

Parts & Service



## **Sand Star I**

**45-001 2D Chain Steering**

**sn: 1CS0469**

## **Sand Star II**

**45-002 3WD Chain Steering**

**sn: 2CS0553**

**July 2020**

***Product Support:***

***Hwy 55 & Poplar Ave; Cameron WI 54822***

***1-800-891-9435    [productsupport@smithco.com](mailto:productsupport@smithco.com)***

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

Read this manual and all other manuals pertaining to the Bunker Rake 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

*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. Serial number tag is located on left rear ROPs mount post. Refer to engine manual for placement of engine serial number.

For product and accessory information, help finding a dealer, or to register your product please contact us at [www.Smithco.com](http://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.

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

**SMITHCO CUSTOMER SERVICE 1-800-891-9435**

## SAFE PRACTICES

1. It is your responsibility to read this manual and all publications associated with this machine (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.
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. 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.
15. Before leaving operator's position for any reason:
  - A. Disengage all drives.
  - B. Lower all attachments to the ground.
  - C. 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

|                  |                                                                  |
|------------------|------------------------------------------------------------------|
| Length           | 68" (1.73 m)                                                     |
| Width            | 58" (1.47 m)                                                     |
| Height           | 52" (1.2 m)                                                      |
| Wheel Base       | 42" (1.07m)                                                      |
| Ground Clearance | 5.5" - 7" (13 -18 cm) - under cultivator depending on attachment |
| Weight           | 2WD - 875 lbs. (397 kg)      3WD - 915 lbs. ( 415 kg)            |

## SOUND LEVEL (EAR PROTECTION REQUIRED)

|              |       |
|--------------|-------|
| At Ear Level | 87 dB |
|--------------|-------|

## ENGINE

### 2WD (45-001)

### 3WD (45-002)

|                    |                                     |                              |
|--------------------|-------------------------------------|------------------------------|
| Make               | Briggs and Stratton Vanguard        | Briggs and Stratton Vanguard |
| Model#             | 305447                              | 356447                       |
| Type / Spec#       | 0230 G1                             | 0263 G                       |
| Horsepower         | 16 hp (11.9 kW)                     | 18 hp (13 kW)                |
| Fuel               | Unleaded 87 Octane Gasoline Minimum |                              |
| Lubrication System | Full Pressure                       |                              |
| Alternator         | 16 amp                              |                              |

## WHEELS & TIRE

Three: 22 X 11 - 10.0 Knobby Tires 5 psi (.34 bar)  
Optional: 23-10.50 x 12 Turf Tires 5 psi (.34 bar)Smithco # 48-265

## SPEED

|               |                           |
|---------------|---------------------------|
| Forward Speed | 0 to 10 m.p.h. (0-16 kph) |
| Reverse Speed | 0 to 5 m.p.h. (0-8 kph)   |

## BATTERY

|                          |                       |
|--------------------------|-----------------------|
| BCI Group                | Lawn & Garden 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          | 20 quarts (18.93 liters)                      |
| Grade of Hydraulic Fluid | SAE 10W-40 API Service SJ or higher Motor Oil |

## ROPS CERTIFICATION

|            |              |
|------------|--------------|
| Rops       | ISO 21299    |
| Seat belts | OSHA 1928.51 |

## HYDRAULIC PRESSURES

|                                 |                      |                                |                          |
|---------------------------------|----------------------|--------------------------------|--------------------------|
| Piston Pump Displacement        | .913 in <sup>3</sup> | Charge Pump Displacement       | .33 in <sup>3</sup> /rev |
| Pump Input Speed (up to)        | 3300rpm              | Max. Inlet Vacuum              | 5 in. Hg                 |
| Max. Operating Pressure         | 3000 peak psi        | Max. Case Pressure             | 25 psi                   |
| Implement Setting               | 345 psi              | Relief Valve Pressure (set at) | 1230 psi                 |
| 13-729 Hydraulic Valve (2 bank) | 900 psi              |                                |                          |



# MAINTENANCE

## ⚠ CAUTION

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

## ⚠ IMPORTANT

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

Service

### LUBRICATION

Use No. 2 General purpose Lithium Base Grease and lubricate every 100 hours. The Sand Star has four grease fittings. One located on the steering cylinder (45-003), two on the rake lift, on the rod end of the center lift cylinder and one is located on the steering chain tensioner (45-001 and 45-002).

### REMOTE AIR CLEANER

1. Unclip the two clips, remove the cover and pull out the element.
2. To service, clean by tapping gently on flat surface. Do not oil. Replace if very dirty or damaged.
3. Clean out the inside of the body and cover.
4. Place the element into the body and put the cover back on.

### TOWING

When it is necessary to move the Super Star without engine running, bypass valve built into hydrostatic pump must be "open" by turning it counterclockwise. The valve is A 17mm bolt on the top of the pump. 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. The machine can be moved for a short distance with the engine off, but we **do not** recommend this as a standard procedure. When towing **do not** tow the machine faster than 2-3 MPH (3-5 km/h) because the drive system may be damaged. The tires may lock up if the machine is towed too fast. If this occurs, stop towing the machine. If the machine must be moved a considerable distance, transport it on a truck or trailer.



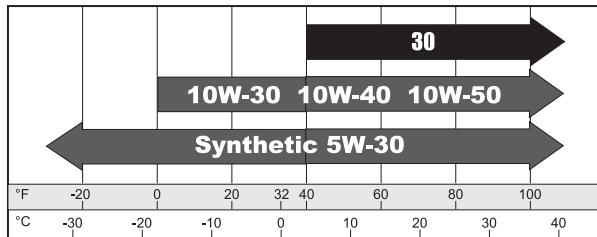
## TIRE PRESSURE

Caution must be used when inflating a low tire to recommended pressure. Over inflating can cause tires to explode. Tires should be 5 psi (0.34 bar). Improper inflation will reduce tire life considerably.

## ENGINE

Change and add oil according to chart below. Do not overfill. Use a high quality detergent oil classified "For Service SJ or higher" SAE 30 oil. Use no special additives with recommended oils. Do not mix oil with gaso-line.

### 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

### Starting Temperature Range Anticipated Before Next Oil Change

Use of multi-viscosity oils (10W-30, etc.) above 40° F (4° 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.

## 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 50 hours, then every 250 hours thereafter.
3. The oil level should be 2" to 2½" 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 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.

# MAINTENANCE

## 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

**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

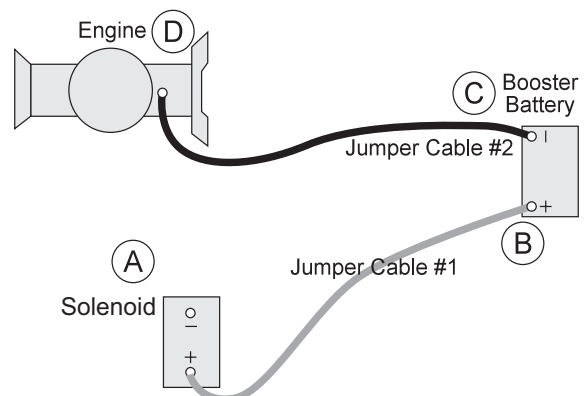
### WARNING

**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.



## ⚠ CAUTION

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

## ⚠ IMPORTANT

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

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))<br>Change the engine oil filter.                                                                                                                                                                                                                                   |
| Before each use daily             | Check the engine oil level.<br>Clean area around muffler and controls.<br>Check the hydraulic fluid level.<br>Check the tire pressure.<br>Check condition of hydraulic hoses and fittings.<br>Inspect and clean the machine.                                                                                            |
| After the first 50 hours          | Change Hydraulic Oil Filter.                                                                                                                                                                                                                                                                                            |
| Every 100 hours                   | Clean or change air filter. <sup>1</sup><br>Clean pre-cleaner. <sup>1</sup><br>Change engine oil and filter.<br>Replace spark plug .<br>Lubricate machine.<br>Clean or change remote air cleaner.<br>Check the battery fluid level and cable connections..<br>Check muffler and spark arrestor.<br>Check belt tension . |
| Every 250 hours                   | Check engine valve clearance and adjust if necessary.<br>Check idle speed.<br>Clean battery terminals.<br>Change hydraulic oil filter.<br>Torque the wheel lug nuts. (64-74 ft/lb (87-100 Nm))                                                                                                                          |
| Every 500 hours or yearly         | Change fuel filter.<br>Change hydraulic oil and filter.<br>Clean oil cooler fins. <sup>1</sup><br>Clean air cooling system. <sup>1</sup><br>Check safety filter in remote air cleaner.                                                                                                                                  |

<sup>1</sup> In dusty conditions or when airborne debris is present, clean more often.

## END USER'S SERVICE CHART

*Duplicate this page for routine use.*

## Service

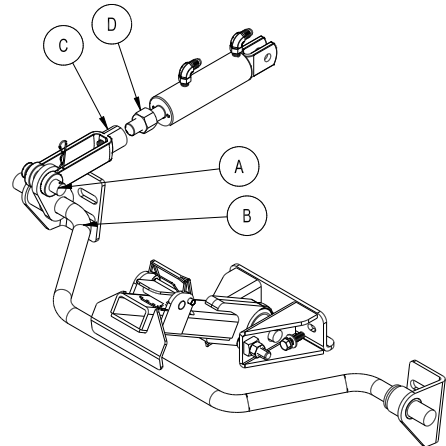
| Maintenance Check Item                        | For the week of: |       |      |        |      |      |      |
|-----------------------------------------------|------------------|-------|------|--------|------|------|------|
|                                               | Mon              | Tues. | 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.         |                  |       |      |        |      |      |      |

[illegible]



## RAKE LIFT CYLINDER

Completely lower Rake Lift. Remove the clevis pin (A). Twist lift linkage (C) so clevis pin end of cylinder extension lines up with holes in attachment lift arm (B). Replace clevis and cotter pins. Tighten Jam Nut (D). Raise and lower Rake Lift to check for proper clearance.



Tighten until there is sufficient tension between lift arm and quick hitch and will not move in full up position.

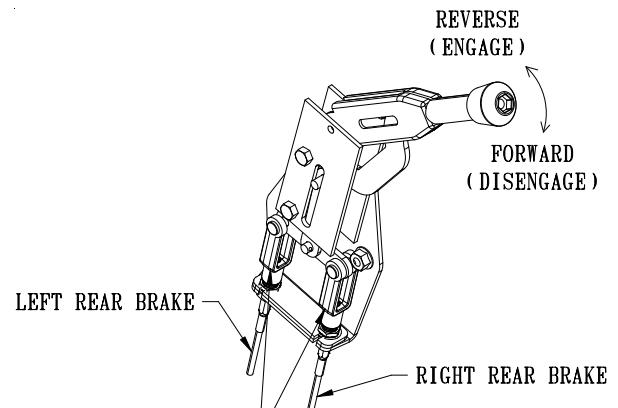
## CAUTION

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.

## PARK BRAKE

The park brake is located on the left hand side of the machine and operates both rear wheels. Pull lever back to engage and push forward to disengage.

To adjust, turn the knob on the end of the handle.



## DRUM BRAKE ADJUSTMENT

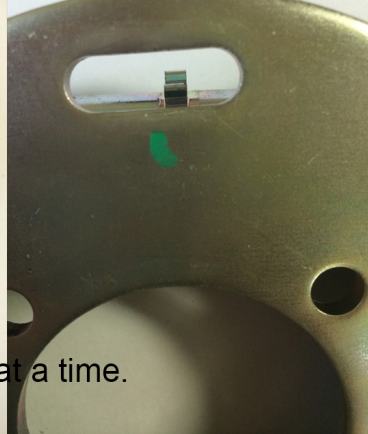
The brake can be adjusted through the access hole in the backing plate. Remove the rubber plug from the backing plate. Using a drum brake adjusting tool, or a suitable flat blade screw driver, rotate the adjusting star towards the axle shaft to expand the shoes, one click at a time. Expand the shoes until slight contact is made with the drum. It is highly recommended that you adjust 1 click at a time. Rotate the drum back and forth to insure the brake is not rubbing excessively, if so back off the adjuster star. Slight rubbing is acceptable as the brake is used it will seat in. Test after each adjustment.

### Brake Adjustment

Remove Cover



### Adjustment Gear



Move 1 click at a time.

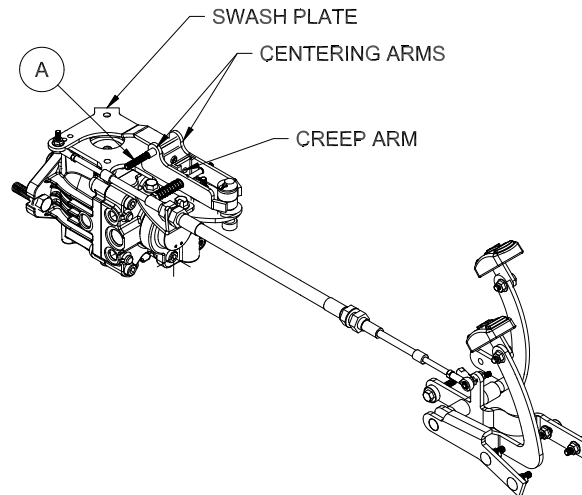


# ADJUSTMENTS

## WHEEL 'CREEP' ADJUSTMENT

'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. On the top of the pump there is a Creep Arm. Loosen bolts.
3. With engine running adjust the creep arm side to side in slot so centering arm centers on the swash plate.
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.



## TO ADJUST FOOT PEDAL THROTTLE CABLE

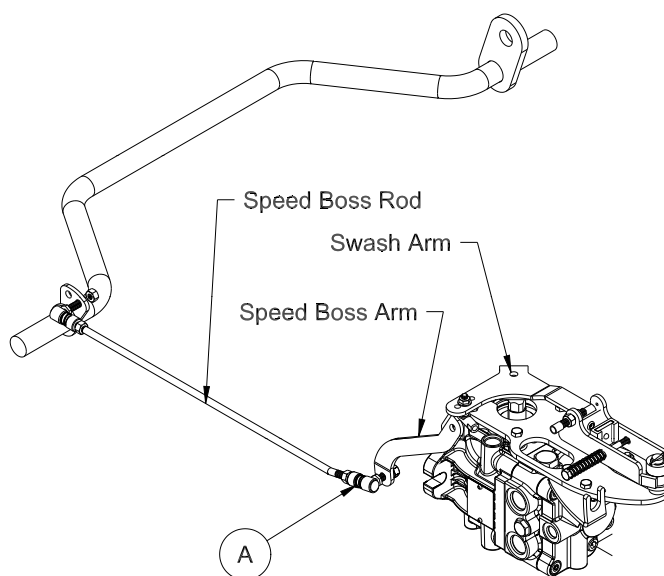
1. Jack up unit so that all drive wheel are off the ground. (Use jack stands)
2. Start the engine, make certain that the hand throttle is in the idle position (1200 engine RPM).
3. Engine speed must increase as soon as the foot pedal begins to move in either direction. At the full forward position, the engine RPM must be 3300RPM  $\pm$  100.
4. Minor adjustment can be made by backing out (unscrewing) Retainer (Ref A) until you reach full engine RPM with the foot pedal fully depressed in the forward position. Be sure to recheck after the nuts are fully tightened.
5. Major adjustment needs to be made by pulling the slack out of the cable. Loosen the screw in the wire block on the engine that is clamped onto the end of the cable and sliding it up to the cable block that is through the throttle plate. Do not let the throttle plate move to increase idle speed. Tighten the screw.
6. Test run to determine that there is no binding and that engine idle speed is 1200 RPM and that it is 3300RPM at full forward position of the foot pedal.

## ADJUSTMENTS

### SPEED BOSS

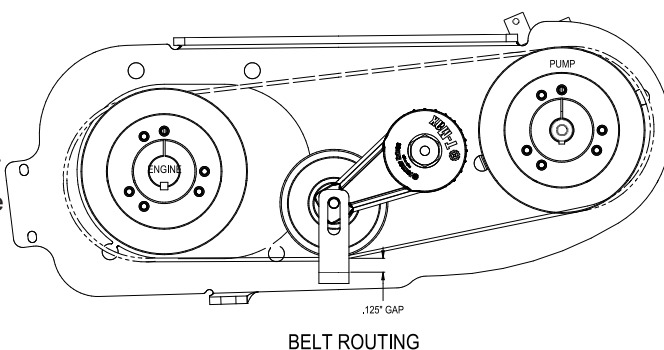
Speed Boss allows the machine to operate at a proper speed while raking sand traps on golf courses. This speed boss has been factory set at an average speed of 3-4 m.p.h. (5-6.5 kph). The Speed Boss will only limit the speed while the rake is lowered into the operating position. The speed setting may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

For RBS System, Spiker and Grader Box remove the speed boss arm and the speed boss rod from machine so it does not interfere with other operations.



### ADJUSTMENT OF BELT TENSIONER

The belt tensioner controls the tension on the belt from the engine to the pump. The proper tension of the idler should be in the second 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 second notch. Tighten bolt on tensioner.



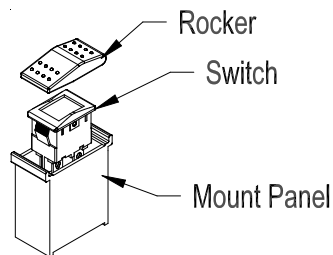
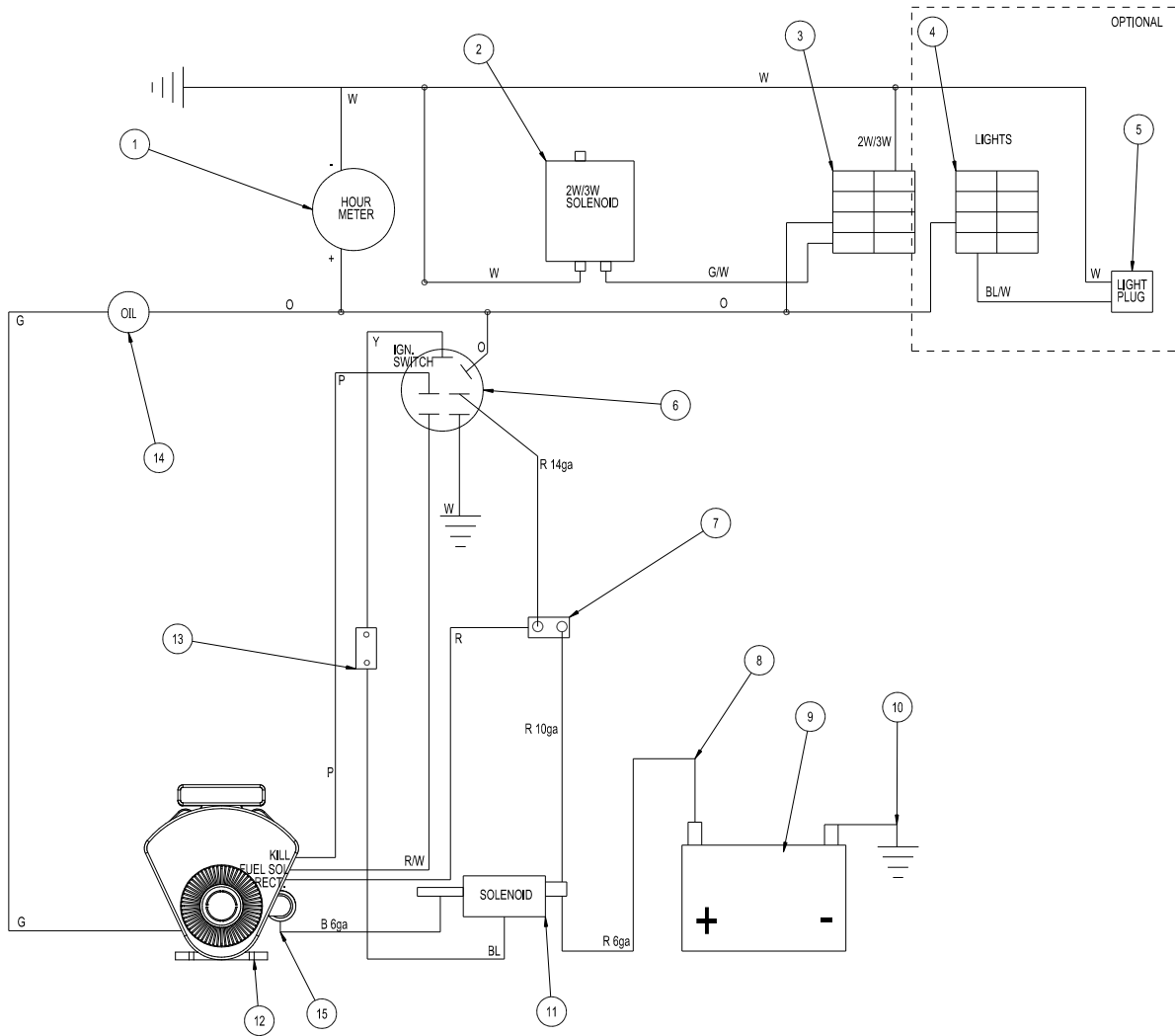
## STORAGE

When storing, remove the key from the key switch to avoid unauthorized persons from operating machine.

1. Before storing clean machine thoroughly.
2. Check bolts and nuts, tighten as necessary.
3. Make all repairs that are needed and remove any debris.
4. Remove the battery, adjust the electrolyte level and recharge it. Store the battery in a dry, dark place.
5. Store in a clean and dry area, but NOT near a stove, furnace or water heater which uses a pilot light or any device that can create a spark.
6. Engines stored over 30 days need to be protected or drained of fuel to prevent gum from forming in a fuel system or on essential carburetor parts. Check the engine manual and follow the instructions for the storage of the engine.



# WIRING DRAWING (COMMON)



## Color Code Chart

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

## WIRING PARTS LIST (COMMON)

| REF # | PART #                   | DESCRIPTION                   | QUANTITY |
|-------|--------------------------|-------------------------------|----------|
| 1     | 12-804                   | Hour Meter                    | 1        |
|       | 8875                     | Bullet Terminal               | 1        |
| 2*    | 42-118                   | Electric On-Off Valve         | 1        |
|       | 42-118-01                | Coil                          | 1        |
| 3*    | Electric On-Off Switch   |                               |          |
|       | 15-725                   | Mount Panel End               | 1        |
|       | 15-726                   | Switch Body Light             | 1        |
|       | 15-731                   | Actuator Amber                | 1        |
| 4‡    | Lights Switch (Optional) |                               |          |
|       | 15-729                   | Mount Panel Middle            | 1        |
|       | 15-727                   | Switch Actuator, no light     | 1        |
|       | 15-782                   | Rocker Switch, Unlit          | 1        |
| 5‡    | 34-201                   | Lights (Optional)             | 3        |
|       | 43-505                   | Lights Wire Harness           | 1        |
| 6     | 13-488                   | Ignition Switch               | 1        |
| 7     | 8975                     | Circuit Breaker, 30AMP        | 1        |
|       | 8977                     | Breaker Boot                  | 1        |
| 8     | 45-119                   | Red Battery Cable             | 1        |
| 9     |                          | Battery (not included)        | 1        |
| 10    | 22-065                   | Black Battery Cable           | 1        |
| 11    | 13-750                   | Starter Solenoid w/ Connector | 1        |
| 12    | 43-024                   | 18hp Briggs & Stratton        | 1        |
|       | 15-165                   | 16hp Briggs & Stratton        | 1        |
| 13    | 14-292                   | Seat Switch                   | 1        |
| 14    | 50-359                   | Warning Indicator Lights      | 1        |
| 15    | 22-017                   | Starter Cable                 | 1        |
|       | 45-042                   | Wire Harness                  | 1        |

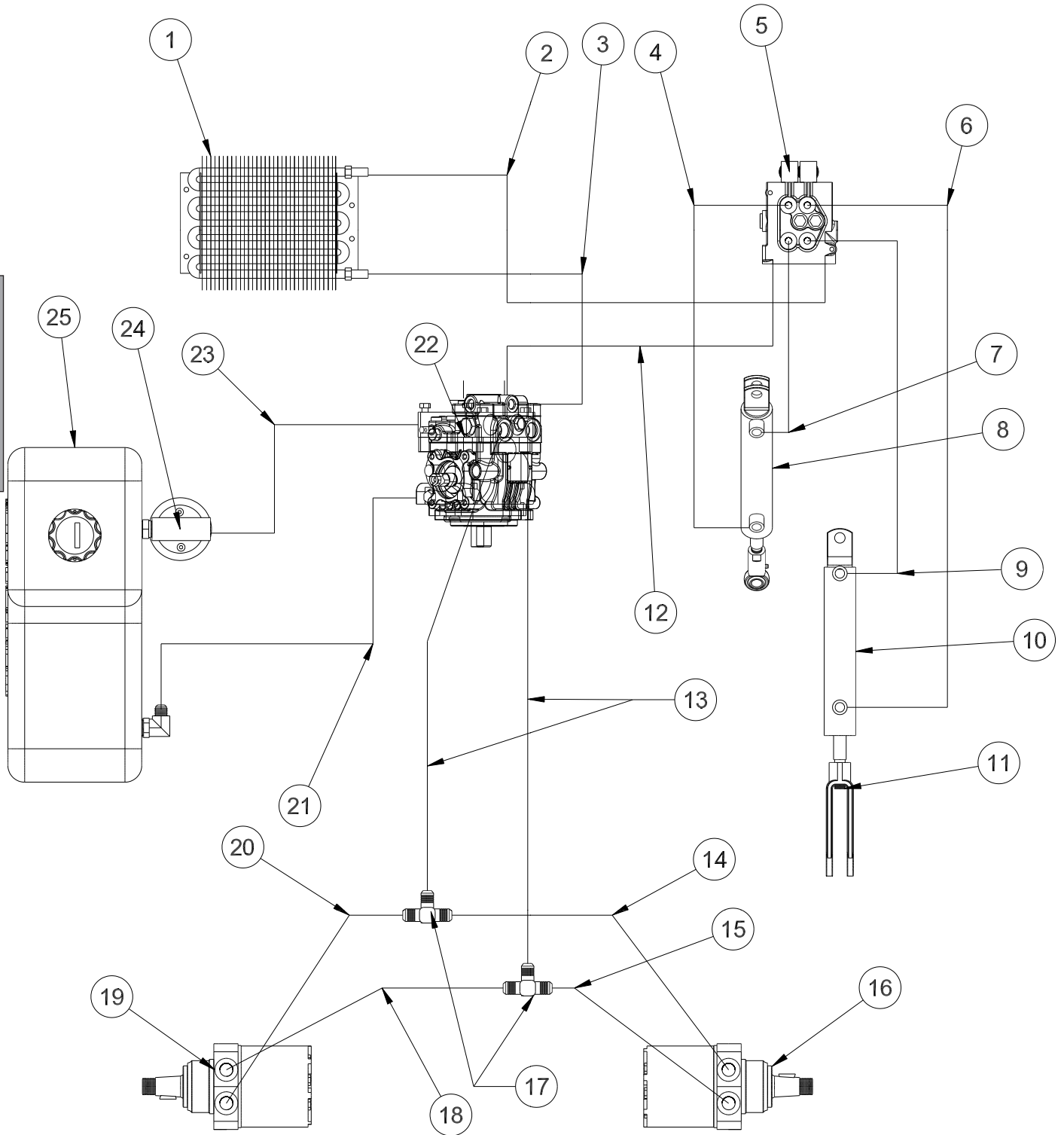
\* For 45-002 Sand Star II only

‡ 45-016 Light Kit



# 45-001 HYDRAULIC DRAWING

Diagrams



## 45-001 HYDRAULIC PARTS LIST

| REF # | PART #    | DESCRIPTION                        | QUANTITY |
|-------|-----------|------------------------------------|----------|
| 1     | 45-382    | Cooler                             | 1        |
| 2     | 45-032    | Hydraulic Hose, 17.5"              | 1        |
| 3     | 45-365    | Hydraulic Hose, 16"                | 1        |
| 4     | 45-028    | Hydraulic Hose, 21.5               | 1        |
| 5     | 13-729    | 2-Bank Hydraulic Valve             | 1        |
| 6     | 45-030    | Hydraulic Hose, 47"                | 1        |
| 7     | 45-029    | Hydraulic Hose, 27"                | 1        |
| 8     | 10-554    | Attachment Lift Cylinder           | 1        |
|       | 18-154    | Rod End                            | 1        |
| 9     | 45-031    | Hydraulic Hose, 50"                | 1        |
| 10    | 43-150    | Rake Cylinder                      | 1        |
| 11    | 42-040    | Yoke End                           | 1        |
| 12    | 45-068    | Hydraulic Hose, 29"                | 1        |
| 13    | 45-037    | Hydraulic Hose, 12.5"              | 2        |
| 14    | 45-041    | Right Upper Steel Tube             | 1        |
| 15    | 45-040    | Right Lower Steel Tube             | 1        |
| 16    | 45-065    | Right Wheel Motor w/ Brake         | 1        |
| 17    | 18-170    | Tee                                | 2        |
| 18    | 45-039    | Left Upper Steel Tube              | 1        |
| 19    | 45-066    | Left Wheel Motor w/ Brake          | 1        |
| 20    | 45-038    | Left Lower Steel Tube              | 1        |
| 21    | 45-366    | Hydraulic Hose, 54"                | 1        |
| 22    | 45-373    | Hydrostatic Pump                   | 1        |
|       | 45-373-01 | Overhaul Kit                       | 1        |
| 23    | 8832-31   | $\frac{3}{4}$ " Suction Hose x 37" | 1        |
|       | 18-040    | Hose Clamp                         | 2        |
| 24    | 23-006    | Oil Filter                         | 1        |
|       | 23-031    | Replacement Filter only            |          |
| 25    | 42-005    | Oil Tank                           | 1        |
|       | 13-747    | Filler Breather                    | 1        |

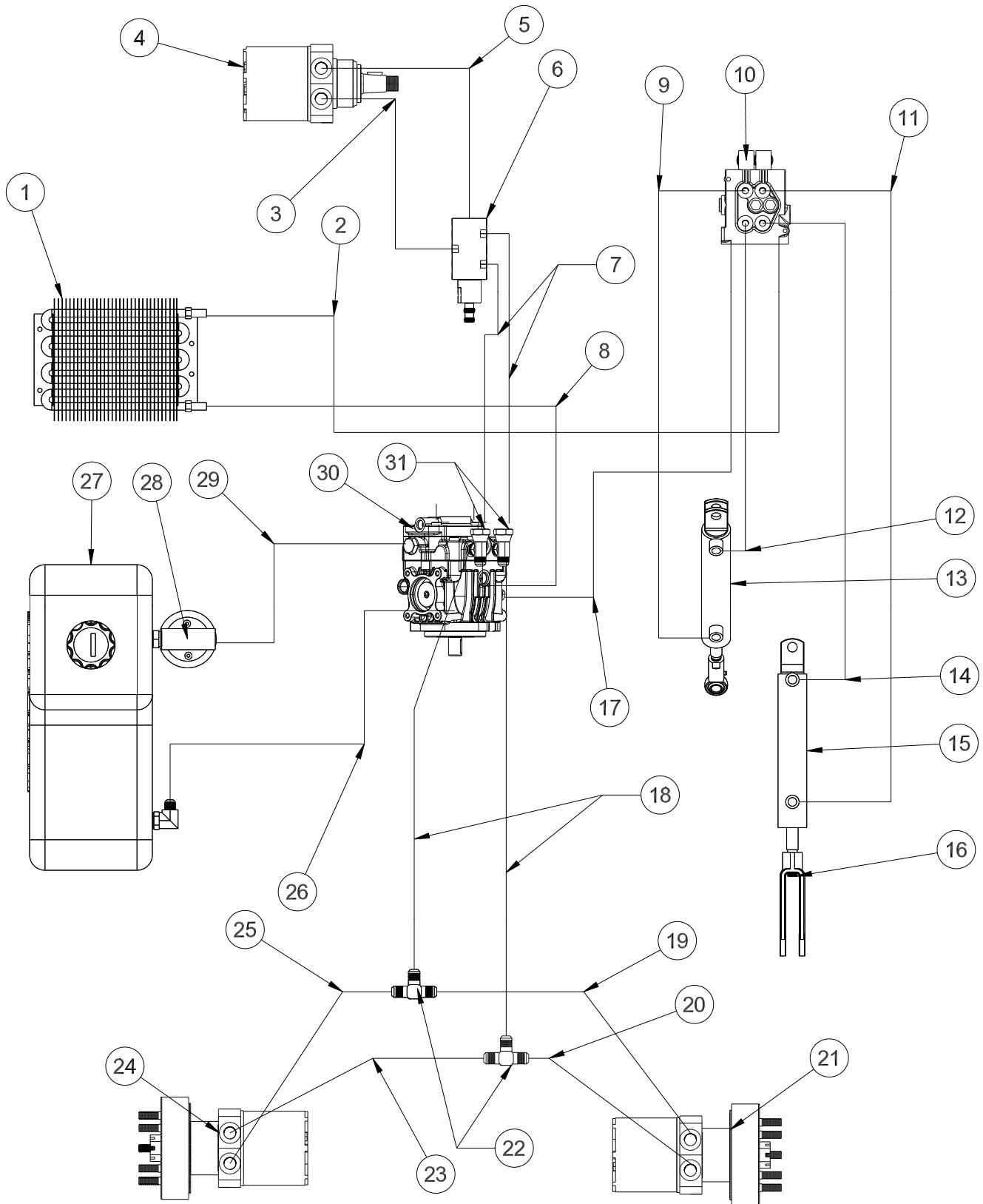
Diagrams

### HYDRAULIC PRESSURES

|                                 |                      |                                |                          |
|---------------------------------|----------------------|--------------------------------|--------------------------|
| Piston Pump Displacement        | .913 in <sup>3</sup> | Charge Pump Displacement       | .33 in <sup>3</sup> /rev |
| Pump Input Speed (up to)        | 3300rpm              | Max. Inlet Vacuum              | 5 in. Hg                 |
| Max. Operating Pressure         | 3000 peak psi        | Max. Case Pressure             | 25 psi                   |
| Implement Setting               | 345 psi              | Relief Valve Pressure (set at) | 1200 psi                 |
| 13-729 Hydraulic Valve (2 bank) | 900 psi              |                                |                          |

# 45-002 HYDRAULIC DRAWING

Diagrams





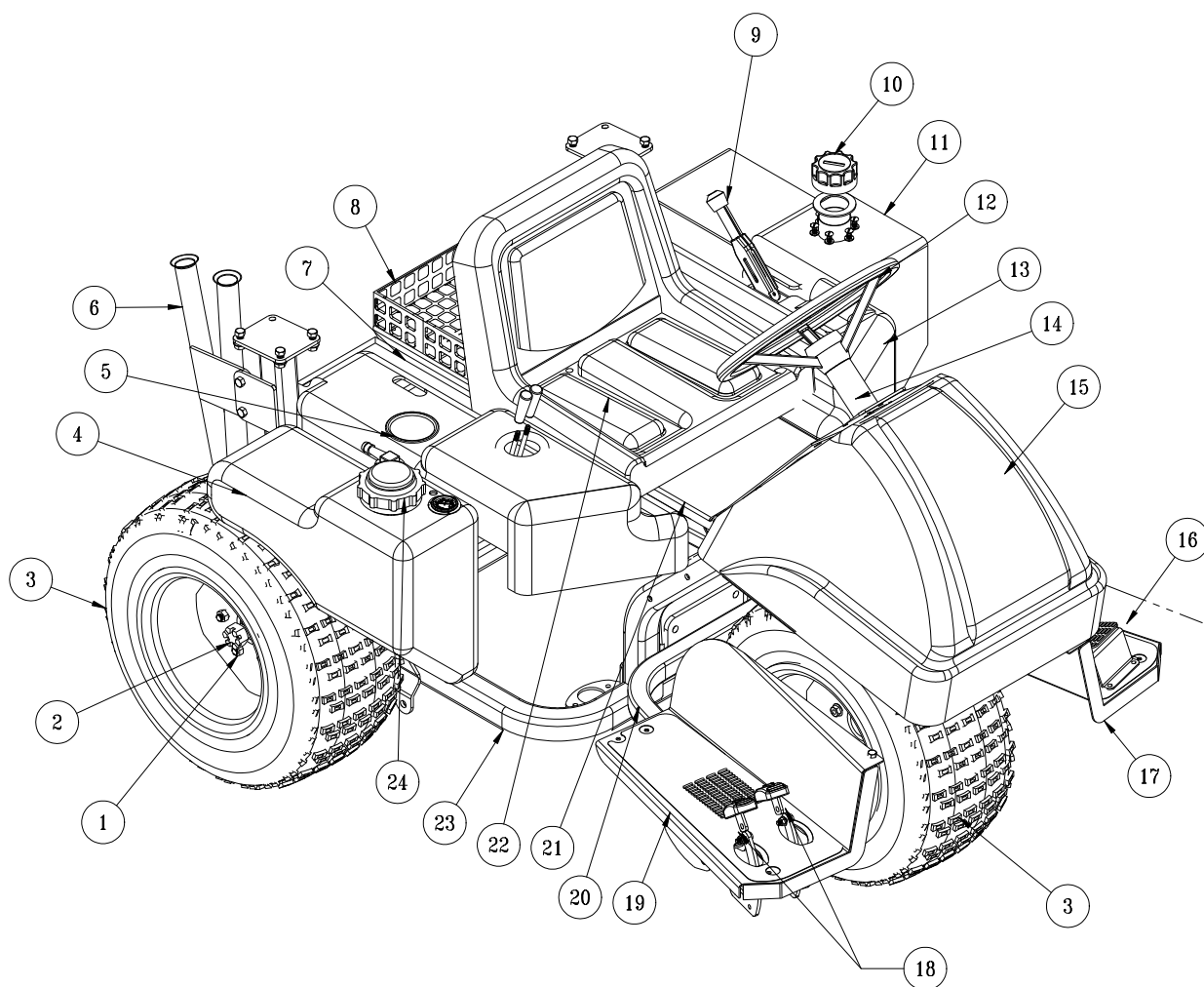
## 45-002 HYDRAULIC PARTS LIST

| REF # | PART #    | DESCRIPTION                        | QUANTITY |
|-------|-----------|------------------------------------|----------|
| 1     | 45-382    | Cooler                             | 1        |
| 2     | 45-032    | Hydraulic Hose, 17.5"              | 1        |
| 3     | 45-035    | Hydraulic Hose, 50"                | 1        |
| 4     | 45-067    | Front Wheel Motor                  | 1        |
| 5     | 45-034    | Hydraulic Hose, 53"                | 1        |
| 6     | 42-118    | Electric On/Off Valve              | 1        |
| 7     | 45-033    | Hydraulic Hose, 11.5"              | 2        |
| 8     | 45-365    | Hydraulic Hose, 16"                | 1        |
| 9     | 45-028    | Hydraulic Hose, 21.5"              | 1        |
| 10    | 13-729    | 2-Bank Hydraulic Valve             | 1        |
| 11    | 45-030    | Hydraulic Hose, 47"                | 1        |
| 12    | 45-029    | Hydraulic Hose, 27"                | 1        |
| 13    | 10-554    | Attachment Lift Cylinder           | 1        |
|       | 18-154    | Rod End                            | 1        |
|       | HNJ-58-14 | Jam Nut, $\frac{5}{8}$ - 14        | 1        |
| 14    | 45-031    | Hydraulic Hose, 50"                | 1        |
| 15    | 43-150    | Rake Cylinder                      | 1        |
| 16    | 42-040    | Yoke End                           | 1        |
| 17    | 45-068    | Hydraulic Hose, 29"                | 1        |
| 18    | 45-037    | Hydraulic Hose, 12.5"              | 2        |
| 19    | 45-041    | Right Upper Steel Tube             | 1        |
| 20    | 45-040    | Right Lower Steel Tube             | 1        |
| 21    | 45-065    | Right Wheel Motor w/ Brake         | 1        |
| 22    | 18-170    | Tee                                | 2        |
| 23    | 45-039    | Left Upper Steel Tube              | 1        |
| 24    | 45-066    | Left Wheel Motor w/ Brake          | 1        |
| 25    | 45-038    | Left Lower Steel Tube              | 1        |
| 26    | 45-366    | Hydraulic Hose, 54"                | 1        |
| 27    | 42-005    | Oil Tank                           | 1        |
|       | 13-747    | Filler Breather                    | 1        |
| 28    | 23-006    | Oil Filter                         | 1        |
|       | 23-031    | Replacement Filter only            |          |
| 29    | 8832-31   | $\frac{3}{4}$ " Suction Hose x 37" | 1        |
|       | 18-040    | Hose Clamp                         | 2        |
| 30    | 45-373    | Hydrostatic Pump                   | 1        |
|       | 45-373-01 | Overhaul Kit                       | 1        |
| 31    | 18-377    | Tee                                | 2        |

### HYDRAULIC PRESSURES

|                                 |                      |                                |                          |
|---------------------------------|----------------------|--------------------------------|--------------------------|
| Piston Pump Displacement        | .913 in <sup>3</sup> | Charge Pump Displacement       | .33 in <sup>3</sup> /rev |
| Pump Input Speed (up to)        | 3300rpm              | Max. Inlet Vacuum              | 5 in. Hg                 |
| Max. Operating Pressure         | 3000 peak psi        | Max. Case Pressure             | 25 psi                   |
| Implement Setting               | 345 psi              | Relief Valve Pressure (set at) | 1230 psi                 |
| 13-729 Hydraulic Valve (2 bank) | 900 psi              |                                |                          |

# MAIN FRAME DRAWING



Parts

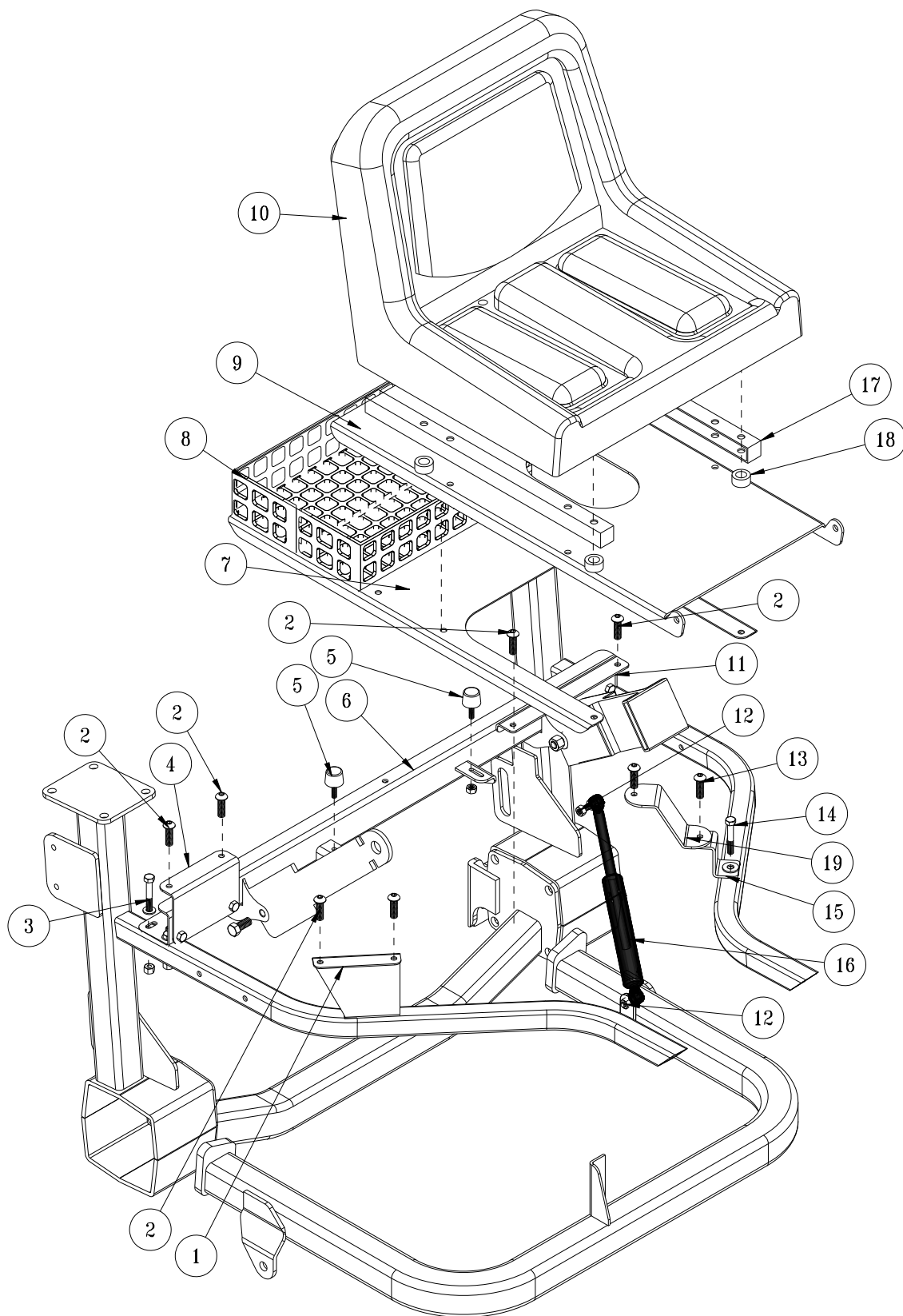
## MAIN PARTS LIST

| REF# | PART#     | DESCRIPTION                    | QUANTITY |
|------|-----------|--------------------------------|----------|
| 1    | HNL-12-20 | Lug Nuts, 1/2 - 20             | 10       |
| 2    | 14-265    | Axle Nut (part of wheel motor) | 3        |
| 3    | 45-021    | Knobby Tire and Wheel          | 3        |
|      | 45-021-01 | Tire, 22 x 11 - 10             | 3        |
|      | 45-021-02 | Wheel                          | 3        |
| 4    | 42-833    | Fuel Tank                      | 1        |
| 5    | 15-781    | Cup Holder                     | 1        |
| 6    | 45-123    | Rake Holder                    | 1        |
| 7    | 45-043    | RH Fender                      | 1        |
|      | 8803-11   | Black Trim, 11"                | 1        |
| 8    | 8-532     | Crate                          | 1        |
| 9    | 60-106    | Park Brake Lever               | 1        |
| 10   | 13-747    | Filler Breather                | 1        |
|      | 13-586-03 | Neck                           | 1        |
| 11   | 42-005    | Oil Tank                       | 1        |
| 12   | 20-057    | Steering Wheel                 | 1        |
|      | 20-129    | Center Cap                     | 1        |
| 13   | 45-044    | LH Fender                      | 1        |
| 14   | 45-157    | Steering Post                  | 1        |
| 15   | 45-026    | Nose Cone                      | 1        |
|      | 8803-45   | Black Trim, 45"                | 1        |
|      | 18-436    | Lock Hole Plug                 | 1        |
| 16   | 45-047    | Foot Rest Plate                | 1        |
|      | 45-132    | Foot Rest Grip                 | 1        |
| 17   | 45-099    | LH Floorboard                  | 1        |
|      | 45-064    | LH Floor Mat                   | 1        |
| 18   | 45-022    | Molded Foot Pedal              | 2        |
| 19   | 45-098    | RH Floorboard                  | 1        |
|      | 45-063    | RH Floor Mat                   | 1        |
| 20   | 45-145    | Floorboard Frame               | 1        |
| 21   | 45-085    | Seat Panel                     | 1        |
| 22   | 14-293    | Adjustable Low Back Seat       | 1        |
|      | 14-800    | Seat Rails                     | 1        |
| 23   | 45-050    | Main Frame                     | 1        |
| 24   | 42-814-02 | Fuel Cap                       | 1        |

### OPTIONAL TURF TIRES

|           |                             |   |
|-----------|-----------------------------|---|
| 48-265    | Tire & Wheel                | 3 |
| 43-123-01 | Turf Tires, 5 psi (.34 bar) | 3 |
| 16-857-02 | Wheel, 23-10.50 x 12        | 3 |

# SEAT PANEL DRAWING



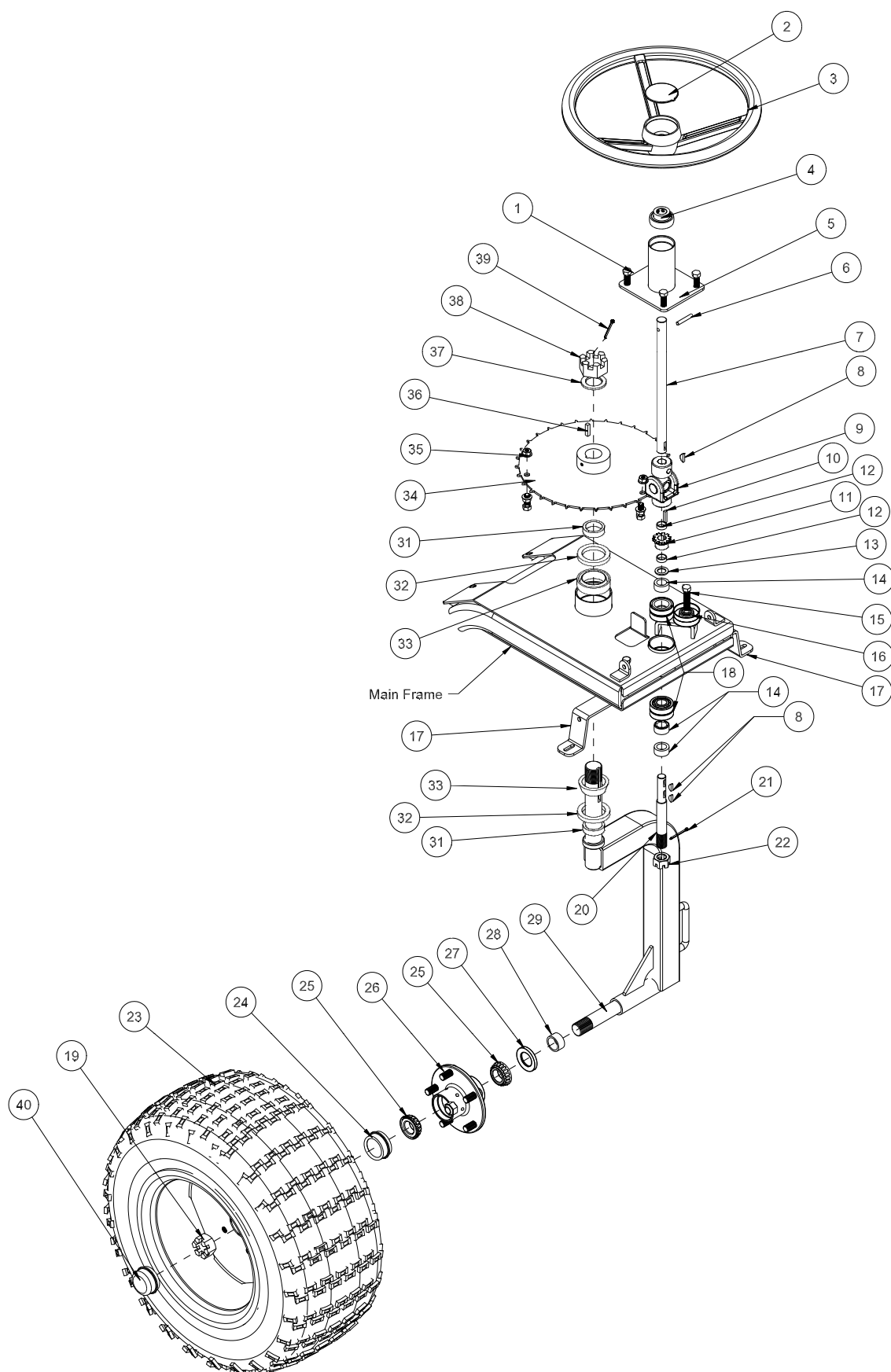
Parts

## SEAT PANEL PARTS LIST

| REF# | PART#            | DESCRIPTION                                     | QUANTITY |
|------|------------------|-------------------------------------------------|----------|
| 1    | 45-087           | RH Fender Support                               | 1        |
| 2    | HSTP-516-18-100  | Phillips Machine Screw, $\frac{5}{16}$ - 18 - 1 | 6        |
|      | 78-274           | Cage Nuts                                       | 6        |
| 3    | HB-516-18-200    | Hex Bolt, $\frac{5}{16}$ - 18 x 2               | 4        |
|      | HW-516           | Flat Washer, $\frac{5}{16}$                     | 4        |
|      | HNFL-516-18      | Flange Whiz-Loc Nut $\frac{5}{16}$ - 18         | 4        |
| 4    | 45-086           | RH Rear Fender Bracket                          | 1        |
| 5    | 15-013           | Rubber Bumper                                   | 2        |
|      | HNTL-516-18      | Nylon Lock Nut, $\frac{5}{16}$ - 18             | 2        |
| 6    | 45-082           | Seat Belt Brace                                 | 1        |
| 7    | 45-088           | Basket Mount                                    | 1        |
| 8    | 8-532            | Basket                                          | 1        |
| 9    | 45-085           | Seat Panel                                      | 1        |
| 10   | 14-293           | Adjustable Low Back Seat                        | 1        |
| 11   | 45-113           | LH Rear Fender Mount                            | 1        |
| 12   | 26-034           | Ball Stud                                       | 2        |
|      | HNFL-516-18      | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18        | 2        |
| 13   | HSTP-516-18-100  | Phillips Machine Screw, $\frac{5}{16}$ - 18 - 1 | 2        |
|      | HNFL-516-18      | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18        | 2        |
| 14   | HB-516-18-200    | Hex Bolt, $\frac{5}{16}$ - 18 x 2               | 1        |
|      | HW-516           | Flat Washer, $\frac{5}{16}$                     | 1        |
|      | HNFL-516-18      | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18        | 1        |
| 15   | 45-105           | LH Front Fender Mount                           | 1        |
| 16   | 13-569           | Gas Spring 60#                                  | 1        |
| 17   | 14-800           | Seat Rails                                      | 1        |
| 18   | HSP-1260-340-250 | Spacer                                          | 4        |
|      | HB-516-18-100    | Hex Bolt, $\frac{5}{16}$ - 18 x 1               | 4        |
| 19   | 45-384           | LH Front Fender Brace                           | 1        |

# 45-001 FRONT FORK DRAWING

Parts

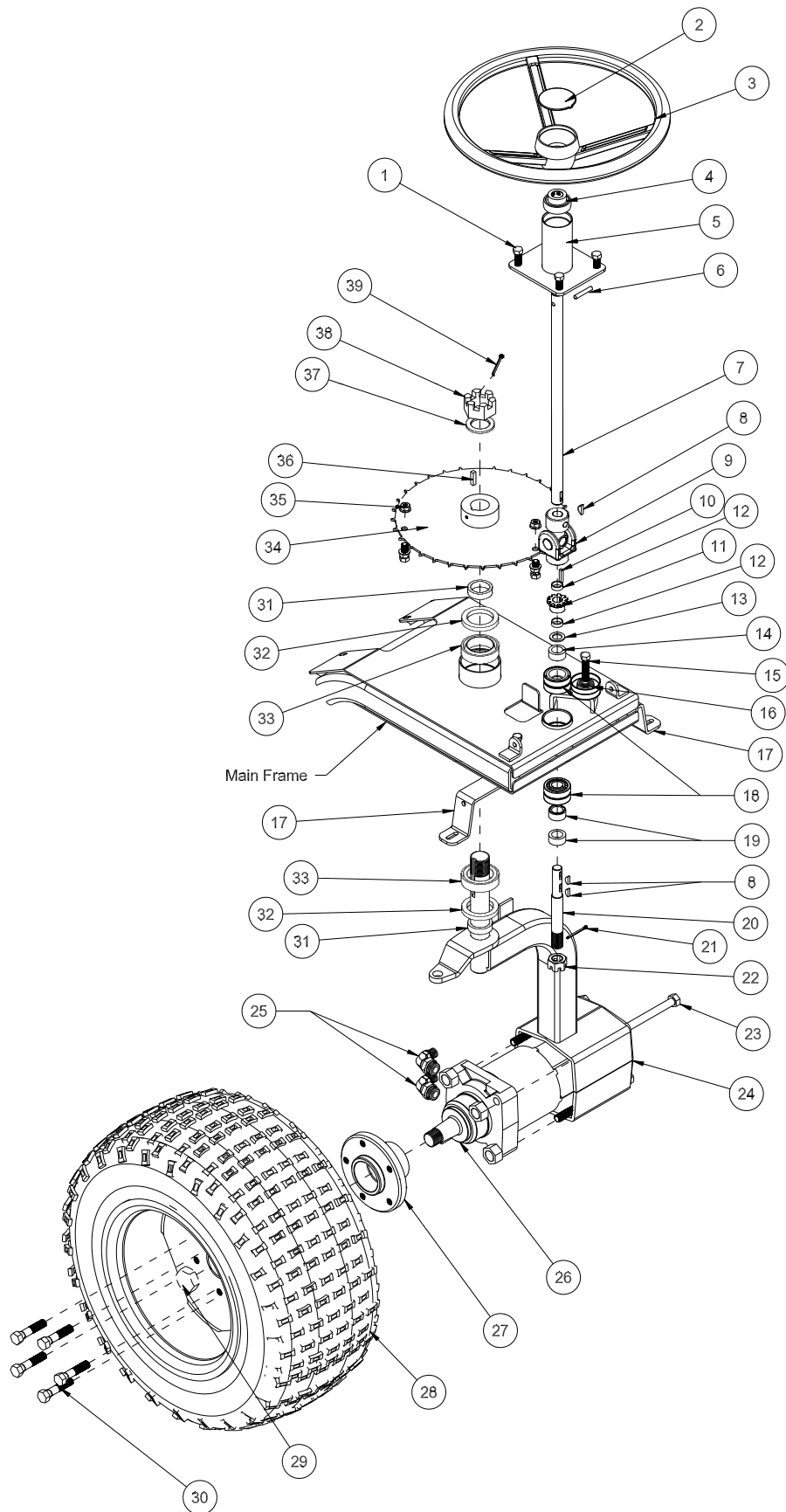


## 45-001 FRONT FORK PARTS LIST

| REF# | PART#         | DESCRIPTION                                                          | QUANTITY |
|------|---------------|----------------------------------------------------------------------|----------|
| 1    | HB-516-18-100 | Hex Bolt, $\frac{5}{16}$ - 18 x 1                                    | 4        |
|      | HNFL-516-18   | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                             | 4        |
| 2    | 20-129        | Center Cap                                                           | 1        |
|      | 27-077        | Decal, Smithco Round                                                 | 1        |
| 3    | 20-057        | Steering Wheel                                                       | 1        |
| 4    | 45-155        | Bearing                                                              | 1        |
| 5    | 45-157        | Steering Post                                                        | 1        |
| 6    | HRP-14-150    | Roll Pin, $\frac{1}{4}$ x $1\frac{1}{2}$                             | 1        |
| 7    | 45-096        | Top Steering Shaft                                                   | 1        |
| 8    | HWK-316-075   | Woodruff Key, $\frac{3}{16}$ x $\frac{3}{4}$                         | 4        |
| 9    | 60-300        | U-Joint                                                              | 1        |
| 10   | HKSQ-316-100  | Square Key, $\frac{3}{16}$ x $\frac{3}{16}$ x 1                      | 1        |
| 11   | 60-298        | Sprocket                                                             | 1        |
| 12   | 60-325        | Spacer                                                               | 1        |
| 13   | HMB-58-14     | Machine Bushing, $\frac{5}{8}$ x 14GA                                | 1        |
| 14   | 11-040        | Spacer                                                               | 3        |
| 15   | HB-38-16-175  | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{3}{4}$                        | 1        |
|      | HW-38         | Flat Washer, $\frac{3}{8}$                                           | 3        |
|      | HNTL-38-16    | Nylon Lock Nut, $\frac{3}{8}$ - 16                                   | 1        |
| 16   | 26-060        | Idler Pulley                                                         | 1        |
| 17   | 45-093        | Front Support                                                        | 2        |
| 18   | 11-038        | Bearing w/ Race                                                      | 2        |
|      | 11-039        | Oil Seal                                                             | 2        |
| 19   | HNAR-100-14   | Axle Nut, 1 - 14                                                     | 1        |
|      | HP-18-150     | Cotter Pin, $\frac{1}{8}$ x $1\frac{1}{2}$                           | 1        |
| 20   | 13-005        | Bottom Steering Shaft                                                | 1        |
| 21   | HP-18-150     | Cotter Pin, $\frac{1}{8}$ x $1\frac{1}{2}$                           | 1        |
| 22   | HNA-34-16     | Axle Nut, $\frac{3}{4}$ - 16                                         | 1        |
| 23   | 45-021        | Knobby Tire and Wheel                                                | 1        |
|      | 45-021-01     | Tire, 22 x 11 x 10                                                   | 1        |
|      | 45-021-02     | Wheel                                                                | 1        |
| 24   | 42-817        | Wheel Bearing Protector                                              | 1        |
| 25*  | 11-043        | Bearing                                                              | 1        |
| 26   | 80-019        | Hub (includes * items: bearings, seal, dust cap, lug nuts and studs) | 1        |
|      | 27-022-02     | Stud, $\frac{1}{2}$ - 20- $1\frac{7}{16}$                            | 5        |
| 27*  | 11-041        | Seal                                                                 | 1        |
| 28   | 11-042        | Spacer                                                               | 1        |
| 29   | 13-448        | Front Fork                                                           | 1        |
| 31   | 20-141        | Spacer                                                               | 2        |
| 32   | 20-142        | Oil Seal                                                             | 2        |
| 33   | 20-143        | Bearing                                                              | 2        |
| 34   | 42-295        | Sprocket                                                             | 1        |
| 35   | HB-38-16-175  | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{3}{4}$                        | 2        |
|      | HNFL-38-16    | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 16                              | 4        |
| 36   | HKSQ-14-100   | Square Key, $\frac{1}{4}$ x $\frac{1}{4}$ x 1                        | 1        |
| 37   | HMB-114-10    | Machine Bushing, $1\frac{1}{4}$ x 10GA                               | 1        |
| 38   | HNA-114-12    | Axle Nut, $1\frac{1}{4}$ - 12                                        | 1        |
| 39   | HP-18-200     | Cotter Pin, $\frac{1}{8}$ x 2                                        | 1        |
| 40*  |               | Dust Cap                                                             | 1        |
| NS   | 8834-38       | #35 Chain - 38 links                                                 | 1        |
|      | 18-114        | Connector Link                                                       | 1        |

# 45-002 FRONT FORK DRAWING

Parts



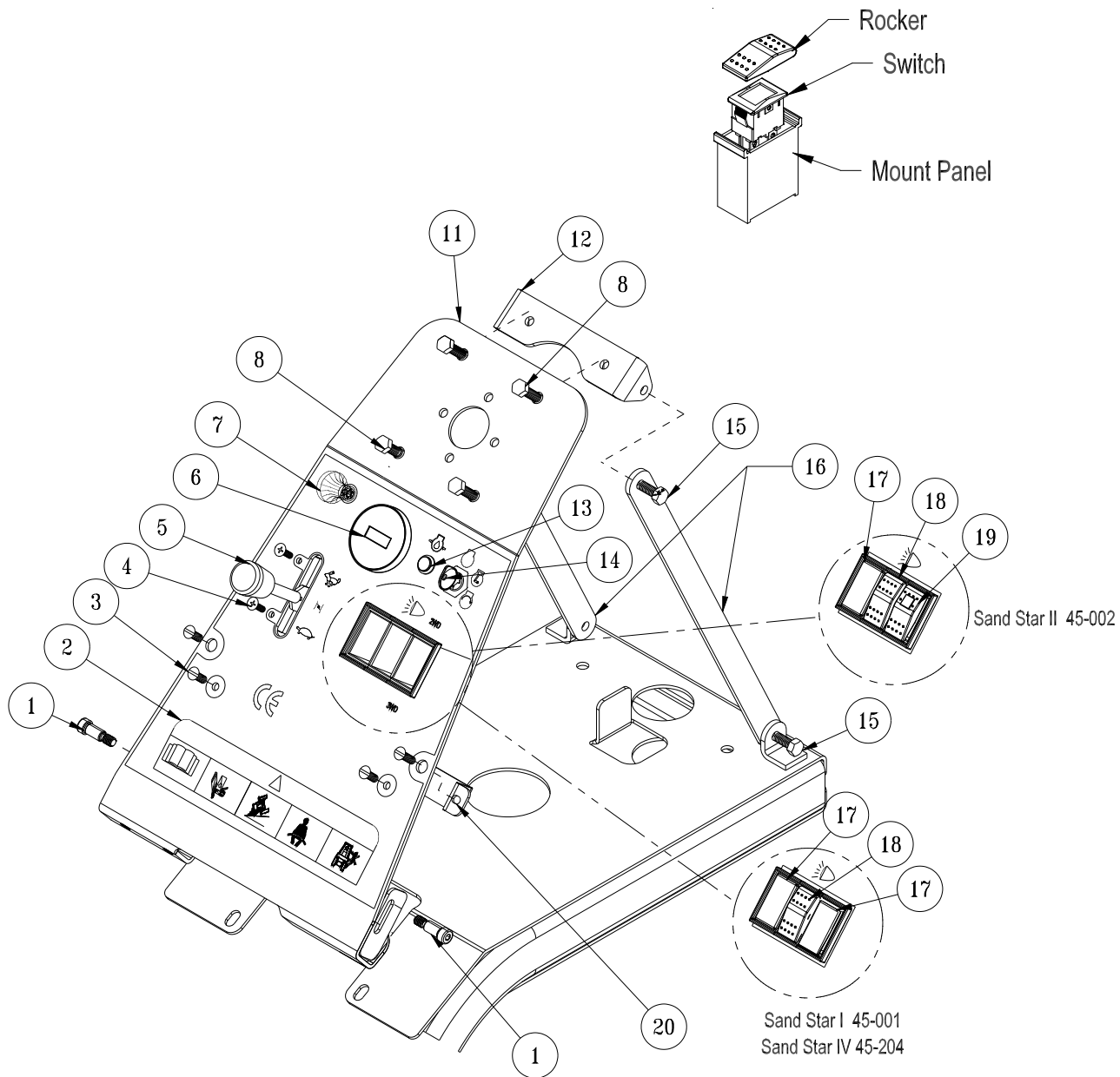


## 45-002 FRONT FORK PARTS LIST

| REF# | PART#         | DESCRIPTION                                     | QUANTITY |
|------|---------------|-------------------------------------------------|----------|
| 1    | HB-516-18-100 | Hex Bolt, $\frac{5}{16}$ - 18 x 1               | 4        |
|      | HNFL-516-18   | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18        | 4        |
| 2    | 20-129        | Center Cap                                      | 1        |
|      | 27-077        | Decal, Smithco Round                            | 1        |
| 3    | 20-057        | Steering Wheel                                  | 1        |
| 4    | 45-155        | Bearing                                         | 1        |
| 5    | 45-157        | Steering Post                                   | 1        |
| 6    | HRP-14-150    | Roll Pin, $\frac{1}{4}$ x $1\frac{1}{2}$        | 1        |
| 7    | 45-096        | Top Steering Shaft                              | 1        |
| 8    | HWK-316-075   | Woodruff Key, $\frac{3}{16}$ x $\frac{3}{4}$    | 4        |
| 9    | 60-300        | U-Joint                                         | 1        |
| 10   | HKSQ-316-100  | Square Key, $\frac{3}{16}$ x $\frac{3}{16}$ x 1 | 1        |
| 11   | 60-298        | Sprocket                                        | 1        |
| 12   | 60-325        | Spacer                                          | 1        |
| 13   | HMB-58-14     | Machine Bushing, $\frac{5}{8}$ x 14GA           | 1        |
| 14   | 11-040        | Spacer                                          | 1        |
| 15   | HB-38-16-175  | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{3}{4}$   | 1        |
|      | HW-38         | Flat Washer, $\frac{3}{8}$                      | 3        |
|      | HNTL-38-16    | Nylon Lock Nut, $\frac{3}{8}$ - 16              | 1        |
| 16   | 26-060        | Idler Pulley                                    | 1        |
| 17   | 45-093        | Front Support                                   | 2        |
| 18   | 11-038        | Bearing w/ Race                                 | 2        |
|      | 11-039        | Oil Seal                                        | 2        |
| 19   | 11-040        | Spacer                                          | 2        |
| 20   | 13-005        | Bottom Steering Shaft                           | 1        |
| 21   | HP-18-150     | Cotter Pin $\frac{1}{8}$ x $1\frac{1}{2}$       | 1        |
| 22   | HNA-34-16     | Axle Nut $\frac{3}{4}$ - 16                     | 1        |
| 23   | HB-12-13-750  | Hex Bolt $\frac{1}{2}$ - 13 x $7\frac{1}{2}$    | 4        |
|      | HNFL-12-13    | Flange Whiz-Loc Nut $\frac{1}{2}$ - 13          | 4        |
| 24   | 45-115        | Front Fork                                      | 1        |
| 25   | 18-350        | 90° Seal Lock Elbow                             | 2        |
| 26   | 45-067        | Front Wheel Motor                               | 1        |
| 27   | 13-033        | Hub                                             | 1        |
| 28   | 45-021        | Knobby Tire and Wheel                           | 1        |
|      | 45-021-01     | Tire, 22 x 11 x 10                              | 1        |
|      | 45-021-02     | Wheel                                           | 1        |
| 29   | 14-265        | Nut (comes with wheel motor)                    | 1        |
| 30   | 60-268        | Lug Hex Bolt                                    | 5        |
| 31   | 20-141        | Spacer                                          | 2        |
| 32   | 20-142        | Oil Seal                                        | 2        |
| 33   | 20-143        | Bearing                                         | 2        |
| 34   | 42-295        | Sprocket                                        | 1        |
| 35   | HB-38-16-175  | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{3}{4}$   | 2        |
|      | HNFL-38-16    | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 16         | 4        |
| 36   | HKSQ-14-100   | Square Key, $\frac{1}{4}$ x $\frac{1}{4}$ x 1   | 1        |
| 37   | HMB-114-10    | Machine Bushing, $\frac{1}{4}$ x 10GA           | 1        |
| 38   | HNA-114-12    | Axle Nut, $1\frac{1}{4}$ - 12                   | 1        |
| 39   | HP-18-200     | Cotter Pin, $\frac{1}{8}$ x 2                   | 1        |
| NS   | 8834-38       | #35 Chain - 38 links                            | 1        |
|      | 18-114        | Connector Link                                  | 1        |

