9	45-546	LH Control Lever	1
10	HNTL-38-16	Lock Nut, $^{3}/_{8}$ - 16	4
11	45-566	Seat Riser	2
12	40-009	Flange Block	4
13	45-549	Seat Frame	1
14	HSSH-516-18-200	Socket Head Cap Screw, $^{5}/_{16}$ - 18 x 2	2
	HNTL-516-18	Lock Nut, $^{5}/_{16}$ -18	2
15	45-545	RH Control Lever	1
16	45-558	Lower Lever	2
17	45-536	RH Steering Lever (45-500 Ball Field ZTR)	1
18	HBFL-516-18-075	Flange Bolt, $^{5}/_{16}$ - 18 x $^{3}/_{4}$	8
19	HNFL-516-18	Flange Lock Nut, $^{5}/_{16}$ - 18	8
20	HB-716-14-125	Bolt, $^{7}/_{16}$ - 14 x $1^{1}/_{4}$	2
	HNTL-716-14	Lock Nut, $^{7}/_{16}$ -14	2
21	45-624	RH Steering Lever (45-501 Golf ZTR)	1
22	45-625	Rocker Switch, Momentary On-Off-On	1

BRAKE & CONTROL LINKAGE DRAWING



REF#	PART#	DESCRIPTION	QUANTITY
1	45-597	Wheel Spacer	2
2	HCP-516-100	Clevis Pin, 5/16 x 1	4
	HP-18-100	Cotter Pin, 1/8 x 1	4
3	45-528	RH Hydro Unit	1
4	45-536	RH Steering Lever (45-500 Ball Field ZTR)	1
	45-624	RH Steering Lever (45-501 Golf ZTR)	1
5	45-527	LH Hydro Unit	1
6	45-583	Brake Linkage	2
	HP-18-100	Cotter Pin, 1/8 x 1	2
7	11-100	5/16" Linkage Yoke	4
	HN-516-24	Nut, 5/16 -24	4
8	18-441	Ball Joint	4
	HN-516-24	Nut, 5/16 -24	8
9	45-584	F/R Linkage	2
10	26-034	Ball Stud, 10mm	4
11	45-533	Dampener	2
12	45-535	LH Steering Lever	1
13	60-106	Park Brake Lever	1
14	HB-516-18-200	Bolt, 5/16 - 18 x 2	2
	HNFL-516-18	Lock Nut, 5/16 - 18	2
15	45-605	Park Brake Bracket	1
16	60-536	Bellows	2
17	45-546	LH Control Lever	1
18	14-339	Cable	1
19	40-009	Flange Block	4
20	45-545	RH Control Lever	1
21	45-547	Brake Relay	1
	HG-14-28-180	Grease Fitting, 1/4 - 28 x 180°	2
22	HNL-12-20	Lug Nut, 1/2 - 20	10

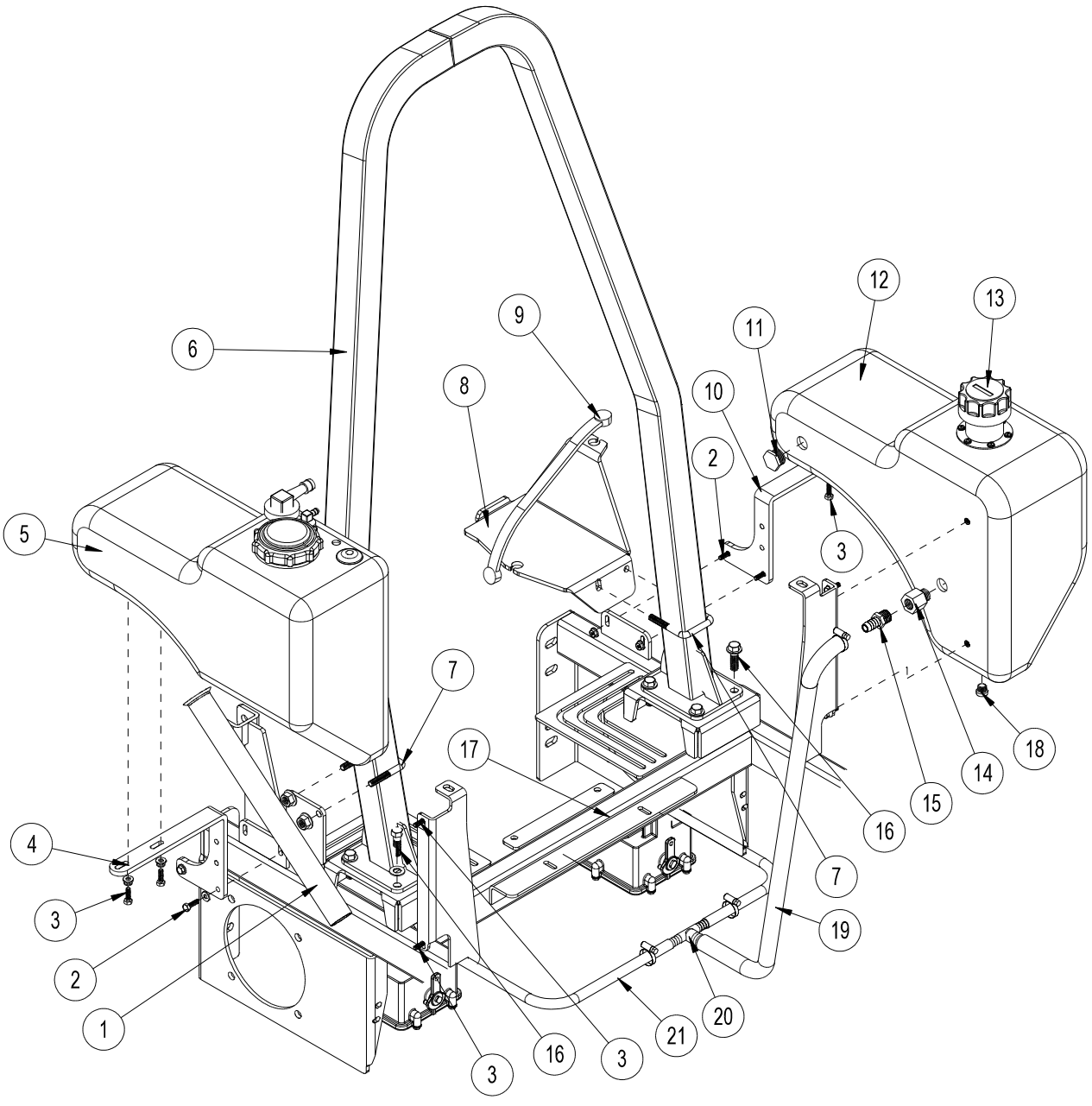
CONTROL PANEL - GAS TANK DRAWING



REF#	PART#	DESCRIPTION	QUANTITY
1	45-520	22HP Briggs & Stratton Engine	1
2	50-403	Replacement In-line Gas Filter	1
3	45-551	RH Control Panel	1
	8803-36	Black Trim x 36"	1
4	12-017	Hour Meter	1
5	48-271	Throttle Cable Assembly	1
	8-624	Knob	1
	HSM-10-32-063	Machine Screw, 10 -32 x 5/8	2
	HNFL-10-32	Flange Lock Nut, 10 -32	2
6	50-359	Warning Indicator Light	1
7	13-488	Ignition Switch Assembly	1
8	80-020	Choke Cable	1
9	HLC-A-58	Loom Clamp	2
	HSTP-14-20-075	Machine Screw, 1/4 - 20 x 3/4	2
	HNFL-14-20	Flange Lock Nut, 1/4 - 20	2
10	15-725	Mount Panel End	2
	15-730	Mount Panel Plug	2
11	8-688	Carbon Canister Mount	1
	HSTP-14-20-075	Machine Screw, 1/4 - 20 x 3/4	2
	HNFL-14-20	Flange Lock Nut, 1/4 - 20	2
12	8800-24	1/4" Fuel Hose x 24"	1
	18-186	Hose Clamp	1
13	8-738	Carbon Canister Assembly	1
14*	42-814-03	Fuel Level Gauge	1
15	42-833	CARB Fuel Tank	1
16*	26-054	Bushing Insert	1
17*	26-055	Fuel Shut-off Valve	1
18	45-572	RH Rear Tank Bracket	1
19	HB-516-18-100	Bolt, 5/16 - 18 x 1	2
	HW-516	Washer, 5/16	2
	HNTL-516-18	Lock Nut, 5/16 - 18	2
20	HB-14-20-075	Bolt, 1/4 - 20 x 3/4	2
	HW-14	Washer, 1/4	2
	HWL-14	Lock Washer, 1/4	2
21*	42-814-02	Cap	1
	42-814-01	Tether	1
22*	42-814-04	Top Draw	1
23*	42-814-05	Vent Check Valve	1
24	8800-16	1/4" Fuel Hose x 16"	1
	18-186	Hose Clamp	1
25	9025-30	3/16" Fuel Hose x 30"	1
	18-186	Hose Clamp	1

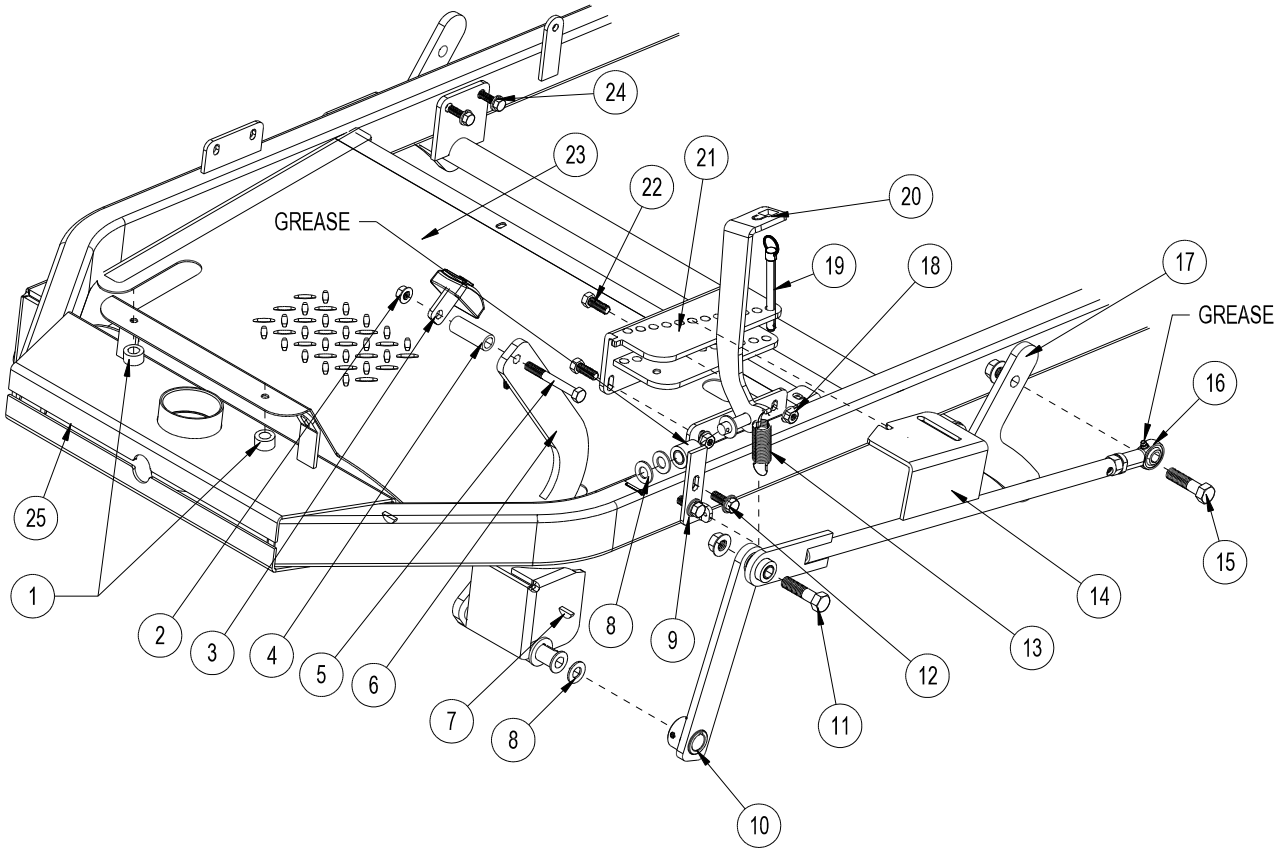
* Comes with 42-833 Fuel Tank

ROLL BAR - OIL TANK DRAWING



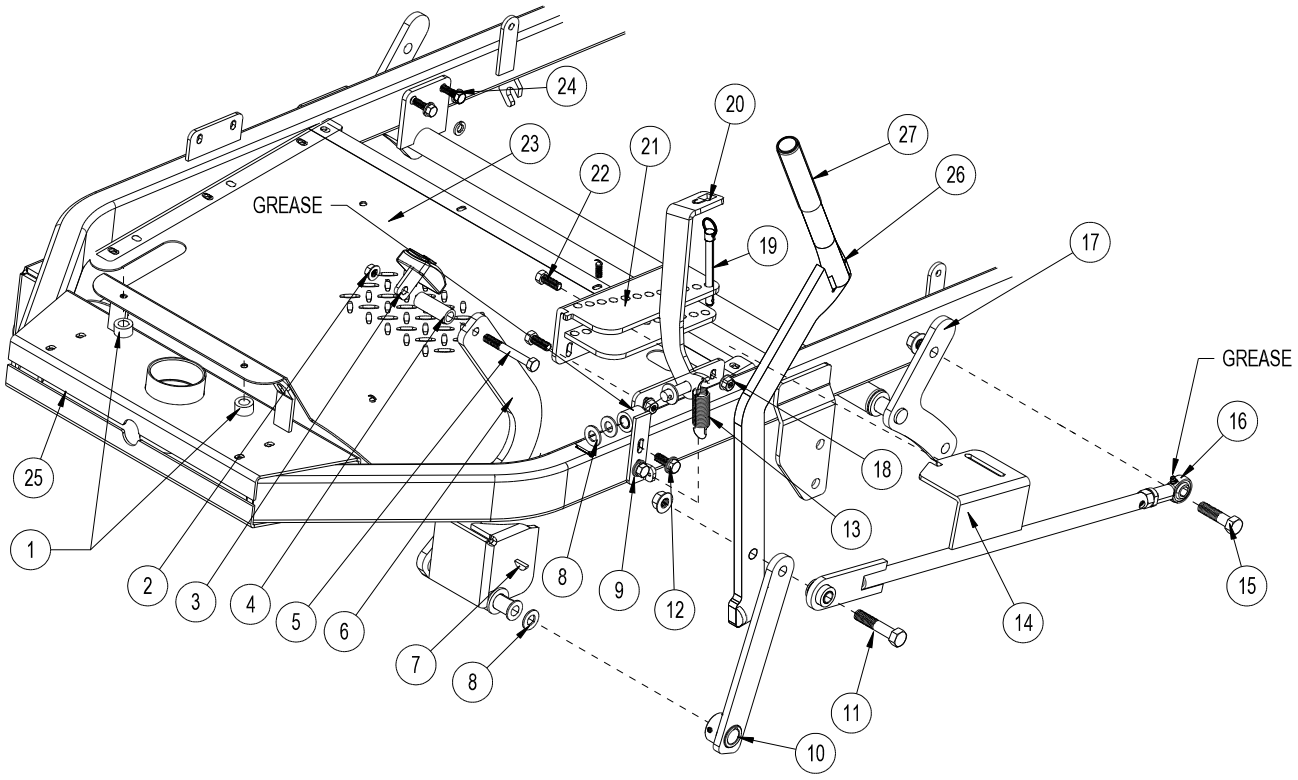
REF#	PART#	DESCRIPTION	QUANTITY
1	45-542	Rake Holder	1
2	HB-516-18-100	Bolt, 5/16 - 18 x 1	4
	HW-516	Washer, 5/16	4
	HNTL-516-18	Lock Nut, 5/16 - 18	4
3	HB-14-20-075	Bolt, 1/4 - 20 x 3/4	8
	HW-14	Washer, 1/4	8
	HWL-14	Lock Washer, 1/4	8
4	45-572	Rear Tank Bracket, RH	1
5	42-833	CARB Fuel Tank	1
6	45-609	Roll Bar	1
7	17-537	Square U-bolt	2
8	45-606	Battery Tray	1
9	8-603	Battery Strap	1
10	45-573	Rear Tank Bracket, LH	1
11	45-534	Hollow Hex Plug	1
12	42-005	Oil Tank	1
13	45-594	Filler Breather with Dipstick	1
14	18-240	Pipe Adapter	1
15	23-139	Barb Fitting	1
16	HB-716-14-150	Bolt, 7/16 - 14 x 1 1/2	8
	HMB-12-14	Machine Bushing, 1/2 x 14GA	8
	HNTL-716-14	Lock Nut, 7/16 - 14	8
17	45-560	Main Frame	1
18	23-126	O-ring Plug	1
19	8810-24	5/8" Hose x 24"	1
	18-077	Hose Clamp	2
20	18-463	Tee Fitting	1
21	8810-16	5/8" Hose x 16"	2
	18-077	Hose Clamp	4

