# ATLAS LOADER TABLE OF CONTENTS


**OPERATION:**

**Part 1: A Word to Owner, Operator and Service Personnel about Safety**

**Part 2: Daily Inspections – Before Leaving the Storage Facility**

**Part 3: Safety Devices**

**Part 4: Controls**

**Part 5: Training**

**Part 6: Setting Up at the Job Site**

**Part 7: Loading Procedures**

**Part 8: Dumping the Load**

**MAINTENANCE:**

**Part 1: Safety Procedures and Precautions for Service and Repair**

**Part 2: Service**

**DIAGRAMS AND DRAWINGS:**


***Note: There are multiple drawings included for some of the components listed below. You will need to identify which drawing matches the components on your loader. Please call our Parts Department at 800/930-5623, Ext. 229, should you need assistance. Please have your loader Serial Number available when calling our Parts Department. See "How to Find the Serial Number" in this section of the manual.***

**How to Find the Serial Number**

**Load Capacity Chart**

**Lubrication Diagram**

**Hydraulic Diagram for Atlas Loader**

**Head and Pedestal Assemblies**

**Top Seat Head Assembly**

**Main Boom Assembly**

**Tip Boom Assembly**

**Dual Cylinder Bucket Assembly**

**Hose Recoil Assembly, Right Side**

**Hose Recoil Assembly, Left Side**

**Notification of Transfer of Ownership**

**WARRANTY:**

**VENDOR INSERTS:**

**Parker P1 Variable Displacement Piston Pump**

**890 Chelsea PTO**

**Scott Hoist**

**Venco Hoist 6628**

# Part 1: A Word to Owner, Operator, and Service Personnel About Safety

**⚠ WARNING**

**FAILURE TO READ THIS BOOKLET IS A MISUSE OF THE EQUIPMENT. ANYONE WHO WILL OPERATE, SERVICE OR WORK AROUND THIS LOADER MUST FIRST READ THIS BOOKLET. DEATH OR SERIOUS INJURY MAY RESULT FROM IMPROPER USE OR MAINTENANCE OF THIS LOADER.**

## Introduction

Anyone who will operate, service or work around the loader should first read this manual. It is important that all workers understand the safety, operational, service, and repair requirements of the loader. Death or serious injury can result from improper use or maintenance of the loader.

As an owner or employer, it is your responsibility to know the specific requirements, governmental regulations, precautions, and work hazards that exist. You should make these known to all personnel working with the equipment or in the area. It is your responsibility to instruct the operator in the safe operation of the equipment and to provide the operator with properly maintained equipment.

It is the operator's responsibility to operate the loader with skill, good judgment and caution. Following recognized safety procedures helps to avoid accidents.

Do not allow untrained personnel, even on a temporary basis, to operate this equipment. Operators must be trained by an experienced trash loader operator who is familiar with all aspects of operation, safety, and maintenance of this equipment. Keep children, visitors and untrained personnel away from the equipment.

Modifications to any part of this loader can create a safety hazard and therefore shall not be made without the manufacturer's written approval. Use only factory approved parts to repair or maintain this equipment. If this equipment is rebuilt or remounted, mounting procedures and retesting is required in accordance with factory instructions.

**⚠ WARNING**

**DO NOT OPERATE THE LOADER UNDER ANY CIRCUMSTANCE IF THERE IS REASON TO BELIEVE THE UNIT IS BROKEN OR MALFUNCTIONING. DO NOT ATTEMPT TO PLACE THE BOOM OF A BROKEN OR MALFUNCTIONING UNIT IN THE BODY OF THE LOADER UNIT WITHOUT ASSISTANCE FROM ANOTHER CRANE OR LIFTING DEVICE. ANY ATTEMPT TO USE OR MOVE THE BROKEN OR MALFUNCTIONING UNIT COULD RESULT IN SERIOUS BODILY INJURY OR DEATH.**

The lighting and reflective devices on the unit is in compliance with FMVSS 108, however it is the responsibility of the end user to verify that the lighting specifically complies with any additional local requirements for the area that the truck is to be operated within.

The mud flaps installed on the unit are positioned based on the method of locating the mud flap a distance behind the rear tire in order for the bottom of the mud flap to be mounted low enough to be below the line formed from a 22.5 degree tangent angle out the rear tire. It is however the responsibility of the end user to verify that the mud flaps comply with requirements for the area that the truck is to be operated within.

## Part 2: Daily Inspections - Before Leaving the Storage Facility

One of the most important factors in the prevention of accidents is a positive attitude towards safety. The habit of anticipating possible problems normally prevents many accidents from occurring.

Each morning, prior to leaving the storage facility or lot, the following inspections should be made:

1. Check oil level and battery.

2. Check the brakes and backup alarm. The backup alarm must always be sounding prior to backing up. Verify that the boom up alarm is functioning properly. If your unit is equipped with any additional alarms or warning lights, check these items also for proper operation.

3. Check rearview mirrors and adjust if necessary.

4. Check tires for proper inflation, cuts, and loose wheel nuts.

5. Check head and taillights, strobes, and flashers for proper operation.

6. Check the hydraulic system for any unusual conditions such as pools of hydraulic fluid or lubricating oil under the chassis, any outrigger which may have crept down, or any signs of damage or improper maintenance. The hydraulic hoses should be free from cuts and abrasions and there should be no evidence of binding or leakage.

7. Ensure that outriggers are fully retracted and the bucket is open and resting on the floor of the body. If the body contains debris, the bucket should be closed and at rest on the load. Ensure that most of the bucket and boom tip are below top of body.

Consult the truck manufacturer's manual for vehicle checks recommended by them.

Any insufficiencies found during this inspection must be corrected prior to use of the equipment.

## Part 3: Safety Devices

We will now discuss some of the components designed into the loader system to ensure that safe loader control is maintained. There are hydraulic system flow devices designed into the loader system to control the flow of hydraulic fluid. Loader control and speed are essential to the safe operation of, and longevity of the loader.

To maintain safe loader control you must ensure that proper engine speed is observed, all oil flow restrictors are in place and have not been modified, and all valves are operating properly. You must not remove, or tamper with the manufacturer's recommended settings of oil flow devices.

Excessive operating speed causes erratic operation of the loader. Excessive operating speed decreases operator control and increases the stresses on the loader's supporting structures, which could cause unexpected component failure. The result of unexpected component failure could be damage to the equipment and/or serious bodily injury or death.

**LOAD CONTROL VALVES**

The load control valves are either a part of or plumbed directly onto load holding cylinders. These valves are found on the main boom lift cylinder, tip cylinder, tip extension, and the outrigger cylinders.

**Main Boom Lift, Tip, and Tip Extension Cylinders:**

Counter-balance Valves: - The counter-balance valve is a cartridge type valve, mounted directly into a housing that is welded to the lift, tip, and tip extension cylinders. These valves hold the load until hydraulic pressure is applied to it causing the valve to open. This ensures the load is held in case of hose rupture, or other hydraulic system failure.

**Notice to Operators: If load control valve(s) malfunction, do not attempt to adjust valves, and/or continue to use the loader. Return to the maintenance facility for repair.**

Counter-balance valve adjustment is not normally needed after initial installation. However, if adjustment is needed, first release load from valve and rest bucket on ground or floor of body. Turn valve screw far enough out so that valve will hold load when control valve is opened and truck PTO is off. The PTO should be off when adjusting the screw, back on to lift the boom, and off again to test load holding capability of the valve.

If the cartridge valve is replaced, you must first release the load from the valve. This means the boom must be at rest in the floor of the body or on the ground, prior to removing the cartridge valve.

**⚠ WARNING**

**FAILURE TO FOLLOW THE PRECEDING INSTRUCTIONS REGARDING COUNTER-BALANCE VALVE ADJUSTMENT AND/OR REPLACEMENT, COULD RESULT IN THE BOOM FALLING ONCE THE CARTRIDGE VALVE IS REMOVED, WHICH COULD RESULT IN DAMAGE TO THE EQUIPMENT OR SERIOUS PERSONAL INJURY OR DEATH.**

If the operator experiences hydraulic failure while on route, first try to get the hydraulic system working again. If you cannot get the hydraulic system working, we recommend that you call for the assistance of an auxiliary service vehicle that can provide a power source for the loader hydraulic system. The connections from the auxiliary power source should be made from the work ports of a valve on the auxiliary power source directly to the cylinder or motor that needs to be moved to get the loader back into a stowed position for travel.

**Outrigger Cylinders:**

Pilot Operated Check Valve: - The outrigger cylinders use pilot operated check valves which are part of the cylinders. In the event of hose failure, these valves hold the load until hydraulic pressure is applied, causing the valve to open.

These valves are factory preset and are not serviceable.

If you need to remove this valve, make sure the load is released from the cylinder prior to removing the valve.

## BACK-UP ALARM

All truck mounted loaders have back-up alarms that must sound any time the gear shift selector is in reverse “R”. The back-up alarm is on the daily checklist of items to be checked prior to leaving the storage facility. If the back-up alarm is not working, it must be repaired prior to putting the vehicle in service.

| ⚠ WARNING |
| --- |
| **ALARM MUST SOUND WHEN BACKING UP. DO NOT BACK UP WITHOUT HAVING SOMEONE CLEAR BEHIND THIS VEHICLE.** |

It is the operator’s responsibility to make sure that the area behind the loader is clear before backing up.

## “BOOM-UP” ALARM

A warning system that alerts the loader operator when the boom is not stowed properly for travel. A sensor is installed on the boom, and an audible alarm and red light in the truck cab. When the operator enters the truck cab after using the loader, the warning light and audible alarm will alert him if the boom travel height exceeds 13 feet.

The boom up alarm may have a round dial attached to the light that can be turned to adjust the volume of the audible alarm.

The boom up sensor will turn on a light once the sensor passes the head side plate.

Some trucks have a customizable red light and alarm already in the dash that can be used as a boom up alarm. If the truck is equipped with such a light and alarm, the boom up sensor will be wired into this light and alarm to function as a boom up alarm.

This system should be viewed as a tool to help operators measure the height of their boom, but more importantly, to warn the loader operators that their boom is above safe height for travel. It is not intended to replace an operator’s good judgment on safe travel height of their boom.

Operators should always be aware that some routes may have streets, roads, alleys, etc., that do not comply with the legal height requirement of 13’6”, and should conduct their operations accordingly.

The PI factory boom sensors are set to 13’-0” so if you have a low height object you need to travel under you will need to set the sensor to the desired boom height. It therefore, may be necessary for the boom up sensor to be adjusted to a lower setting than the factory setting.

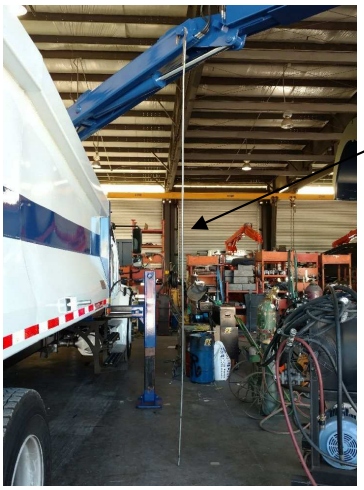
To adjust the boom sensor:

1. Park the truck on a smooth and level paved surface.

2. Set the outriggers out and down to stabilize the truck (Do not lift the truck). Swing the boom over to the side of the truck with the boom fully extended. Lift the main boom to desired height (typically the highest point is at the tip boom stop).

3. Loosen the sensor and slide it up or down as necessary so that the in dash alarm starts to go off at this boom height.

4. Tighten the sensor and put a visible mark at the center of the bracket so that a visual inspection can confirm that the sensor position has not changed. Note: This sensor must be within 1/8” of the head side plate to function properly.



When adjusting or checking boom sensor, use a set gage or measure to desired height (measure to from the ground to the upper most point of the tip boom stop).

Once sensor is set to required setting, mark with paint marker.

**⚠ WARNING**

**BEFORE MOVING TRUCK, BOOM MUST BE STOWED TO LOWEST POSSIBLE HEIGHT; MAX. BOOM HEIGHT NOT TO EXCEED 13'6".**

This boom-up warning system became a standard feature of our loader in April, 2002. If you have an older model Lightning Loader® that does not have this boom-up warning system, you can contact our Parts Department and order a retro-fit kit to install this system.

**SAFETY SYMBOLS**

Your loader has required safety decals (see following pages) that alert those operating, working around, or performing maintenance on the loader of certain safety hazards. The safety decals are used to show the consequence of human interaction with a hazard in terms of:

1. The degree of severity.
   (minor injury, severe injury, death)
2. The probability of severity.
   (WILL result in, COULD result in)

The following definitions for identifying hazard levels are provided with their respective signal words.

**⚠ DANGER**

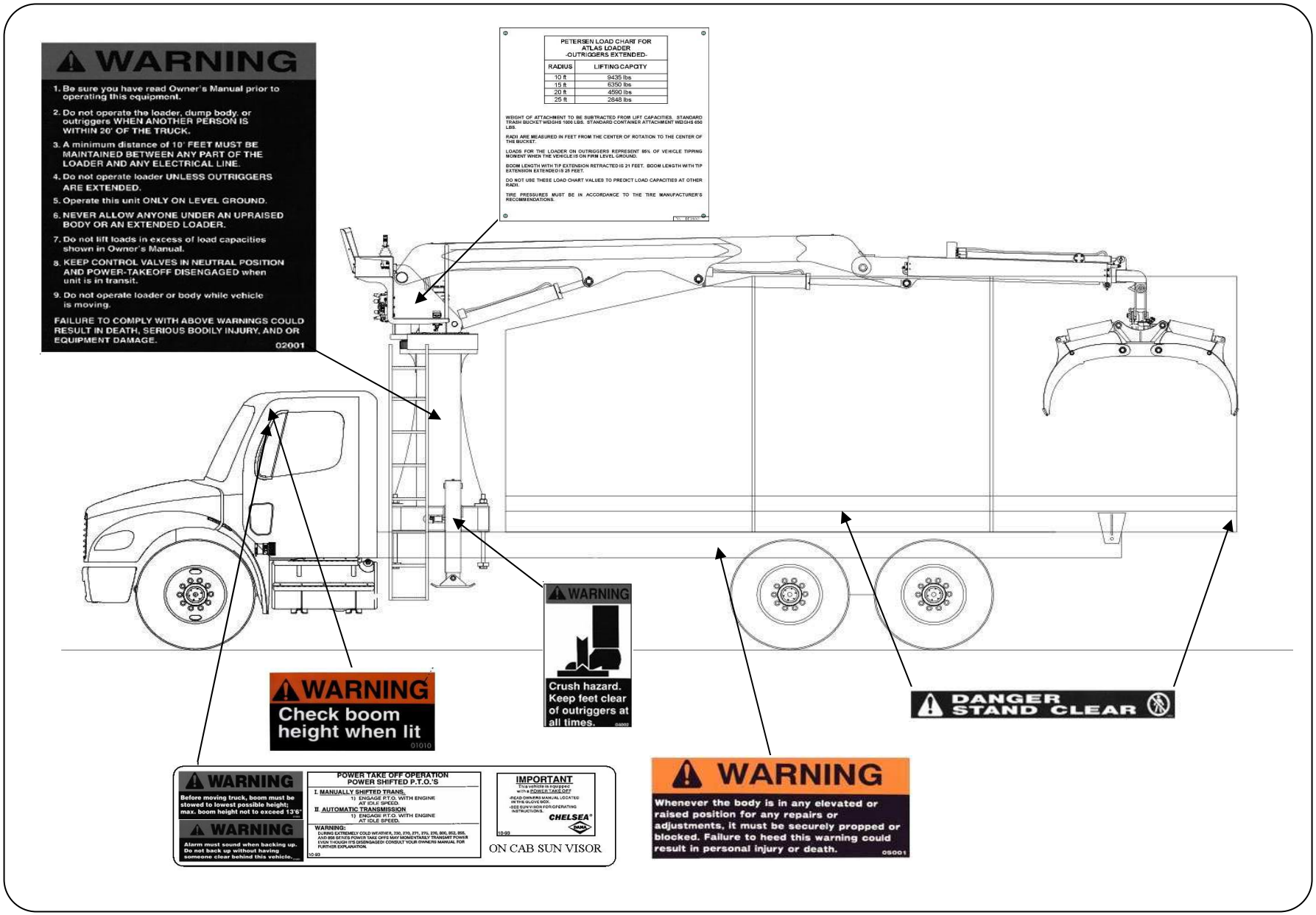
**DANGER** Immediate hazards which WILL result in severe personal injury or death.

**⚠ WARNING**

**WARNING** Hazards or unsafe practices which COULD result in severe personal injury or death.

**⚠ CAUTION**

**CAUTION** Hazards or unsafe practices which COULD result in minor personal injury or product or property damage.




PETERSEN INDUSTRIES LIGHTNING LOADER®

# Part 4: Controls

## THROTTLE CONTROL

Throttle controls are installed for loaders mounted on a truck chassis. For loaders mounted on trucks with electronically controlled engines, a manual switch is used to advance the engine speed. The engine speed is advanced to the preset RPM, which increases the amount of engine power available. The hydraulic system is designed for a maximum oil flow of 42 GPM.

**Preset RPM = Never to exceed 1400**

The Atlas loader has a variable displacement hydraulic pump, therefore will operate at full speed at idle. Using the throttle advance may only be necessary if lifting heavy loads or performing multiple functions simultaneously. The spools inside the hydraulic valve are sized to only allow a set amount of flow out of the work ports for that valve, therefore increasing the engine rpms will not make any one function faster.

## PTO OVER-SPEED CONTROL

The purpose of this control device is to prevent the pump from overspeeding. The pump is rated to a max rpm of 2700 rpm. This overspeed setting is based on the engine rpm and the ratio of the PTO.

The PTO used on an Allison 3000 RDS is 154% and on an Allison 4000 RDS it is 161%.

**PRESET RPM = NOT TO EXCEED 1650**

<u>Power Take-Off Automatic Transmission:</u>

Electrical Shift Control – The recommended procedure is to bring the vehicle to a full stop, place the truck gear shift lever in the neutral position, set the parking brake, and then engage the PTO. At the completion of loading operations, disengage the PTO, apply the service brakes, disengage the parking brake, and then select the appropriate transmission gear.

<u>Power Take-Off Manual Transmission:</u>

Manual Shift Control – The PTO is engaged when the knob on the dash or floor is pulled out and disengaged when the knob is pushed in. The truck gear shift lever must be in neutral and the clutch depressed whenever the knob is moved.

Air Shift Control – The PTO is engaged when the switch is moved to apply air to PTO, the “On” position. The PTO is disengaged when the switch is

in the “Off” position. The truck gear shift lever must be in neutral and the clutch depressed when the switch is moved.

## PARK BRAKE

The truck brake must be set before leaving the cab for any reason.

## BOOM SWING CIRCUIT

The boom swing circuit has an integral static brake that engages once the swing has stopped moving. The brake is spring applied and hydraulically released. Once the swing control is activated, hydraulic pressure is sent to the brake inside the gearbox releasing the brake. When the swing control is released the hydraulic pressure going to the brake slowly bleeds off to reengage the brake after the boom stops swinging.

The boom swing is continuous rotation in the top seat configuration and non-continuous if the controls are a dual walk thru configuration. Since you cannot see what is in front of the truck a continuous rotation is not very practical in a dual walk thru control configuration.

In the dual walk thru configuration the boom swing circuit is limited to swing using two proximity sensors in the inner ring of the slewing bearing. These sensors can be seen below the top plate of the pedestal. The sensors are activated by a plate that is mounted to the underside of the head weldment and swings with the head. The sensors close a valve that acts to stop the flow of hydraulic fluid to the swing motor in one direction which stops the boom from swinging in that direction. If for any reason there is an issue with these valves there are manual overrides on them to bypass the sensors and valves that act as swing stops. The overrides are located on top of the valves which are on the dual walk thru platform behind the main control valve. To put the valves into override mode twist the knurled knob and they pop up. If these valves are put into override mode, have your service department address this issue immediately, the overrides are intended for temporary use so the boom swing doesn’t become stuck in the event of a hydraulic, electric or sensor issue.

## TOP SEAT HYDRAULIC PILOT LOADER CONTROLS

There are two (2) joystick handles to either side of the operator's seat. The operator seat is equipped with an operator present switch to enable the joysticks and the foot controller. In the event of a problem with the enable switch there is a manual override on the pilot control block to manually enable the controls, however this is only intended for temporary use to get the loader back into a stowed position so that repairs can be performed.

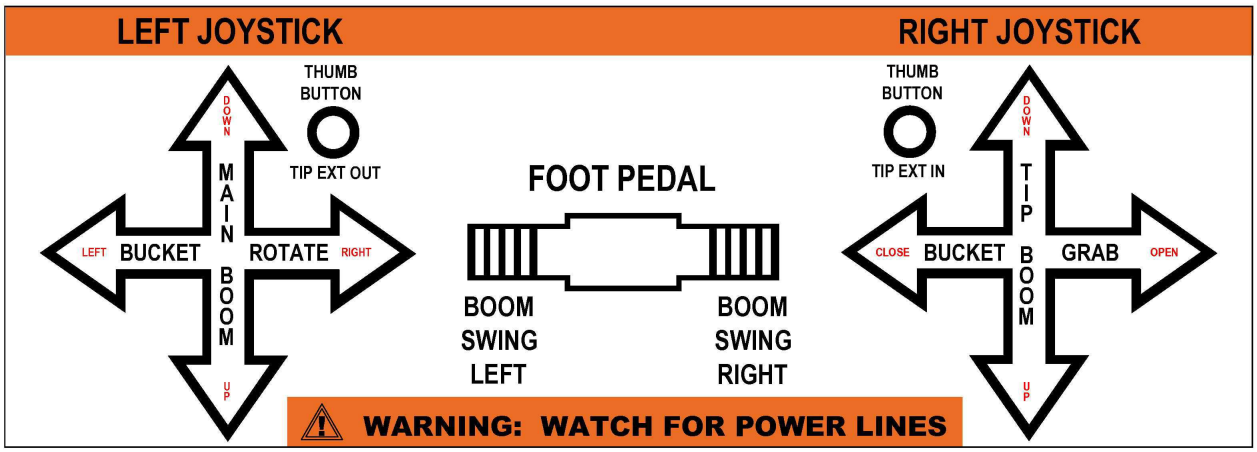
In front of the operator's seat there are four (4) toggle switches for controlling the outriggers. In between the outrigger controls are two (2) push buttons and a push/pull type switch. The push buttons are for activating the horn and emergency engine kill. The push/pull switch is to engage the high idle.

Body dump control is a momentary on/off/on toggle switch located inside the truck cab. This switch is located inside the cab to ensure operator safety when dumping. When the body is dumped no one should be seated at the top seat controls.

The optimum, safe method of operating the joystick and foot pedal controls is by feathering. Feather the controls by moving the joystick or foot pedal smoothly from the neutral position to start motion. After a slow, smooth start, move the joystick control to extreme for full speed. Just before stopping movement, move the joystick control smoothly back to the neutral position.

Do not store any collectibles on the operator's station, as they can create a tripping hazard or become lodged in the controls.

TOP SEAT HYDRAULIC PILOT LOADER CONTROLS




**Left Joystick:**

Bucket Rot.: Push handle to the left to rotate bucket left (counter-clockwise).
Push handle to the right to rotate bucket right (clockwise).

Main Boom: Pull handle back to raise boom.
Push handle forward to lower boom.

Tip Ext.: Push the thumb button to extend the tip extension.

**Right Joystick:**

Tip Boom: Pull the handle back to raise tip boom.
Push handle forward to lower tip boom.

Bucket Grab: Move handle right to open bucket.
Move handle left to close bucket.

Tip Ext.: Push the thumb button to retract the tip extension.

**Foot Pedal Controller:**

Boom Swing: Move handle right to make boom swing right.
Move handle left to make boom swing left.

## DUAL WALK THRU HYDRAULIC PILOT LOADER CONTROLS

There are two (2) joystick handles on each side of the operator's platform. The operating functions of the two sides are identical, so the operator uses the same movements on either side to control the boom elevation, boom swing, tip boom extension, bucket grab, and bucket rotation.