# DASHBOARD DRAWING

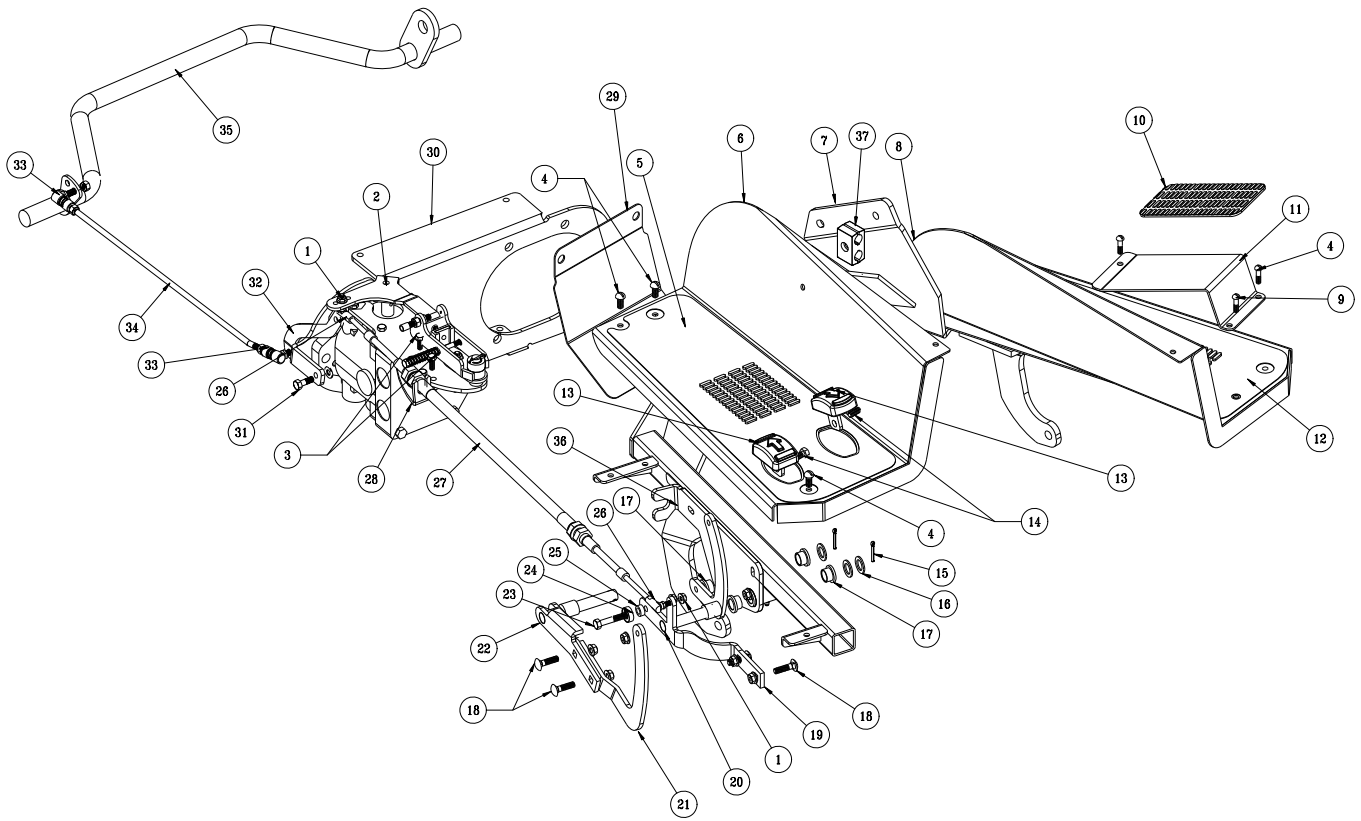
Parts



## DASHBOARD PARTS LIST

| REF# | PART#           | DESCRIPTION                                                | QUANTITY |
|------|-----------------|------------------------------------------------------------|----------|
| 1    | HBSH-38 x 38    | Shoulder Hex Bolt, $\frac{3}{8}$ UNC x $\frac{3}{8}$       | 2        |
|      | HNSQ-516-18     | Square Nut, $\frac{5}{16}$ -18                             | 2        |
| 2    | 45-095          | Decal, Dash Panel                                          | 1        |
| 3    | HSTP-14-20-075  | Phillips Machine Screw, $\frac{1}{4}$ - 20 x $\frac{3}{4}$ | 4        |
|      | HNFL-14-20      | Flange Whiz-Loc Nut, $\frac{1}{4}$ - 20                    | 4        |
| 4    | HSM-10-32-063   | Machine Screw, #10 - 32 x $\frac{5}{8}$                    | 2        |
|      | HNFL-10-32      | Flange Whiz-Loc Nut, #10 - 32                              | 2        |
| 5    | 45-118          | Throttle Cable                                             | 1        |
| 6    | 12-804          | Hour Meter                                                 | 1        |
| 7    | 80-020          | Choke Cable                                                | 1        |
| 8    | HB-516-18-100   | Hex Bolt, $\frac{5}{16}$ - 18 x 1                          | 4        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                   | 4        |
| 11   | 45-090          | Dash Board                                                 | 1        |
| 12   | 45-078          | Top Mount Bracket                                          | 1        |
| 13   | 50-359          | Warning Indicator Light                                    | 1        |
| 14   | 13-488          | Ignition Switch assembly                                   | 1        |
|      | 76-310          | Key Set                                                    | 1        |
| 15   | HBFL-516-18-075 | Flange Hex Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$       | 4        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ -18                    | 4        |
| 16   | 45-124          | Dash Brace                                                 | 2        |
| 17   | 15-725          | Mount Panel End                                            | 1        |
|      | 15-730          | Mount Panel Plug (1 on 3WD and 2 on 2WD)                   | 1        |
| 18   | 15-729          | Mount Panel Middle                                         | 1        |
|      | 15-727          | Rocker , No light                                          | 1        |
|      | 15-782          | Non lighted Switch, On-None-Off                            | 1        |
| 19   | 15-725          | Mount Panel End                                            | 1        |
|      | 15-726          | Lighted Switch                                             | 1        |
|      | 15-731          | Rocker, Amber                                              | 1        |
| 20   | 45-049          | Wire Retainer                                              | 1        |
| NS   | 45-042          | Wire Harness                                               | 1        |

# FOOT PEDAL LINKAGE DRAWING

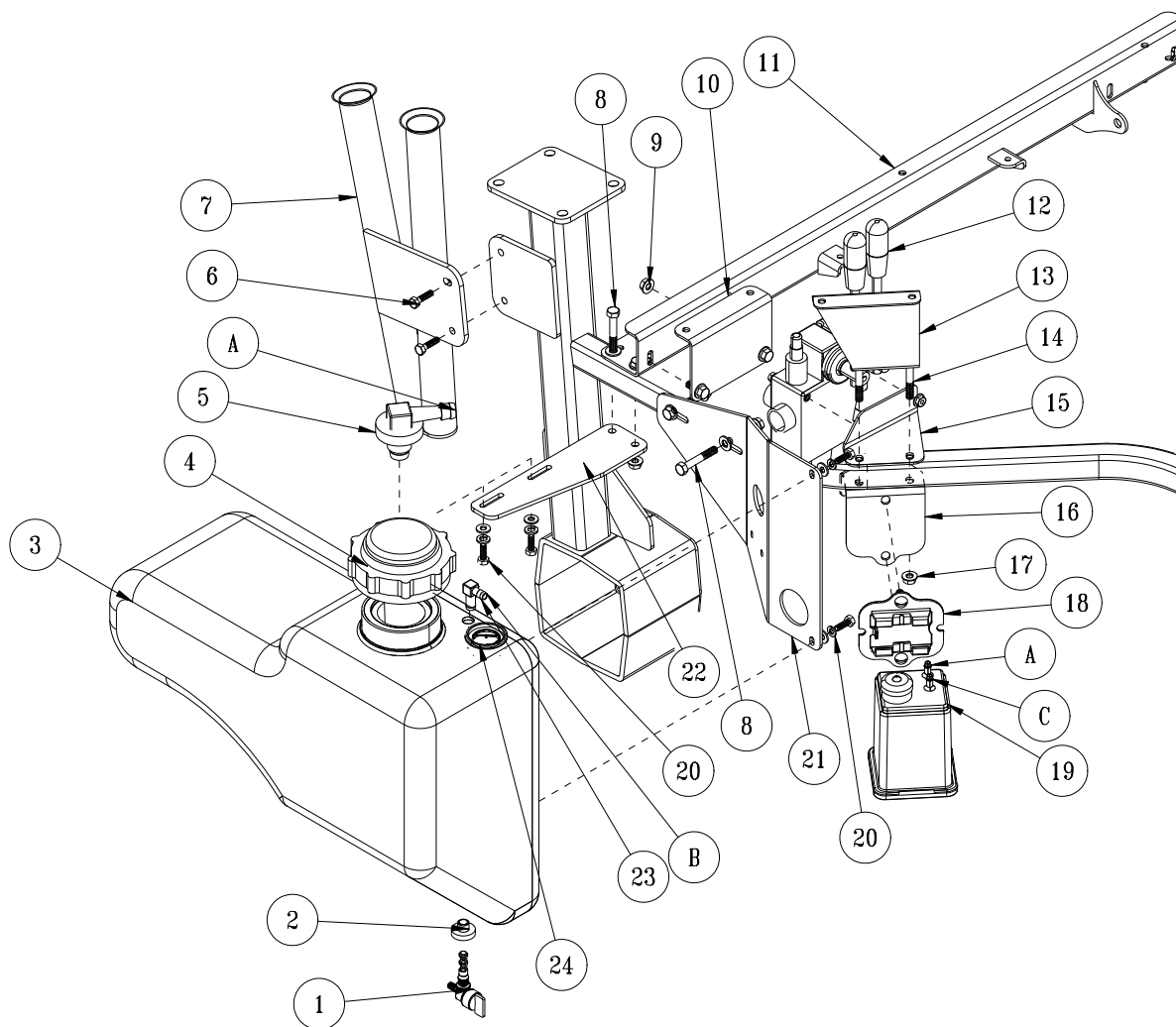


Parts

# FOOT PEDAL LINKAGE PARTS LIST

| REF# | PART#           | DESCRIPTION                                | QUANTITY |
|------|-----------------|--------------------------------------------|----------|
| 1    | HN-14-28        | Hex Nut, 1/4 NF                            | 2        |
| 2    | 45-369          | Swash Arm                                  | 1        |
| 3    | HB-516-18-075   | Hex Bolt, 5/16 - 18 x 3/4                  | 2        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, 5/16 - 18             | 2        |
| 4    | HSTP-516-18-075 | Truss Head Pan Screw, 5/16 - 18 x 3/4      | 6        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, 5/16 - 18             | 6        |
| 5    | 45-063          | RH Floor Mat                               | 1        |
| 6    | 45-098          | RH Floorboard                              | 1        |
| 7    | 45-145          | Floorboard Frame                           | 1        |
| 8    | 45-099          | LH Floorboard                              | 1        |
| 9    | HSTP-14-20-100  | Truss Head Pan Screw, 1/4 -20 x 1          | 1        |
|      | HNFL-14-20      | Flange Whiz-Loc Nut, 1/4 - 20              | 1        |
| 10   | 45-132          | Foot Rest Grip                             | 1        |
| 11   | 45-047          | Foot Rest Plate                            | 1        |
| 12   | 45-064          | LH Floor Mat                               | 1        |
| 13   | 45-022          | Molded Foot Pedal                          | 2        |
| 14   | HBFL-516-18-075 | Flange Whiz-Loc Bolt, 5/16 - 18 x 3/4      | 2        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, 5/16 - 18             | 2        |
| 15   | HP-18-100       | Cotter Pin, 1/8 x 1                        | 2        |
| 16   | HMB-58-14       | Machine Bushing, 5/8 x 10GA                | 3        |
| 17   | 76-128          | Flange Bushing (part of floor board frame) | 4        |
| 18   | HBCL-516-18-075 | Carriage Hex Bolt, 5/16 - 18 x 3/4         | 4        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, 5/16 - 18             | 4        |
| 19   | 45-133          | Forward Pedal Arm                          | 1        |
| 20   | 45-083          | Forward Pedal Brace                        | 1        |
| 21   | 45-134          | Reverse Pedal Arm                          | 1        |
| 22   | 45-084          | Reverse Pedal Brace                        | 1        |
| 23   | HB-516-18-125   | Hex Bolt, 5/16 -18 x 1 1/4                 | 1        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, 5/16 - 18             | 1        |
| 24   | 8-601           | Micro Ball Bearing                         | 1        |
| 25   | 8-622           | Spacer                                     | 1        |
| 26   | 8-701           | Ball Joint, 1/4 NF                         | 2        |
| 27   | 45-117          | Push Pull Cable                            | 1        |
| 28   | 45-094          | Cable Bracket                              | 1        |
| 29   | 45-146          | Dirt Guard                                 | 1        |
| 30   | 45-045          | Pump Mount                                 | 1        |
| 31   | HB-516-18-100   | Hex Bolt, 5/16 - 18 x 1                    | 1        |
|      | HNTL-516-18     | Nylon Lock Nut, 5/16 - 18                  | 1        |
|      | HW-516          | Flat Washer, 5/16                          | 2        |
| 32   | 45-371          | Speed Boss Arm                             | 1        |
| 33   | 18-387          | Quick Disconnect Ball Joints               | 2        |
|      | HN-516-24       | Hex Nut, 5/16 - 24                         | 4        |
| 34   | 45-372          | Speed Boss Rod                             | 1        |
| 35   | 45-114          | Lift Bar                                   | 1        |
| 36   | 45-147          | Pedal Mount                                | 1        |
| 37   | 18-370          | Hose Clamp                                 | 1        |

# FUEL TANK DRAWING



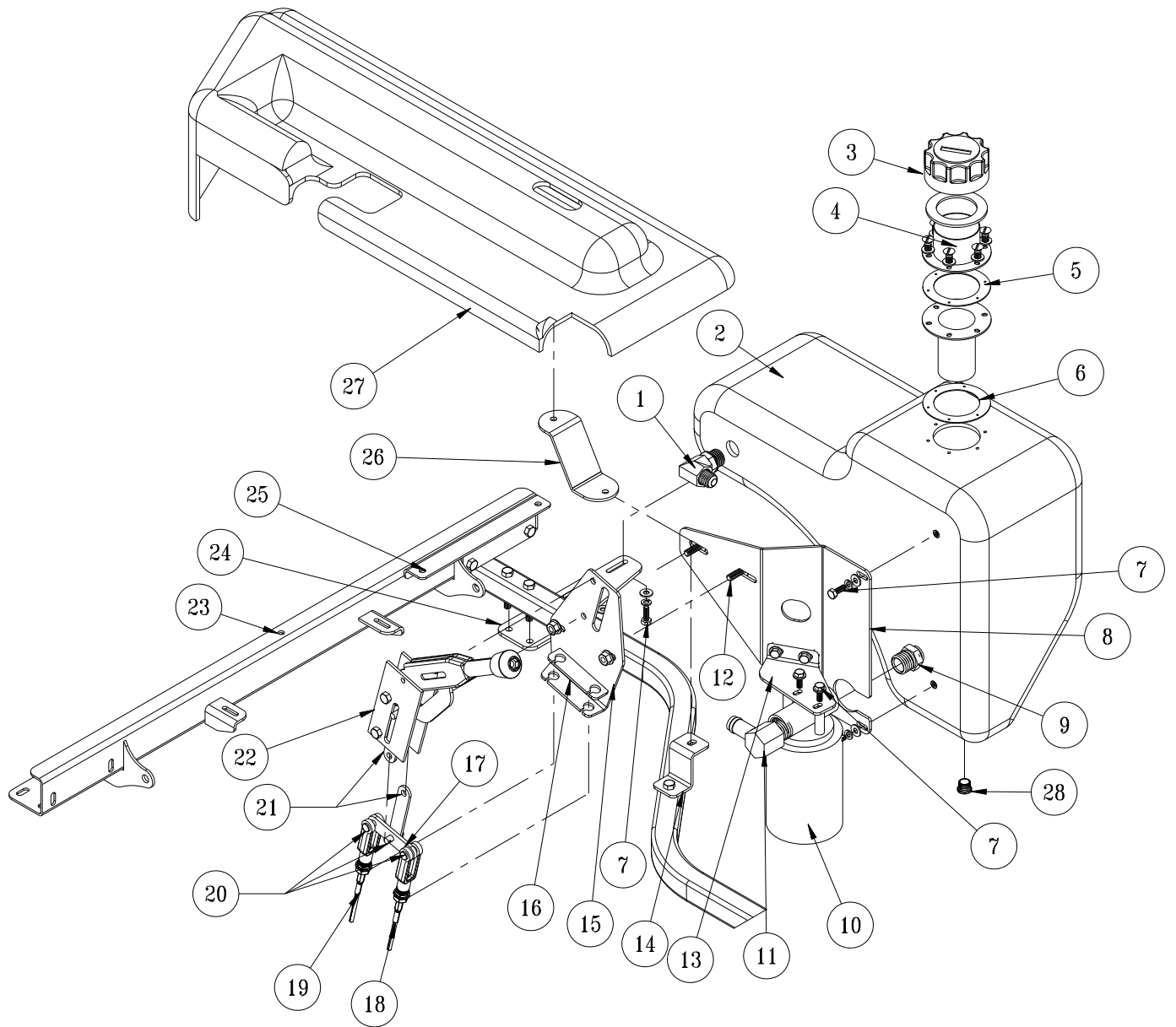
Parts

# FUEL TANK PARTS LIST

| REF# | PART#           | DESCRIPTION                                                           | QUANTITY |
|------|-----------------|-----------------------------------------------------------------------|----------|
| 1*   | 26-055          | Shut-Off Valve                                                        | 1        |
| 2*   | 26-054          | Bushing Insert                                                        | 1        |
| 3    | 42-833          | Fuel Tank (includes all * items)                                      | 1        |
| 4*   | 42-814-02       | Cap                                                                   | 1        |
|      | 42-814-01       | Tether                                                                | 1        |
| 5*   | 42-814-05       | Vent Check Valve                                                      | 1        |
| 6    | HBFL-516-18-075 | Flange Whiz-Loc Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$             | 2        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                              | 2        |
| 7    | 45-123          | Rake Holder                                                           | 1        |
| 8    | HB-516-18-200   | Hex Bolt, $\frac{5}{16}$ - 18 x 2                                     | 6        |
|      | HW-516          | Flat Washer, $\frac{5}{16}$                                           | 6        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                              | 6        |
| 9    | HB-516-18-075   | Hex Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$                         | 2        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                              | 2        |
| 10   | 45-086          | RH Rear Fender Bracket                                                | 1        |
| 11   | 45-082          | Seat Belt Brace                                                       | 1        |
| 12   | 13-729          | 2-Bank Hydraulic Valve                                                | 1        |
|      | 78-551          | Handles                                                               | 2        |
| 13   | 45-087          | RH Fender Support                                                     | 1        |
| 14   | HB-516-18-200   | Hex Bolt, $\frac{5}{16}$ - 18 x 2                                     | 2        |
| 15   | 45-061          | Upper Valve Mount                                                     | 1.       |
| 16   | 45-062          | Lower Valve Mount                                                     | 1        |
| 17   | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                              | 2        |
| 18   | 8-688           | Carbon Canister Mount                                                 | 1        |
|      | HSTP-516-18-075 | Phillips Machine Screw, $\frac{5}{16}$ - 18 x $\frac{3}{4}$           | 2        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                              | 2        |
| 19   | 8-738           | Carbon Canister                                                       | 1        |
| 20   | HB-14-20-075    | Hex Bolt, $\frac{1}{4}$ - 20 x $\frac{3}{4}$                          | 2        |
|      | HW-14           | Flat Washer, $\frac{1}{4}$                                            | 2        |
|      | HWL-14          | Lock Washer, $\frac{1}{4}$                                            | 2        |
| 21   | 45-053          | RH Tank Plate                                                         | 1        |
| 22   | 45-178          | RH Tank Mount                                                         | 1        |
| 23*  | 42-814-04       | Top Draw                                                              | 1        |
| 24*  | 42-814-03       | Fuel Level Gauge                                                      | 1        |
| A    | 8800-18         | $\frac{1}{4}$ " Fuel Hose x 18" (Vent Check Valve to Carbon Canister) | 1        |
| B    | 8800-48         | $\frac{1}{4}$ " Fuel Hose x 48" (Top Draw to Fuel Filter To Engine)   | 1        |
|      | 18-186          | Hose Clamp                                                            | 2        |
|      | 9024            | Clamp Cover                                                           | 1        |
| C    | 9025-34         | $\frac{5}{16}$ " Fuel Hose x 34" (Carbon Canister to engine)          | 1        |
| NS   | 42-814-06       | Rollover Valve Grommet                                                |          |
|      | 42-814-07       | Top Draw Grommet                                                      |          |
|      | 20-692-03       | Gauge Grommet                                                         |          |

# OIL TANK DRAWING

Parts

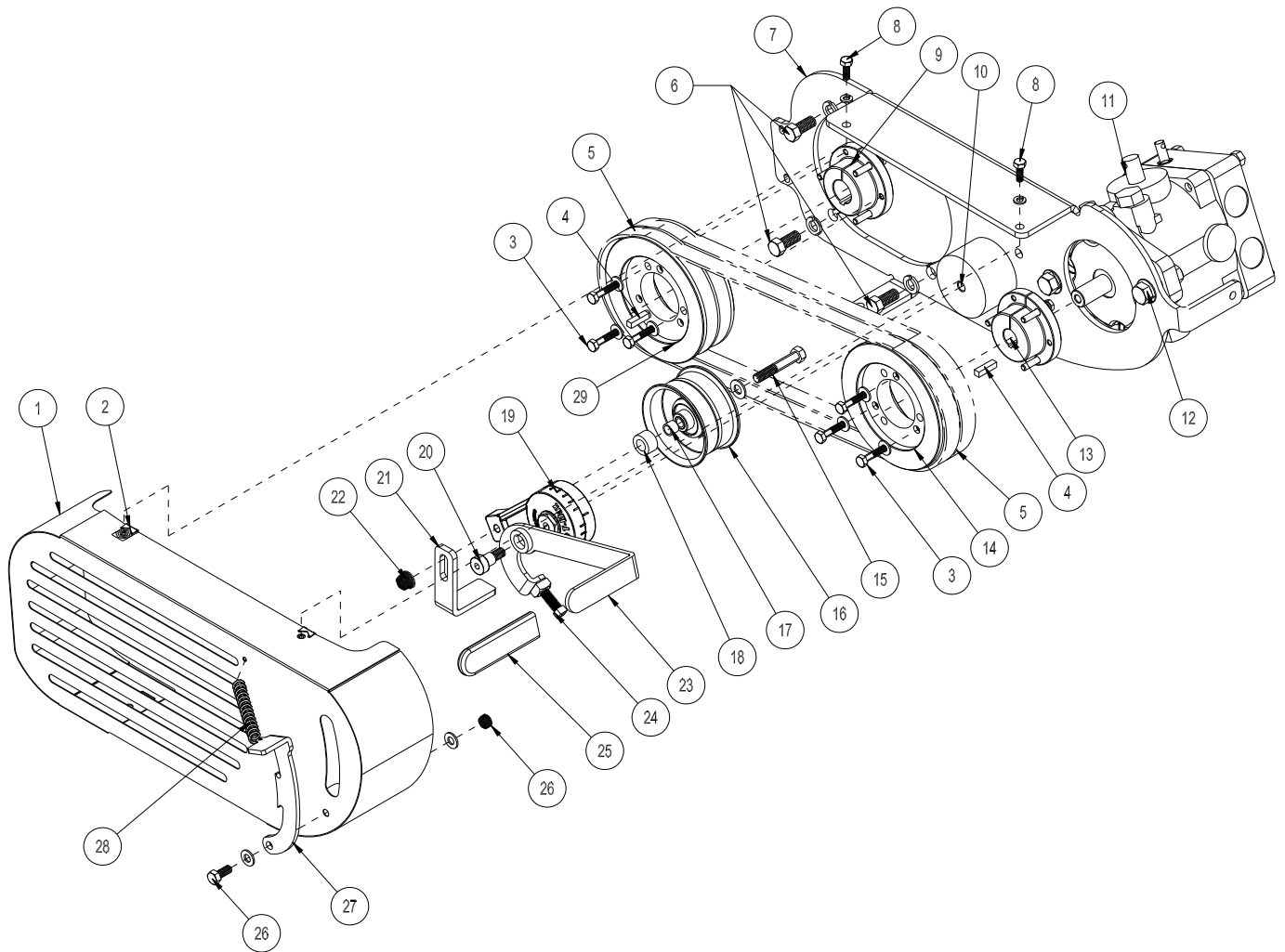




# OIL TANK PARTS LIST

| REF# | PART#         | DESCRIPTION                    | QUANTITY |
|------|---------------|--------------------------------|----------|
| 1    | 23-189        | 90° Adjustable Elbow           | 1        |
| 2    | 42-005        | Oil Tank                       | 1        |
| 3    | 13-747        | Filler Breather                | 1        |
| 5    | 13-586-01     | Cap Gasket                     | 1        |
| 4    | 13-586-03     | Neck                           | 1        |
|      | HSM-8-32-050  | Machine Screw, #8 - 32 x 1/2   | 6        |
|      | HWS-8         | Star Washer, #8                | 6        |
| 6    | 13-586-02     | Bottom Gasket                  | 1        |
| 7    | HB-14-20-075  | Hex Bolt, 1/4 - 20 x 3/4       | 6        |
|      | HW-14         | Flat Washer, 1/4               | 6        |
|      | HWL-14        | Lock Washer, 1/4               | 6        |
| 8    | 45-054        | LH Tank Plate                  | 1        |
| 9    | 18-459        | O-ring Fitting                 | 1        |
| 10   | 23-006        | Oil Filter                     | 1        |
|      | 23-031        | Replacement Filter Element     | 1        |
| 11   | 18-460        | 90° Barb Fitting               | 1        |
| 12   | HB-516-18-200 | Hex Bolt, 5/16 - 18 x 2        | 2        |
|      | HW-516        | Flat Washer, 5/16              | 2        |
|      | HNFL-516-18   | Flange Whiz-Loc Nut, 5/16 - 18 | 2        |
| 13   | 45-056        | Oil Filter Brace               | 1        |
|      | HB-14-20-075  | Hex Bolt, 1/4 - 20 x 3/4       | 2        |
|      | HW-14         | Flat Washer, 1/4               | 2        |
|      | HNFL-14-20    | Flange Whiz-Loc Nut, 1/4 - 20  | 2        |
| 14   | 45-105        | LH Front Fender Mount          | 1        |
|      | HB-516-18-200 | Hex Bolt, 5/16 - 18 x 2        | 1        |
|      | HNFL-516-18   | Flange Whiz-Loc Nut, 5/16 - 18 | 1        |
| 15   | 45-057        | Park Brake Mount               | 1        |
| 16   | 45-070        | Cable Mount Spacer             | 1        |
| 17   | 45-075        | Equalizer Link                 | 1        |
| 18   | 45-108        | Brake Cable (to RH brake)      | 1        |
| 19   | 45-107        | Brake Cable (to LH Brake)      | 1        |
| 20   | HCP-516-100   | Clevis Pin, 5/16 x 1           | 3        |
|      | HP-18-075     | Cotter Pin, 1/8 x 3/4          | 3        |
| 21   | 45-074        | Park Brake Link                | 2        |
| 22   | 60-106        | Park Brake Lever               | 1        |
| 23   | 45-082        | Brace Plate                    | 1        |
| 24   | 45-178        | LH Tank Mount                  | 1        |
|      | HB-516-18-175 | Hex Bolt, 5/16 - 18 x 1 3/4    | 2        |
|      | HW-516        | Flat Washer, 5/16              | 2        |
|      | HNFL-516-18   | Flange Whiz-Loc Nut, 5/16 - 18 | 2        |
| 25   | 45-113        | LH Rear Fender Mount           | 1        |
| 26   | 45-384        | LH Front Fender Brace          | 1        |
| 27   | 45-044        | LH Front Fender                | 1        |
| 28   | 23-126        | #6 Plug                        | 1        |

# BELTS AND PULLEYS DRAWING

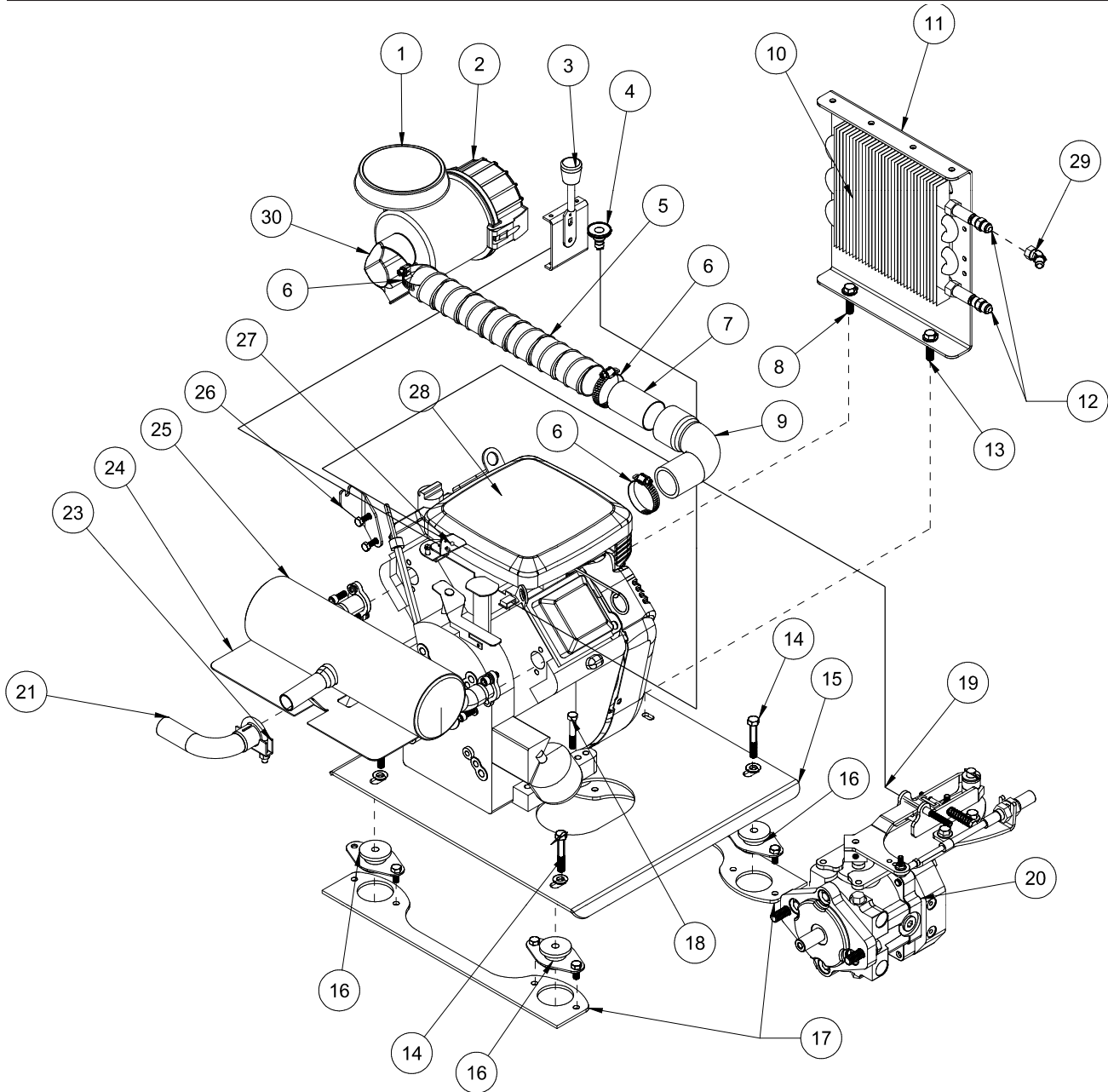


Parts

## BELTS AND PULLEYS PARTS LIST

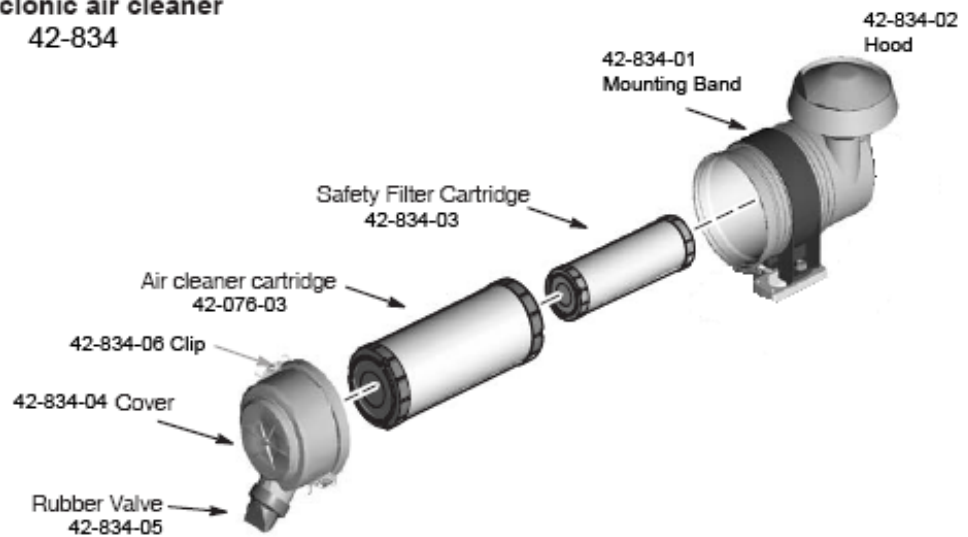
| REF# | PART#          | DESCRIPTION                                                   | QUANTITY |
|------|----------------|---------------------------------------------------------------|----------|
| 1    | 42-353         | Belt Guard                                                    | 1        |
| 2    | 78-274         | Cage Nut                                                      | 3        |
| 3    | HB-14-20-125   | Hex Bolt, $\frac{1}{4}$ - 20 x $1\frac{1}{4}$                 | 6        |
|      | HW-14          | Lock Washer, $\frac{1}{4}$                                    | 6        |
| 4    | HKSQ-14-150    | Machine Key, $\frac{1}{4}$ x $\frac{1}{4}$ x $1\frac{1}{2}$   | 2        |
| 5    | 42-359         | Belt                                                          | 2        |
| 6    | HB-716-14-100  | Hex Bolt, $\frac{7}{16}$ - 14 x 1                             | 4        |
|      | HWL-716        | Lock Washer, $\frac{7}{16}$                                   | 4        |
| 7    | 45-045         | Pump Mount                                                    | 1        |
| 8    | HB-14-20-075   | Hex Bolt, $\frac{1}{4}$ -20 x $\frac{3}{4}$                   | 3        |
|      | HWL-14         | Lock Washer, $\frac{1}{4}$                                    | 3        |
| 9    | 42-245         | Hub, 1"                                                       | 1        |
| 10   | 42-361         | Tensioner Spacer                                              | 1        |
|      | HB-38-16-275   | Hex Bolt, $\frac{3}{8}$ -16 x $2\frac{3}{4}$                  | 1        |
|      | HWL-38         | Lock Washer, $\frac{3}{8}$                                    | 1        |
| 11   | 45-373         | Pump                                                          | 1        |
| 12   | HB-12-13-175   | Socket Screw, $\frac{1}{2}$ - 13 x $1\frac{3}{4}$             | 2        |
|      | HNTL-12-13     | Nylon Lock Nut, $\frac{1}{2}$ - 13                            | 2        |
| 13   | 45-376         | Hub, $\frac{3}{4}$ "                                          | 1        |
| 14   | 45-374         | Pulley, 6"                                                    | 1        |
| 15   | HB-38-16-275   | Hex Bolt, $\frac{3}{8}$ -16 x $2\frac{3}{4}$                  | 1        |
|      | HW-38          | Flat Washer, $\frac{3}{8}$                                    | 1        |
| 16   | 42-358         | Idler Pulley                                                  | 1        |
| 17   |                | Oilite Bushing Part of Idler Pulley                           | 1        |
| 18   | 16-990         | Spacer                                                        | 1        |
| 19   | 42-327         | Tensioner                                                     | 1        |
| 20   | 42-352         | Hex Socket Head shoulder Screw                                | 1        |
| 21   | 42-357         | Belt Stop                                                     | 1        |
| 22   | HNFL-38-16     | Flange Whiz-Loc Nut, $\frac{3}{8}$ -16                        | 1        |
| 23   | 42-355         | Clutch Handle                                                 | 1        |
| 24   | HSSQ-38-16-150 | Socket Head Square Screw, $\frac{3}{8}$ - 16 x $1\frac{1}{2}$ | 1        |
|      | HN-38-16       | Hex Nut, $\frac{3}{8}$ - 16                                   | 1        |
| 25   | 15-020         | Grip                                                          | 1        |
| 26   | HB-516-18-075  | Hex Bolt, $\frac{5}{16}$ -18 x $\frac{3}{4}$                  | 1        |
|      | HW-516         | Flat Washer, $\frac{5}{16}$                                   | 1        |
|      | HNTL-516-18    | Nylon Lock Nut, $\frac{5}{16}$ -18                            | 1        |
| 27   | 42-356         | Lock Handle                                                   | 1        |
| 28   | 16-046         | Spring                                                        | 1        |
| 29   | 45-375         | Pulley, 5"                                                    | 1        |

# 16HP ENGINE DRAWING



Parts

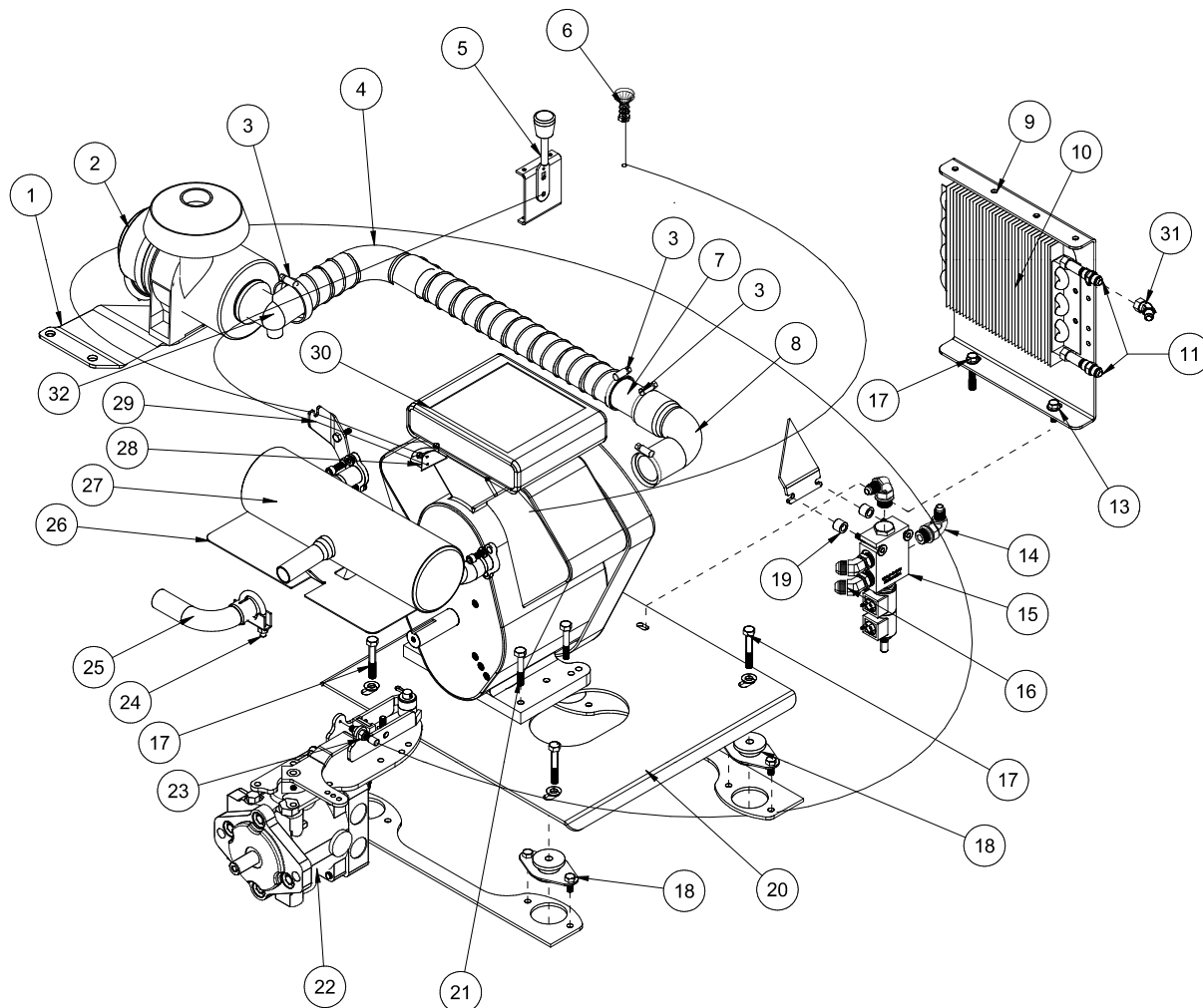
**Cyclonic air cleaner  
42-834**



# 16HP ENGINE PARTS LIST

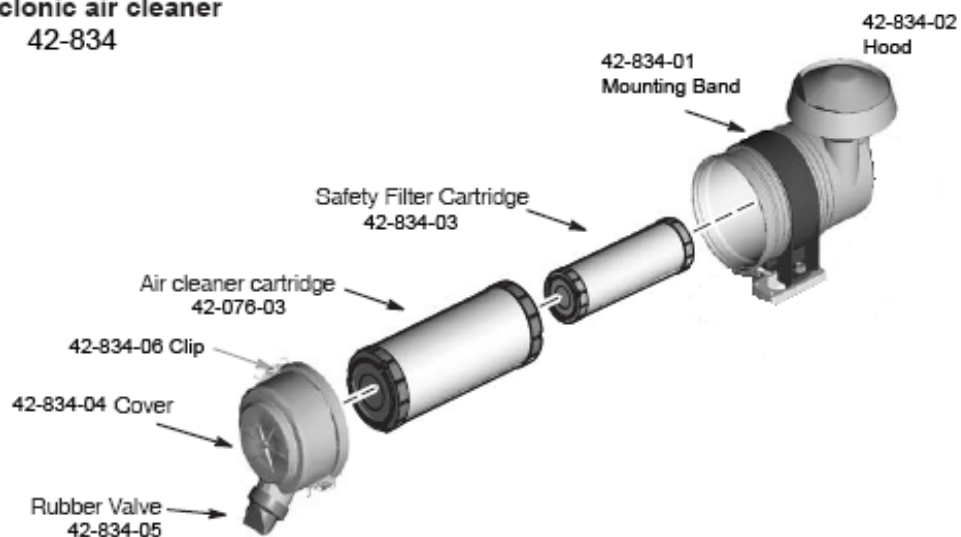
| REF # | PART #        | DESCRIPTION                                   | QUANTITY |
|-------|---------------|-----------------------------------------------|----------|
| 1     | 42-834-02     | Air Cleaner Hood                              | 1        |
| 2     | 42-834        | Air Cleaner                                   | 1        |
|       | 42-076-03     | Replacement Filter                            |          |
|       | 43-834-03     | Safety Filter                                 |          |
| 3     | 45-118        | Throttle Cable                                | 1        |
| 4     | 80-020        | Choke Cable                                   | 1        |
| 5     | 8959-26       | Flex Hose x 26"                               | 1        |
| 6     | 18-116        | Hose Clamp                                    | 4        |
| 7     | 42-776        | Air Cleaner Hose Sleeve                       | 1        |
| 8     | HB-516-18-150 | Hex Bolt, $\frac{5}{16}$ -18- $1\frac{1}{2}$  | 1        |
|       | HW-516        | Flat Washer, $\frac{5}{16}$                   | 1        |
|       | HNFL-516-18   | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18      | 1        |
| 9     | 27-113        | Rubber Elbow                                  | 1        |
| 10    | 45-382        | Cooler                                        | 1        |
| 11    | 45-383        | Cooler Mount                                  | 1        |
| 12    | 18-410        | Connector                                     | 2        |
| 13    | HB-516-18-075 | Hex Bolt, $\frac{5}{16}$ -18- $\frac{3}{4}$   | 1        |
|       | HW-516        | Flat Washer, $\frac{5}{16}$                   | 1        |
|       | HNFL-516-18   | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18      | 1        |
| 14    | HB-38-16-225  | Hex Bolt, $\frac{3}{8}$ - 16 x $2\frac{1}{4}$ | 4        |
|       | HW-38         | Flat Washer, $\frac{3}{8}$                    | 4        |
|       | HNFL-38-16    | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 16       | 4        |
| 15    | 45-046        | Engine Plate                                  | 1        |
| 16    | 20-618        | Rubber Insulators                             | 4        |
|       | HB-516-18-075 | Hex Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$ | 8        |
|       | HNFL-516-18   | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18      | 8        |
| 17    |               | Part of Main Frame                            |          |
| 18    | HB-516-18-175 | Hex Bolt, $\frac{5}{16}$ -18 x $1\frac{3}{4}$ | 4        |
|       | HNFL-516-18   | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18      | 4        |
| 19    | 17-151        | Cable                                         | 1        |
|       | 17-624        | Conduit w/ retainers                          | 1        |
| 20    | 45-373        | Piston Pump                                   | 1        |
| 21    | 45-162        | Tail Pipe                                     | 1        |
| 23    | 45-161        | Clamp                                         | 1        |
| 24    | 42-601        | Heat Shield                                   | 1        |
|       | HB-716-14-100 | Hex Bolt, $\frac{7}{16}$ - 14 x 1             | 4        |
|       | HWL-716       | Lock Washer, $\frac{7}{16}$                   | 4        |
| 25    | 45-158        | Muffler                                       | 1        |
|       | 18-222        | Hose Clamp                                    | 2        |
| 26    | 45-077        | Cable Bracket                                 | 1        |
| 27    | 45-111        | Throttle Adapter                              | 1        |
|       | 21-161        | Wire Block                                    | 1        |
| 28    | 15-165        | Engine B&S 16HP                               | 1        |
|       | 18-462        | Drain Valve                                   | 1        |
| 29    | 18-214        | 45° Elbow                                     | 1        |

# 18HP ENGINE DRAWING



Parts

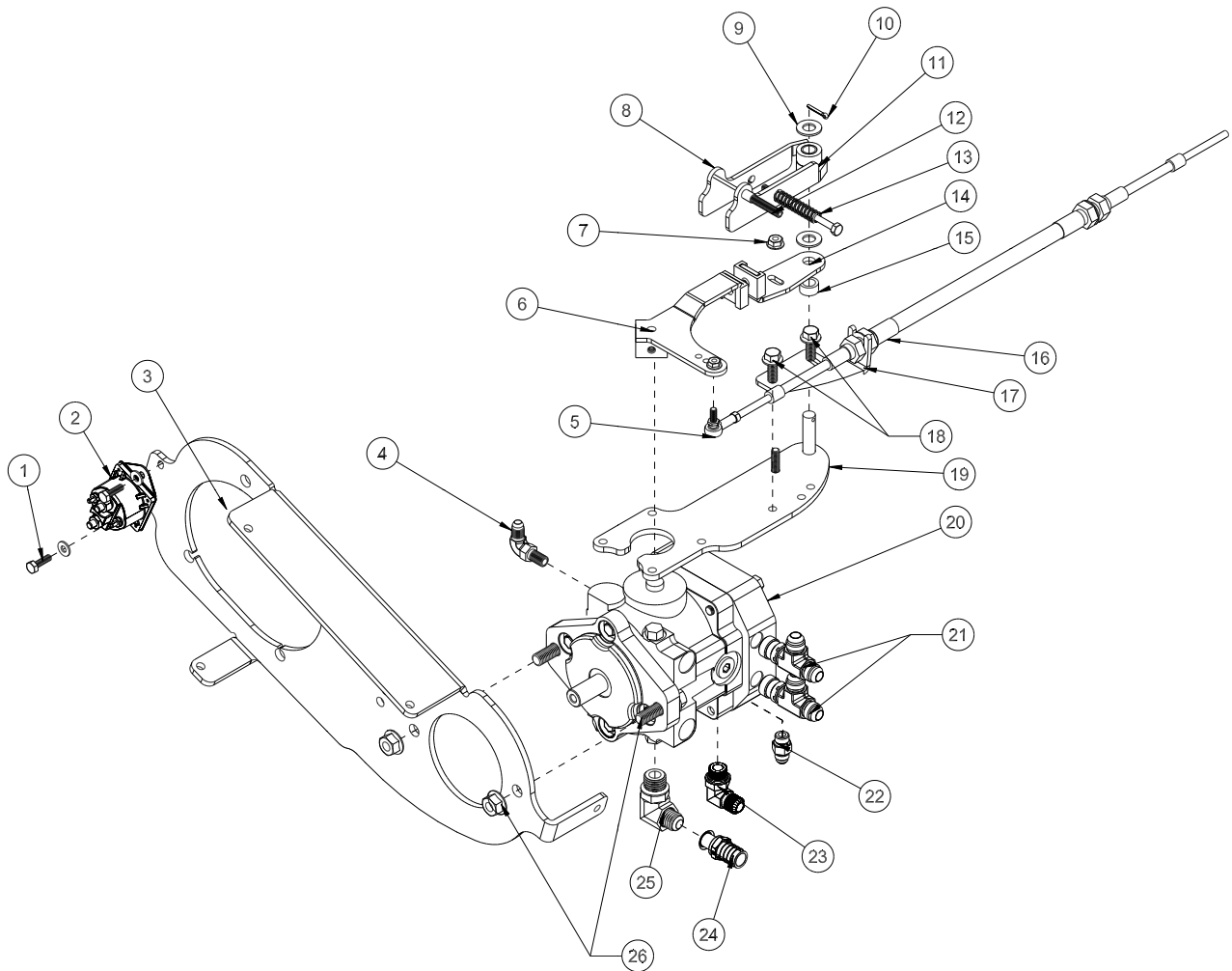
## Cyclonic air cleaner 42-834



# 18HP ENGINE PARTS LIST

| REF # | PART #        | DESCRIPTION                                    | QUANTITY |
|-------|---------------|------------------------------------------------|----------|
| 1     | 45-058        | Air Filter Mount                               | 1        |
| 2     | 42-834        | Air Cleaner                                    | 1        |
|       | 42-076-03     | Replacement Filter                             | 1        |
|       | 42-834-03     | Safety Filter                                  | 1        |
| 3     | 18-116        | Hose Clamp                                     | 4        |
| 4     | 8959-26       | Flex Hose x 26"                                | 1        |
| 5     | 45-118        | Throttle Cable                                 | 1        |
| 6     | 80-020        | Choke Cable                                    | 1        |
| 7     | 42-776        | Air Cleaner Hose Sleeve                        | 1        |
| 8     | 27-113        | Rubber Elbow                                   | 1        |
| 9     | 45-383        | Cooler Mount                                   | 1        |
| 10    | 45-382        | Cooler                                         | 1        |
| 11    | 18-410        | Adapter                                        | 2        |
| 13    | HB-516-18-075 | Hex Bolt, $\frac{5}{16}$ - 18 - $\frac{3}{4}$  | 1        |
|       | HW-516        | Flat Washer, $\frac{5}{16}$                    | 1        |
|       | HNFL-516-18   | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18       | 1        |
| 14    | 18-185        | 90° O-ring Fittings                            | 2        |
| 15    | 42-118        | Electric On/Off Valve                          | 1        |
|       | 42-118-01     | Coil                                           | 1        |
| 16    | 18-266        | 45° O-ring Fittings                            | 2        |
| 17    | HB-38-16-225  | Hex Bolt, $\frac{3}{8}$ - 16 x $2\frac{1}{4}$  | 4        |
|       | HW-38         | Flat Washer, $\frac{3}{8}$                     | 4        |
|       | HNTL-38-16    | Nylon Lock Nut, $\frac{3}{8}$ - 16             | 4        |
| 18    | 20-618        | Rubber Insulators                              | 4        |
|       | HB-516-18-075 | Hex Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$  | 8        |
|       | HNFL-516-18   | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18       | 8        |
| 20    | 45-046        | Engine Plate                                   | 1        |
| 21    | HB-516-18-175 | Hex Bolt, $\frac{5}{16}$ - 18 x $1\frac{3}{4}$ | 4        |
|       | HNFL-516-18   | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18       | 4        |
| 22    | 45-373        | Pump                                           | 1        |
| 23    | 17-151        | Cable                                          | 1        |
|       | 17-624        | Conduit                                        | 1        |
| 24    | 45-161        | Clamp                                          | 1        |
| 25    | 45-162        | Tail Pipe                                      | 1        |
| 26    | 42-601        | Heat Shield                                    | 1        |
|       | HB-716-14-100 | Hex Bolt, $\frac{7}{16}$ - 14 x 1              | 4        |
|       | HWL-716       | Lock Washer, $\frac{7}{16}$                    | 4        |
| 27    | 45-158        | Muffler                                        | 1        |
|       | 18-222        | Hose Clamp                                     | 2        |
| 28    | 45-111        | Throttle Adapter                               | 1        |
|       | 21-161        | Wire Block                                     | 1        |
| 29    | 45-077        | Cable Bracket                                  | 1        |
| 30    | 43-024        | Engine B&S 18HP                                | 1        |
|       | 18-462        | Drain Valve                                    | 1        |
| 31    | 18-214        | 45° Elbow                                      | 1        |

# 3WD PUMP DRAWING



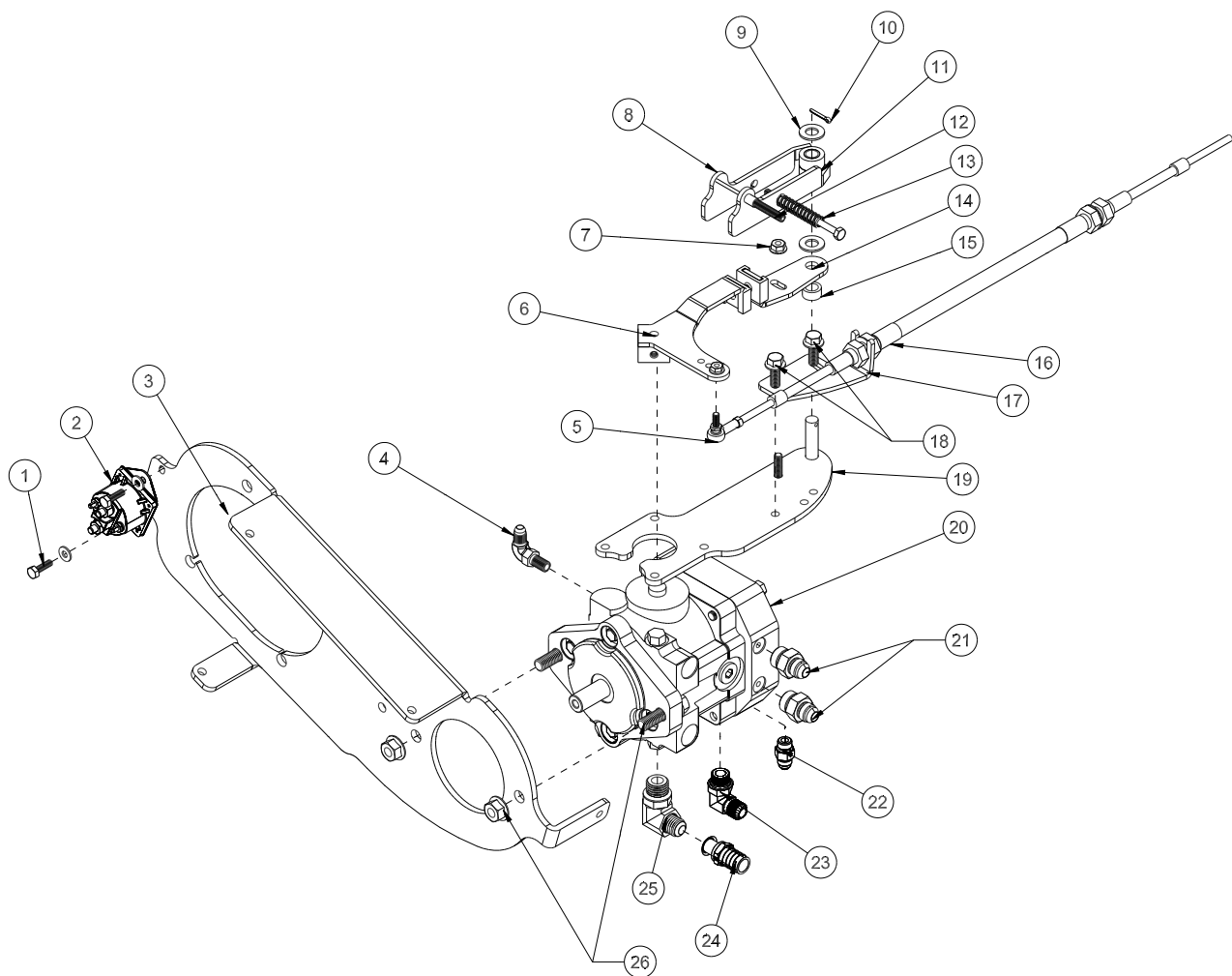
Parts



## 3WD PUMP PARTS LIST

| REF # | PART #         | DESCRIPTION                                       | QUANTITY |
|-------|----------------|---------------------------------------------------|----------|
| 1     | HB-14-20-075   | Hex Bolt, $\frac{1}{4}$ - 20 x $\frac{3}{4}$      | 2        |
|       | HW-14          | Flat Washer, $\frac{1}{4}$                        | 2        |
|       | HNFL-14-20     | Flange Whiz Nut, $\frac{1}{4}$ - 20               | 2        |
| 2     | 13-750         | Solenoid w/ Connector                             | 1        |
| 3     | 45-045         | Pump Mount                                        | 1        |
| 4     | 18-168         | Elbow, $\frac{3}{8}$ Straight Thread              | 1        |
| 5     | 8-701          | Ball Joint, $\frac{1}{4}$ NF                      | 1        |
|       | HN-14-28       | Hex Nut, $\frac{1}{4}$ - 28                       | 1        |
| 6     | 45-369         | Swash Arm                                         | 1        |
|       | 8946-1         | Wear Strip (part of 45-369)                       | 1        |
|       | HRS-316-050    | Rivet (part of 45-369)                            | 1        |
|       | HRW-316        | Rivet Washer                                      | 1        |
| 7     | HNFL-516-18    | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18          | 1        |
| 8     | 45-368         | Top Centering Arm                                 | 1        |
|       | 18-434         | Bushing (part of 45-368)                          | 1        |
| 9     | HMB-12-14      | Machine Bushing, $\frac{1}{2}$ x 14GA             | 2        |
| 10    | HP-332-075     | Cotter Pin, $\frac{3}{32}$ x $\frac{3}{4}$        | 1        |
| 11    | 45-367         | Bottom Centering Arm                              | 1        |
|       | 18-434         | Bushing (part of 45-367)                          | 1        |
| 12    | 17-151         | Cable                                             | 1        |
|       | 17-624         | Conduit                                           | 1        |
| 13    | 42-832         | Compression Spring                                | 1        |
|       | HB-14-20-400   | Hex Bolt, $\frac{1}{4}$ - 20 x 4                  | 1        |
|       | HNTL-14-20     | Nylon Lock Nut, $\frac{1}{4}$ - 20                | 1        |
|       | HW-14          | Flat Washer, $\frac{1}{2}$                        | 1        |
| 14    | 45-327         | Creep Arm                                         | 1        |
|       | 8946-1         | Wear Strip (part of 45-327)                       | 1        |
|       | HRS-316-050    | Rivet (part of 45-327)                            | 1        |
|       | HRW-316        | Rivet Washer                                      | 1        |
| 15    | 42-836         | Spacer                                            | 1        |
| 16    | 45-117         | Push Pull Cable                                   | 1        |
| 17    | 45-094         | Cable Bracket                                     | 1        |
| 18    | HB-38-16-100   | Hex Bolt, $\frac{3}{8}$ - 16 x 1                  | 2        |
|       | HNTL-38-16     | Nylon Lock Nut, $\frac{3}{8}$ - 16                | 2        |
| 19    | 45-370         | Control Mount                                     | 1        |
| 20    | 45-373         | Piston Pump                                       | 1        |
| 21    | 18-477         | Tee                                               | 2        |
| 22    | 18-169         | Adapter                                           | 1        |
| 23    | 18-174         | Straight Thread Elbow                             | 1        |
| 24    | 18-133         | Barb Fitting                                      | 1        |
| 25    | 23-127         | Elbow                                             | 1        |
| 26    | HSSH-12-13-175 | Socket Screw, $\frac{1}{2}$ - 13 x $1\frac{3}{4}$ | 2        |
|       | HNFL-12-13     | Flange Whiz-Loc Nut, $\frac{1}{2}$ - 13           | 2        |

## 2WD PUMP DRAWING

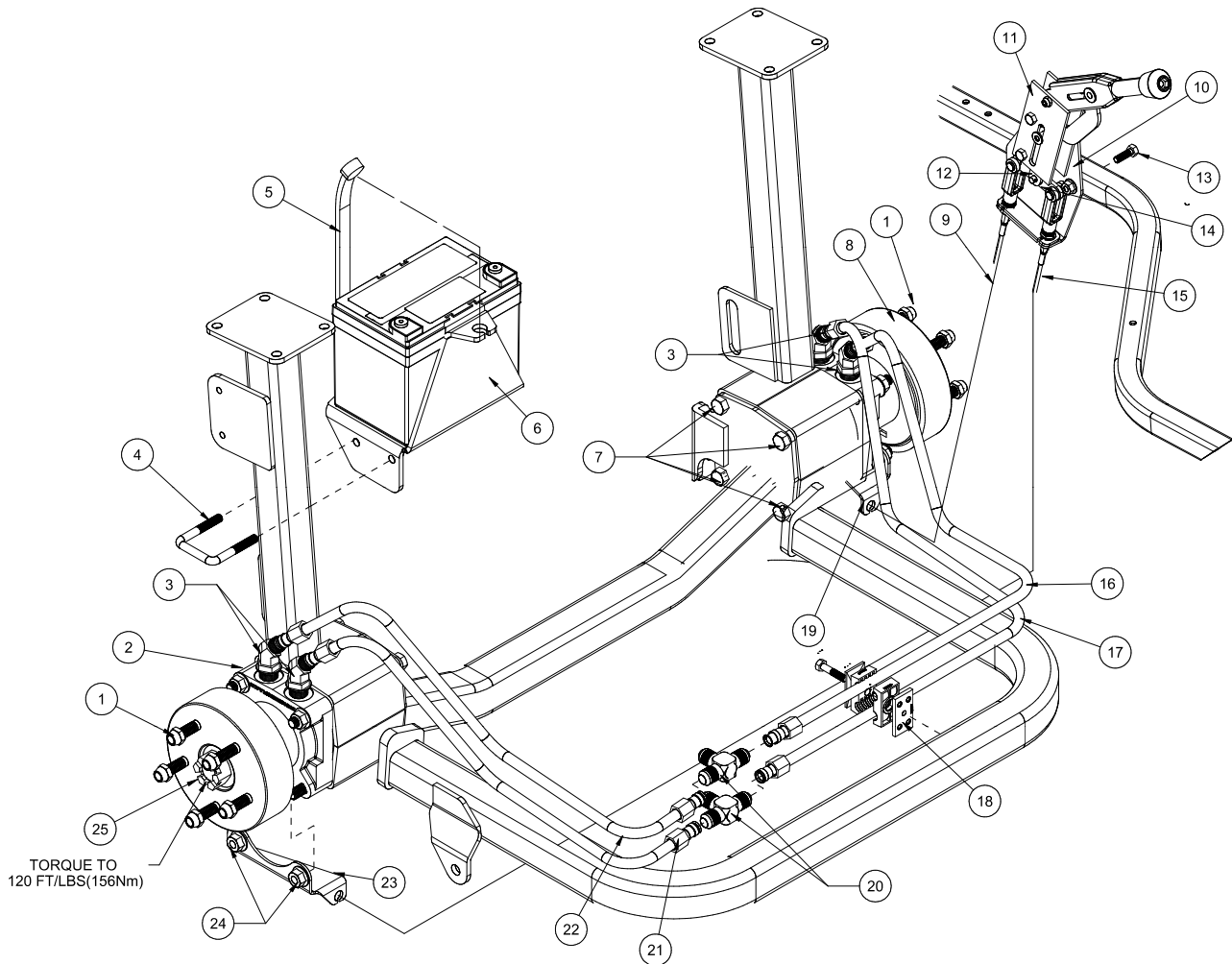


Parts

## 2WD PUMP PARTS LIST

| REF # | PART #         | DESCRIPTION                                       | QUANTITY |
|-------|----------------|---------------------------------------------------|----------|
| 1     | HB-14-20-075   | Hex Bolt, $\frac{1}{4}$ - 20 x $\frac{3}{4}$      | 2        |
|       | HW-14          | Flat Washer, $\frac{1}{4}$                        | 2        |
|       | HNFL-14-20     | Flange Whiz Nut, $\frac{1}{4}$ - 20               | 2        |
| 2     | 13-750         | Solenoid w/ Connector                             | 1        |
| 3     | 45-045         | Pump Mount                                        | 1        |
| 4     | 18-168         | Elbow $\frac{3}{8}$ Straight Thread               | 1        |
| 5     | 8-701          | Ball Joint, $\frac{1}{4}$ NF                      | 1        |
|       | HN-14-28       | Hex Nut, $\frac{1}{4}$ - 28                       | 1        |
| 6     | 45-369         | Swash Arm                                         | 1        |
|       | 8946-1         | Wear Strip (part of 45-369)                       | 1        |
|       | HRS-316-050    | Rivet (part of 45-369)                            | 1        |
|       | HRW-316        | Rivet Washer                                      | 1        |
| 7     | HNFL-516-18    | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18          | 1        |
| 8     | 45-368         | Top Centering Arm                                 | 1        |
|       | 18-434         | Bushing (part of 45-368)                          | 1        |
| 9     | HMB-12-14      | Machine Bushing, $\frac{1}{2}$ x 14GA             | 2        |
| 10    | HP-18-075      | Cotter Pin, $\frac{1}{8}$ x $\frac{3}{4}$         | 1        |
| 11    | 45-367         | Bottom Centering Arm                              | 1        |
|       | 18-434         | Bushing (part of 45-367)                          | 1        |
| 12    | 17-151         | Cable                                             | 1        |
|       | 17-624         | Conduit                                           | 1        |
| 13    | 42-832         | Compression Spring                                | 1        |
|       | HB-14-20-400   | Hex Bolt, $\frac{1}{4}$ - 20 x 4                  | 1        |
|       | HNTL-14-20     | Nylon Lock Nut, $\frac{1}{4}$ - 20                | 1        |
|       | HW-14          | Flat Washer, $\frac{1}{2}$                        | 1        |
| 14    | 45-327         | Creep Arm                                         | 1        |
|       | 8946-1         | Wear Strip (part of 45-327)                       | 1        |
|       | HRS-316-050    | Rivet (part of 45-327)                            | 1        |
|       | HRW-316        | Rivet Washer                                      | 1        |
| 15    | 42-836         | Spacer                                            | 1        |
| 16    | 45-117         | Push Pull Cable                                   | 1        |
| 17    | 45-094         | Cable Bracket                                     | 1        |
| 18    | HB-38-16-100   | Hex Bolt, $\frac{3}{8}$ - 16 x 1                  | 2        |
|       | HNTL-38-16     | Nylon Lock Nut, $\frac{3}{8}$ - 16                | 2        |
| 19    | 45-370         | Control Mount                                     | 1        |
| 20    | 45-373         | Piston Pump                                       | 1        |
| 21    | 18-343         | Adapter                                           | 2        |
| 22    | 18-169         | Adapter                                           | 1        |
| 23    | 18-174         | Straight Thread Elbow                             | 1        |
| 24    | 18-133         | Barb Fitting                                      | 1        |
| 25    | 23-127         | Elbow                                             | 1        |
| 26    | HSSH-12-13-175 | Socket Screw, $\frac{1}{2}$ - 13 x $1\frac{3}{4}$ | 2        |
|       | HNFL-12-13     | Flange Whiz-Loc Nut, $\frac{1}{2}$ - 13           | 2        |