CENTER LIFT LINKAGE DRAWING



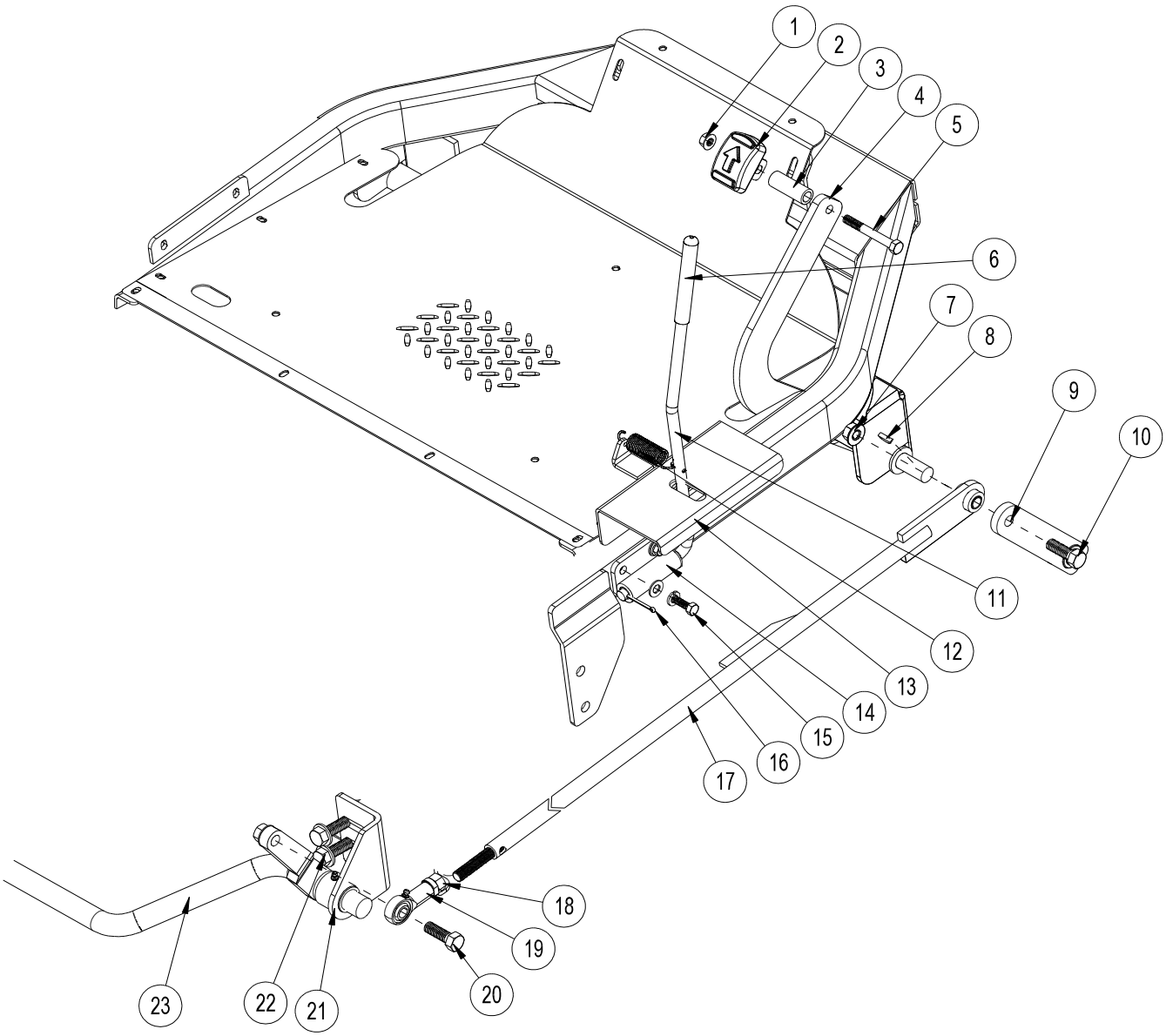
REF#	PART#	DESCRIPTION	QUANTITY
1	16-990	Spacer	2
2	HNTL-38-16	Lock Nut, 3/8-16	1
3	45-022	Molded Foot PEdal	1
4	45-598	Pedal Spacer	1
5	HB-38-16-300	Bolt, 3/8 - 16 x 3	1
6	45-578	Center Lift Pedal	1
7	HWK-316-075	Woodruff Key, 3/16 x 3/4	1
8	HMB-12-14	Machine Bushing, 1/2 x 14GA	5
9	45-602	Tube Mount	1
	HG-14-28-180	Grease Fitting, 1/4 - 28 x 180°	1
10	45-579	Center Lift Relay	1
	HSSHS-14-20-031	Set Screw, 1/4 - 20 x 5/16	1
11	HB-12-13-200	Bolt, 1/2 -13 x 2	1
	HNTL-12-13	Lock Nut, 1/2 - 13	1
12	HB-38-16-100	Bolt, 3/8 - 16 x 1	2
	HW-38	Washer, 3/8	2
	HWL-38	Lock Washer, 3/8	2
13	11-050	Extension Spring	1
14	45-564	Center Lift Rod	1
15	HB-12-13-200	Bolt, 1/2 -13 x 2	1
	HNTL-12-13	Lock Nut, 1/2 - 13	1
16	80-006	Rod End w/ Grease Fitting	1
	HNJ-12-20	Jam Nut, 1/2 - 20	1
	HG-14-28-180	Grease Fitting, 1/4 - 28 x 180°	1
17	45-582	Center Lift	1
18	HNFL-516-18	Flange Lock Nut, 5/16 -18	2
19	45-561	Detent Pin	1
20	45-608	Center Lift Lock Arm	1
21	45-603	Depth Adjustment	1
22	HB-516-18-100	Bolt, 5/16 - 18 x 1	2
23	45-612	Floorboard	1
24	HB-516-18-150	Bolt, 5/16 - 18 x 1 1/2	4
	HWL-516	Lock Washer, 5/16	4
25	45-560	Main Frame	1

CENTER LIFT LINKAGE DRAWING



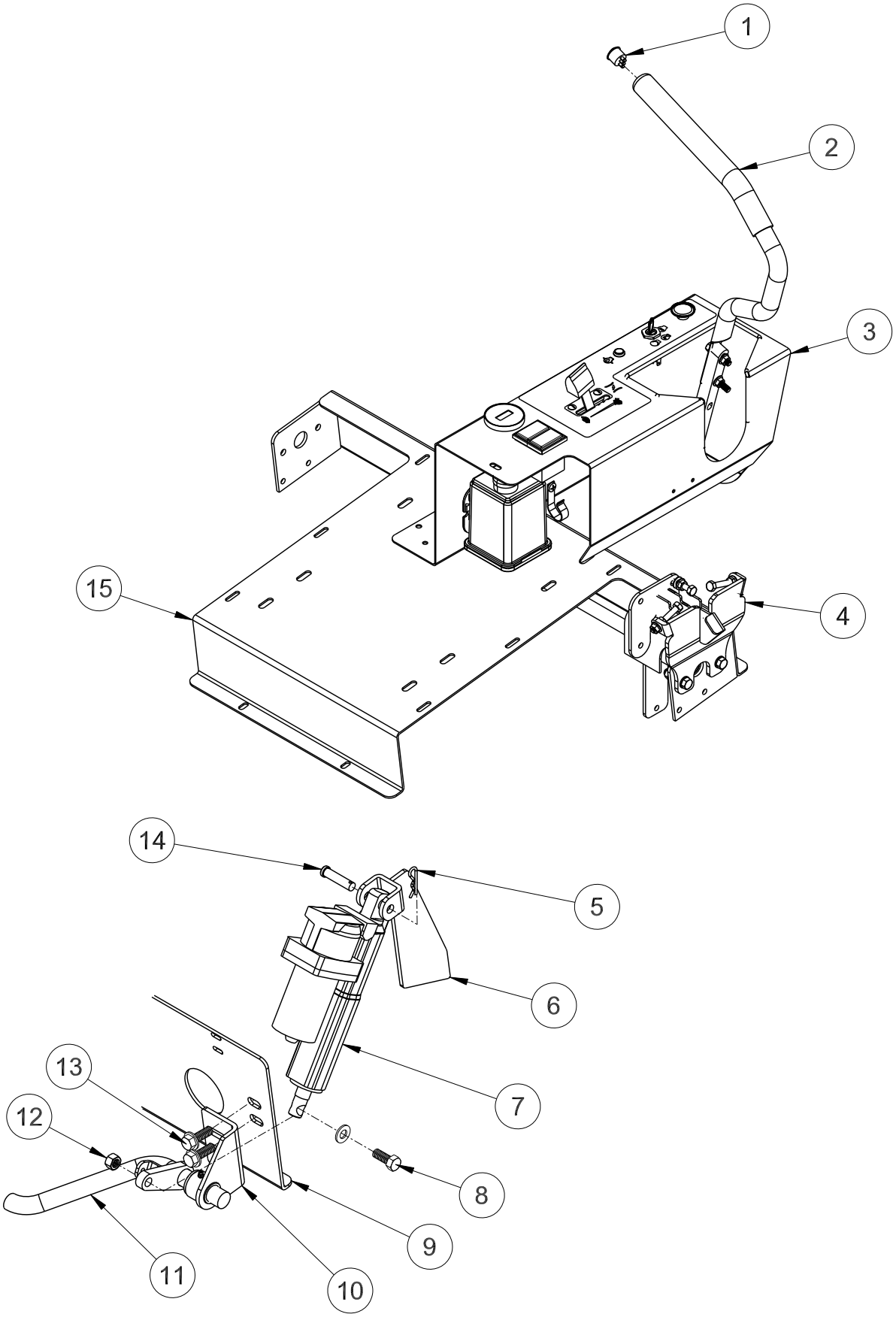
REF#	PART#	DESCRIPTION	QUANTITY
1	16-990	Spacer	2
2	HNTL-38-16	Lock Nut, 3/8-16	1
3	45-022	Molded Foot PEdal	1
4	45-598	Pedal Spacer	1
5	HB-38-16-300	Bolt, 3/8 - 16 x 3	1
6	45-578	Center Lift Pedal	1
7	HWK-316-075	Woodruff Key, 3/16 x 3/4	1
8	HMB-12-14	Machine Bushing, 1/2 x 14GA	5
9	45-602	Tube Mount	1
	HG-14-28-180	Grease Fitting, 1/4 - 28 x 180°	1
10	45-579	Center Lift Relay	1
	HSSHS-14-20-031	Set Screw, 1/4 - 20 x 5/16	1
11	HB-12-13-250	Bolt, 1/2 -13 x 2 1/2	1
	HNTL-12-13	Lock Nut, 1/2 - 13	1
12	HB-38-16-100	Bolt, 3/8 - 16 x 1	2
	HW-38	Washer, 3/8	2
	HWL-38	Lock Washer, 3/8	2
13	11-050	Extension Spring	1
14	45-564	Center Lift Rod	1
15	HB-12-13-200	Bolt, 1/2 -13 x 2	1
	HNTL-12-13	Lock Nut, 1/2 - 13	1
16	80-006	Rod End w/ Grease Fitting	1
	HNJ-12-20	Jam Nut, 1/2 - 20	1
	HG-14-28-180	Grease Fitting, 1/4 - 28 x 180°	1
17	45-582	Center Lift	1
18	HNFL-516-18	Flange Lock Nut, 5/16 -18	2
19	45-561	Detent Pin	1
20	45-608	Center Lift Lock Arm	1
21	45-603	Depth Adjustment	1
22	HB-516-18-100	Bolt, 5/16 - 18 x 1	2
23	45-612	Floorboard	1
24	HB-516-18-150	Bolt, 5/16 - 18 x 1 1/2	4
	HWL-516	Lock Washer, 5/16	4
25	45-560	Main Frame	1
26	45-639	Handle	1
27	15-019	Grip	1