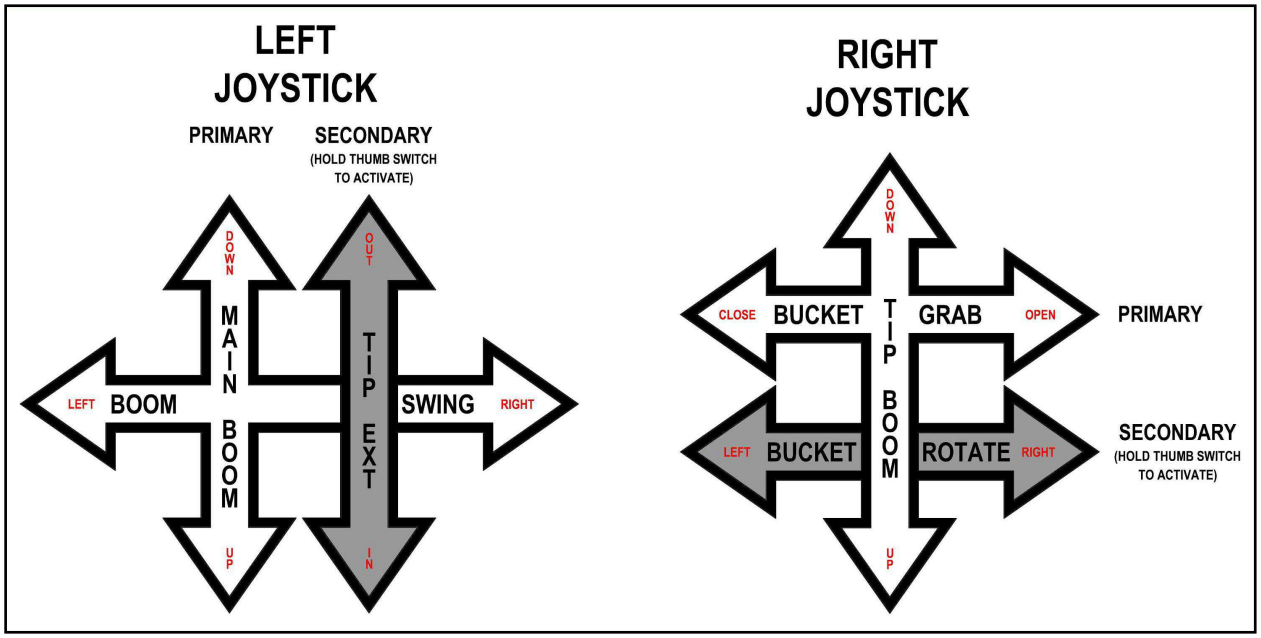
At the center of the work platform are three (5) control handles. These handles are for the outriggers and the body dump.

At the center of the work platform is a 3 position toggle switch. This switch is used to activate the left control station, the right control station or turn both control stations off.

The optimum, safe method of operating the controls is by feathering. **Do not jerk the control levers to full speed, or from one extreme to another.** Feather the controls by moving the joystick smoothly from the neutral position to start motion. After a slow, smooth start, move the joystick control to extreme for full speed. Just before stopping movement, move the joystick control smoothly back to the neutral position.

Always operate the loader on the side closest to the debris being loaded. Do not store any collectibles on the operator's platform, as they can create a tripping hazard or become lodged in the controls.

DUAL WALK THRU HYDRAUILC PILOT LOADER CONTROLS




**Left Joystick:**

Boom Swing: Move handle right to make boom swing right.
Move handle left to make boom swing left.

Main Boom: Pull handle back to raise boom.
Push handle forward to lower boom.

Tip Ext.: While holding the thumb switch push handle forward to extend tip or pull handle back to retract tip.

**Right Joystick:**

Tip Boom: Pull the handle back to raise tip boom.
Push handle forward to lower tip boom.

Bucket Grab: Move handle right to open bucket.
Move handle left to close bucket.

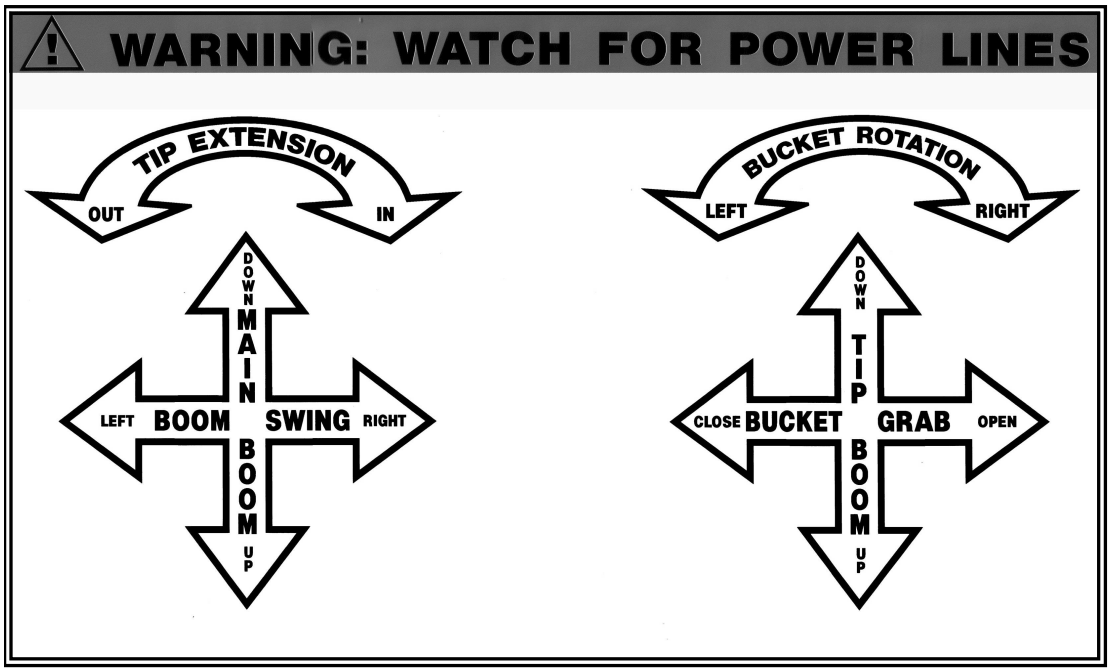
Bucket Rot.: While holding the thumb switch move handle right to rotate bucket right (clockwise) or move handle left to rotate bucket left (counter-clockwise).

DUAL WALK THRU QUADSTICK CONTROLS

There are two (2) joystick handles on each side of the operator's platform. The operating functions of the two sides are identical, so the operator uses the same movements on either side to control the boom elevation, boom swing, tip boom extension, bucket grab, and bucket rotation.

The optimum, safe method of operating the controls is by feathering. **Do not jerk the control levers to full speed, or from one extreme to another.** Feather the controls by moving the joystick smoothly from the neutral position to start motion. After a slow, smooth start, move the joystick control to extreme for full speed. Just before stopping movement, move the joystick control smoothly back to the neutral position.

On units equipped with dual controls, always operate the loader on the side closest to the debris being loaded. Do not store any collectibles on the operator's platform, as they can create a tripping hazard or become lodged in the controls.




Left Joystick:

**Boom Swing:** Move handle right to make boom swing right.
Move handle left to make boom swing left.

**Main Boom:** Pull handle back to raise boom.
Push handle forward to lower boom.

**Tip Ext.:** Twist handle counter-clockwise to extend tip extension out.
Twist handle clockwise to retract tip extension in.

Right Joystick:

**Tip Boom:** Pull the handle back to raise tip boom.
Push handle forward to lower tip boom.

**Bucket Grab:** Move handle right to open bucket.
Move handle left to close bucket.

**Bucket Rot.:** Twist handle clockwise to rotate bucket right (clockwise).
Twist handle counter-clockwise to rotate bucket left (counter-clockwise).

## Part 5: Training

All members of the crew must become thoroughly familiar with the operation of controls, the correct operating procedures, maximum lifting capacities, and safety precautions before operating the loader. Operator training is essential. Always be prepared for an emergency. The following pages contain numerous safety precautions, information, and operating instructions that must be observed while performing work operations.

The health, safety and well-being of each member of the crew is of primary importance. Consequently, each member has an obligation to himself, and to his fellow workers, to make sure safe operating procedures are followed. All operating regulations recommended by the manufacturer, the employer and by municipal, state and federal agencies must be observed. The operating procedures set up in this manual are Petersen's recommendations and do not necessarily cover employer and governmental regulations. Each operator must know and observe those regulations.

Become familiar with all equipment checks. You should make daily equipment inspections and be able to spot any abnormality or malfunctions before beginning an assigned task, while working or after completing the task. There is a high degree of reliability built into your equipment, but there is always a possibility of mechanical failure or power failure due to incomplete service or abnormal wear. An operator should never take another's word. He should always thoroughly check the equipment himself.

Each crew member must receive thorough instructions on the care and maintenance of this machine, thus enabling him to identify and anticipate any problems that may occur. Knowing how the equipment operates will help you recognize when it is not operating properly and that repairs or adjustments are required.

## Part 6: Setting Up at the Job Site

An important prerequisite to proper setting up at the job site is to thoroughly plan the lift before positioning the vehicle.

Always seek the best possible work site when parking the vehicle. An ideal parking location at a job site is firm, level dry ground or pavement, located in close proximity to the work station. Avoid uneven, rocky or muddy terrain, or steep grades. Location should be selected such that outriggers can be fully extended and the outrigger pad comes down on a firm, level surface. In the event that it is necessary to use the loader on an inclined surface, extreme care should be used. Loader slewing torque, stability, lifting capacity and other loader control functions may be affected adversely. Particular caution must be exercised with the swing function since a "downhill" inclined surface will increase the slewing speed and lengthen the time it takes to stop the motion. Your vehicle should be positioned in an area free from overhead obstructions and to allow performance of the entire task without repositioning, if possible. The operator must be familiar with the swing arc of the loader. You should position your vehicle so that the load is well within this arc. Once the vehicle is in position for loading, please follow these precautions and procedures for loading:

<u>Precautions and Procedures for Loading:</u>

- Before leaving the cab, engage all safety lights, place the transmission in neutral, and set the truck brake.

- Always be aware of traffic conditions. Extreme caution should be taken when operating extendible outriggers where there is traffic. The operator should consider the possible safety hazard and take necessary precautions, such as using safety cones to mark the outriggers. The operator should also consider using safety cones to mark the vehicle, if the loading position interferes with traffic flow, or other conditions make the vehicle not easily visible.

- Before commencing work, make sure the debris you are going to load does not conceal any fixed objects, such as fire hydrants, guy wires, etc.

- The vehicle should be positioned so that it is impossible for any portion of the equipment to come within the minimum required safe distance to any energized power line. Maintain a clearance of at least 10 feet between any part of the loader and any electrical line. Remember, power lines deflect in winds and additional clearances must be allowed. Death or serious injury may result from contact or arcing due to inadequate clearance to anyone working on or around the loader. All overhead wires should be considered energized until the electrical utility authorities verify that they are not and the wires are visibly grounded.

- Do not operate the loader during electrical storms, when high wind conditions exist, or in poorly lighted conditions.

- Your loading area must be clear of people. Do not operate the loader, outriggers, or dump body if another person is within twenty feet of the equipment.

- Do not allow any person under a raised body or extended loader.

- If your model loader uses a ladder for access to the loader station, use provided handholds and steps. Face the steps when getting on and off. Never use controls as handholds. Do not mount the machine if handholds or steps are broken or missing. Repair them first.

**Failure to heed these instructions can result in serious personal injury or death.**

## Part 7: Loading Procedures

Engage the power-take-off. For cold weather operation, allow the loader hydraulic system to reach operating temperature before commencing work.

Before conducting any boom operations, extend all outriggers to level the loader side to side. When extending outriggers out and down, ensure that the vehicle is stabilized. To develop rated load capacity, the outriggers should be fully extended. Provide blocks, if necessary, to level the unit on sloping ground or bearing pads if the outriggers tend to sink into soft terrain. Some concrete surfaces are relatively thin and cannot withstand outrigger loading. Concrete can break through and cause instability.

Remember this safety information regarding the outriggers:

- Keep feet clear of outriggers at all times to avoid serious crushing injury.
- Failure to use the outriggers when loading may create an unstable condition, including the loader overturning that could result in serious personal injury or death.

Do you know the load capacity of the loader? Refer to the "Load Capacity Chart" in this manual for information regarding load capacities. The “Load Capacity Chart” is also riveted to the pedestal of the loader. Do not attempt to lift more than the capacities shown on the load chart for your model loader at the correct radius.

For loaders with manual throttle controls, set the throttle control to desired RPM, depending on loading conditions. Remember, DO NOT exceed the preset throttle control setting of 1400 revolutions per minute.

<u>To make the lift:</u>

1. Raise boom from inside of dump body and swing to trash pile. Use tip extension, if needed, and rotate bucket so that it is aligned with trash.
2. Open the bucket, lower around trash, and close the bucket so that you have a firm grip on the trash. Raise the boom slightly and activate the bucket grab once again to make sure you have a firm grip on the trash.
3. Lift and swing the load over the dump body. In order to minimize the height and stress on the boom, it is recommended that the tip extension be retracted prior to swinging the load. It is recommended to load the front of the body first.

When loading the dump body, please follow these precautions:

- **Do not** use the bucket to crowd the load to the front of the dump body as you can damage the bucket and other loader components.
- **Do not** overload the dump body. You must have room to stow the bucket within the body sides for travel.
- **Do not** allow limbs or other debris to protrude from the dump body.
- **Do not** excessively pack the load. Excess packing could result in dump body floor damage and loader damage.
- **Do not** allow the bucket to swing beyond parallel to the tip boom. If the bucket flips up beyond parallel to the tip boom the gimbal can damage the end of the tip boom.

Continue the loading procedure until all trash is loaded. If it is necessary for the operator to manually rake any remaining trash into a smaller pile, the boom must be stowed in the dump body or on the ground, and the PTO disengaged when the operator leaves the control station.

Please follow these additional loading precautions at all times:

- Do not leave a load suspended when the operator is away from the control station.
- Only operate the loader from the operator's station. Do not attempt to operate the loader from any position other than the operator's station.
- Never climb on operator controls or other loader components.
- Do not sit or stand at operator control station when truck is in motion. The control station is to be manned only when the vehicle has been parked and the procedures we previously discussed have been followed for setting up to load.
- Do not attempt to lift loads exceeding manufacturer's recommended safe working capacity.
- Do not impose lateral loads on the boom.
- Do not use stability to determine safe working load.

To cover the load:

When using a Petersen manufactured and installed load cover, please follow these procedures:

1. Knuckle the bucket to the front of the dump body.

2. Hook the tarp chain to the hook on the bucket.

3. Extend the boom to cover the debris, and rest the bucket on the load.

To stow the boom and bucket:

There are two proper ways to stow the bucket in the dump body. In each case the bucket sides should be parallel to sides of the dump body. The operator can either stow the bucket in the opened position on the body floor, or roll the closed bucket over on top of the load. In both cases it is necessary for the operator to leave room in the dump body to stow the boom and bucket. Always ensure that at least half of the bucket and tip of the boom are below the top of the body sides before travel.

Bucket Roll Method (with PI single cylinder bucket only):

The rear of the dump body must be at least half full in order to use the bucket roll method for stowing the boom and bucket.

1. Use the control handles on the curb side.

2. Close the bucket and rotate until bucket sides are parallel to body sides.

3. Move the bucket to the curb side rear inside corner of the dump body.

4. Rest the bucket on the load.

5. Simultaneously boom down and swing the boom to the street side until the boom tip and at least half of the bucket are below top of body sides. Ensure that no part of the loader or load is over legal height of 13 ft. 6 in.

Please see illustrations on the following page for examples of correct and incorrect ways to stow the bucket for travel.

**WARNING! – Failure to stow the boom and bucket as instructed could allow the boom to slew (swing) and the bucket to fall outside of the body. Loss of boom control with the bucket outside of the dump body could result in damage to objects in the vicinity of the grapple truck, and/or serious injury or death to people in the vicinity of the grapple truck.**

Once the bucket has been properly stowed for travel, retract all outriggers, disengage the PTO, and pickup any safety cones or markers that were used.  Release the parking brake, and you're ready to travel to the dump site.

## Part 8: Dumping the Load

As you prepare to dump the load, it is important that you choose a level, firm area. Each of the following steps must be followed precisely and in sequence. The procedure must not be done in a hurried manner.

1. Set the parking brake.

2. Open the rear dump body doors and latch them back. Use caution when opening doors, as items placed against doors could fall suddenly when doors are opened and cause injury.

3. Engage the power-take-off.

4. Extend the outrigger on both sides and lower to within six to eight inches of the ground. This allows for emergency stabilization, and movement of the truck.

5. If your load is covered with a tarp, as discussed in "Covering the Load", retract the tarp.

6. Raise the main boom to the maximum elevation and keep it centered over the dump body during the entire dumping procedure.

7. Place the tip boom in a position so that it will not contact the bulkhead of the dump body when the dump body is raised. Do not swing the boom to either side during the dumping procedure, as the outriggers are not fully lowered.

8. Activate the body dump handle or switch. Slowly raise the body to empty the load. Make sure you avoid contact between the main boom and tip boom, and the dump body.

9. If the emptied pile prevents complete dumping of body contents, disengage the PTO. SLOWLY move the truck forward to complete dumping of the body. Remember, the outriggers are partially down and the boom is raised. Extreme caution should be used during this procedure.

   This is not a procedure to force debris out of the dump body. If there is debris stuck in the dump body, lower the dump body and dislodge the debris with the loader.

10. When you have finished dumping the load, lower the dump body. Stow the boom and bucket in the dump body with bucket open and resting on body floor.

11. Raise and retract the outriggers, and disengage the power-take-off.

12. Close and lock body rear doors.

Safety Precautions Regarding Dumping Procedure:

- Do not use the loader boom to force the dump body down when lowering the dump body.
- Do not dump the load until the rear body doors are latched open. The doors and body hinges can be damaged if doors are allowed to swing freely during the dumping procedure.
- Do not travel with rear body doors open. They must be closed and locked for travel.

# Part 1: Safety Procedures and Precautions for Service and Repair

A regular schedule of maintenance is essential to keep your unit at peak operating efficiency. Operators or service personnel responsible for the care of the unit must be completely familiar with the type and frequency of inspections, maintenance, and lubrication operations to be performed.

Always keep the loader free from sand and other foreign particles to ensure trouble-free operation and to avoid excessive wear. Air entering the oil tank carries with it small quantities of impurities and moisture. The hydraulic oil should be drained at least once a year to rid the system of any contamination and condensation.

The hydraulic circuit diagram is included in this manual for service or maintenance information.

Make sure you observe the following procedures and precautions when performing maintenance and/or repairs on your equipment.

| Safety Procedures and Precautions for Service and Repair |
| --- |
| ➢ Do not perform any work on the loader unless you are qualified and authorized to do so.<br>➢ Loader is placed where it will cause the least interference with other equipment or operations in the area.<br>➢ All controls at the off position and all operating features in neutral position.<br>➢ Do not attempt to clean, oil or service a loader when the power-take-off is engaged.<br>➢ Deactivate means for starting. Use lockout-tagout procedure.<br>➢ Bucket and boom at rest on ground or floor of dump body.<br>➢ Do not disconnect hydraulic connections under pressure. Hot hydraulic fluid can cause serious injury. Stay clear of hydraulic leaks as high pressure and hot hydraulic fluid can cause serious injury.<br>➢ Always use dump body prop(s) before servicing or repairing body or hoist. Never leave the body raised or partly raised while vehicle is unattended or while performing maintenance or service under the body, unless the body is braced to prevent accidental lowering. |

Modification to any part of the loader can create a safety hazard and therefore shall not be made without the manufacturer's written approval. It is important that you use factory replacement parts to ensure that size and capacity are as the original parts.

It is important that hydraulic components be rated at proper flow and pressure. If your loader is rebuilt or remounted, mounting procedures and retesting is required in accordance with factory instructions.

Disconnecting, removing, or disabling any part or component which controls the speed of the loader is a misuse of the loader.

The following lists inspections and maintenance which are to be conducted on your unit to help assure it is operating properly and safely. These inspections are in addition to any inspections previously listed, such as daily inspections. Check all items at the frequency listed and make necessary repairs prior to operating.

The following are minimum service requirements.  Hard use or dirty operating conditions dictate more frequent inspection and maintenance.

After service adjustment, and repairs, the loader shall not be returned to service until all guards have been reinstalled, trapped air removed from the hydraulic system if required, safety devices reactivated, and maintenance equipment removed.

**Procedure to Set Backlash on Pinion and Ring Gear**

The ring gear is not perfectly round and has a spot where its diameter is the largest. This spot is marked with paint and Petersen Industries always places this spot where the pinion meshes with the ring gear as if the boom was straight back in the body. If for some reason it isn't possible to position the ring gear in this location this spot will be stamped with a "BL" on the side of the upper plate of the pedestal.

It is recommended that this same practice be followed if the slewing bearing ever requires replacement.

To set backlash position the boom straight back in the body so the pinion is in contact with the largest diameter of the ring gear. One tooth of the pinion should be perfectly set into a gear opening on the ring gear.

Loosen the gearbox bolts and use a suitable tool to push the gearbox closer to the ring gear. Use a 0.007 inch feeler gauge and set into one side of the perfectly meshed tooth. With the feeler gauge placed on one side of this tooth, the other side of this tooth should be contacting the ring gear. The gearbox should now be pivoted in or out to make the feeler gauge snug. Once set, tighten all gearbox mounting bolts.

Remove the feeler gauge and rotate the boom to check that there isn't excessive play between the pinion and ring gear in any locations around the gear.

**Procedure to check/set pressures on Atlas Hydraulic System**

Note that this procedure should only be performed if major hydraulic work is performed. The pumps come preset from the factory so you should not have to set, however to be certain your system is working properly you should perform these steps to verify your hydraulic system is working properly.

Install a pressure gauge into the BG port on the pump, use a hydraulic hose that is long enough to reach to the valves on the loader and to the top seat so the controls can be activated while the gauge is monitored. Alternatively you can install a gauge into any port on either valve is labeled “P” in order to read pump pressure. Refers to the following pages for where these ports are located on the pump and inlet/outlet sections of the valve.

The factory setting of the pressure compensator on the pump is 3500 psi but the load sense reliefs on the valves are the pressure limiting devices which are set to 3000 psi on the valve in terms of the maximum system pressure. The pump is set higher than the valves so that the two pressure compensators do not interfere with each other.

Lower Valve:

While holding the dump body in the up position turn the load sense relief clockwise until the gauge pressure reaches 3000 psi. Note that the only function on the lower valve that needs 3000 psi is body dump up so you cannot use an outrigger to set this pressure. Once you get to the point where you see 3000 psi as described above you should increase the pump pressure compensator to ensure that the compensator on the valve is actually the one that is set lower and is controlling the pressure.

Upper Valve:

While holding the joystick to activate the tip boom up in a fully up (extended) out position turn the load sense relief clockwise until the gauge pressure reaches 3000 psi. Note that main boom up, tip boom up, and tip extension in can all be used to set this 3000 psi pressure setting. These functions also have port reliefs but these are only present in these functions for induced loads (if the boom is ran into something and experiences an external force not created by the hydraulic system.)

Once the 3000 psi pressure is set on both the lower and upper valves, check all the other functions for pressure settings as indicated on the owner’s manual.

Remove the gauge and hose, then replace the BG plug and verify that all adjustment screws and lock nuts are tightened.

Once the pressure compensators have been set properly as described above. The loader should be operated and the controls should match the control decal for function and direction. The hydraulic functions should be bottomed out to verify port relief settings according to the owner's manual.

Note that the port reliefs start to relief at 4-5 GPM and some of the functions run on up to 18 GPM. Therefore if you bottom out a function the pressure reading could be as much as 400 psi higher than the port relief setting due to the pressure rise from the additional flow.

To test a cylinder bottom out the cylinder in the fully retracted position, hold the function and record the pressure reading. To test a motor position the motor so rotation will not be possible, hold the function and record the pressure reading.