# REAR AXLE DRAWING

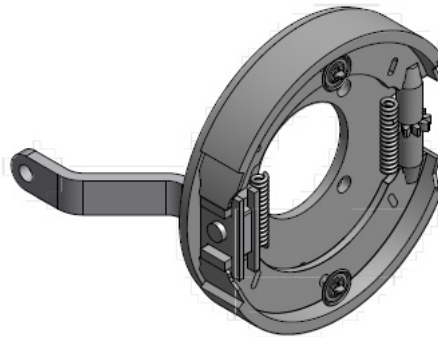


Parts

## REAR AXLE PARTS LIST

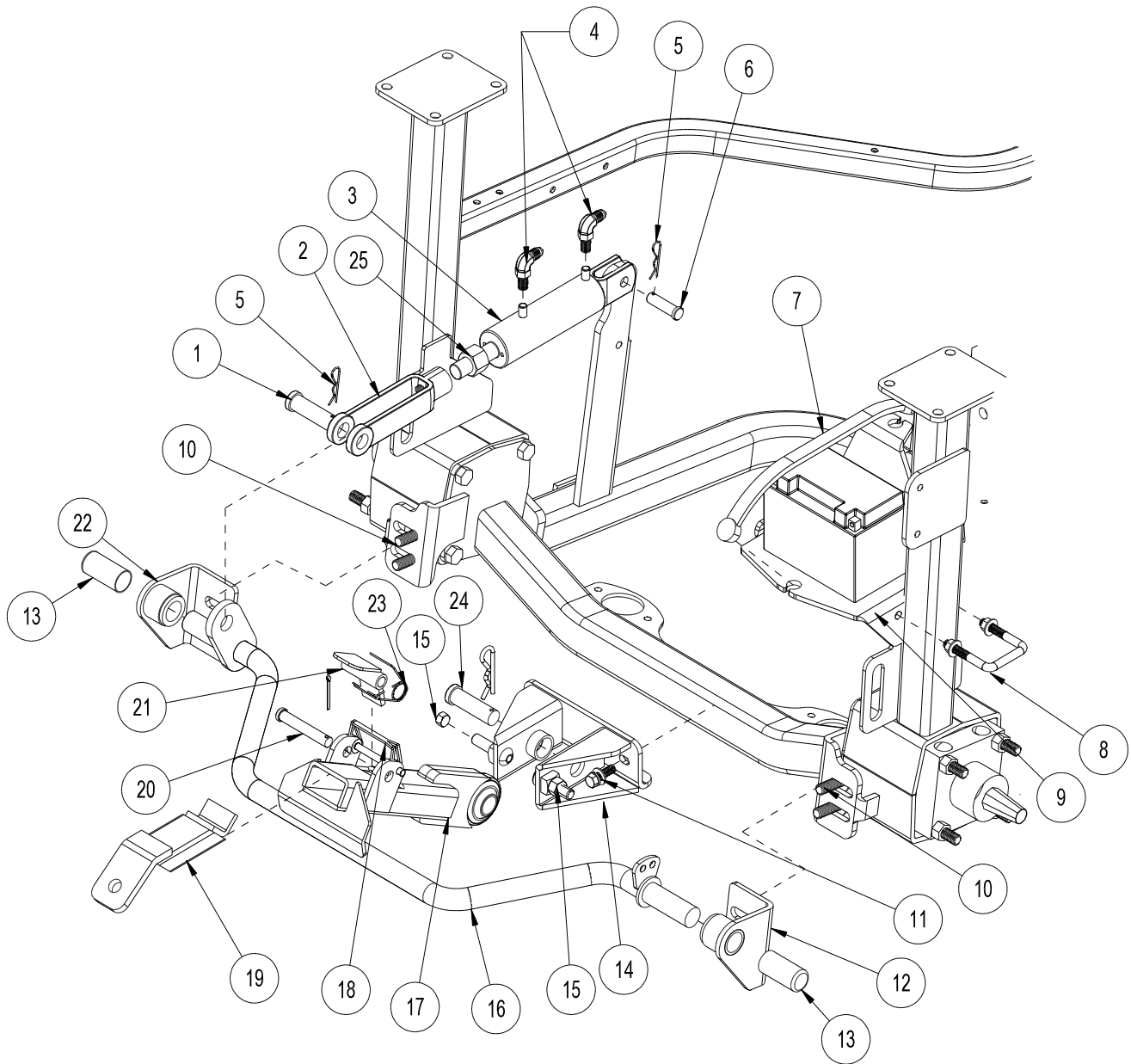
| REF# | PART#         | DESCRIPTION                      | QUANTITY |
|------|---------------|----------------------------------|----------|
| 1    | HNL-12-20     | Lug Nut, 1/2 - 20                | 10       |
|      | 45-065-01     | Wheel Stud                       | 10       |
| 2    | 45-065        | RH Brake Assembly w/ Wheel Motor | 1        |
| 3    | 18-383        | 45° Elbow                        | 4        |
| 4    | 17-537        | Square U-Hex Bolt                | 1        |
| 5    | 8-603         | Battery Strap                    | 1        |
| 6    | 45-059        | Battery Tray                     | 1        |
| 7    | HB-12-13-700  | Hex Bolt, 1/2 - 13 x 7           | 8        |
| 8    | 45-066        | LH Brake Assembly w/ Wheel Motor | 1        |
| 9    | 45-107        | LH Brake Cable                   | 1        |
| 10   | 45-057        | Park Brake Mount                 | 1        |
| 11   | 60-106        | Park Brake Lever                 | 1        |
| 12   | 45-074        | Park Brake Link                  | 2        |
| 13   | HB-516-18-100 | Hex Bolt, 5/16 - 18 x 1          | 2        |
|      | HW-516        | Flat Washer, 5/16                | 2        |
|      | HNFL-516-18   | Flange Whiz-Loc Nut, 5/16 - 18   | 2        |
| 14   | 45-075        | Equalizer                        | 1        |
|      | HCP-516-100   | Clevis Pin, 5/16 x 1             | 2        |
|      | HP-18-100     | Cotter Pin, 1/8 x 1              | 2        |
| 15   | 45-108        | RH Brake Cable                   | 1        |
| 16   | 45-039        | LH Upper Hydraulic Tube          | 1        |
| 17   | 45-038        | LH Lower Hydraulic Tube          | 1        |
| 18   | 45-069        | Twin Pipe Clamp                  | 1        |
| 19   | 45-080        | LH Brake Cable Mount             | 1        |
| 20   | 18-170        | Tee                              | 2        |
| 21   | 45-040        | RH Lower Hydraulic Tube          | 1        |
| 22   | 45-041        | RH Upper Hydraulic Tube          | 1        |
| 23   | 45-079        | RH Brake Cable Mount             | 1        |
| 24   | HNFL-12-13    | Flange Whiz-Loc Nut, 1/2 - 13    | 8        |
| 25   | 14-265        | Nut, 1-8 (part of wheel motor)   | 2        |

NS 43-241-01 Park Brake Assembly only (replacement part)



# REAR RAKE LIFT DRAWING

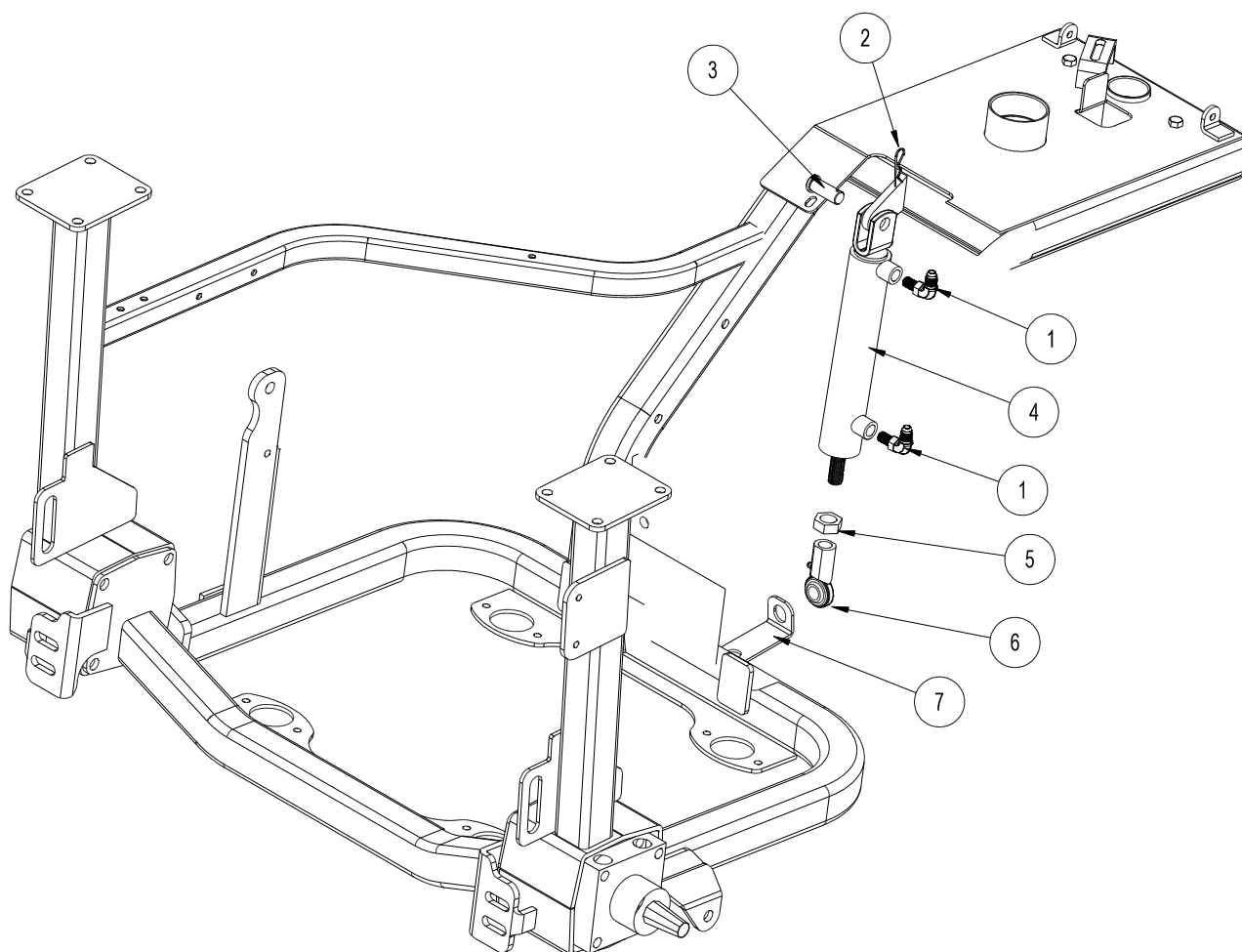
Parts



## REAR RAKE LIFT PARTS LIST

| REF# | PART#           | DESCRIPTION                                   | QUANTITY |
|------|-----------------|-----------------------------------------------|----------|
| 1    | HCP-34-200      | Clevis Pin, $\frac{3}{4}$ x 2                 | 1        |
| 2    | 42-040          | Lift Linkage                                  | 1        |
| 3    | 43-150          | Hydraulic Cylinder                            | 1        |
|      | 43-150-01       | Seal Kit                                      | 1        |
| 4    | 18-168          | 90° Elbow                                     | 2        |
| 5    | HHP-18          | Bridge Pin, $\frac{1}{8}$                     | 2        |
| 6    | HCP-12-150      | Clevis Pin, $\frac{1}{2}$ - $1\frac{1}{2}$    | 1        |
| 7    | 8-603           | Battery Strap                                 | 1        |
| 8    | 17-537          | Square U-Hex Bolt                             | 1        |
| 9    | 45-059          | Battery Tray                                  | 1        |
| 10   | HB-12-13-125    | Hex Bolt, $\frac{1}{2}$ - 12 x $1\frac{1}{4}$ | 4        |
|      | HW-12           | Flat Washer, $\frac{1}{2}$                    | 4        |
|      | HNFL-12-13      | Flange Whiz-Loc Nut, $\frac{1}{2}$ - 12       | 4        |
| 11   | HB-38-24-100    | Hex Bolt, $\frac{3}{8}$ - 24 x 1              | 2        |
|      | HW-38           | Flat Washer, $\frac{3}{8}$                    | 2        |
|      | HWL-38          | Lock Washer, $\frac{3}{8}$                    | 2        |
| 12   | 34-220          | Pivot Bracket - RH                            | 1        |
|      | 33-086          | Flange Bushing (part of 34-220)               | 1        |
|      | HG-14-28-180    | Grease Fitting, $\frac{1}{4}$ - 28 x 180°     | 1        |
| 13   | 15-019          | Rubber Grip                                   | 2        |
| 14   | 43-140          | Frame Mount                                   | 1        |
| 15   | HSSHB-12-13-200 | Button Socket Head Cap Screw                  | 2        |
|      | HN-12-13        | Nut, $\frac{1}{2}$ - 13                       | 2        |
|      | HNCL-12-13      | Center Nylon Lock Nut, $\frac{1}{2}$ - 13     | 2        |
| 16   | 45-114          | Lift Bar                                      | 1        |
| 17   | 43-141          | Lift Arm                                      | 1        |
| 18   | 25-382          | Lock Pin                                      | 1        |
| 19   | 43-143          | Towing Hitch                                  | 1        |
| 20   | HCP-12-350      | Clevis Pin, $\frac{1}{2}$ - $3\frac{1}{2}$    | 1        |
|      | HP-18-100       | Cotter Pin, $\frac{1}{8}$ x 1                 | 1        |
| 21   | 43-139          | Lock                                          | 1        |
| 22   | 34-219          | Pivot Bracket - LH                            | 1        |
|      | 33-086          | Flange Bushing (part of 34-219)               | 1        |
|      | HG-14-28-180    | Grease Fitting, $\frac{1}{4}$ - 28 x 180°     | 1        |
| 23   | 43-136          | Torsion Spring                                | 1        |
| 24   | HCP-78-350      | Clevis Pin, $\frac{7}{8}$ x $3\frac{1}{2}$    | 1        |
|      | HHP-.177        | Bridge Pin, .177 x $3\frac{3}{4}$             | 1        |
| 25   | HNJ-34-16       | Jam Nut, $\frac{3}{4}$ - 16                   | 1        |

# CENTER LIFT DRAWING

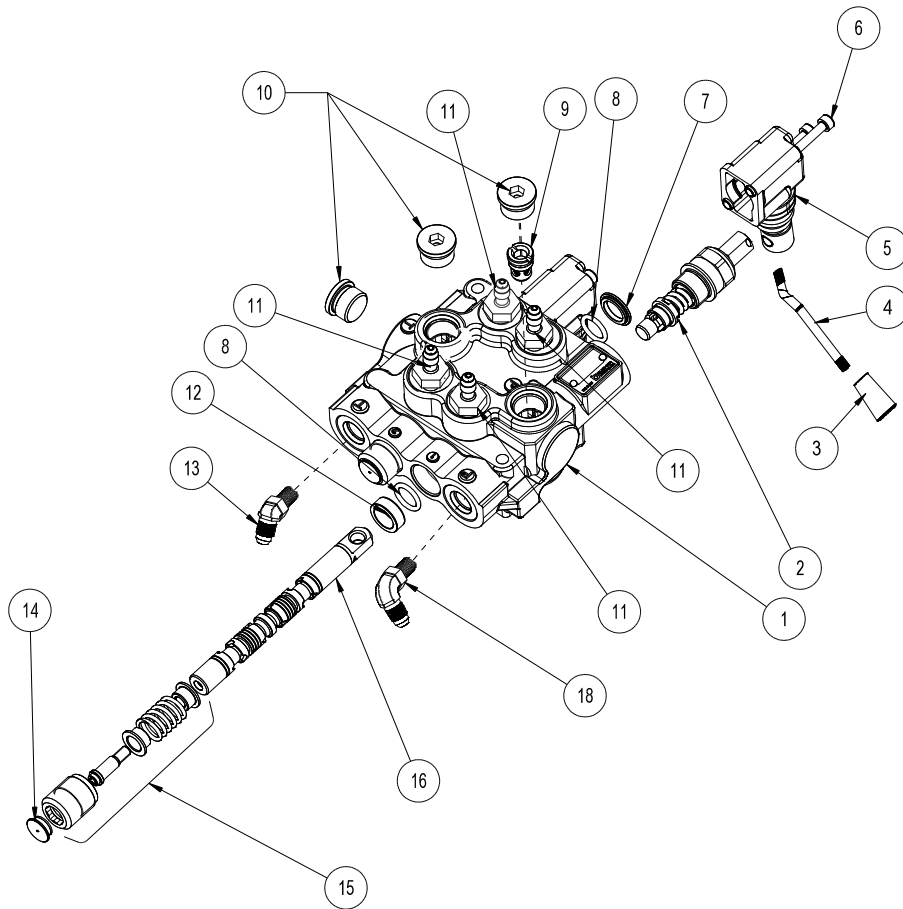


Parts

| REF# | PART #       | DESCRIPTION                                | QUANTITY |
|------|--------------|--------------------------------------------|----------|
| 1    | 18-168       | 90° Elbow                                  | 2        |
| 2    | HHP-18       | Bridge Pin, $\frac{1}{8}$                  | 1        |
| 3    | HCP-58-150   | Clevis Pin, $\frac{5}{8}$ - $1\frac{1}{2}$ | 1        |
| 4    | 10-554       | Hydraulic Cylinder                         | 1        |
|      | 14-529       | Seal Kit                                   | 1        |
| 5    | HNJ-58-18    | Jam Nut, $\frac{5}{8}$ - 18                | 1        |
| 6    | 18-154       | Rod End                                    | 1        |
|      | HG-14-28-180 | Grease Fitting, $\frac{1}{4}$ - 28 x 180°  | 1        |
| 7    | 45-153       | Center Ram Holder                          | 1        |



# 13-729 2-BANK HYDRAULIC VALVE



| REF # | PART #    | DESCRIPTION                                 | QUANTITY |
|-------|-----------|---------------------------------------------|----------|
| 1*    | 78-415-01 | Body (complete with spacer and check valve) | 1        |
| 2*    | 78-415-02 | Spool, HDM10                                | 1        |
| 3     | 78-417-01 | Tapered Knob                                | 2        |
| 4     | 78-551    | Offset Bent Handle                          | 2        |
| 5*    | 78-415-09 | Lever Group, HDS11                          | 2        |
| 6*    | 78-415-10 | Metric Socket Screw, M5 x .8 x 45           | 4        |
| 7*    | 78-415-04 | Flanged Washer, HDM10                       | 2        |
| 8*    | 78-415-03 | O-Ring Seal                                 | 4        |
| 9*    | 78-415-12 | Check Valve Assembly, HDM12                 | 1        |
| 10*   | 78-415-13 | 3/4 - 16 SAE 8 Screw Plug                   | 3        |
| 11    | 18-169    | Adapter, 1/4 - 3/8 SAE                      | 4        |
| 12*   | 78-415-05 | Spacer                                      | 2        |
| 13    | 18-188    | 45° Elbow                                   | 1        |
| 14*   | 78-415-08 | Plug                                        | 2        |
| 15    | 78-415-11 | Positioner                                  | 2        |
| 16*   | 78-415-06 | A Type Spool, HDS11                         | 2        |
| 18    | 18-168    | Elbow                                       | 1        |

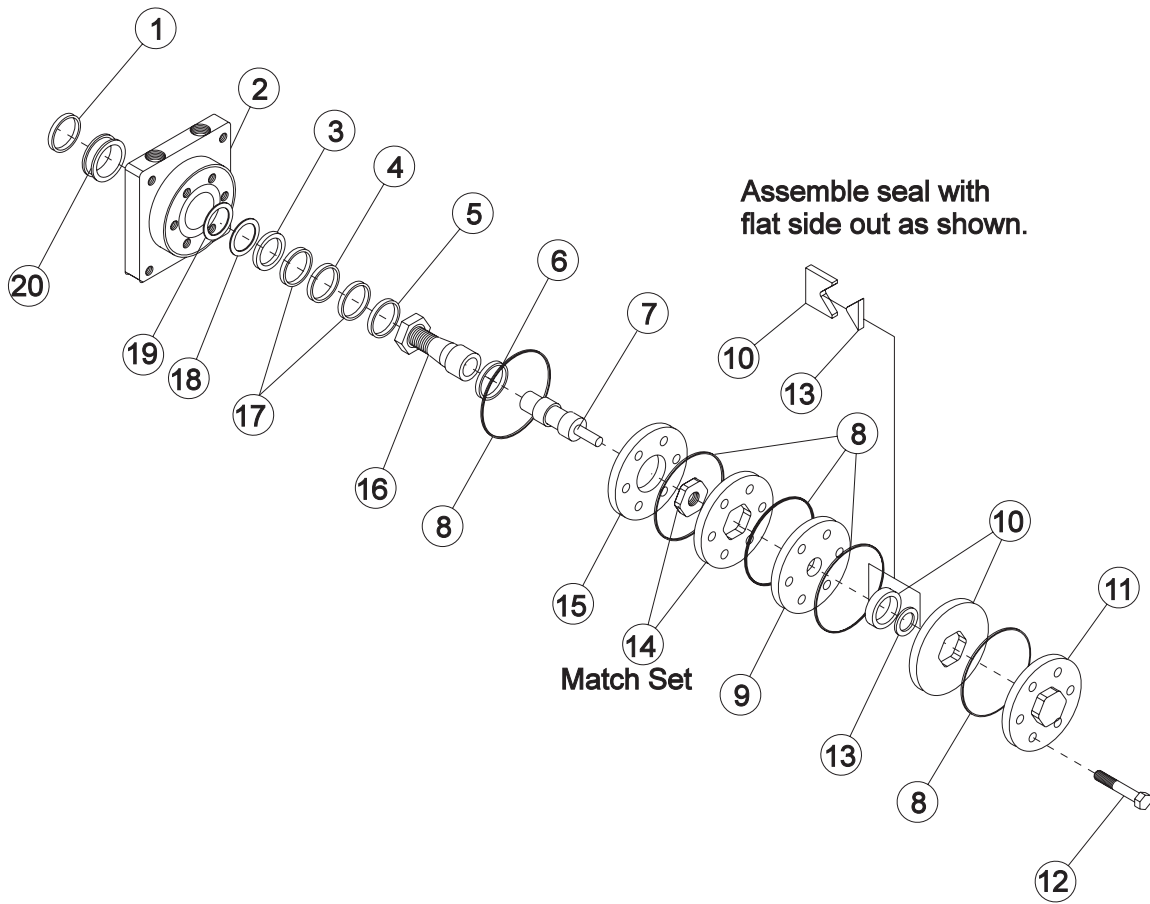
\*

13-729

2 – Bank Hydraulic Valve (includes all \* items)

Parts

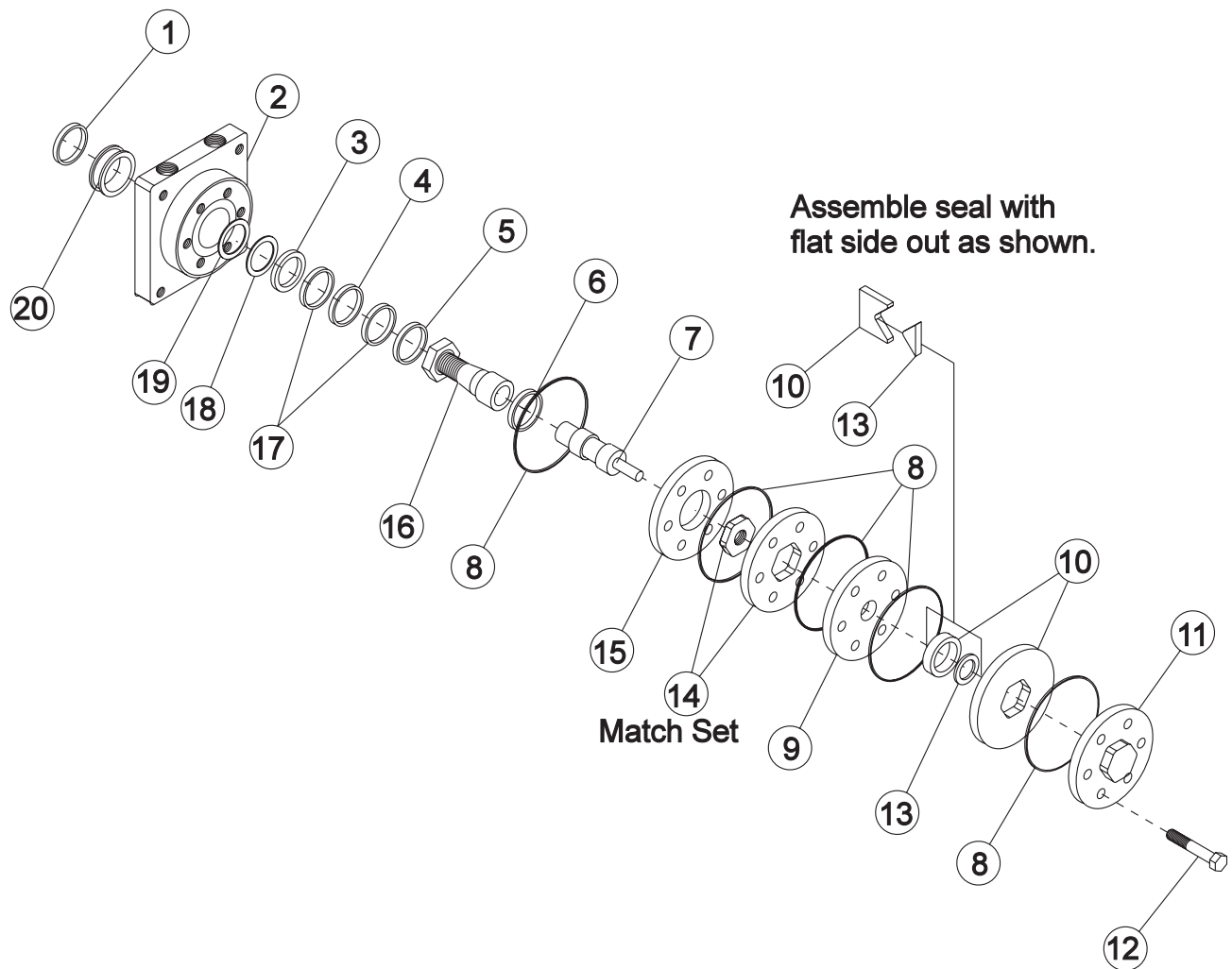
## 45-067 FRONT WHEEL MOTOR



## 45-067 FRONT WHEEL MOTOR

| 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   |             | End Cover                          | 1        |
| 12   | 14-134      | Hex Bolt                           | 7        |
| 13*  |             | Commutator Seal (matches with #10) | 1        |
| 14   | 13-032-34   | Rotor Set (matched set)            | 1        |
| 15   | 14-399-06   | Plate Wear                         | 1        |
| 16   | 13-032-36   | Coupling Shaft                     | 1        |
|      | HWK-516-100 | Woodruff Key, $\frac{5}{16}$ 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        |

# REAR WHEEL MOTOR (7.5 C.I.) DRAWING

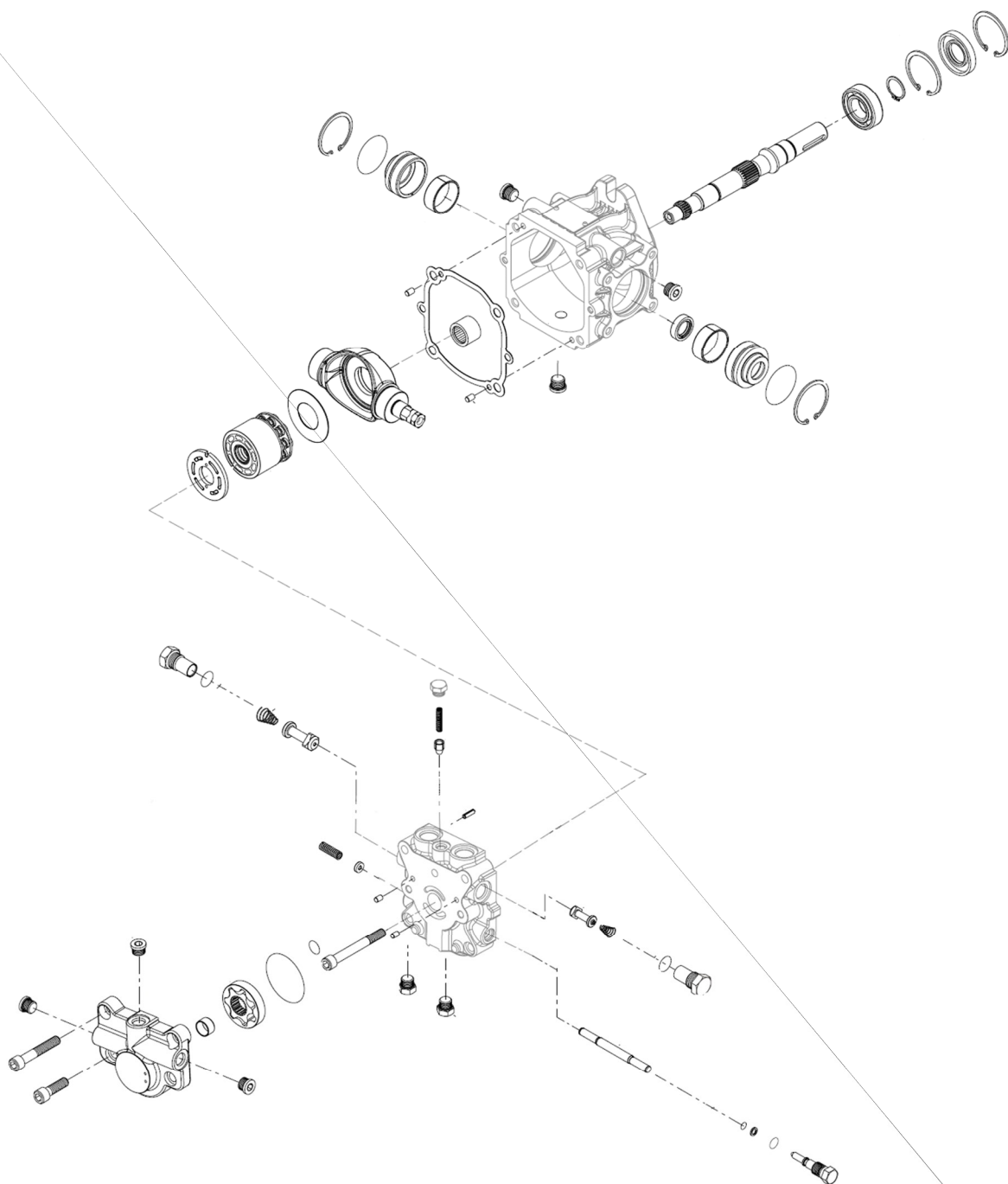


## REAR WHEEL MOTOR (7.5 C.I.) PARTS LIST

| REF# | PART#       | DESCRIPTION                                                      | QUANTITY |
|------|-------------|------------------------------------------------------------------|----------|
| 1*   |             | Water & Dirt Seal                                                | 1        |
| 2    |             | Service Housing Assembly (Includes Ref 4, 5, 17(2 req'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   |             | End Cover                                                        | 1        |
| 12   | 13-615-01   | Hex Bolt                                                         | 7        |
| 13*  |             | Commutator Seal (matches with #10)                               | 1        |
| 14   | 13-615-02   | Rotor Set (matched set)                                          | 1        |
| 15   | 13-032-35   | Plate Wear                                                       | 1        |
| 16   | 13-615-04   | Coupling Shaft                                                   | 1        |
|      | HWK-516-100 | Woodruff Key, $\frac{5}{16}$ 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        |

## 45-373 PISTON PUMP DRAWING

Parts



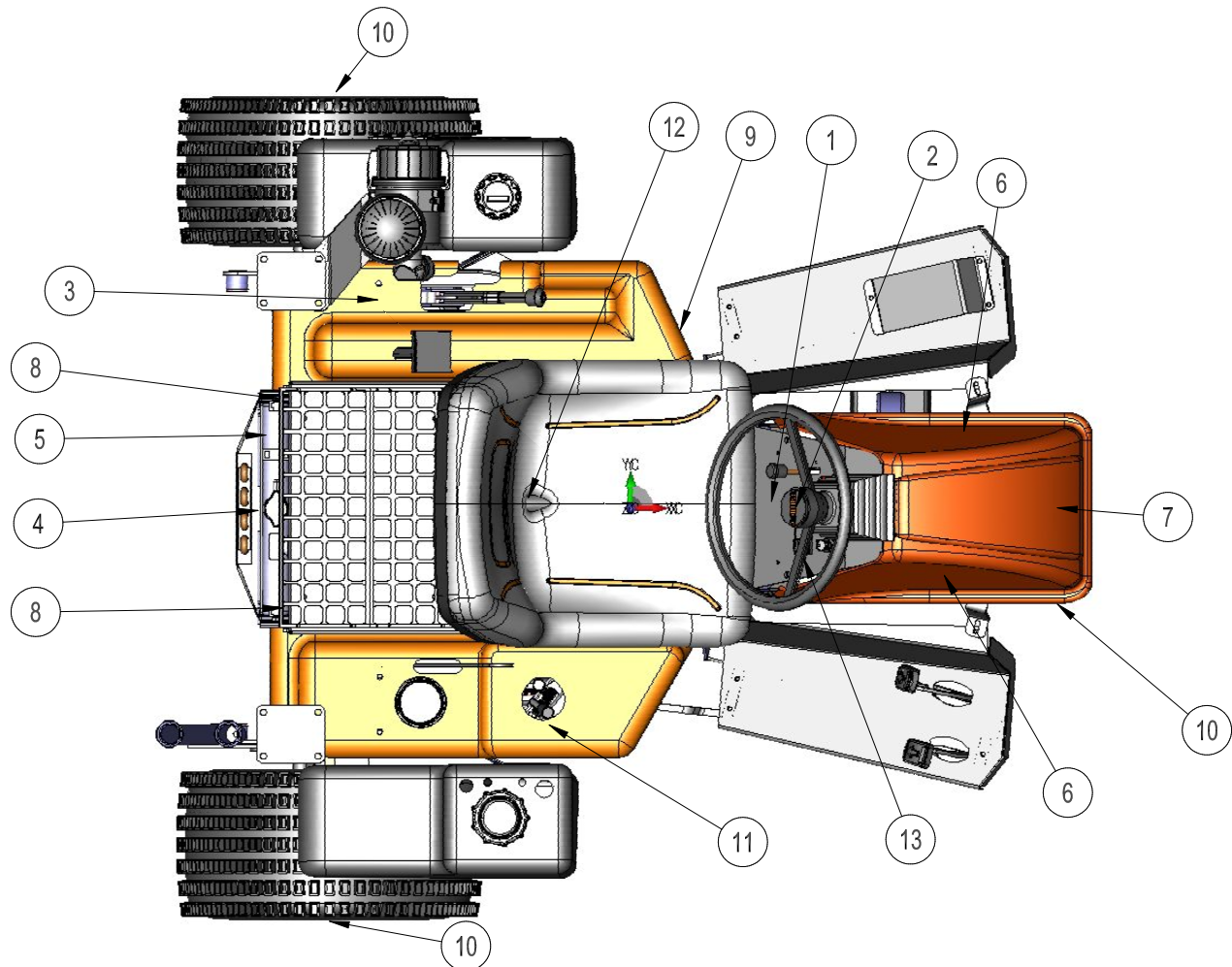
## 45-373 PISTON PUMP PARTS LIST

| REF# | PART#     | DESCRIPTION                      | QUANTITY |
|------|-----------|----------------------------------|----------|
| 1    | 45-373-02 | Ball Bearing                     | 1        |
| 2    | 45-373-03 | Retaining Ring                   | 1        |
| 3    | 45-373-04 | Retaining Ring                   | 2        |
| 4*   |           | Lip Seal                         | 1        |
| 5    | 45-373-05 | Journal Bearing Carrier Assembly | 1        |
| 6    | 45-373-06 | Retaining Ring                   | 1        |
| 7    | 45-373-07 | Needle Bearing                   | 1        |
| 8    | 45-373-08 | End Cap                          | 1        |
| 9    | 45-373-09 | Plug Assembly                    | 2        |
| 10   | 45-373-10 | By-Pass Valve Assembly           | 1        |
| 11   | 45-373-11 | Charge Pump Housing              | 1        |
| 12   | 45-373-12 | Gerotor Assembly                 | 1        |
| 13*  |           | O-ring                           | 1        |
| 14*  |           | O-ring                           | 1        |
| 15   | 45-373-13 | Valve Plate CCW                  | 1        |
| 16   | 45-373-14 | Cylinder Block kit               | 1        |
| 17   | 45-373-15 | Thrust Plate                     | 1        |
| 18   | 45-373-16 | Swash Plate, Axial Offset        | 1        |
| 19*  |           | Gasket                           | 1        |
| 20   | 45-373-17 | Journal Bearing Carrier Assembly | 1        |
| 21   | 45-373-19 | Housing                          | 1        |
| 22   | 45-373-18 | Pump Shaft                       | 1        |
| *    | 45-373-01 | Overhaul Kit                     |          |

## DECAL LIST

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

| REF# | PART#  | DESCRIPTION               | QTY |
|------|--------|---------------------------|-----|
| 1    | 45-095 | Decal, Dash Panel         | 1   |
| 2    | 27-077 | Decal, Round Smithco      | 1   |
| 3    | 51-184 | Decal, Park Brake         | 1   |
| 4    | 25-298 | Decal, Warning Hot        | 1   |
| 5    | 25-277 | Decal, Battery            | 1   |
| 6    | 45-135 | Decal, Sand Star          | 2   |
| 7    | 25-372 | Decal, Smithco Star       | 1   |
| 8    | 25-286 | Decal, Pinch Points       | 2   |
| 9    | 25-370 | Decal, DbA 88             | 1   |
| 10   | 25-354 | Decal, Tire Pressure 5PSI | 3   |
| 11   | 25-386 | Decal, Lift & Lower       | 1   |
| 12   | 25-337 | Decal, Speed Boss         | 1   |
| 13   | 25-352 | Decal, Bypass Valve       | 1   |





## QUICK REFERENCE REPLACEMENT PARTS

### REPLACEMENT FILTERS

|           |                                      |                             |
|-----------|--------------------------------------|-----------------------------|
| 23-031    | Hydraulic Oil Filter                 |                             |
| 15-165-01 | Air Filter Element with Pre-Cleaner  | Briggs and Stratton# 5050   |
| 42-076-03 | Air Filter Element Fender Mounted    |                             |
| 42-834-03 | Safety Filter Element Fender Mounted |                             |
| 50-403    | Fuel Filter                          |                             |
| 13-531    | Engine Oil Filter                    | Briggs and Stratton #492932 |
| 18-462    | Oil Drain Valve                      |                             |

### SEAL KITS

|                 |                                                      |  |
|-----------------|------------------------------------------------------|--|
| 45-373          | Variable Pump                                        |  |
| 45-373-01       | Overhaul Kit                                         |  |
| 45-065 & 45-066 | Wheel Motor (Rear)                                   |  |
| 14-080          | Seal Kit                                             |  |
| 45-067          | Wheel Motor (Front)                                  |  |
| 14-080          | Seal Kit                                             |  |
| 13-729          | 2-Bank Valve                                         |  |
| 78-415-03       | Seal Kit                                             |  |
| 10-554          | Hydraulic Cylinder (Center Attachment Lift Cylinder) |  |
| 14-529          | Seal Kit                                             |  |
| 43-150          | Hydraulic Cylinder (Rake Lift)                       |  |
| 43-150-01       | Seal Kit                                             |  |
| 10-554          | Steering Hydraulic Cylinder                          |  |
| 14-529          | Seal Kit                                             |  |

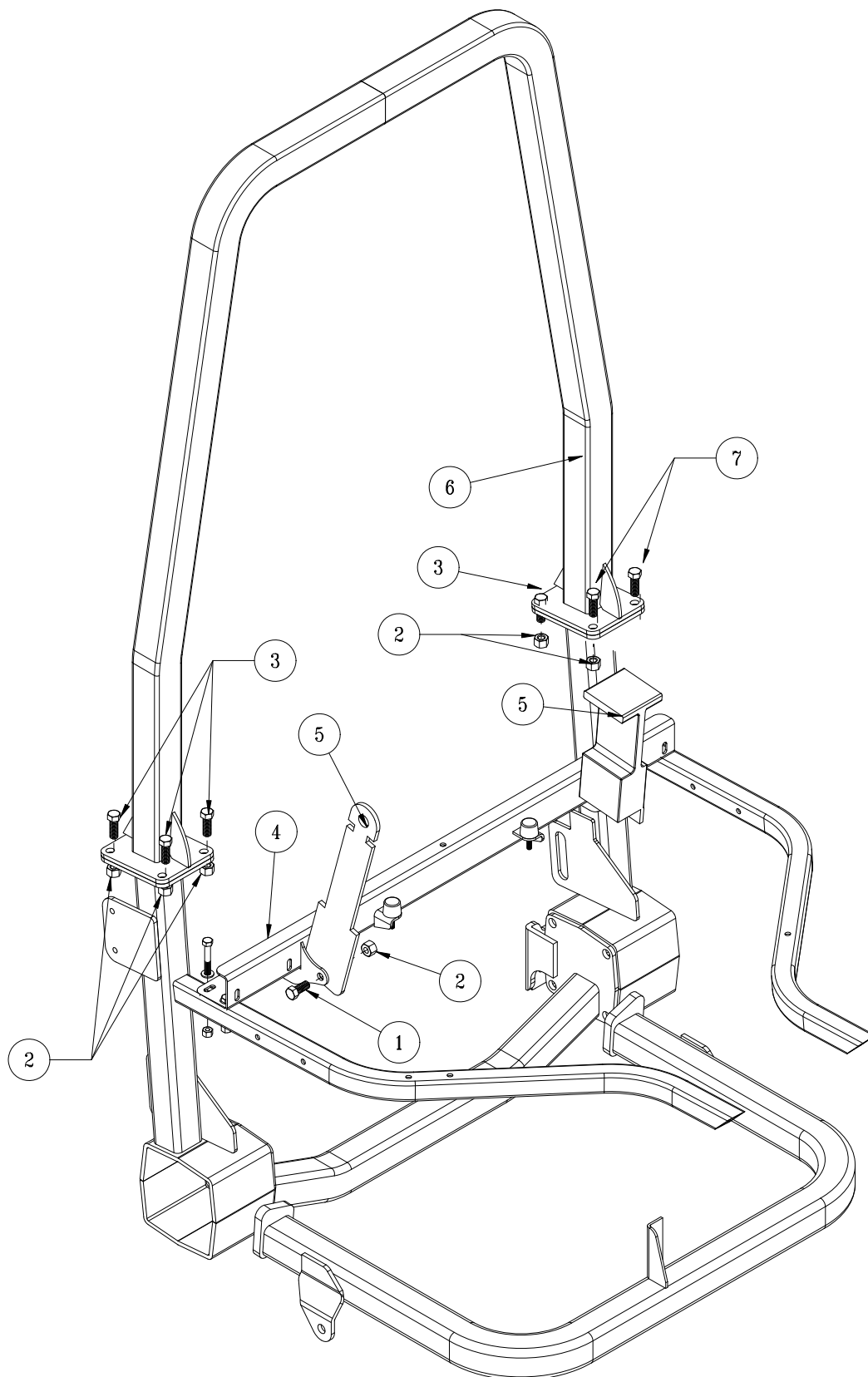
### FLUIDS

|                 |                                               |
|-----------------|-----------------------------------------------|
| Engine Oil      | Refer to Engine Manual                        |
| Hydraulic Fluid | SAE 10W-40 API Service SJ or higher Motor Oil |

### OTHER PARTS

|             |                                  |
|-------------|----------------------------------|
| Spark Plugs | RC12YC (Gap 0.030 inch (0.76mm)) |
| 48-265      | Turf Tire and Wheel              |

## 45-004 ROPS



Accessories

| REF# | PART#         | DESCRIPTION                                   | QUANTITY |
|------|---------------|-----------------------------------------------|----------|
| 1    | HB-716-14-100 | Hex Bolt $\frac{7}{16}$ - 14 x 1              | 2        |
| 2    | HNTL-716-14   | Nylon Lock Nut $\frac{7}{16}$ - 14            | 8        |
| 3    | HB-716-14-125 | Hex Bolt $\frac{7}{16}$ - 14 x $1\frac{1}{4}$ | 6        |
| 4    | 45-082        | Seat Belt Brace                               | 1        |
| 5    | 76-198-03     | Seat Belt                                     | 1        |
| 6    | 45-060        | Roll Bar                                      | 1        |
| 7    | HB-716-14-150 | Hex Bolt $\frac{7}{16}$ - 14 x $1\frac{1}{2}$ | 2        |

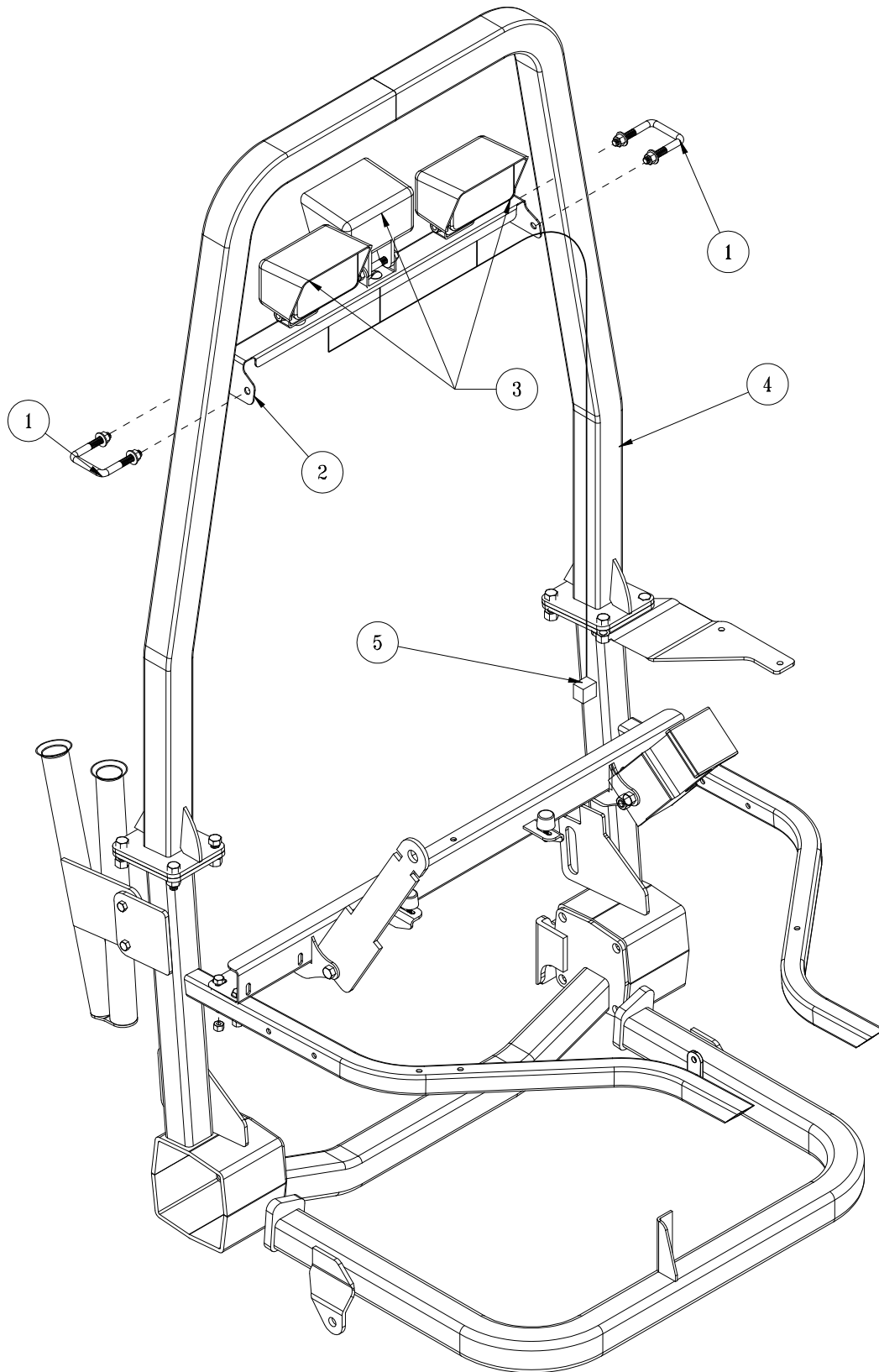
## INSTALLATION INSTRUCTIONS

The Following instructions apply to all Sand Star Machines.

1. Line up the mount plate on the roll bar to the square mounting plate by the seat. Mount vertically, **not** leaning back toward the rear of the machine.
2. Place four  $1\frac{1}{4}$ " Hex Bolts in the right mount plate holes and tighten. Place two  $1\frac{1}{4}$ " Hex Bolts on left rear and two  $1\frac{1}{2}$ " Hex Bolts on left front. Hex Bolts are longer in the left front to accommodate remote air cleaner option.
3. If your machine has a remote air cleaner you will have to remove the 2 Hex Bolts holding the air filter mount. Place the roll bar on top of the air filter mount. Replace Hex Bolts and tighten down.
4. Mount seat belts onto seat belt brace using 1" Hex Bolts. The strap goes on the right side and the lock goes on the left side.
5. Tighten all hardware.

***ROPs are certified to meet ISO 21299 and restraints meet OSHA 1928.51***

## 45-016 LIGHT KIT DRAWING



## 45-016 LIGHT KIT PARTS LIST

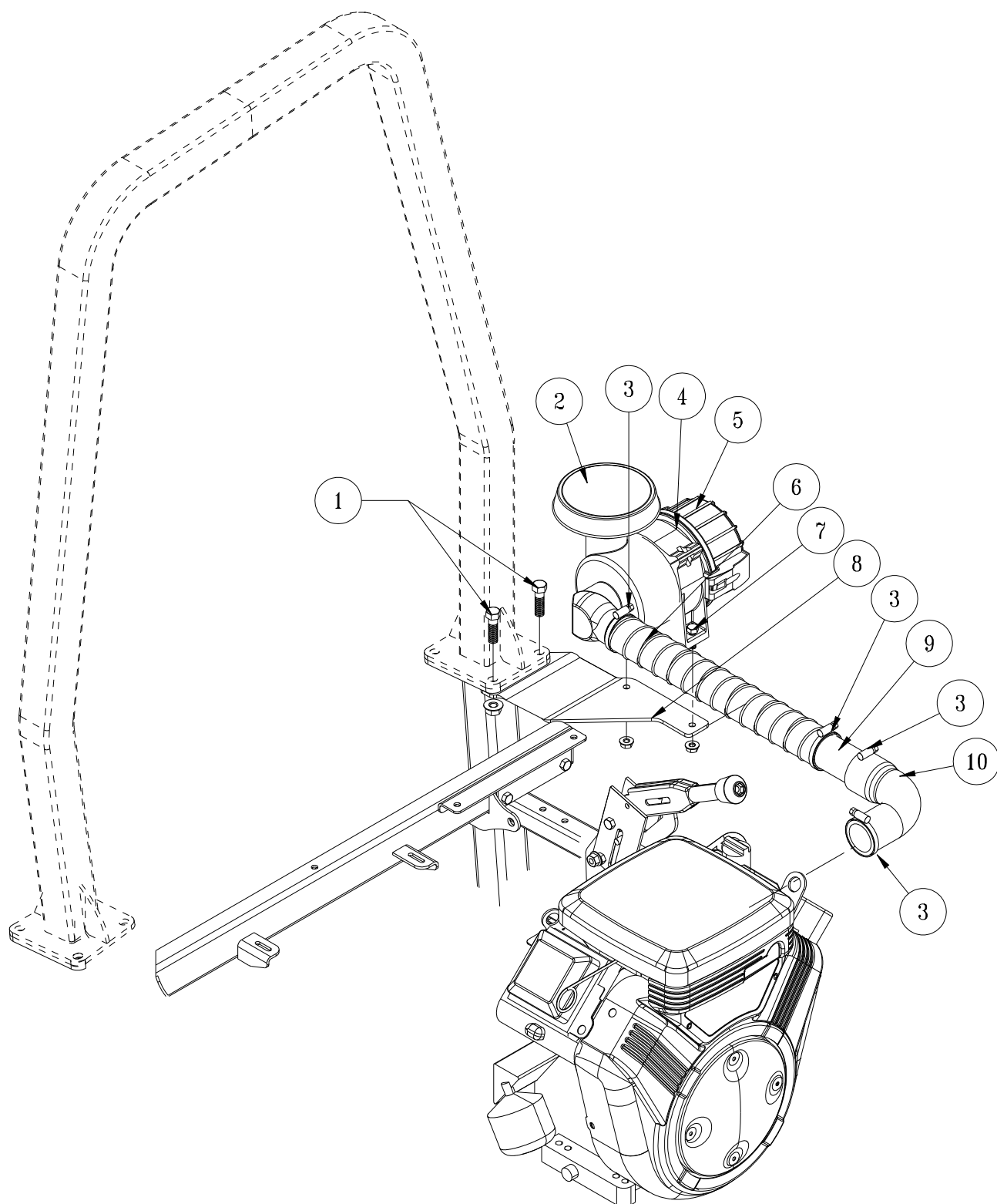
| REF# | PART#  | DESCRIPTION        | QUANTITY |
|------|--------|--------------------|----------|
| 1    | 17-537 | Square U-Hex Bolt  | 2        |
| 2    | 45-081 | Light Bar          | 1        |
| 3    | 34-201 | Light              | 3        |
| 4    | 45-004 | Roll Bar Kit       | 1        |
| 5    | 43-505 | Light Wire Harness | 1        |

## INSTALLATION INSTRUCTIONS

45-004-K ROPs Kit is required for Light Kit on all Sand Star Machines.

1. Mount lights to light bar. Outside two facing forwards and center light facing to the rear.
2. Using the square u-Hex Bolts, mount light bar assembly to the roll bar.
3. Tighten u-Hex Bolts down and make sure light bar and lights are secure.
4. Tighten all hardware.
5. Center toggle switch is wired for lights via the main machine wire harness. The plug for the light wire harness is zip tied to the left rear post (Ref 5). Hook light wire harness from lights to the plug on the left rear post.
6. Use the tie straps provided to secure the light wire harness to the roll bar and the light bar.
7. Test lights.

## 45-017-A REMOTE AIR CLEANER



Accessories

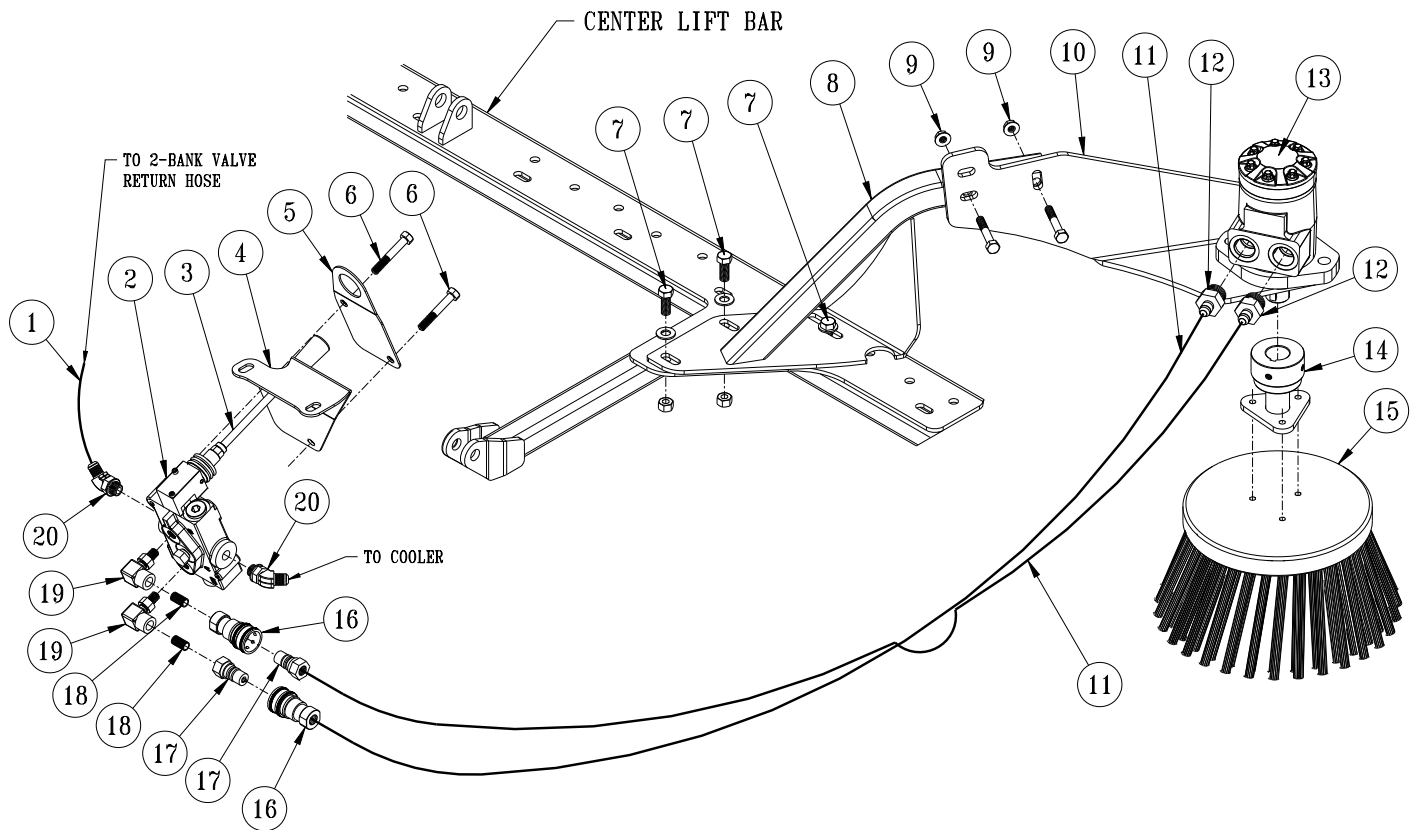
## 45-017 REMOTE AIR CLEANER

| REF# | PART#         | DESCRIPTION                                  | QUANTITY |
|------|---------------|----------------------------------------------|----------|
| 1    | HB-716-14-150 | Hex Bolt, $\frac{7}{16}$ - 14 $1\frac{1}{2}$ | 2        |
|      | HNTL-716-14   | Nylon Lock Nut, $\frac{7}{16}$ - 14          | 2        |
| 2    | 42-834-02     | Hood                                         | 1        |
| 3    | 18-116        | Hose Clamp                                   | 4        |
| 4    | 42-834-01     | Band                                         | 1        |
| 5    | 42-834        | Air Cleaner                                  | 1        |
| 6    | 8959-26       | Flex Hose x 26"                              | 1        |
| 7    | HB-516-18-100 | Hex Bolt, $\frac{5}{16}$ - 18 x 1            | 2        |
|      | HNFL-516-18   | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18     | 2        |
| 8    | 45-058        | Air Filter Mount                             | 1        |
| 9    | 42-776        | Air Cleaner Hose Sleeve                      | 1        |
| 10   | 27-113        | Rubber Elbow                                 | 1        |

## INSTALLATION INSTRUCTIONS

1. Assemble air cleaner, band and hood. (Ref 2, 4 and 5)
2. Install air cleaner assembly on air filter mount (Ref 8).
3. Install air cleaner and mount onto left main frame post using  $\frac{7}{16}$  Hex Bolts and Nylon Lock Nuts (Ref 1). If roll bar is installed, remove Hex Bolts from left side and slide air filter mount (Ref 8) between roll bar and main frame post. Use  $\frac{7}{16}$  - 14  $1\frac{1}{2}$  in the front and roll bar Hex Bolts you removed in the back.
4. Make sure all bolts are tightened.
5. Place rubber elbow (Ref 10) on engine and use hose clamp (Ref 3) to hold in place.
6. Attach hose sleeve (Ref 9) to rubber elbow with another hose clamp (Ref 3).
7. Install flex hose (Ref 6) from air cleaner (Ref 5) to hose sleeve (Ref 9) using two hose clamps (Ref 3).
8. Tighten all hose clamps.

# 45-015 MOTORIZED BRUSH DRAWING





## 45-015 MOTORIZED BRUSH PARTS LIST

| REF# | PART #        | DESCRIPTION                                   | QUANTITY |
|------|---------------|-----------------------------------------------|----------|
| 1    | 45-143        | Hydraulic Hose, 21"                           | 1        |
| 2    | 45-148        | Single Bank Valve                             | 1        |
| 3    | 78-417        | Handle                                        | 1        |
| 4    | 45-364        | Valve Brace                                   | 1        |
| 5    | 45-127        | Valve Mount Plate                             | 1        |
| 6    | HB-516-18-200 | Hex Bolt, $\frac{5}{16}$ - 18 x 2             | 2        |
|      | HNTL-516-18   | Nylon Lock Nut, $\frac{5}{16}$ -18            | 2        |
| 7    | HB-38-16-100  | Hex Bolt, $\frac{3}{8}$ -16 x 1               | 3        |
|      | HW-38         | Flat Washer, $\frac{3}{8}$                    | 3        |
|      | HNTL-38-16    | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 3        |
| 8    | 45-152        | Brush Motor Support                           | 1        |
| 9    | HB-516-18-200 | Hex Bolt, $\frac{5}{16}$ - 18 x 2             | 2        |
|      | HNFL-516-18   | Flange Whiz-Loc Nut, $\frac{5}{16}$ -18       | 2        |
| 10   | 45-151        | Brush Motor Mount                             | 1        |
| 11   | 45-142        | Hydraulic Hose, 42"                           | 2        |
| 12   | 18-331        | Adapter                                       | 2        |
| 13   | 45-149        | Hydraulic Motor                               | 1        |
| 14   | 45-150        | Hub Assembly                                  | 1        |
|      | HB-14-20-150  | Hex Bolt, $\frac{1}{4}$ - 20 x $1\frac{1}{2}$ | 3        |
|      | HNTL-14-20    | Nylon Lock Nut, $\frac{1}{4}$ - 20            | 3        |
| 15   | 45-144        | 8" Polypro Side Broom                         | 1        |
| 16   | 78-230        | Coupler, $\frac{1}{4}$ "                      | 2        |
| 17   | 78-231        | Nipple, $\frac{1}{4}$                         | 2        |
| 18   | 18-011        | Black Pipe Close Nipple, $\frac{1}{4}$        | 2        |
| 19   | 23-018        | O-ring Elbow                                  | 2        |
| 20   | 18-188        | 45° Elbow                                     | 2        |

# INSTALLATION INSTRUCTIONS

1. This product only fits on a Sand Star I(45-001) and Sand Star II (45-002).
2. Center lift bar must be installed on our machine. This kit does not come with a lift bar.
3. If your center lift bar has castor wheels on it, you must remove the castor wheels and brackets.
4. Install Brush Motor Support (Ref 8) on your right side of center lift arm using the holes where the caster wheel would Hex Bolt to. Hex Bolt in place with hardware (Ref 7).
5. Place Hub Assembly (Ref 14) on Brush (Ref 15) with the (Ref 14) hardware.
6. Place Motor (Ref 13) on Motor Mount (Ref 10) and then mount that assembly to the Brush Motor Support (Ref 8).
7. Connect the Brush and Hub assembly to the Motor and tighten set screws.
8. Place adapter (Ref 12) into Motor. The place the Coupler (Ref 16) on the inside adapter and the Nipple (Ref 17) on the outside adapter.
9. Assemble the valve as shown in the drawing.

10. The Valve assembly mounts on the right front fender. The Valve goes underneath the fender with the handle pointing outward. The Valve Mount Plate (Ref 5) mounts on the outside of the fender. The Valve Brace (Ref 4) mounts inside the fender.