45-500 MANUAL REAR LIFT DRAWING



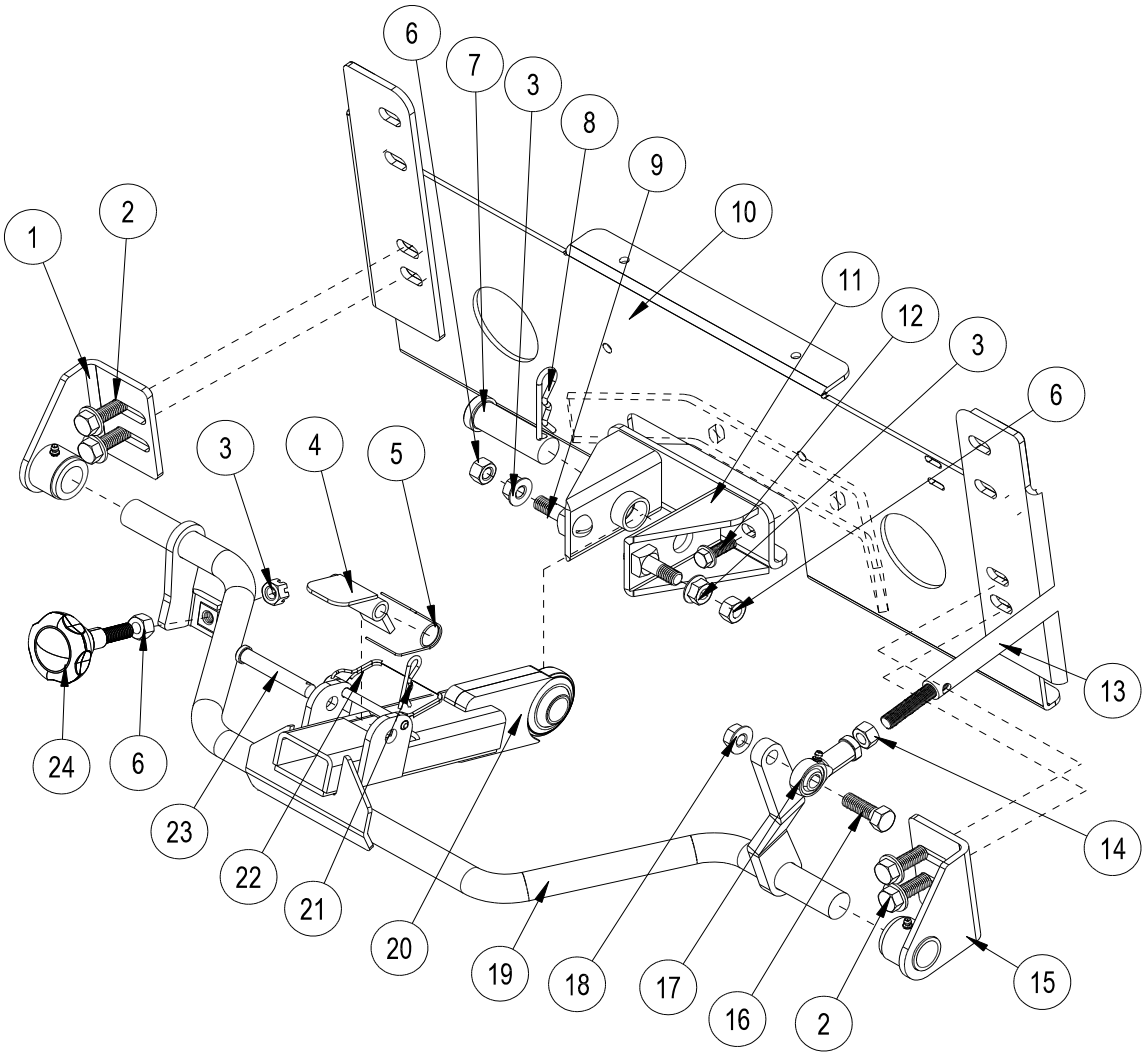
REF#	PART#	DESCRIPTION	QUANTITY
1	HNTL-38-16	Lock Nut, 3/8 - 16	1
2	45-022	Molded Foot Pedal	1
3	45-598	Foot Pedal Spacer	1
4	45-580	Rake Lift Pedal	1
5	HB-38-16-300	Bolt, 3/8 -16 x 3	1
6	25-120	Handle Grip	1
7	HNTL-12-13	Lock Nut, 1/2 -13	1
8	HWK-316-075	Woodruff Key, 3/16 x 3/4	1
9	45-581	Rake Lift Relay	1
10	HB-12-13-150	Bolt, 1/2 - 12 x 1 1/2	1
	HW-12	Washer, 1/2	1
11	45-540	Lock Rod	1
12	13-436	Spring	1
13	45-537	Rake Stop	1
14	45-541	Pivot	1
15	HB-516-18-100	Bolt, 5/16 - 18 x 1	2
	HW-516	Washer, 5/16	2
	HWL-516	Lock Washer, 5/16	2
16	HP-18-100	Cotter Pin, 1/8 x 1	1
17	45-562	Rake Lift Rod	1
18	HNJ-12-20	Jam Nut, 1/2 - 20	1
19	80-006	Rod End with Grease Fitting	1
	HG-14-28-180	Grease Fitting, 1/4 -28 x 180°	1
20	HB-12-13-200	Bolt, 1/2 - 13 x 2	1
	HNTL-12-13	Lock Nut, 1/2 - 13	1
21	34-219	LH Pivot Bracket	1
	HG-14-28-180	Grease Fitting, 1/4 -28 x 180°	1
22	HB-12-13-150	Bolt, 1/2 -13 x 1 1/2	2
	HW-12	Washer, 1/2	2
	HNFL-12-13	Flange Lock Nut, 1/2 - 13	2
23	45-607	Lift Bar	1

45-501 ELEC/HYD REAR LIFT



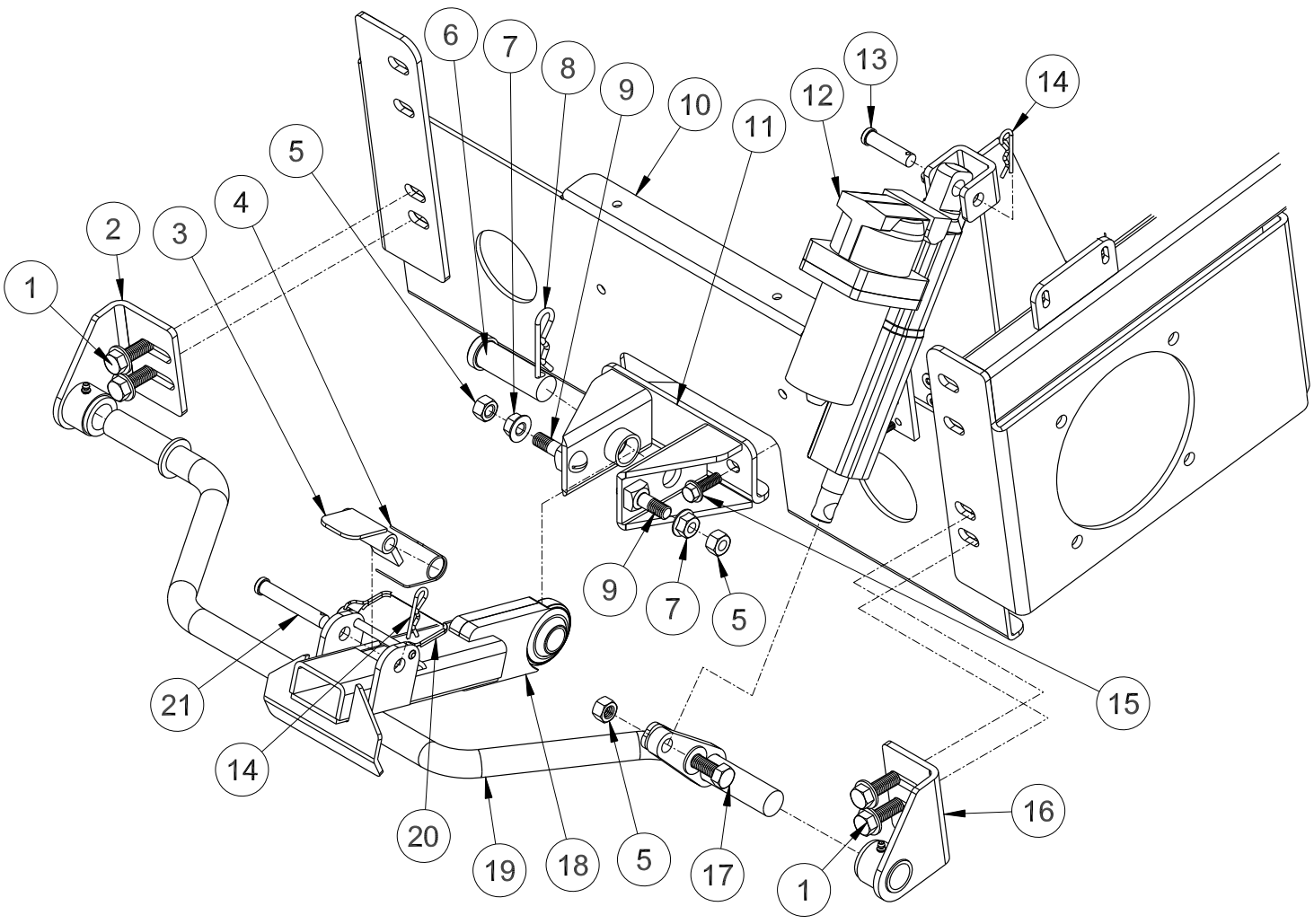
REF#	PART#	DESCRIPTION	QUANTITY
1	45-625	Rocker Switch, Momentary On-Off-On	1
	45-592	Wire Harness Electric Lift	1
2	45-624	RH Steering Lever (wire harness goes through)	1
3	45-551	RH Control Panel	1
4	45-543	Centering Bracket	1
5	HHP-18	Bridge Pin, 1/8	1
6		Main Frame	1
7	45-631	Electric/Hydraulic Actuator w/ Connector	1
8	HB-12-13-125	Bolt, 1/2 - 13 x 1 1/4	1
	HW-12	Washer, 1/2	1
9	45-577	Rear Panel	1
10	34-219	LH Pivot Bracket	1
	HG-14-28-180	Grease Fitting, 1/4 - 28 x 80°	1
11	45-585	Lift Bar	1
12	HN-12-13	Nut, 1/2 - 13	1
13	HB-12-13-150	Bolt, 1/2 -13 x 1 1/2	2
	HW-12	Washer, 1/2	2
	HNFL-12-13	Flange Lock Nut, 1/2 - 13	2
14	HCP-12-225	Clevis Pin, 1/2 x 2 1/4	1
15	45-549	Seat Panel	1

45-500 REAR HITCH DRAWING



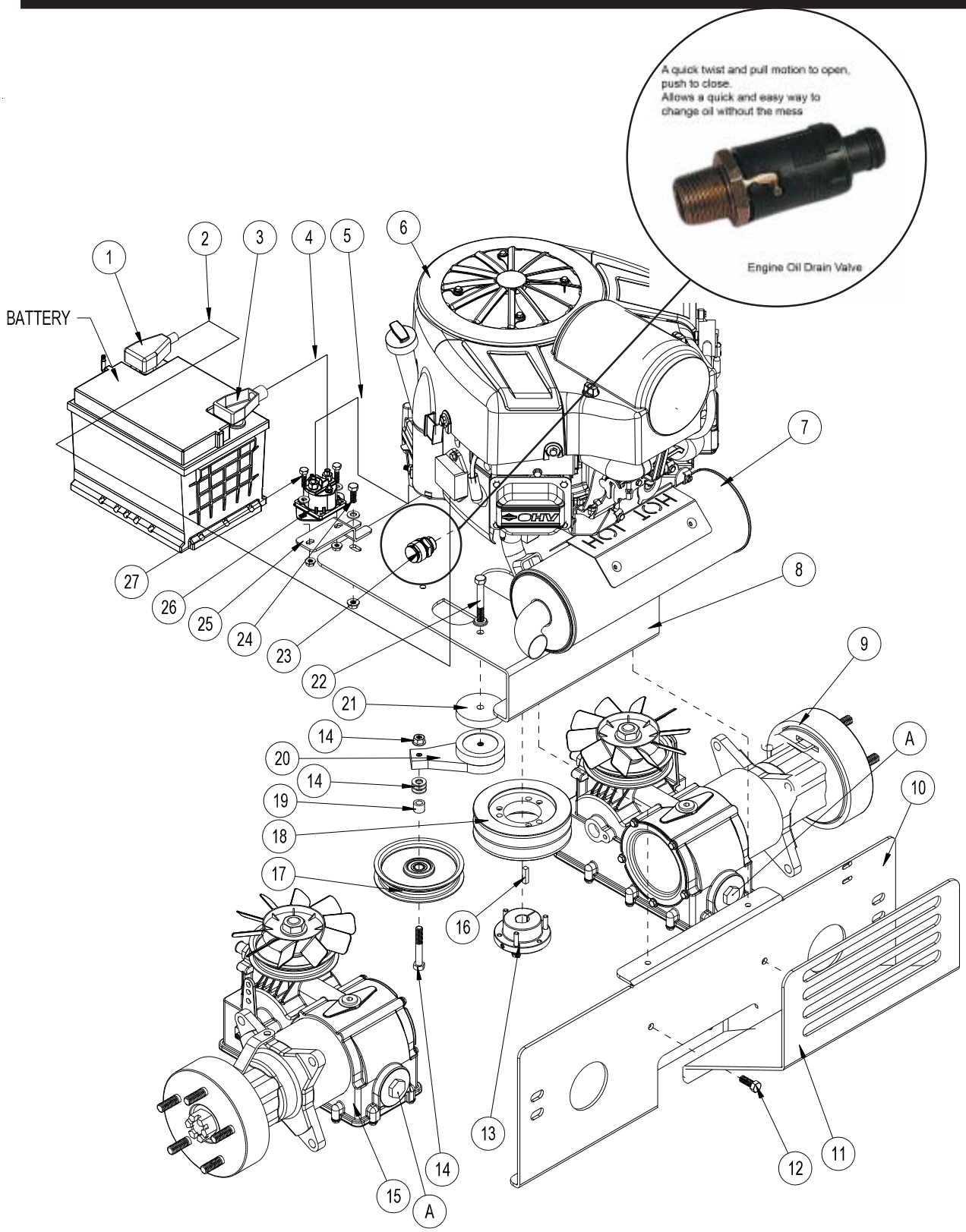
REF#	PART#	DESCRIPTION	QUANTITY
1	34-220	RH Pivot	1
	HG-14-28-180	Grease Fitting, 1/4 -28 x 180°	1
2	HB-12-13-150	Bolt, 1/2 -13 x 1 1/2	4
	HW-12	Washer, 1/2	4
	HNFL-12-13	Flange Lock Nut, 1/2 - 13	4
3	HNCL-12-13	Center Lock Nut, 1/2 - 13	3
4	43-139	Lock	1
5	43-136	Torsion Spring	1
6	HN-12-13	Nut, 1/2 - 13	3
7	HCP-78-350	Clevis Pin 7/8 x 3 1/2	1
8	HHP-.177	Bridge Pin, .177	1
9	HSSHB-12-13-200	Button Socket Head Cap Screw, 1/2 - 13 x 2	2
10	45-577	Rear Panel	1
11	43-140	Frame Mount	1
12	HB-38-24-100	Bolt, 3/8 - 24 x 1	2
	HW-38	Washer, 3/8	2
	HWL-38	Lock Washer, 3/8	2
13	45-562	Rake Lift Rod	1
14	HNJ-12-20	Jam Nut, 1/2 - 20	1
15	34-219	LH Pivot	1
	HG-14-28-180	Grease Fitting, 1/4 -28 x 180°	1
16	HB-12-13-200	Bolt, 1/2 -13 x 2	1
17	80-006	Rod End with Grease Fitting	1
	HG-14-28-180	Grease Fitting, 1/4 -28 x 180°	1
18	HNTL-12-13	Lock Nut, 1/2 - 13	1
19	45-607	Lift Arm	1
20	43-141	Lift Bar	1
21	HHP-18	Bridge Pin, 1/8	1
22	25-382	Lock Pin	1
23	HCP-12-350	Clevis Pin, 1/2 x 3 1/2	1
24	45-538	Adjustment Knob	1