## Hydraulic System Settings and Specifications

| Hydraulic Function | Pressure Setting | Maximum Flow |
|---|---|---|
| Main Boom Cylinder Up | 3300 psi* | 18 GPM |
| Main Boom Cylinder Down | 1200 psi | 18 GPM |
| Tip Boom Cylinder Up | 3300 psi* | 18 GPM |
| Tip Boom Cylinder Down | 2000 psi | 18 GPM |
| Boom Swing Left | 2000 psi | 14.5 GPM** |
| Boom Swing Right | 2000 psi | 14.5 GPM** |
| Bucket Open | 2000 psi | 18 GPM |
| Bucket Close | 2500 psi | 18 GPM |
| Bucket Rotate Clockwise | None | 2 GPM** |
| Bucket Rotate Counter Clockwise | None | 2 GPM** |
| Tip Extension Retract | 3045 psi | 13.2 GPM** |
| Tip Extension Extend | 1450 psi | 18 GPM** |
| Outrigger Slide Out | 2500 psi | 8 GPM |
| Outrigger Slide In | 2500 psi | 8 GPM |
| Outrigger Down | 2500 psi | 18 GPM |
| Outrigger Up | 2500 psi | 18 GPM |
| Body Dump Up | 3000 psi | 18 GPM |
| Body Dump Down | NA | NA |
| Pilot Generator | 508 psi | 4-6 GPM |

* This function has a port relief only for induced loads and is actually limited to the 3000 psi which is controlled by the pressure compensator setting.

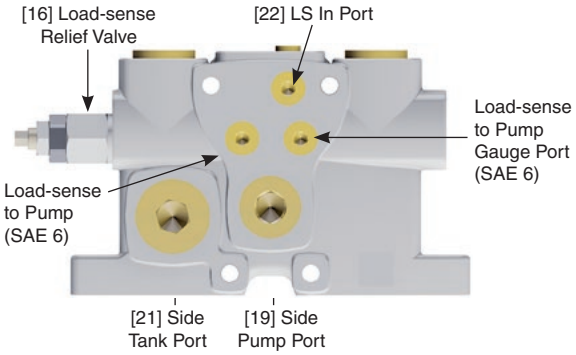
** This function has spool stops at the upper and lower of the work section valve. The spool stops can be used to limit the flow by limiting the stroke of the spool. The flow listed on the chart above is the maximum flow that can be theoretically achieved.

## I – [P15] Inlet Section Type

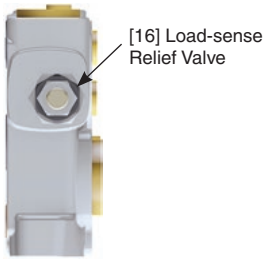
### Standard Inlet

The standard inlet can be used with manual, hydraulic pilot, and electrohydraulic configurations. The pilot in port allows for solenoid pilot generation flow to be brought into the VP120 valve assembly from an external source.

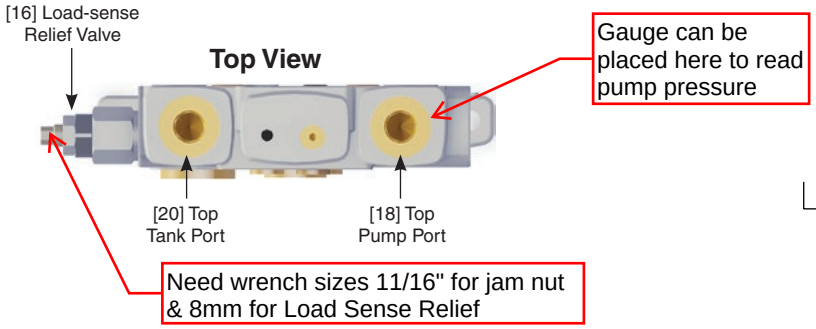
**Front View**

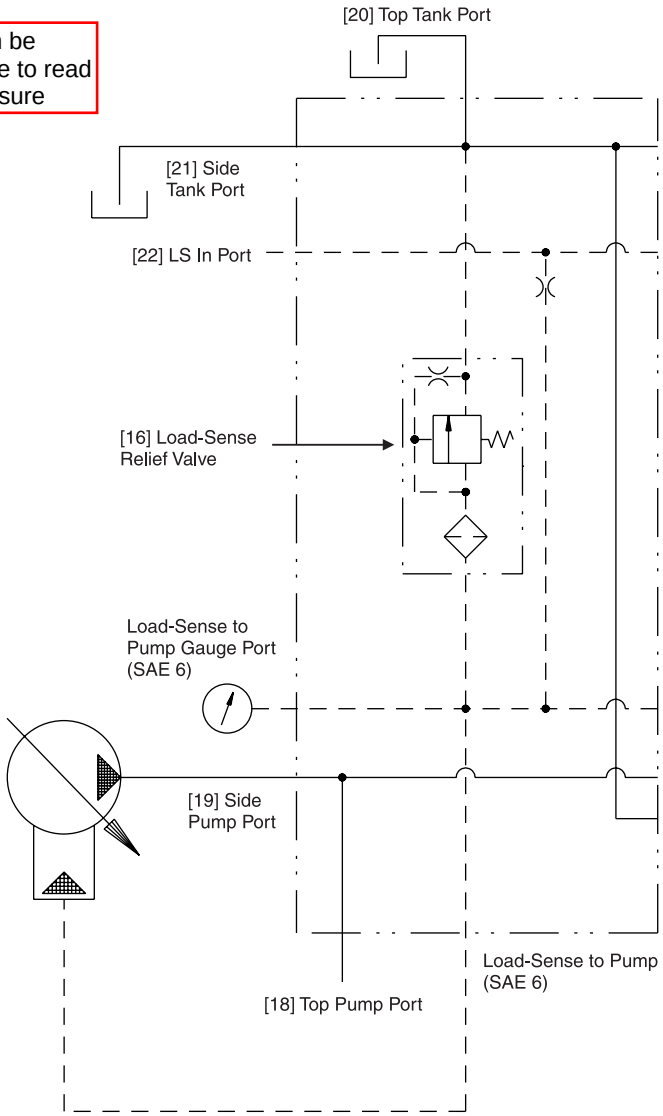



**Left View**




**Right View**



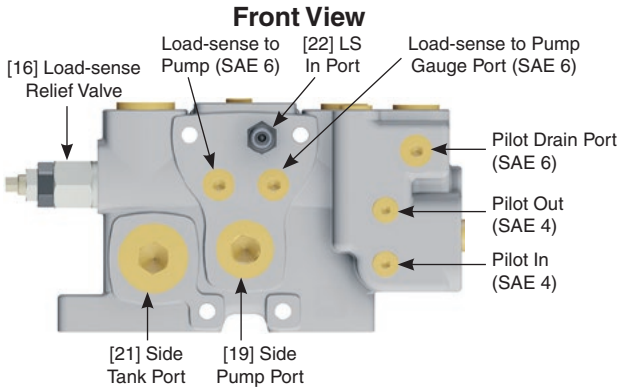

## Port Options Available

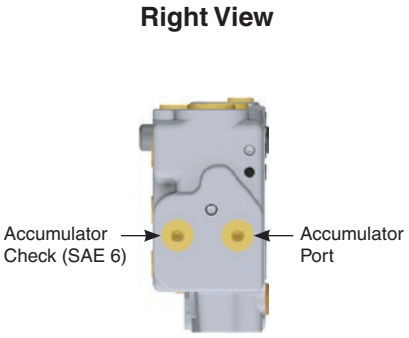
| | |
|---|---|
| **[P18]** | **Top Pump Port SAE 10** |
| P1B | Top Pump Port with a Steel Plug |
| P1 | Top Pump Port Open |
| **[P19]** | **Side Pump Port SAE 12** |
| P2B | Side Pump Port with a Steel Plug |
| P2 | Side Pump Port Open |
| **[P20]** | **Top Tank Port SAE 12** |
| T1B | Top Tank Port with a Steel Plug |
| T1 | Top Tank Port Open |
| **[P21]** | **Side Tank Port SAE 16** |
| T2B | Side Tank Port with a Steel Plug |
| T2 | Side Tank Port Open |
| **[P22]** | **Load-Sense in Port SAE 6** |
| ILSPB | Load-Sense in Port with a Steel Plug |
| ILSP | Load-Sense in Port Open |
| ILSPCK | Load-Sense in Port with an Integrated Shuttle Check |
| **[P23]** | **Pilot Supply in Port SAE 6** |
| IPSB | Pilot Supply in Port with a Steel Plug |
| IPS | Pilot Supply in Port Open |
| **[P25]** | **Pilot Out Port** |
| \ | Not Machined |
| **[P26]** | **Pilot Supply Accumulator Port** |
| \ | Not Machined |

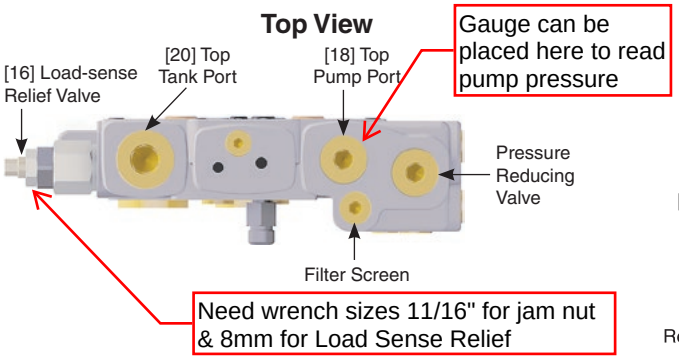
## IEH – [P15] Inlet Section Type

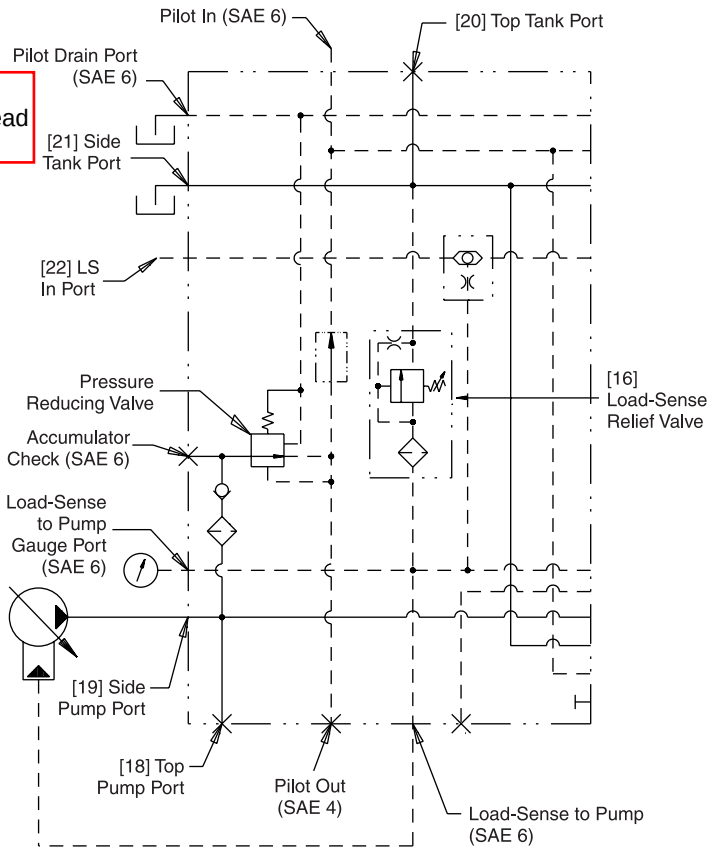
### Pilot Generating Inlet

The pilot generating inlet is mainly used when electrohydraulic sections are in use to provide pilot flow and pressure to the section solenoids. Other reasons for the inlet with internal pilot generation could be to generate pilot flow and pressure for external operations (i.e., hydraulic pilot controllers) or for kidney loop filtration. The inlet with internal pilot generation also contains an optional accumulator porting with check valve to provide a stand by flow and pressure for certain situations.






## Port Options Available

| | |
|---|---|
| **[P18]** | **Top Pump Port SAE 10** |
| P1B | Top Pump Port with a Steel Plug |
| P1 | Top Pump Port Open |
| **[P19]** | **Side Pump Port SAE 12** |
| P2B | Side Pump Port with a Steel Plug |
| P2 | Side Pump Port Open |
| **[P20]** | **Top Tank Port SAE 12** |
| T1B | Top Tank Port with a Steel Plug |
| T1 | Top Tank Port Open |
| **[P21]** | **Side Tank Port SAE 16** |
| T2B | Side Tank Port with a Steel Plug |
| T2 | Side Tank Port Open |
| **[P22]** | **Load-Sense in Port SAE 6** |
| ILSPB | Load-Sense in Port with a Steel Plug |
| ILSP | Load-Sense in Port Open |
| ILSPCK | Load-Sense in Port with an Integrated Shuttle Check |
| **[P23]** | **Pilot Supply in Port SAE 6** |
| IPSB | Pilot Supply in Port with a Steel Plug |
| IPS | Pilot Supply in Port Open |

Continued in next column

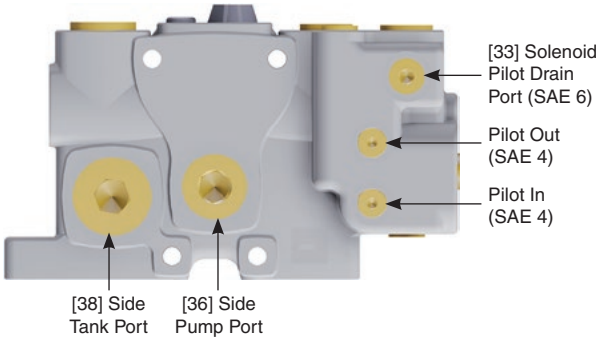
| | |
|---|---|
| **[P25]** | **Pilot Out Port SAE 6** |
| IPOB | Pilot Out Port with a Steel Plug |
| IPO | Pilot Out Port Open |
| **[P26]** | **Pilot Supply Accumulator Port SAE 6** |
| IACB | Pilot Supply Accumulator Port Plugged |
| IAC | Pilot Supply Accumulator Port Open |
| **[P27]** | **Inlet Pilot Drain** |
| ISDP | Inlet Pilot Drain Plugged |
| ISD | Inlet Pilot Drain Open |

## OEH – [P30] Outlet Section Type

### Pilot Generating Outlet

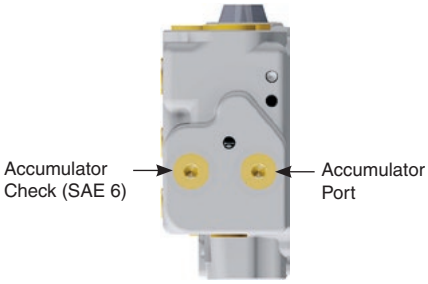
The pilot generating outlet is mainly used when electrohydraulic sections are in use to provide pilot flow and pressure to the section solenoids. Please note only one pilot generating outlet should be used, if already used as an inlet then the outlet option is not available. Other reasons the outlet with internal pilot generation could be to generate pilot flow and pressure for external operations (i.e., hydraulic pilot controllers) or for kidney loop filtration. All pilot generating outlets contain a mandatory pilot drain port in the cover which can be plugged if pilot flow will be drained from an inlet cover.

**Right Cover**

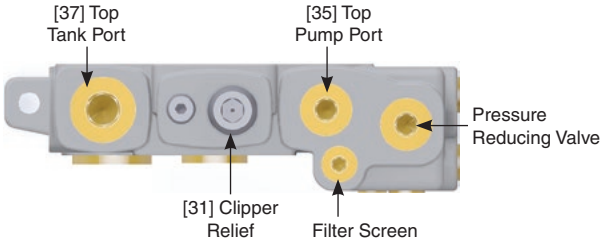


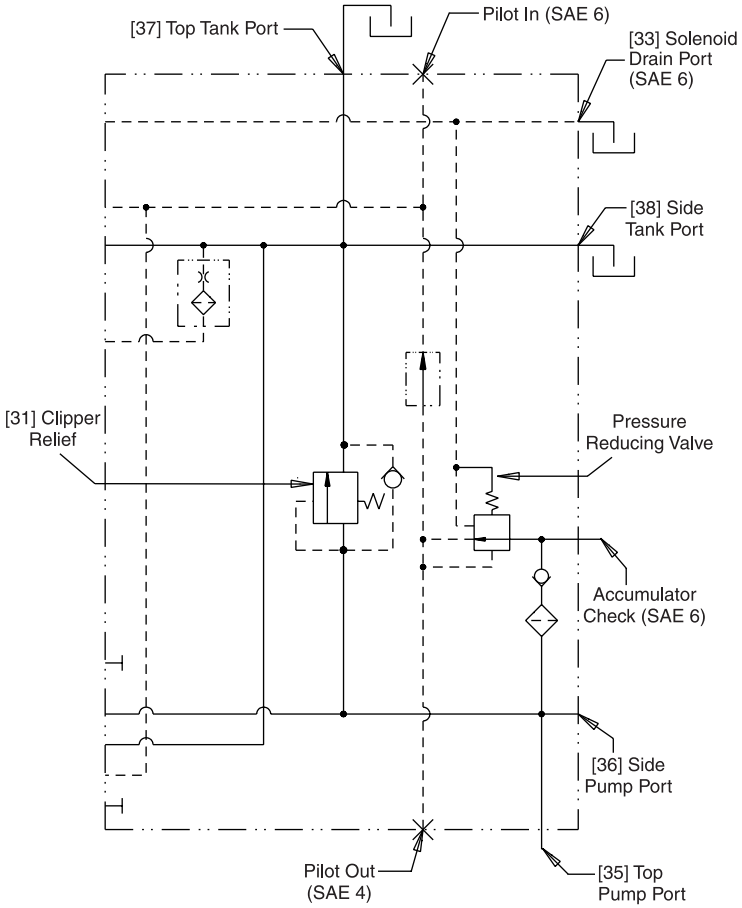

**Left View**

**Right View**




**Top View**




## Port Options Available

| [P33] | **Solenoid Drain SAE 6** |
|---|---|
| SDB | Solenoid Drain with a Steel Plug |
| SD | Solenoid Drain Open |
| **[P35]** | **Top Pump Port SAE 10** |
| P3B | Top Pump Port with a Steel Plug |
| P3 | Top Pump Port Open |
| **[P36]** | **Side Pump Port SAE 12** |
| P4B | Side Pump Port with a Steel Plug |
| P4 | Side Pump Port Open |
| **[P37]** | **Top Tank Port SAE 12** |
| T3B | Top Tank Port with a Steel Plug |
| T3 | Top Tank Port Open |
| **[P38]** | **Side Tank Port SAE 16** |
| T4B | Side Tank Port with a Steel Plug |
| T4 | Side Tank Port Open |
| **[P39]** | **Load-Sense in Port** |
| \ | Not Machined |
| **[P40]** | **Pilot Supply in Port SAE 6** |
| OPSB | Pilot Supply in Port with a Steel Plug |
| OPS | Pilot Supply in Port Open |

Continued in next column

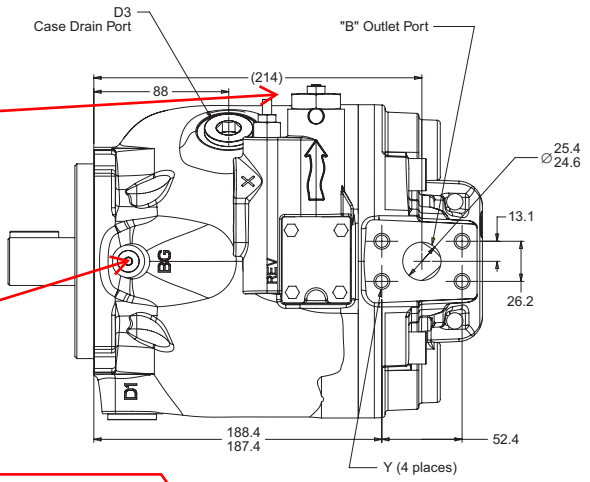
| [P43] | **Pilot Out Port SAE 6** |
|---|---|
| OPOB | Pilot Out Port with a Steel Plug |
| OPO | Pilot Out Port Open |
| **[P44]** | **Pilot Supply Accumulator Port SAE 6** |
| OACB | Pilot Supply Accumulator Port Plugged |
| OAC | Pilot Supply Accumulator Port Open |

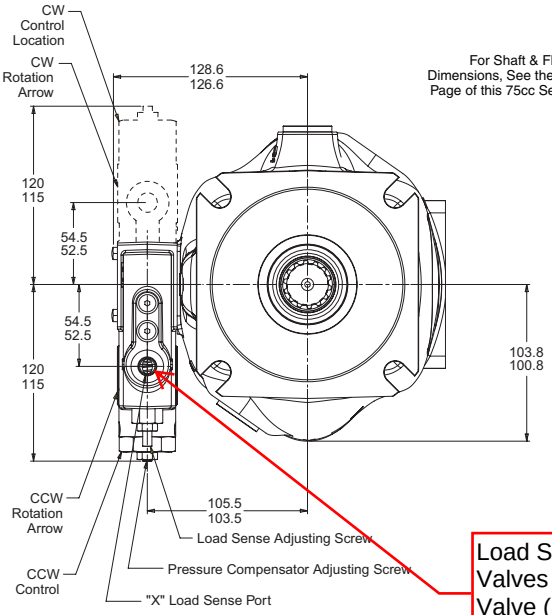
## Pump Installation - P1/PD 075
## Side Port
## "L" Control Option

10 mm wrench for jam nuts and 2.5 mm allen wrench for adjuster screws

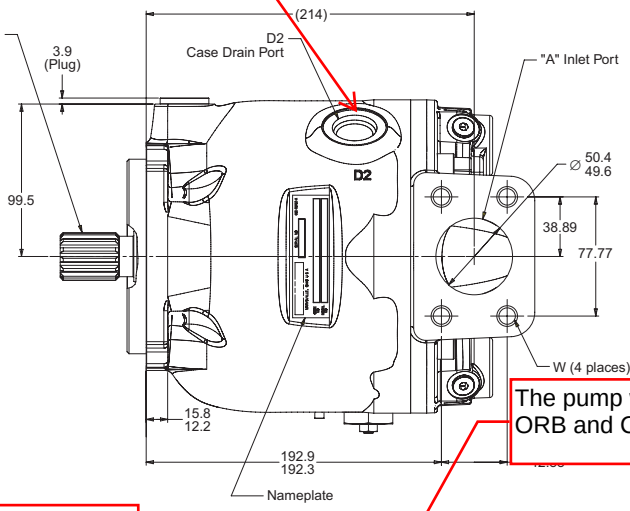
BG Port Used to Measure Pump Pressure

Highest Drain (D port) must be connected back to Tank. It allows the pump to have constant lubrication.