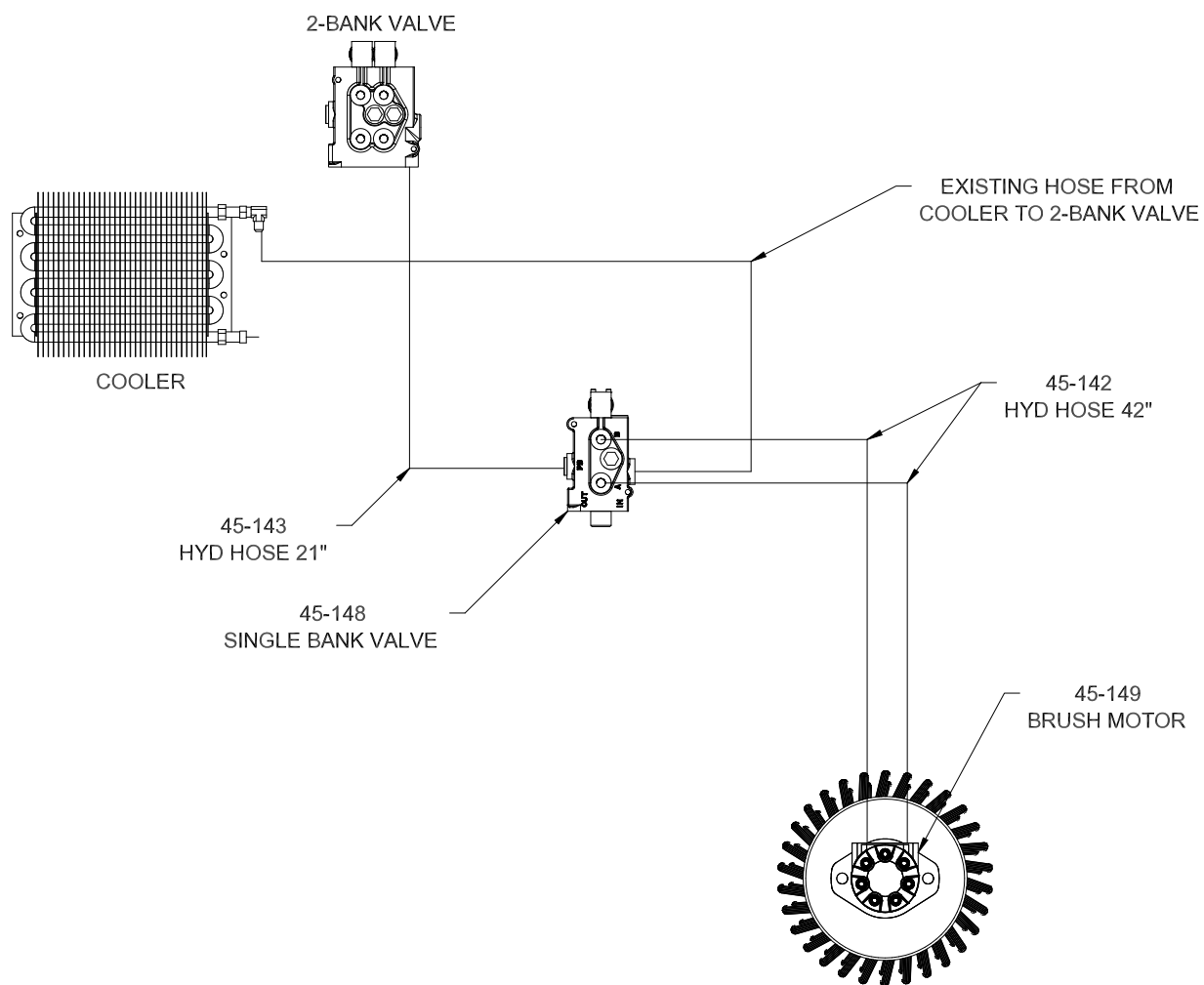
11. Remove the 4 Hex Bolts holding the fender to the mainframe. Working on the inside of the fender, place the Valve Brace, with the slotted holes lined up with the fender holes, and the face with the offset holes against the front of the fender, as shown in the photo. Mark the location of the two offset holes. Drill a  $\frac{3}{8}$ " hole at each mark. *Use a piece of scrap wood to drill into to prevent tearing the plastic fender.*



12. Position the Valve Mount (Ref 5) so the holes line up with the holes that you drilled. Mark location of the large hole then drill a  $1\frac{1}{4}$ " hole at that mark. *Use a piece of scrap wood to drill into to prevent tearing the plastic fender.*



13. Mount the Single Bank Hydraulic Valve (Ref 2) to the Valve Mount (Ref 5) as illustrated, using the two  $\frac{5}{16}$  - 18 x 2 Hex Bolts (Ref 6). Secure with the two Nylon Lock Nuts. Connect the Straight Handle (Ref 3) to the Valve.
14. Connect 42" hoses (Ref 11) from the motor to the valve. Connect the 21" hose from the valve to the cooler. The return hose on the 2-bank valve connects to the single bank valve.
15. Test operation of the broom before using on turf.



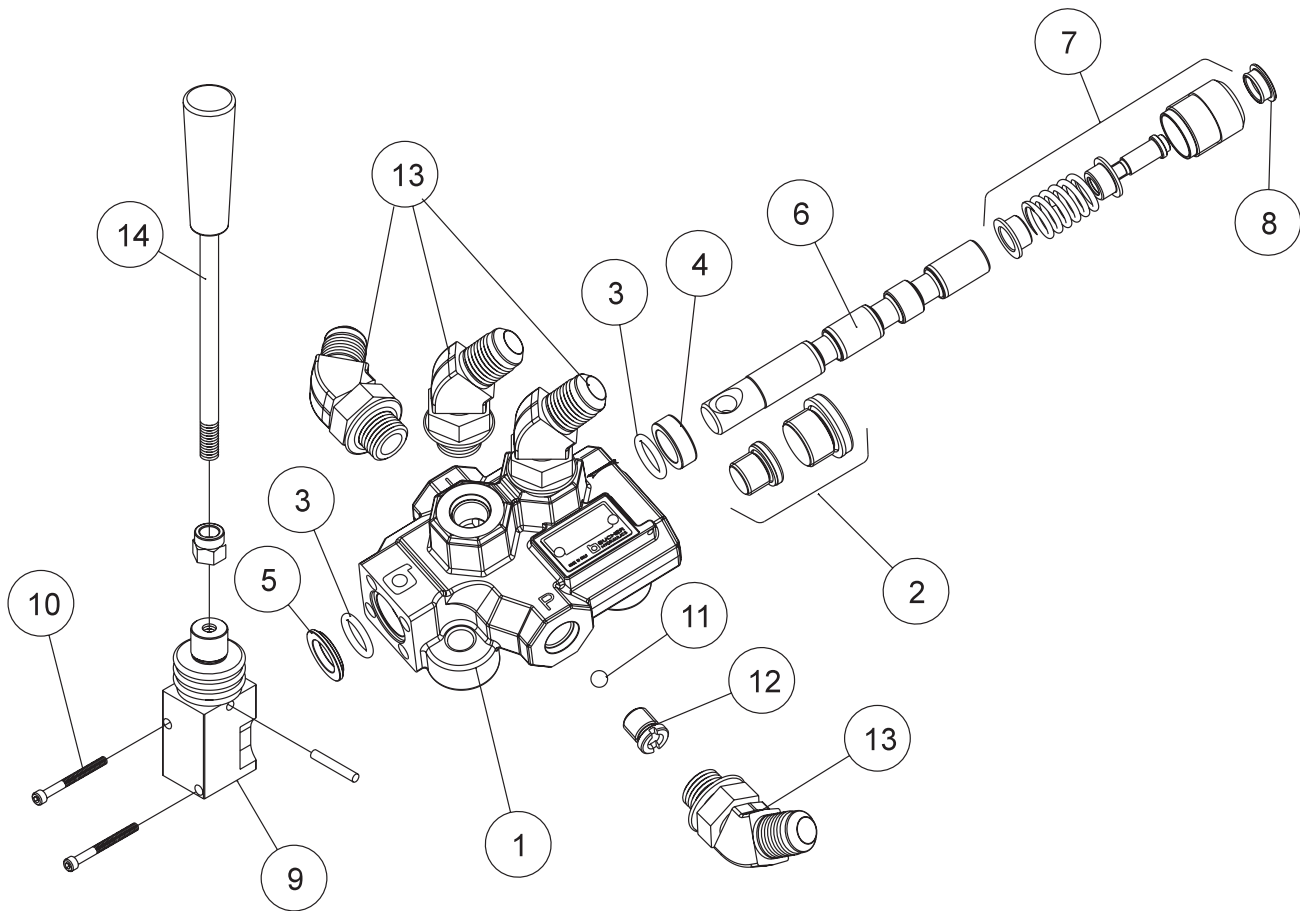
## NOTES

# ACCESSORIES

|                                                          |          |
|----------------------------------------------------------|----------|
| <b>Front Accessories .....</b>                           | <b>A</b> |
| 13-731 Single Bank Valve .....                           | 2        |
| 45-005 40" Aluminum Hydraulic Plow.....                  | 4        |
| 45-009 40" Aluminum Manual Plow.....                     | 8        |
| 45-019 60" Aluminum Manual Plow .....                    | 10       |
| 45-179 40" Adjustable Manual Plow .....                  | 12       |
| 45-180 60" Adjustable Manual Plow .....                  | 14       |
| <b>Center Attachments.....</b>                           | <b>B</b> |
| 45-014 Weed Cultivator.....                              | 16       |
| 45-006 Sand Cultivator.....                              | 17       |
| 45-008 Sand Cultivator w/ Spring Tine .....              | 18       |
| 45-012 Construction Leveling Blade.....                  | 19       |
| 45-013 Sand Cultivator w/ Castor Wheels.....             | 20       |
| 45-007 Infield Scarifier (vertical blades) .....         | 22       |
| 45-011 Infield Scarifier (chisel blades).....            | 24       |
| 45-173 Infield Scarifier (chisel blades/no castors)..... | 26       |
| 45-360 Infield Scarifier (straight blades).....          | 28       |
| 45-195 Grader Blade Kit.....                             | 30       |
| 45-177 Nail Drag .....                                   | 32       |
| 45-015 Motorized Brush .....                             | 34       |
| 45-175 Adjustable Disc Edger .....                       | 36       |
| <b>Rear Attachments .....</b>                            | <b>C</b> |
| 42-391Q 72" Pro-Brush Tournament Rake .....              | 38       |
| 43-392Q 84" Pro-Brush Tournament Rake .....              | 42       |
| 42-130Q 84" Mild Steel Rake .....                        | 46       |
| 42-132Q 72" Mild Steel Rake .....                        | 50       |
| 13-758Q Max Flex Sand Rake .....                         | 54       |
| 45-503 84" Pro Rake .....                                | 56       |
| 45-511 Rubber Flex Rake.....                             | 58       |
| 13-740 Brush Attachment.....                             | 60       |
| 13-684 Brush Attachment.....                             | 61       |
| 13-298Q Fan Rake .....                                   | 62       |
| 13-319 Fan Rake Kit.....                                 | 63       |
| 26-007Q Professional Field Finisher .....                | 64       |
| 43-002Q Flex Action Field Finisher w/ Brush .....        | 65       |
| 26-008Q Flex Action Field Finisher .....                 | 68       |
| 43-043 Finishing Brush.....                              | 70       |
| 43-008 Drag Mat Kit .....                                | 71       |
| 45-176 Drag Mat Kit w/ Finisher Brush.....               | 72       |
| 45-010 Box Grader .....                                  | 74       |
| 42-586Q Green Star RBS Main Frame .....                  | 76       |
| 42-581 Green Star RBS Roller .....                       | 78       |
| 42-585 Green Star RBS Brush .....                        | 80       |
| 42-582 Green Star RBS Spiker .....                       | 82       |
| 43-009 Coco Mat Finisher .....                           | 84       |
| 43-170 Rahn Groomer.....                                 | 86       |
| 41-501 Typhoon.....                                      | 90       |
| Warranty .....                                           |          |

# 13-731 SINGLE BANK HYDRAULIC VALVE DRAWING

Front Attachment

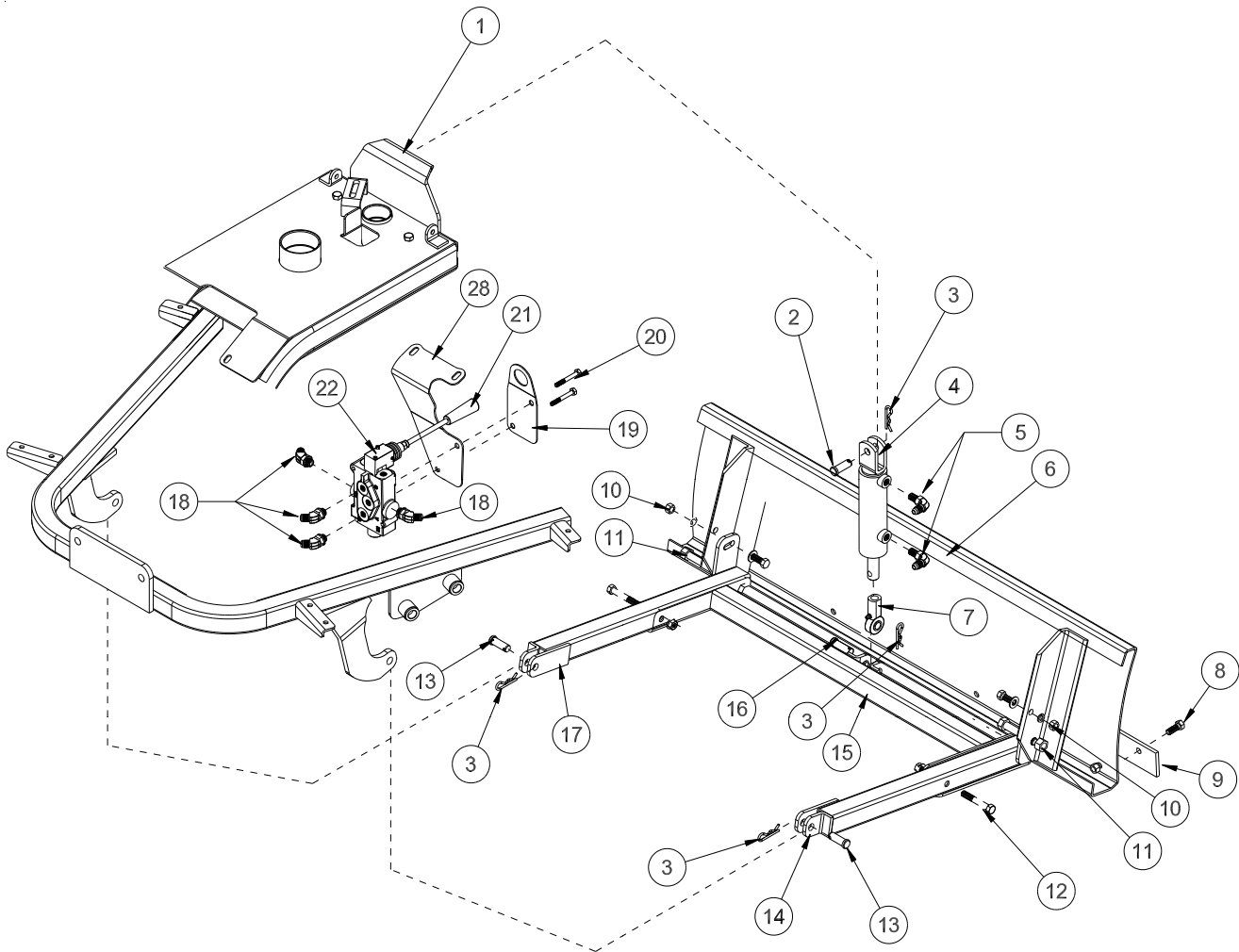


## 13-731 SINGLE BANK HYDRAULIC VALVE PARTS LIST

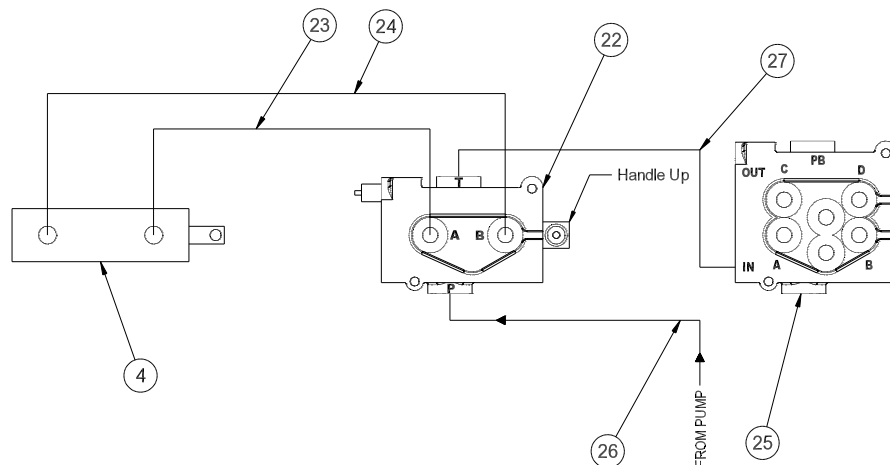
| REF # | PART #    | DESCRIPTION                                        | QUANTITY   |
|-------|-----------|----------------------------------------------------|------------|
| 1*    | 13-731-01 | Actuator Housing Assembly                          | 1          |
| 2*    | 13-731-02 | Valve Plug                                         | 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 |

# 45-005 HYDRAULIC SAND PLOW DRAWING

Front Attachment



# HYDRAULIC VALVE PLUMBING DRAWING





## 45-005 HYDRAULIC SAND PLOW PARTS LIST

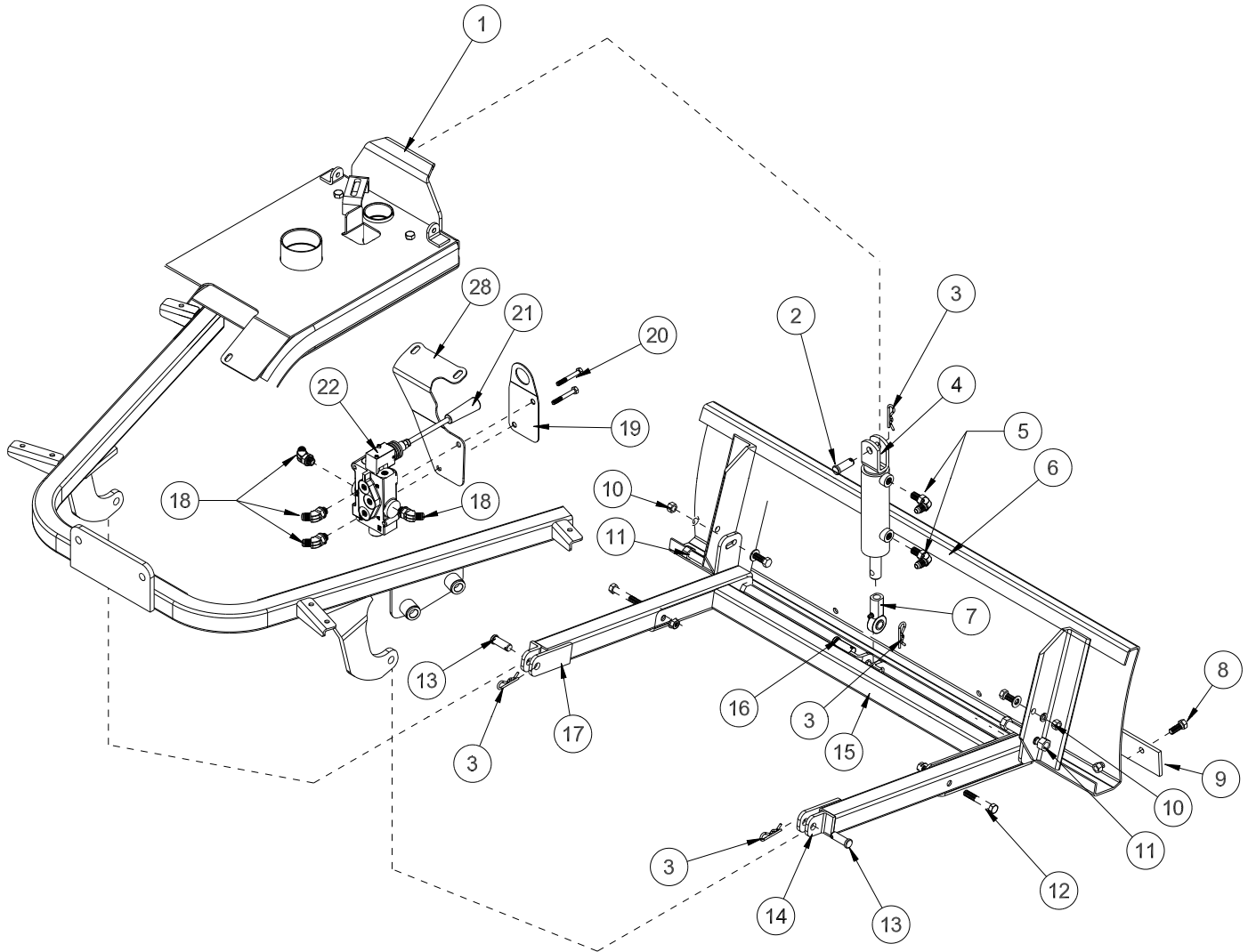
| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | 45-126       | Ram Mount                                     | 1        |
| 2    | HCP-58-150   | Clevis Pin, $\frac{5}{8}$ x $1\frac{1}{2}$    | 1        |
| 3    | HHP-18       | Bridge Pin, $\frac{1}{8}$                     | 4        |
| 4    | 13-406       | Hydraulic Cylinder                            | 1        |
| 5    | 18-168       | 45° Elbow                                     | 2        |
| 6    | 45-092       | Aluminum Sand Plow Blade                      | 1        |
|      | 45-321       | Steel Sand Plow Blade                         | 1        |
| 7    | 18-154       | Rod End                                       | 1        |
|      | HNJ-58-18    | Jam Nut, $\frac{5}{8}$ - 18                   | 1        |
| 8    | HB-38-16-100 | Hex Bolt, $\frac{3}{8}$ - 16 x 1              | 4        |
|      | HNFL-38-16   | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 16       | 4        |
| 9    | 13-167       | Wear Blade                                    | 1        |
| 10   | HB-38-16-125 | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{4}$ | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                    | 2        |
|      | HWL-38       | Lock Washer, $\frac{3}{8}$                    | 2        |
|      | HN-38-16     | Hex Nut, $\frac{3}{8}$ - 16                   | 2        |
| 11   | HB-12-13-300 | Hex Bolt, $\frac{1}{2}$ - 13 x 3              | 2        |
|      | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13            | 2        |
| 12   | HB-38-16-250 | Hex Bolt, $\frac{3}{8}$ - 16 x $2\frac{1}{2}$ | 2        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 2        |
| 13   | HCP-12-150   | Clevis Pin, $\frac{1}{2}$ x $1\frac{1}{2}$    | 2        |
| 14   | 45-100       | Right Pusher Bar                              | 1        |
| 15   | 45-125       | Plow Crossbar                                 | 1        |
| 16   | HCP-58-175   | Clevis Pin, $\frac{5}{8}$ x $1\frac{3}{4}$    | 1        |
| 17   | 45-101       | Left Pusher Bar                               | 1        |
| 18   | 18-188       | 45° Elbow                                     | 4        |
| 19   | 45-127       | Valve Mount                                   | 1        |
| 20   | HB-14-20-200 | Hex Bolt, $\frac{1}{4}$ - 20 x 2              | 2        |
|      | HNFL-14-20   | Flange Whiz-Loc Nut, $\frac{1}{4}$ - 20       | 2        |
| 21   | 78-417       | Straight Handle                               | 1        |
| 22   | 13-731       | Single Bank Hydraulic Valve                   | 1        |
| 23   | 45-130       | Hose, 51½"                                    | 1        |
| 24   | 45-129       | Hose, 43"                                     | 1        |
| 25   |              | 2-Bank Valve (on machine)                     |          |
| 26   | 45-068       | Hose (on machine to pump)                     |          |
| 27   | 45-128       | Hose, 26"                                     | 1        |
| 28   | 45-364       | Valve Brace                                   | 1        |

### **ENGINE MUST BE COOL BEFORE DISCONNECTING THE HOSES.**

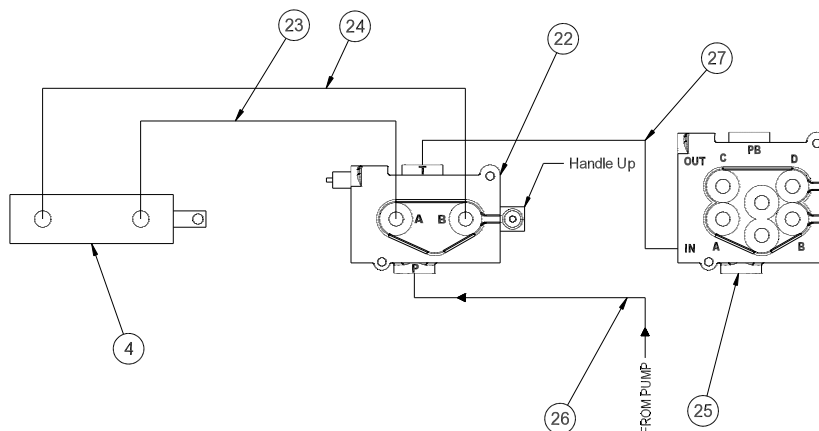
1. Assemble pusher bars (Ref# 14 and 17) to plow blade (Ref# 6) using one  $\frac{3}{8}$ -16 x  $1\frac{1}{4}$  bolt (Ref# 10) and one  $\frac{3}{8}$ -16 x 3 bolt (Ref#11) per pusher bar. There are 2 holes to bolt (Ref# 10) hardware in. Using hole **closest to the blade will result in a shallow cut**, 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.
2. Assemble the plow cross tube (Ref# 15) to the front pusher bars (Ref# 14 and 17) using  $\frac{3}{8}$  - 16 x  $2\frac{1}{2}$  bolts and lock nuts (Ref# 12).
3. Assemble the ram mount (Ref# 1) to the main frame using the two studs that are welded to the frame and below the front of the console. Install rod end (Ref# 7) onto cylinder with  $\frac{5}{8}$  jam nut.
4. Using a  $\frac{5}{8}$  x  $1\frac{3}{4}$  clevis pin (Ref# 16) and  $\frac{1}{8}$ " bridge pin (Ref#3) mount the hydraulic cylinder (Ref# 4) to the plow crossbar (Ref# 15). Connect the other end of the hydraulic cylinder to the ram mount (Ref# 1) using  $\frac{5}{8}$  x  $1\frac{1}{2}$  Clevis Pin (Ref# 2) and  $\frac{1}{8}$ " bridge pin (Ref#3).
5. Slide the plow/pusher bar assembly under machine and connect to machine. Secure using  $\frac{1}{2}$  x  $1\frac{1}{2}$  clevis pins (Ref# 13) and  $\frac{1}{8}$ " bridge pins (Ref# 3).

# 45-005 HYDRAULIC SAND PLOW DRAWING

Front Attachment

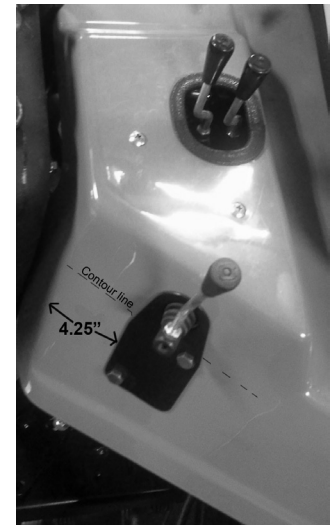


## HYDRAULIC VALVE PLUMBING DRAWING



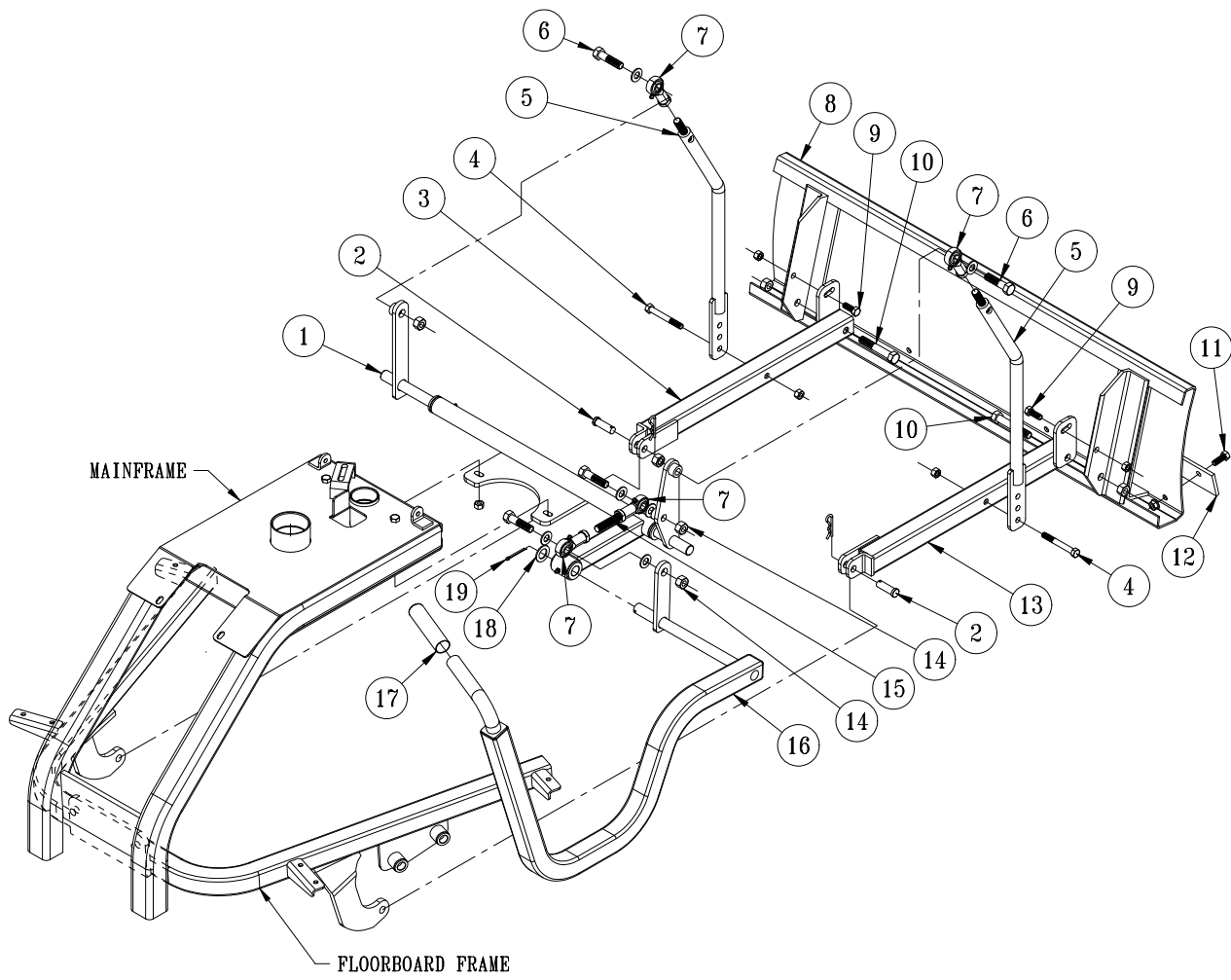
## 45-005 HYDRAULIC SAND PLOW INSTRUCTIONS

6. Thread four, 45° elbow fittings (Ref# 18) into the single bank valve (Ref# 22), one each in the **A** port, **B** port, **IN** port and **OUT** port. Reference Single Bank Hydraulic Valve Drawing for a detailed view of the valve.
7. Thread two,  $\frac{3}{8}$ " straight thread elbow fittings (Ref# 5) into the ports on the hydraulic cylinder (Ref# 4). Make sure the fittings on the hydraulic cylinder are pointing towards the machine.
8. Next connect the 43" hose (Ref# 24) to the fitting in the **B** port and connect the 51.5" hose (Ref# 23) to the fitting in the **A** port.
9. Fiberglass Fender: Using the valve mount as a template, Measure in approximately 4.25 inches from edge of right fender and mark. Line valve mount up with contour of the fender and the right side of the line you just marked. Trace holes onto fiberglass. CARB Canister is underneath so use caution when drilling holes out.
10. Fiberglass Fender: Mount the single bank hydraulic Valve (Ref# 22) to the valve mount (Ref# 19) as illustrated, using the two  $\frac{1}{4}$ " - 20 x 2 bolts (Ref# 20). Secure with the two  $\frac{1}{4}$ " - 20 flange whiz-lock nuts. Connect the straight handle (Ref# 21) to the valve. Reference Single Bank Hydraulic Valve Drawing for a detailed view of the valve.
11. Plastic Fender: The Valve assembly mounts on the right front fender. The Valve goes underneath the fender with the handle pointing outward. The Valve Mount Plate (Ref 19) mounts on the outside of the fender. The Valve Brace (Ref 28) mounts inside the fender.
12. Plastic Fender: Remove the 4 bolts holding the fender to the mainframe. Working on the inside of the fender, place the Valve Brace, with the slotted holes lined up with the fender holes, and the face with the offset holes against the front of the fender, as shown in the photo. Mark the location of the two offset holes. Drill a  $\frac{3}{8}$ " hole at each mark. *Use a piece of scrap wood to drill into to prevent tearing the plastic fender.*
13. Position the Valve Mount (Ref 19) so the holes line up with the holes that you drilled. Mark location of the large hole then drill a  $1\frac{1}{4}$ " hole at that mark. *Use a piece of scrap wood to drill into to prevent tearing the plastic fender.*
14. Route the 43" hose (Ref# 24) from the **B** port on the single bank hydraulic valve to the top port on the hydraulic cylinder. Route the 51.5" hose (Ref# 23) from the **A** port on the single bank hydraulic valve to the bottom port on the cylinder.
15. Disconnect the negative (-) ground battery cable from the battery. Place a drain pan under the valve on the machine. **ENGINE MUST BE COOL BEFORE DISCONNECTING THE HOSES.**
16. Disconnect hose (Ref# 26) from the **IN** port on the two-bank hydraulic valve (Ref#25). Connect this hose (Ref# 26) to the "**P**" port of the single bank valve (Ref# 22). Connect the 26" hose (Ref# 27) from the "**T**" port on the single bank valve (Ref# 22) to the **IN** port of the two-Bank valve (Ref# 25). Fasten to the frame using the  $14\frac{1}{2}$ " nylon ties.
17. Reconnect the negative (-) ground battery cable to battery.
18. 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.
19. Check the hydraulic oil level. The level should be 2" to  $2\frac{1}{2}$ " below the top of the tank. If more is needed, use SAE 10W-40 API service SG motor oil.



# 45-009 ALUMINUM SAND PLOW DRAWING

Front Attachment



## 45-009 ALUMINUM SAND PLOW PARTS LIST

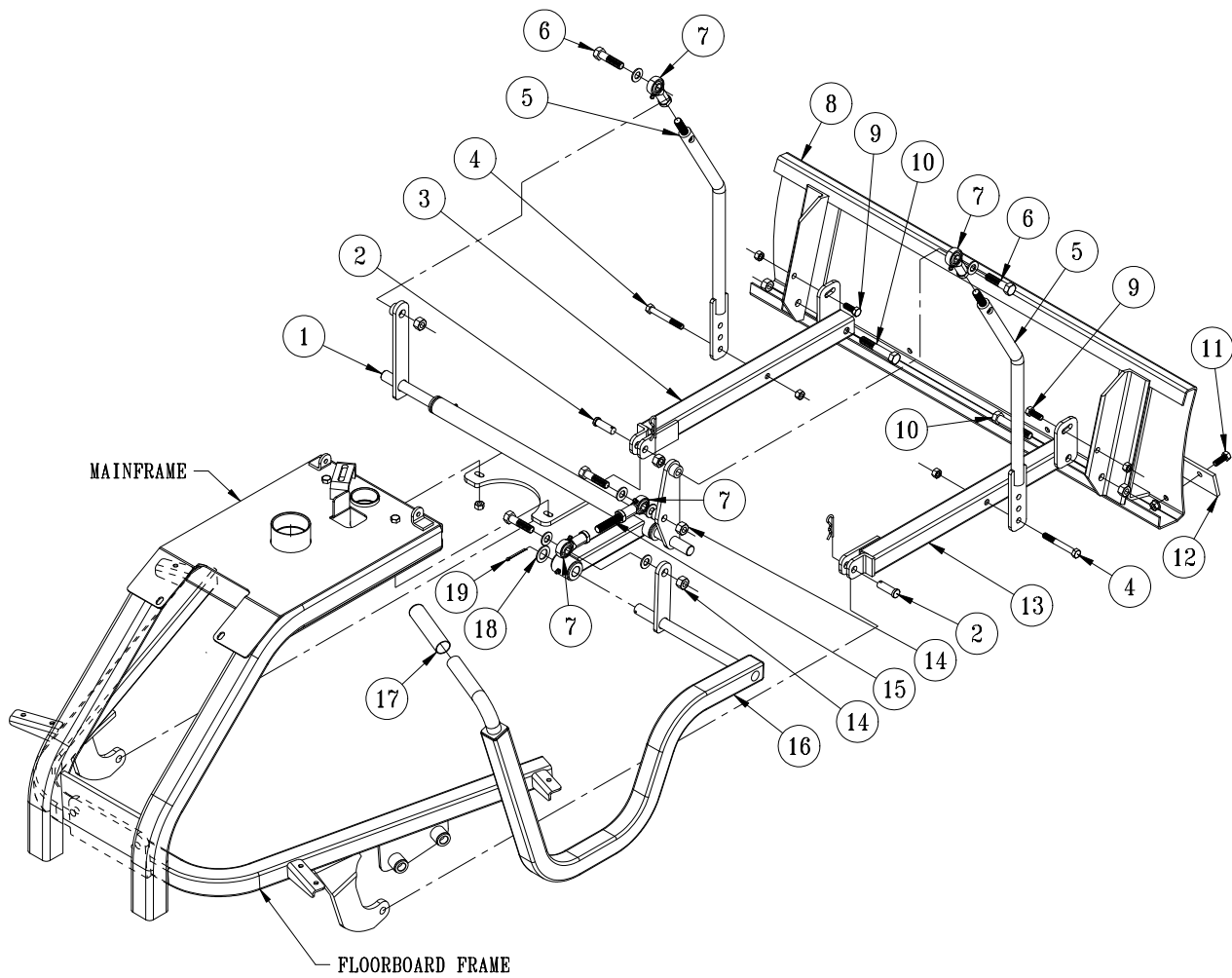
| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | 45-106       | Lift Assembly                                 | 1        |
|      | 18-221       | Flange Bushing                                | 2        |
| 2    | HCP-12-150   | Clevis Pin, $\frac{1}{2}$ x $1\frac{1}{2}$    | 2        |
|      | HHP-18       | Bridge Pin, $\frac{1}{8}$                     | 2        |
| 3    | 45-101       | Left Pusher Bar                               | 1        |
| 4    | HB-38-16-250 | Hex Bolt, $\frac{3}{8}$ - 16 x $2\frac{1}{2}$ | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                    | 4        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 2        |
| 5    | 27-073       | Lift Rod                                      | 2        |
| 6    | HB-12-13-200 | Hex Bolt, $\frac{1}{2}$ - 13 x 2              | 2        |
|      | HMB-12-14    | Machine Bushing, $\frac{1}{2}$ x 14GA         | 8        |
|      | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13            | 2        |
| 7    | 80-006       | Rod End                                       | 4        |
|      | HNJ-12-20    | Jam Nut, $\frac{1}{2}$ - 20                   | 4        |
| 8    | 45-092       | Aluminum Sand Plow Blade                      | 1        |
| 9    | HB-38-16-125 | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{4}$ | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                    | 2        |
|      | HWL-38       | Lock Washer, $\frac{3}{8}$                    | 2        |
|      | HN-38-16     | Hex Nut, $\frac{3}{8}$ - 16                   | 2        |
| 10   | HB-12-13-300 | Hex Bolt, $\frac{1}{2}$ - 13 x 3              | 2        |
|      | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13            | 2        |
| 11   | HB-38-16-100 | Hex Bolt, $\frac{3}{8}$ - 16 x 1              | 4        |
|      | HNFL-38-16   | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 16       | 4        |
| 12   | 13-167       | Wear Blade                                    | 1        |
| 13   | 45-100       | Right Pusher Bar                              | 1        |
| 14   | HB-12-13-200 | Hex Bolt, $\frac{1}{2}$ - 13 x 2              | 2        |
|      | HMB-12-14    | Machine Bushing, $\frac{1}{2}$ x 14GA         | 2        |
|      | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13            | 2        |
| 15   | 27-073-02    | Plow Link, 3"                                 | 1        |
| 16   | 45-097       | Plow Handle                                   | 1        |
| 17   | 15-019       | Grip                                          | 1        |
| 18   | HMB-34-14    | Machine Bushing, $\frac{3}{4}$ - 14GA         | 1        |
| 19   | HP-18-150    | Cotter Pin, $\frac{1}{8}$ x $1\frac{1}{2}$    | 1        |

## SAND PLOW INSTALLATION

1. Assemble (Ref# 3 and 13) Pusher Bars to (Ref# 8) Plow using (Ref# 9 and 10) hardware. There are 2 holes to Hex Bolt (Ref# 9) hardware 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.
2. Assemble the (Ref# 1) Lift Assembly to the Main Frame using the two studs that are under the frame and below the front of the console.
3. Attach the (Ref# 6) Lift Handle to the lift assembly using (Ref# 18 & 19) Cotter Pin and Machine Bushing. Using (Ref# 15 & 7) Rod and Yoke attach the handle to the lift assembly.
4. Put (Ref# 7) Rod Ends onto (Ref# 10) Lift Rods with Jam Nut first. Adjust to equal lengths. Hex Bolt Lift Rods to Lift Arms with Ball Joints to the outside. Hex Bolt from outside with the  $\frac{1}{2}$ " Machine Bushing between Rod End and Lift Arm and the  $\frac{1}{2}$  - 13 nut on the inside. Use (Ref# 6) Hardware.
5. Slide Plow under machine and connect to machine. Use (Ref# 2) Clevis Pin and Bridge Pin.
6. Lift up the plow using the bottom hole in the Lift Rod as a starting point. Secure to the Pusher Bars. Use (Ref# 4) hardware. For maximum blade clearance use the second hole from the front of the pusher bar. The three holes in the lift rods are for adjusting the hand lever. The top hole moves the lever forward. Each hole down moves the lever to the rear of the machine.
7. For fine tuning of blade height off ground twist (Ref# 7) rod end on (Ref# 15) rod. Twisting the rod end out will increase down pressure. Twisting the rod end onto the rod will decrease down pressure.

# 45-019 ALUMINUM 60" SAND PLOW DRAWING

Front Attachment





## 45-019 ALUMINUM 60" SAND PLOW PARTS LIST

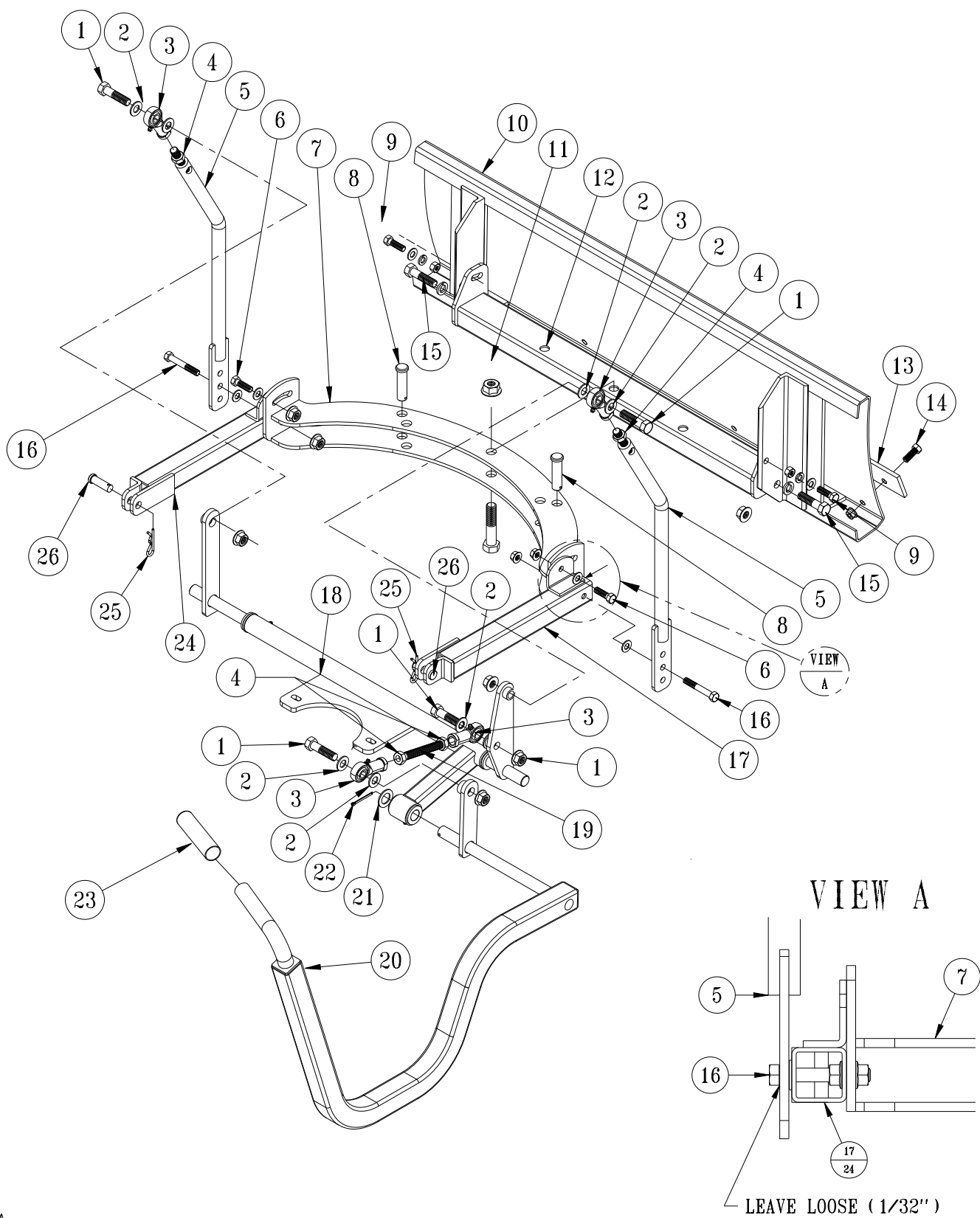
| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | 45-106       | Lift Assembly                                 | 1        |
|      | 18-221       | Flange Bushing                                | 2        |
| 2    | HCP-12-150   | Clevis Pin, $\frac{1}{2}$ x $1\frac{1}{2}$    | 2        |
|      | HHP-18       | Bridge Pin, $\frac{1}{8}$                     | 2        |
| 3    | 45-101       | Left Pusher Bar                               | 1        |
| 4    | HB-38-16-250 | Hex Bolt, $\frac{3}{8}$ - 16 x $2\frac{1}{2}$ | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                    | 4        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 2        |
| 5    | 27-073       | Lift Rod                                      | 2        |
| 6    | HB-12-13-200 | Hex Bolt, $\frac{1}{2}$ - 13 x 2              | 2        |
|      | HMB-12-14    | Machine Bushing, $\frac{1}{2}$ x 14GA         | 8        |
|      | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13            | 2        |
| 7    | 80-006       | Rod End                                       | 4        |
|      | HNJ-12-20    | Jam Nut, $\frac{1}{2}$ - 20                   | 4        |
| 8    | 45-159       | Aluminum Sand Plow Blade                      | 1        |
| 9    | HB-38-16-125 | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{4}$ | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                    | 2        |
|      | HWL-38       | Lock Washer, $\frac{3}{8}$                    | 2        |
|      | HN-38-16     | Hex Nut, $\frac{3}{8}$ - 16                   | 2        |
| 10   | HB-12-13-300 | Hex Bolt, $\frac{1}{2}$ - 13 x 3              | 2        |
|      | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13            | 2        |
| 11   | HB-38-16-100 | Hex Bolt, $\frac{3}{8}$ - 16 x 1              | 4        |
|      | HNFL-38-16   | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 16       | 4        |
| 12   | 35-012       | Wear Blade                                    | 1        |
| 13   | 45-100       | Right Pusher Bar                              | 1        |
| 14   | HB-12-13-200 | Hex Bolt, $\frac{1}{2}$ - 13 x 2              | 2        |
|      | HMB-12-14    | Machine Bushing, $\frac{1}{2}$ x 14GA         | 2        |
|      | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13            | 2        |
| 15   | 27-073       | Plow Link. 3"                                 | 1        |
| 16   | 45-097       | Plow Handle                                   | 1        |
| 17   | 15-019       | Grip                                          | 1        |
| 18   | HMB-34-14    | Machine Bushing, $\frac{3}{4}$ - 14GA         | 1        |
| 19   | HP-18-150    | Cotter Pin, $\frac{1}{8}$ x $1\frac{1}{2}$    | 1        |

## SAND PLOW INSTALLATION

1. Assemble (Ref# 3 and 13) Pusher Bars to (Ref# 8) Plow using (Ref# 9 and 10) hardware. There are 2 holes to Hex Bolt (Ref# 9) hardware 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.
2. Assemble the (Ref# 1) Lift Assembly to the Main Frame using the two studs that are under the frame and below the front of the console.
3. Attach the (Ref# 6) Lift Handle to the lift assembly using (Ref# 18 & 19) Cotter Pin and Machine Bushing. Using (Ref# 15 & 7) Rod and Yoke attach the handle to the lift assembly.
4. Put (Ref# 7) Rod Ends onto (Ref# 10) Lift Rods with Jam Nut first. Adjust to equal lengths. Hex Bolt Lift Rods to Lift Arms with Ball Joints to the outside. Hex Bolt from outside with the  $\frac{1}{2}$ " Machine Bushing between Rod End and Lift Arm and the  $\frac{1}{2}$  - 13 nut on the inside. Use (Ref# 6) Hardware.
5. Slide Plow under machine and connect to machine. Use (Ref# 2) Clevis Pin and Bridge Pin.
6. Lift up the plow using the bottom hole in the Lift Rod as a starting point. Secure to the Pusher Bars. Use (Ref# 4) hardware. For maximum blade clearance use the second hole from the front of the pusher bar. The three holes in the lift rods are for adjusting the hand lever. The top hole moves the lever forward. Each hole down moves the lever to the rear of the machine.
7. For fine tuning of blade height off ground twist (Ref# 7) rod end on (Ref# 15) rod. Twisting the rod end out will increase down pressure. Twisting the rod end onto the rod will decrease down pressure.

# 45-179 40" ANGLE PLOW

Front Attachment



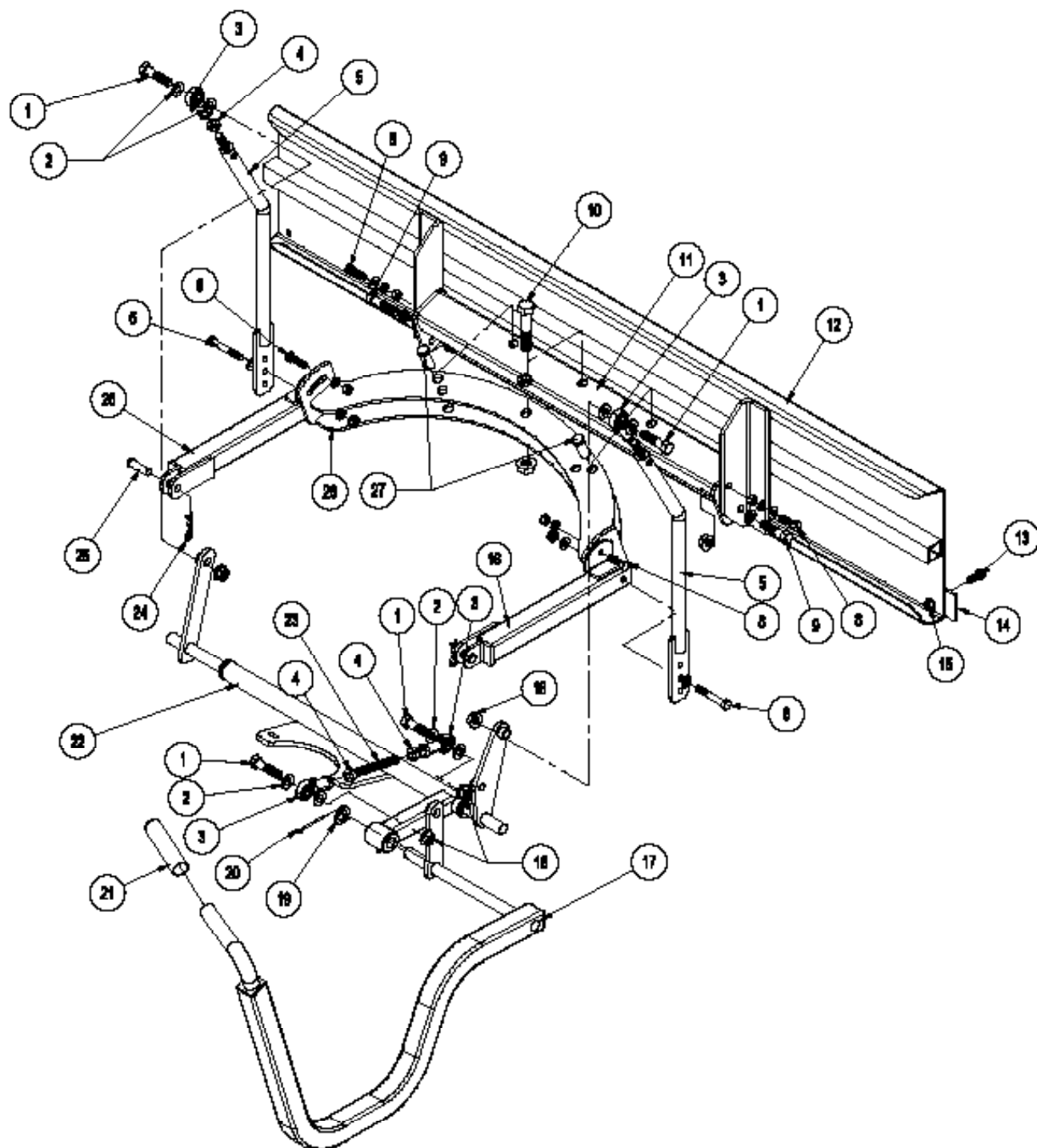


## 45-179 40" ANGLE PLOW PARTS LIST

| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | HB-12-13-200 | Hex Bolt, $\frac{1}{2}$ - 13 x 2              | 4        |
|      | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13            | 4        |
| 2    | HMB-12-14    | Machine Bushing, $\frac{1}{2}$ x 14GA         | 8        |
| 3    | 80-006       | Rod End                                       | 4        |
| 4    | HNJ-12-20    | Jam Nut, $\frac{1}{2}$ - 20                   | 4        |
| 5    | 27-073       | Lift Rod                                      | 2        |
| 6    | HB-38-16-125 | Hex Bolt, $\frac{5}{8}$ - 16 x $1\frac{1}{4}$ | 2        |
|      | HNFL-38-16   | Flange Whiz-Loc Nut, $\frac{5}{8}$ - 16       | 2        |
| 7    | 45-181       | Plow Mount                                    | 1        |
| 8    | HCP-58-250   | Clevis Pin, $\frac{5}{8}$ x $2\frac{1}{2}$    | 2        |
|      | HHP-18       | Bridge Pin, $\frac{1}{8}$                     | 2        |
| 9    | HB-38-16-125 | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{4}$ | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                    | 2        |
|      | HWL-38       | Lock Washer, $\frac{3}{8}$                    | 2        |
|      | HN-38-16     | Hex Nut, $\frac{3}{8}$ - 16                   | 2        |
| 10   | 27-017       | Aluminum Sand Plow Blade                      | 1        |
| 11   | HB-58-11-300 | Hex Bolt, $\frac{5}{8}$ - 11 x 3              | 1        |
|      | HNTL-58-11   | Nylon Lock Nut, $\frac{5}{8}$ - 11            | 1        |
| 12   | 42-495       | Pivot Frame                                   | 1        |
| 13   | 13-167       | Wear Blade                                    | 1        |
| 14   | HB-38-16-100 | Hex Bolt, $\frac{3}{8}$ - 16 x 1              | 4        |
|      | HNFL-38-16   | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 16       | 4        |
| 15   | HB-12-13-200 | Hex Bolt, $\frac{1}{2}$ - 13 x 2              | 2        |
|      | HWL-12       | Lock Washer, $\frac{1}{2}$                    | 2        |
| 16   | HB-38-16-250 | Hex Bolt, $\frac{3}{8}$ - 16 x $2\frac{1}{2}$ | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                    | 2        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 4        |
| 17   | 45-231       | Right Pusher Bar                              | 1        |
| 18   | 45-106       | Lift Assembly                                 | 1        |
|      | 18-221       | Flange Bushing                                | 2        |
| 19   | 27-073-02    | Plow Link, 3"                                 | 1        |
| 20   | 45-097       | Lift Handle                                   | 1        |
| 21   | HMB-34-14    | Machine Bushing, $\frac{3}{4}$ - 14GA         | 1        |
| 22   | HP-18-150    | Cotter Pin, $\frac{1}{8}$ x $1\frac{1}{2}$    | 1        |
| 23   | 15-019       | Grip                                          | 1        |
| 24   | 45-232       | Left Pusher Bar                               | 1        |
| 25   | HHP-18       | Bridge Pin, $\frac{1}{8}$                     | 2        |
| 26   | HCP-12-150   | Clevis Pin, $\frac{1}{2}$ x $1\frac{1}{2}$    | 2        |

# 45-180 60" ANGLE PLOW

Front Attachment

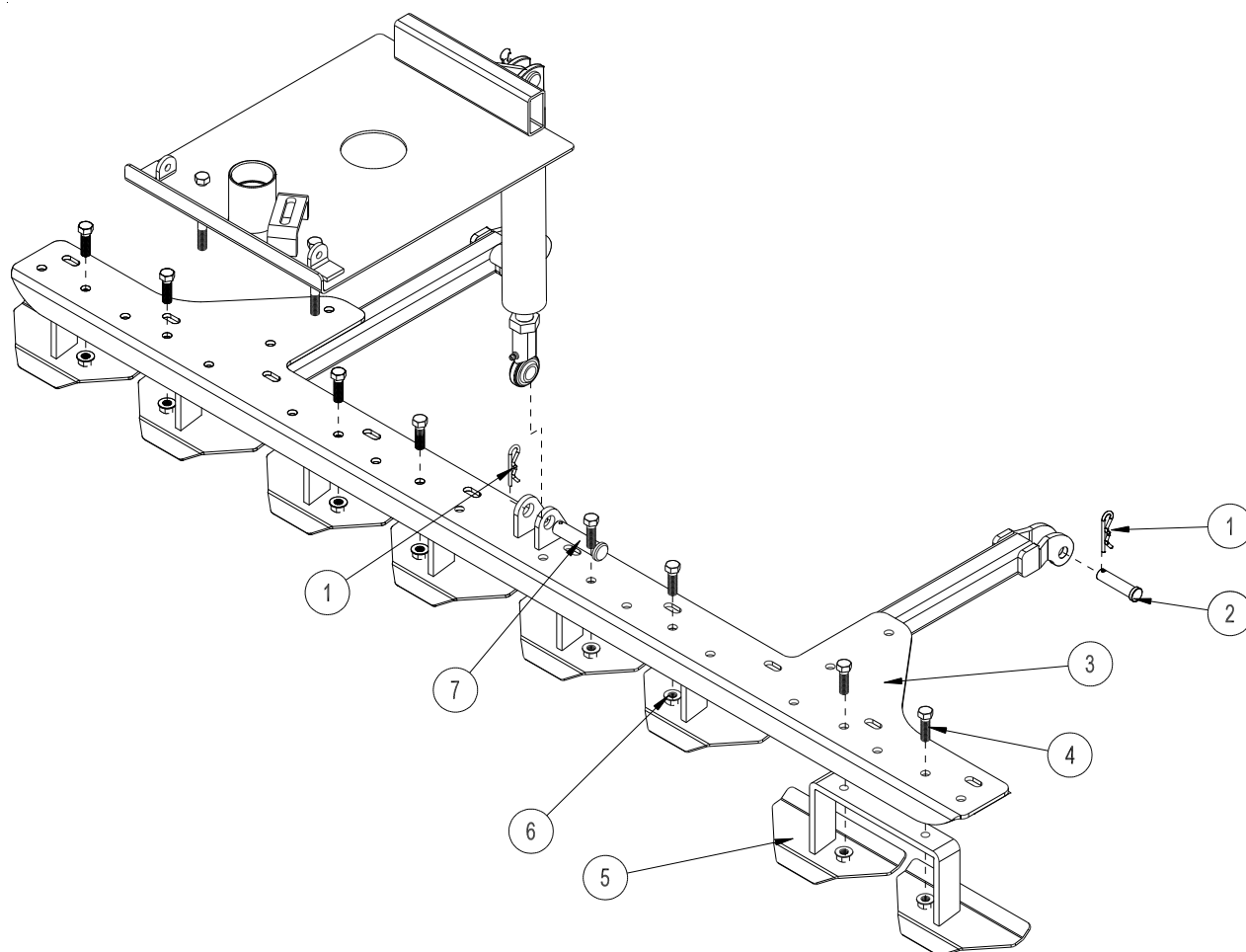


## 45-180 60" ANGLE PLOW PARTS LIST

| REF# | PART#        | DESCRIPTION                                    | QUANTITY |
|------|--------------|------------------------------------------------|----------|
| 1    | HB-12-13-200 | Hex Bolt, $\frac{1}{2}$ - 13 x 2               | 4        |
| 2    | HMB-12-14    | Machine Bushing, $\frac{1}{2}$ x 14GA          | 8        |
| 3    | 80-006       | Rod End                                        | 4        |
| 4    | HNJ-12-20    | Jam Nut, $\frac{1}{2}$ - 20                    | 4        |
| 5    | 27-073       | Lift Rod                                       | 2        |
| 6    | HB-38-16-250 | Hex Bolt, $\frac{3}{8}$ - 16 x 2 $\frac{1}{2}$ | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                     | 4        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16             | 2        |
| 7    | HB-38-16-250 | Hex Bolt, $\frac{3}{8}$ - 16 x 2 $\frac{1}{2}$ | 2        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16             | 2        |
| 8    | HB-38-16-125 | Hex Bolt, $\frac{3}{8}$ - 16 x 1 $\frac{1}{4}$ | 4        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                     | 4        |
|      | HWL-38       | Lock Washer, $\frac{3}{8}$                     | 4        |
|      | HN-38-16     | Hex Nut, $\frac{3}{8}$ - 16                    | 4        |
| 9    | HB-12-13-200 | Hex Bolt, $\frac{1}{2}$ - 13 x 2               | 2        |
|      | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13             | 2        |
| 10   | HB-58-11-300 | Hex Bolt, $\frac{5}{8}$ - 11 x 3               | 1        |
|      | HNTL-58-11   | Nylon Lock Nut, $\frac{5}{8}$ - 11             | 1        |
| 11   | 42-495       | Pivot Frame                                    | 1        |
| 12   | 45-159       | Aluminum 60" Sand Plow Blade                   | 1        |
| 13   | HB-38-16-100 | Hex Bolt, $\frac{3}{8}$ - 16 x 1               | 4        |
| 14   | 35-012       | Wear Blade                                     | 1        |
| 15   | HNFL-38-16   | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 16        | 4        |
| 16   | 45-182       | Right Pusher Bar                               | 1        |
| 17   | 45-097       | Lift Handle                                    | 1        |
|      | 18-221       | Flange Bushing                                 | 2        |
| 18   | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13             | 4        |
| 19   | HMB-34-14    | Machine Bushing, $\frac{3}{4}$ - 14GA          | 1        |
| 20   | HP-18-150    | Cotter Pin, $\frac{1}{8}$ x 1 $\frac{1}{2}$    | 1        |
| 21   | 15-019       | Grip                                           | 1        |
| 22   | 45-106       | Lift Assembly                                  | 1        |
|      | 18-221       | Flange Bushing                                 | 2        |
| 23   | 27-073-02    | Plow link. 3"                                  | 1        |
| 24   | HHP-18       | Bridge Pin, $\frac{1}{8}$                      | 2        |
| 25   | HCP-12-150   | Clevis Pin, $\frac{1}{2}$ x 1 $\frac{1}{2}$    | 2        |
| 26   | 45-183       | Left Pusher Bar                                | 1        |
| 27   | HCP-58-250   | Clevis Pin, $\frac{5}{8}$ x 2 $\frac{1}{2}$    | 2        |
|      | HHP-18       | Bridge Pin, $\frac{1}{8}$                      | 2        |
| 28   | 45-181       | Plow Mount                                     | 1        |

## 45-014 WEED CULTIVATOR

Center Attachment



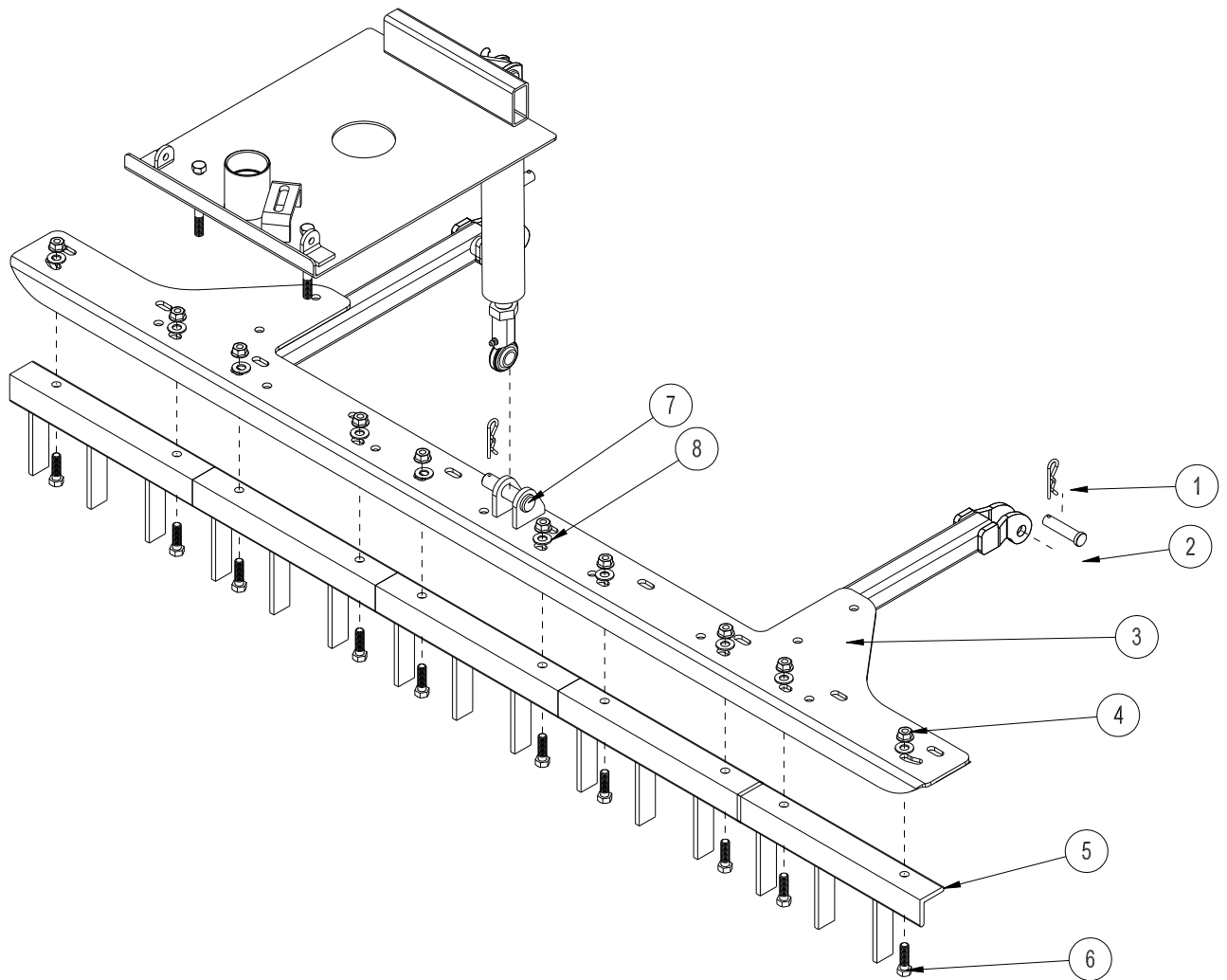
## 45-014 WEED CULTIVATOR

| REF# | PART #       | DESCRIPTION                                      | QUANTITY |
|------|--------------|--------------------------------------------------|----------|
| 1    | HHP-18       | Bridge Pin, $\frac{1}{8}$                        | 3        |
| 2    | HCP-12-200   | Clevis Pin, $\frac{1}{2} \times 2$               | 2        |
| 3    | 45-185       | Center Bar Lift                                  | 1        |
| 4    | HB-38-16-125 | Hex Bolt, $\frac{3}{8} - 16 \times 1\frac{1}{4}$ | 8        |
| 5    | 13-096       | Blade Assembly                                   | 4        |
| 6    | HNFL-38-16   | Flange Nut, $\frac{3}{8} - 16$                   | 8        |
| 7    | HCP-58-250   | Clevis Pin, $\frac{5}{8} \times 2\frac{1}{2}$    | 1        |

## INSTALLATION INSTRUCTIONS

1. Blade assemblies (Ref 5) should be Hex Bolted to the center lift bar (Ref 3). Use the  $\frac{3}{8} - 16 \times 1\frac{1}{4}$  Hex Bolt (Ref 4) and Flange Whiz-Loc Nut (Ref 6).
2. Attach the center lift bar to main frame using (Ref 1 and 2) clevis pin and bridge pin.
3. Lift center lift bar up or extend cylinder so rod end lines up with the holes on the center of the attachment lift. Use clevis pin and bridge pin (Ref 7 and 1) to fasten cylinder to sand cultivator.
4. Turn machine on and test for proper operation.