45-501 REAR HITCH DRAWING

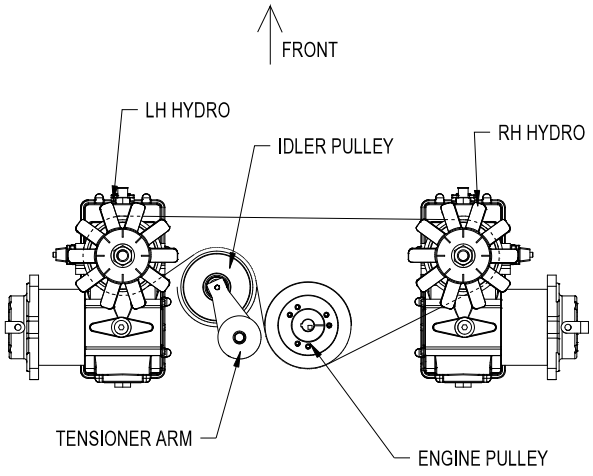


REF#	PART#	DESCRIPTION	QUANTITY
1	HB-12-13-150	Bolt, 1/2 -13 x 1 1/2	4
	HW-12	Washer, 1/2	4
	HNFL-12-13	Flange Lock Nut, 1/2 - 13	4
2	34-220	RH Pivot	1
	HG-14-28-180	Grease Fitting, 1/4 -28 x 180°	1
3	43-139	Lock	1
4	43-136	Torsion Spring	1
5	HN-12-13	Nut, 1/2 - 13	3
6	HCP-78-350	Clevis Pin 7/8 x 3 1/2	1
7	HNCL-12-13	Center Lock Nut, 1/2 - 13	2
8	HHP-177	Bridge Pin, .177	1
9	HSSHB-12-13-200	Button Socket Head Cap Screw, 1/2 - 13 x 2	2
10	45-577	Rear Panel	1
11	43-140	Frame Mount	1
12	45-631	Electric/Hydraulic Actator w/ Connector	1
13	HCP-12-225	Clevis Pin, 1/2 x 2 1/4	1
14	HHP-18	Bridge Pin, 1/8	2
15	HB-38-24-100	Bolt, 3/8 - 24 x 1	2
	HW-38	Washer, 3/8	2
	HWL-38	Lock Washer, 3/8	2
16	34-219	LH Pivot	1
	HG-14-28-180	Grease Fitting, 1/4 -28 x 180°	1
17	HB-12-13-125	Bolt, 1/2 - 13 x 1 1/4	1
	HW-12	Washer, 1/2	1
18	43-141	Lift Bar	1
19	45-585	Lift Arm	1
20	25-382	Lock Pin	1
21	HCP-12-350	Clevis Pin, 1/2 x 3 1/2	1

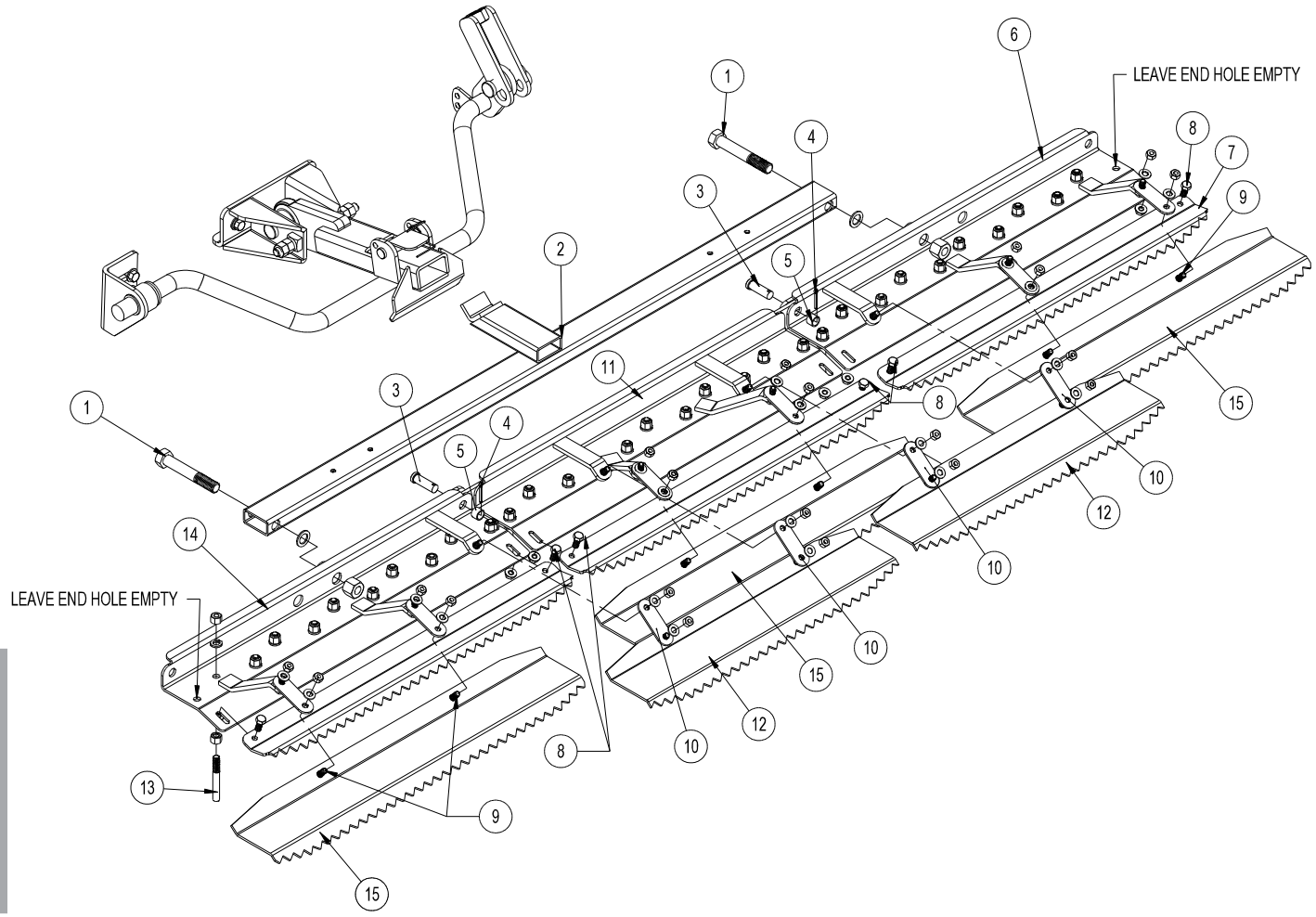
ENGINE DRAWING



REF#	PART#	DESCRIPTION	QUANTITY
1	12-031	Battery Boot - Black	1
2	22-065	Starter Cable - Black	1
3	45-563	Battery Boot - Red	1
4	13-215	24" Starter Cable - Black	1
5	13-197	Battery Cable	1
6	45-520	22HP Briggs & Stratton Engine	1
7	45-525	Muffler	1
8	45-575	Engine Plate	1
9	45-528	RH Hydro	1
10	45-577	Rear Panel	1
11	45-604	Rear Shield	1
12	HB-38-16-100	Bolt, $^{3}/_{8}$ -16 x 1	2
	HNFL-38-16	Flange Lock Nut, $^{3}/_{8}$ - 16	2
13	45-532	Hub	1
14	HB-38-16-275	Bolt, $^{3}/_{8}$ - 16 x $2^{3}/_{4}$	1
	HW-38	Washer, $^{3}/_{8}$	3 or as needed
	HNFL-38-16	Flange Lock Nut, $^{3}/_{8}$ - 16	1
15	45-527	LH Hydro	1
16	HKSQ-14-100	Square Key, $^{1}/_{2}$ x 1	1
17	45-643	Idler Pulley	1
18	45-531	Pulley	1
19	45-154	Spacer	1
20	42-327	Belt Tensioner	1
21	45-610	Tensioner Spacer	1
22	HB-38-16-275	Bolt, $^{3}/_{8}$ - 16 x $2^{3}/_{4}$	1
	HW-38	Washer, $^{3}/_{8}$	1
	HWL-38	Lock Washer, $^{3}/_{8}$	1
23	18-462	Oil Drain Valve	1
24	HB-516-18-100	Bolt, $^{5}/_{16}$ - 18 x 1	1
	HW-516	Washer, $^{5}/_{16}$	1
	HNFL-516-18	Flange Lock Nut, $^{5}/_{16}$ - 18	1
25	45-557	Solenoid Mount	1
26	13-750	Solenoid w/ Connector	1
27	HB-14-20-100	Bolt, $^{1}/_{4}$ -20 x 1	2
	HW-14	Washer, $^{1}/_{4}$	2
	HNFL-14-20	Flange Lock Nut, $^{1}/_{4}$ - 20	2
A	45-527-01	Filter	2
NS	45-530	DuraPower II FHP Belt	1



45-503 84" RAKE ASSEMBLY DRAWING



45-503 84" RAKE ASSEMBLY PARTS LIST

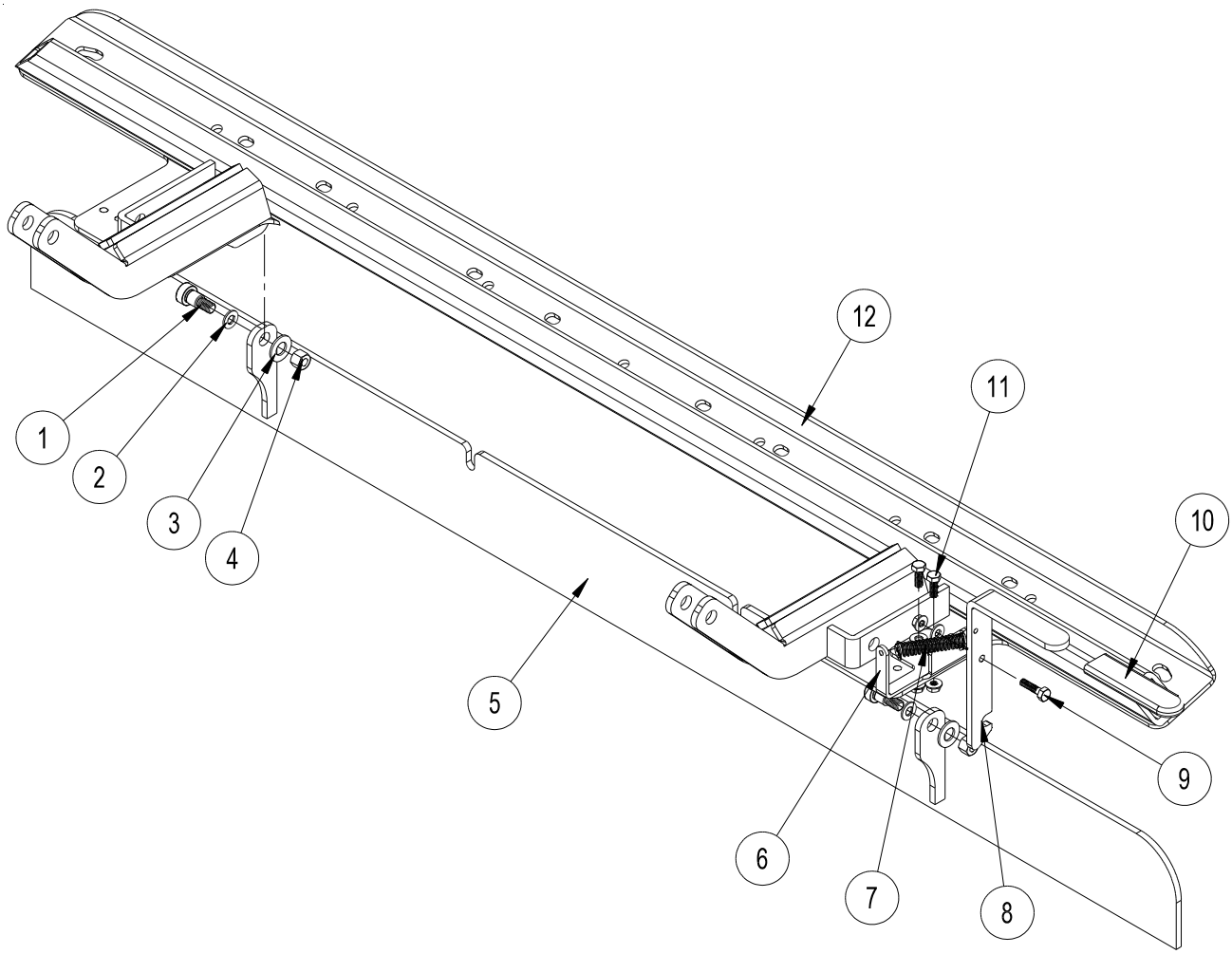
REF#	PART#	DESCRIPTION	QUANTITY
1*	HB-58-11-400	Bolt, $^5/_8$ - 11 x 4	2
	HMB-58-14	Machine Bushing, $^5/_8$ x 14GA	2
	HNCL-58-11	Lock Nut, $^5/_8$ - 11	2
2	45-588	Drawbar	1
3*	HCP-12-150	Clevis Pin, $^1/_2$ - $1^1/_2$	2
4*	HP-18-100	Cotter Pin, $^1/_8$ x 1	2
5	76-275	Spacer	2
6	45-590	Right Rake Frame	1
7	45-586	Grooming Blade	3
8*	HB-516-18-075	Bolt, $^5/_{16}$ - 18 x $^3/_4$	6
	HNFL-516-18	Flange Lock Nut, $^5/_{16}$ - 18	6
9*	HBFL-516-18-075	Flange Lock Bolt, $^5/_{16}$ - 18 x $^3/_4$	20
	HNTL-516-18	Nylon Lock Nut, $^5/_{16}$ - 18	20
	HW-516	Flat Washer, $^5/_{16}$	20
10	13-757	Rake Connect Strap	10
11	45-589	Center Rake Frame	1
12	13-443	Finishing Blade	2
13	13-445	Rake Teeth Kit (27 per kit)	1
	11-066	Rake Teeth	4
	HN-38-16	Nut, $^3/_8$	8
	HWL-38	Lockwasher, $^3/_8$	4
14	45-591	Left Rake Frame	1
15	45-587	Finishing Blades	3
*	13-764	Hardware Kit	1

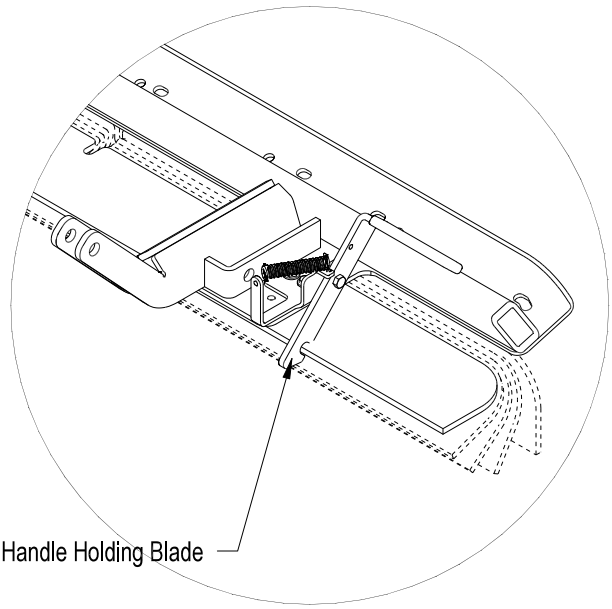
INSTALLATION INSTRUCTIONS

1. Bolt 31 rake teeth (Ref 13) to frames, keeping all the same length.
2. Lay out rake frames (Ref 6, 11 & 14). Connect them using clevis pin (Ref 3), Spacer (Ref 5) and cotter pin (Ref 4).
3. Attach left frame (Ref 14) and right frame (Ref 6) to drawbar (Ref 2) using $^5/_8$ bolt, machine bushing, and center lock nut (Ref 1).
4. Attach the three groomer blades (Ref 7), one to each of the rake frames (Refs 6, 11 & 14) using two hex bolts and flange lock nuts (Ref 8). Slide groomer blades to end of slot and tighten hardware.
5. Attach three large finishing blades (Ref 15) and then the two smaller finishing blades (Ref 12) to the tabs of the rake frames using two rake connect strap (Ref 10) per finishing blade. Secure, using flange lock bolt, flat washer and nylon lock nut (Ref 9).