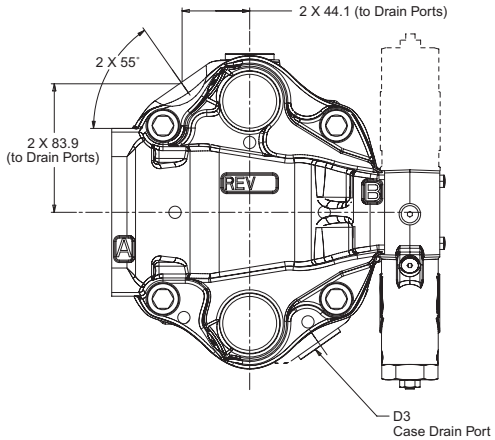




For Shaft & Flange Dimensions, See the First Page of this 75cc Section




The pump we use has ORB and Code 61 Ports

Load Sense Port to Valves or Shuttle Valve (Signals pump to increase stroke)




| | P1/PD 075 Port Sizes | | |
|---|---|---|---|
| | **SAE** | **ISO** | **BSP** |
| **A Inlet** | 50mm code 61[C] | 50mm DN 51[B] | — |
| **W Threads** | ½ - 13 UNC-2B[C] | M12 x 1.75[B] | — |
| **B Outlet** | 25mm code 61[C] | 25mm DN25[B] | — |
| **Y Threads** | ⅜- 16 UNC-2B[C] | M10 x 1.5[B] | — |
| **BG** | SAE-4[D] | M12x1.5[A] | ¼"[E] |
| **D1 D2 D3** | SAE-12[D] | M27x2[A] | ¾"[E] |
| **X** | SAE-4[D] | M12x1.5[A] | ¼"[E] |

Note A: Metric o-ring boss port conform to ISO 6149-1
Note B: Metric 4-bolt flange port conforms to ISO 6162
Note C: Inch 4-bolt flange port conforms to SAE J518
Note D: Inch o-ring boss port conforms to SAE J514
Note E: BSP boss port conforms to ISO 228-1



Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

## Part 2: Service:

| AFTER FIRST 40 HOURS OF OPERATION (BREAK IN SERVICE) | |
|---|---|
| Re-torque slewing bearing bolts. | 280 ft. lbs. |
| Check torque of gearbox bolts | 280 ft. lbs. (3/4" bolts)<br>680 ft. lbs. (1" bolts) |
| Replace return filter | |
| Change oil in planetary gearbox | Drain existing oil from swing gearbox and replace with 2.95 quarts of 80W gear lube. |

| EVERY 40 HOURS or WEEKLY | |
|---|---|
| Grease all fittings. | See Grease and Maintenance Diagram in the "Dia. & Drawings" section of this manual.<br><br>Grease fittings that are worn and will not hold the grease gun, or those that have a stuck check ball, must be replaced.<br><br>Grease = EP2 (Extreme Pressure) |
| Check hydraulic hoses for cuts or abrasions, or any evidence of binding or leakage. | Replace any damaged hoses. |
| Check all hydraulic fittings to make sure they are in place and do not show signs of leakage. | Replace any missing, damaged or modified fittings. |
| Tighten bucket brake pads. | If brake pads show excessive wear, replace. Tighten gimbal rotator bolt and tip boom gimbal bolt, if needed. |
| Check oil level. | All oil levels are to be checked with the loader parked on a level surface in transport position, and while the oil is cold, unless otherwise specified. Oil level should be two to three (2 to 3) inches from top of tank.<br><br>Hydraulic Oil = AW32 |

| EVERY 40 HOURS or WEEKLY | |
|---|---|
| Check engine over speed control for proper setting. | Check by revving the engine to exceed 1650 RPM, at which point the PTO light should turn off if the engine overspeed is properly set. The PTO should not reengage until engine RPM's drop below 900. Reset if necessary. |
| Check the engine throttle control for proper setting. | 1400 RPM maximum. |
| Check back-up and boom-up alarms to make sure they are working properly. | Repair or replace if needed. |

| EVERY 80 HOURS or EVERY 2 WEEKS<br>*(These requirements are in addition to the 40 hour service requirements.)* | |
|---|---|
| Check torque of slewing bearing bolts. | 280 ft. lbs. |
| Check torque of bucket rotator bolts. | 110 ft. lbs.<br>(PI single cylinder bucket only) |
| Check torque of gearbox bolts | 280 ft. lbs. (3/4" bolts)<br>680 ft. lbs. (1" bolts) |
| Check for play between the pinion and ring gear. | If there is visible play between the pinion and ring gear follow the procedure for setting pinion backlash. |

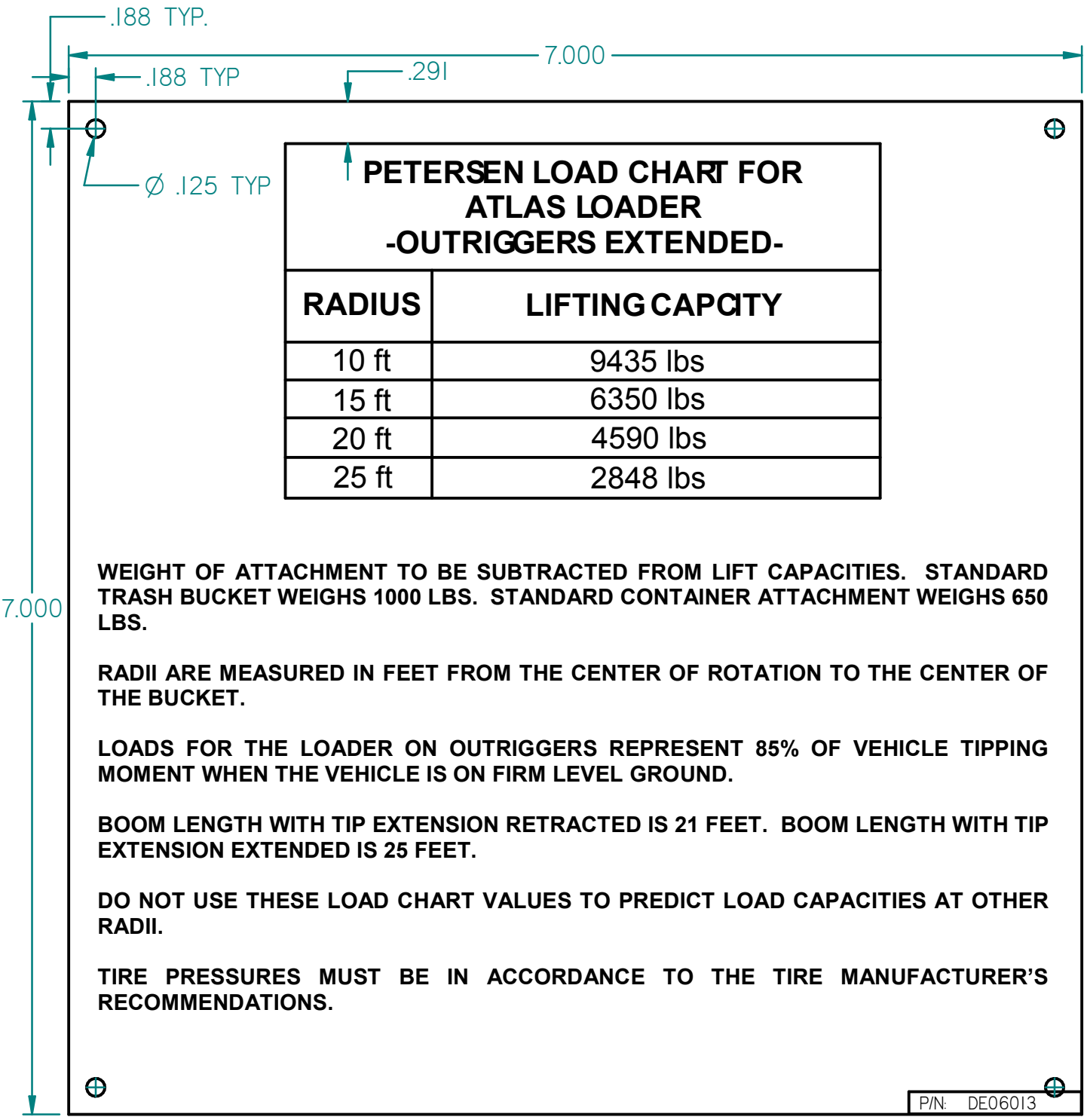
| EVERY 160 HOURS or MONTHLY<br>*(These requirements are in addition to the 80 hour service requirements.)* | |
|---|---|
| Examine all loader pivot points (head and pedestal, main boom, tip boom, bucket and body) for visible play. | If visible play is observed at pivot points, bushings and/or pins must be replaced as needed. |
| Chassis - Check truck frame for cracks, loose or missing bolts, rivets, damaged springs or loose shackles. | See truck manufacturer's service manual for service and repair instructions. |
| Structural - Visually inspect complete loader for damage, especially cracks in weldments. | It is necessary for your loader to be clean of oil and grease for these inspections to be performed effectively. |
| Fasteners - Check all pins, sheaves, retainers, bolts and nuts. | Replace damaged or missing parts. |
| Retighten main boom and tip boom connecting bolts. | Replace if needed. |
| Check PTO and pump drive train. | Check for loose or missing bolts. Replace seals if needed. |
| Inspect loader tie-down bolts. | Tighten if loose |

| **EVERY 160 HOURS or MONTHLY**<br>*(These requirements are in addition to the 80 hour service requirements.)* | |
|---|---|
| Decals - Check for presence and legibility. | Check decal listing in "Part 3: Safety Devices – Safety Symbols" of this manual for required operational and safety decals. Replace missing or illegible decals. |
| Re-torque the two Allen headed bolts at base of bucket rotator | 442.5 ft. lbs. |

| **EVERY 600 HOURS or 6 MONTHS** | |
|---|---|
| Replace return line filter cartridge and breather filter. | |

| **EVERY 3000 HOURS or 12 MONTHS**<br>*(These requirements are in addition to the 160 hour service requirements.)* | |
|---|---|
| Change oil in planetary gearbox | Drain existing oil from swing gearbox and replace with 2.95 quarts of 80W gear lube. |

| ZONE | REV. | DESCRIPTION | DATE | BY |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |




# PETERSEN LOAD CHART FOR ATLAS LOADER -OUTRIGGERS EXTENDED-

| RADIUS | LIFTING CAPCITY |
|---|---|
| 10 ft | 9435 lbs |
| 15 ft | 6350 lbs |
| 20 ft | 4590 lbs |
| 25 ft | 2848 lbs |

**WEIGHT OF ATTACHMENT TO BE SUBTRACTED FROM LIFT CAPACITIES. STANDARD TRASH BUCKET WEIGHS 1000 LBS. STANDARD CONTAINER ATTACHMENT WEIGHS 650 LBS.**

**RADII ARE MEASURED IN FEET FROM THE CENTER OF ROTATION TO THE CENTER OF THE BUCKET.**

**LOADS FOR THE LOADER ON OUTRIGGERS REPRESENT 85% OF VEHICLE TIPPING MOMENT WHEN THE VEHICLE IS ON FIRM LEVEL GROUND.**

**BOOM LENGTH WITH TIP EXTENSION RETRACTED IS 21 FEET. BOOM LENGTH WITH TIP EXTENSION EXTENDED IS 25 FEET.**

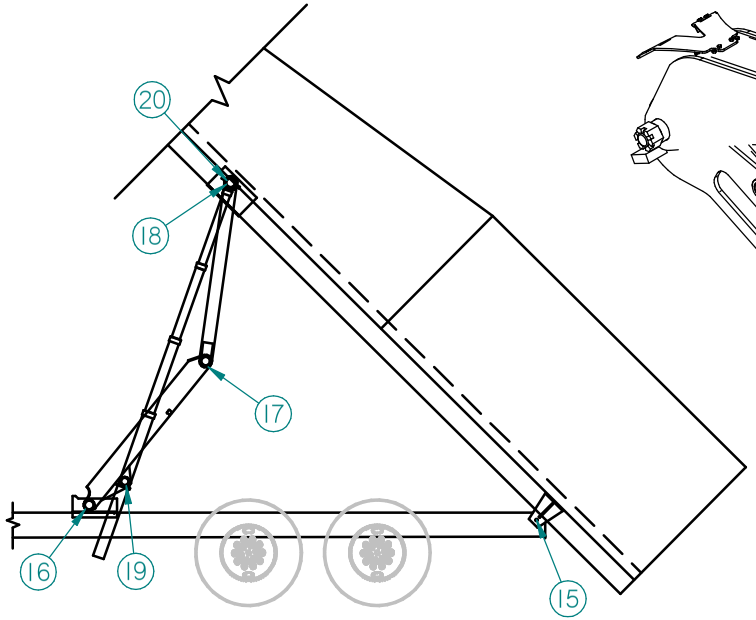
**DO NOT USE THESE LOAD CHART VALUES TO PREDICT LOAD CAPACITIES AT OTHER RADII.**

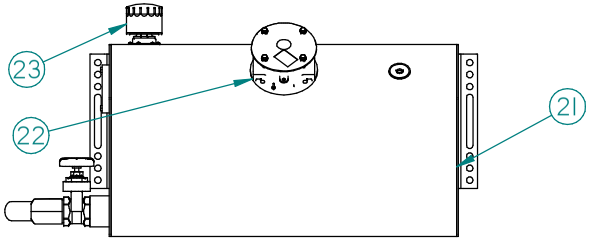
**TIRE PRESSURES MUST BE IN ACCORDANCE TO THE TIRE MANUFACTURER'S RECOMMENDATIONS.**

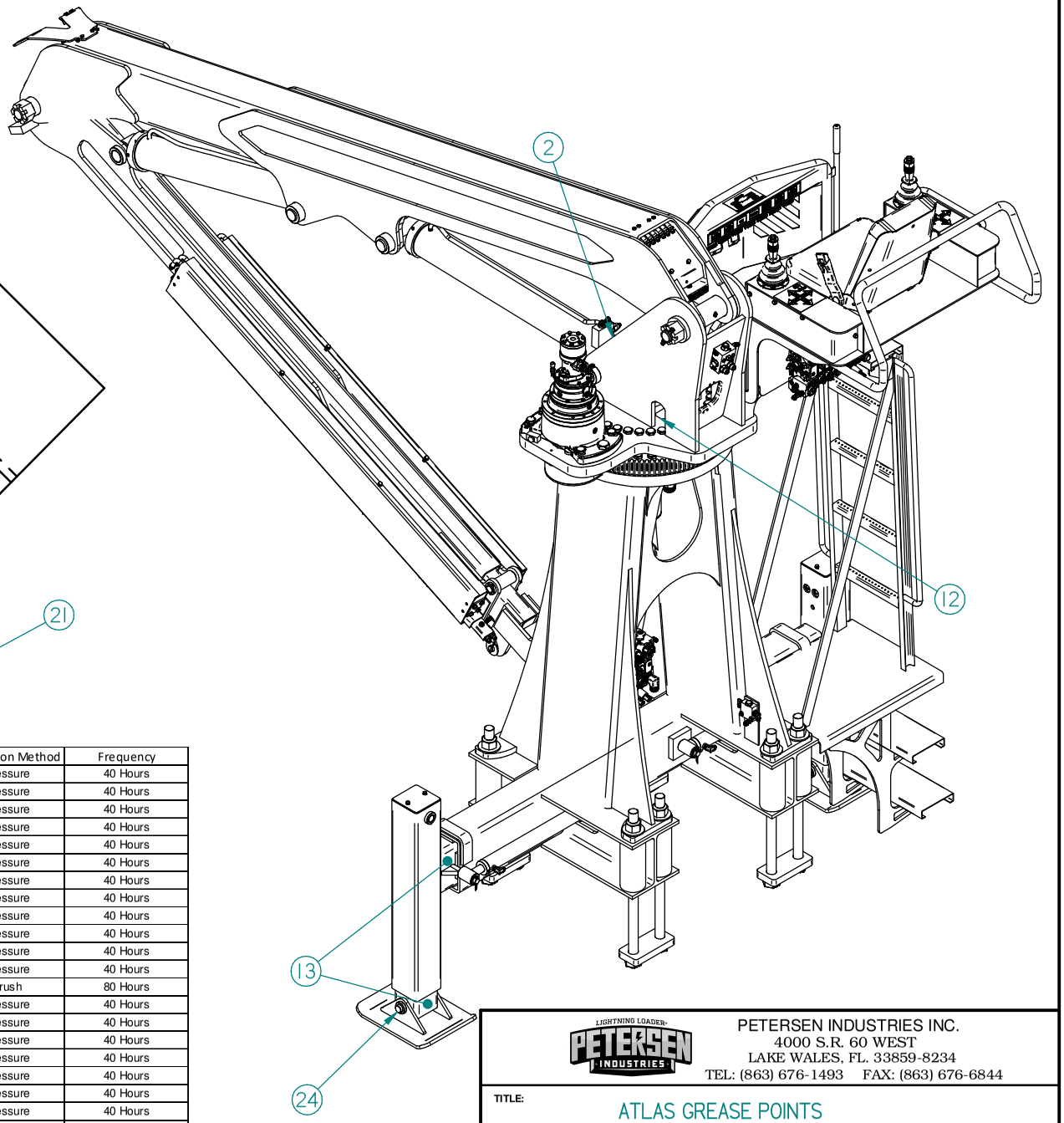
P/N: DE06013

PETERSEN INDUSTRIES INC.
446 US HWY. 27 N.
LAKE WALES,FL.33853
(863) 676 1493 FX (863) 676 6844

| TITLE: LOAD CHART DECAL FOR ATLAS LOADER | | | |
|---|---|---|---|
| CAD NO.: TBD | PART NO.: | | SCALE: 1:1 |
| DRAWN BY: JAC | APPROVED: | DATE: 11/17/2015 | SHEET: 1 OF 1 |




| Point Number | Grease Point Description | Number of Points | Lubricant | Application Method | Frequency |
|---|---|---|---|---|---|
| 1 | Main Boom Pivot | 1 | Grease | Pressure | 40 Hours |
| 2 | Main Boom Lift Cylinder Base End | 1 | Grease | Pressure | 40 Hours |
| 3 | Main Boom Lift Cylinder Rod End | 1 | Grease | Pressure | 40 Hours |
| 4 | Tip Cylinder Base End | 1 | Grease | Pressure | 40 Hours |
| 5 | Tip Boom to Main Boom Pivot | 1 | Grease | Pressure | 40 Hours |
| 6 | Tip Cylinder Rod End | 1 | Grease | Pressure | 40 Hours |
| 7 | Tip Extension Tube | 1 | Grease | Pressure | 40 Hours |
| 8 | Tip Extension Roller | 1 | Grease | Pressure | 40 Hours |
| 9 | Bucket Cylinder Base End | 2 | Grease | Pressure | 40 Hours |
| 10 | Bucket Cylinder Rod End | 2 | Grease | Pressure | 40 Hours |
| 11 | Bucket Jaw Pivot | 2 | Grease | Pressure | 40 Hours |
| 12 | Slewing Bearing | 1 | Grease | Pressure | 40 Hours |
| 13 | Outrigger Inner Tubes | 4 | Grease | Brush | 80 Hours |
| 14 | Bucket Rotator Pin | 1 | Grease | Pressure | 40 Hours |
| 15 | Body, Chassis Pivot | 2 | Grease | Pressure | 40 Hours |
| 16 | Hoist Lower Pivot | 2 | Grease | Pressure | 40 Hours |
| 17 | Hoist Scissors Pivot | 3 | Grease | Pressure | 40 Hours |
| 18 | Hoist Upper Pivot | 2 | Grease | Pressure | 40 Hours |
| 19 | Hoist Cylinder Lower Pivot | 2 | Grease | Pressure | 40 Hours |
| 20 | Hoist Cylinder Upper Pivot | 2 | Grease | Pressure | 40 Hours |
| 21 | Hydraulic Tank | 1 | ISO 32 Hyd. Oil | Fill to Max. Level | 40 Hours |
| 22 | Hydraulic Filter | 1 | OT03008 | Replace | 1000 Hours |
| 23 | Hydraulic Tank Breather | 1 | OT05008 | Replace | 1000 Hours |
| 24 | Outrigger Foot | 2 | Grease | Pressure | 40 Hours |

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS GREASE POINTS

PART NUMBER: 01 00 00 032 0

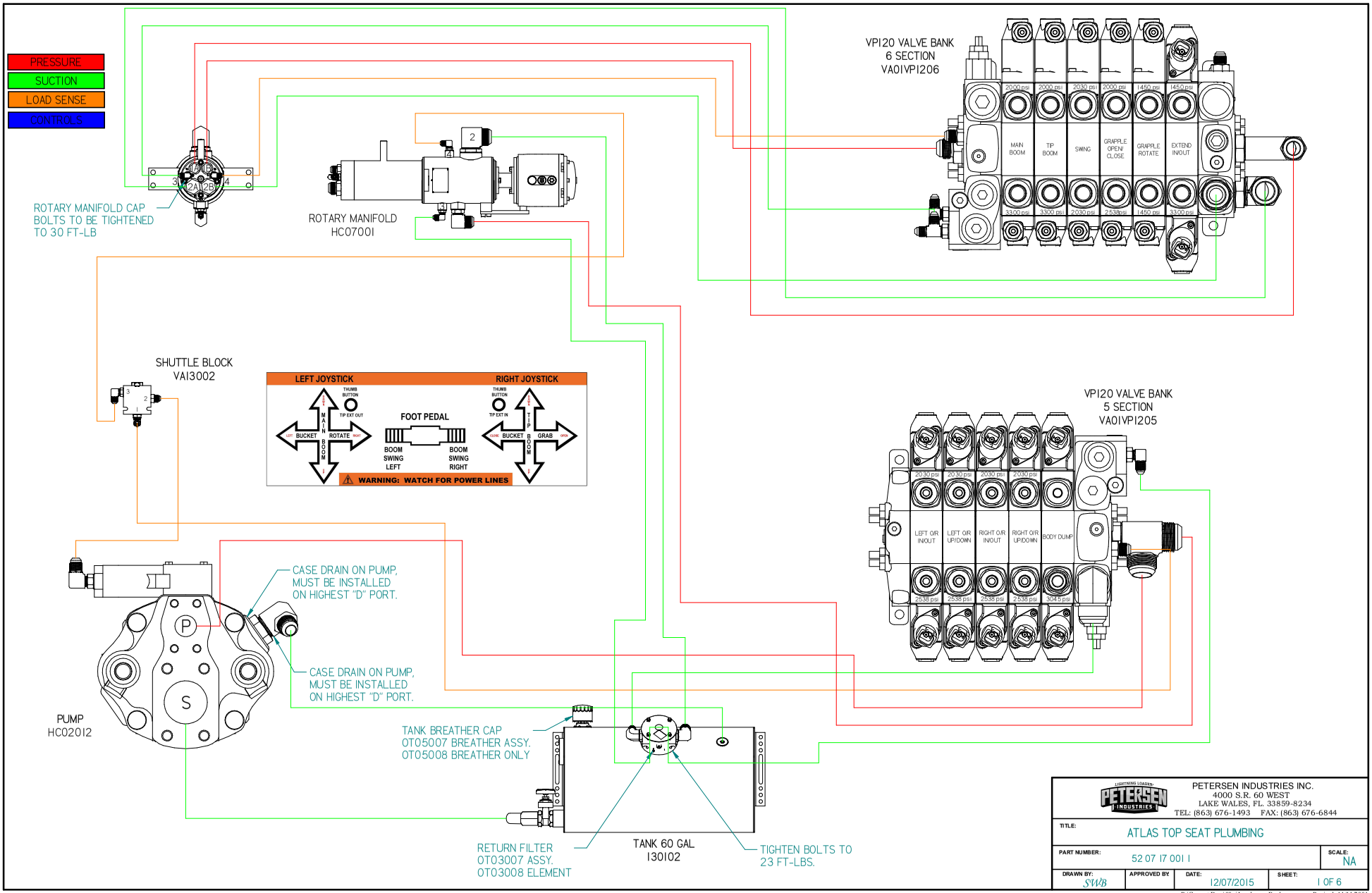
SCALE: 1:20

DRAWN BY: BRB

APPROVED BY:

DATE: 4/20/2016

SHEET: 1 OF 1

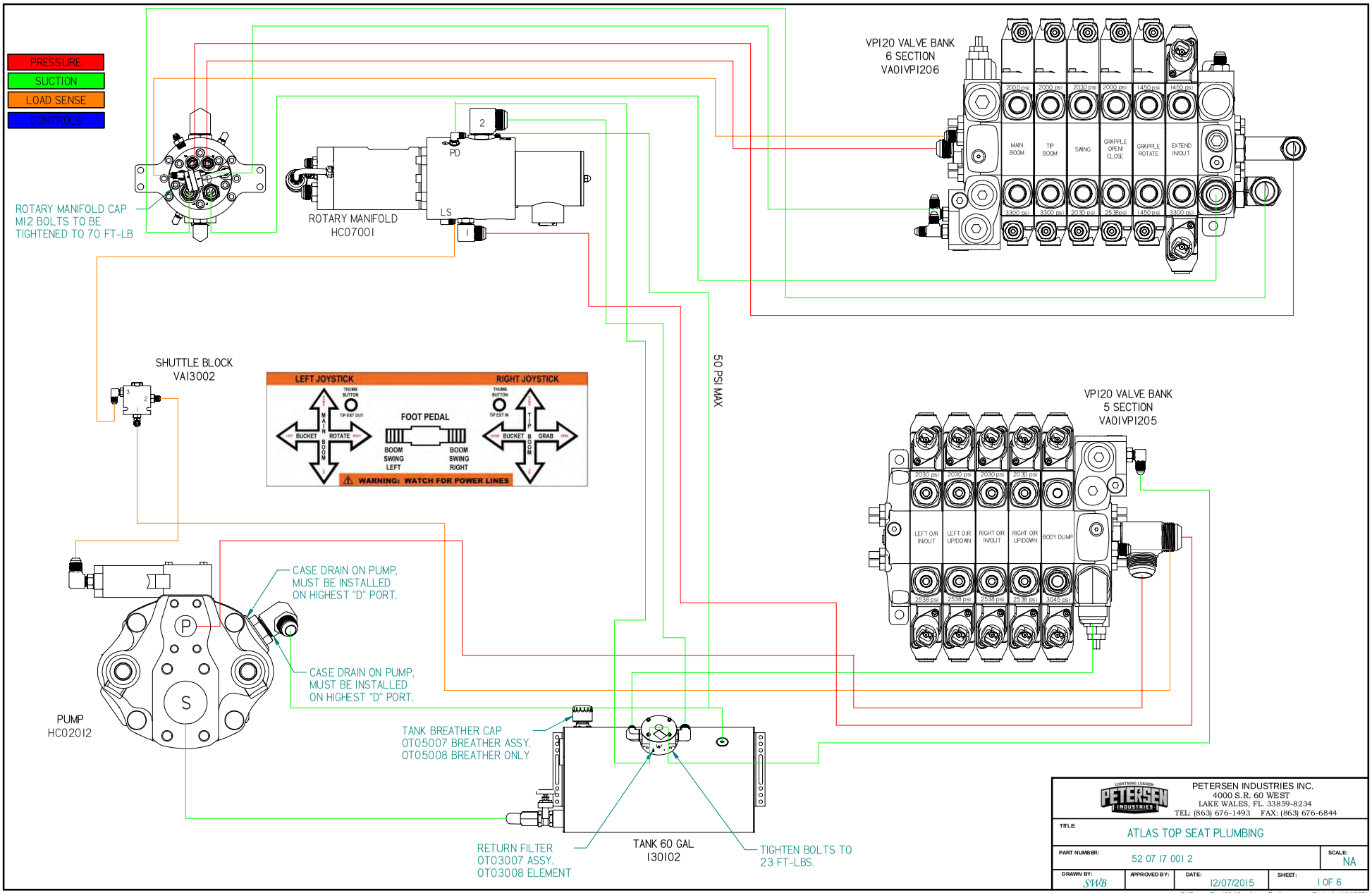



PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

| | | | |
|---|---|---|---|
| TITLE: ATLAS TOP SEAT PLUMBING | | | |
| PART NUMBER: 52 07 17 001 1 | | | SCALE: NA |
| DRAWN BY: SWB | APPROVED BY: | DATE: 12/07/2015 | SHEET: 1 OF 6 |

Last Printed: 5/22/2017 by jczerepka

R:\Current Dwg\00pi Landscape Border Revised: 11/11/2004




PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS TOP SEAT PLUMBING

PART NUMBER: 52 07 17 001 2

SCALE: NA

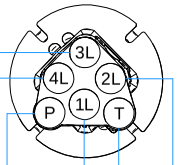
DRAWN BY: SWB

APPROVED BY:

DATE: 12/07/2015

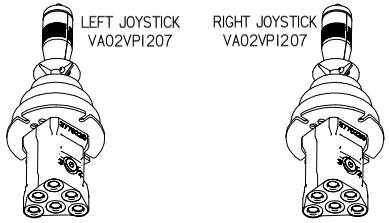
SHEET: 1 OF 6

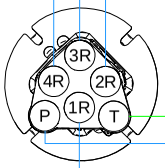
NOTE: LEFT AND RIGHT ARE AS IF YOU ARE SITTING IN THE OPERATORS SEAT, IT IS IMPORTANT THAT JOYSTICKS ARE ORIENTED AS SHOWN IN THE DIAGRAM WITH THE PORT 3 FACING THE REAR OF THE SEAT.



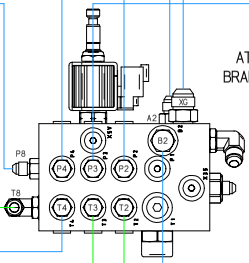

LEFT JOYSTICK
VA02VPI207

RIGHT JOYSTICK
VA02VPI207

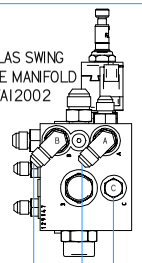




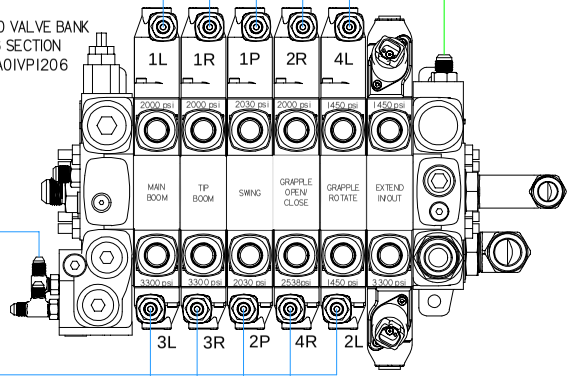

PRESSURE
SUCTION
LOAD SENSE
CONTROLS

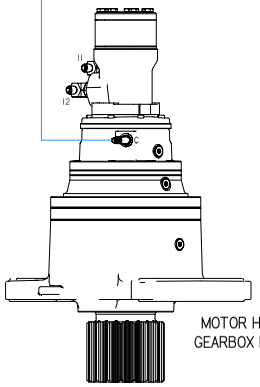


ATLAS SWING
BRAKE MANIFOLD
VAI2002



VPI20 VALVE BANK
6 SECTION
VA0IVPI206

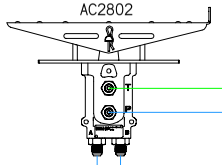


MOTOR HC01006
GEARBOX HC01007

TO
ACCUMULATOR
HOSE

FOOT PEDAL SWING
CONTROLLER
AC2802



PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS TOP SEAT PLUMBING

PART NUMBER: 52 07 17 001 2

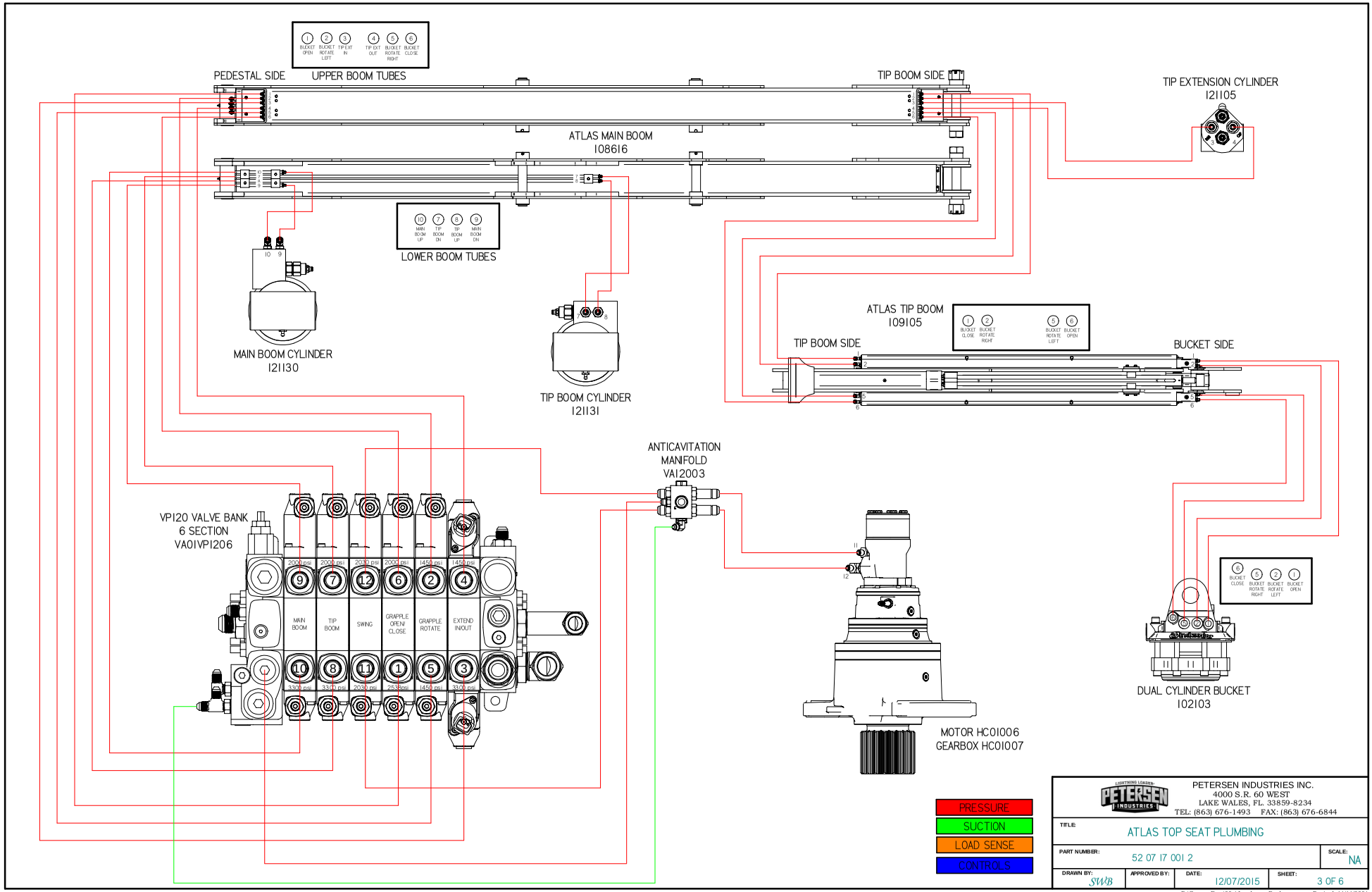
SCALE: NA

DRAWN BY: SWB

APPROVED BY:

DATE: 12/07/2015

SHEET: 2 OF 6




PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS TOP SEAT PLUMBING

PART NUMBER: 52 07 17 001 2

SCALE: NA

DRAWN BY: SWB

APPROVED BY:

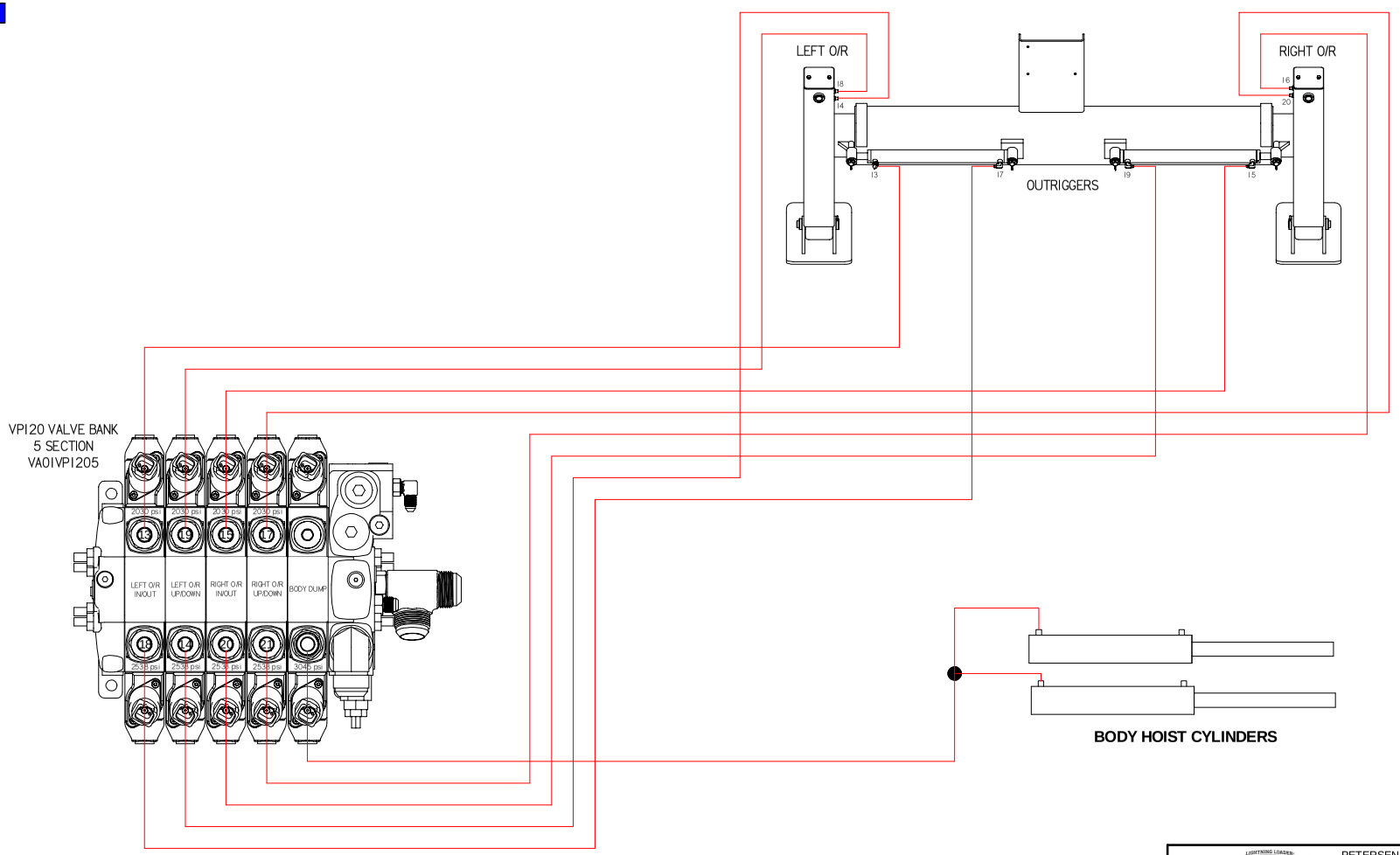
DATE: 12/07/2015

SHEET: 3 OF 6

Last Printed 7/9/2017 by sburchfield

R:\Current Dwg\00pi Landscape Border Revised: 11/11/2004

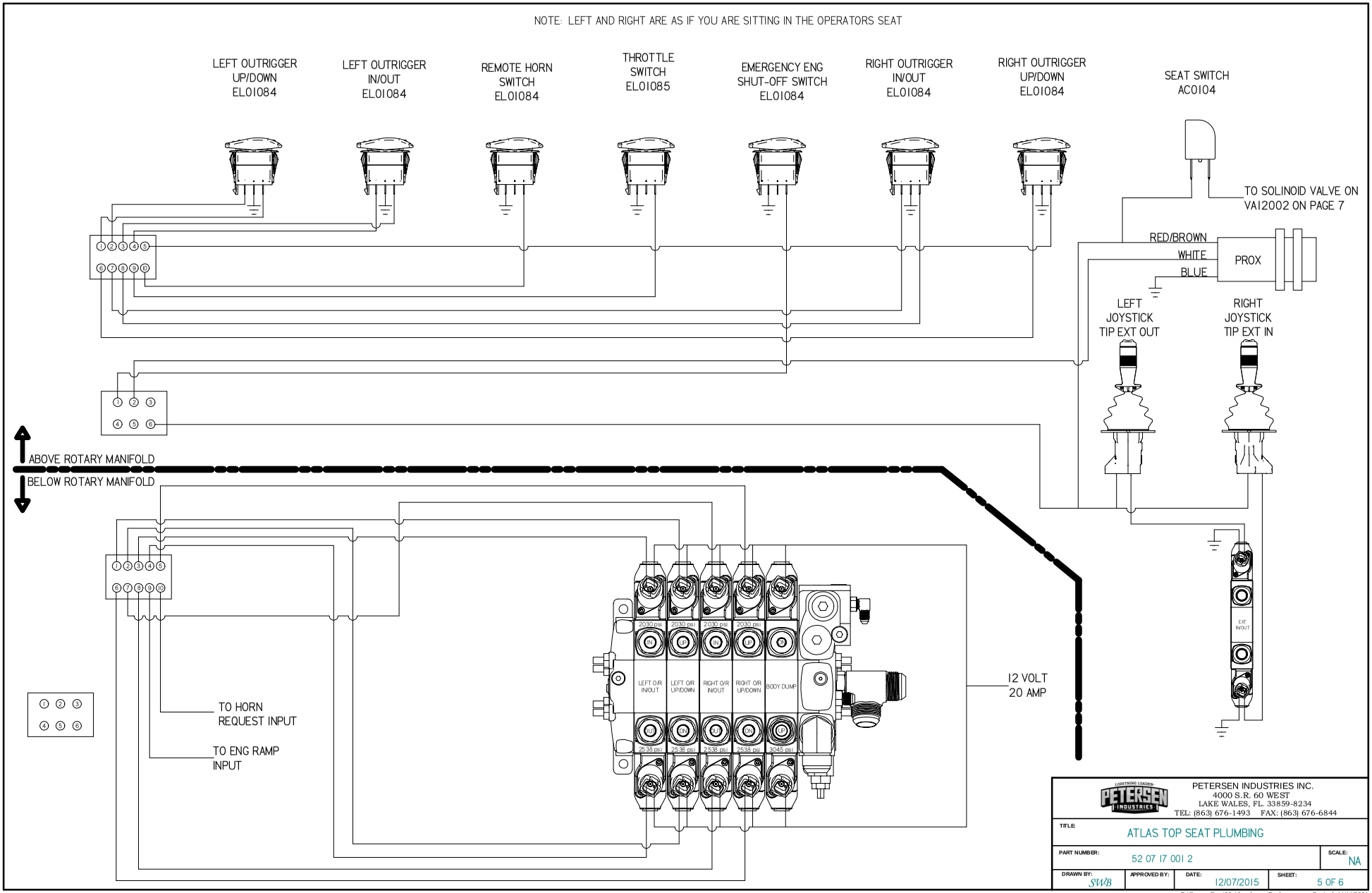
PRESSURE
SUCTION
LOAD SENSE
CONTROLS




PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

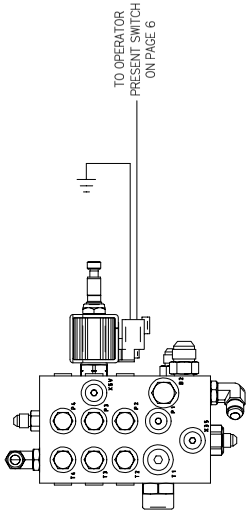
| | | | | |
|---|---|---|---|---|
| TITLE: ATLAS TOP SEAT PLUMBING | | | | |
| PART NUMBER: 52 07 17 001 2 | | | | SCALE: NA |
| DRAWN BY: SWB | APPROVED BY: | DATE: 12/07/2015 | SHEET: 4 OF 6 | |

NOTE: LEFT AND RIGHT ARE AS IF YOU ARE SITTING IN THE OPERATORS SEAT




PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

| | | | |
|---|---|---|---|
| TITLE: ATLAS TOP SEAT PLUMBING | | | |
| PART NUMBER: 52 07 17 001 2 | | | SCALE: NA |
| DRAWN BY: SWB | APPROVED BY: | DATE: 12/07/2015 | SHEET: 5 OF 6 |



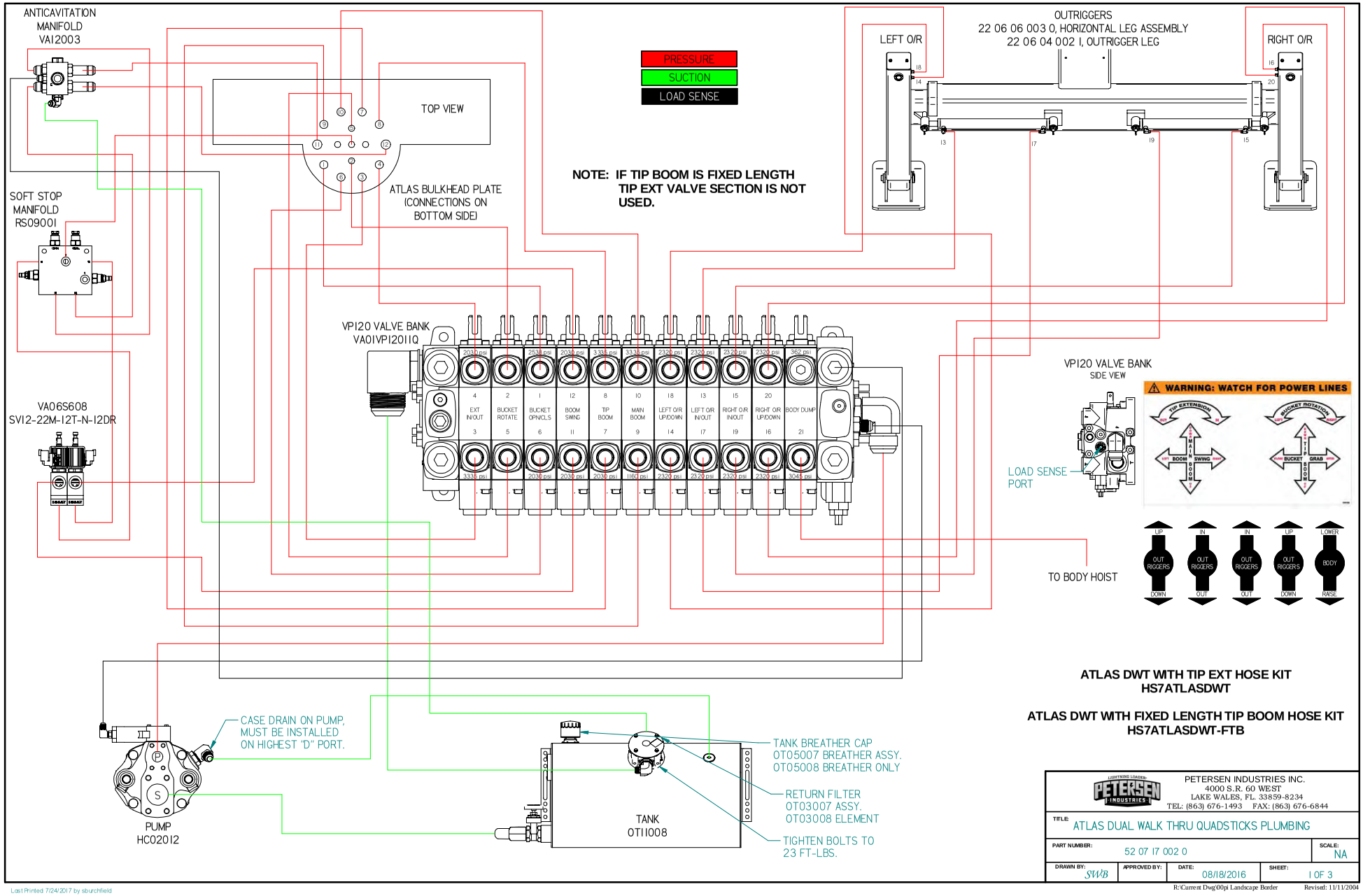

| NO. OF CIRCUITS | WIRE SIZE, AWG | MAX LOAD (AMPS) | WIRE TYPE | WIRE COLOR | FUNCTION |
|---|---|---|---|---|---|
| 1 | 16 | 5 | GXL | YELLOW | LEFT OR UP |
| 2 | 16 | 5 | GXL | GREEN | LEFT OR DOWN |
| 3 | 16 | 5 | GXL | BLACK | LEFT OR IN |
| 4 | 16 | 5 | GXL | BLUE | LEFT OR OUT |
| 5 | 16 | 5 | GXL | PINK | RIGHT OR UP |
| 6 | 16 | 5 | GXL | VIOLET | RIGHT OR DOWN |
| 7 | 16 | 5 | GXL | BROWN | RIGHT OR IN |
| 8 | 16 | 5 | GXL | ORANGE | RIGHT OR OUT |
| 9 | 16 | 5 | GXL | LIGHT BLUE | BODY DUMP |
| 10 | 16 | 5 | GXL | TAN | RAMP UP |
| 11 | 16 | 5 | GXL | WHITE | HORN |
| 12 | 16 | 10 | GXL | GRAY | ENG KILL |
| 13 | 16 | 10 | GXL | | SPARE |
| 14 | 16 | 10 | GXL | | SPARE |
| 15 | 16 | 10 | GXL | | SPARE |
| 16 | 16 | 10 | GXL | | SPARE |
| 17 | 16 | 10 | GXL | | SPARE |
| 18 | 16 | 10 | GXL | | SPARE |
| 19 | 16 | 10 | GXL | | SPARE |
| 20 | 16 | 10 | GXL | | SPARE |