## 45-006 SAND CULTIVATOR DRAWING



Center Attachment

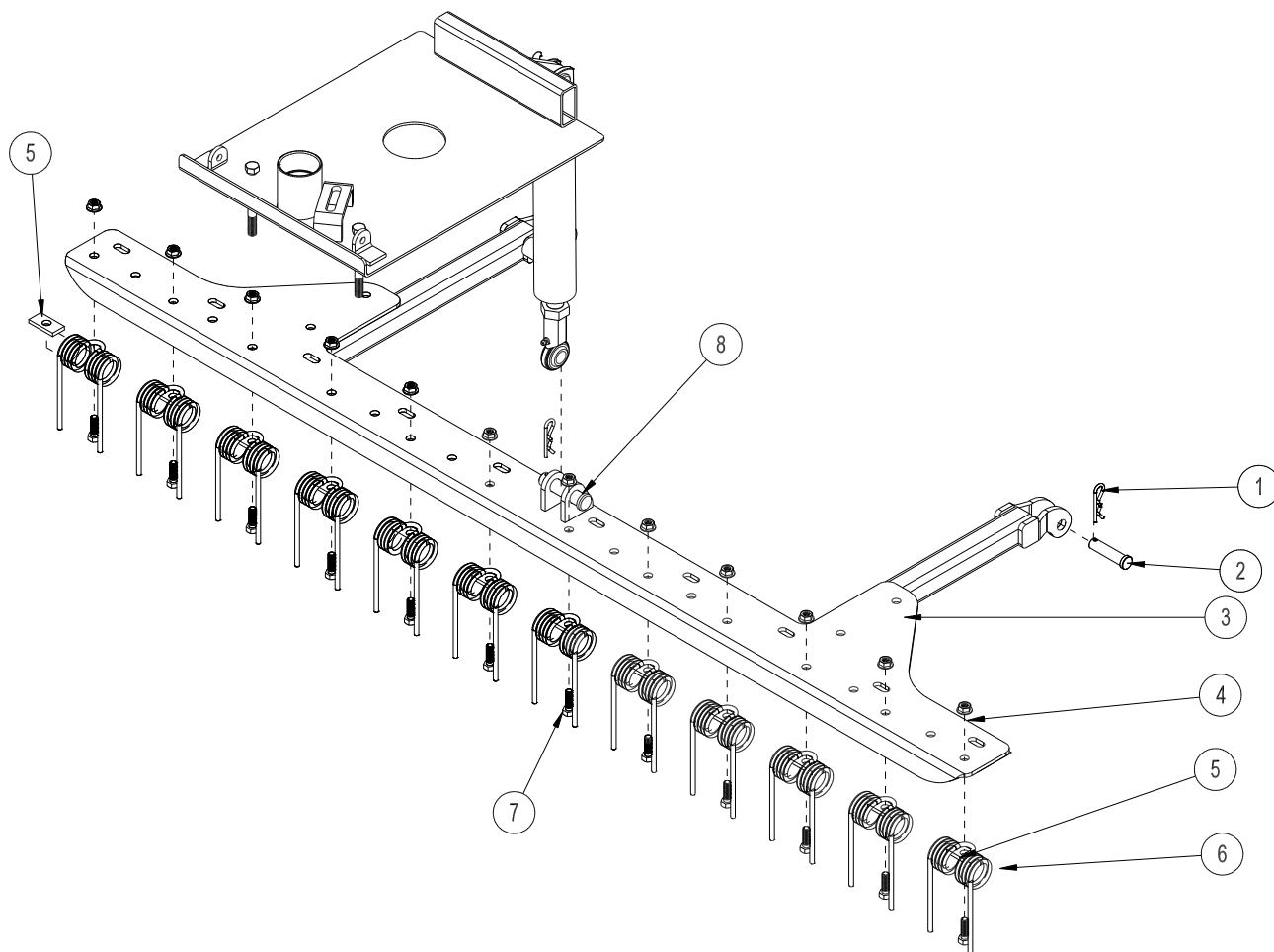
## 45-006 SAND CULTIVATOR PARTS LIST

| REF# | PART#        | DESCRIPTION                                   | QTY |
|------|--------------|-----------------------------------------------|-----|
| 1    | HHP-18       | Bridge Pin, $\frac{1}{8}$                     | 3   |
| 2    | HCP-12-200   | Clevis Pin, $\frac{1}{2} \times 2$            | 2   |
| 3    | 45-184       | Center Lift Bar                               | 1   |
| 4    | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 10  |
| 5    | 42-038       | Tine Segment                                  | 5   |
| 6    | HB-38-16-100 | Hex Bolt, $\frac{3}{8}$ - 16 x 1              | 10  |
| 7    | HCP-58-250   | Clevis Pin, $\frac{5}{8} \times 2\frac{1}{2}$ | 1   |

## INSTALLATION INSTRUCTIONS

1. Tine segments (Ref 5) should be Hex Bolted to the center lift bar (Ref 3). Use the  $\frac{3}{8}$  - 16 x 1 Hex Bolt (Ref 6) and Nylon Lock Nut (Ref 4).
2. Attach the center lift bar to main frame using (Ref 1 and 2) clevis pin and bridge pin.
3. Lift center lift bar up or extend cylinder so rod end lines up with the holes on the center of the attachment lift. Use clevis pin and bridge pin (Ref 7 and 1) to fasten cylinder to sand cultivator.
4. Turn machine on and test for proper operation.

## 45-008 SAND CULTIVATOR WITH SPRING TINES DRAWING



Center Attachment

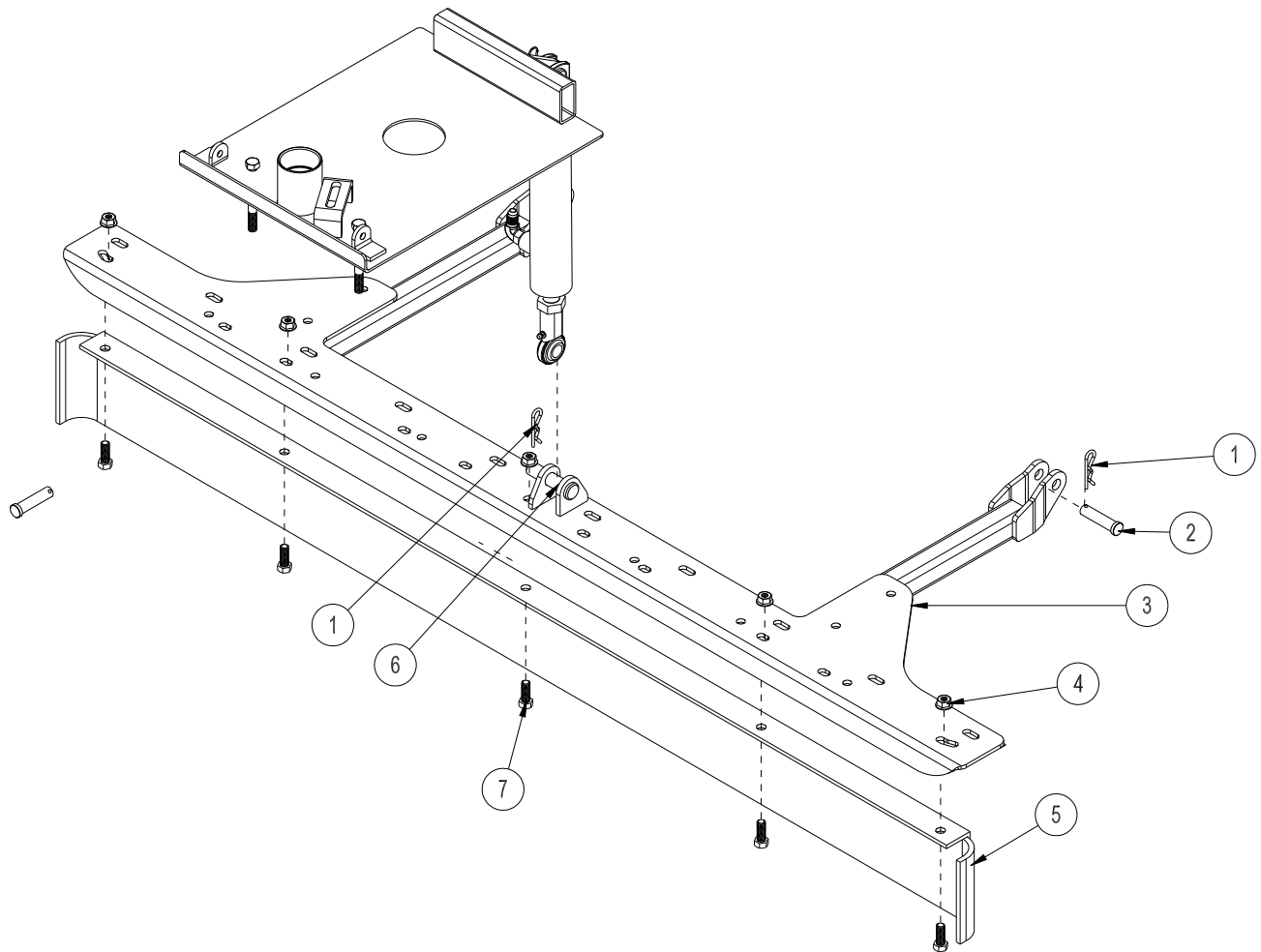
## 45-008 SAND CULTIVATOR WITH SPRING TINES PARTS LIST

| REF# | PART#         | DESCRIPTION                                   | QUANTITY |
|------|---------------|-----------------------------------------------|----------|
| 1    | HHP-18        | Bridge Pin, $\frac{1}{8}$                     | 3        |
| 2    | HCP-12-200    | Clevis Pin, $\frac{1}{2} \times 2$            | 2        |
| 3    | 45-185        | Center Lift Bar                               | 1        |
| 4    | HNTL-516-18   | Nylon Lock Nut, $\frac{5}{16} - 18$           | 12       |
| 5    | 42-177        | Spring Holder                                 | 12       |
| 6    | 42-122        | Rake Spring                                   | 12       |
| 7    | HB-516-18-100 | Hex Bolt, $\frac{5}{16} - 18 \times 1$        | 12       |
| 8    | HCP-58-250    | Clevis Pin, $\frac{5}{8} \times 2\frac{1}{2}$ | 1        |

## INSTALLATION INSTRUCTIONS

1. Springs (Ref 6) should be Hex Bolted to the center lift bar (Ref 3) with the spring holder (Ref 5) between center lift bar and the spring. Hex Bolt in place with  $\frac{5}{16} - 18 \times 1$  Hex Bolt (Ref 7) and Nylon Lock Nut (Ref 4).
2. Attach the center lift bar to main frame using (Ref 1 and 2) clevis pin and bridge pin.
3. Lift center lift bar up or extend cylinder so rod end lines up with the holes on the center of the attachment lift. Use clevis pin and bridge pin (Ref 8 and 1) to fasten cylinder to sand cultivator.
4. Turn machine on and test for proper operation.

## 45-012 CONSTRUCTION LEVELING BLADE DRAWING



Center Attachment

## 45-012 CONSTRUCTION LEVELING BLADE PARTS LIST

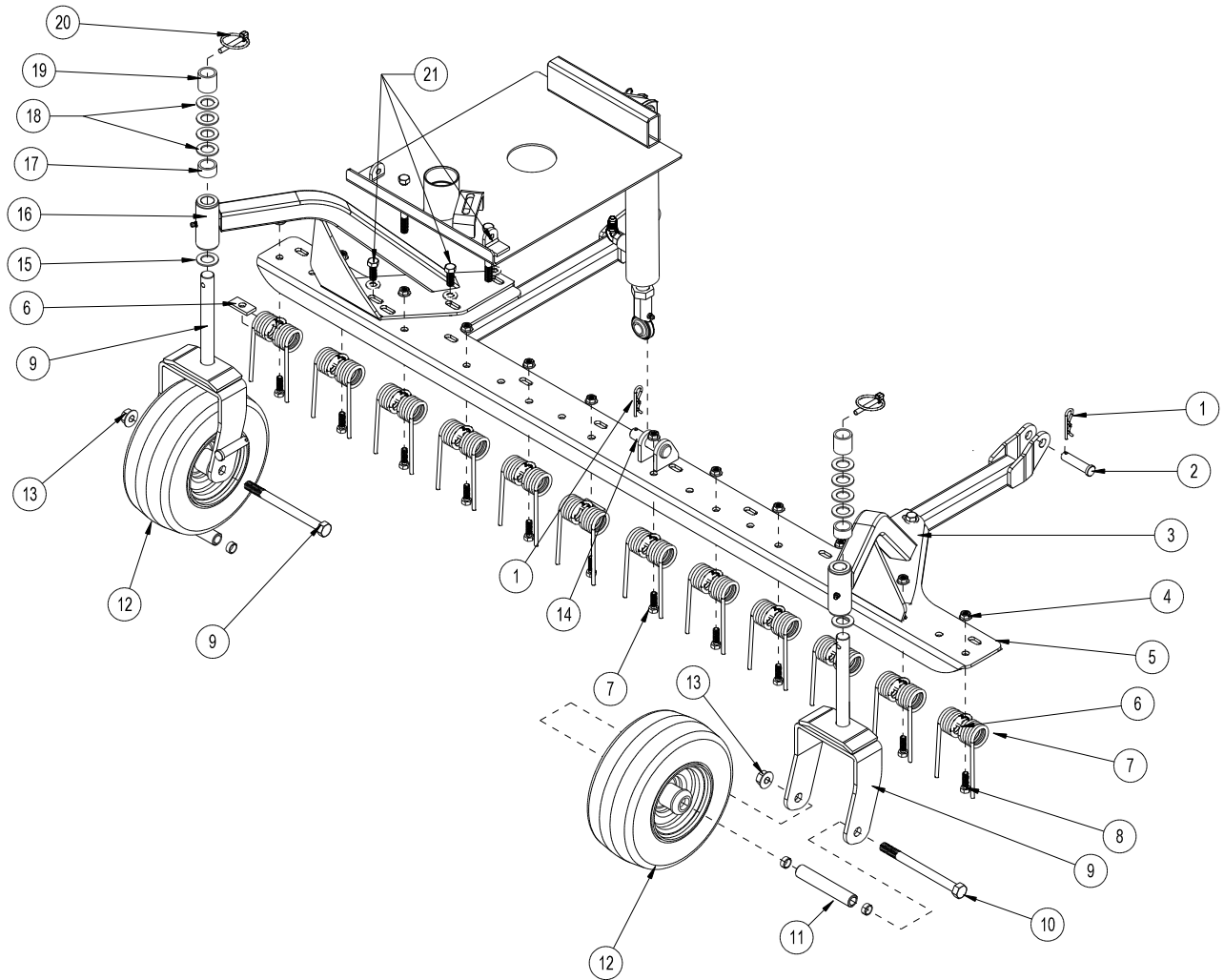
| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | HHP-18       | Bridge Pin, $\frac{1}{8}$                     | 3        |
| 2    | HCP-12-200   | Clevis Pin, $\frac{1}{2} \times 2$            | 2        |
| 3    | 45-116       | Center Lift Bar                               | 1        |
| 4    | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 5        |
| 5    | 42-097       | Leveling Blade                                | 1        |
| 6    | HCP-58-250   | Clevis Pin, $\frac{5}{8} \times 2\frac{1}{2}$ | 1        |
| 7    | HB-38-16-100 | Hex Bolt, $\frac{3}{8}$ - 16 x 1              | 5        |

## INSTALLATION INSTRUCTIONS

1. Hex Bolt leveling blade (Ref 5) to center lift bar (Ref 3) using five  $\frac{3}{8}$  - 16 x 1 Hex Bolts (Ref 7) and five  $\frac{3}{8}$  - 16 Nylon Lock Nuts (Ref 4) as shown on drawing.
2. Attach the center lift bar to a main frame using clevis pin and bridge pin (Ref 1 and 2).
3. Lift center lift bar up or extend cylinder so rod end lines up with the holes on the center of the center lift bar. Use  $\frac{5}{8}$  x  $2\frac{1}{2}$  clevis pin and bridge pin (Ref 6 & 1) to fasten cylinder to cultivator.
4. Turn machine on and test for proper operation.

# 45-013 FIELD SCARIFIER WITH TINES DRAWING

Center Attachment





## 45-013 FIELD SCARIFIER WITH TINES PARTS LIST

| REF# | PART#         | DESCRIPTION                                                          | QUANTITY |
|------|---------------|----------------------------------------------------------------------|----------|
| 1    | HHP-18        | Bridge Pin, $\frac{1}{8}$                                            | 3        |
| 2    | HCP-12-200    | Clevis Pin, $\frac{1}{2} \times 2$                                   | 2        |
| 3    | 42-205        | Left Castor Wheel Bracket                                            | 1        |
|      | 10-025        | Flange Bushing (Part of 42-288)                                      | 2        |
|      | HG-14-28-180  | Grease Fitting, $\frac{1}{4} - 28 \times 180^\circ$ (Part of 42-288) | 1        |
| 4    | HNTL-516-18   | Nylon Lock Nut, $\frac{5}{16} - 18$                                  | 12       |
| 5    | 45-137        | Center Lift Bar                                                      | 1        |
| 6    | 42-177        | Spring Holder                                                        | 12       |
| 7    | 42-122        | Rake Spring                                                          | 12       |
| 8    | HB-516-18-100 | Hex Bolt, $\frac{5}{16} - 18 \times 1$                               | 12       |
| 9    | 42-204        | Castor Fork                                                          | 2        |
| 10   | HB-12-13-600  | Hex Bolt, $\frac{1}{2} - 13 \times 6$                                | 2        |
| 11   | 33-338        | Axle Bearing                                                         | 2        |
| 12   | 42-202        | Tire & Wheel                                                         | 2        |
| 13   | HNTL-12-13    | Nylon Lock Nut, $\frac{1}{2} - 13$                                   | 2        |
| 14   | HCP-58-250    | Clevis Pin, $\frac{5}{8} \times 2\frac{1}{2}$                        | 1        |
| 15   | HMB-34-14     | Machine Bushing, $\frac{3}{4} \times 14\text{GA}$                    | 2        |
| 16   | 42-206        | Right Castor Wheel Bracket                                           | 1        |
|      | 10-025        | Flange Bushing (Part of 42-289)                                      | 2        |
|      | HG-14-28-180  | Grease Fitting, $\frac{1}{4} - 28 \times 180^\circ$ (Part of 42-289) | 1        |
| 17   | 42-215        | Short Spacer                                                         | 2        |
| 18   | HMB-34-10     | Machine Bushing, $\frac{3}{4} \times 10\text{GA}$                    | 8        |
| 19   | 42-214        | Long Spacer                                                          | 2        |
| 20   | 42-539        | Lynch Pin, $\frac{1}{4}$ "                                           | 2        |
| 21   | HB-38-16-100  | Hex Bolt, $\frac{3}{8} - 16 \times 1$                                | 6        |
|      | HW-38         | Flat Washer, $\frac{3}{8}$                                           | 6        |
|      | HNTL-38-16    | Nylon Lock Nut, $\frac{3}{8} - 16$                                   | 6        |

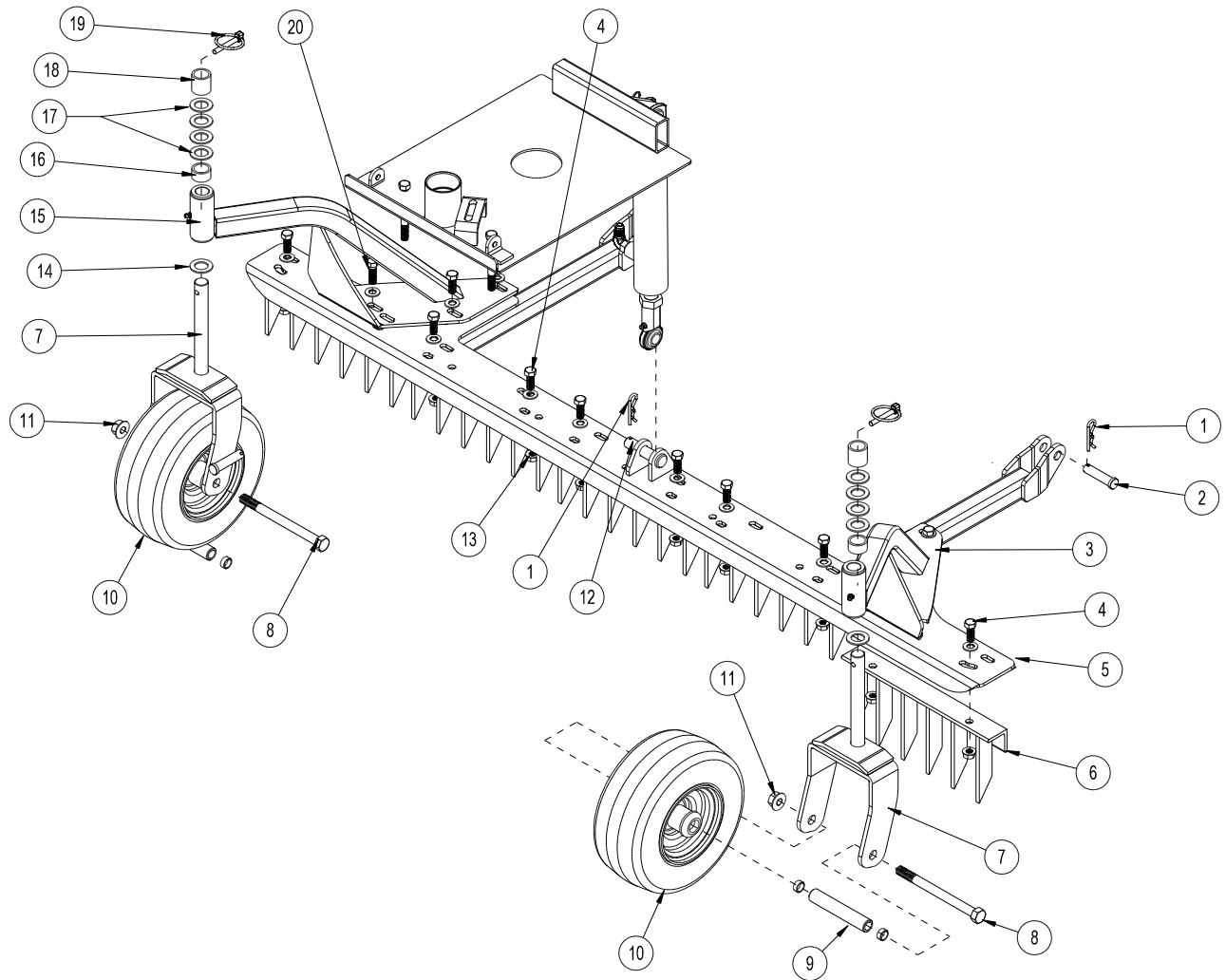
Center Attachment

## INSTALLATION INSTRUCTIONS

1. Assemble seven digger blades (Ref 6) to the center lift bar (Ref 5) using the  $\frac{3}{8} - 16 \times 1\frac{1}{4}$  Hex Bolts, washers and nuts (Ref 4 & 13). Do not put the two digger blades on that mount with the caster arm hardware (Ref 20).
2. Mount the right and left caster wheel brackets (Ref 4 and 15) to the center lift bar (Ref 5) using  $\frac{3}{8} - 16 \times 1$  Hex Bolts, washers and nuts (Ref 21). Mount the last two digger blades at this time using the  $\frac{3}{8} - 16 \times 1\frac{1}{2}$  Hex Bolts, washers and nuts (Ref 20).
4. Slide the Scarifier under the machine lining up the hydraulic cylinder and the center of the center lift bar.
5. Extend hydraulic cylinder all the way down by pushing the lever forward.
6. Mount the rod end of the cylinder onto the center lift bar and secure with a clevis pin (Ref 12) and bridge pin (Ref 1).
7. Attach the arms on the center lift bar to the main frame on the machine and secure with clevis pin (Ref 2) and bridge pin (Ref 1).
8. Turn machine on and test for proper operation.
9. Adjust castor wheels (Ref 12) by placing the short (Ref 16) or long spacer (Ref 18) on the castor wheel fork before placing the castor wheel assembly into the castor wheel brackets. Be sure both castor wheels are adjusted to the same height.

# 45-007 INFIELD SCARIFIER WITH VERTICAL BLADES DRAWING

Center Attachment



## 45-007 INFIELD SCARIFIER WITH VERTICAL BLADES PARTS LIST

| REF# | PART#        | DESCRIPTION                                                          | QUANTITY |
|------|--------------|----------------------------------------------------------------------|----------|
| 1    | HHP-18       | Bridge Pin, $\frac{1}{8}$                                            | 3        |
| 2    | HCP-12-200   | Clevis Pin, $\frac{1}{2} \times 2$                                   | 2        |
| 3    | 42-205       | Left Castor Wheel Bracket                                            | 1        |
|      | 10-025       | Flange Bushing (Part of 42-205)                                      | 2        |
|      | HG-14-28-180 | Grease Fitting, $\frac{1}{4} - 28 \times 180^\circ$ (Part of 42-205) | 1        |
| 4    | HB-38-16-100 | Hex Bolt $\frac{3}{8} - 16 \times 1$                                 | 12       |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                                           | 12       |
| 5    | 45-116       | Center Lift Bar                                                      | 1        |
| 6    | 26-042       | Tine Segment                                                         | 5        |
| 7    | 42-204       | Castor Fork                                                          | 2        |
| 8    | HB-12-13-600 | Hex Bolt, $\frac{1}{2} - 13 \times 6$                                | 2        |
| 9    | 33-338       | Axle Bearing                                                         | 2        |
| 10   | 42-202       | Tire and Wheel                                                       | 2        |
| 11   | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2} - 13$                                   | 2        |
| 12   | HCP-58-250   | Clevis Pin, $\frac{5}{8} \times 2\frac{1}{2}$                        | 1        |
| 13   | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8} - 16$                                   | 14       |
| 14   | HMB-34-14    | Machine Bushing, $\frac{3}{4} \times 14\text{GA}$                    | 2        |
| 15   | 42-206       | Right Castor Wheel Bracket                                           | 1        |
|      | 10-025       | Flange Bushing (Part of 42-206)                                      | 2        |
|      | HG-14-28-180 | Grease Fitting, $\frac{1}{4} - 28 \times 180^\circ$ (Part of 42-206) | 1        |
| 16   | 42-215       | Short Spacer                                                         | 2        |
| 17   | HMB-34-10    | Machine Bushing, $\frac{3}{4} \times 10\text{GA}$                    | 8        |
| 18   | 42-214       | Long Spacer                                                          | 2        |
| 19   | 42-539       | Lynch Pin, $\frac{5}{16}$                                            | 2        |
| 20   | HB-38-16-125 | Hex Bolt, $\frac{3}{8} - 16 \times 1\frac{1}{4}$                     | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                                           | 2        |

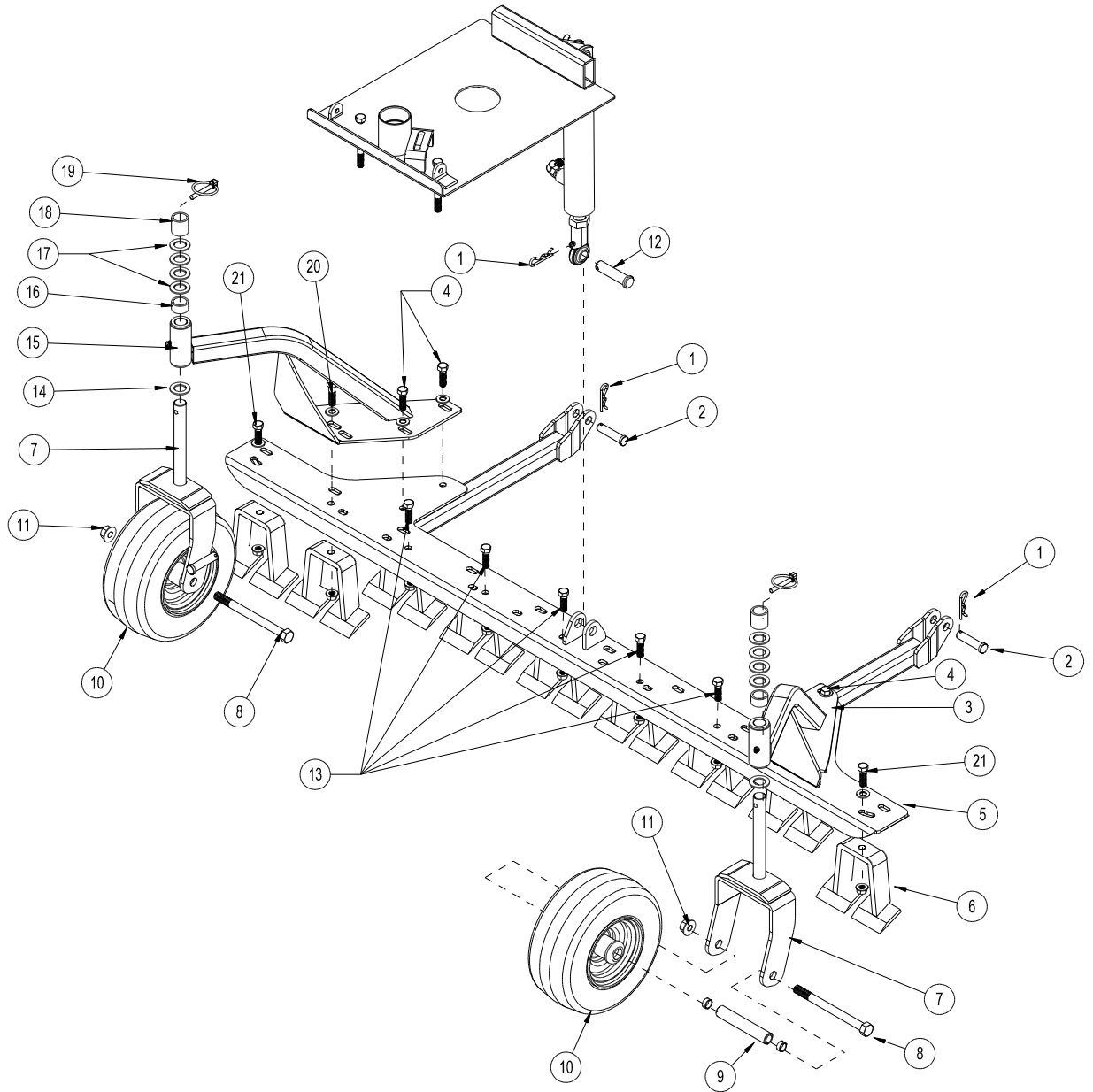
Center Attachment

## INSTALLATION INSTRUCTIONS

1. Assemble the tine Segments (Ref 6) to the center lift bar (Ref 5) using the  $\frac{3}{8} - 16 \times 1$  Hex Bolts, washers and nuts (Ref 4).
2. Mount the right and left caster wheel brackets (Ref 3 and 15) to the center lift bar (Ref 5) using the rest of  $\frac{3}{8} - 16 \times 1$  Hex Bolts, washers and nuts (Ref 4 & 13). Mount the last two digger blades at this time using the  $\frac{3}{8} - 16 \times 1\frac{1}{4}$  Hex Bolts, washers and nuts (Ref 20 & 13).
4. Slide the Scarifier under the machine lining up the hydraulic cylinder and the center of the center lift bar.
5. Extend hydraulic cylinder all the way down by pushing the lever forward.
6. Mount the rod end of the cylinder onto the center lift bar and secure with a clevis pin (Ref 12) and bridge pin (Ref 1).
7. Attach the arms on the center lift bar to the main frame on the machine and secure with clevis pin (Ref 2) and bridge pin (Ref 1).
8. Turn machine on and test for proper operation.
9. Adjust castor wheels (Ref 12) by placing the short (Ref 16) or long spacer (Ref 18) on the castor wheel fork before placing the castor wheel assembly into the castor wheel brackets. Be sure both castor wheels are adjusted to the same height.

# 45-011 INFIELD SCARIFIER WITH CHISEL BLADES DRAWING

Center Attachment



## 45-011 INFIELD SCARIFIER WITH CHISEL BLADES PARTS LIST

| REF# | PART#        | DESCRIPTION                                                          | QUANTITY |
|------|--------------|----------------------------------------------------------------------|----------|
| 1    | HHP-18       | Bridge Pin, $\frac{1}{8}$                                            | 3        |
| 2    | HCP-12-200   | Clevis Pin, $\frac{1}{2} \times 2$                                   | 2        |
| 3    | 42-205       | Left Castor Wheel Bracket                                            | 1        |
|      | 10-025       | Flange Bushing (Part of 42-205)                                      | 2        |
|      | HG-14-28-180 | Grease Fitting, $\frac{1}{4} - 28 \times 180^\circ$ (Part of 42-205) | 1        |
| 4    | HB-38-16-100 | Hex Bolt, $\frac{3}{8} - 16 \times 1$                                | 4        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                                           | 4        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8} - 16$                                   | 4        |
| 5    | 45-116       | Center Lift Bar                                                      | 1        |
| 6    | 13-114       | Digger Blades                                                        | 9        |
| 7    | 42-204       | Castor Fork                                                          | 2        |
| 8    | HB-12-13-600 | Hex Bolt, $\frac{1}{2} - 13 \times 6$                                | 2        |
| 9    | 33-338       | Axle Bearing                                                         | 2        |
| 10   | 42-202       | Tire and Wheel                                                       | 2        |
| 11   | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2} - 13$                                   | 2        |
| 12   | HCP-58-250   | Clevis Pin, $\frac{5}{8} \times 2\frac{1}{2}$                        | 1        |
| 13   | HB-38-16-125 | Hex Bolt, $\frac{3}{8} - 16 \times 1\frac{1}{4}$                     | 5        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8} - 16$                                   | 5        |
| 14   | HMB-34-14    | Machine Bushing, $\frac{3}{4} \times 14GA$                           | 2        |
| 15   | 42-206       | Right Castor Wheel Bracket                                           | 1        |
|      | 10-025       | Flange Bushing (Part of 42-206)                                      | 2        |
|      | HG-14-28-180 | Grease Fitting, $\frac{1}{4} - 28 \times 180^\circ$ (Part of 42-206) | 1        |
| 16   | 42-215       | Short Spacer                                                         | 2        |
| 17   | HMB-34-10    | Machine Bushing, $\frac{3}{4} \times 10GA$                           | 8        |
| 18   | 42-214       | Long Spacer                                                          | 2        |
| 19   | 42-539       | Lynch Pin, $\frac{5}{16}$                                            | 2        |
| 20   | HB-38-16-150 | Hex Bolt, $\frac{3}{8} - 16 \times 1\frac{1}{2}$                     | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                                           | 2        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8} - 16$                                   | 2        |
| 21   | HB-38-16-125 | Hex Bolt, $\frac{3}{8} - 16 \times 1\frac{1}{4}$                     | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                                           | 2        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8} - 16$                                   | 2        |

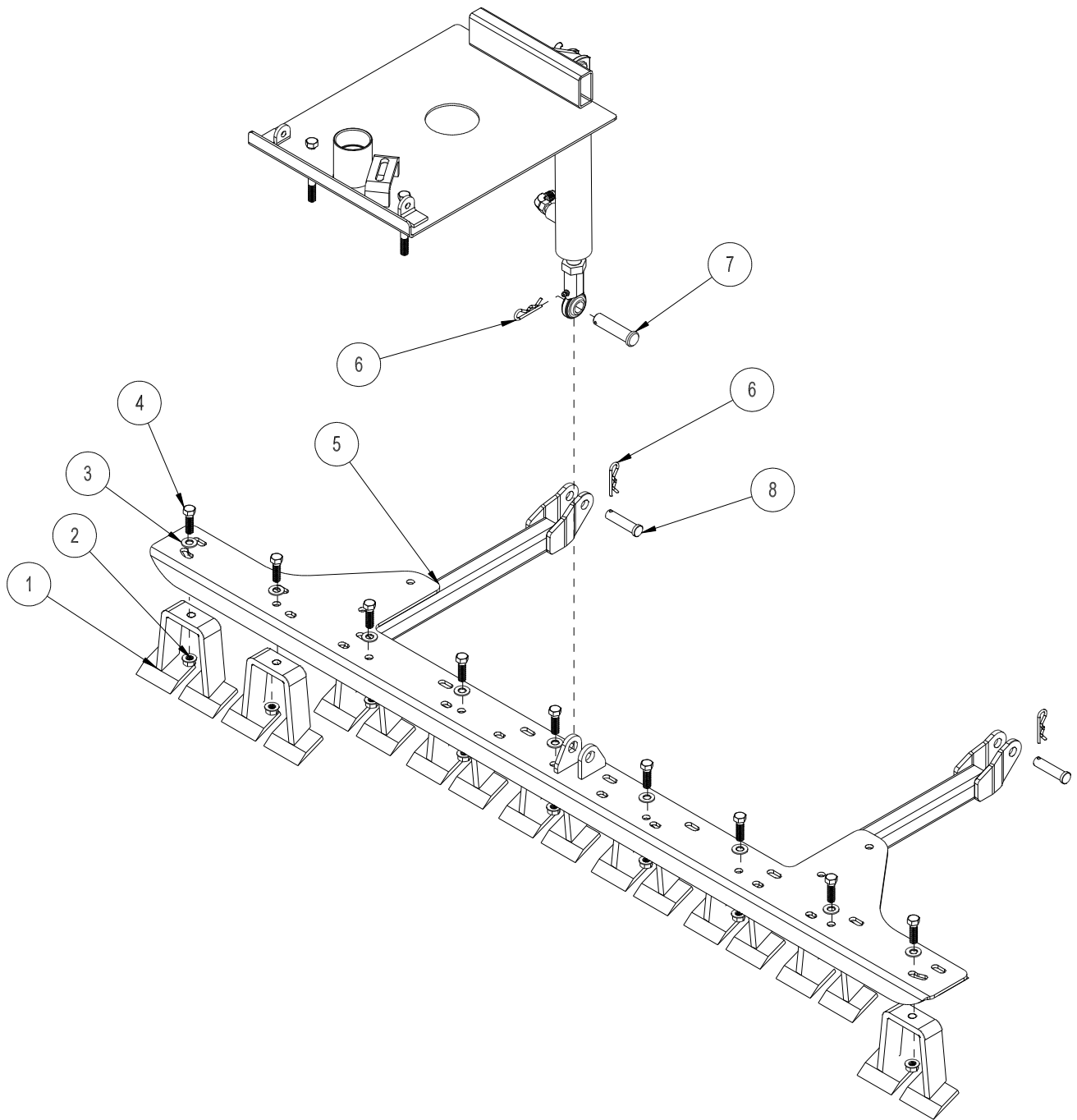
Center Attachment

## INSTALLATION INSTRUCTIONS

- Assemble seven digger blades (Ref 6) to the center lift bar (Ref 5) using the  $\frac{3}{8} - 16 \times 1\frac{1}{4}$  Hex Bolts, washers and nuts (Ref 21) on the outside slots and  $\frac{3}{8} - 16 \times 1$  Hex Bolts and nuts (Ref 13) on the holes. Do not put the two digger blades on that mount with the caster arm hardware (Ref 20).
- Mount the right and left caster wheel brackets (Ref 3 and 15) to the center lift bar (Ref 5) using  $\frac{3}{8} - 16 \times 1$  Hex Bolts, washers and nuts (Ref 4). Mount the last two digger blades at this time using the  $\frac{3}{8} - 16 \times 1\frac{1}{2}$  Hex Bolts, washers and nuts (Ref 20).
- Slide the Scarifier under the machine lining up the hydraulic cylinder and the center of the center lift bar.
- Extend hydraulic cylinder all the way down by pushing the lever forward.
- Mount the rod end of the cylinder onto the center lift bar and secure with a clevis pin (Ref 12) and bridge pin (Ref 1).
- Attach the arms on the center lift bar to the main frame on the machine and secure with clevis pin (Ref 2) and bridge pin (Ref 1).
- Turn machine on and test for proper operation.
- Adjust castor wheels (Ref 12) by placing the short (Ref 16) or long spacer (Ref 18) on the castor wheel fork before placing the castor wheel assembly into the castor wheel brackets. Be sure both castor wheels are adjusted to the same height.

# 45-173 SCARIFIER WITH CHISEL BLADES

Center Attachment



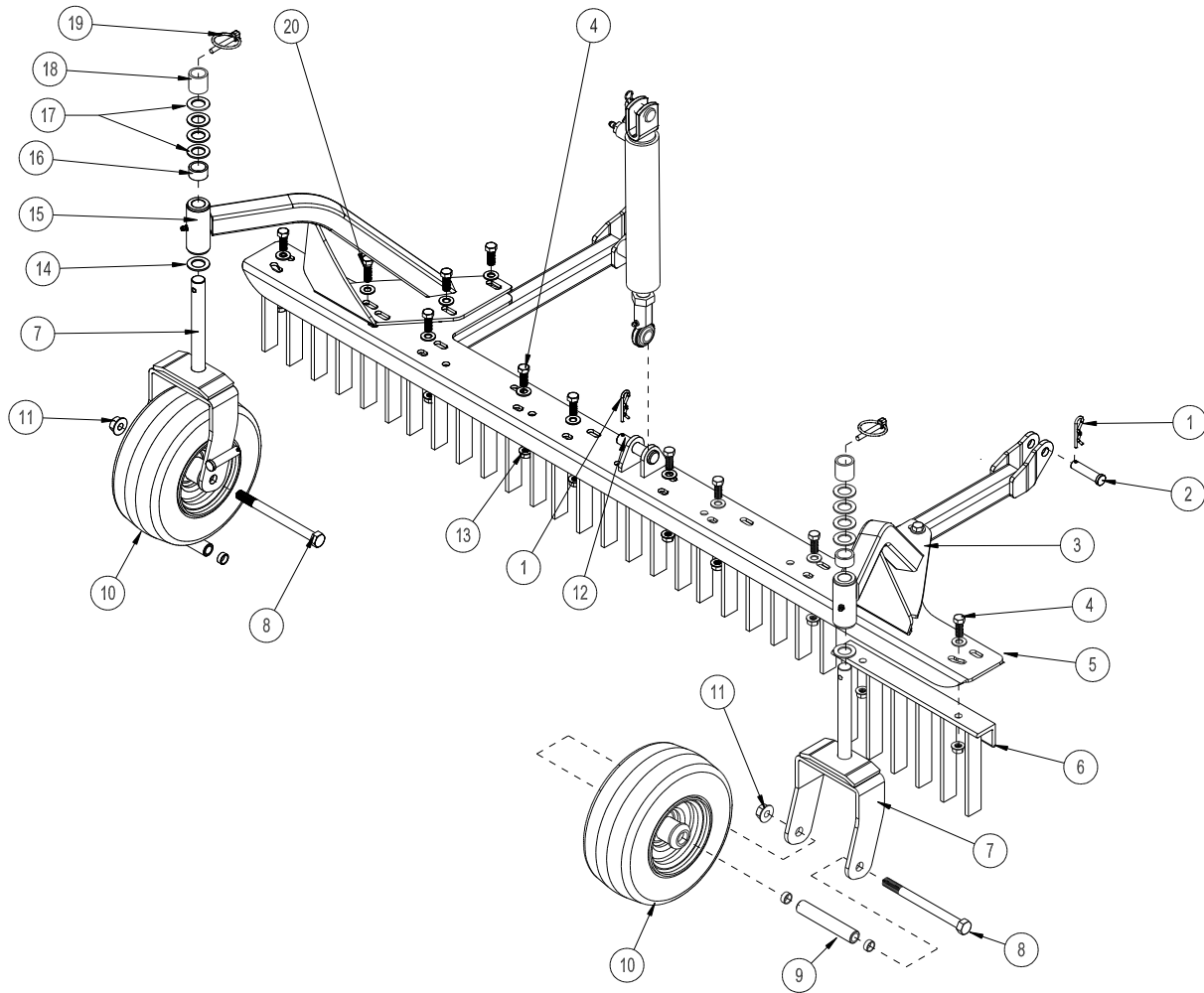
## 45-173 INFIELD SCARIFIER WITH CHISEL BLADES

| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | 13-114       | Digger Blades                                 | 9        |
| 2    | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 9        |
| 3    | HW-38        | Flat Washer, $\frac{3}{8}$                    | 9        |
| 4    | HB-38-16-125 | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{4}$ | 9        |
| 5    | 45-116       | Center Lift Bar                               | 1        |
| 6    | HHP-18       | Bridge Pin, $\frac{1}{8}$                     | 3        |
| 7    | HCP-58-250   | Clevis Pin, $\frac{5}{8}$ x $2\frac{1}{2}$    | 1        |
| 8    | HCP-12-200   | Clevis Pin, $\frac{1}{2}$ x 2                 | 2        |

1. Assemble nine digger blades (Ref 1) to the center lift bar (Ref 5) using the  $\frac{3}{8}$  - 16 x  $1\frac{1}{4}$  Hex Bolts, washers and nuts (Ref 4,5,6)
2. Slide the Scarifier under the machine lining up the hydraulic cylinder and the center of the center lift bar.
3. Extend hydraulic cylinder all the way down by pushing the lever forward.
4. Mount the rod end of the cylinder onto the center lift bar and secure with a clevis pin (Ref 7) and bridge pin (Ref 6).
5. Attach the arms on the center lift bar to the main frame on the machine and secure with clevis pin (Ref 8) and bridge pin (Ref 6).
6. Turn machine on and test for proper operation.

# 45-360 INFIELD SCARIFIER WITH LONG VERTICAL BLADES DRAWING

Center Attachment





## 45-360 INFIELD SCARIFIER WITH LONG VERTICAL BLADES PARTS LIST

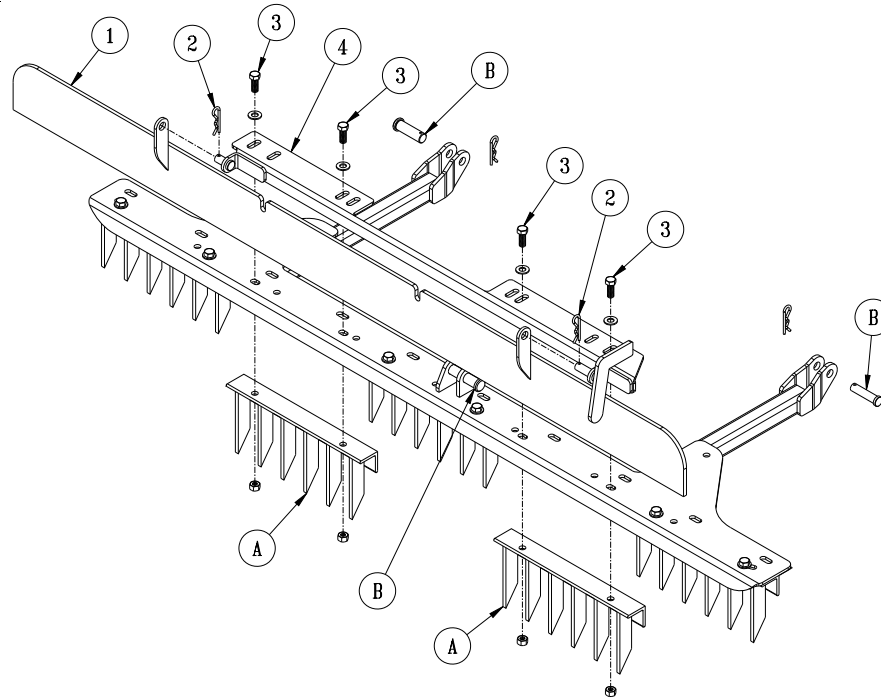
| REF# | PART#        | DESCRIPTION                                                          | QUANTITY |
|------|--------------|----------------------------------------------------------------------|----------|
| 1    | HHP-18       | Bridge Pin, $\frac{1}{8}$                                            | 3        |
| 2    | HCP-12-200   | Clevis Pin, $\frac{1}{2} \times 2$                                   | 2        |
| 3    | 42-288       | Left Castor Wheel Bracket                                            | 1        |
|      | 10-025       | Flange Bushing (Part of 42-205)                                      | 2        |
|      | HG-14-28-180 | Grease Fitting, $\frac{1}{4} - 28 \times 180^\circ$ (Part of 42-205) | 1        |
| 4    | HB-38-16-100 | Hex Bolt, $\frac{3}{8} - 16 \times 1$                                | 12       |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                                           | 12       |
| 5    | 45-116       | Center Lift Bar                                                      | 1        |
| 6    | 42-241       | Tine Segment                                                         | 5        |
| 7    | 42-204       | Castor Fork                                                          | 2        |
| 8    | HB-12-13-600 | Hex Bolt, $\frac{1}{2} - 13 \times 6$                                | 2        |
| 9    | 33-338       | Axle Bearing                                                         | 2        |
| 10   | 42-202       | Tire and Wheel                                                       | 2        |
| 11   | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2} - 13$                                   | 2        |
| 12   | HCP-58-250   | Clevis Pin, $\frac{5}{8} \times 2\frac{1}{2}$                        | 1        |
| 13   | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8} - 16$                                   | 14       |
| 14   | HMB-34-14    | Machine Bushing, $\frac{3}{4} \times 14GA$                           | 2        |
| 15   | 42-289       | Right Castor Wheel Bracket                                           | 1        |
|      | 10-025       | Flange Bushing (Part of 42-206)                                      | 2        |
|      | HG-14-28-180 | Grease Fitting, $\frac{1}{4} - 28 \times 180^\circ$ (Part of 42-206) | 1        |
| 16   | 42-215       | Short Spacer                                                         | 2        |
| 17   | HMB-34-10    | Machine Bushing, $\frac{3}{4} \times 10GA$                           | 8        |
| 18   | 42-214       | Long Spacer                                                          | 2        |
| 19   | 42-539       | Lynch Pin, $\frac{5}{16}$                                            | 2        |
| 20   | HB-38-16-125 | Hex Bolt, $\frac{3}{8} - 16 \times 1\frac{1}{4}$                     | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                                           | 2        |

Center Attachment

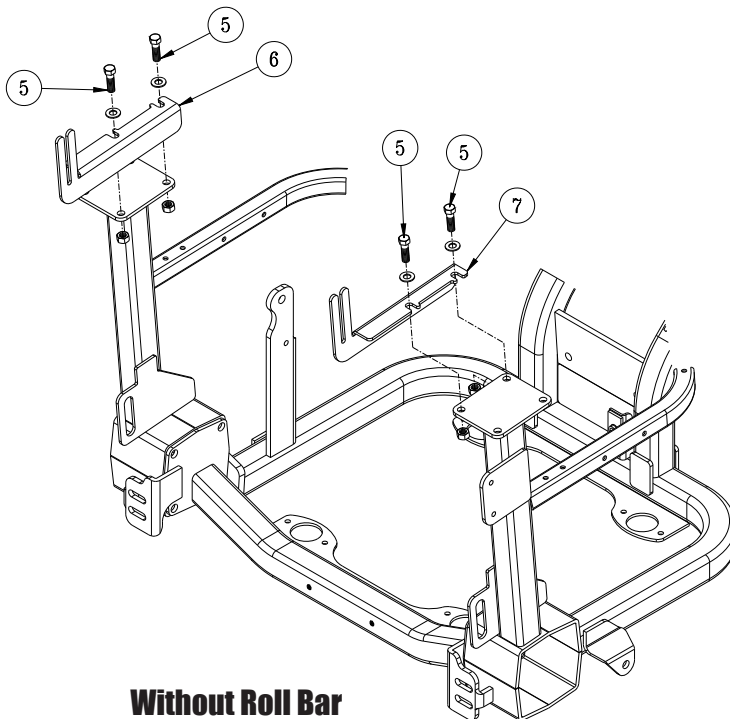
## INSTALLATION INSTRUCTIONS

1. Assemble the tine Segments (Ref 6) to the center lift bar (Ref 5) using the  $\frac{3}{8} - 16 \times 1$  Hex Bolts, washers and nuts (Ref 4).
2. Mount the right and left caster wheel brackets (Ref 3 and 15) to the center lift bar (Ref 5) using the rest of  $\frac{3}{8} - 16 \times 1$  Hex Bolts, washers and nuts (Ref 4 & 13). Mount the last two digger blades at this time using the  $\frac{3}{8} - 16 \times 1\frac{1}{4}$  Hex Bolts, washers and nuts (Ref 20 & 13).
4. Slide the Scarifier under the machine lining up the hydraulic cylinder and the center of the center lift bar.
5. Extend hydraulic cylinder all the way down by pushing the lever forward.
6. Mount the rod end of the cylinder onto the center lift bar and secure with a clevis pin (Ref 12) and bridge pin (Ref 1).
7. Attach the arms on the center lift bar to the main frame on the machine and secure with clevis pin (Ref 2) and bridge pin (Ref 1).
8. Turn machine on and test for proper operation.
9. Adjust castor wheels (Ref 12) by placing the short (Ref 16) or long spacer (Ref 18) on the castor wheel fork before placing the castor wheel assembly into the castor wheel brackets. Be sure both castor wheels are adjusted to the same height.

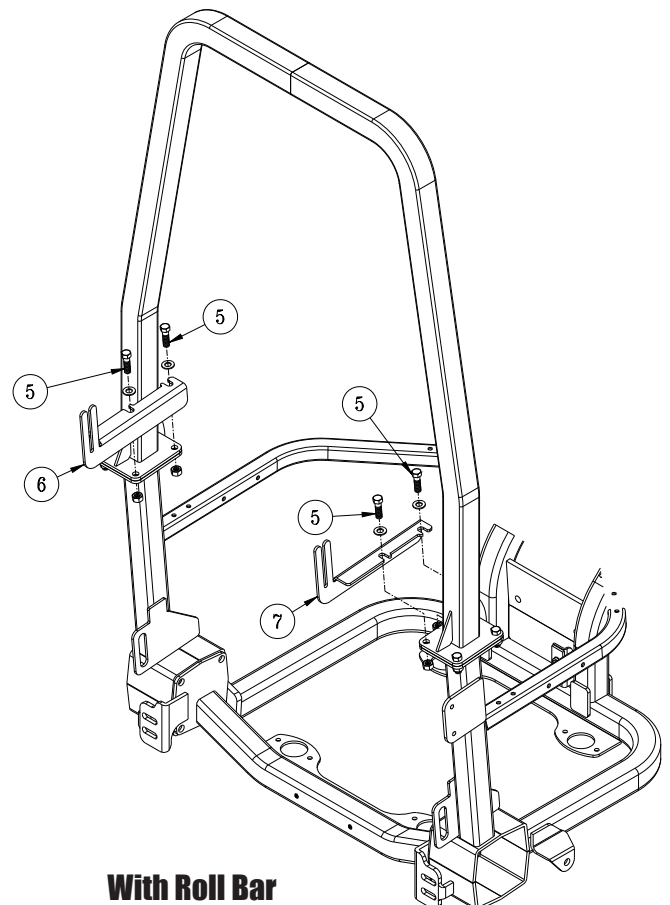
## 45-195 GRADER BLADE DRAWING



## 45-195 GRADER BLADE CARRIER DRAWINGS



**Without Roll Bar**



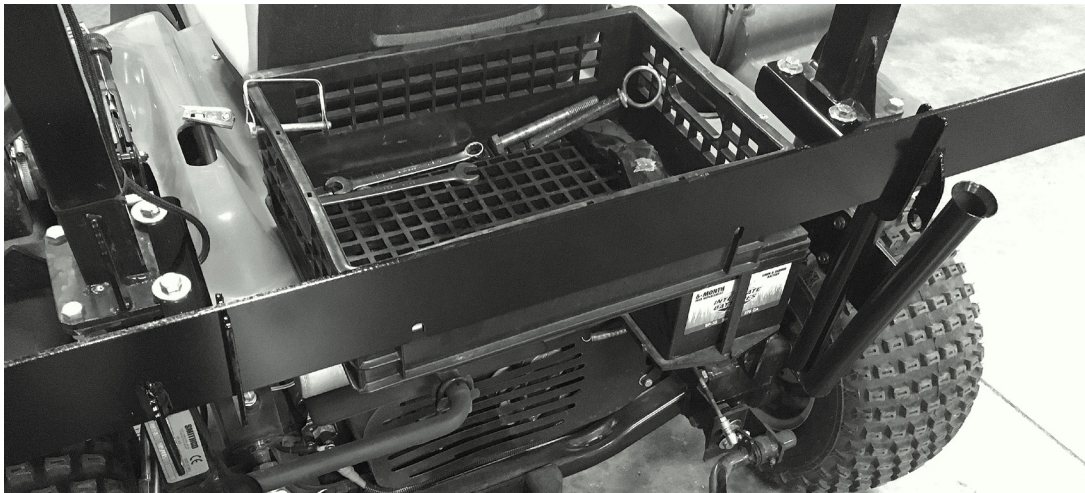
**With Roll Bar**

## 45-195 GRADER BLADE PARTS LIST

| REF# | PART#         | DESCRIPTION                                    | QTY |
|------|---------------|------------------------------------------------|-----|
| 1    | 42-207        | Grader Blade                                   | 1   |
| 2    | HHP-18        | Bridge Pin, $\frac{1}{8}$                      | 2   |
| 3    | HB-38-16-125  | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{4}$  | 4   |
|      | HW-38         | Flat Washer, $\frac{3}{8}$                     | 4   |
| 4    | 45-190        | Blade Mount                                    | 1   |
| 5    | HB-716-14-150 | Hex Bolt, $\frac{7}{16}$ - 14 x $1\frac{1}{2}$ | 4   |
|      | HNTL-716-14   | Nylon Lock Nut, $\frac{7}{16}$ - 14            | 4   |
|      | HW-716        | Flat Washer, $\frac{7}{16}$                    | 4   |
| 6    | 45-191        | LH Carrier Bracket                             | 1   |
| 7    | 45-192        | RH Carrier Bracket                             | 1   |

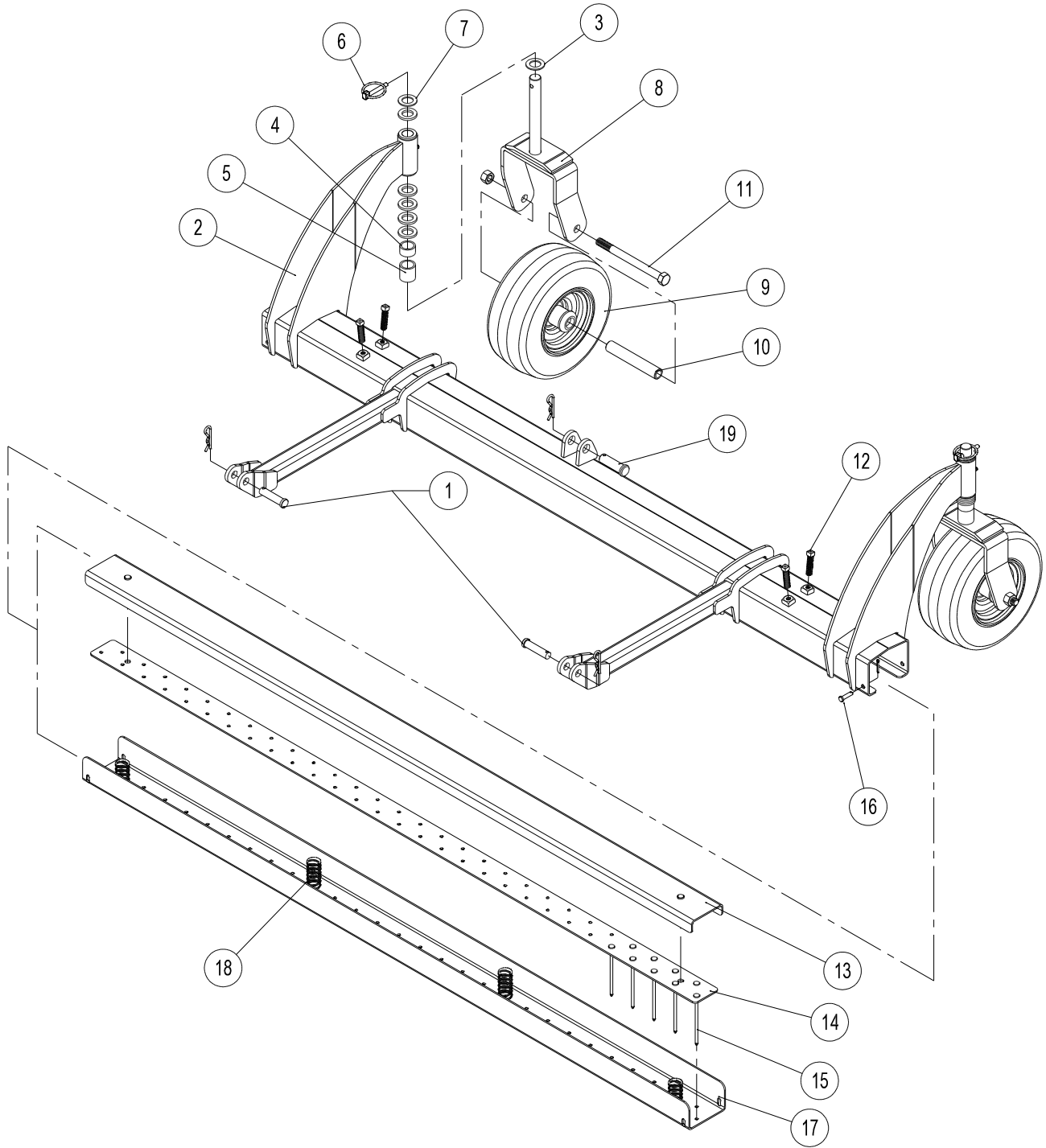
## 45-195 GRADER BLADE INSTALLATION INSTRUCTIONS

1. Lower center attachment to the ground and remove the 3 Clevis Pins(**Ref. B**).
2. Remove the (4) Hex Bolts holding each of Blades(**Ref A**) to the right and left of the center blade. Set the Blades and (4) Nylon Lock Nuts aside.
3. Place the Blade Mount(**Ref. 4**) on top of the attachment frame, lining up the slots where the Hex Bolts were removed. Replace the removed Hex Bolts with the included  $\frac{3}{8}$  -16 x  $1\frac{1}{4}$  Hex Bolts and  $\frac{3}{8}$  Flat Washers(**Ref 3**). Reinstall the Blades(**Ref. A**) and secure using the  $\frac{3}{8}$  -16 Nylon Lock Nuts that were set aside.
4. Check all hardware for tightness.
5. Reinstall center attachment. Slide the Grader Blade(**Ref. 1**) onto the pins, as illustrated, and secure using the Bridge Pins(**Ref 2**).
- 6a. *To install the Carrier Brackets on a machine **without** a roll bar:*  
Mount the RH Carrier Bracket(**Ref. 7**) and LH Carrier Bracket(**Ref. 6**) to the to the ROPS towers using the inside set of holes. Secure each Bracket using the  $\frac{7}{16}$  -14 x  $1\frac{1}{2}$  Hex Bolts,  $\frac{7}{16}$  Flat Washers and  $\frac{7}{16}$  -14 Nylon Lock Nuts.
- 6b. *To install the Carrier Brackets on a machine **with** a roll bar:*  
Remove the (4) inside Hex Bolts, position each Carrier Bracket(**Refs. 6 & 7**) over the holes and use the  $\frac{7}{16}$  -14 x  $1\frac{1}{2}$  Hex Bolts,  $\frac{7}{16}$  Flat Washers and  $\frac{7}{16}$  -14 Nylon Lock Nuts to secure.
7. When placing the Grader Blade in the Carriers point the mounting tabs downward as shown in the photo below.