   NOTE: Attach Straps using hardware as illustrated, placing Flat Washer on Strap then secure with Lock Nut. Attaching with the Flange Bolt in contact with the Strap will cause the Strap to bind and misalign Finishing Blade.
6. Attach the rake to the trap rake quick hitch by sliding the drawbar hitch into the spring loaded locking mechanism.
7. With the rake on the ground pull the rake to the right side until it is 2-3 inches from the tire.
8. Repeat steps on left side.
9. 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.
10. **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.

45-504 FLIP DOWN GRADER BLADE DRAWING





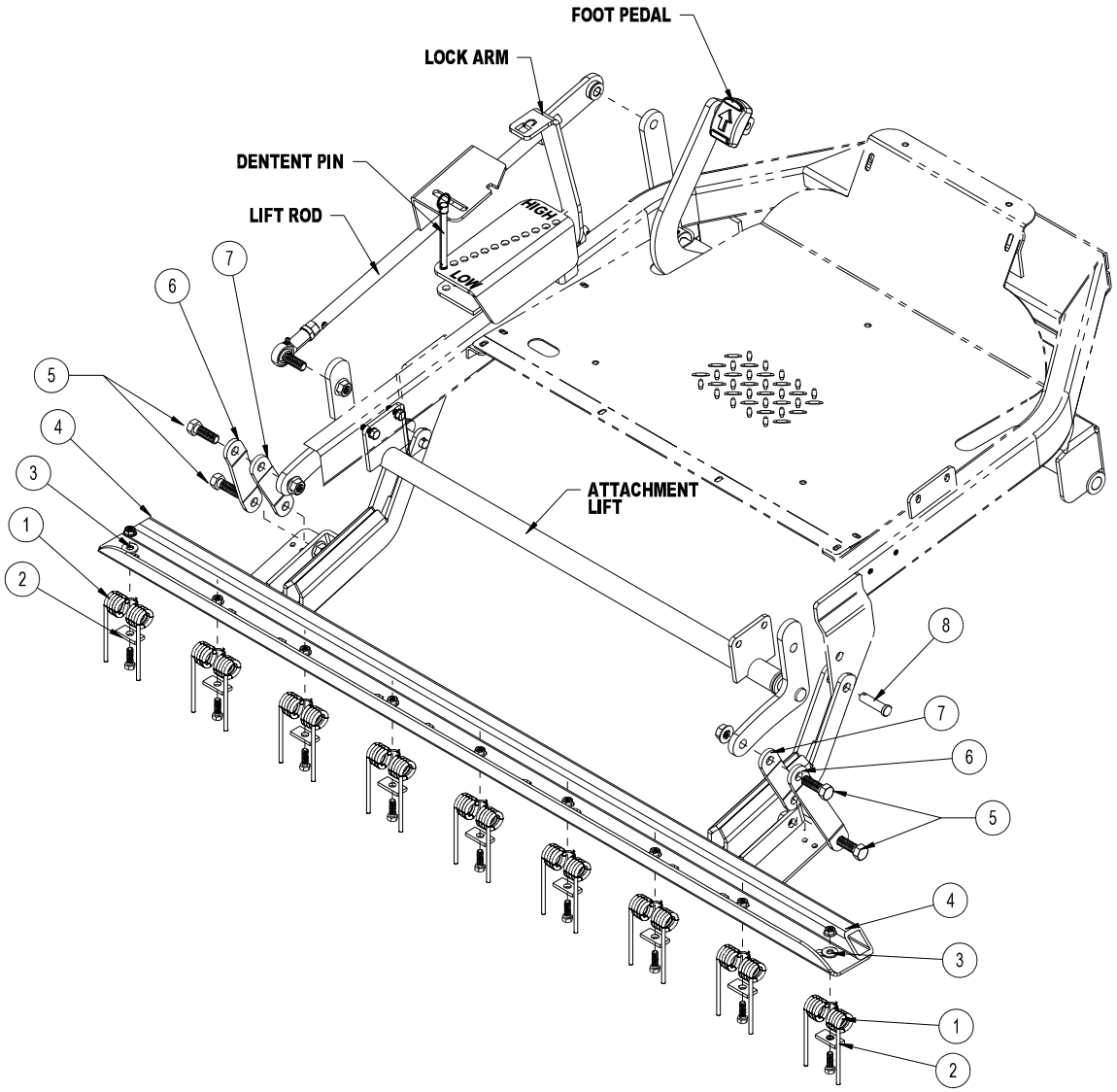
45-504 FLIP DOWN GRADER BLADE PARTS LIST

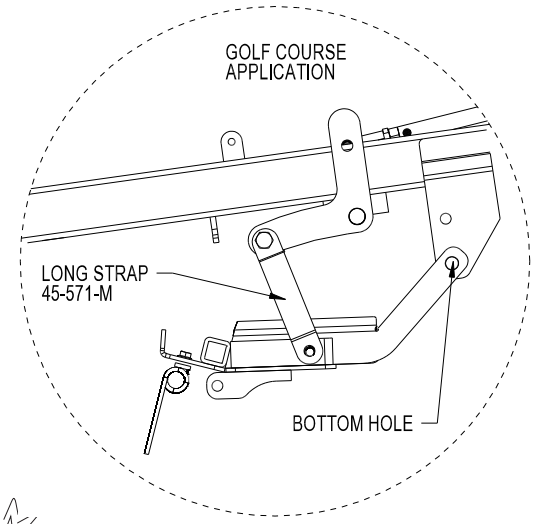
REF#	PART#	DESCRIPTION	QUANTITY
1	42-352	Shoulder Bolt	2
2	HW-516	Washer, $^5/_{16}$	2
3	HMB-12-14	Machine Bushing, $^1/_2$ x 14GA	2
4	HNCL-38-16	Center Lock Nut, $^3/_8$ - 16	2
5	45-623	Blade	1
6	45-554	Latch Mechanism	1
7	13-436	Spring, $^1/_2$ OD x $2^1/_2$	1
8	45-553	Handle Catch	1
9	HB-14-20-100	Bolt, $^1/_4$ -20 x 1	1
	HW-14	Washer, $^1/_4$	1
	HNTL-14-20	Lock Nut, $^1/_4$ - 20	1
10	15-020	Hand Grip	1
11	HB-14-20-075	Bolt, $^1/_4$ - 20 x $^3/_4$	2
	HW-14	Washer, $^1/_4$	2
	HNTL-14-20	Lock Nut, $^1/_4$ - 20	2
12		Attachment Lift Assembly	1

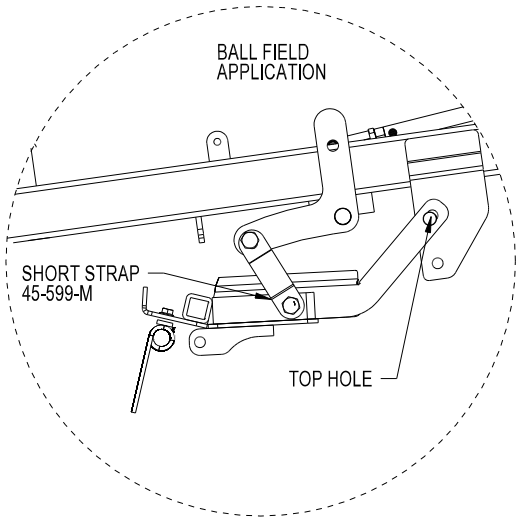
INSTALLATION INSTRUCTIONS

1. Install blade (Ref 5) onto attachment lift (Ref 12) using shoulder bolts, machine bushing, $^5/_{16}$ washer and $^3/_8$ -16 center lock nuts (Ref 1-4). Only tighten bolts so blade can still rotate up and down.
2. Install latch mechanism (Ref 6) onto the left hand side of attachment lift (Ref 12). Use $^1/_4$ - 20 x $^3/_4$ bolt, $^1/_4$ washer and $^1/_4$ - 20 lock nut (Ref 11). Tighten hardware.
3. See that the handle catch (Ref 8) locks the blade in the up position. If adjustment is needed, the latch mechanism (Ref 6) can be moved forward or backward in slots.

45-505 SPRING TINE SCARIFIER DRAWING







45-505 SPRING TINE SCARIFIER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	42-122	Spring Tines	9
2	42-177	Spring Holder	9
3	HB-516-18-125	Bolt $^5/_{16}$ - 18 x $1^1/_4$	9
	HW-516	Washer $^5/_{16}$	9
	HNTL-516-18	Lock Nut $^5/_{16}$-18	9
4	45-621	Attachment Lift Assembly	1
5	HB-12-13-150	Bolt $^1/_2$ - 13 x $1^1/_2$	4
	HNTL-12-13	Lock Nut $^1/_2$-13	4
6	45-599	Short Lift Strap (Ball field Application)	2
7	45-571	Long Lift Strap (Golf Course Application)	2
8	HCP-12-200	Clevis Pin $^1/_2$ -20	2
	HHP-18	Bridge Pin $^1/_8$	2

INSTALLATION INSTRUCTIONS

1. Spring tines (Ref 1) should be bolted to the attachment lift (Ref 4) using the spring holders (Ref 2) and the $^5/_{16}$ hardware (Ref 3) supplied.
2. Attach lift straps (Ref 6 or 7) to the attachment lift using $^1/_2$ -13 bolts and lock nuts (Ref 5). Only tighten enough so straps can move freely. If the attachment is being installed on a **45-500 Ball Field ZTR, use the short lift straps.** If the attachment is being installed on a **45-501 Golf Course ZTR, use the long lift straps.**
3. Using the $^1/_2$" clevis and bridge pin (Ref 8), attach the attachment lift assembly to the attachment mounts on the main frame. Then connect the lift straps (Ref 6 or 7) to the arms of the attachment lift using $^1/_2$ -13 bolts and lock nuts (Ref 5). Only tighten bolts until they until they will still rotate in the holes. **DO NOT OVERTIGHTEN.**

TO LOWER SCARIFIER

1. Place detent pin in depth hole.
2. Push left pedal down.
3. Push lock arm inward (toward your leg) and release foot pedal slowly.
4. Lift rod will stop at detent pin.

TO LIFT SCARIFIER

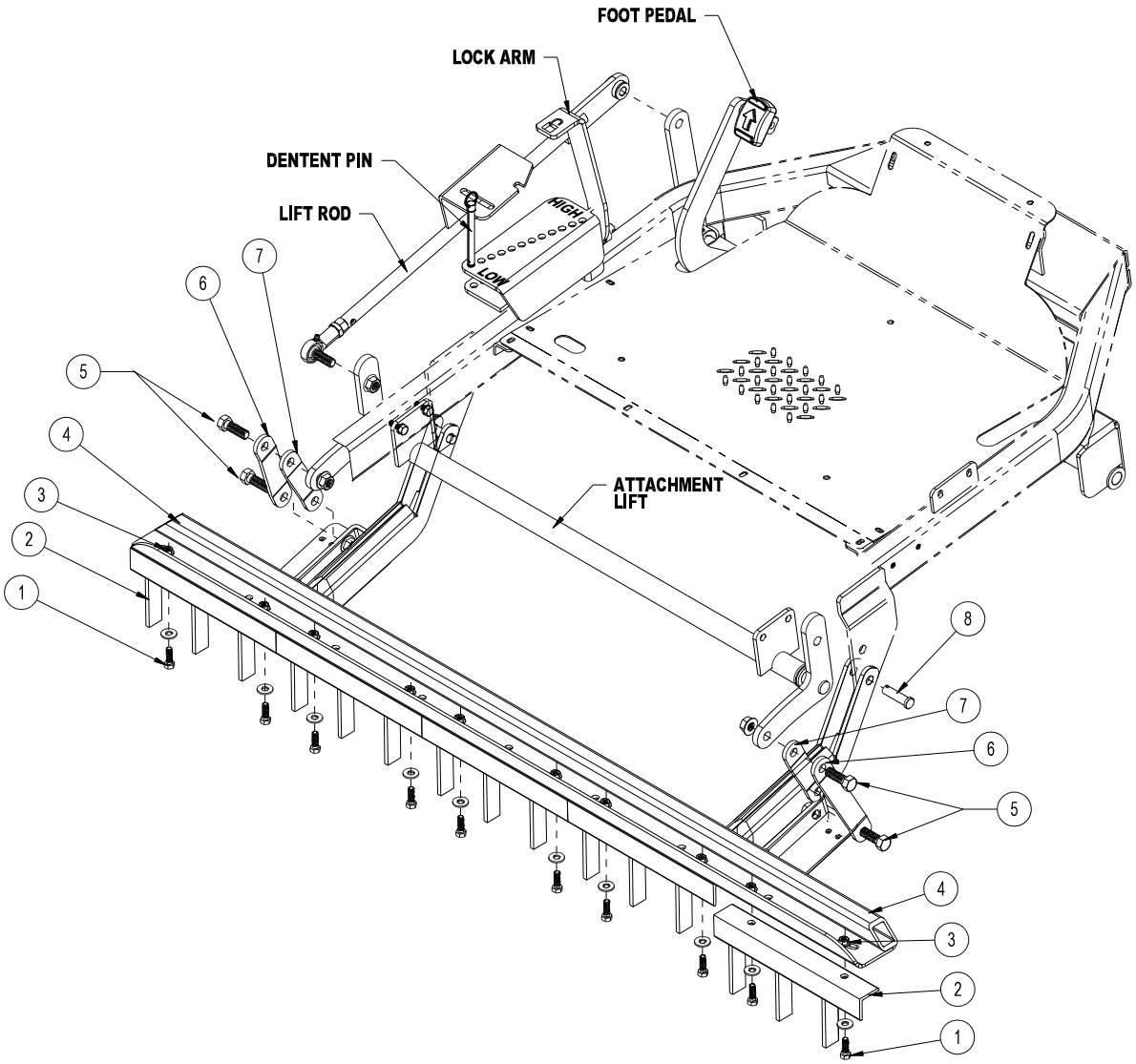
1. Push foot pedal all the way down and lock arm, which is spring loaded, will spring into locking slot.