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS TOP SEAT PLUMBING

PART NUMBER: 52 07 17 001 2 | SCALE: NA

DRAWN BY: SMB | APPROVED BY: | DATE: 12/07/2015 | SHEET: 6 OF 6




**ATLAS DWT WITH TIP EXT HOSE KIT**
**HS7ATLASDWT**

**ATLAS DWT WITH FIXED LENGTH TIP BOOM HOSE KIT**
**HS7ATLASDWT-FTB**

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS DUAL WALK THRU QUADSTICKS PLUMBING

| PART NUMBER: | SCALE: |
|---|---|
| 52 07 17 002 0 | NA |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 08/18/2016 | 1 OF 3 |

**NOTE: IF TIP BOOM IS FIXED LENGTH DO NOT INSTALL SMALL BULKHEAD PLATES (107371). RETURN PLATES TO STOCK.**

BIG BULKHEAD
107370

SMALL BULKHEAD
107371

THESE BIG AND SMALL BULKHEAD PLATES ARE STANDING ON THE WALK THRU LOOKING AT BACK OF HEAD

ATLAS TIP BOOM
02 04 08 001 0

1 BUCKET CLOSE · 2 BUCKET ROTATE RIGHT · 5 BUCKET ROTATE LEFT · 6 BUCKET OPEN

TIP BOOM SIDE

BUCKET SIDE

TIP EXTENSION CYLINDER
121105

6 BUCKET OPEN · 5 BUCKET ROTATE LEFT · 2 BUCKET ROTATE RIGHT · 1 BUCKET CLOSE

DUAL CYLINDER BUCKET
102103

1 BUCKET CLOSE · 2 BUCKET ROTATE RIGHT · 3 TIP EXT IN · 4 TIP EXT OUT · 5 BUCKET ROTATE LEFT · 6 BUCKET OPEN

UPPER BOOM TUBES

**NOTE: IF TIP BOOM IS FIXED LENGTH HOSES 3 AND 4 WILL NOT BE USED.**

PEDESTAL SIDE

ATLAS MAIN BOOM
02 03 18 001 0

TIP BOOM SIDE

10 MAIN BOOM UP · 7 TIP BOOM DN · 8 TIP BOOM UP · 9 MAIN BOOM DN

LOWER BOOM TUBES

THIS IS THE BOTTOM OF THE MAIN BOOM LOOKING UP

BIG BULKHEAD
107370

SMALL BULKHEAD
107371

THESE BIG AND SMALL BULKHEAD PLATES ARE LOOKING INSIDE HEAD

MAIN BOOM CYLINDER
121130

TIP BOOM CYLINDER
121131

MOTOR HC01006
GEARBOX HC01007

TOP VIEW

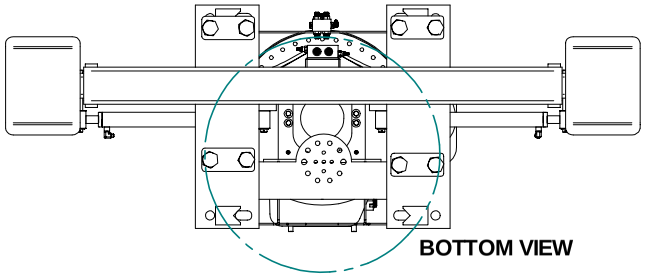
ATLAS BULKHEAD PLATE (CONNECTIONS ON TOP SIDE)

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS DUAL WALK THRU QUADSTICKS PLUMBING

| PART NUMBER: | SCALE: |
|---|---|
| 52 07 17 002 0 | NA |

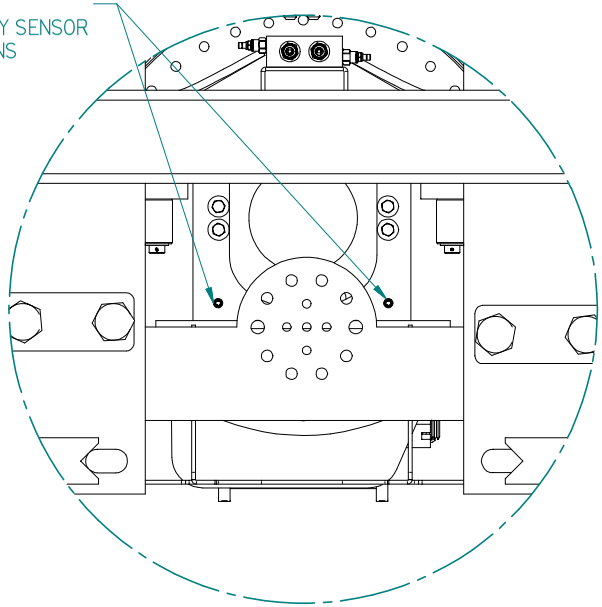
| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 08/18/2016 | 2 OF 3 |



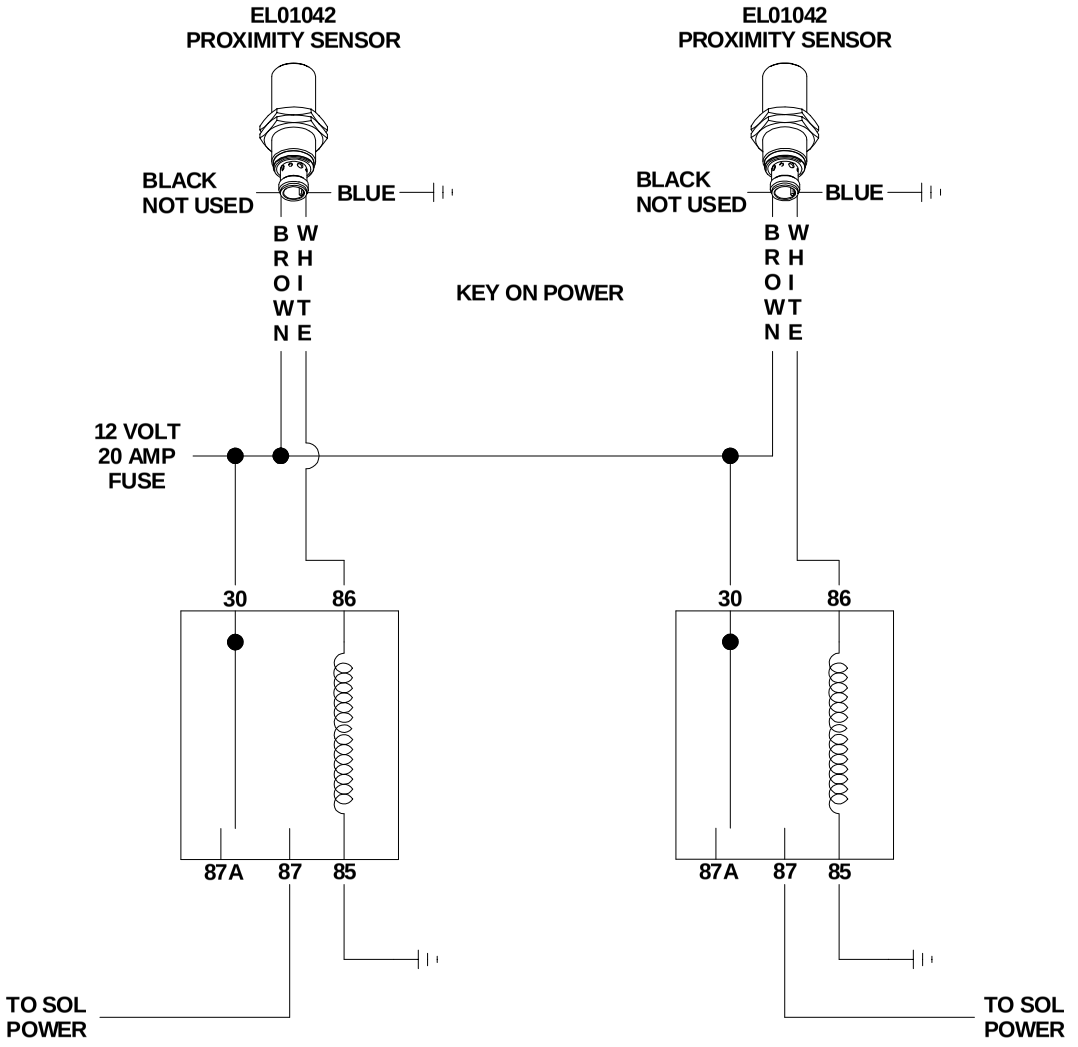
BOTTOM VIEW

A

EL01064
PROXIMITY SENSOR
LOCATIONS



DETAIL A




PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS DUAL WALK THRU QUADSTICKS PLUMBING

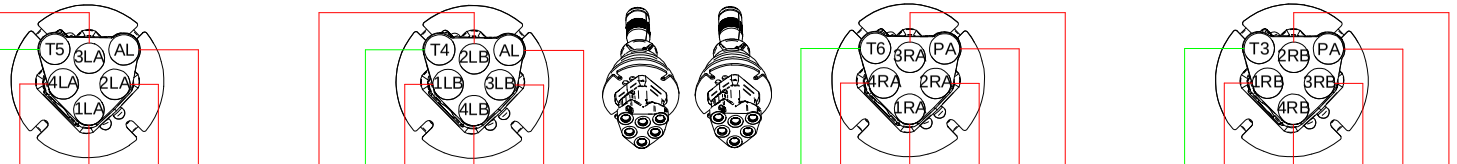
| PART NUMBER: | SCALE: |
|---|---|
| 52 07 17 002 0 | NA |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 08/18/2016 | 3 OF 3 |

PILOT CONTROL DIAGRAM

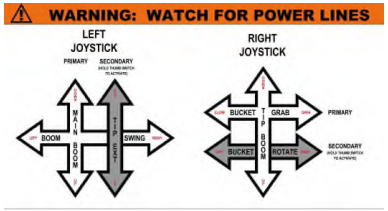
LEFT JOYSTICKS
VA02VP1207

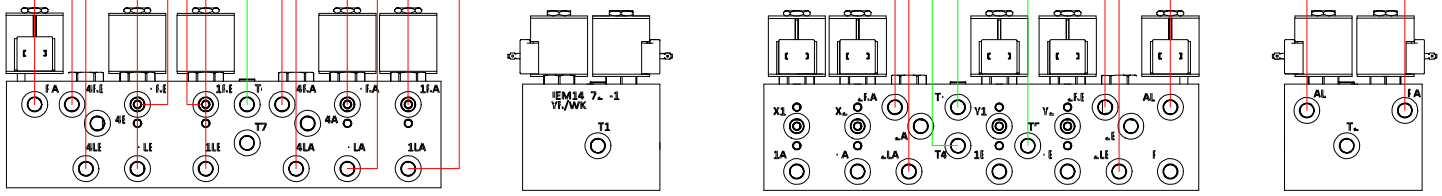
RIGHTJOYSTICKS
VA02VP1207




*** JOYSTICK PLUMBING IS SHOWN LOOKING AT BOTTOM OF JOYSTICK.**

***JOYSTICK MUST BE INSTALLED WITH FLAT SIDE OF JOYSTICK FACING OPERATOR ON DUAL WALK THRU**




**PILOT HOSE KIT**
**HS7ATLASDWT/PIL**

**ATLAS DWT WITH TIP EXT HOSE KIT**
**HS7ATLASDWT**

**ATLAS DWT WITH FIXED LENGTH TIP BOOM HOSE KIT**
**HS7ATLASDWT-FTB**

**SHUTTLE MANIFOLD**
**VA13001**

**T, X1, X2, Y1, Y2 CAN BE USED AS TANK PORTS ON SHUTTLE MANIFOLD. ANY UNUSED PORTS SHOULD BE PLUGGED.**


PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


TITLE: ATLAS DUAL WALK THRU PILOT PLUMBING

PART NUMBER: 52 07 17 003 0

SCALE: NA

DRAWN BY: SWB

APPROVED BY:

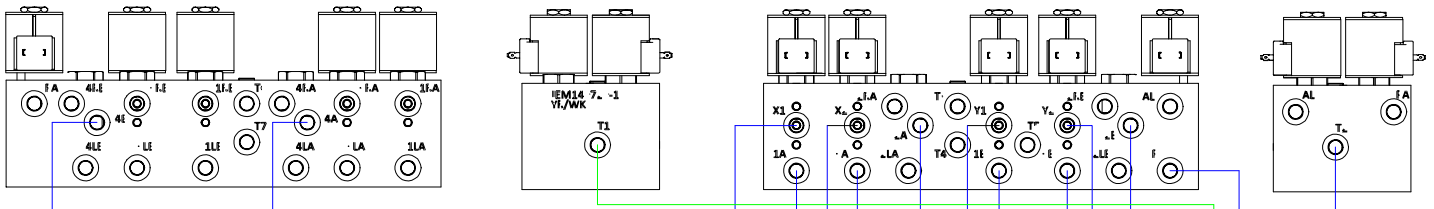
DATE: 01/30/2017

SHEET: 1 OF 8

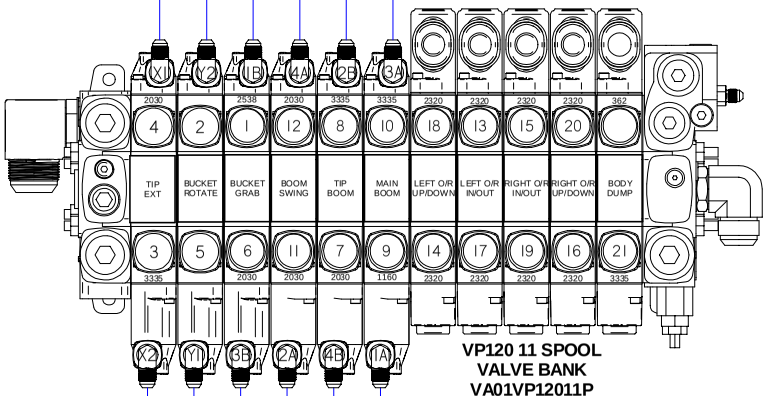
**PILOT CONTROL DIAGRAM**

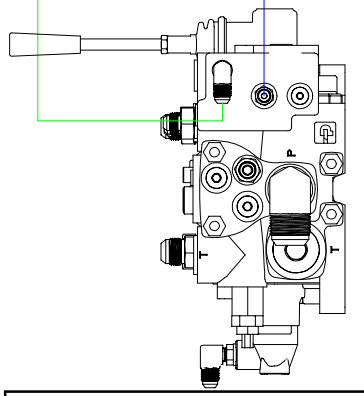
PRESSURE
SUCTION
LOAD SENSE
CONTROLS

**SHUTTLE MANIFOLD VA13001**



**PLUMB DIRECTLY TO TANK. DO NOT ROUTE THRU RETURN FILTER.**



**VP120 11 SPOOL VALVE BANK VA01VP12011P SEE 32 07 17 010 0 FOR FITTING LOCATIONS**

**NOTE: IF TIP BOOM IS FIXED LENGTH TIP EXT VALVE SECTION IS NOT USED.**


PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


TITLE: ATLAS DUAL WALK THRU PILOT PLUMBING

PART NUMBER: 52 07 17 003 0

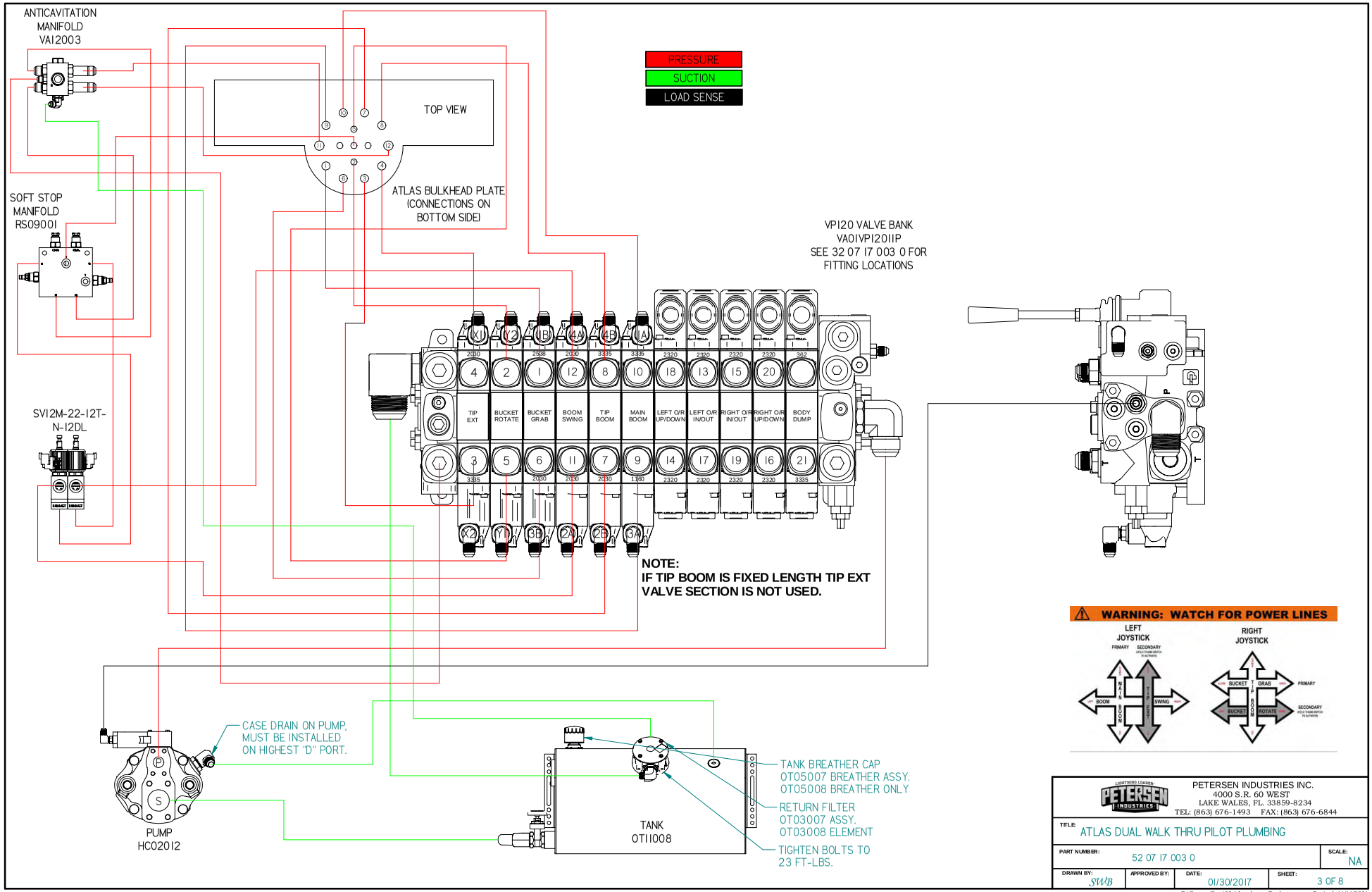
SCALE: NA

DRAWN BY: SWB

APPROVED BY:

DATE: 01/30/2017

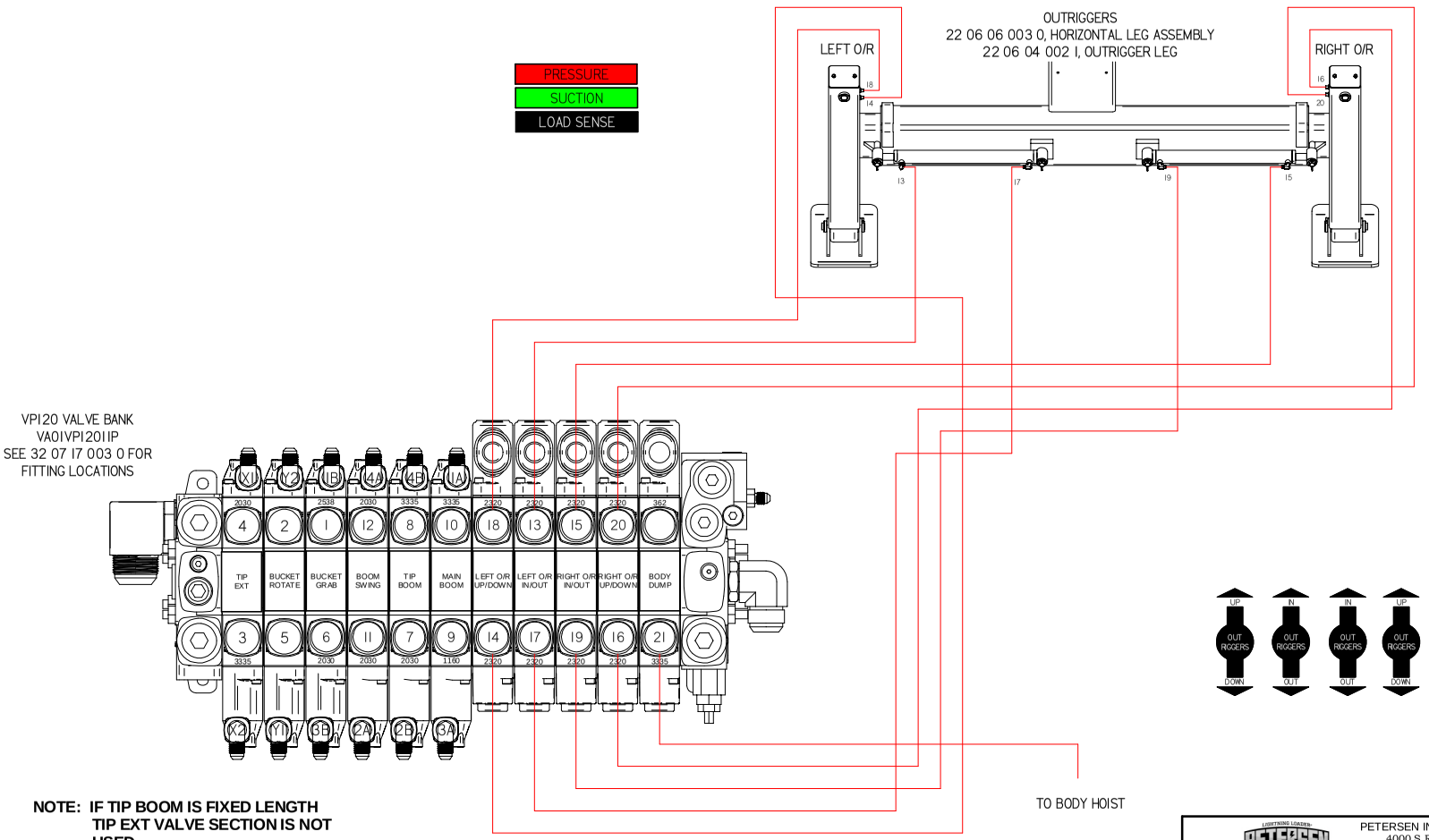
SHEET: 2 OF 8




PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS DUAL WALK THRU PILOT PLUMBING

| PART NUMBER | SCALE | DRAWN BY | APPROVED BY | DATE | SHEET |
|---|---|---|---|---|---|
| 52 07 17 003 0 | NA | SWB | | 01/30/2017 | 3 OF 8 |




**NOTE: IF TIP BOOM IS FIXED LENGTH TIP EXT VALVE SECTION IS NOT USED.**


PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


TITLE: ATLAS DUAL WALK THRU PILOT PLUMBING

| PART NUMBER: | SCALE: |
|---|---|
| 52 07 17 003 0 | NA |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 01/30/2017 | 4 OF 8 |