# 45-177 NAIL SCARIFIER WITH CASTOR WHEELS DRAWING

Center Attachment

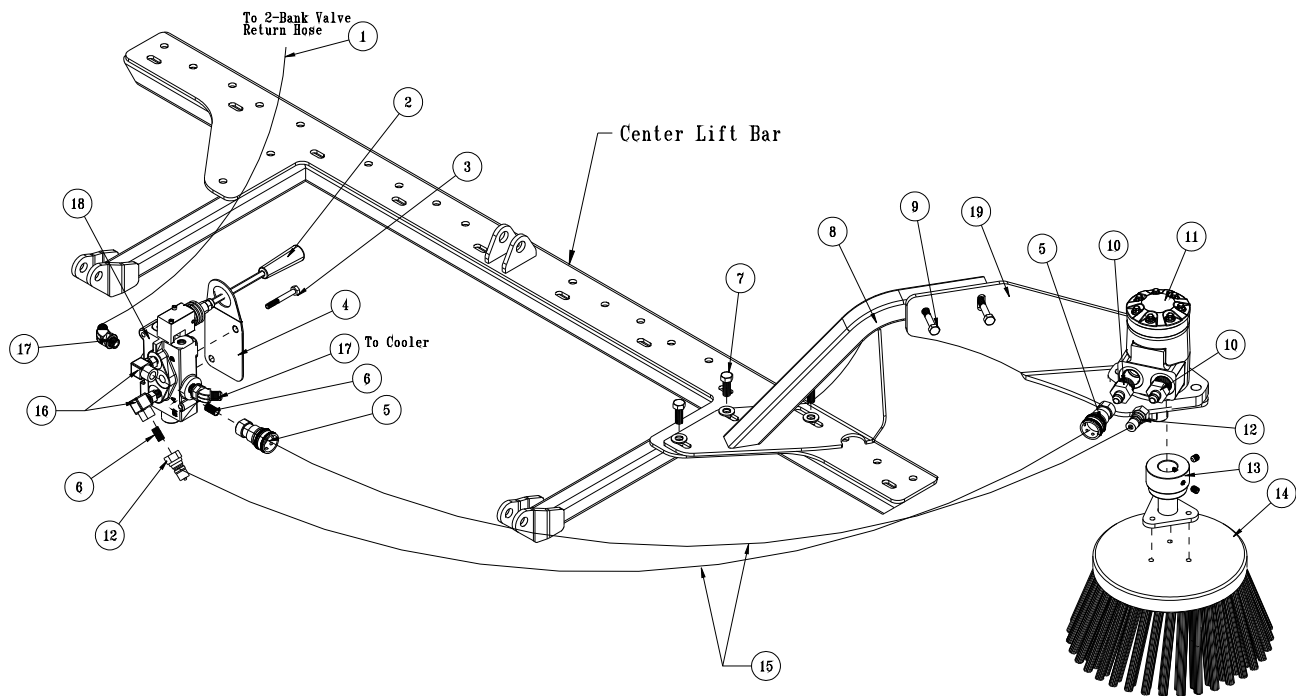


## 45-177 NAIL SCARIFIER WITH CASTOR WHEELS PARTS LIST

| REF# | PART#           | DESCRIPTION                                      | QUANTITY |
|------|-----------------|--------------------------------------------------|----------|
| 1    | HCP-12-200      | Clevis Pin, 1/2 x 2                              | 2        |
|      | HHP-18          | Bridge Pin, 1/8                                  | 2        |
| 2    | 45-171          | Nail Scarifier Frame                             | 1        |
|      | 10-025          | Flange Bushing (Part of 43-171)                  | 4        |
|      | HG-14-28-180    | Grease Fitting, 1/4 - 28 x 180° (Part of 43-171) | 2        |
| 3    | HMB-34-14       | Machine Bushing, 3/4 x 14GA                      | 2        |
| 4    | 42-215          | Short Spacer                                     | 2        |
| 5    | 42-214          | Long Spacer                                      | 2        |
| 6    | 42-539          | Lynch Pin, 1/4"                                  | 2        |
| 7    | HMB-34-10       | Machine Bushing, 3/4 x 10GA                      | 12       |
| 8    | 42-204          | Castor Fork                                      | 2        |
| 9    | 42-202          | Tire & Wheel                                     | 2        |
| 10   | 33-338          | Axle Bearing                                     | 2        |
| 11   | HB-12-13-600    | Hex Bolt, 1/2 - 13 x 6                           | 2        |
|      | HNTL-12-13      | Nylon Lock Nut, 1/2 - 13                         | 2        |
| 12   | HSSQS-38-16-150 | SS Sq. Head Set Screw, 3/8 - 16 x 1 1/2          | 4        |
|      | HN-38-16        | Hex Nut, 3/8 - 16                                | 4        |
| 13   | 45-172          | Nail Channel Cover                               | 1        |
| 14   | 45-170          | Nail Plate                                       | 1        |
| 15   | 9028            | Spiral Shank Nail, 7GA x 4"                      | 57       |
| 16   | HCP-14-075      | Clevis Pin, 1/4 x 3/4                            | 1        |
|      | HP-332-075      | Cotter Pin, 3/8 x 3/4                            | 1        |
| 17   | 45-169          | Nail Channel                                     | 1        |
| 18   | 43-175          | Compression Spring                               | 4        |
| 19   | HCP-58-200      | Clevis Pin, 5/8 x 2                              | 1        |
|      | HHP-18          | Bridge Pin, 1/8                                  | 1        |

Center Attachment

# 45-015 MOTORIZED BRUSH DRAWING



Center Attachment

| REF# | PART #        | DESCRIPTION                                  | QUANTITY |
|------|---------------|----------------------------------------------|----------|
| 1    | 45-143        | Hydraulic Hose 21"                           | 1        |
| 2    | 78-417        | Handle                                       | 1        |
| 3    | HB-516-18-200 | Hex Bolt $\frac{5}{16}$ - 18 x 2             | 2        |
|      | HNTL-516-18   | Nylon Lock Nut $\frac{5}{16}$ - 18           | 2        |
| 4    | 45-127        | Valve Mount Plate                            | 1        |
| 5    | 78-230        | Coupler $\frac{1}{4}$ "                      | 2        |
| 6    | 18-011        | Black Pipe Close Nipple $\frac{1}{4}$        | 2        |
| 7    | HB-38-16-100  | Hex Bolt $\frac{3}{8}$ - 16 x 1              | 3        |
|      | HW-38         | Washer $\frac{3}{8}$                         | 3        |
|      | HNTL-38-16    | Nylon Lock Nut $\frac{3}{8}$ - 16            | 3        |
| 8    | 45-152        | Brush Motor Support                          | 1        |
| 9    | HB-516-18-200 | Hex Bolt $\frac{5}{16}$ - 18 x 2             | 2        |
|      | HNFL-516-18   | Flange Whiz-Loc Nut $\frac{5}{16}$ - 18      | 2        |
| 10   | 18-331        | Adapter                                      | 2        |
| 11   | 45-149        | Hydraulic Motor                              | 1        |
| 12   | 78-231        | Nipple, $\frac{1}{4}$                        | 2        |
| 13   | 45-150        | Hub Assembly                                 | 1        |
|      | HB-14-20-150  | Hex Bolt $\frac{1}{4}$ - 20 x $1\frac{1}{2}$ | 3        |
|      | HNTL-14-20    | Nylon Lock Nut $\frac{1}{4}$ - 20            | 3        |
| 14   | 45-144        | 8" Polypro Side Broom                        | 1        |
| 15   | 45-142        | Hydraulic Hose 42"                           | 2        |
| 16   | 23-018        | O-ring Elbow                                 | 2        |
| 17   | 18-188        | 45° Elbow                                    | 2        |
| 18   | 45-148        | Single Bank Valve                            | 1        |
| 19   | 45-151        | Brush Motor Mount                            | 1        |



# INSTALLATION INSTRUCTIONS

1. This product only fits on a Sand Star I(45-001) and Sand Star II (45-002).
2. Center lift bar must be installed on our machine. This kit does not come with a lift bar.
3. If your center lift bar has castor wheels on it, you must remove the castor wheels and brackets.
4. Install Brush Motor Support (Ref 8) on your right side of center lift arm using the holes where the caster wheel would Hex Bolt to. Hex Bolt in place with hardware (Ref 7).
5. Place Hub Assembly (Ref 13) on brush (Ref 14) with the (Ref 13) hardware.
6. Place motor (Ref 11) on Motor mount (Ref 19) and then mount that assembly to the Brush Motor Support (Ref 8).
7. Connect the brush and hub assembly to the motor and tighten set screws.
8. Place adapter (Ref 10) into motor. Then place the Coupler (Ref 5) on the inside adapter and the nipple (Ref 12) on the outside adapter.
9. Assemble the valve as shown in the drawing.
10. The Valve assembly mounts on the right front fender. The valve goes underneath the fender with the handle pointing outward. The valve mount plate (Ref 4) mounts on the outside of the fender.
11. Using the valve mount as a template, Measure in approximately **4.25 inches** from edge of right fender and mark. Line valve mount up with contour of the fender and the right side of the line you just marked. Trace holes onto fiberglass. Drill holes out.
12. Mount the Single Bank Hydraulic Valve (Ref # 18) to the Valve Mount (Ref # 4) as illustrated, using the two  $\frac{5}{16}$  - 18 x 2 Hex Bolts (Ref # 3). Secure with the two Nylon Lock Nuts. Connect the Straight Handle (Ref # 2) to the Valve.
13. Connect 42" hoses (Ref 15) from the motor to the valve. Connect the 21" hose from the valve to the cooler. The return hose on the 2-bank valve connects to the single bank valve.
14. Test operation of the broom before using on turf.

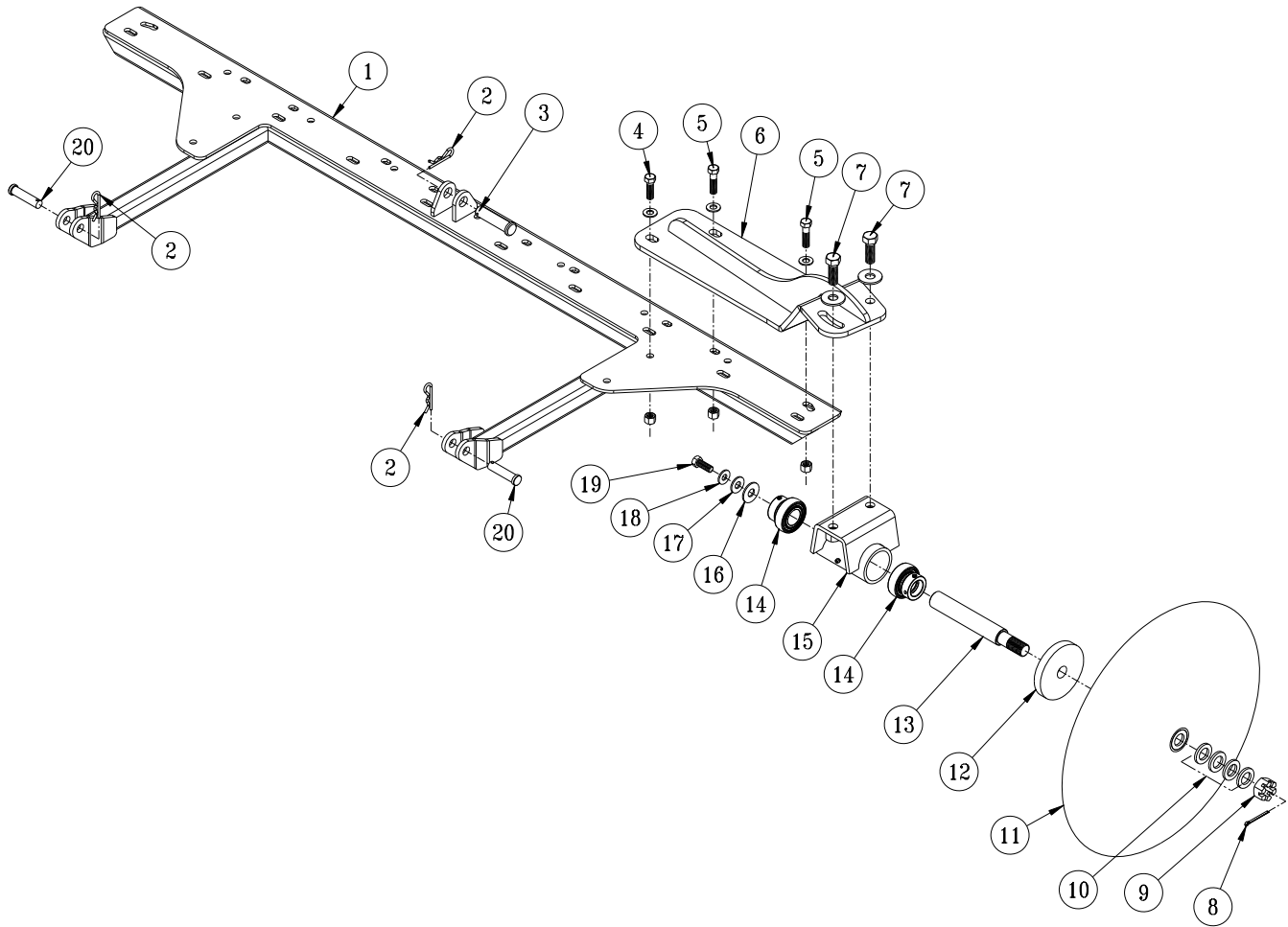


Center Attachment



# 45-175 ADJUSTABLE DISC EDGER DRAWING

Center Attachment





## 45-175 ADJUSTABLE DISC EDGER PARTS LIST

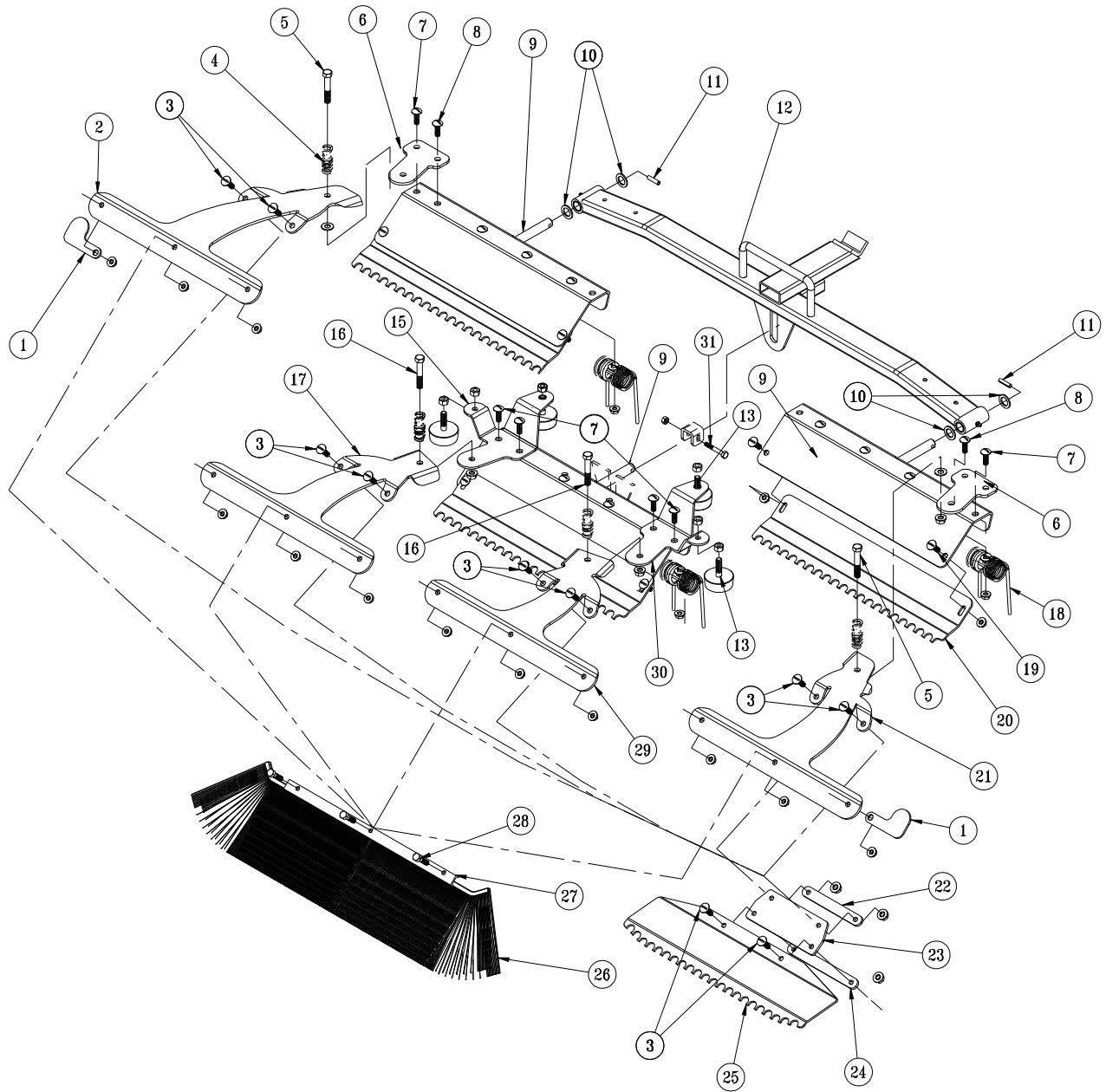
| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | 45-116       | Center Lift                                   | 1        |
| 2    | HHP-18       | Bridge Pin, $\frac{1}{8}$                     | 3        |
| 3    | HCP-58-250   | Clevis Pin, $\frac{5}{8} \times 2\frac{1}{2}$ | 1        |
| 4    | HB-38-16-125 | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{4}$ | 1        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                    | 1        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 1        |
| 5    | HB-38-16-150 | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{2}$ | 2        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                    | 2        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 2        |
| 6    | 45-166       | Edger Mount                                   | 1        |
| 7    | HB-12-13-150 | Hex Bolt, $\frac{1}{2}$ - 13 x $1\frac{1}{2}$ | 2        |
|      | HW-12        | Flat Washer, $\frac{1}{2}$                    | 2        |
|      | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13            | 2        |
| 8    | HP-18-150    | Cotter Pin, $\frac{1}{8} \times 1\frac{1}{2}$ | 1        |
| 9    | HNA-34-16    | Axle Nut, $\frac{3}{4}$ - 16                  | 1        |
| 10   | HMB-34-10    | Machine Bushing, $\frac{3}{4} \times 10GA$    | 4        |
| 11   | 13-204       | Disc                                          | 1        |
| 12   | 13-205       | Disc Flange                                   | 1        |
| 13   | 13-206       | Spindle Shaft                                 | 1        |
| 14   | 13-391       | Bearing and Collar                            | 2        |
| 15   | 13-203       | Spindle                                       | 1        |
|      | HG-14-28-180 | Grease Fitting                                | 1        |
| 16   | HW-716       | Flat Washer $\frac{7}{16}$                    | 1        |
| 17   | HWL-38       | Lock Washer, $\frac{3}{8}$                    | 1        |
| 18   | HW-516       | Flat Washer, $\frac{5}{16}$                   | 1        |
| 19   | HB-38-16-100 | Hex Bolt, $\frac{3}{8}$ - 16 x 1              | 1        |
| 20   | HCP-12-200   | Clevis Pin, $\frac{1}{2} \times 2$            | 2        |

Center Attachment

## INSTALLATION INSTRUCTIONS

1. For initial assembly, Hex Bolt Spindle Assembly (**Ref. 13 thru 19**) to the Edger Mount (**Ref. 6**). Use the  $\frac{1}{2}$  - 13 Hex Bolts, Washers and Nylon Lock Nuts (**Ref. 7**) to secure.
2. Slide the Disc Flange (**Ref. 12**) on the Spindle Shaft (**Ref. 13**) up to the shoulder. Then place the Disc (**Ref. 11**) onto the shaft, orienting the concave side towards the Spindle followed by the four Machine Bushings (**Ref. 10**), and the axle nut (**Ref. 9**).
3. Tighten Axle Nut, insert and clinch the Cotter Pin (**Ref. 8**).
4. Connect the Edger Mount onto the Center Lift (**Ref. 1**) using the  $\frac{3}{8}$  Hex Bolts, Washers and Nylon Lock Nuts (**Refs. 4 & 5**), with the  $1\frac{1}{4}$ " Hex Bolt (**Ref. 4**) going into the last hole on the Mount Plate.
5. The Edger mounts under the center of the trap rake.
6. Start the engine and lower the cylinder for the attachment lift FULLY. Stop engine.
7. Slide Edger under the trap rake from the right side.
8. Position the lift arms on the attachment lift assembly to the lift brackets on the machine. Hold in place with  $\frac{1}{2} \times 2$  clevis pin and bridge pins (**Refs. 2 & 20**).
9. Attach the cylinder to the center tab on the Center Lift using the  $\frac{5}{8} \times 2\frac{1}{2}$  Clevis Pin and Bridge Pin (**Refs. 2 & 3**).
10. Start engine and test lift and Edger to make sure all works well.

# 42-391Q 72"(183CM) ProBrush TOURNAMENT RAKE DRAWING

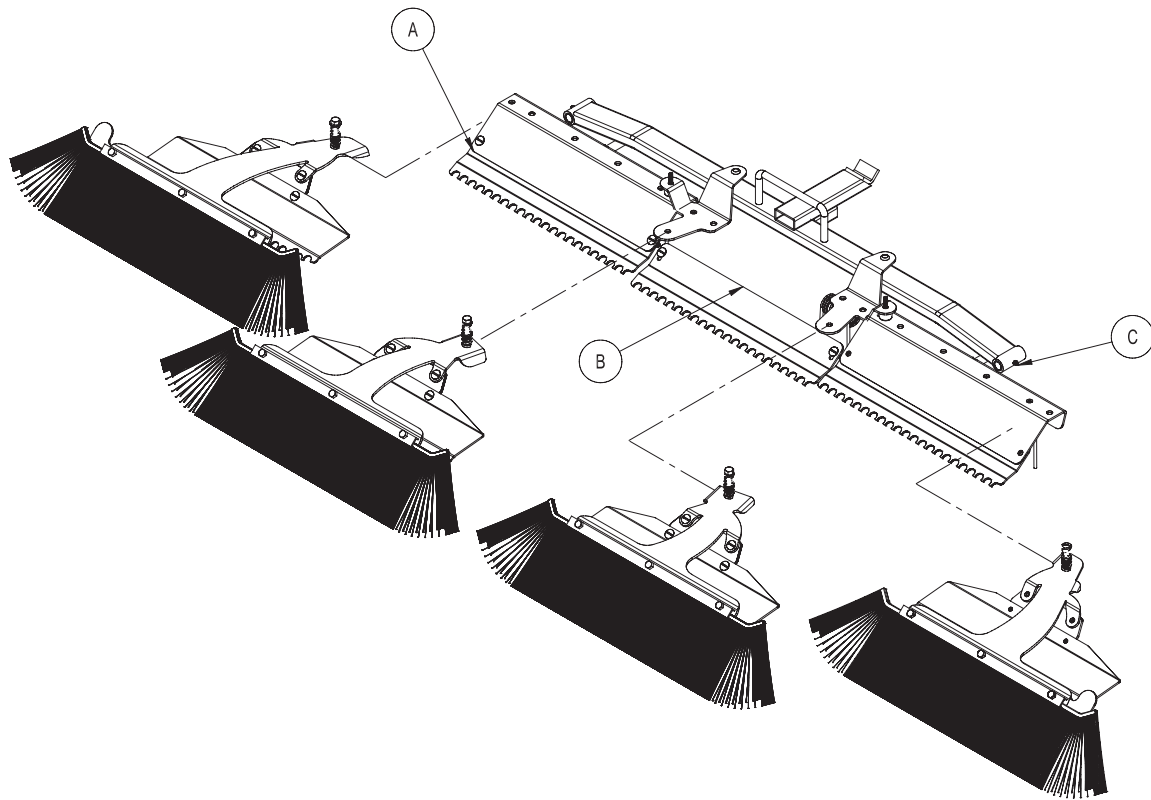


Rear Attachment

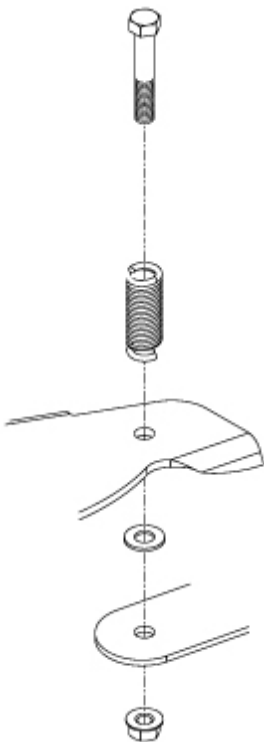
## 42-391Q 72"(183CM) ProBrush TOURNAMENT RAKE PARTS LIST

| REF# | PART#           | DESCRIPTION                                                      | QUANTITY |
|------|-----------------|------------------------------------------------------------------|----------|
| 1    | 42-489          | Tip Guard                                                        | 2        |
| 2    | 42-397          | Outside Brush Arm, LH                                            | 1        |
| 3    | HSTP-516-18-100 | Phillip Truss Head Screw, $\frac{5}{16}$ - 18 x 1                | 16       |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                         | 16       |
| 4    | 11-055          | Compression Spring                                               | 4        |
| 5    | HB-38-16-275    | Hex Bolt, $\frac{3}{8}$ - 16 x 21 $\frac{3}{4}$                  | 2        |
|      | HW-38           | Flat Washer, $\frac{3}{8}$                                       | 2        |
|      | HNTL-38-16      | Nylon Lock Nut, $\frac{3}{8}$ - 16                               | 2        |
| 6    | 42-396          | Outside Brush Arm Mount                                          | 2        |
| 7    | HSTP-516-18-100 | Phillips Truss Head Screw, $\frac{5}{16}$ - 18 x 1               | 4        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                         | 4        |
| 8    | HSTP-516-18-125 | Phillips Truss Head Screw, $\frac{5}{16}$ - 18 x 1 $\frac{1}{4}$ | 12       |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                         | 12       |
| 9    | 42-140          | Outside Rake                                                     | 3        |
| 10   | HMB-58-14       | Machine Bushing $\frac{5}{8}$ x 14GA                             | 4        |
| 11   | HRP-14-100      | Roll Pin $\frac{1}{4}$ x 1                                       | 2        |
| 12   | 43-154          | Draw Bar                                                         | 1        |
|      | 20-018          | Oilite Bushing (comes with 43-154)                               | 4        |
| 13   | 50-081          | Rubber Bumper                                                    | 4        |
|      | HNFL-38-16      | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 16                          | 6        |
| 15   | 42-399          | Brush Arm Mount, LH                                              | 1        |
| 16   | HB-38-16-250    | Hex Bolt, $\frac{3}{8}$ - 16 x 2 $\frac{1}{2}$                   | 2        |
|      | HNTL-38-16      | Nylon Lock Nut, $\frac{3}{8}$ - 16                               | 2        |
| 17   | 42-454          | Inside Brush Arm, LH                                             | 1        |
| 18   | 42-122          | Rake Spring                                                      | 12       |
|      | 42-177          | Spring Holder                                                    | 12       |
| 19   | HSTP-516-18-075 | Phillip Truss Head Screw, $\frac{5}{16}$ - 18 x $\frac{3}{4}$    | 6        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut $\frac{5}{16}$ - 18                          | 6        |
| 20   | 42-171          | Groomer Blades                                                   | 3        |
| 21   | 42-393          | Outside Brush Arm, RH                                            | 1        |
| 22   | 42-105          | Top Strap                                                        | 4        |
| 23   | 42-107          | Matting                                                          | 4        |
| 24   | 42-106          | Bottom Strap                                                     | 4        |
| 25   | 42-170          | Finishing Blades                                                 | 4        |
| 26   | 42-466          | Brush, 21"                                                       | 4        |
| 27   | 42-465          | Brush Clamp                                                      | 4        |
| 28   | HB-516-18-125   | Hex Bolt, $\frac{5}{16}$ - 18 x 1 $\frac{1}{4}$ - 18             | 12       |
| 29   | 42-453          | Inside Brush Arm, RH                                             | 1        |
| 30   | 42-398          | Brush Arm Mount, RH                                              | 1        |
| 31   | HB-14-20-175    | Hex Bolt, $\frac{1}{4}$ - 20 x 1 $\frac{3}{4}$                   | 1        |
|      | HNTL-14-20      | Nylon Lock Nut, $\frac{1}{4}$ - 20                               | 1        |

# 42-391Q 72"(183CM) ProBRUSH TOURNAMENT RAKE DRAWING



**Fig. 1**



**Fig. 2**



**Fig. 3**

Rear Attachment

# ProBrush TOURNAMENT RAKE ASSEMBLY INSTRUCTIONS

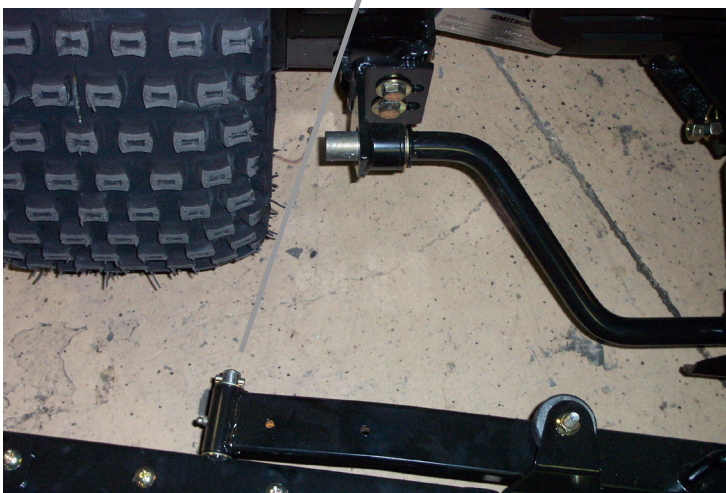
Your **ProBrush TOURNAMENT RAKE** comes mostly assembled.

1. Before assembly please note the two Brush/Finish Blade Assemblies (Refs A & C in Fig.1) that are 1. Before assembly please note the two Brush/Finish Blade Assemblies (Refs A & C in Fig.1) that are mounted on the outside (RH & LH) have flat washers that are between the Brush Arms (Refs 2 & 21) and the Brush Arm Mount (Ref 6).
2. Also please note the placement of the Brush/Finish Blade Assemblies as illustrated in Fig 1. They must be mounted as illustrated to work as intended.
3. Begin assembling your **ProBrush TOURNAMENT RAKE** by inserting the Outside and Center Groomer Blade Assemblies (Refs A, B & C in Fig.1) in their locations as illustrated. Secure the Outside Assemblies with the  $\frac{1}{4}$ " Pin (Ref 11) and the Center Assembly with the  $\frac{1}{4}$ " x  $1\frac{3}{4}$ " Hex Bolt and Nylon Lock Nut (Ref 31).
4. Mount the Brush/Finish Blade Assemblies to the Brush Arm Mounts (Refs 6, 30 & 15) as illustrated using the  $\frac{3}{8}$ " x  $2\frac{1}{2}$ " Hex Bolts and Nylon Lock Nuts. Assemble with the Springs (Ref 4) as shown in Fig. 2. Please note that the  $\frac{3}{8}$ " Flat Washers are used only on the Outside Assemblies. Secure when assembled.
5. Mount your **ProBrush TOURNAMENT RAKE** to the trap rake quick hitch. Position the Rake so it is centered and equal distance away from the right and left hand tires (2-3 inches). Fig. 4. Once positioned, set the Adjustment Screws on the Hitch so they touch the trap rake hitch. Fig. 5.
6. Run machine and test for operation of the Rake by raising and lowering the assembly and with rake down turn sharp corners in both directions to ensure rake is not contacting the tires. Test Rake in sand to ensure tire tracks are covered when turning sharp corners. If the tire tracks are not covered by the Rake, turn the Adjustment Screws on the Rake Hitch so the rake comes closer to the tires when turning. For reference see Fig. 4 and 5 below.

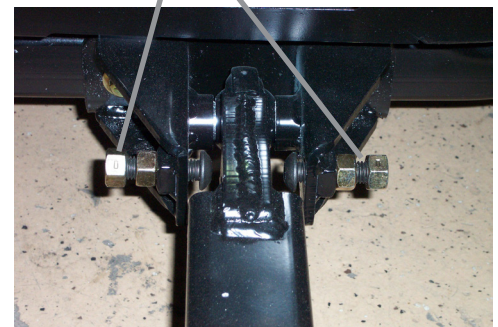
## NOTE:

The Outside Brush/Finish Blade Assemblies may be rotated 180° for transport and for working in narrow areas, as illustrated in Fig.3 on the facing page.

**Fig. 4**



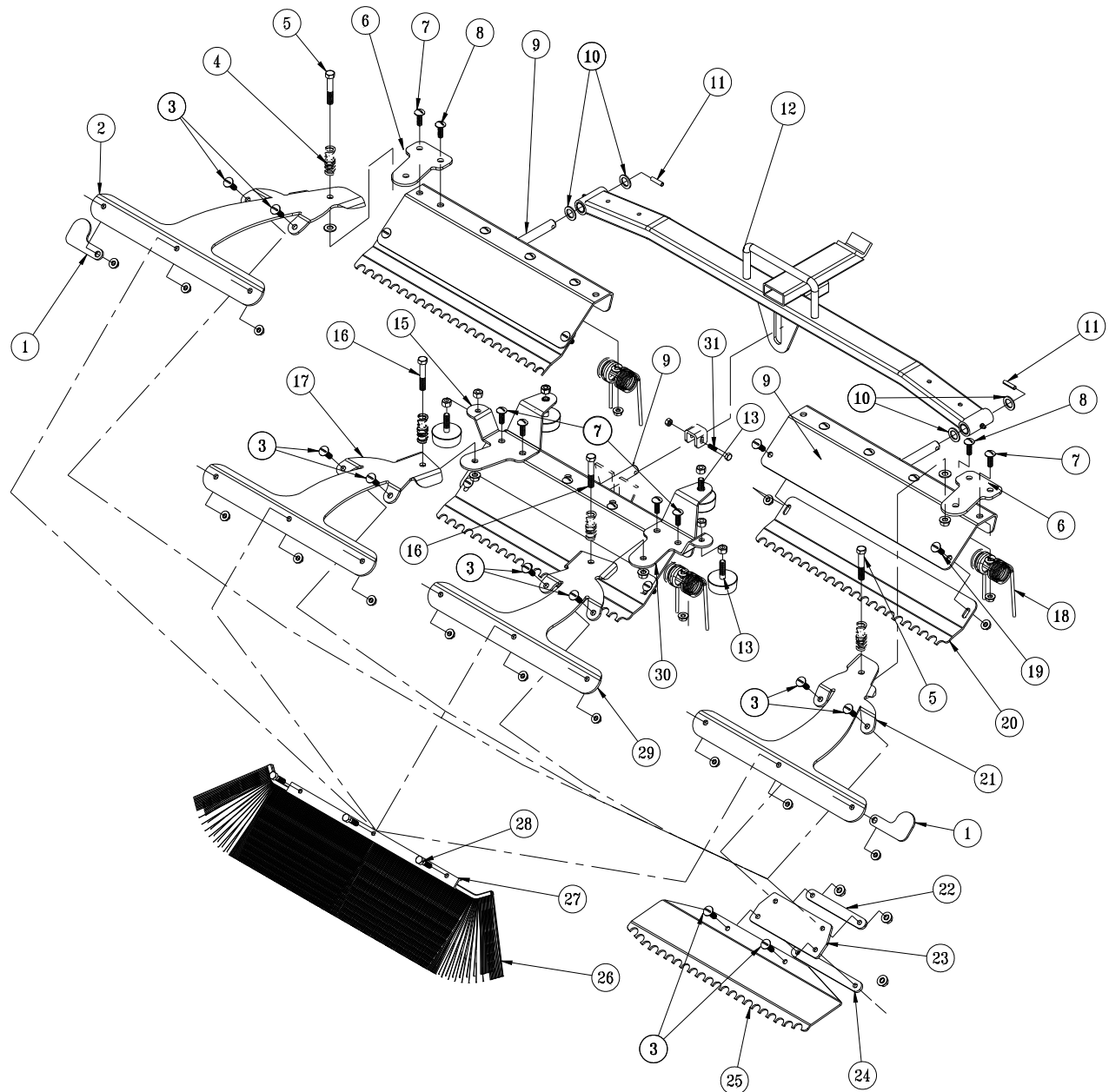
**Adjustment Screws**



**Fig. 5**



# 42-392Q 84"(213CM) ProBRUSH TOURNAMENT RAKE DRAWING



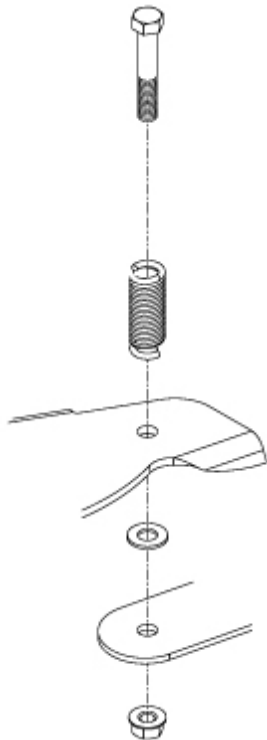
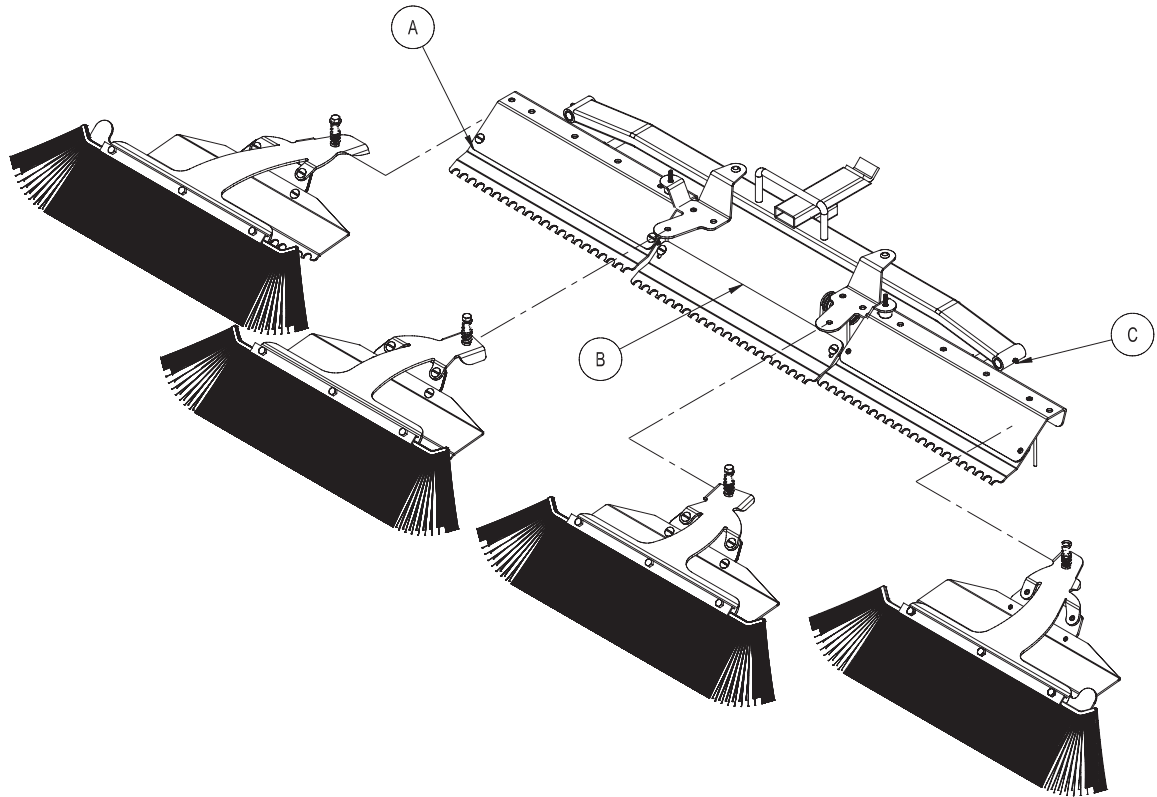
Rear Attachment

## 42-392Q 84"(213CM) ProBrush TOURNAMENT RAKE PARTS LIST

| REF# | PART#           | DESCRIPTION                                                      | QUANTITY |
|------|-----------------|------------------------------------------------------------------|----------|
| 1    | 42-489          | Tip Guard                                                        | 2        |
| 2    | 42-397          | Outside Brush Arm, LH                                            | 1        |
| 3    | HSTP-516-18-100 | Phillip Truss Head Screw, $\frac{5}{16}$ - 18 x 1                | 16       |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                         | 16       |
| 4    | 11-055          | Compression Spring                                               | 4        |
| 5    | HB-38-16-250    | Hex Bolt, $\frac{3}{8}$ - 16 x 2 $\frac{1}{2}$                   | 2        |
|      | HW-38           | Flat Washer, $\frac{3}{8}$                                       | 2        |
|      | HNTL-38-16      | Nylon Lock Nut, $\frac{3}{8}$ - 16                               | 2        |
| 6    | 42-396          | Outside Brush Arm Mount                                          | 2        |
| 7    | HSTP-516-18-100 | Phillips Truss Head Screw, $\frac{5}{16}$ - 18 x 1               | 4        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                         | 4        |
| 8    | HSTP-516-18-125 | Phillips Truss Head Screw, $\frac{5}{16}$ - 18 x 1 $\frac{1}{4}$ | 12       |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                         | 12       |
| 9    | 42-102          | 84" Outside Rake                                                 | 3        |
| 10   | HMB-58-14       | Machine Bushing, $\frac{5}{8}$ x 14GA                            | 4        |
| 11   | HRP-14-100      | Roll Pin, $\frac{1}{4}$ x 1                                      | 2        |
| 12   | 43-144          | 84" Draw Bar                                                     | 1        |
| 13   | 50-081          | Rubber Bumper                                                    | 4        |
|      | HNFL-38-16      | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 16                          | 6        |
| 15   | 42-399          | Brush Arm Mount, LH                                              | 1        |
| 16   | HB-38-16-250    | Hex Bolt, $\frac{3}{8}$ - 16 x 2 $\frac{1}{2}$                   | 2        |
|      | HNTL-38-16      | Nylon Lock Nut, $\frac{3}{8}$ - 16                               | 2        |
| 17   | 42-454          | Inside Brush Arm, LH                                             | 1        |
| 18   | 42-122          | Rake Spring                                                      | 12       |
|      | 42-177          | Spring Holder                                                    | 12       |
| 19   | HSTP-516-18-075 | Phillip Truss Head Screw, $\frac{5}{16}$ - 18 x $\frac{3}{4}$    | 6        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                         | 6        |
| 20   | 42-129          | Groomer Blades                                                   | 3        |
| 21   | 42-393          | Outside Brush Arm, RH                                            | 1        |
| 22   | 42-105          | Top Strap                                                        | 4        |
| 23   | 42-107          | Matting                                                          | 4        |
| 24   | 42-106          | Bottom Strap                                                     | 4        |
| 25   | 42-135          | Finishing Blades                                                 | 4        |
| 26   | 42-466          | Brush, 21"                                                       | 4        |
| 27   | 42-465          | Brush Clamp                                                      | 4        |
| 28   | HB-516-18-125   | Hex Bolt, $\frac{5}{16}$ - 18 x 1 $\frac{1}{4}$                  | 12       |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                         | 12       |
| 29   | 42-453          | Inside Brush Arm, RH                                             | 1        |
| 30   | 42-398          | Brush Arm Mount, RH                                              | 1        |
| 31   | HB-14-20-175    | Hex Bolt, $\frac{1}{4}$ - 20 x 1 $\frac{3}{4}$                   | 1        |
|      | HNTL-14-20      | Nylon Lock Nut, $\frac{1}{4}$ - 20                               | 1        |

# 42-392Q 84"(213CM) ProBRUSH TOURNAMENT RAKE DRAWING

**Fig. 1**



**Fig. 2**



**Fig. 3**



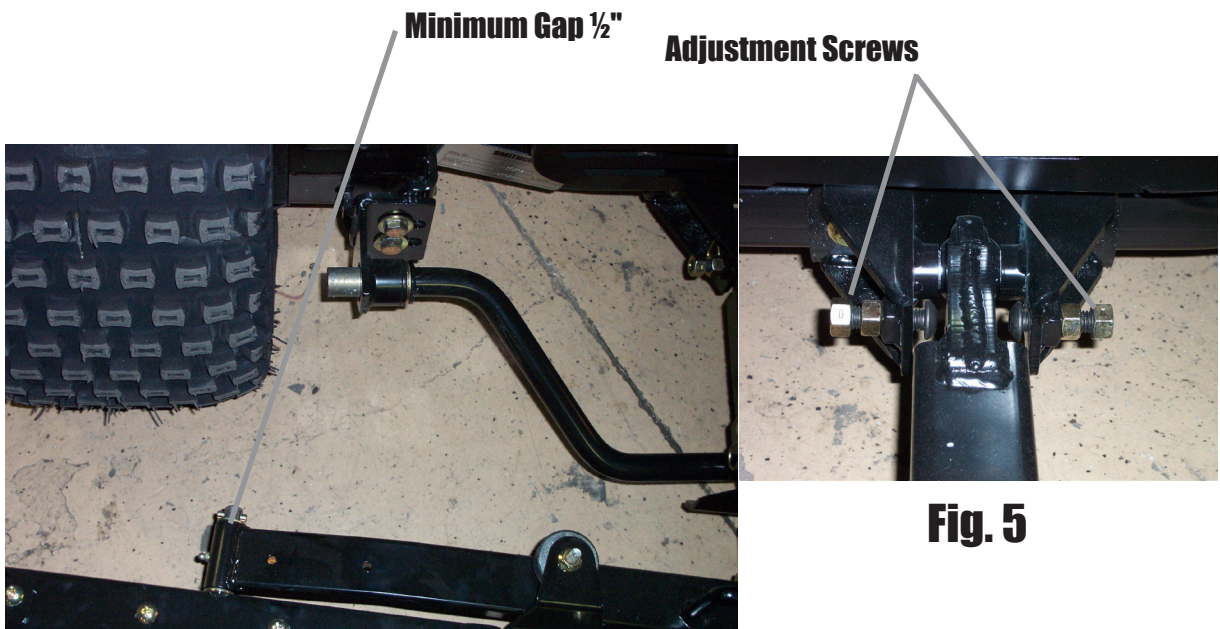
# ProBrush TOURNAMENT RAKE ASSEMBLY INSTRUCTIONS

Your **ProBrush TOURNAMENT RAKE** comes mostly assembled.

1. Before assembly please note the two Brush/Finish Blade Assemblies (Refs A & C in Fig.1) that are mounted on the outside (RH & LH) have flat washers that are between the Brush Arms (Refs 2 & 21) and the Brush Arm Mount (Ref 6).
2. Also please note the placement of the Brush/Finish Blade Assemblies as illustrated in Fig 1. They must be mounted as illustrated to work as intended.
3. Begin assembling your **ProBrush TOURNAMENT RAKE** by inserting the Outside and Center Groomer Blade Assemblies (Refs A, B & C in Fig.1) in their locations as illustrated. Secure the Outside Assemblies with the  $\frac{1}{4}$ " Pin (Ref 11) and the Center Assembly with the  $\frac{1}{4}$ " x  $1\frac{3}{4}$ " Hex Bolt and Nylon Lock Nut (Ref 31).
4. Mount the Brush/Finish Blade Assemblies to the Brush Arm Mounts (Refs 6, 30 & 15) as illustrated using the  $\frac{3}{8}$  x  $2\frac{1}{2}$  Hex Bolts and Nylon Lock Nuts. Assemble with the Springs (Ref 4) as shown in Fig. 2. Please note that the  $\frac{3}{8}$ " Flat Washers are used only on the Outside Assemblies. Secure when assembled.
5. Mount your **ProBrush TOURNAMENT RAKE** to the trap rake quick hitch. Position the Rake so it is centered and equal distance away from the right and left hand tires (2-3 inches). Fig. 4. Once positioned, set the Adjustment Screws on the Hitch so they touch the trap rake hitch. Fig. 5.
6. Run machine and test for operation of the Rake by raising and lowering the assembly and with rake down turn sharp corners in both directions to ensure rake is not contacting the tires. Test Rake in sand to ensure tire tracks are covered when turning sharp corners. If the tire tracks are not covered by the Rake, turn the Adjustment Screws on the Rake Hitch so the rake comes closer to the tires when turning. For reference see Fig. 4 and 5 below.

## NOTE:

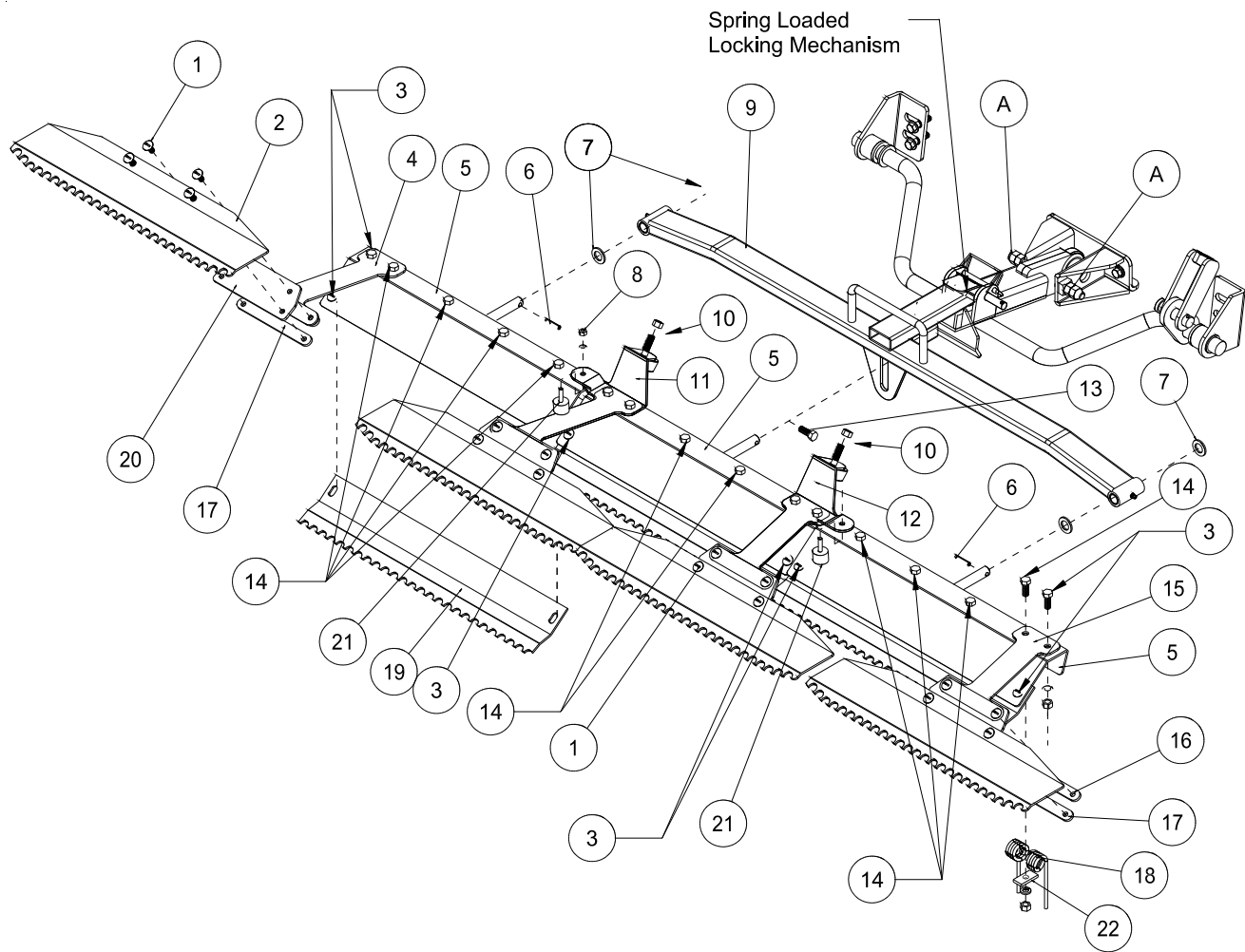
The Outside Brush/Finish Blade Assemblies may be rotated 180° for transport and for working in narrow areas, as illustrated in Fig.3 on the facing page.



**Fig. 4**

**Fig. 5**

# 42-130Q 84" (213CM) MILD STEEL TOURNAMENT RAKE DRAWING

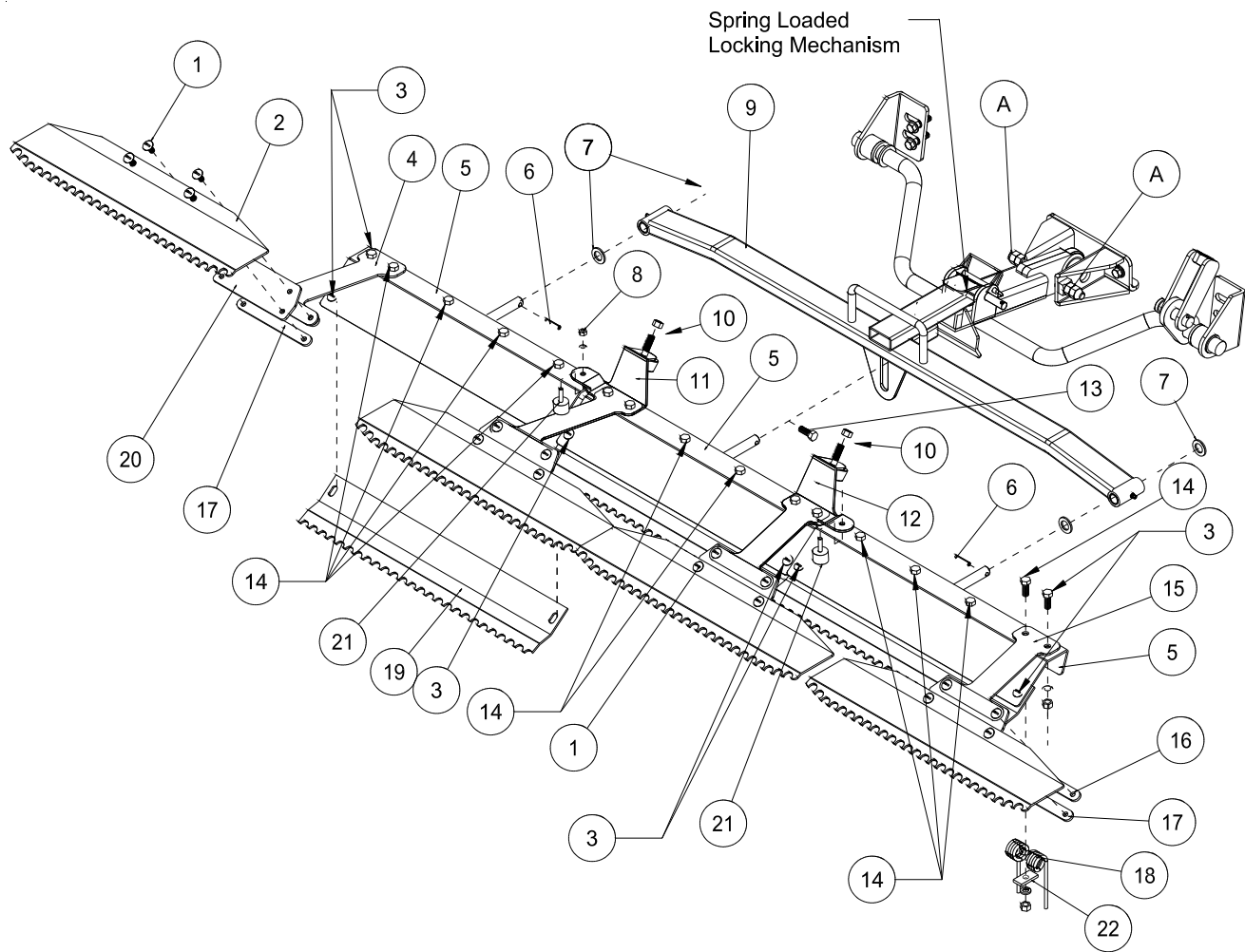


Rear Attachment

## 42-130Q 84" (213CM) MILD STEEL TOURNAMENT RAKE PARTS LIST

| REF# | PART#           | DESCRIPTION                                                  | QUANTITY |
|------|-----------------|--------------------------------------------------------------|----------|
| 1    | HSTP-516-18-100 | Phillips Machine Screw, $\frac{5}{16}$ - 18 x 1              | 16       |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                     | 16       |
| 2    | 42-135          | Finishing Blades                                             | 4        |
| 3    | HSTP-516-18-075 | Phillips Machine Screw, $\frac{5}{16}$ - 18 x $\frac{3}{4}$  | 8        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                     | 8        |
| 4    | 42-111          | Left Outside Mount                                           | 1        |
| 5    | 42-102          | Outside Rake                                                 | 3        |
| 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    | HNC-14-20       | Cap Nut, $\frac{1}{4}$ - 20                                  | 2        |
|      | HWL-14          | Lock Washer, $\frac{1}{4}$                                   | 2        |
| 9    | 43-144          | Draw Bar                                                     | 1        |
| 10   | 50-081          | Rubber Bumper                                                | 2        |
| 11   | 42-110          | Left Inside Mount                                            | 1        |
| 12   | 42-108          | Inside Trowel Mount                                          | 1        |
| 13   | HB-14-20-175    | Hex Bolt, $\frac{1}{4}$ - 20 x $1\frac{3}{4}$                | 1        |
|      | HNTL-14-20      | Nylon Lock Nut, $\frac{1}{4}$ - 20                           | 1        |
| 14   | HSTP-516-18-125 | Phillips Machine Screw, $\frac{5}{16}$ - 18 x $1\frac{1}{4}$ | 12       |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                     | 12       |
| 15   | 42-109          | Outside Towel Mount                                          | 1        |
| 16   | 42-105          | Top Strap                                                    | 4        |
| 17   | 42-106          | Bottom Strap                                                 | 4        |
| 18   | 42-122          | Rake Spring                                                  | 12       |
| 19   | 42-129          | Groomer Blades                                               | 3        |
| 20   | 42-107          | Matting                                                      | 4        |
| 21   | 15-013          | Rubber Bumper                                                | 2        |
| 22   | 42-177          | Spring Holder                                                | 12       |

# 42-130Q 84" (213CM) MILD STEEL TOURNAMENT RAKE DRAWING

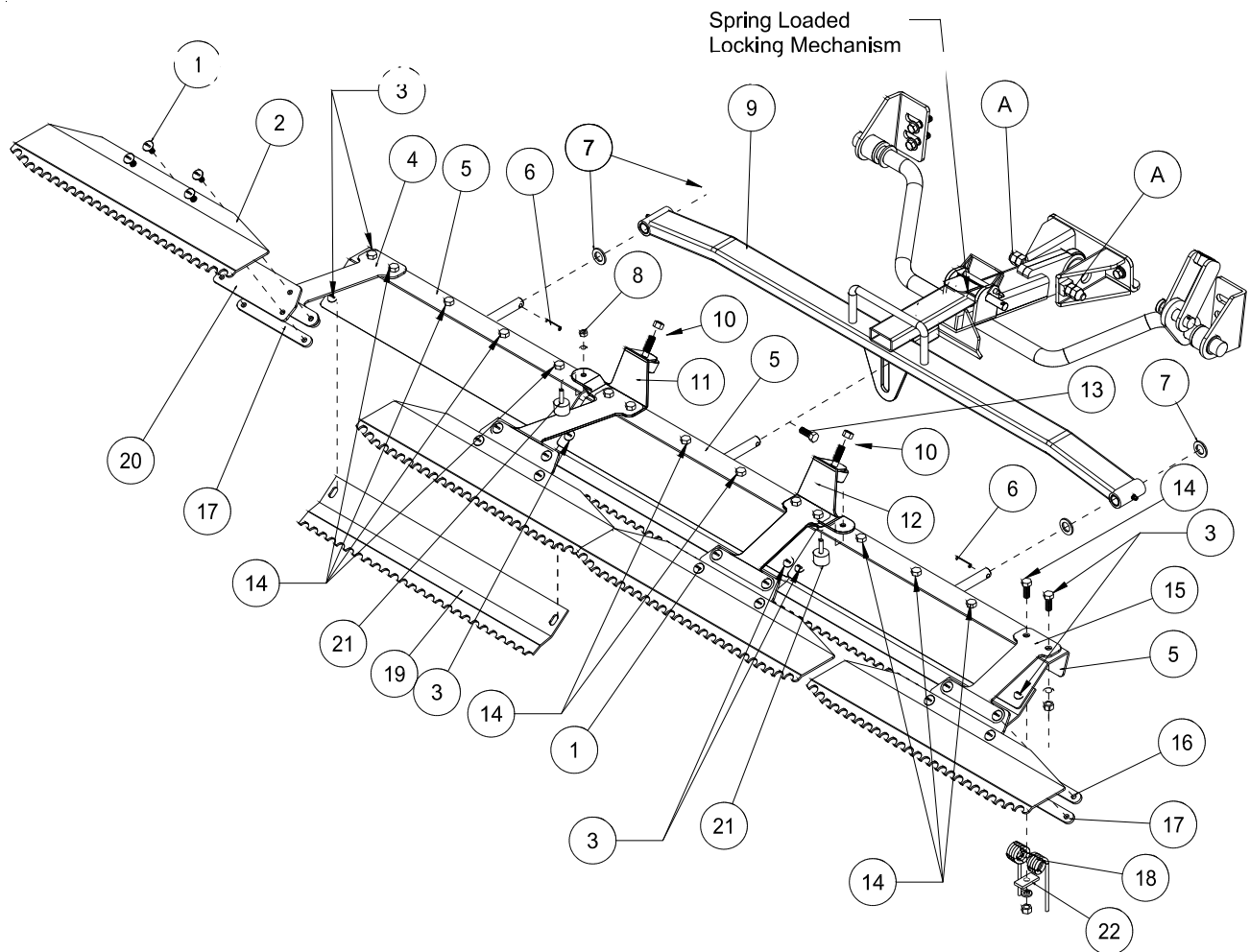


Rear Attachment

## RAKE ASSEMBLY INSTRUCTIONS

1. Hex Bolt rake spring (Ref 18) to rake frames (Ref 5) using hardware (Ref 14). Leave the two outside holes on right, left, and center rake open.
  2. Attach rubber bumper (Ref 21) using cap nut and washer (Ref 8). Attach rubber grommet (Ref 10) to inside mounts (Ref 11 & 12)
  3. Attach the left outside mount (Ref 4), the left inside mount (Ref 11), the outside trowel mount (Ref 15), and the inside trowel mount (Ref 12) to the outside and center rakes (Ref 5) as shown. Use the  $\frac{3}{4}$ " truss head screws (Ref 3) on the outside hole of each rake. Use the spring holder (Ref 22) and the  $\frac{1}{4}$ " truss head screws (Ref 14) to attach rake springs (Ref 18) to the rakes under the left outside and inside mounts and the outside and inside trowel mounts.
  4. 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).
  5. Attach center rake (Ref 5) to draw bar (Ref 9) as shown, using  $1\frac{3}{4}$  Hex Bolts and Nylon Lock Nuts (Ref 13) with the shaft of the center rake in the slot on the bottom of the drawbar.
  6. Attach the matting (Ref 20) and the top strap (Ref 16) to the inside and outside mounts using the 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 truss head screw  $\frac{5}{16}$  - 18 x 1 (Ref 1) going through the finishing blade, matting, and bottom strap (Ref 17).
  7. Place the three groomer blades (Ref 19) under the three rake assemblies as shown, using (Ref 3).
  8. Attach the rake lift to the trap rake quick hitch, by sliding the the hitch into the spring loaded locking mechanism.
  9. With the rake on the ground pull the rake to the right side until it is 2-3 inches from the tire.
  10. Using the adjustment Hex Bolts (Ref A) on the side of hitch, adjust the Hex Bolts until it hits the trap rake hitch. Lock jam nut so adjustment will not change.
  11. Repeat steps for the left side.
  12. 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.

# 42-132Q 72" (183CM) MILD STEEL TOURNAMENT RAKE DRAWING

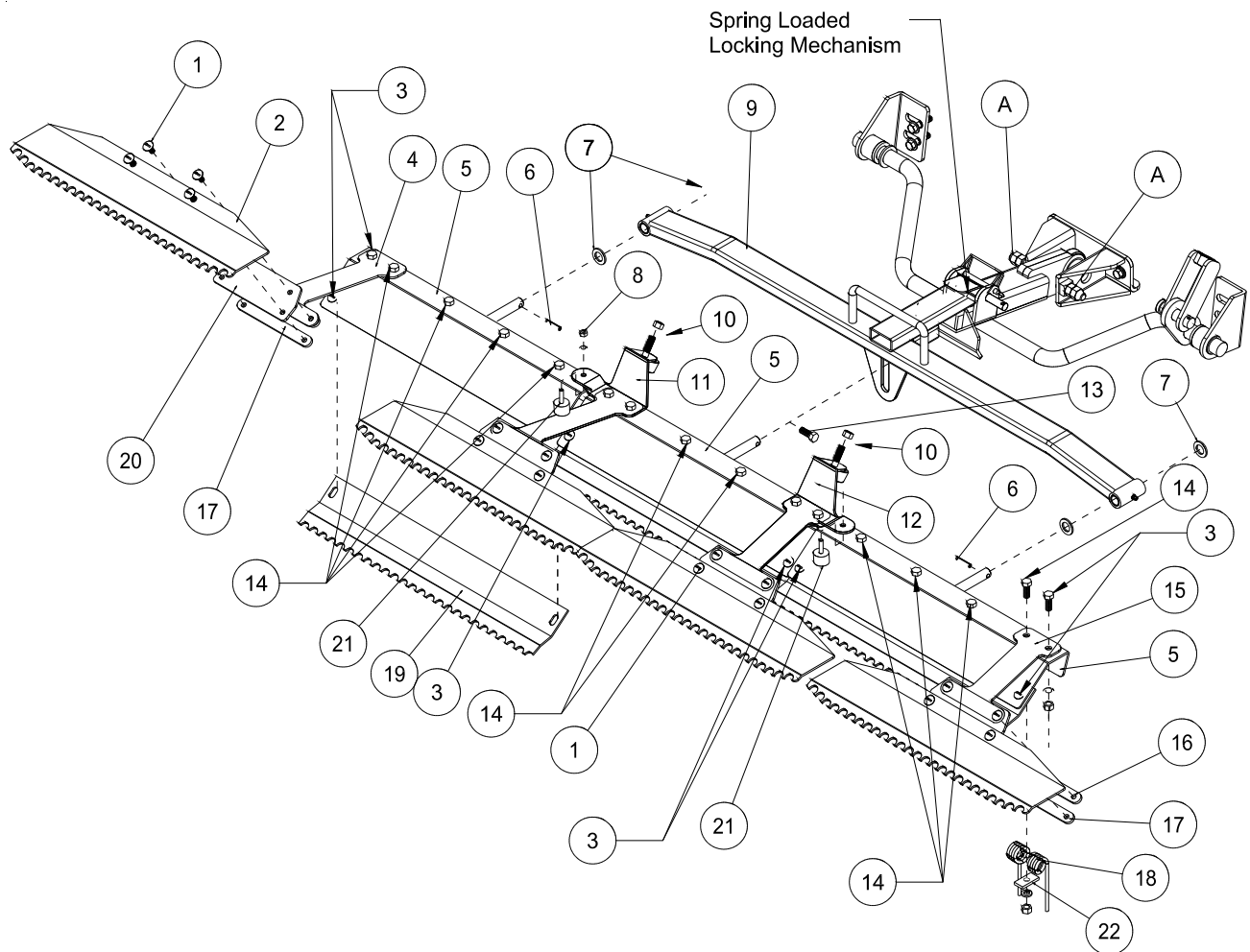


Rear Attachment

## 42-132Q 72"(183CM) MILD STEEL TOURNAMENT RAKE PARTS LIST

| REF# | PART#           | DESCRIPTION                                                  | QUANTITY |
|------|-----------------|--------------------------------------------------------------|----------|
| 1    | HSTP-516-18-100 | Phillips Machine Screw, $\frac{5}{16}$ - 18 x 1              | 16       |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                     | 16       |
| 2    | 42-170          | Finishing Blades                                             | 4        |
| 3    | HSTP-516-18-075 | Phillips Machine Screw, $\frac{5}{16}$ - 18 x $\frac{3}{4}$  | 10       |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                     | 10       |
| 4    | 42-111          | Left Outside Mount                                           | 1        |
| 5    | 42-140          | Outside Rake                                                 | 3        |
| 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    | HNC-14-20       | Cap Nut, $\frac{1}{4}$ - 20                                  | 2        |
|      | HWL-14          | Lock Washer, $\frac{1}{4}$                                   | 2        |
| 9    | 43-154          | Draw Bar                                                     | 1        |
|      | 20-018          | Oilite Bushing (comes with 43-154)                           | 4        |
| 10   | 50-081          | Rubber Bumper                                                | 2        |
|      | HNFL-38-16      | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 18                      | 2        |
| 11   | 42-110          | Left Inside Mount                                            | 1        |
| 12   | 42-108          | Inside Trowel Mount                                          | 1        |
| 13   | HB-14-20-175    | Hex Bolt, $\frac{1}{4}$ - 20 x $1\frac{3}{4}$                | 1        |
|      | HNTL-14-20      | Nylon Lock Nut, $\frac{1}{4}$ - 20                           | 1        |
| 14   | HSTP-516-18-125 | Phillips Machine Screw, $\frac{5}{16}$ - 18 x $1\frac{1}{4}$ | 12       |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                     | 12       |
| 15   | 42-109          | Outside Towel Mount                                          | 1        |
| 16   | 42-105          | Top Strap                                                    | 4        |
| 17   | 42-106          | Bottom Strap                                                 | 4        |
| 18   | 42-122          | Rake Spring                                                  | 12       |
| 19   | 42-171          | Groomer Blades                                               | 3        |
| 20   | 42-107          | Matting                                                      | 4        |
| 21   | 15-013          | Rubber Bumper                                                | 2        |
| 22   | 42-177          | Spring Holder                                                | 12       |

# 42-132Q 72"(183CM) MILD STEEL TOURNAMENT RAKE DRAWING



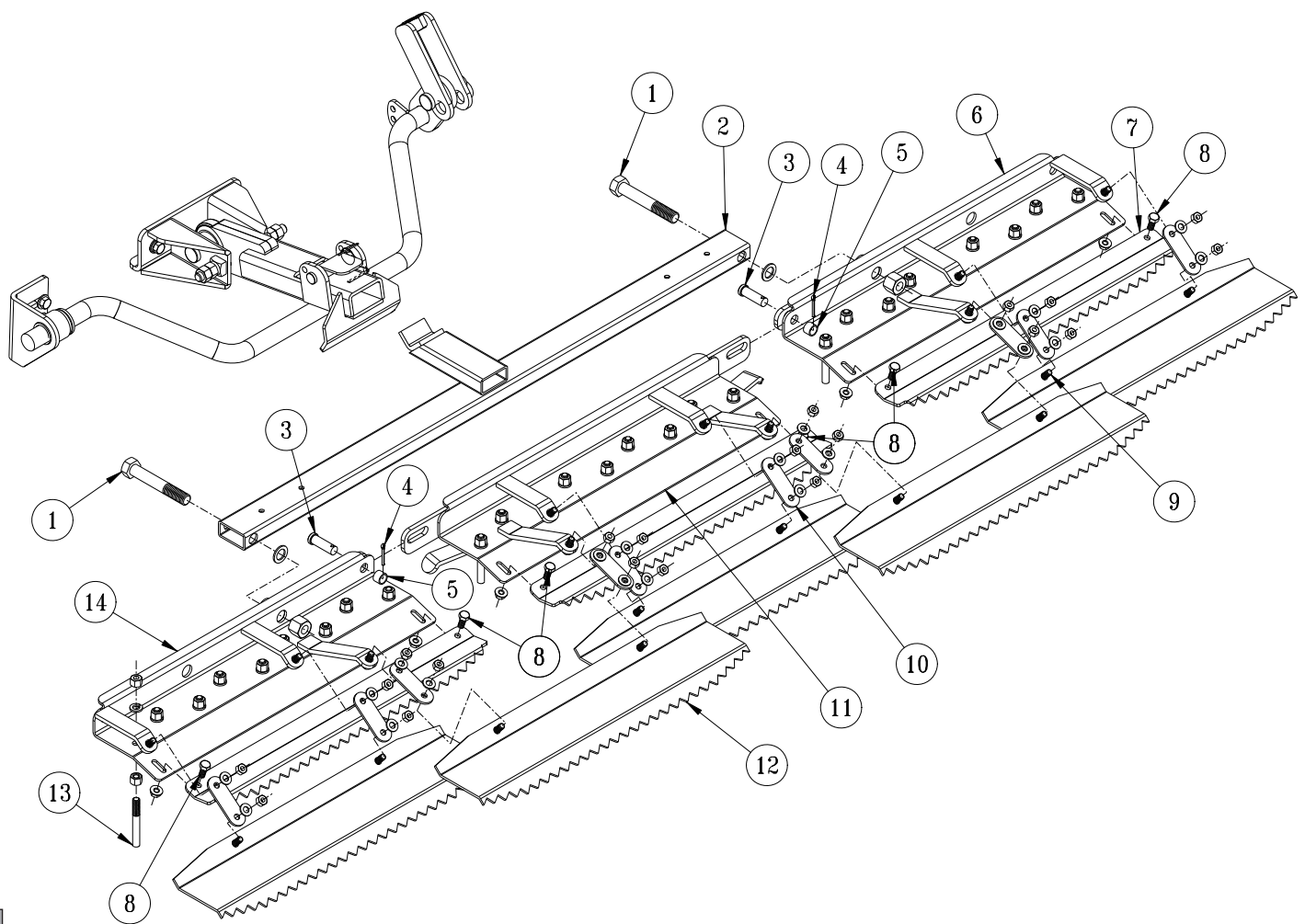
Rear Attachment



## RAKE ASSEMBLY INSTRUCTIONS

1. Hex Bolt rake spring (Ref 18) to rake frames (Ref 5) using hardware (Ref 14). Leave the two outside holes on right, left, and center rake open.
  2. Attach rubber bumper (Ref 21) using cap nut and washer (Ref 8). Attach rubber grommets (Ref 10) to inside mounts (Ref 11 & 12)
  3. Attach the left outside mount (Ref 4), the left inside mount (Ref 11), the outside trowel mount (Ref 15), and the inside trowel mount (Ref 12) to the outside and center rakes (Ref 5) as shown. Use the  $\frac{3}{4}$ " truss head screws (Ref 3) on the outside hole of each rake. Use the spring holder (Ref 22) and the  $\frac{1}{4}$ " truss head screws (Ref 14) to attach rake springs (Ref 18) to the rakes under the left outside and inside mounts and the outside and inside trowel mounts.
  4. 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).
  5. Attach center rake (Ref 5) to draw bar (Ref 9) as shown, using  $1\frac{3}{4}$  Hex Bolts and Nylon Lock Nuts (Ref 13) with the shaft of the center rake in the slot on the bottom of the drawbar.
  6. Attach the matting (Ref 20) and the top strap (Ref 16) to the inside and outside mounts using the 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 truss head screw  $\frac{5}{16}$  - 18 x 1 (Ref 1) going through the finishing blade, matting, and bottom strap (Ref 17).
  7. Place the three groomer blades (Ref 19) under the three rake assemblies as shown, using (Ref 3).
  8. Attach the rake lift to the trap rake quick hitch, by sliding the the hitch into the spring loaded locking mechanism.
  9. With the rake on the ground pull the rake to the right side until it is 2-3 inches from the tire.
  10. Using the adjustment Hex Bolts (Ref A) on the side of hitch, adjust the Hex Bolts until it hits the trap rake hitch. Lock jam nut so adjustment will not change.
  11. Repeat steps for the left side.
  12. 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.