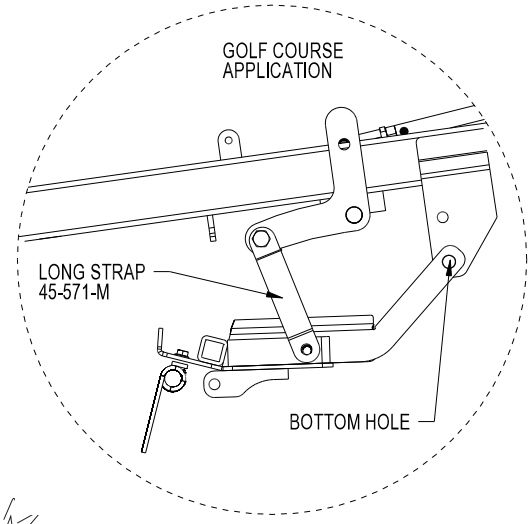
MORE PERMANENT DEPTH POSITION

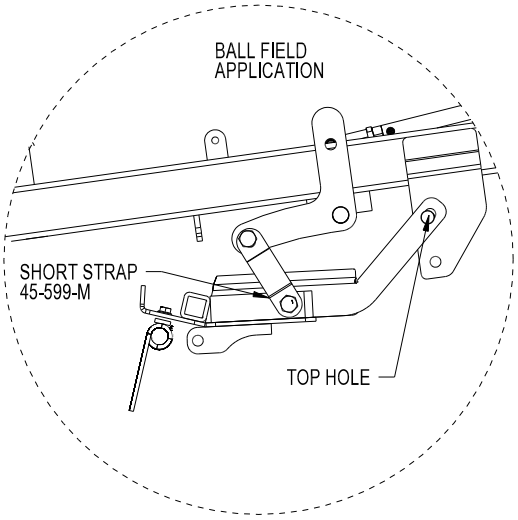
CAUTION: DO NOT USE DURING TRANSPORT. DAMAGE COULD BE CAUSED TO SCARIFIER.

1. Push pedal down.
2. Push lock arm inward (toward your leg) and release foot pedal slowly.
3. Line up slot on lift rod with depth hole and place detent pin threw the selected hole and slot on the lift rod.
4. Scarifier will stay in that position until detent pin is removed.
5. To remove detent pin - apply pressure to he foot pedal, pull detent pin out. Push foot pedal to floor until lock arm springs into locking slot.

45-506 SAND CULTIVATOR DRAWING







45-506 SAND CULTIVATOR PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HB-38-16-125	Bolt $^{3}/_{8}$ - 16 x $1^{1}/_{4}$	10
	HW-38	Washer $^{3}/_{8}$	10
2	42-038	Tine Segment	5
3	HNTL-38-16	Lock Nut $^{3}/_{8}$ - 16	10
4	45-621	Attachment Lift Assembly	1
5	HB-12-13-150	Bolt $^{1}/_{2}$ - 13 x $1^{1}/_{2}$	4
	HNTL-12-13	Lock Nut $^{1}/_{2}$-13	4
6	45-599	Short Lift Strap (Ball field Application)	2
7	45-571	Long Lift Strap (Golf Course Application)	2
8	HCP-12-200	Clevis Pin $^{1}/_{2}$ -20	2
	HHP-18	Bridge Pin $^{1}/_{8}$	2

INSTALLATION INSTRUCTIONS

1. Tine segments (Ref 2) should be bolted to the attachment lift (Ref 4) using the $^{3}/_{8}$ hardware (Ref 1 and 3) supplied.
2. Attach lift straps (Ref 6 or 7) to the attachment lift using $^{1}/_{2}$ -13 bolts and lock nuts (Ref 5). Only tighten enough so straps can move freely. If the attachment is being installed on a **45-500 Ball Field ZTR, use the short lift straps.** If the attachment is being installed on a **45-501 Golf Course ZTR, use the long lift straps.**
3. Using the $^{1}/_{2}$" clevis and bridge pin (Ref 8), attach the attachment lift assembly to the attachment mounts on the main frame. Then connect the lift straps (Ref 6 or 7) to the arms of the attachment lift using $^{1}/_{2}$ -13 bolts and lock nuts (Ref 5). Only tighten bolts until they until they will still rotate in the holes. **DO NOT OVERTIGHTEN.**

TO LOWER SCARIFIER

1. Place detent pin in depth hole.
2. Push left pedal down.
3. Push lock arm inward (toward your leg) and release foot pedal slowly.
4. Lift rod will stop at detent pin.

TO LIFT SCARIFIER

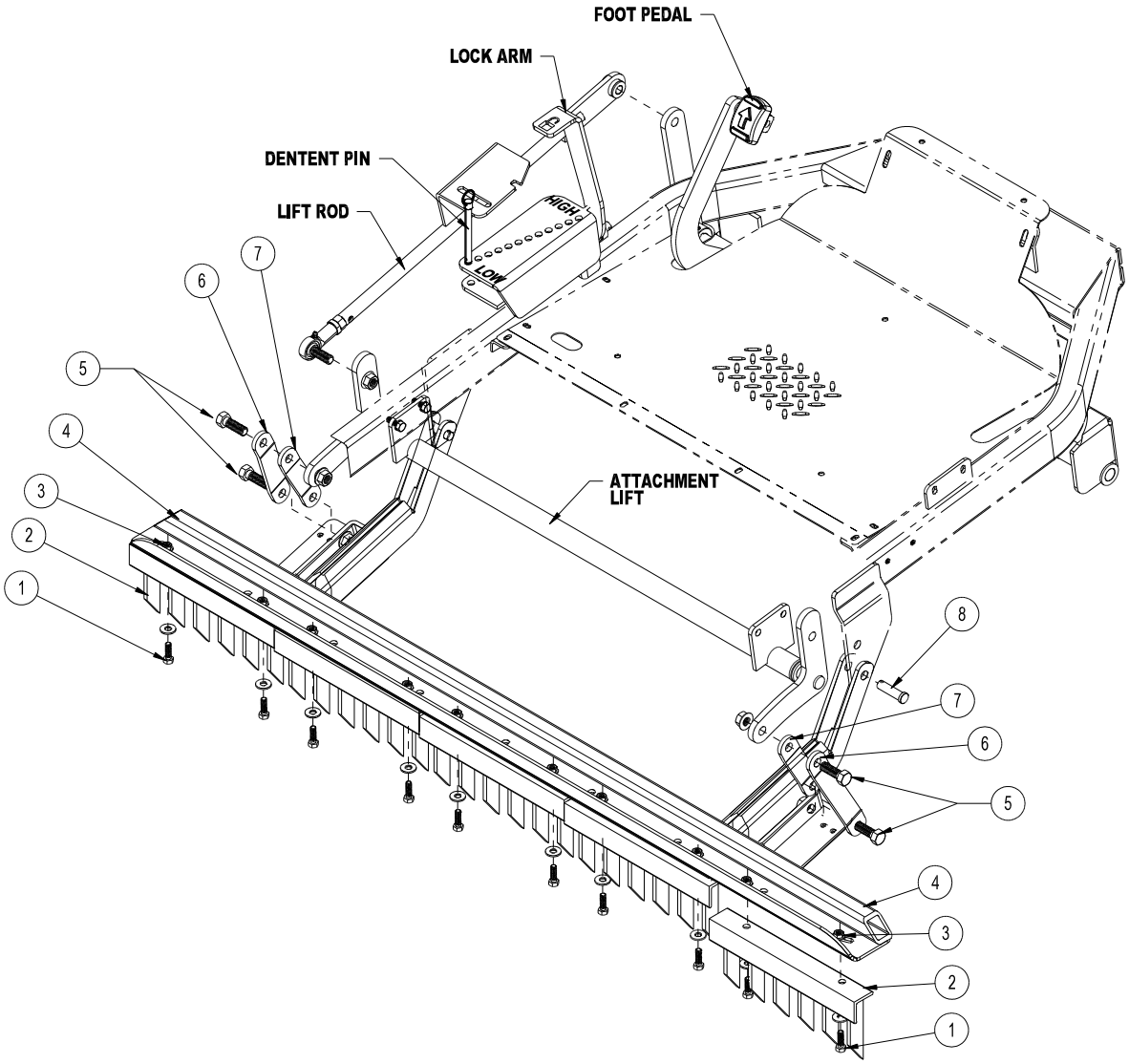
1. Push foot pedal all the way down and lock arm, which is spring loaded, will spring into locking slot.

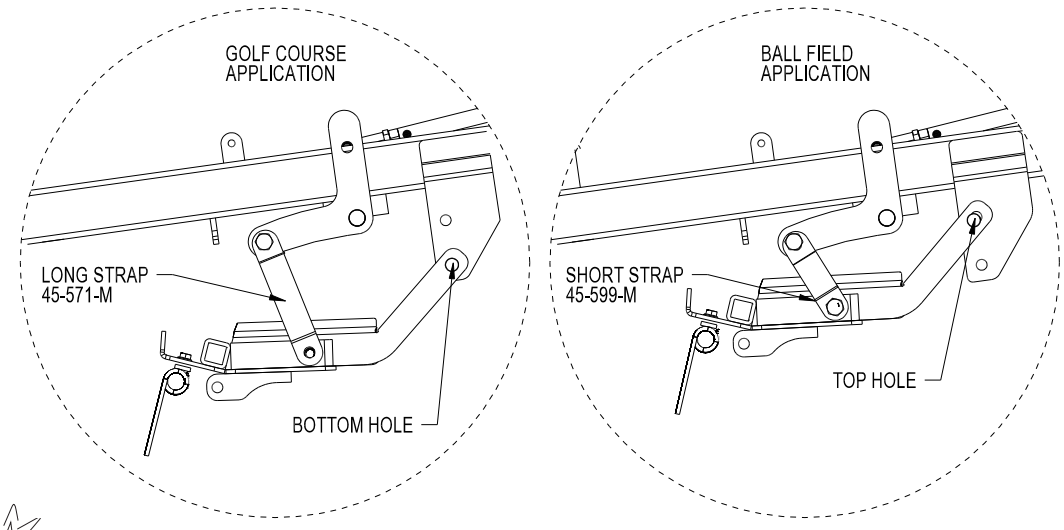
MORE PERMANENT DEPTH POSITION

CAUTION: DO NOT USE DURING TRANSPORT. DAMAGE COULD BE CAUSED TO SCARIFIER.

1. Push pedal down.
2. Push lock arm inward (toward your leg) and release foot pedal slowly.
3. Line up slot on lift rod with depth hole and place detent pin threw the selected hole and slot on the lift rod.
4. Scarifier will stay in that position until detent pin is removed.
5. To remove detent pin - apply pressure to he foot pedal, pull detent pin out. Push foot pedal to floor until lock arm springs into locking slot.

45-507 SCARIFIER DRAWING





45-507 SCARIFIER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HB-38-16-125	Bolt $^3/_8$ - 16 x $1^1/_4$	10
	HW-38	Washer $^3/_8$	10
2	26-042	Tine Segment	5
3	HNTL-38-16	Lock Nut $^3/_8$ - 16	10
4	45-621	Attachment Lift Assembly	1
5	HB-12-13-150	Bolt $^1/_2$ - 13 x $1^1/_2$	4
	HNTL-12-13	Lock Nut $^1/_2$-13	4
6	45-599	Short Lift Strap (Ball field Application)	2
7	45-571	Long Lift Strap (Golf Course Application)	2
8	HCP-12-200	Clevis Pin $^1/_2$ -20	2
	HHP-18	Bridge Pin $^1/_8$	2

INSTALLATION INSTRUCTIONS

1. Tine segments (Ref 2) should be bolted to the attachment lift (Ref 4) using the $^3/_8$ hardware (Ref 1 and 3) supplied.
2. Attach lift straps (Ref 6 or 7) to the attachment lift using $^1/_2$ -13 bolts and lock nuts (Ref 5). Only tighten enough so straps can move freely. If the attachment is being installed on a **45-500 Ball Field ZTR, use the short lift straps.** If the attachment is being installed on a **45-501 Golf Course ZTR, use the long lift straps.**
3. Using the $^1/_2$" clevis and bridge pin (Ref 8), attach the attachment lift assembly to the attachment mounts on the main frame. Then connect the lift straps (Ref 6 or 7) to the arms of the attachment lift using $^1/_2$ -13 bolts and lock nuts (Ref 5). Only tighten bolts until they until they will still rotate in the holes. **DO NOT OVERTIGHTEN.**

TO LOWER SCARIFIER

1. Place detent pin in depth hole.
2. Push left pedal down.
3. Push lock arm inward (toward your leg) and release foot pedal slowly.
4. Lift rod will stop at detent pin.