**NOTE: IF TIP BOOM IS FIXED LENGTH DO NOT INSTALL SMALL BULKHEAD PLATES (107371). RETURN PLATES TO STOCK.**

BIG BULKHEAD
107370

SMALL BULKHEAD
107371

THESE BIG AND SMALL BULKHEAD PLATES ARE STANDING ON THE WALK THRU LOOKING AT BACK OF HEAD

ATLAS TIP BOOM
02 04 08 001 0

1 BUCKET CLOSE · 2 BUCKET ROTATE RIGHT · 5 BUCKET ROTATE LEFT · 6 BUCKET OPEN

TIP BOOM SIDE

BUCKET SIDE

DUAL CYLINDER BUCKET
102103

1 BUCKET CLOSE · 2 BUCKET ROTATE RIGHT · 3 TIP EXT IN · 4 TIP EXT OUT · 5 BUCKET ROTATE LEFT · 6 BUCKET OPEN

UPPER BOOM TUBES

PEDESTAL SIDE

ATLAS MAIN BOOM
02 03 18 001 0

TIP BOOM SIDE

TIP EXTENSION CYLINDER
121105

10 MAIN BOOM UP · 7 TIP BOOM DN · 8 TIP BOOM UP · 9 MAIN BOOM DN

LOWER BOOM TUBES

THIS IS THE BOTTOM OF THE MAIN BOOM LOOKING UP

BIG BULKHEAD
107370

SMALL BULKHEAD
107371

THESE BIG AND SMALL BULKHEAD PLATES ARE LOOKING INSIDE HEAD

MAIN BOOM CYLINDER
121130

TIP BOOM CYLINDER
121131

MOTOR HC01008
GEARBOX HC01007

TOP VIEW

ATLAS BULKHEAD PLATE (CONNECTIONS ON TOP SIDE)

**NOTE: IF TIP BOOM IS FIXED LENGTH HOSES 3 AND 4 WILL NOT BE USED.**


PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


TITLE: ATLAS DUAL WALK THRU PILOT PLUMBING

PART NUMBER: 52 07 17 003 0

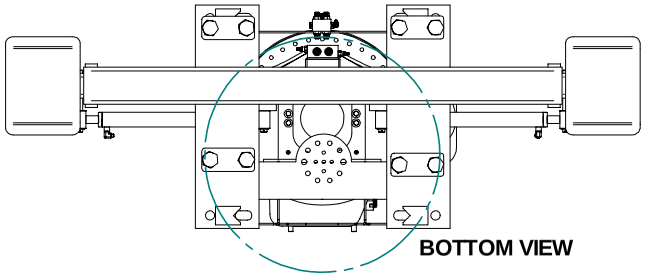
SCALE: NA

DRAWN BY: SWB

APPROVED BY:

DATE: 01/30/2017

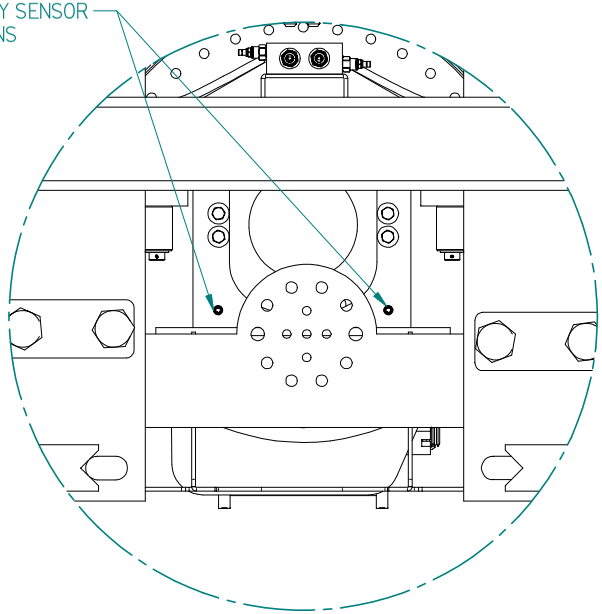
SHEET: 5 OF 8



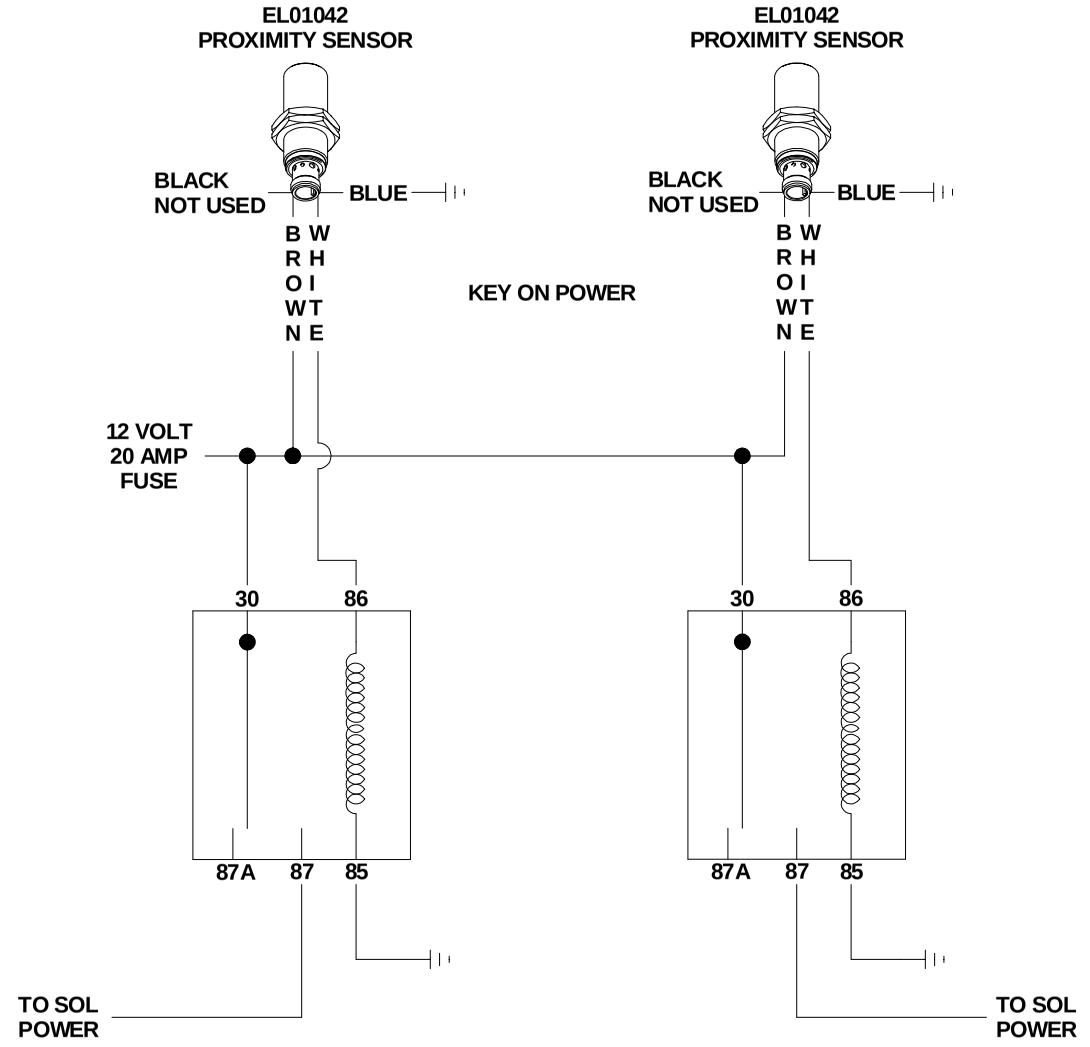
BOTTOM VIEW

A

PROXIMITY SENSOR LOCATIONS



DETAIL A



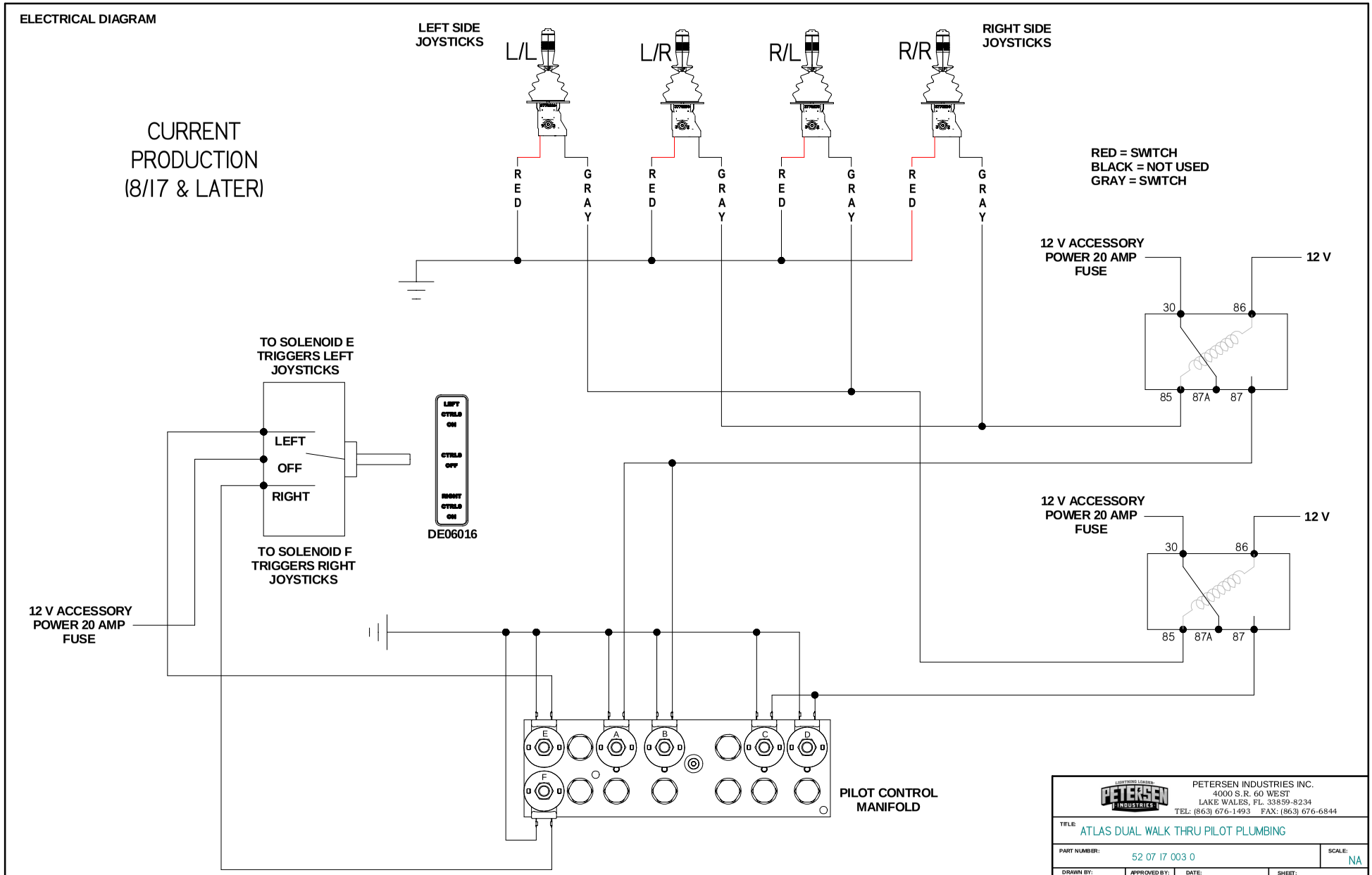

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS DUAL WALK THRU PILOT PLUMBING

| PART NUMBER: | SCALE: |
|---|---|
| 52 07 17 003 0 | NA |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 01/30/2017 | 6 OF 8 |

ELECTRICAL DIAGRAM

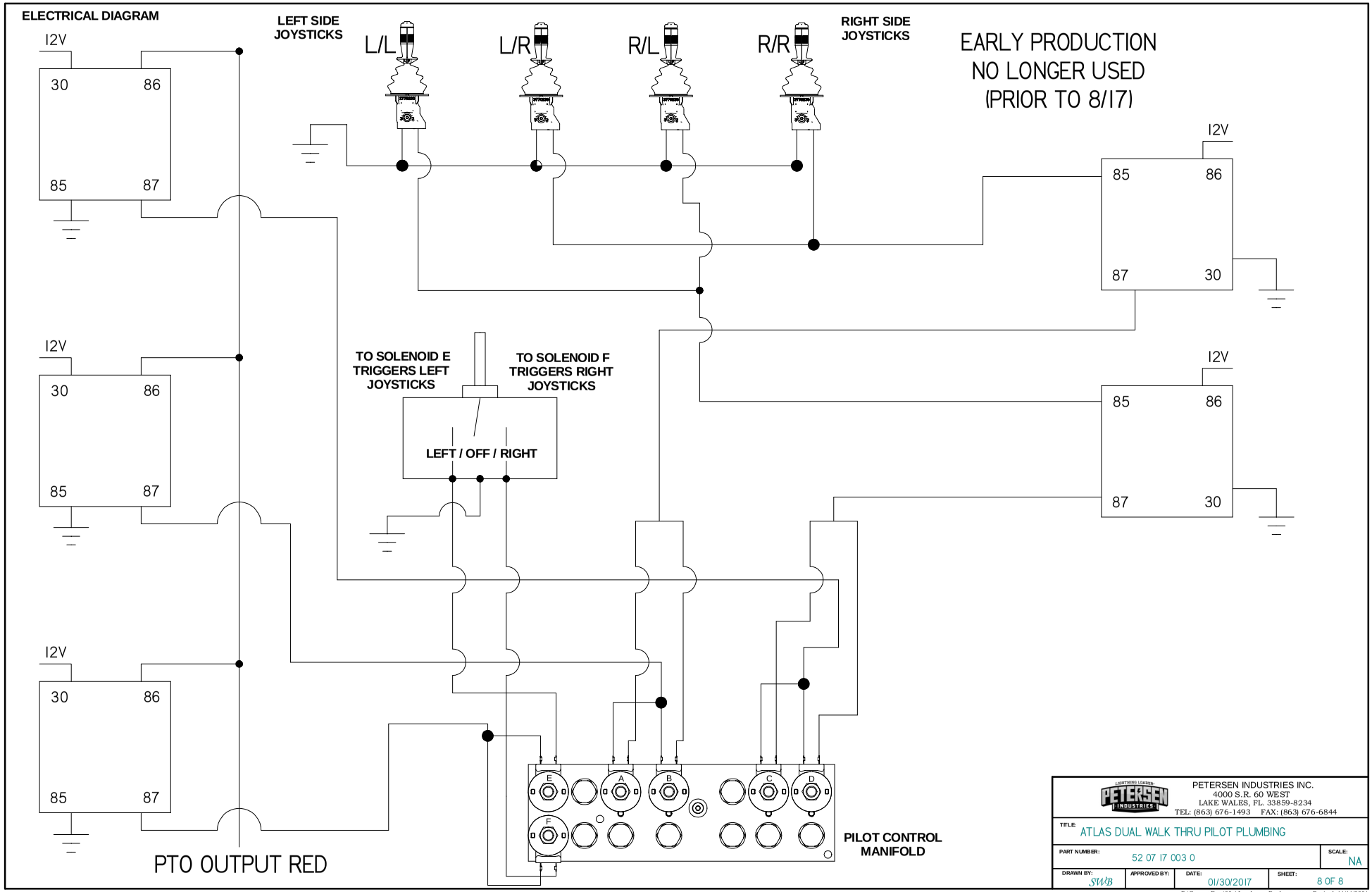



PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS DUAL WALK THRU PILOT PLUMBING

| PART NUMBER | SCALE |
|---|---|
| 52 07 17 003 0 | NA |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 01/30/2017 | 7 OF 8 |




PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

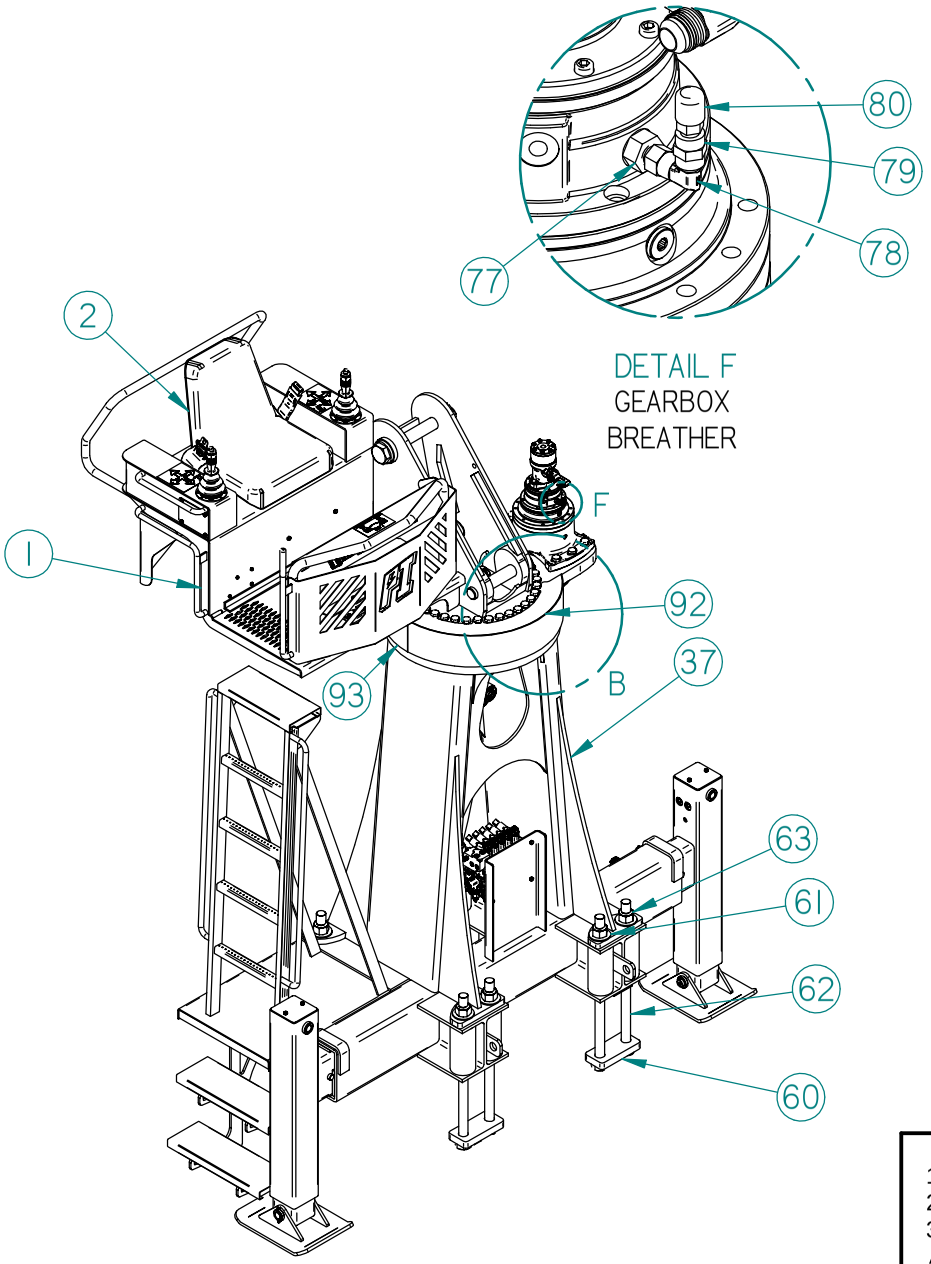
TITLE: ATLAS DUAL WALK THRU PILOT PLUMBING

| PART NUMBER: | SCALE: |
|---|---|
| 52 07 17 003 0 | NA |

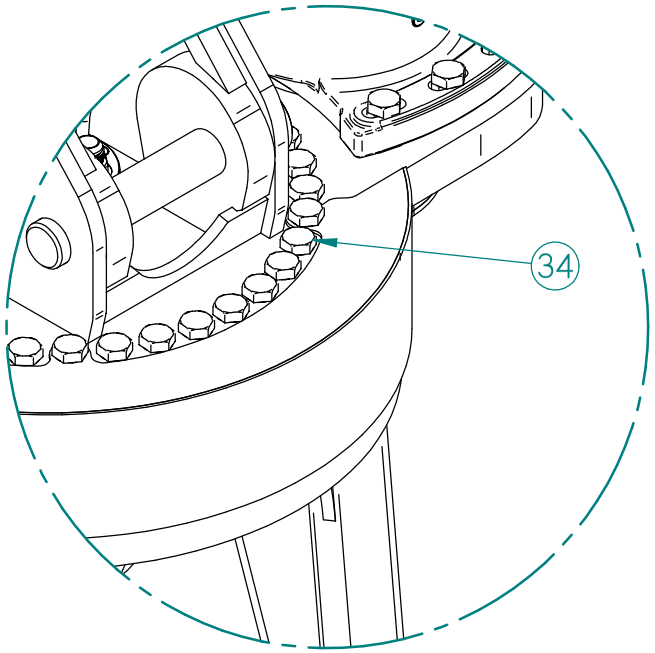
| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 01/30/2017 | 8 OF 8 |

| REV. | DESCRIPTION | DATE | BY |
|---|---|---|---|
| 3 | CUSTOMER REQUESTED CHANGES TO FLOOR, LADDER, ETC | 04/07/17 | SWB |

010 ASSEMBLY




ATLAS BEARING HOSE KIT
HS7ATLASBRGGREA




DETAIL B

*SLEWING BEARING BOLTS TO BE TORQUED TO 282 FT-LB

*GEARBOX BOLTS TO BE TORQUED TO:
1" BOLTS - 480 FT-LB
3/4" BOLTS - 282 FT-LB

**TOLERANCES**

| | |
|---|---|
| 1 DEC. | ± 0.100 |
| 2 DEC. | ± 0.050 |
| 3 DEC. | ± 0.010 |
| ANGLE: | ± 1.000° |
| FRACTION: | ± 1/32" |
| DIM. UNITS: | INCHES |
| SURFACE FINISH: | 125/32 |

*UNLESS OTHERWISE SPECIFIED*

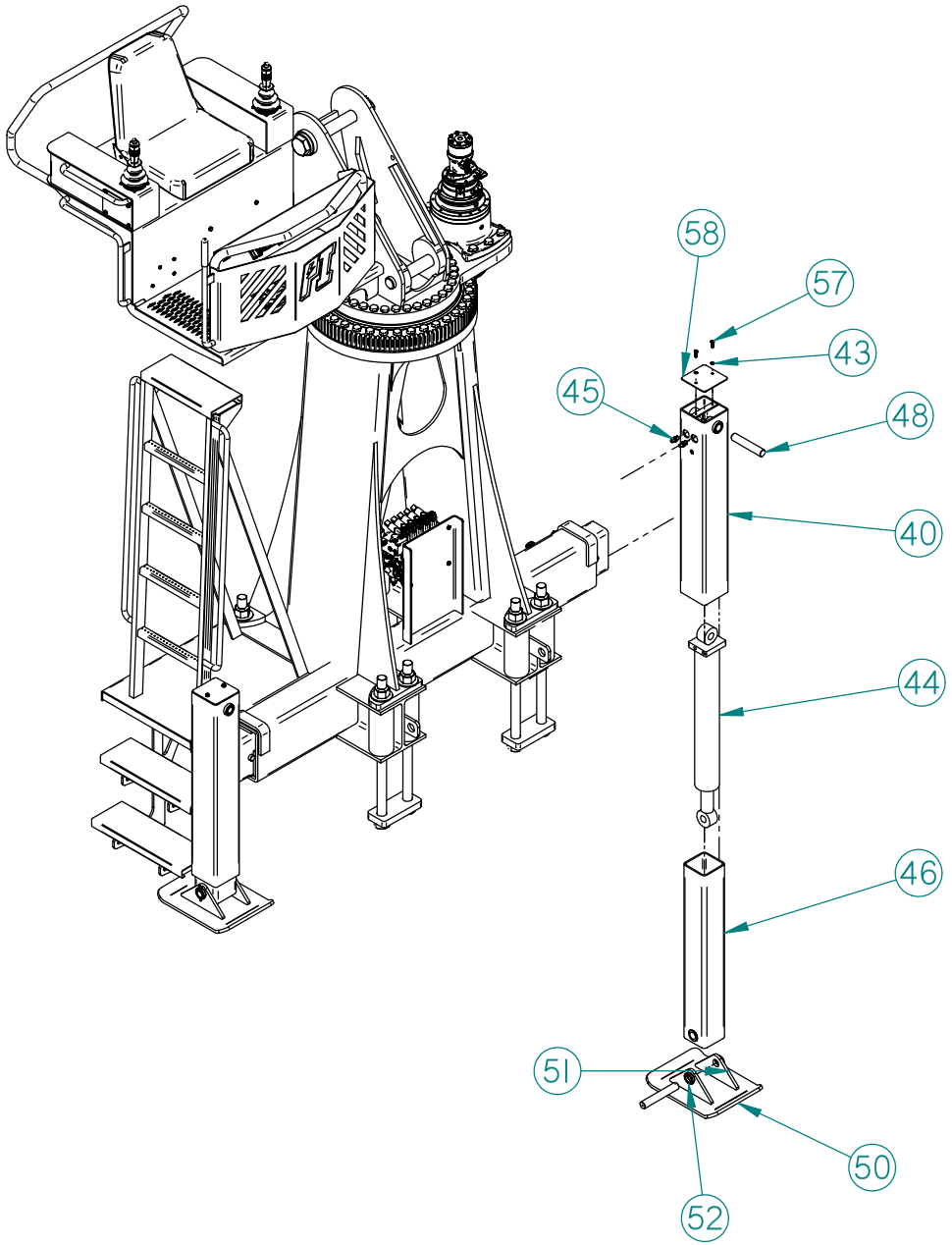
DEC. = DECIMAL PLACE(S)