# 13-758 MAX FLEX SAND RAKE



Rear Attachment

## 13-758 MAX FLEX SAND RAKE

| REF# | PART#           | DESCRIPTION                                   | QUANTITY |
|------|-----------------|-----------------------------------------------|----------|
| 1    | HB-58-11-400    | Hex Bolt, $\frac{5}{8}$ - 11 x 4              | 2        |
|      | HMB-58-14       | Machine Bushing, $\frac{5}{8}$ x 14GA         | 2        |
|      | HNCL-58-11      | Nylon Lock Nut, $\frac{5}{8}$ - 11            | 2        |
| 2    | 43-145          | Draw bar                                      | 1        |
| 3    | HCP-12-150      | Clevis Pin, $\frac{1}{2}$ - 1 $\frac{1}{2}$   | 2        |
| 4    | HP-18-100       | Cotter Pin, $\frac{1}{8}$ x 1                 | 2        |
| 5    | 76-275          | Spacer                                        | 2        |
| 6    | 13-762          | Right Rake                                    | 1        |
| 7    | 13-759          | Grooming Blade                                | 3        |
| 8    | HB-516-18-075   | Hex Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$ | 6        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18      | 6        |
| 9    | HBFL-516-18-100 | Flange Lock Hex Bolt, $\frac{5}{16}$ - 18 x 1 | 20       |
|      | HNTL-516-18     | Nylon Lock Nut, $\frac{5}{16}$ - 18           | 20       |
|      | HW-516          | Flat Washer, $\frac{5}{16}$                   | 20       |
| 10   | 13-757          | Rake Connect Strap                            | 10       |
| 11   | 13-761          | QH Center Rake                                | 1        |
| 12   | 13-443          | Finishing Blade                               | 5        |
| 14   | 13-763          | Left Rake                                     | 1        |
| 13*  | 13-445          | Rake Teeth Kit (27 Studs and Hardware)        | 1        |

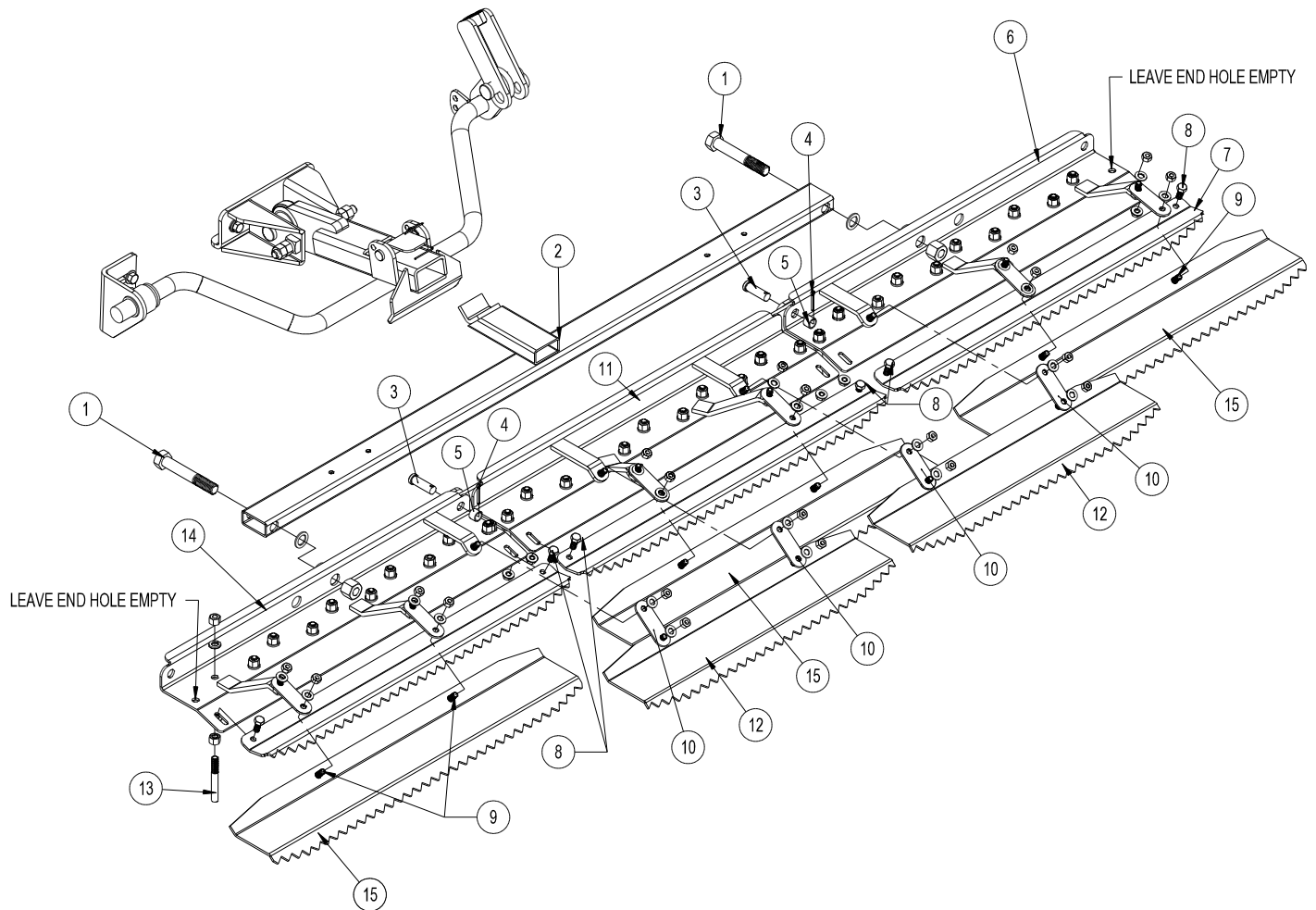
## INSTALLATION INSTRUCTIONS

1. Hex Bolt rake teeth (Ref 13) to frames, keeping all the same length.
2. Lay out rake frames (Refs 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 Draw bar (Ref 2) using  $\frac{5}{8}$  Hex Bolt, Machine Bushing, and Center Nylon 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 Whiz-Loc Nuts (Ref 8). Slide Groomer Blades to end of slot and tighten hardware.
5. Attach the five 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 Hex Bolt, Flat Washer and Nylon Lock Nut (Ref 9).

**NOTE: Attach Straps using hardware as illustrated, placing Flat Washer on Strap then secure with Nylon Lock Nut. Attaching with the Flange Hex 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 draw bar 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.

# 45-503 84" RAKE ASSEMBLY DRAWING



Rear Attachment

## 45-503 84" RAKE ASSEMBLY PARTS LIST

| REF# | PART#           | DESCRIPTION                                               | QUANTITY |
|------|-----------------|-----------------------------------------------------------|----------|
| 1*   | HB-58-11-400    | Hex Bolt, $\frac{5}{8}$ - 11 x 4                          | 2        |
|      | HMB-58-14       | Machine Bushing, $\frac{5}{8}$ x 14GA                     | 2        |
|      | HNCL-58-11      | Nylon Lock Nut, $\frac{5}{8}$ - 11                        | 2        |
| 2    | 45-588          | Draw bar                                                  | 1        |
| 3*   | HCP-12-150      | Clevis Pin, $\frac{1}{2}$ - $1\frac{1}{2}$                | 2        |
| 4*   | HP-18-100       | Cotter Pin, $\frac{1}{8}$ 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   | Hex Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$             | 6        |
|      | HNFL-516-18     | Flange Whiz-Loc Nut, $\frac{5}{16}$ - 18                  | 6        |
| 9*   | HBFL-516-18-075 | Flange Whiz-Loc Bolt, $\frac{5}{16}$ - 18 x $\frac{3}{4}$ | 20       |
|      | HNTL-516-18     | Nylon Lock Nut, $\frac{5}{16}$ - 18                       | 20       |
|      | HW-516          | Flat Washer, $\frac{5}{16}$                               | 20       |
| 10   | 13-757          | Rake Connect Strap                                        | 10       |
| 11   | 45-589          | Center Rake Frame                                         | 1        |
| 12   | 13-443          | Finishing Blade                                           | 2        |
| 13   | 19-106          | Rake Teeth                                                | 31       |
|      | HN-38-16        | Hex Nut, $\frac{3}{8}$ -16                                | 62       |
|      | HWL-38          | Lock Washer, $\frac{3}{8}$                                | 31       |
| 14   | 45-591          | Left Rake Frame                                           | 1        |
| 15   | 45-587          | Finishing Blades                                          | 3        |
| *    | 13-764          | Hardware Kit                                              | 1        |

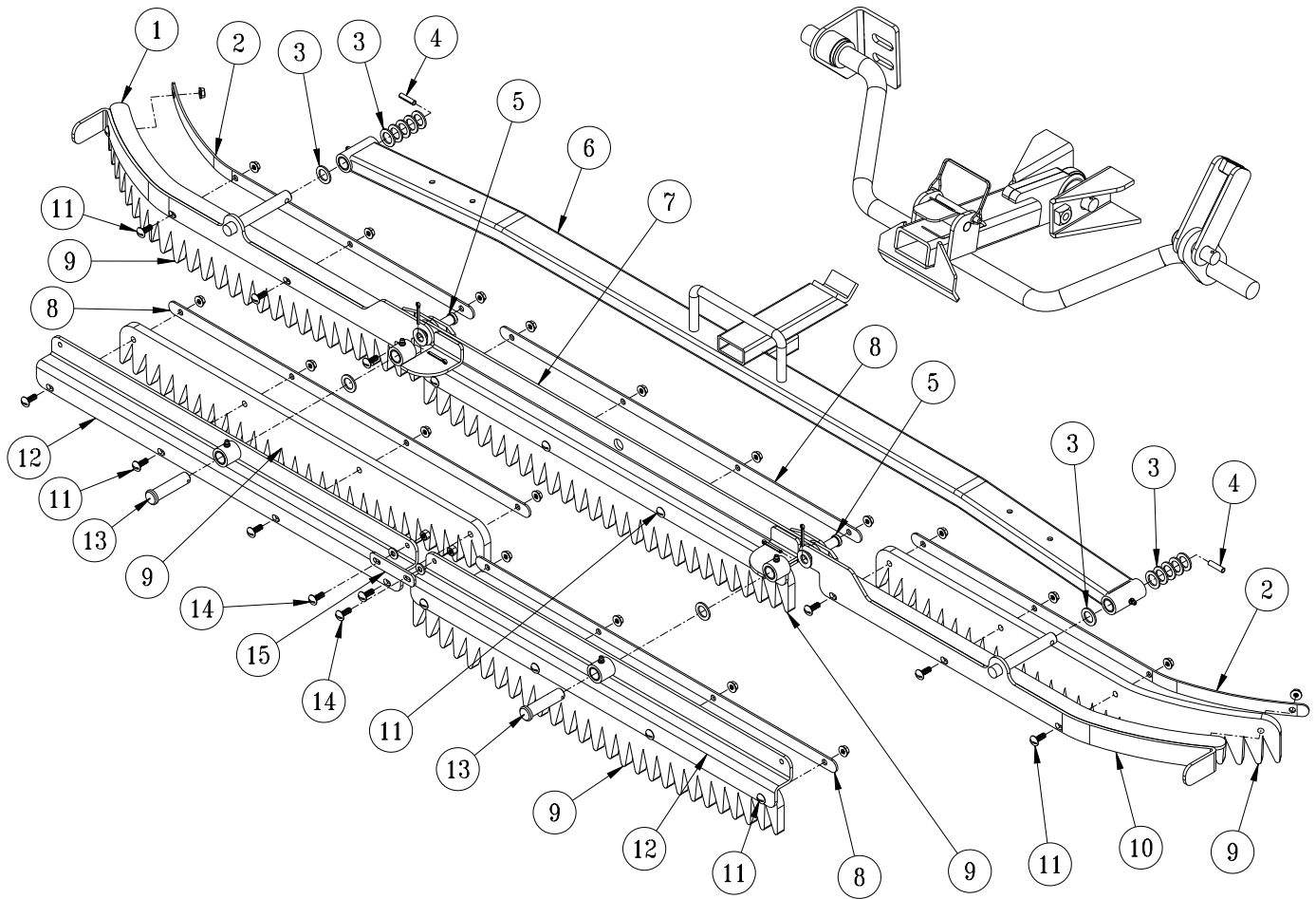
## INSTALLATION INSTRUCTIONS

- Hex Bolt rake teeth (Ref 13) to frames, keeping all the same length.
- Lay out rake frames (Refs 6, 11 & 14). Connect them using clevis pin (Ref 3), Spacer (Ref 5) and cotter pin (Ref 4).
- Attach left frame (Ref 14) and right frame (Ref 6) to draw bar (Ref 2) using  $\frac{5}{8}$  Hex Bolt, machine bushing, and center Nylon Lock Nut (Ref 1).
- Attach the three groomer blades (Ref 7), one to each of the rake frames (Refs 6, 11 & 14) using two Hex Bolts and Flange Whiz-Loc Nuts (Ref 8). Slide groomer blades to end of slot and tighten hardware.
- 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 Hex Bolt, flat washer and Nylon Lock Nut (Ref 9).

**NOTE: Attach Straps using hardware as illustrated, placing Flat Washer on Strap then secure with Nylon Lock Nut. Attaching with the Flange Hex Bolt in contact with the Strap will cause the Strap to bind and misalign Finishing Blade.**

- Attach the rake to the trap rake quick hitch by sliding the draw bar hitch into the spring loaded locking mechanism.
- With the rake on the ground pull the rake to the right side until it is 2-3 inches from the tire.
- Repeat steps 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.

# 45-511 RUBBER FLEX RAKE ASSEMBLY DRAWING



Rear Attachment

## 45-511 RUBBER FLEX RAKE ASSEMBLY PARTS LIST

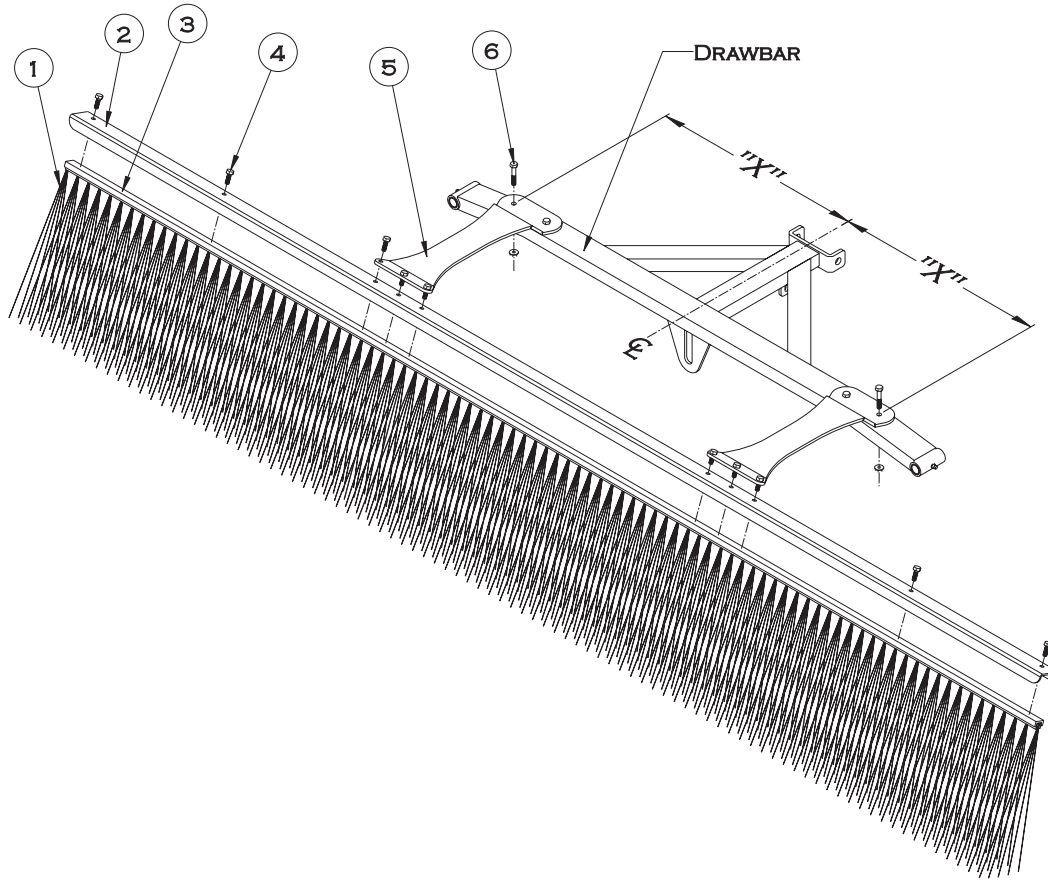
| REF# | PART#          | DESCRIPTION                                                | QUANTITY |
|------|----------------|------------------------------------------------------------|----------|
| 1    | 45-653         | LH Wing                                                    | 1        |
| 2    | 45-657         | Curved Cover Strap                                         | 2        |
| 3    | HMB-58-14      | Machine Bushing, $\frac{5}{8}$ x 14GA                      | 12       |
| 4    | HRP-14-100     | Roll Pin, $\frac{1}{4}$ x 1                                | 2        |
| 5    | HCP-12-150     | Clevis Pin, $\frac{1}{2}$ - $1\frac{1}{2}$                 | 2        |
|      | HMB-12-14      | Machine Bushing, $\frac{1}{2}$ x 14GA                      | 2        |
|      | HP-18-100      | Cotter Pin, $\frac{1}{8}$ x 1                              | 2        |
| 6    | 45-649         | Draw bar                                                   | 1        |
| 7    | 45-654         | Center Rake                                                | 1        |
| 8    | 45-658         | Flat Cover Strap                                           | 1        |
| 9    | 45-651         | Rubber Rake Blade                                          | 5        |
| 10   | 45-652         | RH Wing                                                    | 1        |
| 11   | HSTP-14-20-100 | Phillips Machine Screw, $\frac{1}{4}$ - 20 x 1             | 20       |
|      | HNFL-14-20     | Flange Whiz-Loc Nut, $\frac{1}{4}$ - 20                    | 20       |
| 12   | 45-655         | Rear Rake Mount                                            | 2        |
| 13   | HCP-58-250     | Clevis Pin, $\frac{5}{8}$ x $2\frac{1}{2}$                 | 2        |
|      | HMB-58-14      | Machine Bushing, $\frac{5}{8}$ x 14GA                      | 2        |
|      | HP-18-100      | Cotter Pin, $\frac{1}{8}$ x 1                              | 2        |
| 14   | HSTP-14-20-075 | Phillips Machine Screw, $\frac{1}{4}$ - 20 x $\frac{3}{4}$ | 2        |
|      | HNTL-14-20     | Nylon Lock Nut, $\frac{1}{4}$ - 20                         | 2        |
|      | HW-14          | Flat Washer, $\frac{1}{4}$                                 | 2        |
| 15   | 45-656         | Rake Strap                                                 | 1        |

## INSTALLATION INSTRUCTIONS

1. Hex Bolt rubber rake blades (Ref 9) onto all five rake sections using  $\frac{1}{4}$  x 1 machine Hex Bolts, and Flange Whiz-Loc Nuts (Ref 11). Add cover straps (Ref 8) and then tighten hardware.
2. Lay out right, left and center rake sections and connect them using  $\frac{1}{2}$  x  $1\frac{1}{2}$  clevis pins, machine bushings, and cotter pins (Ref 5).
3. Attach the three assembled sections onto the draw bar (Ref 6) and secure with machine bushings and roll pins (Ref 3 and 4).
4. Connect the two rear rake mounts (Ref 12) together with the rake strap (Ref 8) using two  $\frac{1}{4}$  x  $\frac{3}{4}$  machine Hex Bolts with Nylon Lock Nuts (Ref 14). **Only tighten enough so they move freely.**
5. Connect the two assembled rear rake mounts onto the other rake sections using two  $\frac{5}{8}$  x  $2\frac{1}{2}$  clevis pins, machine bushings and cotter pins (Ref 13).
6. Attach the rake to the bunker rake quick hitch by sliding the draw bar into the spring loaded locking mechanism.
7. With the rake on the ground, pull the rake to the sides and adjust hitch stops so the rake stops about 2" from the tires.
8. Start machine and test for operation of rake assembly by raising and lowering the rake assembly. Check for loose hardware.

# 13-740 SAND RAKE BRUSH KIT DRAWING

For use with 42-130 and 45-511



| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | 13-738       | Brush, 89 x 11                                | 1        |
| 2    | 13-737       | Brush Channel                                 | 1        |
| 3    | 13-739       | Brush Track                                   | 1        |
| 4    | HB-14-20-075 | Hex Bolt, $\frac{1}{4}$ - 20 x $\frac{3}{4}$  | 10       |
|      | HNFL-14-20   | Flange Whiz-Loc Nut, $\frac{1}{4}$ - 20       | 10       |
| 5    | 13-681       | Mounting Brackets                             | 2        |
| 6    | HB-14-20-150 | Hex Bolt, $\frac{1}{4}$ - 20 x $1\frac{1}{2}$ | 4        |
|      | HNFL-14-20   | Flange Whiz-Loc Nuts, $\frac{1}{4}$ - 20      | 4        |

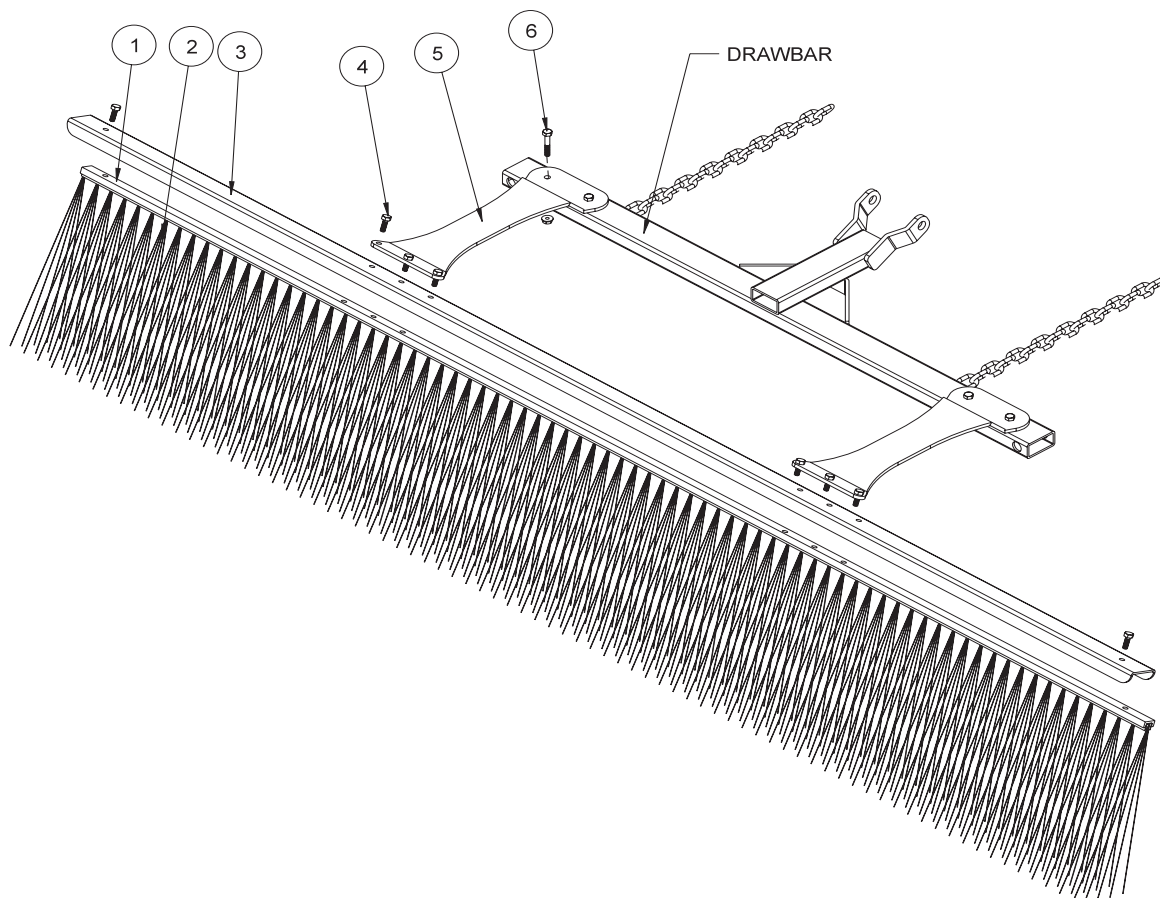
## INSTALLATION INSTRUCTIONS

1. Place the Brush (Ref 1) into the Brush Track (Ref 3). Place the Brush Channel (Ref 2) between the brush track and the mounting brackets. Now Hex Bolt the Mounting Brackets (Ref 5) to the brush track using the  $\frac{3}{4}$ " Hex Bolts and flange whiz-Nylon Lock Nuts(Ref 4).
2. To mount the Brush Assembly (Refs 1-5) to the Rake Draw bar, first align the Mounting Brackets so the Brush Assembly is centered ("X" measurements are equal) on the Rake Draw bar. Mark the locations for the four holes that will need to be drilled. Note: To fit the curve of the Rake Draw bar, a small amount of twist will need to be put in the Mounting Brackets. This can be done by clamping the Mounting Brackets to the Draw bar.
3. Mount the Brush Assembly to the Draw bar using the four  $1\frac{1}{2}$ " Hex Bolts and flange whiz-Nylon Lock Nuts(Ref 6).



# 13-684 SAND RAKE BRUSH KIT DRAWING

For use with 13-438



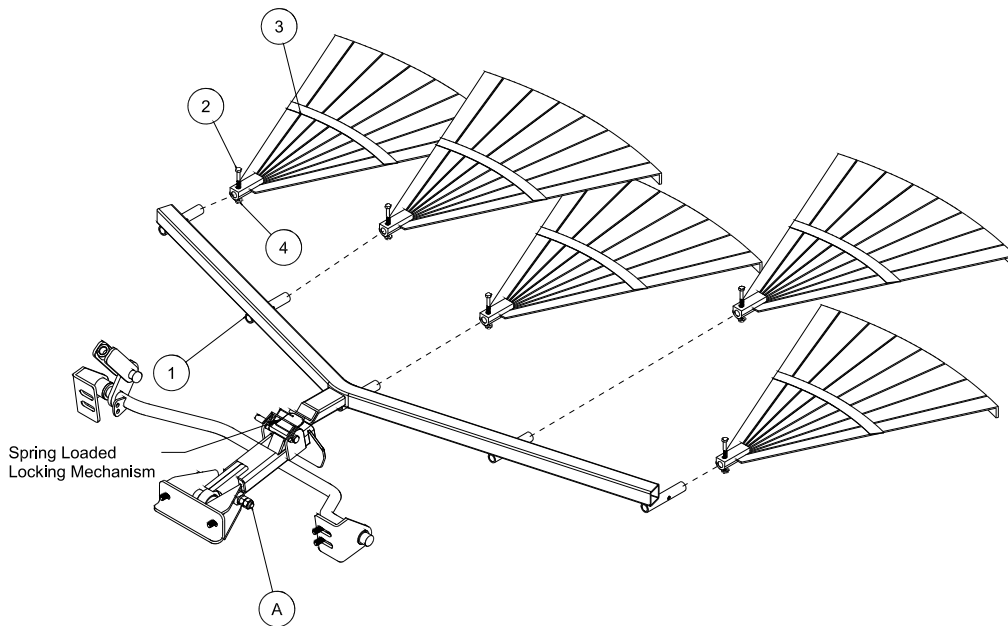
| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | 13-683       | Brush Track                                   | 1        |
| 2    | 13-682       | Brush 77 x 11                                 | 1        |
| 3    | 13-688       | Brush Channel                                 | 1        |
| 4    | HB-14-20-075 | Hex Bolt, $\frac{1}{4}$ - 20 x $\frac{3}{4}$  | 8        |
|      | HNFL-14-20   | Flange Whiz-Loc Nut, $\frac{1}{4}$ - 20       | 8        |
| 5    | 13-681       | Mounting Brackets                             | 2        |
| 6    | HB-14-20-150 | Hex Bolt, $\frac{1}{4}$ - 20 x $1\frac{1}{2}$ | 4        |
|      | HNFL-14-20   | Flange Whiz-Loc Nut, $\frac{1}{4}$ - 20       | 4        |

## INSTALLATION INSTRUCTIONS

1. Place the brush (Ref 2) into the brush track (Ref 1). Place the brush channel (Ref 3) between the brush track and the mounting brackets. Now Hex Bolt the mounting brackets (Ref 5) to the brush track using the  $\frac{3}{4}$ " Hex Bolts and flange whiz-Nylon Lock Nuts (Ref 3).
2. Mount the brush assembly to the draw bar using four  $\frac{3}{4}$ " Hex Bolts and flange whiz-Nylon Lock Nuts (Ref 5).

Rear Attachment

## 13-298Q FAN RAKE ATTACHMENT DRAWING

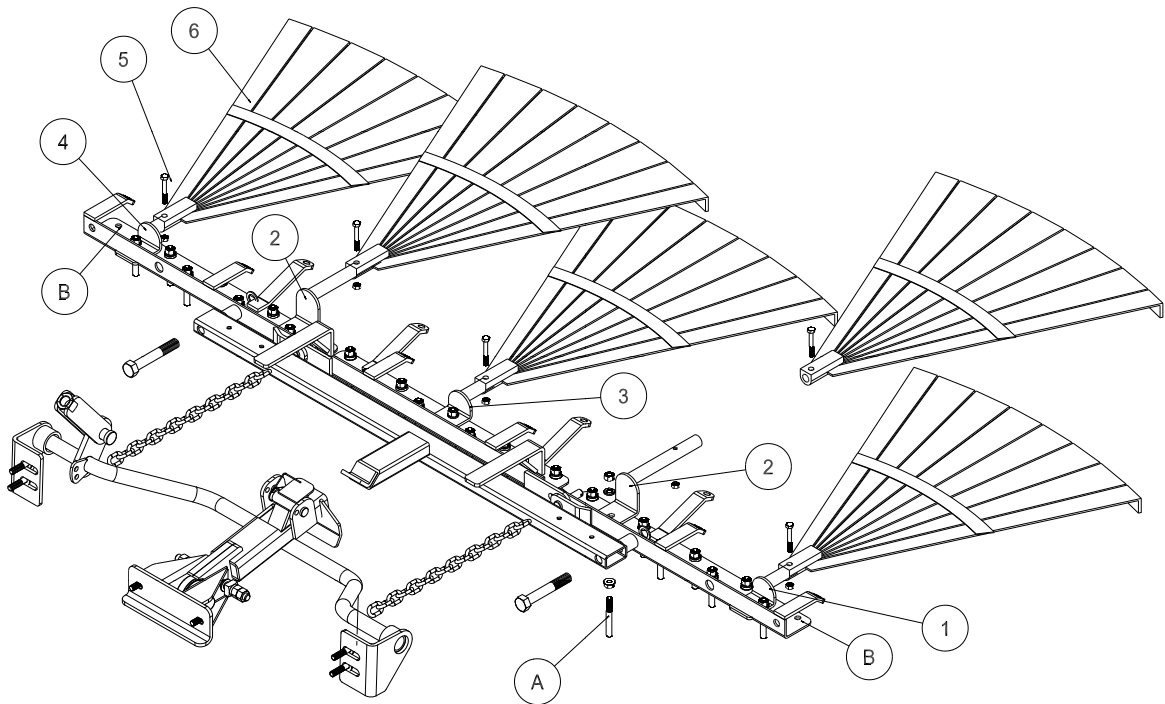


| REF# | PART#        | DESCRIPTION                     | QUANTITY |
|------|--------------|---------------------------------|----------|
| 1    | 43-153       | Frame                           | 1        |
| 2    | HB-14-20-200 | Hex Bolt, 1/4 - 20 x 2          | 5        |
| 3    | 13-310       | Rake                            | 5        |
| 4    | HNCL-14-20   | Center Nylon Lock Nut, 1/4 - 20 | 5        |

## INSTALLATION INSTRUCTIONS

1. Assemble the five rakes (Ref 3) to the frame using the Hex Bolt and center Nylon Lock Nuts (Ref 2 and 4). Slide the fan rake assembly under the rear of the trap rake to the hitch.
2. Attach the rake lift to the trap rake quick hitch, by sliding the hitch into the spring loaded locking mechanism.
3. With the rake on the ground pull the rake to the right side until it is 2-3 inches from the tire.
4. Repeat steps on left side.
5. 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.

# 13-319-K FAN RAKE KIT DRAWING



| REF# | PART#  | DESCRIPTION   | QUANTITY |
|------|--------|---------------|----------|
| 1    | 13-326 | Left Holder   | 1        |
| 2    | 13-329 | Long Holder   | 2        |
| 3    | 13-327 | Center Holder | 1        |
| 4    | 13-328 | Right Holder  | 1        |
| 5    | 29-541 | Lock Pin      | 5        |
| 6    | 13-310 | Rake          | 5        |

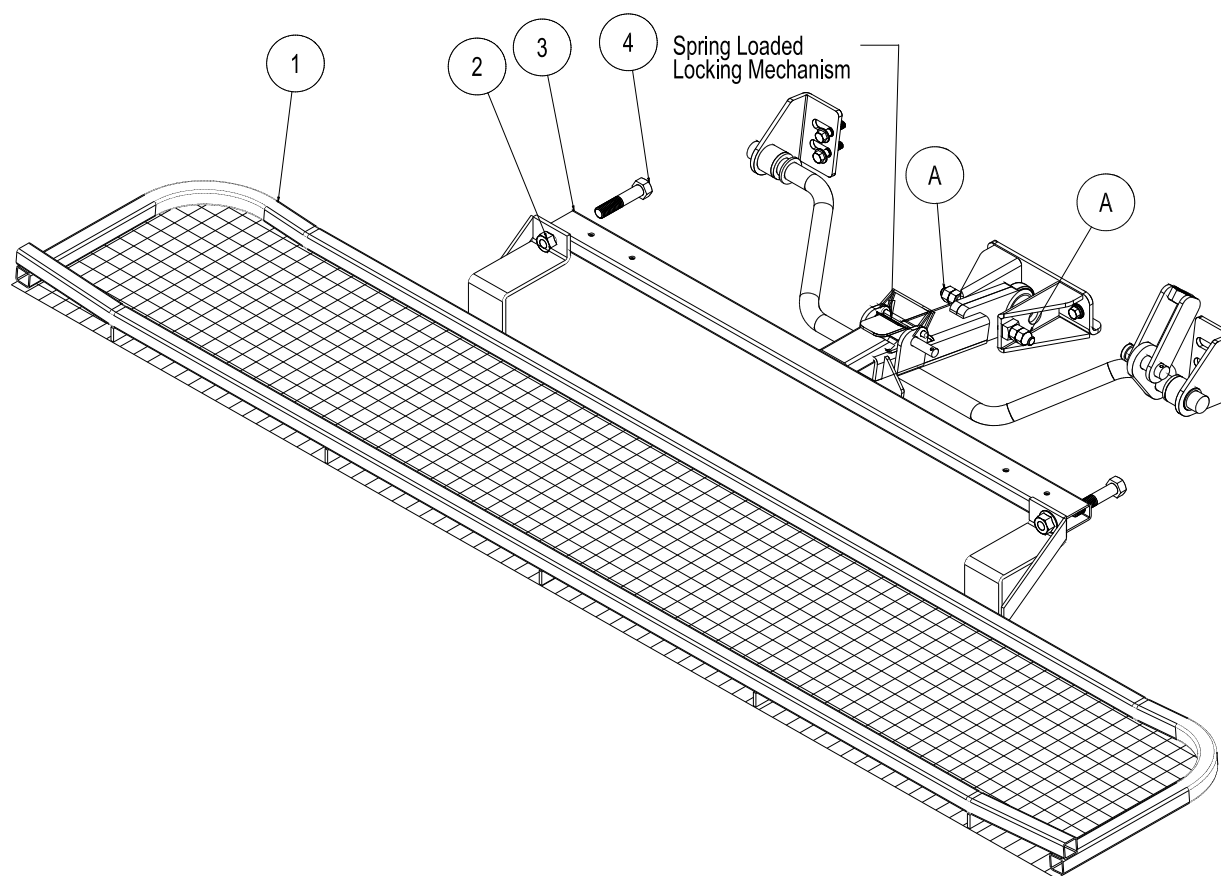
B No Studs in first slot - Leave Empty.

## FAN RAKE KIT INSTRUCTIONS

1. Remove connector links that hold rake blades to rake frame if desired.
2. Remove groomer blades from rake frame that are held on with rake teeth studs (Ref A). Replace rake teeth studs, if desired.
3. Place left holder (Ref 1), angle side up, to the second rake tooth hole from the end and install rake tooth stud. The first rake tooth hole from each end (Ref B) have no rake teeth in them.
4. Remove the 8th rake tooth stud from the end of right and left rake frame and place long holders (Ref 2) on top, reinstall rake teeth studs.
5. Remove rake tooth in direct center of rake and install the center holder (Ref 3). Reinstall rake teeth studs.
6. Place right holder (Ref 4), angle side up, to the second rake tooth hole from the end and install rake tooth stud. The first rake tooth hole from each end (Ref B) have no rake teeth in them.
7. Slide fan rake (Ref 6) onto holders and pin with lock pin (Ref 5).

Rear Attachment

## 26-007Q PROFESSIONAL INFELD FINISHER DRAWING



Rear Attachment

## 26-007Q PROFESSIONAL INFIELD FINISHER PARTS LIST

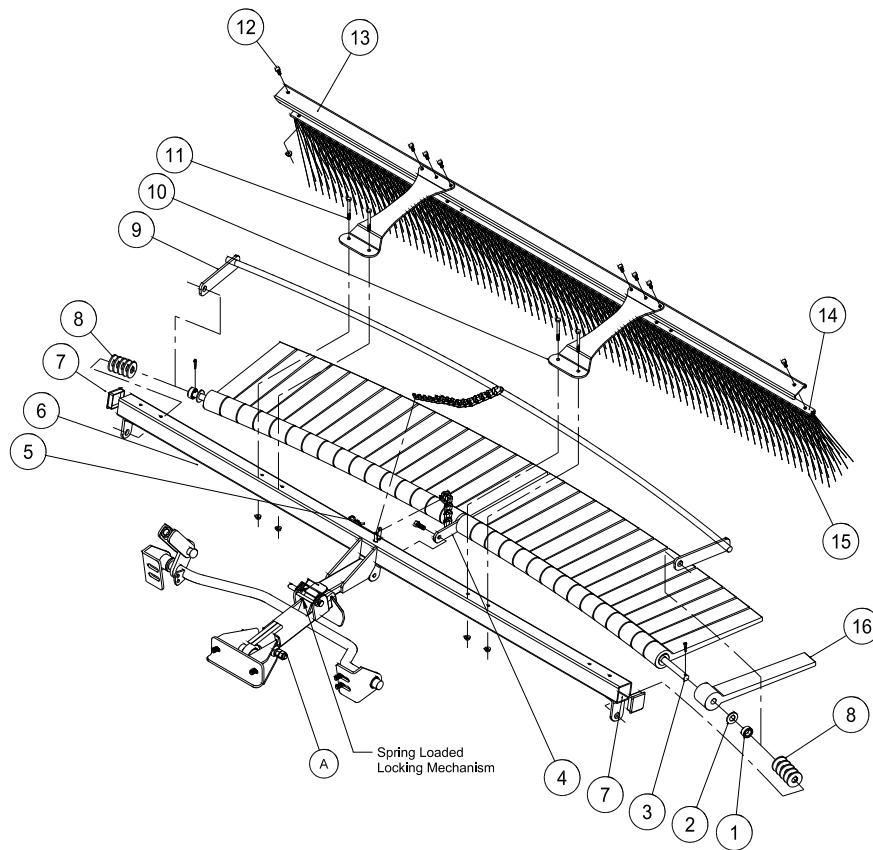
| REF# | PART#        | DESCRIPTION                               | QUANTITY |
|------|--------------|-------------------------------------------|----------|
| 1    | 26-045       | Leveling Screen                           | 1        |
| 2    | HNCL-58-11   | Center Nylon Lock Nut, $\frac{5}{8}$ - 11 | 2        |
| 3    | 43-145       | Draw bar                                  | 1        |
| 4    | HB-58-11-300 | Hex Bolt, $\frac{5}{8}$ - 11 x 3          | 2        |

## INSTALLATION INSTRUCTIONS

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

1. Attach leveling screen (Ref 1) to draw bar (Ref 3) using two Hex Bolts (Ref 4) and center Nylon Lock Nuts (Ref 2).
2. Mount Professional Field Finisher to the hitch on the trap rake by sliding the draw bar into the quick hitch locking mechanism.
3. When Professional Field Finisher is attached, adjust Hex Bolts on hitch (Ref A) to hold Finisher in desired position.
4. **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.
5. When removing the attachment from machine. Push down on quick hitch locking mechanism and pull accessory out.

# 43-002Q FLEX ACTION FIELD FINISHER WITH BRUSH DRAWING



| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | 11-040       | Spacer, $\frac{3}{4}$ "                       | 2        |
| 2    | HW-58        | Washer, $\frac{5}{8}$                         | 32       |
| 3    | 26-049       | Mounting Bar                                  | 1        |
|      | HP-18-100    | Cotter Pin, $\frac{1}{8}$ x 1                 | 2        |
| 4    | 26-048       | Flail Bar Strap                               | 1        |
|      | HB-38-16-100 | Hex Bolt $\frac{3}{8}$ -16 x 1                | 1        |
|      | HNCL-38-16   | Center Nylon Lock Nut $\frac{3}{8}$ -16       | 1        |
| 5    | HHP-18       | Bridge Pin, $\frac{1}{8}$                     | 2        |
| 6    | 43-146       | Frame                                         | 1        |
| 7    | 18-297       | Cap Plug                                      | 2        |
| 8    | HMB-58-14    | Machine Bushing $\frac{5}{8}$ x 14GA          | 10       |
| 9    | 26-047       | Leveler Bar                                   | 1        |
| 10   | 13-681       | Mount Bracket                                 | 2        |
| 11   | HB-14-20-250 | Hex Bolt, $\frac{1}{4}$ -20 x $2\frac{1}{2}$  | 4        |
|      | HNFL-14-20   | Flange Whiz-Nylon Lock Nut, $\frac{1}{4}$ -20 | 4        |
| 12   | HB-14-20-075 | Hex Bolt, $\frac{1}{4}$ -20 x $\frac{3}{4}$   | 8        |
|      | HNFL-14-20   | Flange Whiz-Nylon Lock Nut, $\frac{1}{4}$ -20 | 8        |
| 13   | 13-688       | Brush Channel                                 | 1        |
| 14   | 13-683       | Brush Track                                   | 1        |
| 15   | 13-682       | Brush, 77 x 11                                | 1        |
| 16   | 26-041       | Rasp Flail                                    | 32       |

Rear Attachment

# 43-002Q FLEX ACTION FIELD FINISHER WITH BRUSH INSTRUCTIONS

## ASSEMBLY INSTRUCTIONS

1. Install flail bar strap (Ref 4) to center of mounting bar (Ref 3) 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 17) with knobby side down adjacent to sides of flail bar strap. Now install a flat washer (Ref 2) 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 the **left hand side** of bar strap and **17** flails and washers on the **right hand side**. Force all flails tightly toward bar strap.
3. After all 33 flails have been installed, place one spacer (Ref 1) to each end of mounting bar adjacent to washer.
4. Install leveler bar (Ref 10) 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 next to spacer to ensure a snug fit.** Then reinstall leveler bar.
5. Lay the frame (Ref 7) on the floor or bench with welded 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  $\frac{1}{8}$  x 1 cotter pin.
6. Install flail bar strap (Ref 4) to center tab on frame with  $\frac{3}{8}$  -16 x  $1\frac{1}{2}$  Hex Bolt and  $\frac{3}{8}$  -16 center Nylon Lock Nut. Loose fit is required. Do not over tighten.
7. Flip assembly over so knobby sides of flails are now facing down. Connect Finisher to the Quick Hitch frame, locking securely in the locking mechanism, as illustrated.
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.

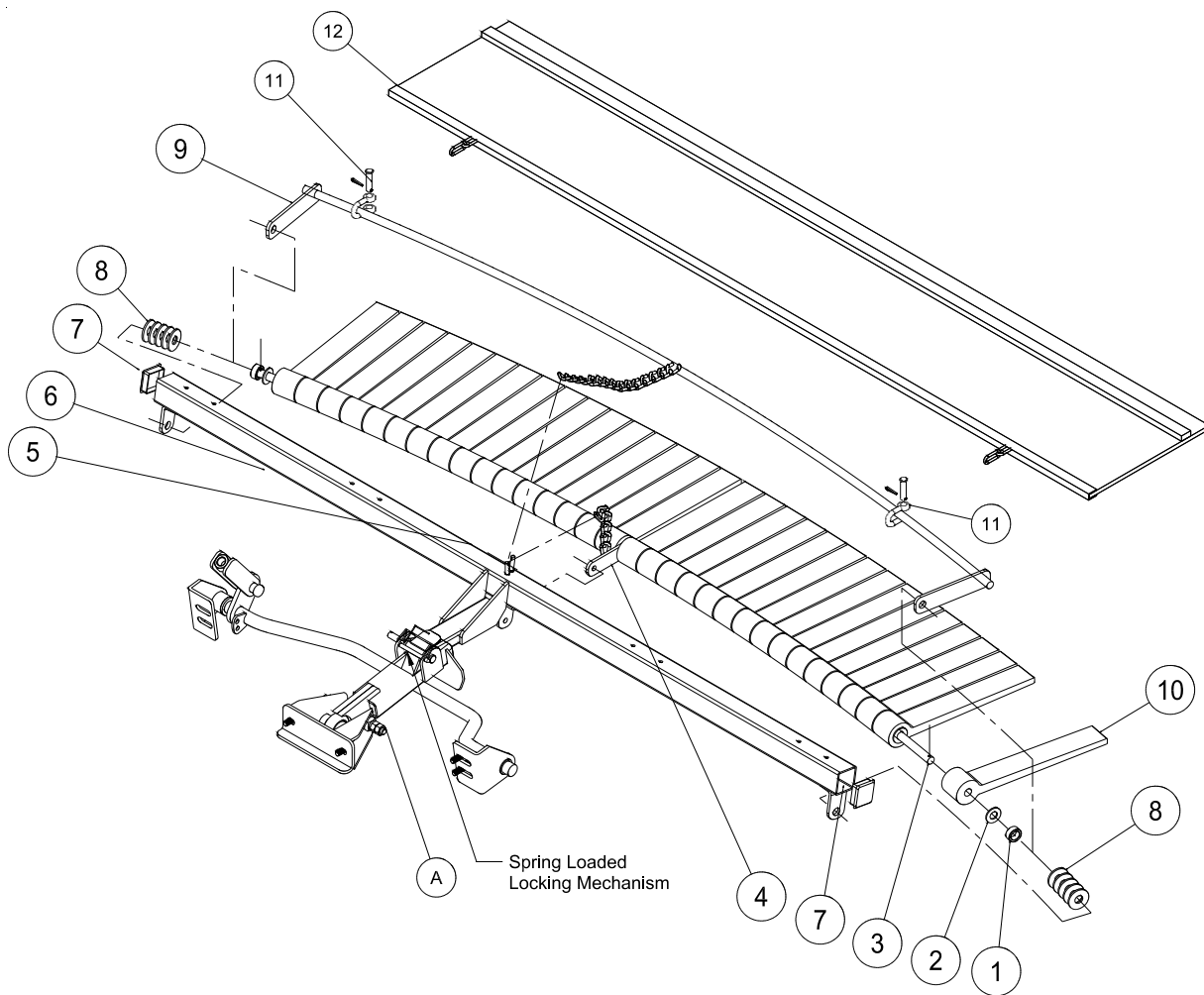
## OPERATING INSTRUCTIONS

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.

## BRUSH ASSEMBLY

1. Place the brush (Ref 16) into the brush track (Ref 15). Place the brush channel (Ref 14) between the brush track and the mounting brackets. Now Hex Bolt the mounting brackets (Ref 11) to the brush track using the  $\frac{1}{4}$  - 20 x  $\frac{3}{4}$  Hex Bolts and  $\frac{1}{4}$  - 20 flange whiz-loc Nuts (Ref 13).
2. Mount the brush assembly to the frame using the (4)  $\frac{1}{4}$ -20 x  $2\frac{1}{2}$  Hex Bolts and  $\frac{1}{4}$  - 20 flange whiz-loc Nuts (Ref 12).

## 26-008Q FLEX ACTION FIELD FINISHER DRAWING





## 26-008Q FLEX ACTION FIELD FINISHER PARTS LIST

| REF# | PART#        | DESCRIPTION                               | QUANTITY |
|------|--------------|-------------------------------------------|----------|
| 1    | 11-040       | Spacer, $\frac{3}{4}$ "                   | 2        |
| 2    | HW-58        | Flat Washer, $\frac{5}{8}$                | 32       |
| 3    | 26-049       | Mounting Bar                              | 1        |
| 4    | 26-048       | Flail Bar Strap                           | 1        |
|      | HB-38-16-100 | Hex Bolt, $\frac{3}{8}$ - 16 x 1          | 1        |
|      | HNCL-38-16   | Center Nylon Lock Nut, $\frac{3}{8}$ - 16 | 1        |
| 5    | HHP-18       | Bridge Pin, $\frac{1}{8}$                 | 2        |
| 6    | 43-146       | Frame                                     | 1        |
| 7    | 18-297       | Cap Plug                                  | 2        |
| 8    | HMB-58-14    | Machine Bushing, $\frac{5}{8}$ x 14GA     | 10       |
| 9    | 26-047       | Leveler Bar                               | 1        |
| 10   | 26-041       | Rasp Flail                                | 32       |
| 11   | 21-260       | Clevis                                    | 2        |
| 12   | 26-115       | Mesh Finisher                             | 1        |

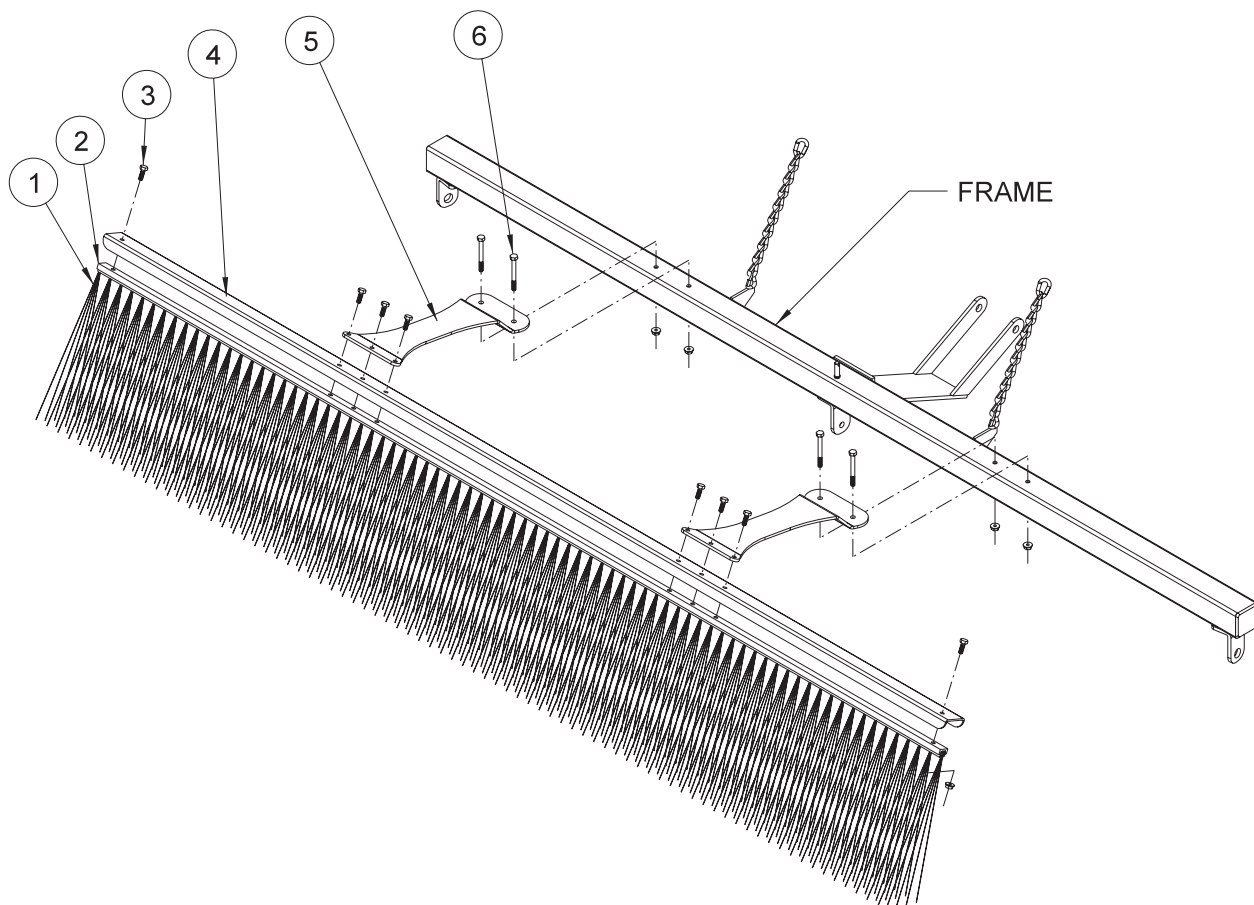
## INSTALLATION INSTRUCTIONS

1. Install flail bar strap (Ref 4) to center of mounting bar (Ref 3) 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 16) with knobby side down adjacent to sides of flail bar strap. Now install a flat washer (Ref 2) 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 1) to each end of mounting bar adjacent to washer.
4. Install leveler bar (Ref 9) 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 welded 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  $\frac{1}{8}$  x 1 cotter pin.
6. Install flail bar strap (Ref 4) to center tab on frame with  $\frac{3}{8}$  -16 x 1 Hex Bolt and  $\frac{3}{8}$  -16 center Nylon Lock Nut. Loose fit is required. Do not over tighten.
7. Flip assembly over so knobby sides of flails are now facing down. Install hitch to frame with clevis pin (Ref 3) and cotter pin (Ref 24). 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.

### 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.

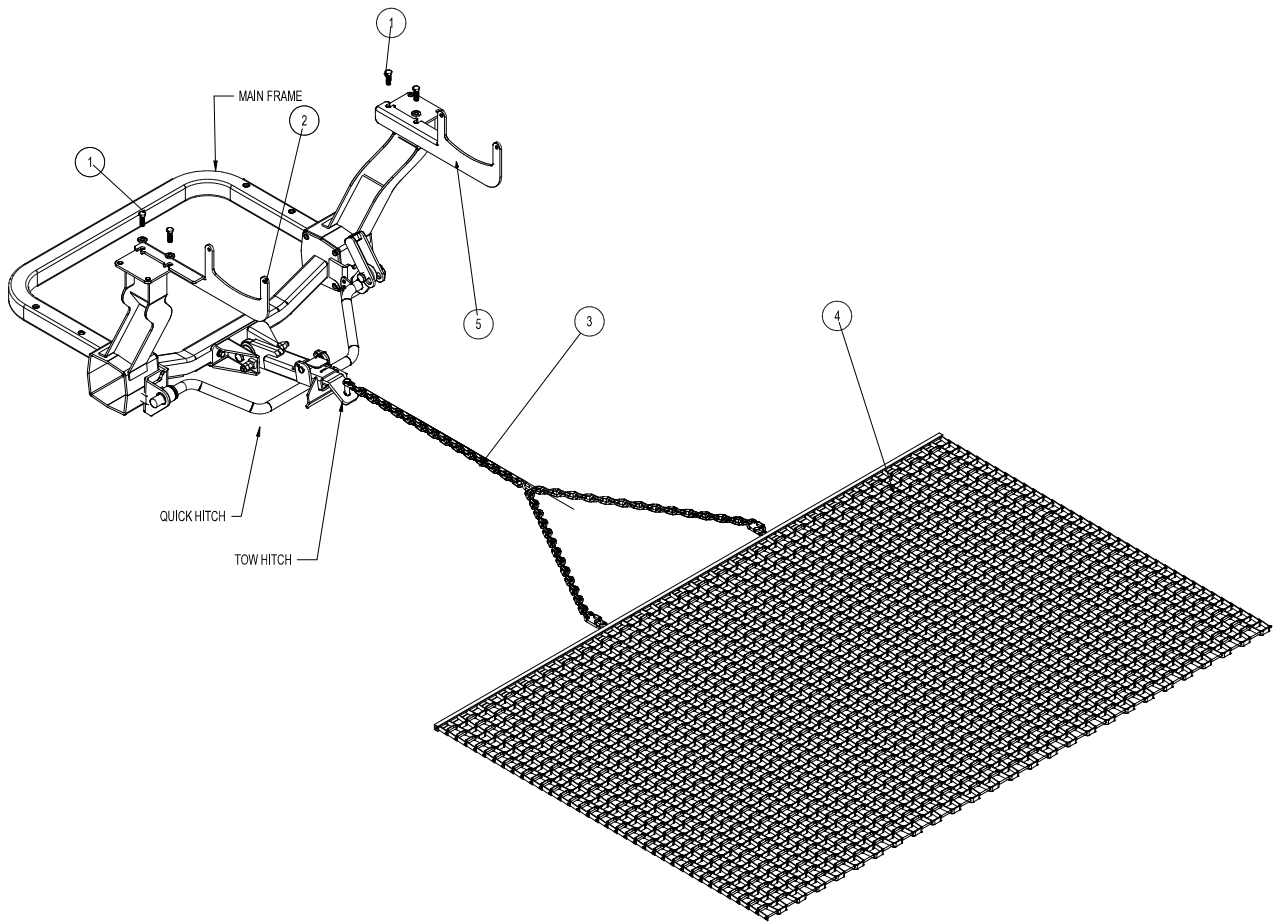
## 43-043 FINISHING BRUSH KIT DRAWING



| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | 13-682       | Brush, 77 x 11                                | 1        |
| 2    | 13-683       | Brush Track                                   | 1        |
| 3    | HB-14-20-075 | Hex Bolt, $\frac{1}{4}$ - 20 x $\frac{3}{4}$  | 8        |
|      | HNFL-14-20   | Flange Whiz-Loc Nut, $\frac{1}{4}$ - 20       | 8        |
| 4    | 13-688       | Brush Channel                                 | 1        |
| 5    | 13-681       | Mount Bracket                                 | 2        |
| 6    | HB-14-20-250 | Hex Bolt, $\frac{1}{4}$ - 20 x $2\frac{1}{2}$ | 4        |
|      | HNFL-14-20   | Flange Whiz-Loc Nut, $\frac{1}{4}$ - 20       | 4        |

1. Remove the mesh finisher from your unit, it will not be used with the brush.
2. Place the brush (Ref 1) into the brush track (Ref 2). Place the brush channel (Ref 4) between the brush track and the mounting brackets (Ref 5). Now Hex Bolt the mounting brackets (Ref 5) to the brush track using the  $\frac{1}{4}$  - 20 x  $\frac{3}{4}$ " Hex Bolts and  $\frac{1}{4}$  - 20 flange whiz-Nylon Lock Nuts (Ref 3).
3. Mount the brush assembly to the frame using the four  $\frac{1}{4}$  - 20 x  $2\frac{1}{2}$ " Hex Bolts and  $\frac{1}{4}$  - 20 flange whiz-Nylon Lock Nuts (Ref 5).

# 43-008 DRAG MAT DRAWING

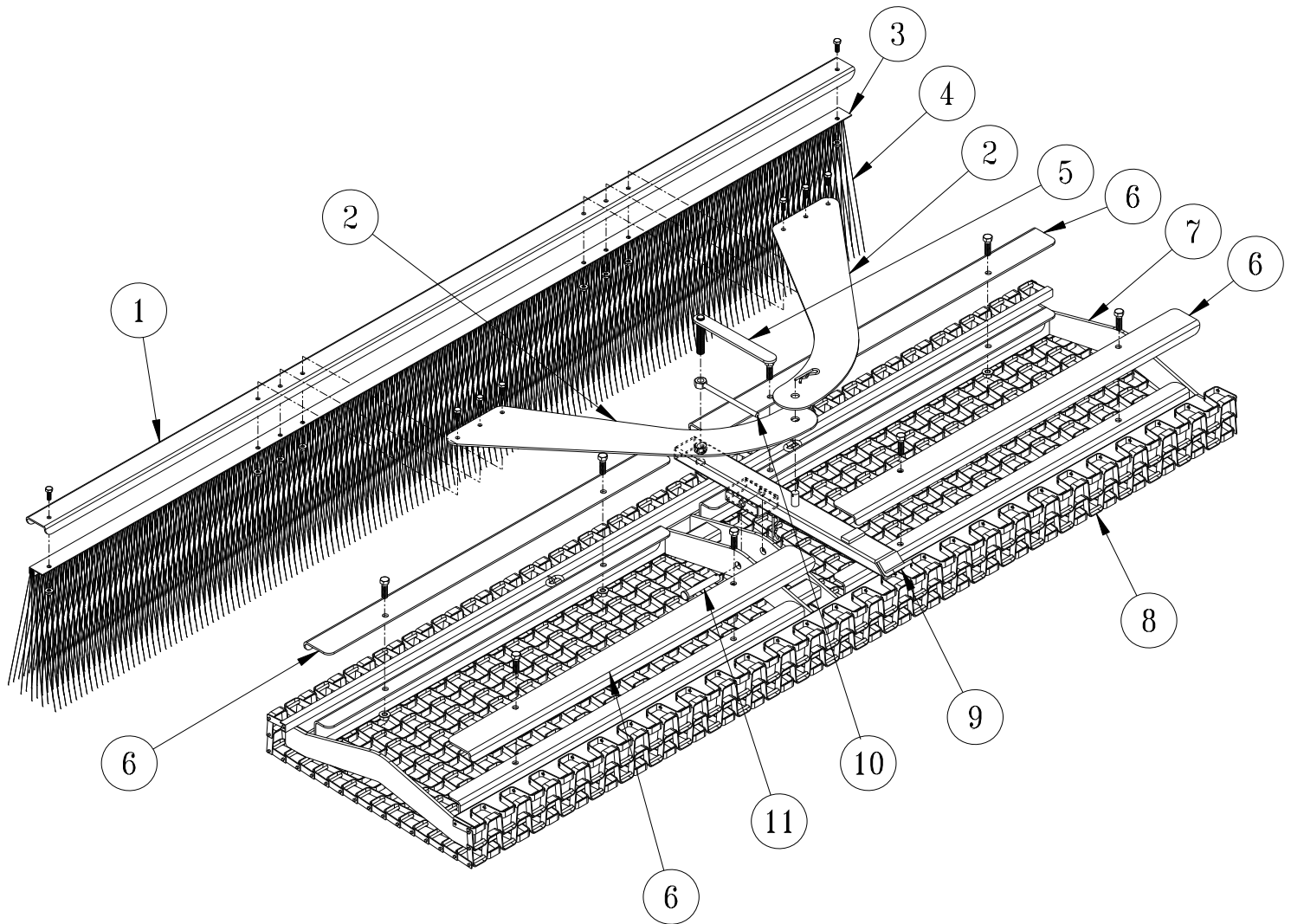


| REF# | PART#         | DESCRIPTION                                    | QUANTITY |
|------|---------------|------------------------------------------------|----------|
| 1    | HB-716-14-125 | Hex Bolt, $\frac{7}{16}$ - 14 x $1\frac{1}{4}$ | 4        |
|      | HW-716        | Flat Washer, $\frac{7}{16}$                    | 4        |
|      | HNTL-716-14   | Nylon Lock Nut, $\frac{7}{16}$ -14             | 4        |
| 2    | 13-751        | Right Carrier Mount                            | 1        |
| 3    | 19-605        | Drag Mat Chain                                 | 1        |
|      | HHP-18        | Bridge Pin, $\frac{1}{8}$                      | 1        |
| 4    | 19-601        | Steel Drag Mat                                 | 1        |
| 5    | 13-752        | Left Carrier Mount                             | 1        |

1. The Drag Mat Kit can be installed on all Super Star with or without the optional Roll Bars.
2. Remove the two insides Hex Bolts from the roll bar mounts. Install the flat washers and secure right and left carrier mounts on opposite sides. Tighten all hardware.
3. Install the tow hitch insert into the quick hitch. This is where the tow chain on the drag mat attaches to the machine.