TO LIFT SCARIFIER

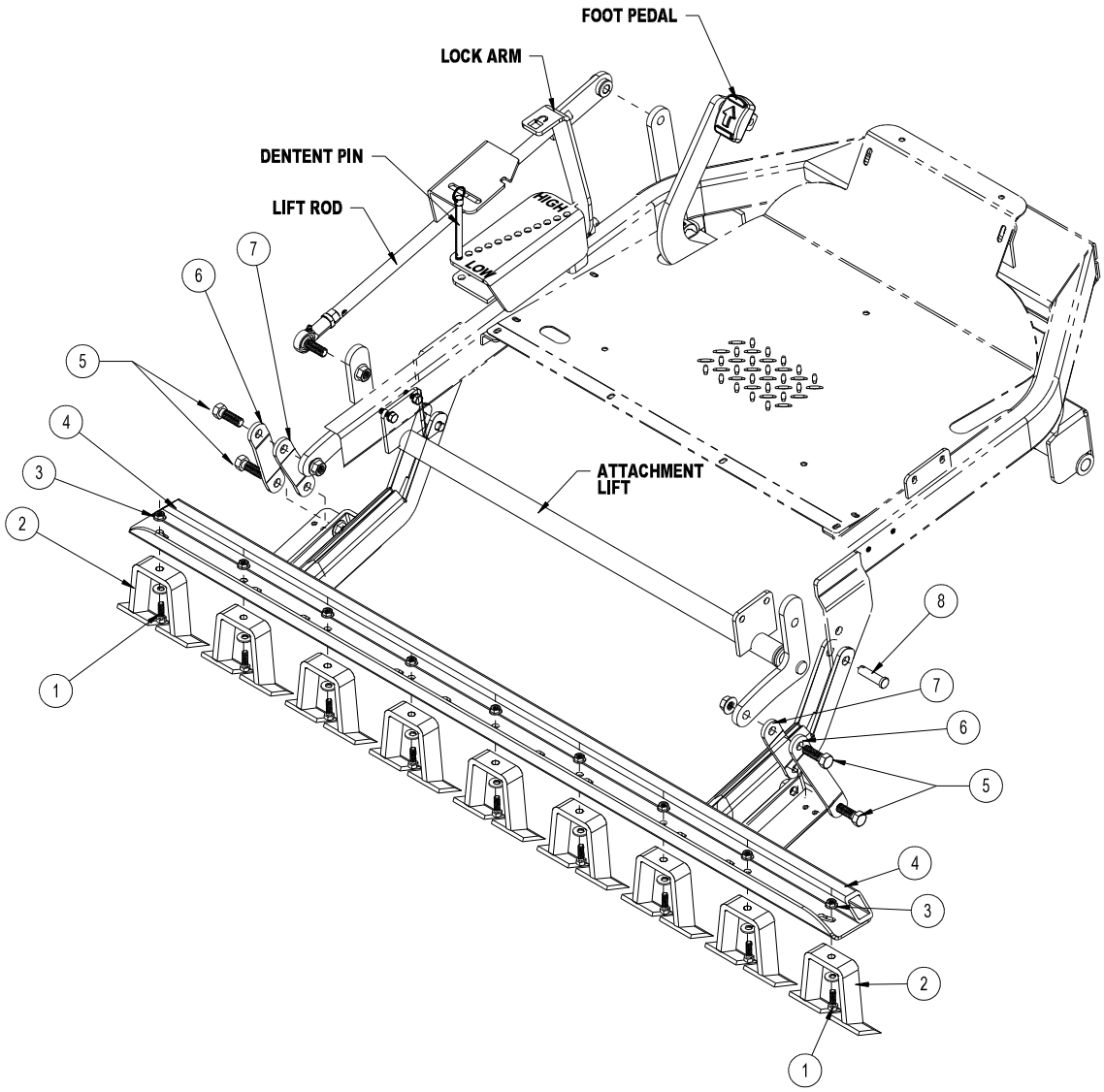
1. Push foot pedal all the way down and lock arm, which is spring loaded, will spring into locking slot.

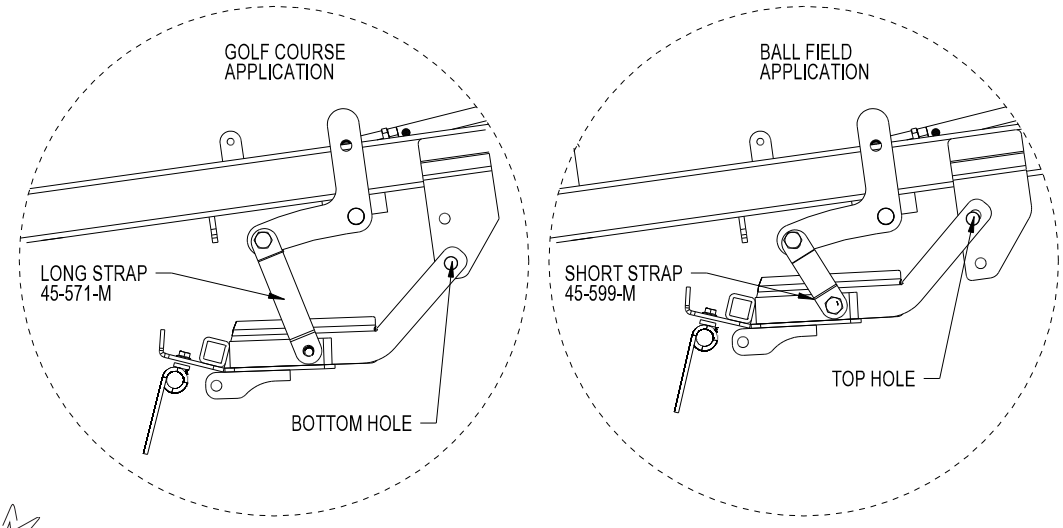
MORE PERMANENT DEPTH POSITION

CAUTION: DO NOT USE DURING TRANSPORT. DAMAGE COULD BE CAUSED TO SCARIFIER.

1. Push pedal down.
2. Push lock arm inward (toward your leg) and release foot pedal slowly.
3. Line up slot on lift rod with depth hole and place detent pin threw the selected hole and slot on the lift rod.
4. Scarifier will stay in that position until detent pin is removed.
5. To remove detent pin - apply pressure to he foot pedal, pull detent pin out. Push foot pedal to floor until lock arm springs into locking slot.

45-509 SCARIFIER DRAWING





45-509 SCARIFIER PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	HB-38-16-125	Bolt $^3/_8$ - 16 x $1^1/_4$	9
	HW-38	Washer $^3/_8$	9
2	13-114	Digger Blades	9
3	HNTL-38-16	Lock Nut $^3/_8$ - 16	9
4	45-621	Attachment Lift Assembly	1
5	HB-12-13-150	Bolt $^1/_2$ - 13 x $1^1/_2$	4
	HNTL-12-13	Lock Nut $^1/_2$-13	4
6	45-599	Short Lift Strap (Ball field Application)	2
7	45-571	Long Lift Strap (Golf Course Application)	2
8	HCP-12-200	Clevis Pin $^1/_2$ -20	2
	HHP-18	Bridge Pin $^1/_8$	2

INSTALLATION INSTRUCTIONS

1. Digger blades (Ref 1) should be bolted to the attachment lift (Ref 4) using the $^3/_8$ hardware (Ref 1 and 3) supplied.
2. Attach lift straps (Ref 6 or 7) to the attachment lift using $^1/_2$ -13 bolts and lock nuts (Ref 5). Only tighten enough so straps can move freely. If the attachment is being installed on a **45-500 Ball Field ZTR, use the short lift straps.** If the attachment is being installed on a **45-501 Golf Course ZTR, use the long lift straps.**
3. Using the $^1/_2$" clevis and bridge pin (Ref 8), attach the attachment lift assembly to the attachment mounts on the main frame. Then connect the lift straps (Ref 6 or 7) to the arms of the attachment lift using $^1/_2$ -13 bolts and lock nuts (Ref 5). Only tighten bolts until they until they will still rotate in the holes. **DO NOT OVERTIGHTEN.**

TO LOWER SCARIFIER

1. Place detent pin in depth hole.
2. Push left pedal down.
3. Push lock arm inward (toward your leg) and release foot pedal slowly.
4. Lift rod will stop at detent pin.

TO LIFT SCARIFIER

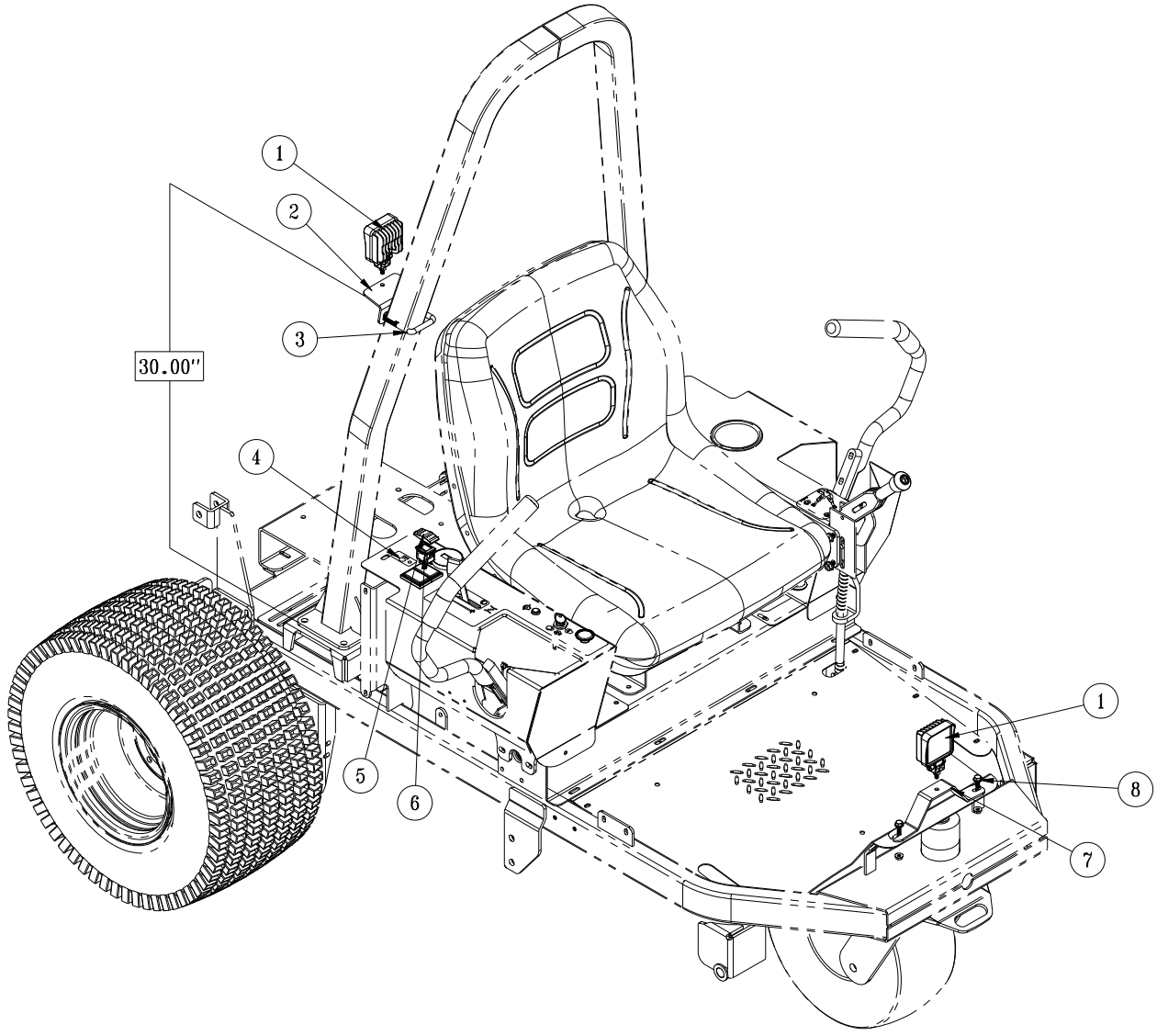
1. Push foot pedal all the way down and lock arm, which is spring loaded, will spring into locking slot.

MORE PERMANENT DEPTH POSITION

CAUTION: DO NOT USE DURING TRANSPORT. DAMAGE COULD BE CAUSED TO SCARIFIER.

1. Push pedal down.
2. Push lock arm inward (toward your leg) and release foot pedal slowly.
3. Line up slot on lift rod with depth hole and place detent pin threw the selected hole and slot on the lift rod.
4. Scarifier will stay in that position until detent pin is removed.
5. To remove detent pin - apply pressure to he foot pedal, pull detent pin out. Push foot pedal to floor until lock arm springs into locking slot.

45-510 LIGHT KIT DRAWING



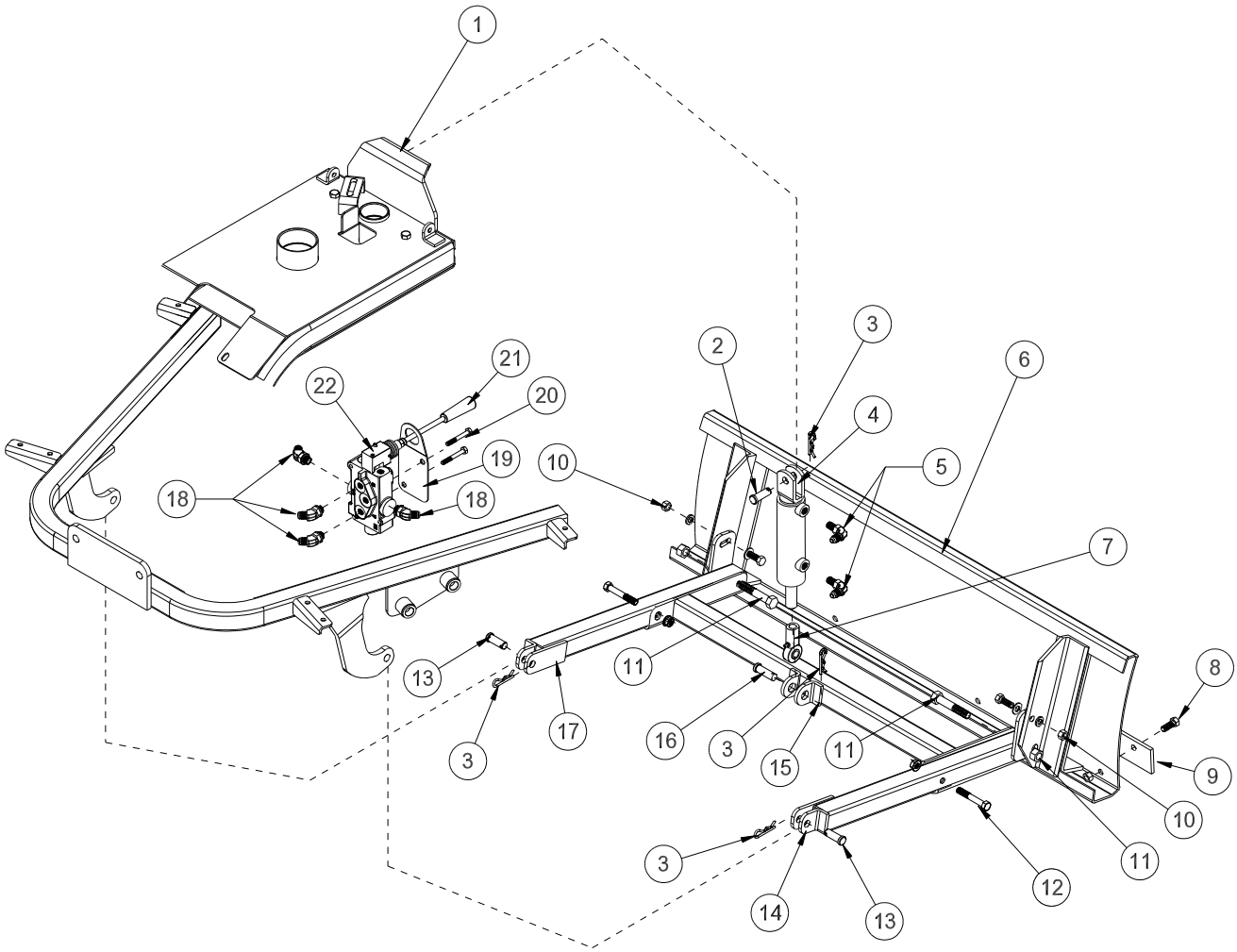
45-510 LIGHT KIT PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	45-627	3x3 LED Light Assembly	2
2	45-595	Rear Light Bracket	1
3	17-537	Square U-Bolt	1
4	45-611	Decal, ZTR Lights	1
5	15-727	Rocker Switch , unlit	1
6	15-782	Switch Body - unlit, On-None-Off	1
7	45-596	Front light Bracket	1
8	HB-14-20-075	Bolt 1/4 - 20 x 3/4	2
	HW-14	Washer 1/4	2
	HNTL-1/4-20	Lock Nut 1/4 - 20	2
NS	45-614	Wire Harness	1