Rear Attachment

## 45-176 72" DRAG MAT + FINISHER BRUSH DRAWING



Rear Attachment

## 45-176 72" DRAG MAT + FINISHER BRUSH PARTS LIST

| REF# | PART#        | DESCRIPTION                                              | QUANTITY |
|------|--------------|----------------------------------------------------------|----------|
| 1    | 13-688       | Brush Channel                                            | 1        |
|      | HB-14-20-075 | Hex Bolt, $\frac{1}{4}$ - 20 x $\frac{3}{4}$             | 2        |
|      | HNFL-14-20   | Flange Whiz-Loc Nut, $\frac{1}{4}$ - 20                  | 2        |
| 2    | 43-168       | Brush Mount Arm                                          | 2        |
|      | HB-14-20-075 | Hex Bolt, $\frac{1}{4}$ - 20 x $\frac{3}{4}$             | 8        |
|      | HNFL-14-20   | Flange Whiz-Loc Nut, $\frac{1}{4}$ - 20                  | 8        |
| 3    | 13-683       | Brush Track                                              | 1        |
| 4    | 13-682       | Brush, 77 x 11                                           | 1        |
| 5    | 43-164       | Adjustment Handle                                        | 1        |
| 6    | 43-166       | Mat Clamp                                                | 4        |
|      | HB-38-16-125 | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{4}$            | 8        |
|      | HNFL-38-16   | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 16 x $1\frac{1}{4}$ | 8        |
| 7    | 43-165       | Frame                                                    | 1        |
| 8    | 45-167       | Steel Mat, 72 x 29                                       | 1        |
| 9    | 43-162       | Draw Bar                                                 | 1        |
|      | HHP-18       | Bridge Pin, $\frac{1}{8}$                                | 1        |
| 10   | 43-163       | Lock Handle                                              | 1        |
| 11   | HCP-12-300   | Clevis Pin, $\frac{1}{2}$ x 3                            | 1        |
|      | HHP-18       | Bridge Pin, $\frac{1}{8}$                                | 1        |

## DRAG MAT ASSEMBLY INSTRUCTIONS

Some components of your **Drag Mat + Finisher Brush** have been assembled at the factory for your convenience.

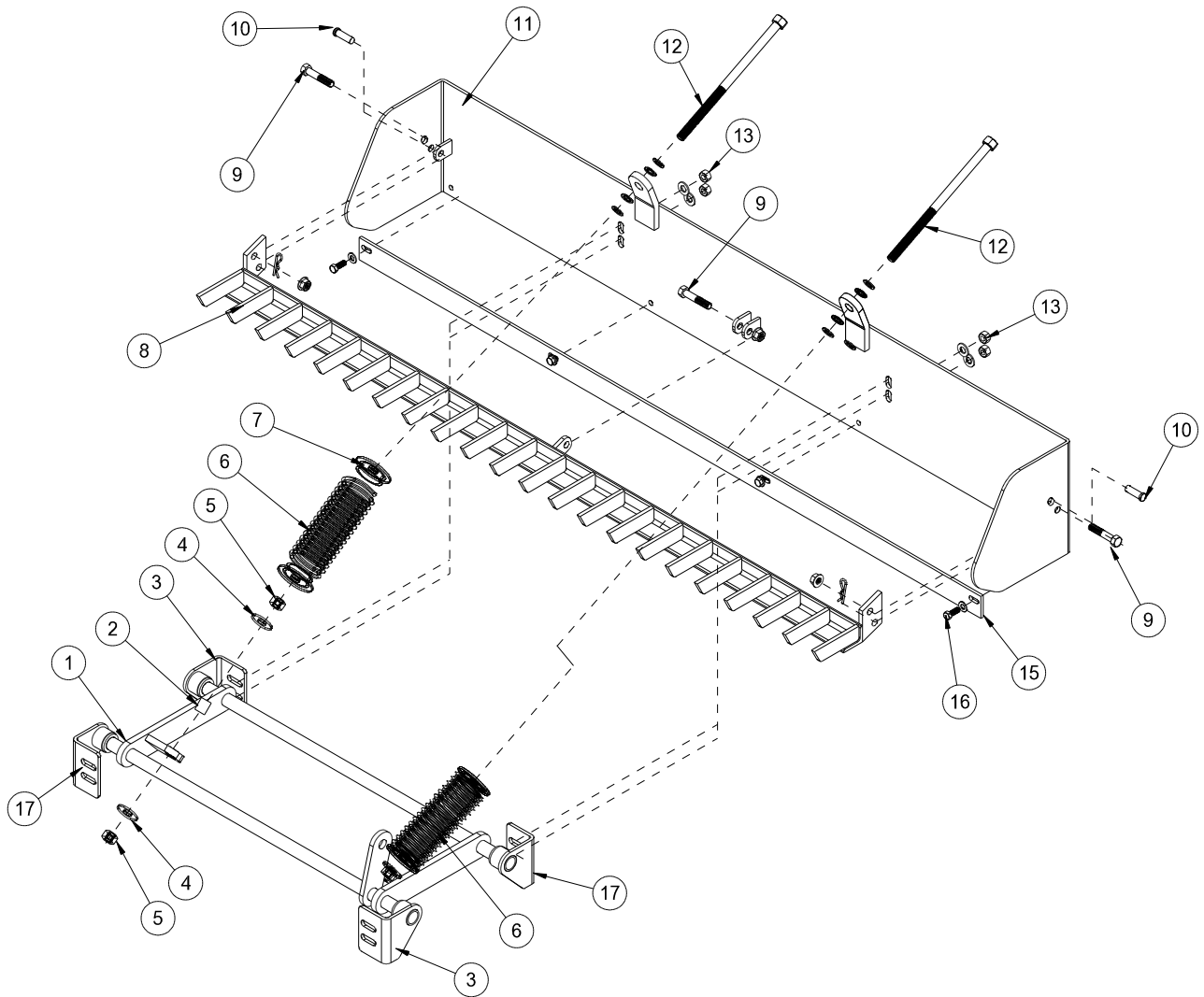
1. Start by mounting the Draw bar (Ref 9) to the Frame (Ref 7) using the Clevis Pin and Bridge Pin (Ref 11). Position the Draw bar, using either set of holes, as illustrated.
2. Next, mount the Brush assembly (Ref 1, 3 & 4) to the Brush Mount Arms (Ref 2), as illustrated, using the (6)  $\frac{1}{4}$  - 20 x  $\frac{3}{4}$  Hex Bolts and  $\frac{1}{4}$  - 20 Flange Whiz-Loc Nuts. Secure fasteners tight.
3. The holes on each of the Brush Mount Arms will line up. Mount to the pin on the Draw bar (Ref 9) and secure using the remaining Bridge Pin.
4. Thread the Lock Handle (Ref 10) on to the Adjustment Handle (Ref 5). Thread the Adjustment Handle into the nut on top of the Draw bar (Ref 9), continuing until the threaded rod is through the Draw bar tube. Turn the Lock Handle clockwise (↻) to lock the Adjustment handle in place.

### Adjusting the **Steel Mat Finisher**.

Adjusting the leading edge (front) will affect the performance of the **Finisher**. Various field compositions and conditions can benefit from fine tuning of the **Finisher's** leading edge angle.

1. Release the Lock Handle (Ref 10) by holding the Adjustment Handle (Ref 5) and turning the Lock Handle counter-clockwise (↺).
2. To raise the leading edge (front) of the **Finisher**, turn the Adjustment Handle clockwise (↻). When you obtain your desired position, turn the Lock Handle clockwise (↻) to lock the Adjustment handle in place.
3. To lower the leading edge (front) of the **Finisher**, turn the Adjustment Handle counter-clockwise (↺). When you obtain your desired position, turn the Lock Handle clockwise (↻) to lock the Adjustment handle in place.

# 45-010 BOX GRADER DRAWING



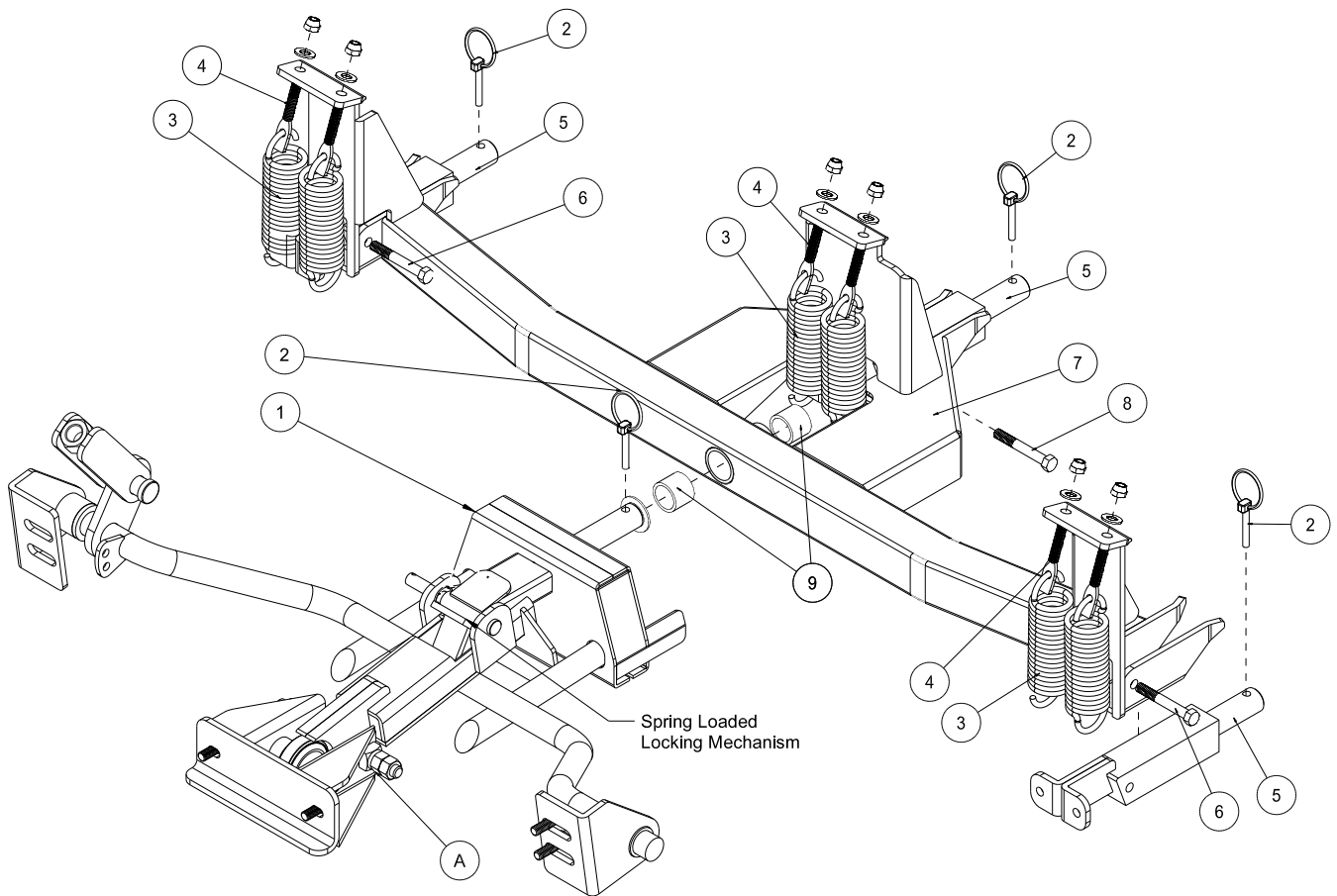
Rear Attachment

## 45-010 BOX GRADER PARTS LIST

| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | 45-141       | Lift Assembly                                 | 1        |
| 2    | 34-215       | Spacer                                        | 2        |
| 3    | 34-220       | Right Pivot Bracket                           | 2        |
|      | 33-086       | Bushing                                       | 2        |
| 4    | HW-58        | Flat Washer, $\frac{5}{8}$                    | 4        |
| 5    | HNTL-58-18   | Nylon Lock Nut, $\frac{5}{8}$ - 18            | 2        |
|      | HN-58-18     | Hex Nut, $\frac{5}{8}$ - 18                   | 4        |
| 6    | 13-276       | Compression Spring                            | 2        |
| 7    | 13-277       | Spring Pad                                    | 4        |
| 8    | 34-217       | Break Up Bar                                  | 1        |
| 9    | HB-12-13-200 | Hex Bolt, $\frac{1}{2}$ - 13 x 2              | 3        |
|      | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13            | 3        |
| 10   | HCP-12-150   | Clevis Pin, $\frac{1}{2}$ x $1\frac{1}{2}$    | 2        |
|      | HHP-18       | Bridge Pin, $\frac{1}{8}$                     | 2        |
| 11   | 34-216       | Blade Assembly                                | 1        |
| 12   | 34-214       | Spring Rod                                    | 2        |
|      | HMB-58-14    | Machine Bushing, $\frac{5}{8}$ - 14GA         | 4        |
| 13   | HB-12-13-125 | Hex Bolt, $\frac{1}{2}$ - 13 x $1\frac{1}{4}$ | 4        |
|      | HW-716       | Flat Washer, $\frac{7}{16}$                   | 8        |
|      | HWL-12       | Lock Washer, $\frac{1}{2}$                    | 4        |
|      | HN-12-13     | Hex Nut, $\frac{1}{2}$ - 13                   | 4        |
| 15   | 34-218       | Cutter Blade                                  | 1        |
| 16   | HB-38-16-125 | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{4}$ | 4        |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                    | 4        |
|      | HWL-38       | Lock Washer, $\frac{3}{8}$                    | 4        |
|      | HN-38-16     | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 4        |
| 17   | 34-219       | Left Pivot Bracket                            | 2        |
|      | 33-086       | Bushing                                       | 2        |



# 42-586Q GREEN STAR RBS MAIN FRAME DRAWING



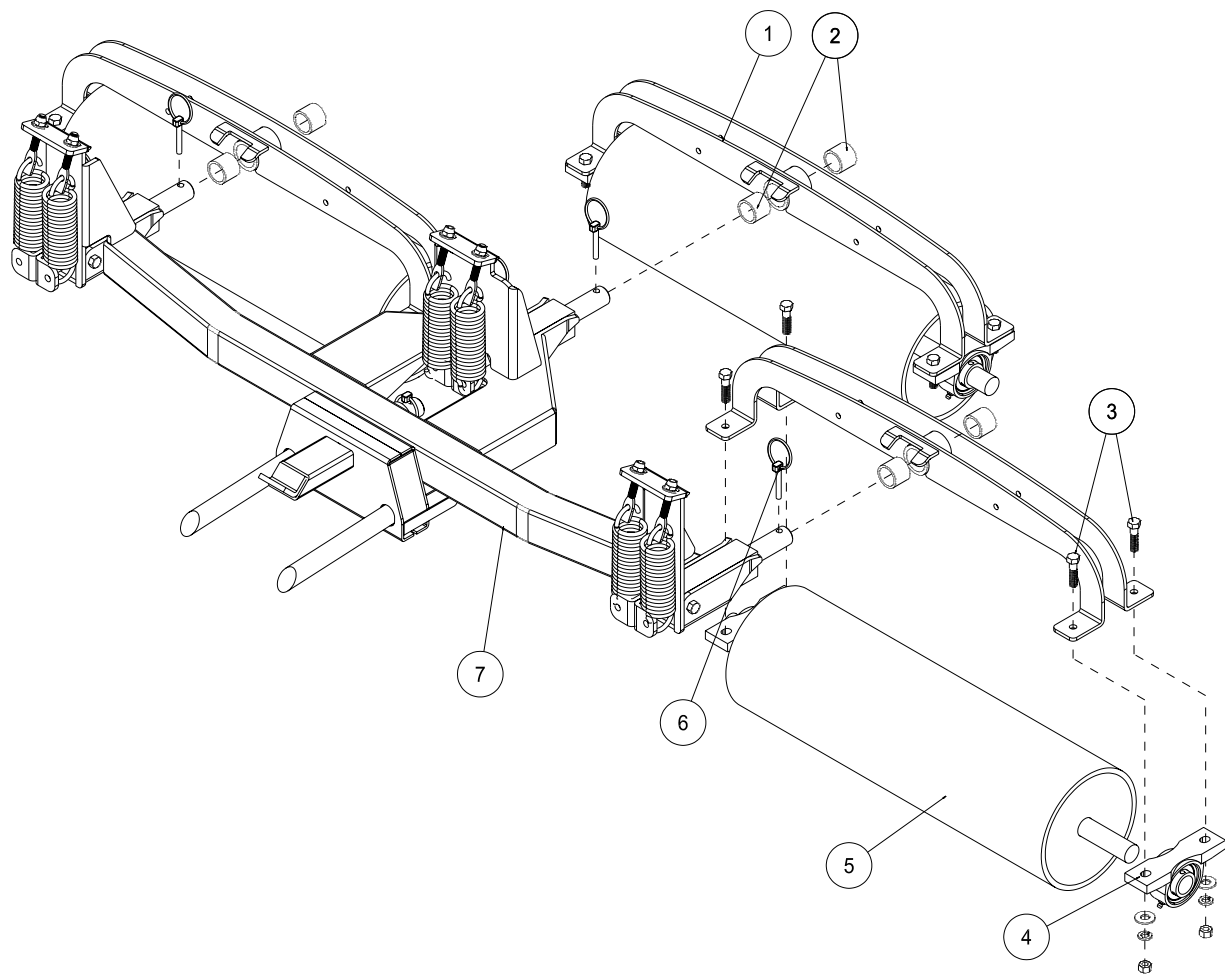
Rear Attachment



## 42-586Q GREEN STAR RBS MAIN FRAME PARTS LIST

| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | 43-155       | Hitch                                         | 1        |
| 2    | 42-539       | Lynch Pin, $\frac{5}{16}$                     | 4        |
| 3    | 42-536       | Spring                                        | 6        |
| 4    | 42-537       | Spade Hex Bolt                                | 6        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 6        |
| 5    | 42-576       | Spring Tower                                  | 3        |
| 6    | HB-38-16-275 | Hex Bolt, $\frac{3}{8}$ - 16 x $2\frac{3}{4}$ | 2        |
|      | HNTL-38-16   | Nylon Lock Nut, $\frac{3}{8}$ - 16            | 2        |
| 7    | 42-577       | Frame                                         | 1        |
| 8    | HB-38-16-250 | Hex Bolt, $\frac{3}{8}$ - 16 x $2\frac{1}{2}$ | 1        |
|      | HNCL-38-16   | Center Nylon Lock Nut, $\frac{3}{8}$ - 16     | 1        |
| 9    | 18-295       | Oilite Bushing (part of 42-577)               | 2        |

## 42-581 GREEN STAR RBS ROLLER SET (3) DRAWING



Rear Attachment

## 42-581 GREEN STAR RBS ROLLER SET (3) PARTS LIST

| REF# | PART#        | DESCRIPTION                                    | QUANTITY |
|------|--------------|------------------------------------------------|----------|
| 1    | 42-574       | Fork                                           | 3        |
| 2    | 18-295       | Oilite Bushing (part of 42-574)                | 6        |
| 3    | HB-38-16-150 | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{2}$  | 12       |
|      | HWL-38       | Lock Washer, $\frac{3}{8}$                     | 12       |
|      | HW-38        | Flat Washer, $\frac{3}{8}$                     | 12       |
|      | HN-38-16     | Hex Nut, $\frac{3}{8}$ - 16                    | 12       |
| 4    | 11-094       | Pillow Block                                   | 6        |
| 5    | 42-584       | Roller                                         | 3        |
| 6    | 42-539       | Lynch Pin, $\frac{5}{16}$ (part of main frame) | 3        |
| 7    | 42-586Q      | Green Star RBS Main Frame                      | 1        |

## ADJUSTMENTS AND OPERATION INSTRUCTIONS

### ADJUSTMENT

The springs are preset for maximum down pressure, and should not need to be adjusted. If you feel the need to adjust the springs please call for further instructions. The unit comes pre-adjusted for most models. The four adjustment holes on the hitch are for making sure all three rollers are touching the ground at the same pressure. When installing roller system start with the lower mounting holes on hitch.

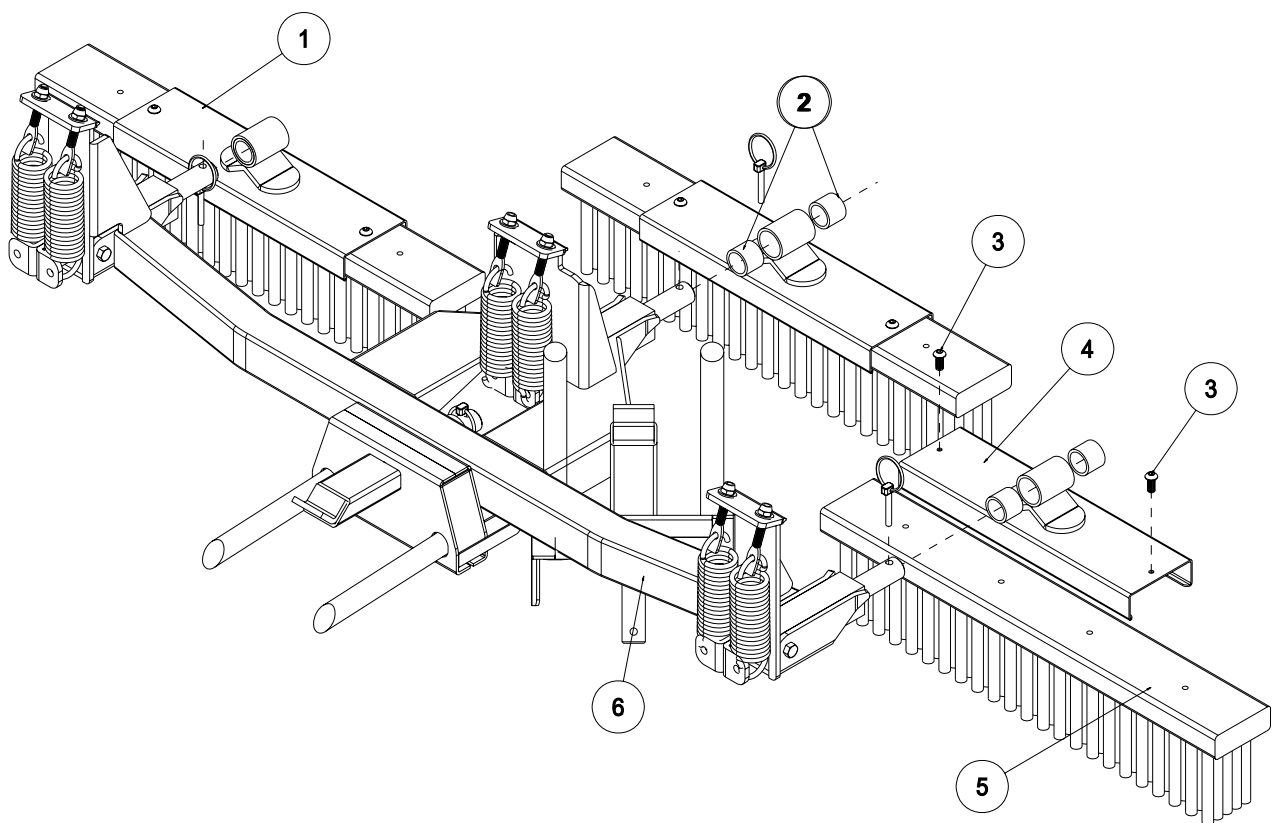
Tire pressure should be 4 psi in the front and 7 psi in the rear tire for best traction.

### OPERATION

Make sure the rolling system has been installed and adjusted properly for your model of bunker rake. Always transport in fully raised position. Always remove flag pole before rolling green. Do not stop on green while rolling. Do not roll up steep slopes or loss of traction may result. Do not turn while rolling.

To begin rolling, lower unit all the way down as you come across collar and continue straight across green until reaching other collar and raise as you come off of green. Overlap stripes the same as if you were mowing.

## 42-585 GREEN STAR RBS BRUSH SET (3) DRAWING



Rear Attachment

## 42-585 GREEN STAR RBS BRUSH SET (3) PARTS LIST

| REF# | PART#           | DESCRIPTION                                             | QUANTITY |
|------|-----------------|---------------------------------------------------------|----------|
| 1    | 42-539          | Lynch Pin, $\frac{5}{16}$ (part of main frame)          | 4        |
| 2    | 18-295          | Oilite Bushing (part of 42-579)                         | 6        |
| 3    | HSPP-516-18-075 | Phillip Head Screw, $\frac{5}{16}$ - 18 x $\frac{3}{4}$ | 6        |
| 4    | 42-579          | Brush Bracket                                           | 3        |
| 5    | 42-545          | Brush Head                                              | 3        |
| 6    | 42-586Q         | Green Star RBS Main Frame                               | 1        |

## ADJUSTMENTS AND OPERATION INSTRUCTIONS

### ADJUSTMENT

The springs are preset for maximum down pressure, and should not need to be adjusted. If you feel the need to adjust the springs please call for further instructions. The unit comes pre-adjusted for most models. The four adjustment holes on the hitch are for making sure all three brushes are touching the ground at the same pressure. When installing brush system start with the lower mounting holes on hitch.

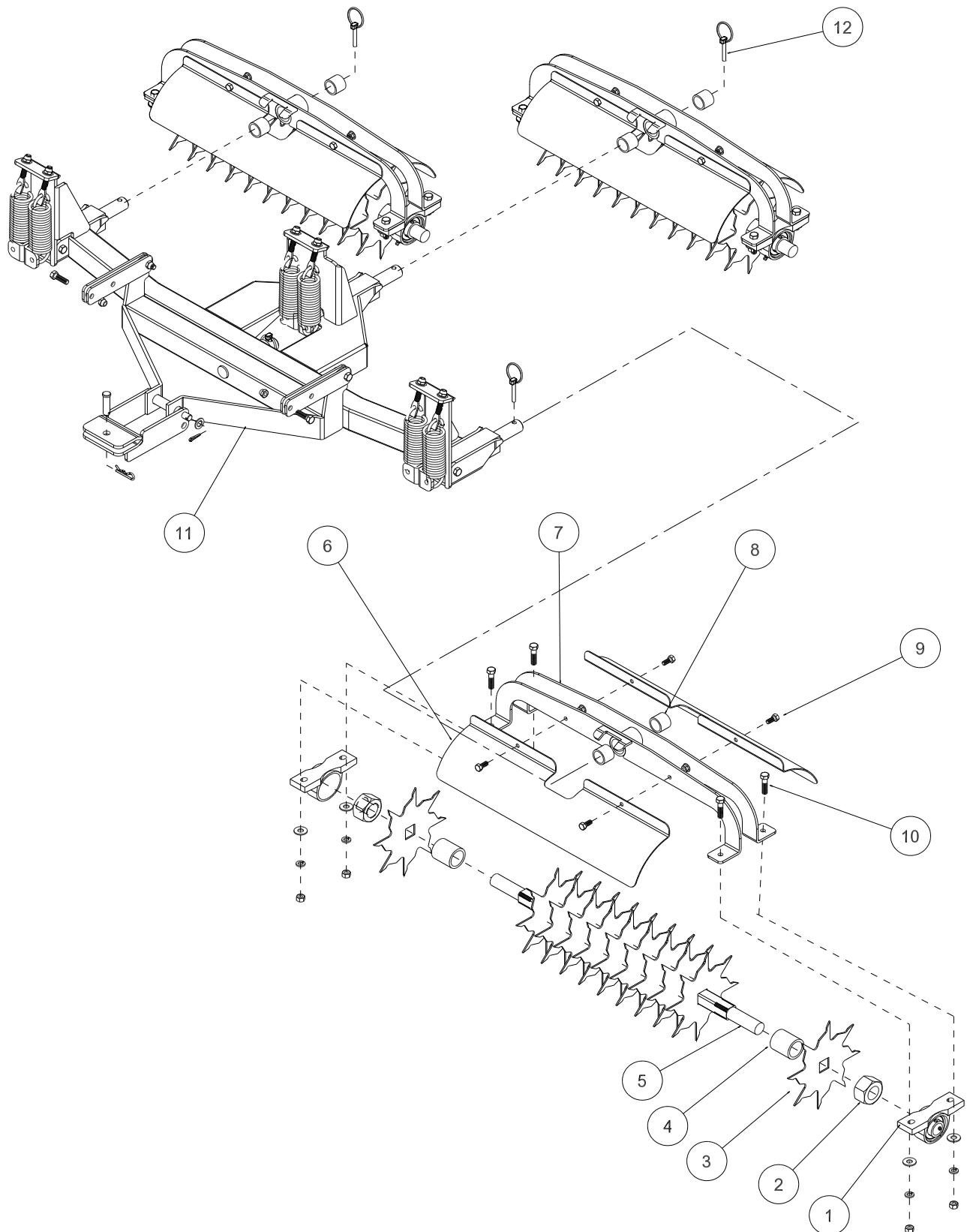
Tire pressure should be 4 psi in the front and 7 psi in the rear tire for best traction.

### OPERATION

Make sure the brush system has been installed and adjusted properly for your model of bunker rake. Always transport in fully raised position. Always remove flag pole before brushing green. Do not stop on green while brushing. Do not brush up steep slopes or loss of traction may result. Do not turn while brushing.

For drag brushes use hydraulics to control the amount of down pressure required to move your top dressing material. We recommend reversing drag brushes after each use for even wear. To begin brushing, lower unit as you come across collar and continue straight across green until reaching other collar and raise as you come off of green. Overlap stripes the same as if you were mowing.

# 42-582 GREEN STAR RBS SPIKER SET (3) DRAWING



Rear Attachment

## 42-582 GREEN STAR RBS SPIKER SET (3) DRAWING

| REF# | PART#         | DESCRIPTION                                                                | QUANTITY |
|------|---------------|----------------------------------------------------------------------------|----------|
| 1    | 11-094        | Pillow Block                                                               | 6        |
| 2    | HNJ-114-12    | Jam Nut, 1 <sup>1</sup> / <sub>4</sub> - 12                                | 6        |
| 3    | 42-583        | Spiker Blade                                                               | 33       |
| 4    | 8965-1.875    | Spiker Blade Spacer (1.875")                                               | 30       |
| 5    | 42-554        | Spiker Shaft                                                               | 3        |
| 6    | 42-578        | Spiker Cover                                                               | 6        |
| 7    | 42-574        | Fork                                                                       | 3        |
| 8    | 18-295        | Oilite Bushing (part of 42-574)                                            | 6        |
| 9    | HB-516-18-075 | Hex Bolt, <sup>5</sup> / <sub>16</sub> - 18 x <sup>3</sup> / <sub>4</sub>  | 12       |
|      | HNTL-516-18   | Nylon Lock Nut, <sup>5</sup> / <sub>16</sub> - 18                          | 12       |
| 10   | HB-38-16-150  | Hex Bolt, <sup>3</sup> / <sub>8</sub> - 16 x 1 <sup>1</sup> / <sub>2</sub> | 12       |
|      | HWL-38        | Lock Washer, <sup>3</sup> / <sub>8</sub>                                   | 12       |
|      | HW-38         | Flat Washer, <sup>3</sup> / <sub>8</sub>                                   | 12       |
|      | HN-38-16      | Hex Nut, <sup>3</sup> / <sub>8</sub> - 16                                  | 12       |
| 11   | 42-586Q       | Green Star RBS Main Frame                                                  | 1        |
| 12   | 42-539        | Lynch Pin, <sup>5</sup> / <sub>16</sub> (part of main frame)               | 3        |

## ADJUSTMENTS AND OPERATION INSTRUCTIONS

### ADJUSTMENT

The springs are preset for maximum down pressure, and should not need to be adjusted. If you feel the need to adjust the springs please call for further instructions. The unit comes pre-adjusted for most models. The four adjustment holes on the hitch are for making sure all three spikers are touching the ground at the same pressure. When installing spiker system start with the lower mounting holes on hitch.

Tire pressure should be 4 psi in the front and 7 psi in the rear tire for best traction.

### OPERATION

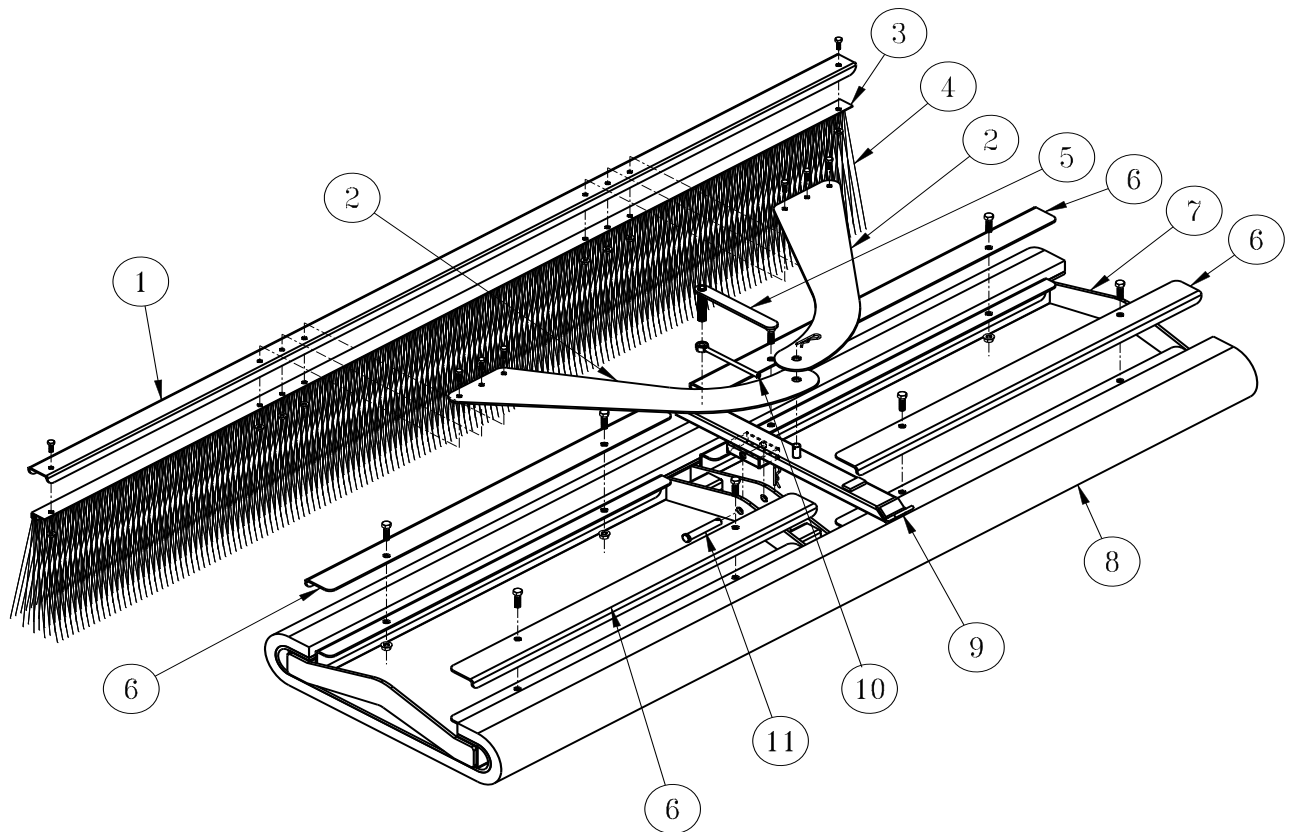
Make sure the spiker system has been installed and adjusted properly for your model of bunker rake. Always transport in fully raised position. Always remove flag pole before spiking green. Do not stop on green while spiking. Do not spike up steep slopes or loss of traction may result. Do not turn while spiking.

To begin spiking, lower unit all the way down as you come across collar and continue straight across green until reaching other collar and raise as you come off of green. Overlap stripes the same as if you were mowing.

### INSTALLATION

Spiker blades must be installed so that the jagged side of the tooth cuts into the turf first. This allows only a piercing of the turf, whereas if the straight edge of the spiker blades enters first it will act more as a cutting effect.

## 43-009 72" COCO MAT FINISHER DRAWING



Rear Attachment



## 72" COCO MAT FINISHER PARTS LIST

| REF# | PART#        | DESCRIPTION                                              | QUANTITY |
|------|--------------|----------------------------------------------------------|----------|
| 1    | 13-688       | Brush Channel                                            | 1        |
|      | HB-14-20-075 | Hex Bolt, $\frac{1}{4}$ - 20 x $\frac{3}{4}$             | 2        |
|      | HNFL-14-20   | Flange Whiz-Loc Nut, $\frac{1}{4}$ - 20                  | 2        |
| 2    | 43-168       | Brush Mount Arm                                          | 2        |
|      | HB-14-20-075 | Hex Bolt, $\frac{1}{4}$ - 20 x $\frac{3}{4}$             | 6        |
|      | HNFL-14-20   | Flange Whiz-Loc Nut, $\frac{1}{4}$ - 20                  | 6        |
| 3    | 13-683       | Brush Track                                              | 1        |
| 4    | 13-682       | Brush, 77 x 11                                           | 1        |
| 5    | 43-164       | Adjustment Handle                                        | 1        |
| 6    | 43-166       | Mat Clamp                                                | 4        |
|      | HB-38-16-125 | Hex Bolt, $\frac{3}{8}$ - 16 x $1\frac{1}{4}$            | 8        |
|      | HNFL-38-16   | Flange Whiz-Loc Nut, $\frac{3}{8}$ - 16 x $1\frac{1}{4}$ | 8        |
| 7    | 43-165       | Frame                                                    | 1        |
| 8    | 43-167       | Coco Mat, 27 x 72                                        | 1        |
| 9    | 43-162       | Draw Bar                                                 | 1        |
|      | HHP-18       | Bridge Pin, $\frac{1}{8}$                                | 1        |
| 10   | 43-163       | Lock Handle                                              | 1        |
| 11   | HCP-12-300   | Clevis Pin, $\frac{1}{2}$ x 3                            | 1        |
|      | HHP-18       | Bridge Pin, $\frac{1}{8}$                                | 1        |

Some components of your **Coco Mat Finisher** have been assembled at the factory for your convenience.

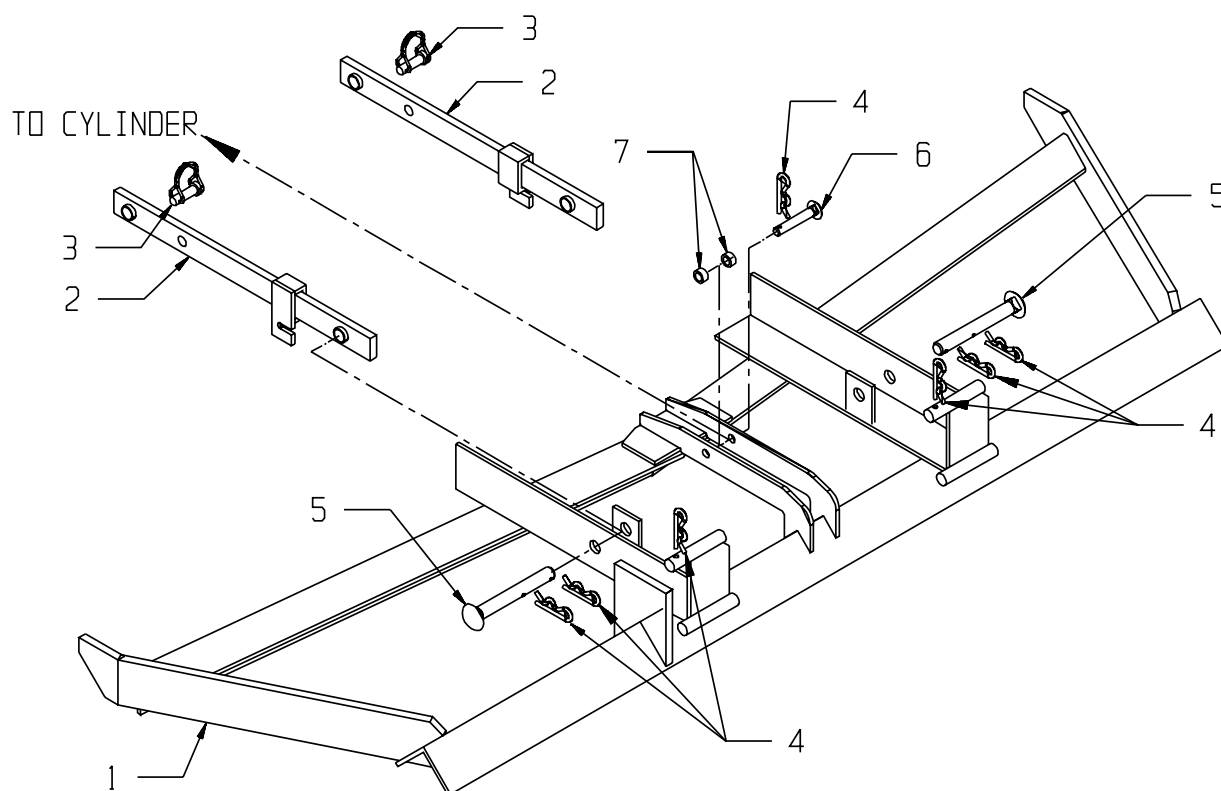
1. Start by mounting the Draw bar (Ref 9) to the Frame (Ref 7) using the Clevis Pin and Bridge Pin (Ref 11). Position the Draw bar, using either set of holes, as illustrated.
2. Next, mount the Brush assembly (Ref 1, 3 & 4) to the Brush Mount Arms (Ref 2), as illustrated, using the (6)  $\frac{1}{4}$  - 20 x  $\frac{3}{4}$  Hex Bolts and  $\frac{1}{4}$  - 20 Flange Whiz-Loc Nuts. Secure fasteners tight.
3. The holes on each of the Brush Mount Arms will line up. Mount to the pin on the Draw bar (Ref 9) and secure using the remaining Bridge Pin.
4. Thread the Lock Handle (Ref 10) on to the Adjustment Handle (Ref 5). Thread the Adjustment Handle into the nut on top of the Draw bar (Ref 9), continuing until the threaded rod is through the Draw bar tube. Turn the Lock Handle clockwise (↻) to lock the Adjustment handle in place.

### Adjusting the **Coco Mat Finisher**.

Adjusting the leading edge (front) will affect the performance of the **Finisher**. Various field compositions and conditions can benefit from fine tuning of the **Finisher's** leading edge angle.

1. Release the Lock Handle (Ref 10) by holding the Adjustment Handle (Ref 5) and turning the Lock Handle counterclockwise (↺).
2. To raise the leading edge (front) of the **Finisher**, turn the Adjustment Handle clockwise (↻). When you obtain your desired position, turn the Lock Handle clockwise (↻) to lock the Adjustment handle in place.
3. To lower the leading edge (front) of the **Finisher**, turn the Adjustment Handle counterclockwise (↺). When you obtain your desired position, turn the Lock Handle clockwise (↻) to lock the Adjustment handle in place.

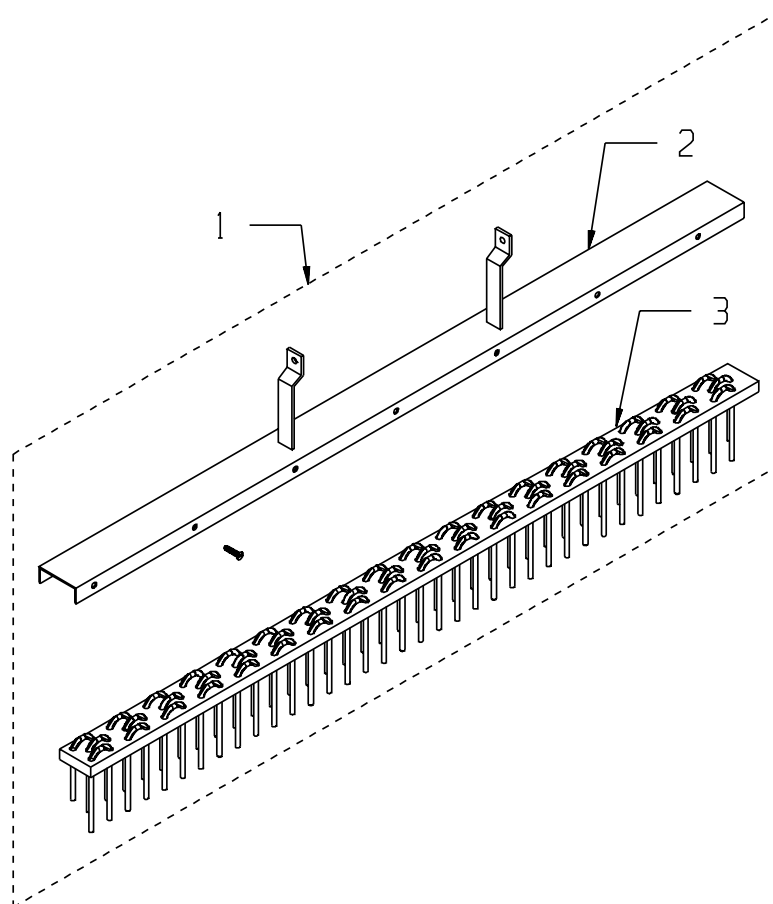
## 43-170 RAHN GROOMER



**Base Unit, Infield Groomer**

| REF# | PART#     | DESCRIPTION                                  | QUANTITY |
|------|-----------|----------------------------------------------|----------|
| 1    | GL650-1   | Groomer Frame                                | 1        |
| 2    | GL650-3   | Pull Arms, Set (includes 2 arms)             | 1        |
| 3    | HP8-09-01 | Pull Arm Locking Pins, Set (included 2 pins) | 1        |
| 4    | HP-8-10   | Hitch Pin                                    | 7        |
| 5    | HP-8-02   | 6" Mounting Pin Set.(Included 2 pins)        | 1        |
| 6    | HP8-03    | Mounting Pin, 3" x 1/2"                      | 1        |
| 7    | HP-8-382  | Spacer (Set of 2)                            | 1        |

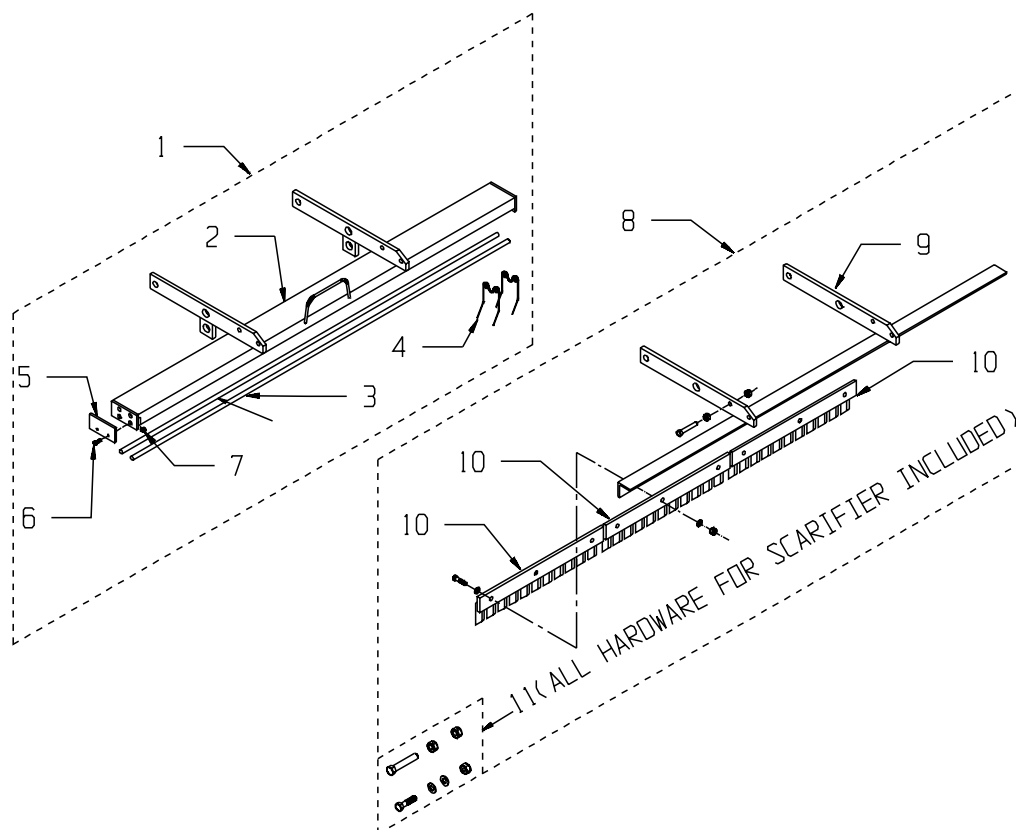
Rear Attachment



**6' Broom Assembly**

| REF# | PART#     | DESCRIPTION              | QUANTITY |
|------|-----------|--------------------------|----------|
| 1    | GL650-6   | Broom Assembly, Complete | 1        |
| 2    | GL650-6-2 | Broom Channel with Arms  | 1        |
| 3    | GL650-6-1 | Replacement Broom        | 1        |

# 43-170 RAHN GROOMER



## Scarifier Options

| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | GL650-4-10   | Spring Tine Assembly, Complete                | 1        |
| 2    | GL650-4-10-1 | Spring Tine Channel with Arms                 | 1        |
| 3    | GL650-4-10-2 | Rods, 1/2" x 60"                              | 2        |
| 4    | GL650-4-15   | Spring Tine Replacement Set (includes 38 pcs) | 1        |
| 5    | GL650-4-10-3 | End Cap                                       | 1        |
| 6    |              | HHCS, 1/4 x 3/4                               | 2        |
| 7    |              | Nylon Lock Nut, 1/4                           | 2        |
| 8    | GL650-4      | Scarifier Assembly                            | 1        |
| 9    | GL650-4-1-1  | 5 Foot Scarifier Angle                        | 1        |
| 10   | GL650-4-5-3  | Scarifier Replacement Set                     | 1        |
| 11   | GL650-4-9    | Hardware Package                              | 1        |



Picture #1



Picture #2

### **SMITHCO QUICK ATTACH MOUNTING INSTRUCTIONS**

1. INSTALL RAHN CENTER LIFT ASSEMBLY INTO THE SMITHCO QUICK ATTACH MOUNTING SLOT UNTIL IT ENGAGES WITH THE SPRING ASSISTED STOP. MAKE SURE THE 3/4" RODS ARE BELOW THE QUICK ATTACH CROSS MEMBER. (PICTURE #1)
2. INSTALL THE RAHN PULL ARM BRACKETS (LEFT & RIGHT) ON TOP OF THE BRACKETS USED FOR THE QUICK ATTACH SYSTEM USING THE HARDWARE PROVIDED. WHEN INSTALLING THE BRACKETS, THE HEX BOLT HOLES ARE LOCATED TOWARD THE WHEELS AND THE EARS OF THE BRACKET ARE TO THE INSIDE.
3. REMOVE CLEVIS PIN IN THE ROD END OF THE CYLINDER. INSTALL CYLINDER MOUNT EXTENDER OVER EXISTING EAR ON CROSS MEMBER. TIGHTEN HEX BOLT AND REPLACE PIN. (PICTURE #2)

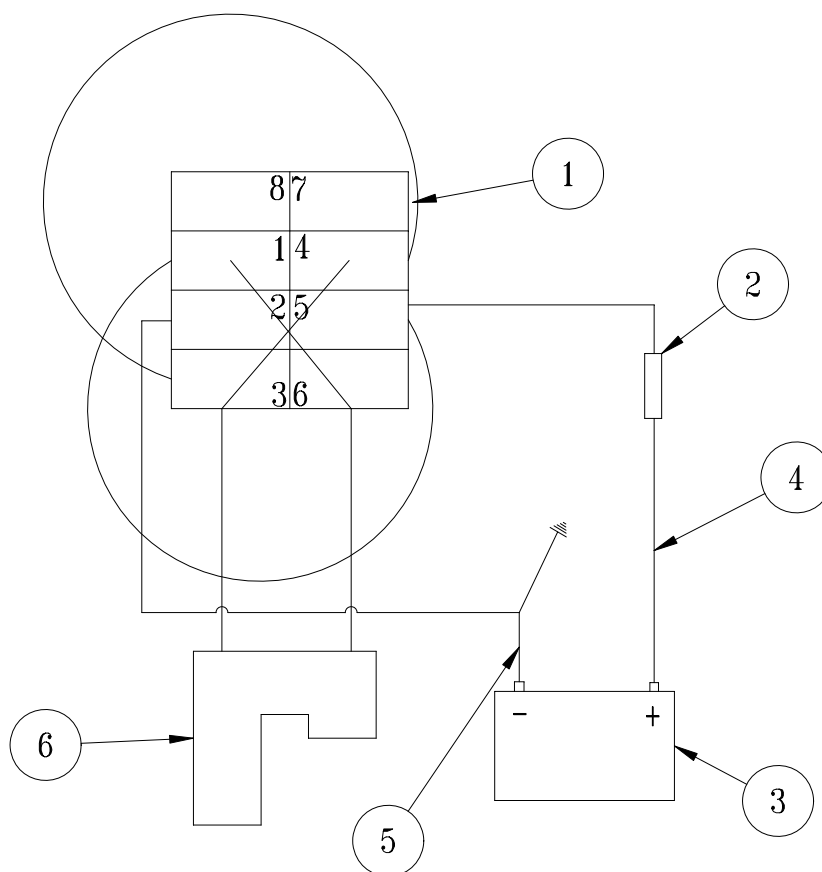
## TYPHOON DRAWING



# TYPHOON PARTS LIST

| REF# | PART#        | DESCRIPTION                                   | QUANTITY |
|------|--------------|-----------------------------------------------|----------|
| 1    | HB-34-10-800 | Hex Bolt, $\frac{3}{4}$ - 10 x 8              | 2        |
|      | HNTL-34-10   | Nylon Lock Nut, $\frac{3}{4}$ -10             | 2        |
| 2    | 72-135       | Castor Wheel Spacer                           | 4        |
| 3    | 78-012       | Tire and Wheel                                | 2        |
| 4    | 18-223       | Flange Bushing (part of 41-520)               | 4        |
| 5    | 41-520       | Frame                                         | 1        |
| 6    | 29-584       | Adjustment Spacer, $\frac{1}{2}$ "            | 4        |
| 7    | 42-539       | Lynch Pin                                     | 2        |
| 8    | 29-585       | Adjustment Spacer, 1"                         | 2        |
| 9    | HB-12-13-350 | Hex Bolt, $\frac{1}{2}$ -13 x 3 $\frac{1}{2}$ | 1        |
|      | HNTL-12-13   | Nylon Lock Nut, $\frac{1}{2}$ - 13            | 1        |
| 10   | 15-725       | Mount Panel End                               | 2        |
|      | 15-727       | Switch Actuator, no light                     | 1        |
|      | 15-728       | Switch Body, On-Off-On                        | 1        |
|      | 15-730       | Mount Panel Plug                              | 1        |
| 11   | 41-522       | Quick Hitch Bar                               | 1        |
| 12   | 41-532       | Pump with 11 HP Honda Engine                  | 1        |
|      | 41-532-01    | Impeller, Wear Plate, Gasket and Seal         | 1        |
|      | 41-532-02    | Gasket                                        | 1        |
|      | 41-532-03    | Seal                                          | 1        |
| 13   | 18-376       | Close Nipple, 3"                              | 2        |
| 14   | 41-530       | Swivel Joint, 3"                              | 1        |
| 15   | 18-382       | 2.5" Suction Hose                             | 1        |
| 16   | 41-527       | Band Clamp, 2.5"                              | 2        |
| 17   | 41-529       | Discharge Tube                                | 1        |
| 18   | 41-525       | Turnbuckle                                    | 1        |
| 19   | 18-375       | King Nipple, 2.5"                             | 1        |
| 20   | 18-378       | Bushing, 3" x 2.5"                            | 1        |
| 21   |              | U-1 300 Amp Battery (not supplied)            | 1        |
| 22   | 8-603        | Battery Strap                                 | 1        |
| 23   | 41-531       | 3" Basket Strainer                            | 1        |
| 24   | 18-380       | Check Valve, 3"                               | 1        |
| 25   | 18-379       | Plastic Elbow                                 | 1        |
| 26   | 18-374       | King Nipple, 3"                               | 1        |
| 27   | 41-526       | Band Clamp, 3"                                | 2        |
| 28   | 8820-8       | Machine Chain, 8 links                        | 1        |
| 29   | 18-381       | 3" Suction Hose                               | 1        |
| 30   | 41-521       | Hose Boom                                     | 1        |
|      | HG-14-28-180 | Grease Fitting, $\frac{1}{4}$ - 28 x 180°     | 1        |
| 31   | 16-754       | Actuator with 8" Stroke                       | 1        |
|      | HCP-12-225   | Clevis Pin, $\frac{1}{2}$ x 2 $\frac{1}{4}$   | 2        |
|      | HP-18-100    | Cotter Pin, $\frac{1}{8}$ x 1                 | 2        |
| 32   | 41-523       | Pivot Rod                                     | 1        |
|      | HHP-18       | Bridge Pin, $\frac{1}{8}$                     | 2        |
| 33   | 72-134       | Castor Wheel                                  | 1        |

# TYPHOON WIRING



## WIRING PARTS LIST

| REF# | PART#  | DESCRIPTION                        | QUANTITY |
|------|--------|------------------------------------|----------|
| 1    | 15-727 | Switch Actuator, no light          | 1        |
|      | 15-728 | Switch Body, On-Off-On             | 1        |
| 2    | 77-261 | Circuit Breaker, 40 amp            | 1        |
|      | 8977   | Circuit Breaker Boot               | 1        |
| 3    |        | U-1 300 Amp Battery (not supplied) | 1        |
| 4    | 22-056 | Cable                              | 1        |
|      | 12-031 | Battery Boot                       | 1        |
| 5    | 22-065 | Starter Cable                      | 1        |
| 6    | 16-754 | Actuator                           | 1        |
|      | 41-524 | Wire Harness                       | 1        |
|      | 16-088 | Decal, Moving Parts Hot            | 1        |
|      | 25-286 | Decal, Pinch Points                | 2        |
|      | 25-298 | Decal, Warning, Hot                | 1        |

Rear Attachment



## WARNING

### **READ ENGINE MANUAL PRIOR TO STARTING THIS MACHINE.**

**Machine is shipped with NO OIL in engine.**

**Fill Engine with oil as suggested in Engine Manual.**

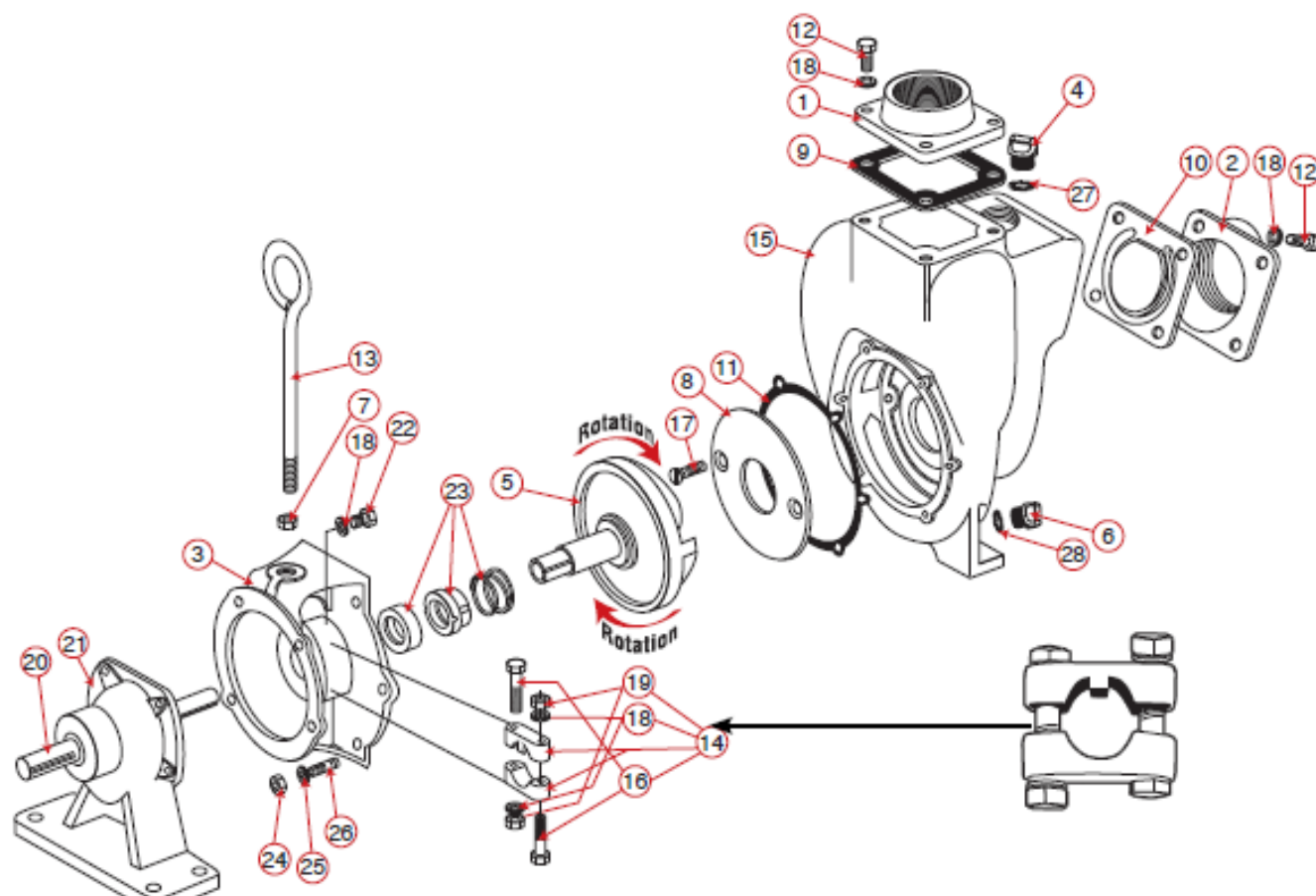
1. You must prime pump before starting the engine. To do so, insert garden hose in Discharge Tube and fill system to full. Full is when you see water in both suction hoses.
2. Fill engine up with 4-stroke motor oil as advised in the engine manual.
3. Install a U-1 300 Amp Battery into the battery box on the right side of the engine. Connect battery cables and strap battery into place.
4. Make yourself familiar with engine controls located on the engine by reading the Engine Owner's Manual.
5. Once the pump is primed, battery installed, and the engine oil is filled you may hook the Typhoon up to the Super Star Bunker Rake.
6. The Typhoon is equipped with a quick hitch attachment. Insert quick hitch bar into hitch on Super Star and lock in place with lock pin.
7. There are 1/2" and 1" spacers on the castor wheels that can be arranged in any combination to achieve the desired height. Please keep both side adjusted the same.
8. Transport the Typhoon to the water hole that needs to be siphoned. Back Typhoon to edge of water.
9. Using the rocker switch on the left side of the engine, lower the boom and suction screen into the water.
10. Stand clear of the discharge tube. Make sure the discharge tube is pointing in a direction that is free of bystanders and buildings.
11. Start engine. There will be immediate water discharge from the discharge tube. There is a swivel tube that allows you to turn the discharge in any direction you desire. There is also a turnbuckle that can be lengthened to give a longer flow or shortened for a closer distance. For best performance keep hand on discharge tube to prevent it from straying.
12. When water is siphoned, shut off engine, leaving water in the pump and discharge hose, so you do not run the pump dry.

## WARNING

### **DO NOT RUN THE PUMP DRY!**

13. Using the rocker switch, raise boom out of the water hole.

# 41-532 PUMP DRAWING



Rear Attachment

## 41-532 PUMP REPLACEMENT PARTS LIST

| REF# | PART#     | DESCRIPTION                                                     | QUANTITY |
|------|-----------|-----------------------------------------------------------------|----------|
| 1    | 41-532-07 | NPT Outlet Flange                                               | 1        |
| 2    | 41-532-05 | NPT Inlet Flange                                                | 1        |
| 3    |           | Adapter for Gas Engine                                          | 1        |
| 4    | 41-532-10 | Plug                                                            | 1        |
| 5*   |           | Impeller & Drive Shaft for Gas Engine                           | 1        |
| 6    | 41-532-11 | Plug                                                            | 1        |
| 7    |           | $\frac{5}{8}$ SS Jam Nut                                        | 1        |
| 8*   |           | Wear Plate                                                      | 1        |
| 9    | 41-532-06 | EPDM Outlet Gasket                                              | 1        |
| 10   | 41-532-04 | Gasket Check Valve Assembly                                     | 1        |
| 11*  | 41-532-02 | Adapter Gasket                                                  | 1        |
| 12   |           | $\frac{3}{8}$ -16 x $1\frac{1}{8}$ SS Cap Screw HXHD            | 8        |
| 13   |           | Handle                                                          | 1        |
| 14   |           | Clamp Assembly                                                  | 1        |
| 15   | 41-532-08 | Pump Housing                                                    | 1        |
| 16   |           | $\frac{3}{8}$ - 24 x $2\frac{1}{4}$ Hex Bolt                    | 2        |
| 17*  |           | Wear Plate Flat Head Screw                                      | 2        |
| 18   |           | $\frac{3}{8}$ Lock Washer                                       | 8        |
| 19   |           | $\frac{3}{8}$ x 24 SS Hex Nut                                   | 1        |
| 20   |           | 1" Shaft                                                        | 1        |
| 21   |           | Bearing Pedestal                                                | 2        |
| 22   |           | Hex Bolt                                                        | 4        |
| 23*  | 41-532-03 | Viton Seal Assembly                                             | 1        |
| 24   |           | $\frac{3}{8}$ - 16 SS Hex Nut                                   | 6        |
| 25   |           | $\frac{3}{8}$ SS Lock Washer                                    | 6        |
| 26   |           | $\frac{3}{8}$ - 16 x $\frac{3}{8}$ -24 x $1\frac{1}{2}$ SS Stud | 6        |
| 27   | 41-532-12 | O-ring                                                          | 1        |
| 28   | 41-532-13 | O-ring                                                          | 1        |
|      | 41-532-01 | Repair Kit (includes * items)                                   |          |



# 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](mailto: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 neither assumes, nor authorizes any person to assume for it, any other liability in connection with the sale or use of this product.**