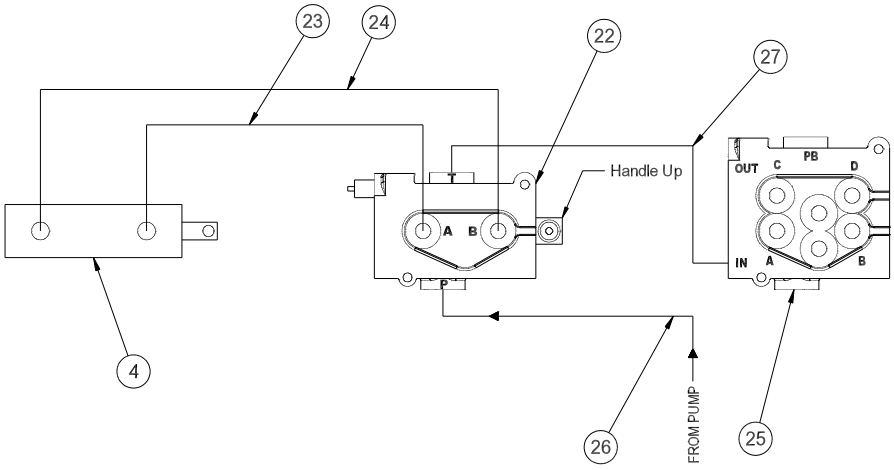
INSTALLATION INSTRUCTIONS

1. Disconnect battery before installing light kit.
2. Install front light bracket (Ref 7) onto front edge of floorboard using 1/4 x 3/4 bolts, flat washers and nylon lock nuts (Ref 8).
3. Install rear light bracket (Ref 2) on RH Roll bar tube, 30 inches up from the base. Hold in place using square u-bolt (Ref 3). Tighten.
4. Remove inside plug from right-hand control panel and discard.
5. Insert switch body (Ref 6) into switch housing and push down to lock it in place. Install rocker switch (Ref 5) onto the switch housing.
6. Install one light (Ref 1) onto front bracket and one light onto rear bracket. Tighten hardware.
7. Plug wire harness into rocker switch assembly and route wire under floorboard for the front light and up the rear right roll bar post for the rear light.
8. Plug lights into wire harness.
9. Remove the orange wire from the positive (+) post on the hour meter and the white wire from the negative (-) post on the hour meter.
10. Plug in the pigtail terminals from the light kit wire harness onto the hour meter terminals. Orange to the positive(+) and white to the negative(-). Then place the orange and white wires that you removed (Step 9), orange to the positive(+) and white tot he negative(-) back onto the hour meter and secure..
11. Reconnect the battery. Install decal (Ref 4) behind rocker switch and test for proper operation.
12. Secure any loose wires with tie straps provided.

45-005 HYDRAULIC SAND PLOW DRAWING



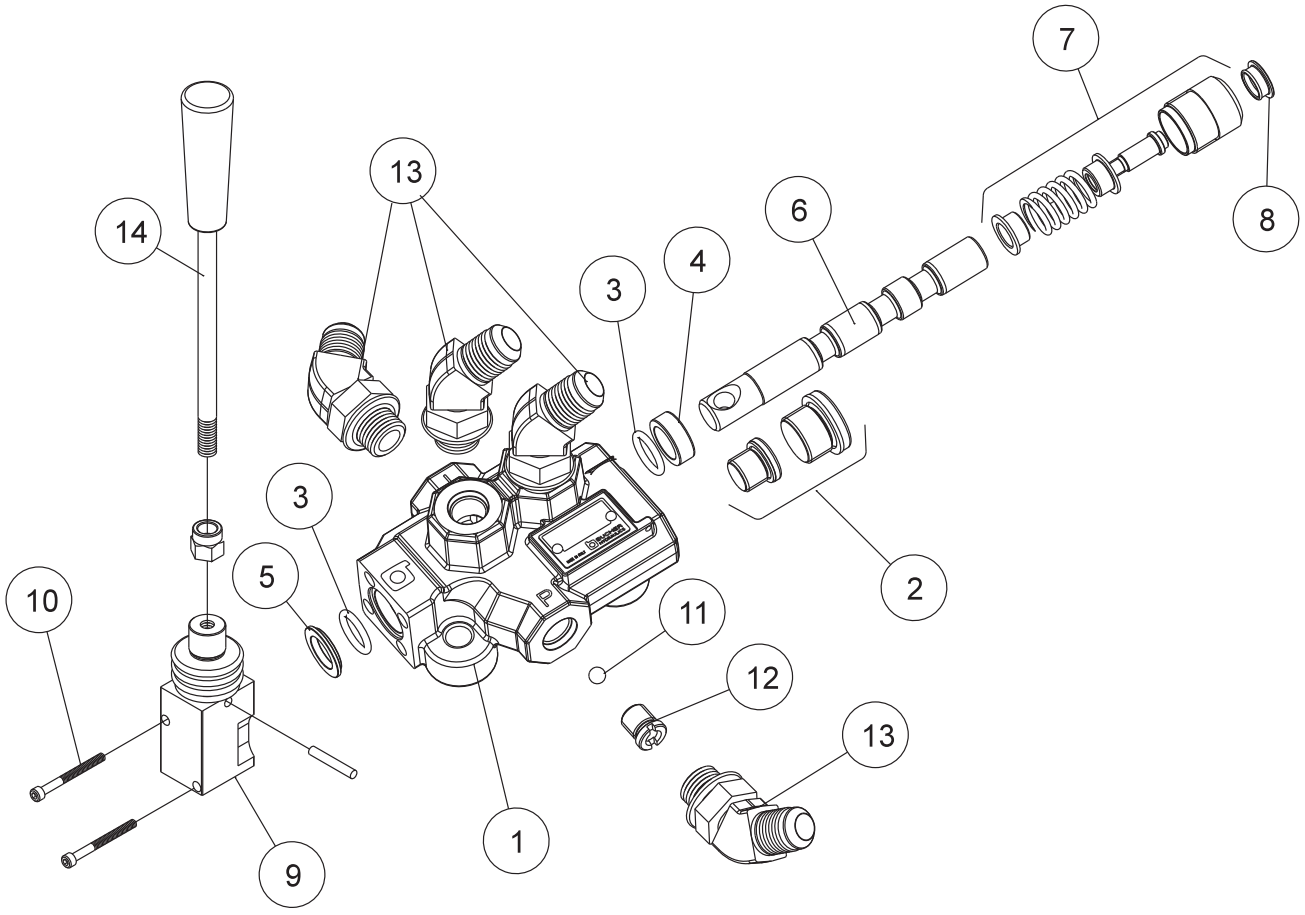
HYDRAULIC VALVE PLUMBING DRAWING



45-005 HYDRAULIC SAND PLOW PARTS LIST

REF#	PART#	DESCRIPTION	QUANTITY
1	45-126	Ram Mount	1
2	HCP-12-150	Clevis Pin, $^{1}/_{2}$ x $1^{1}/_{2}$	4
3	HP-18-100	Cotter Pin, $^{1}/_{8}$ x 1	2
4	14-534	Hydraulic Cylinder	1
5	18-168	45° Elbow	2
6	45-092	Aluminum Sand Plow Blade	1
7	HB-38-16-100	Bolt, $^{3}/_{8}$ - 16 x 1	4
	HNFL-38-16	Flange Whiz Lock Nut, $^{3}/_{8}$ - 16	4
8	13-167	Wear Blade	1
9	HB-38-16-125	Bolt, $^{3}/_{8}$ - 16 x $1^{1}/_{4}$	2
	HW-38	Washer, $^{3}/_{8}$	2
	HWL-38	Lockwasher, $^{3}/_{8}$	2
	HN-38-16	Nut, $^{3}/_{8}$ - 16	2
10	HB-12-13-300	Bolt, $^{1}/_{2}$ - 13 x 3	2
	HNTL-12-13	Lock Nut, $^{1}/_{2}$ - 13	2
11	45-100	Right Pusher Bar	1
12	HHP-18	Bridge Pin, $^{1}/_{8}$	2
13	45-125	Plow Crossbar	1
14	45-101	Left Pusher Bar	1
15	45-127	Valve Mount	1
16	18-188	45° Elbow	4
17	13-731	Single Bank Hydraulic Valve	1
18	78-417	Straight Handle	1
19	HB-14-20-200	Bolt, $^{1}/_{4}$ - 20 x 2	2
	HNFL-14-20	Flange Whiz-Lock Nut, $^{1}/_{4}$ - 20	2
20	43-156	Hose, 75"	1
21	43-049	Hose, 18"	1
22	43-048	Hose, 20"	1
23	43-047	Hose, 57½"	1
24		2-Bank Valve (on machine)	

13-731 SINGLE BANK HYDRAULIC VALVE DRAWING



13-731 SINGLE BANK HYDRAULIC VALVE PARTS LIST

REF #	PART #	DESCRIPTION	QUANTITY
1*	13-731-01	Actuator Housing Assembly	1
2*	13-731-02	Valve Plug	1
3*†	78-415-03	O-Ring Seal	2
4*†	78-415-05	Spacer	3
5*	78-415-04	Flanged Washer HDM10	3
6*	13-731-03	Spool	1
7*	78-415-11	Positioner	1
8*	78-415-08	Plug	3
9*	78-415-09	Lever Group HDS11	3
10*	78-415-10	Metric Socket Screw M5 x .8 x 45	2
11*	13-731-04	1/4" Ball	1
12*†	13-731-05	Check Valve	1
13	18-188	45° Elbow	4
14	78-417	Straight Handle	1
	78-417-01	Tapered Knob	1

*	13-731	Single Bank Hydraulic Valve (includes all * items)	
†	13-731-01	Actuator Housing Assembly	1 per Bank

DECAL LIST

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

13-063	Decal, Warning	1	Front Seat Frame
25-277	Decal, Battery	1	Outside Battery Box
25-286	Decal, Pinch Point	2	Rear Panel
25-298	Decal, Warning Hot	2	Roll Bar Plates
25-357	Decal, Smithco	2	Front Seat Panel,
25-369	Decal, 84 dBA	1	Front Seat Panel
45-522	Decal Sand Star Zee	2	Control Panel Sides
25-354	Decal, Tire Pressure 5psi	2	Rear Wheels
25-356	Decal, Tire Pressure, 20 psi	1	Front Castor Wheel
25-361	Decal, Technical Assistance	1	Rear Seat Panel
45-524	Decal, Control Panel	1	Right Control Panel
51-184	Decal, Park Brake	1	Left Control Panel

OPTIONAL EQUIPMENT

45-503	Rear Rake 84"
45-504	Center Grader Blade
45-505	Spring Tine Infield Scarifier
45-506	Sand Cultivator
45-507	Scarifier with Vertical Blades
45-509	Scarifier with Chisel Blades
45-510	Light Kit

REPLACEMENT FILTERS

50-403	Fuel Filter
18-462	Oil Drain Valve
45-520-01	Engine Air Cleaner Cartridge Filter
45-520-02	Foam Filter for Air Cleaner
45-520-03	Oil Filter, Briggs 22HP
45-527-01	Hydro Filter

FLUIDS

Engine Oil	Refer to Engine Manual
Hydraulic Fluid	1.75 Gallon of Parker Dura Clean Hydraulic Oil or equivalent of AW32 minimum hydraulic oil.

OTHER PARTS

Spark Plug	RC12YC (Gap 0.030 inch (0.76mm))

The Smithco Commercial Products Two-Year Limited Warranty

The Smithco Commercial Products Two-Year Limited Warranty

Smithco, Inc. (Smithco) warrants your 2016 or newer Smithco Commercial Product ("Product") purchased after October 1, 2016 to be free from defects in materials or workmanship for the period of time listed below. Where a warrantable condition exists, Smithco will repair the Product at no cost to you including diagnosis, labor (at the Smithco standard labor rate, subject to the Smithco flat rate schedule), and parts.

Warranty Duration is:

(1) Two years, 1500 operational hours* from the date of delivery to the original purchaser or Five years from the date of original manufacturer of the product, whichever occurs first. (*Products equipped with hour meter).

(2) Products used in rental situations are covered for 90 days from date of delivery to original user/renter.

Owner Responsibilities:

As the Product owner, you are responsible for required maintenance and adjustments stated in your Owner's Manual. Failure to perform required maintenance and adjustments can be grounds for disallowing a warranty claim. **You are particularly responsible to train all present and future operators of this product on the safe operation of this product at your location.**

Instructions for Obtaining Warranty Service:

You are responsible for notifying the Authorized Smithco Products Distributor from whom you purchased the Product as soon as you believe a warrantable condition exists and not later than 30 days from discovery of the condition.

If you need help locating an Authorized Smithco Distributor, or if you have questions regarding your warranty rights or responsibilities, you may contact us at:

Smithco Product Support Department
200 West Poplar Ave.
Cameron, Wisconsin 54822
Telephone: 800-891-9435 E-Mail: ProductSupport@Smithco.com

Maintenance Parts:

Parts scheduled for replacement as required maintenance ("Maintenance Parts"), are warranted for the period of time up to the scheduled replacement time for that part.

Items/Conditions Not Covered:

Not all product failures or malfunctions that occur during the warranty period are defects in materials or workmanship. The items/conditions listed below are not covered by this warranty:

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

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

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

- This warranty does not apply to parts subject to consumption through use, unless found to be defective. Examples of parts which are consumed, or used up, during normal Product operation include, but are not limited to: blades, tines, teeth, scarifiers, rakes, plates, wear plates, castor wheels, tires, batteries, filters, belts, nozzles, etc.

- This warranty does not apply to failures caused by outside influence. Items considered to be outside influence include, but are not limited to, weather, storage practices, contamination, use of unapproved coolants, lubricants, additives, or chemicals, etc.

- This warranty does not apply to normal “wear and tear” items. Normal “Wear and Tear” includes, but is not limited to, damage to seats due to wear or abrasion, worn painted surfaces, scratched decals or windows, etc.

- Smithco may require the return of failed parts or components in order to determine the validity of any warranty claim.

- Smithco will not be obligated to replace components of other manufacturers if inspection by the original component manufacturer indicates that failure was due to normal wear and tear, expected consumption through use or improper care or service.

Other Legal Disclaimers:

The above remedy for product defects through repair or replacement by an authorized Smithco distributor or dealer is the purchaser’s sole remedy for any defect. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

THERE ARE NO OTHER EXPRESS WARRANTIES OTHER THAN THOSE SET FORTH ABOVE. ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR USE ARE LIMITED TO THE DURATION OF THE LIMITED WARRANTIES CONTAINED HEREIN.

Some states may not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

THE SMITHCO COMPANY IS NOT LIABLE FOR INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE USE OF THE PRODUCT, INCLUDING ANY COST OR EXPENSE OF PROVIDING A SUBSTITUTE PRODUCT OR SERVICE DURING PERIODS OF MALFUNCTION OR NON-USE.

Some states may not allow the exclusion of indirect, incidental or consequential damages, so the above exclusion may not apply to you.

Smithco

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