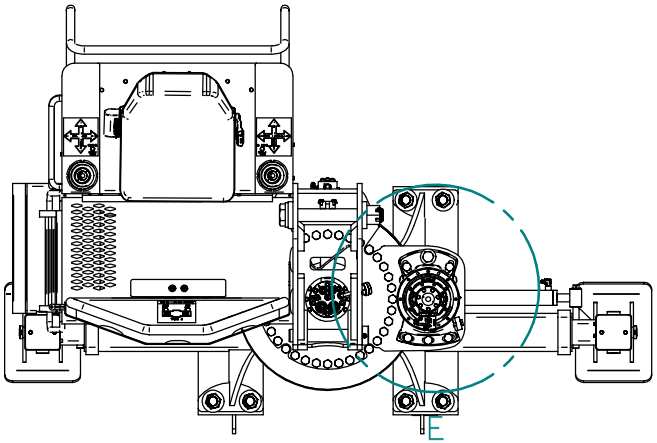

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

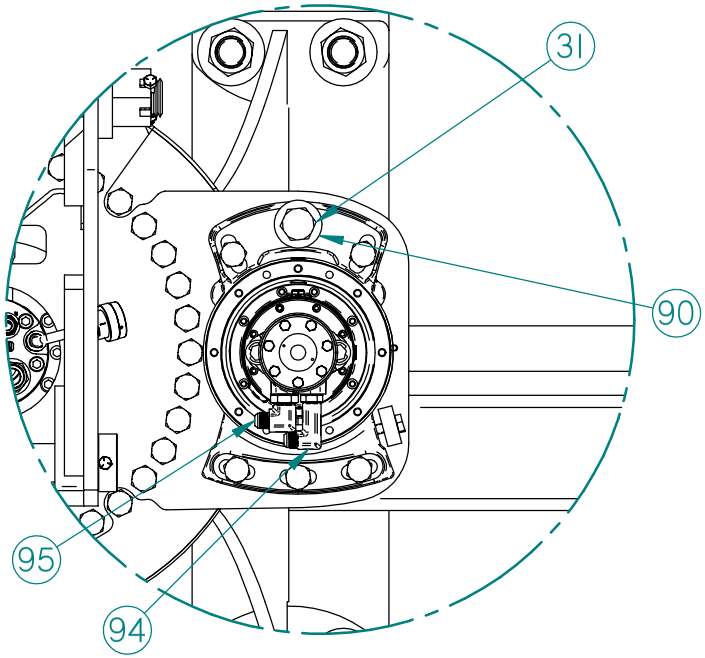

TITLE: ATLAS HEAD AND PEDESTAL ASSEMBLY

| PART NUMBER: | SCALE: |
|---|---|
| 02 02 18 001 3 / 106050 | 1:30 |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 1/19/2015 | 1 OF 9 |



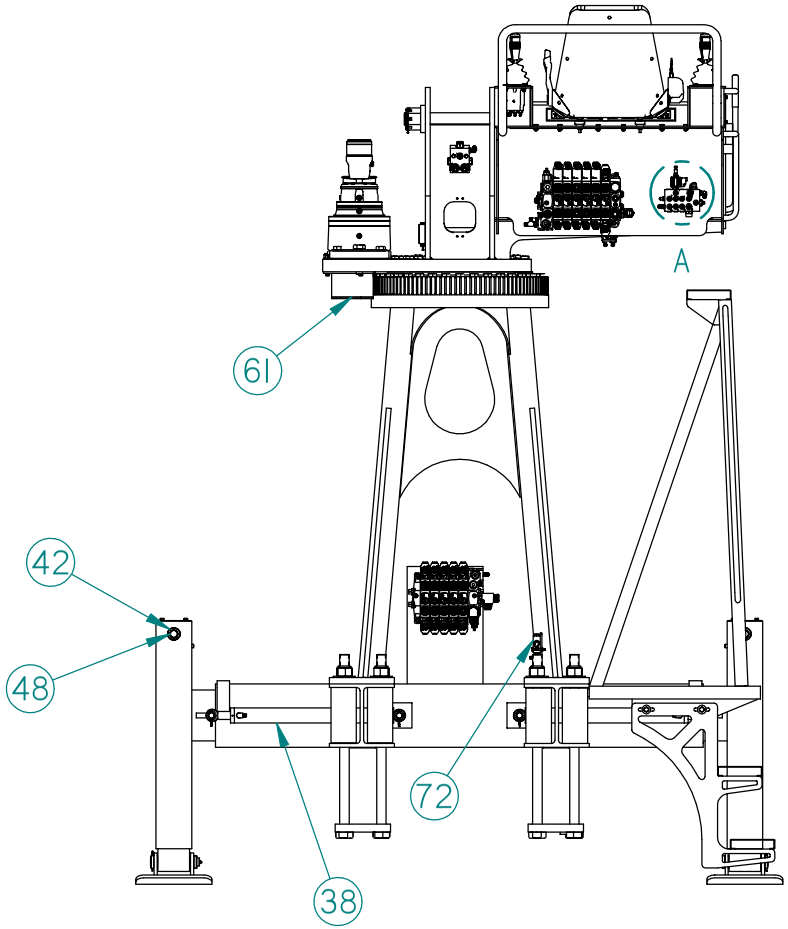

DETAIL E

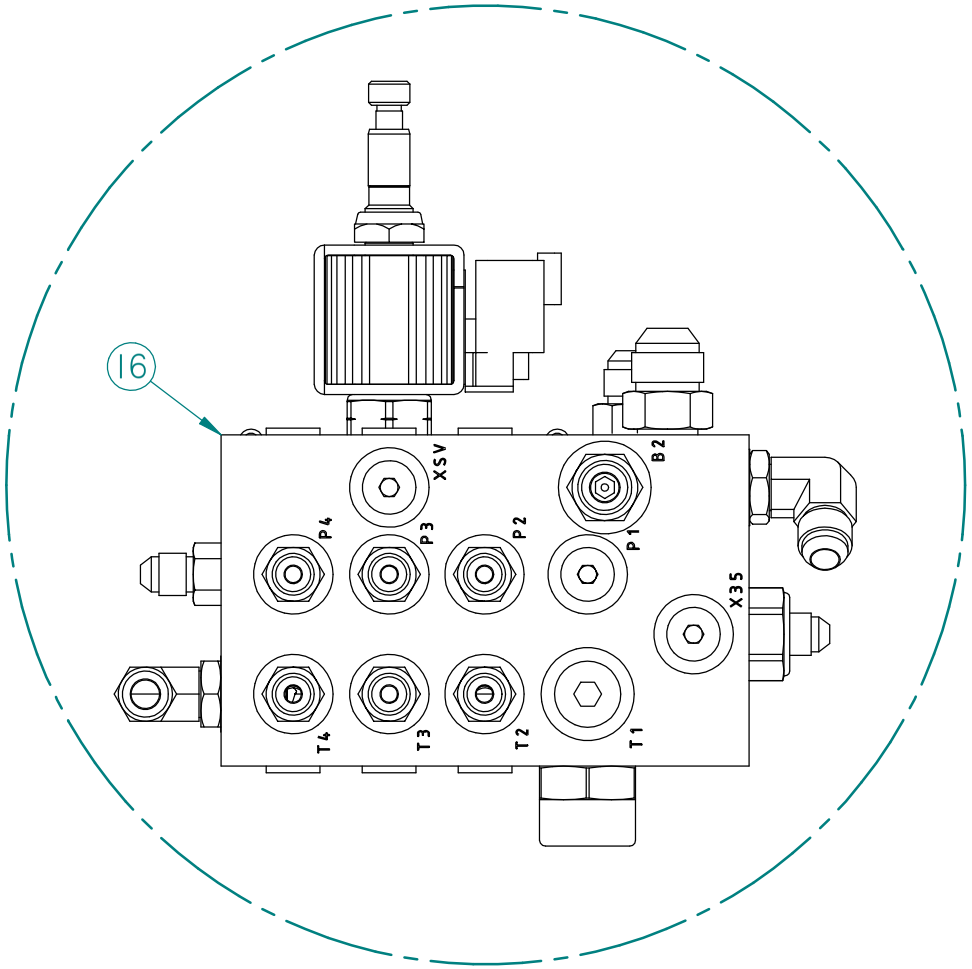
PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS HEAD AND PEDESTAL ASSEMBLY

| PART NUMBER: | SCALE: |
|---|---|
| 02 02 18 001 3 / 106050 | 1:30 |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 1/19/2015 | 2 OF 9 |



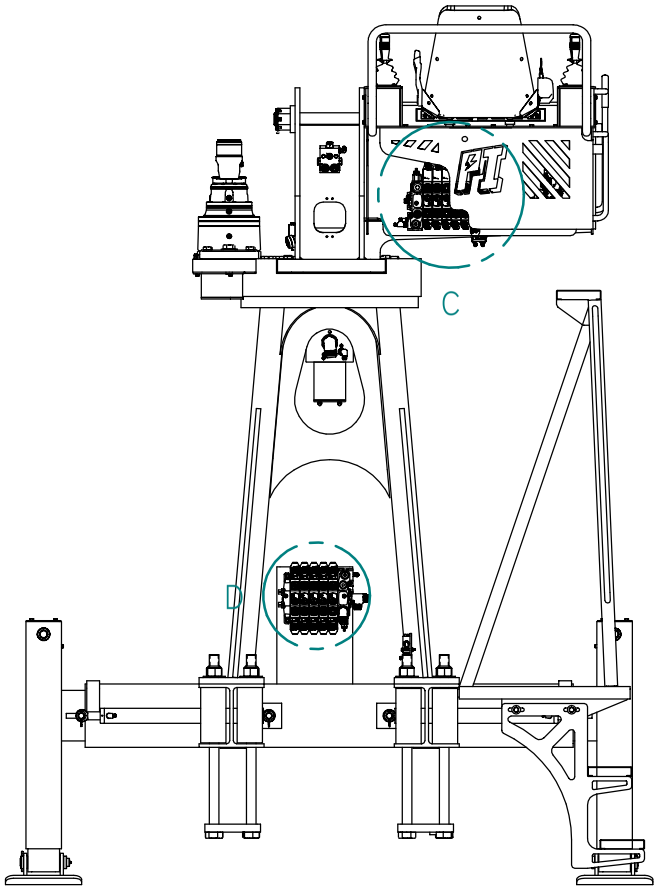

DETAIL A

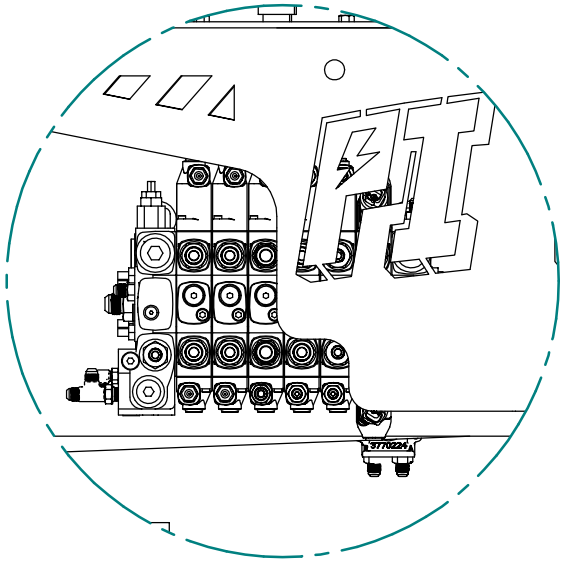
PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS HEAD AND PEDESTAL ASSEMBLY

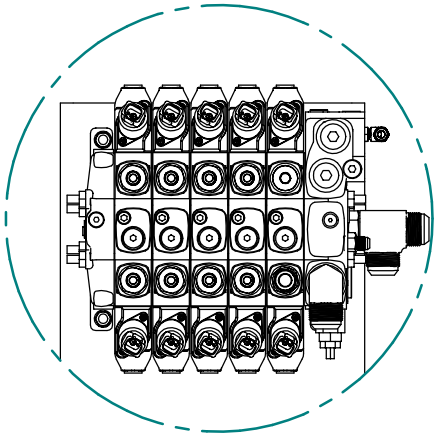
| PART NUMBER: | SCALE: |
|---|---|
| 02 02 18 001 3 / 106050 | 1:30 |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 1/19/2015 | 3 OF 9 |



DETAIL C



DETAIL D

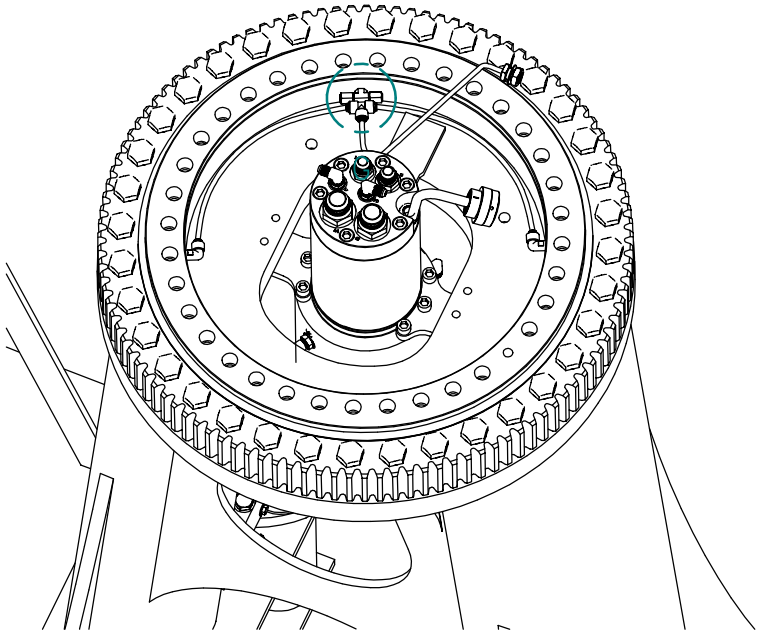
PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

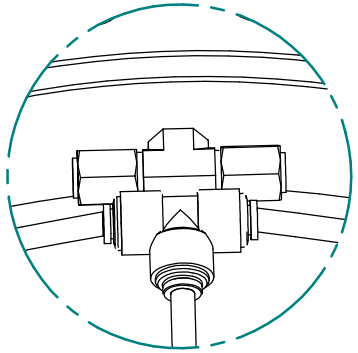
TITLE: ATLAS HEAD AND PEDESTAL ASSEMBLY

| PART NUMBER: | SCALE: |
|---|---|
| 02 02 18 001 3 / 106050 | 1:30 |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 1/19/2015 | 4 OF 9 |

THIS DEPICTS THE PLUMBING FOR THE GREASE LINES ON THE SLEWING BEARING. TWO OF THE OPPOSING PORTS SHOULD BE PLUGGED WITH #2 NPT PLUGS, THE OTHER TWO OPPOSING PORTS SHOULD RECIEVE 90 DEGREE FITTINGS CONNECTED BY A TEE WHICH THEN RUNS UP TO A BULKHEAD FITTING ON THE SIDE OF THE HEAD. THERE IS ALSO A T FITTING INSTALLED INTO THE PORT BEHIND THE T FITTING OF THE GREASE LINE. THIS T FITTING IS CAPPED OFF AND IS USED TO ZIP TIE THE GREASE LINE TO THE FITTING TO PREVENT IT FROM FALLING DOWN. NOTE THAT THE HEAD ISN'T SHOWN IN THIS DIAGRAM FOR CLARITY.





DETAIL G

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS HEAD AND PEDESTAL ASSEMBLY

| PART NUMBER: | | | SCALE: |
|---|---|---|---|
| 02 02 18 001 3 / 106050 | | | 1:10 |
| DRAWN BY: JAC | APPROVED BY: | DATE: 6/25/18 | SHEET: 5 OF 9 |

| Item # | Title | Document # | MACOLA | Qty |
|---|---|---|---|---|
| 1 | ATLAS HEAD WITH SIDE SEAT WELDMENT | 32 02 03 006 4 | 107200 | 1 |
| 2 | ACCESSORY, UNIVERSAL SEAT ASSEMBLY | AC0104 | AC0104 | 1 |
| 3" | VALVE, J-STICK PILOT 2 AXIS WITH 2 WAY SWITCH | VA02VP1207 | VA02VP1207 | 2 |
| 4" | 2 AXIS PILOT FOOT CONTROLLER | AC2802 | AC2802 | 1 |
| 5" | WASHER LOCK 1/4 SPLIT USS | WAS045 | WAS045 | 4 |
| 6" | NUT HEX 1/4 USS | NUA04U | NUA04U | 4 |
| 7" | WASHER LOCK 3/8 SPLIT | WAS065 | WAS065 | 11 |
| 8" | HEX NUT 3/8 -16 USS | NUA06U | NUA06U | 6 |
| 9" | HYDRAULIC, FITTING #4 MJIC-#6 M.OR | HF100406JM | HF100406JM | 14 |
| 10" | WASHER, FLAT .250 USS | WAF04U5 | WAF04U5 | 20 |
| 11" | NUT, NYLON LOCK, .250 USS | NUN04U | NUN04U | 8 |
| 12" | BOLT HEX 1/4-20 X 1 USS G5 | BL304016U520 | BL304016U520 | 8 |
| 13" | WASHER FLAT 5/16 USS | WAF05U5 | WAF05U5 | 6 |
| 14" | HEX NUT 5/16-24 SAE STOVERLOCK | NUS05S | NUS05S | 4 |
| 15" | VALVE, ANTI CAVITATION MANIFOLD | VA12003 | VA12003 | 1 |
| 16 | VALVE, PILOT BRAKE BLOCK | VA12002 | VA12002 | 1 |
| 17" | HYDRAULIC, FITTING WITH ORIFICE CHECKS | VA06C0004 | VA06C0004 | 2 |
| 18" | HEX NUT 5/16-18 USS | NUA05U | NUA05U | 2 |
| 19" | STANDOFF 1-1/2 X 21/64 _ 1-5/8 | 41 07 02 001 0 | 129433 | 3 |
| 20" | ELECTRICAL, SPDT ROCKER SWITCH ON-OFF-ON MOMENTARY | EL01084 | EL01084 | 6 |
| 21" | ELECTRICAL, SPDT ROCKER SWITCH ON-OFF-ON LATCHING | EL01084 | EL01085 | 1 |
| 22" | ELECTRICAL, 10 TERMINAL CONNECTOR | EL01086 | EL01086 | 7 |
| 23" | ATLAS CONTROL BOX DECAL | 01 00 00 033 0 | DE06014 | 1 |
| 24" | BOLT HEX 1/4-20 USS G5 | BL304012U520 | BL304012U520 | 4 |
| 25" | HEX BOLT 5/16-18 X 3.50 USS G5 | BL305056U518 | BL305056U518 | 2 |
| 26" | ATLAS, VP120 6 SECT VALVE BANK W/ FITTINGS | 32 07 17 013 1 | 129496 | 1 |
| 28" | CONTROLS, FOOT PEDAL EXTENDER PLATE | 42 07 13 053 0 | 129495 | 1 |
| 29" | ACCESSORY, SEAT BELT RETRACTABLE | AC0112 | AC0112 | 1 |

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS HEAD AND PEDESTAL ASSEMBLY

| PART NUMBER: | | | SCALE: |
|---|---|---|---|
| 02 02 18 001 3 / 106050 | | | NA |
| DRAWN BY: SWB | APPROVED BY: | DATE: 1/19/2015 | SHEET: 6 OF 9 |

| Item # | Title | Document # | MACOLA | Qty |
|---|---|---|---|---|
| 30* | HYDRAULIC, ACTUATOR RR GEARBOX | HC01007 | HC01007 | 1 |
| 31 | BOLT, 1.00-8 X 4.00 USS G5 | BL316064U508 | BL316064U508 | 1 |
| 32* | BOLT, STRUCTURAL, HEAVY HEX, .75 - 10 UNC X 3 LG | BL112048U810 | BL112048U810 | 5 |
| 33* | HEX BOLT 2-4.5 X 15 UNC G8 | BL132240U845 | BL132240U845 | 1 |
| 34 | BOLT, STRUCTURAL, HEAVY HEX, .75 - 10 UNC X 4 LG | BL112064U810 | BL112064U810 | 72 |
| 35* | HYDRA DYNE ROTARY MANIFOLD ASSEMBLY | 32 07 17 016 0 | 129510 | 1 |
| 36* | ATLAS 28" SLEWING BEARING | BEVW03132 | BEVW03132 | 1 |
| 37 | ATLAS PEDESTAL WELDMENT | 32 02 03 001 0 | 106000 | 1 |
| 38 | OUTRIGGER IN/OUT CYLINDER | CY05001 | CY05001 | 2 |
| 39* | 1.5" OD x 1.032" ID x 0.125" FLAT WASHER | WAB1624 | WAB1624 | 4 |
| 40 | OUTRIGGER, #3A VERTICAL LEG OUTER TUBE | 42 06 04 006 4 | 113111 | 2 |
| 41* | SPOOL, OUTRIGGER LEG CYLINDER UPPER W/HOLE | 42 06 04 008 2 | 115107 | 2 |
| 42 | SPOOL, OUTRIGGER LEG CYLINDER UPPER | 42 06 04 007 1 | 115106 | 2 |
| 43* | OUTRIGGER COVER PLATE BRACKET | 42 06 04 017 1 | 113110 | 2 |
| 44 | CYLINDER, OUTRIGGER, VERTICAL LEG EXTENSION | CY05003 | CY05003 | 2 |
| 45 | HYDRAULIC, FITTING #6-6 MALE CONNECTOR | HF060606 | HF060606 | 4 |
| 46 | OUTRIGGER, #3 VERTICAL LEG INNER TUBE | 42 06 04 005 1 | 113112 | 2 |
| 47* | SPOOL, OUTRIGGER LEG CYLINDER LOWER | 42 06 04 012 1 | 115108 | 4 |
| 48 | PIN, VERTICAL CYLINDER, BASE END | 42 06 04 021 1 | PI18106F1 | 2 |
| 49* | ROLL PIN, .3125 X 2 | FA040532 | FA040532 | 2 |
| 50 | OUTRIGGER, FOOT PLATE | 42 06 04 009 1 | 113109 | 2 |
| 51 | OUTRIGGER FOOT MOUNTING EAR | 42 06 04 013 1 | 113108 | 4 |
| 52 | COLLAR - 42 | 40 00 00 004 0 | 116102 | 2 |
| 53* | COLLAR # 42 WITH HOLE | 40 00 00 005 1 | 116103 | 2 |
| 54* | PIN, VERTICAL CYL, ROD END | 42 06 04 010 3 | PI18122F | 2 |
| 55* | COTTER PIN, 5/16 X 3 | FA020548 | FA020548 | 2 |
| 56 | WASHER LOCK 5/16 SPLIT | WAS055 | WAS055 | 4 |
| 57 | HEX BOLT 5/16-18 X 1 USS G5 | BL305016U518 | BL305016U518 | 4 |

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS HEAD AND PEDESTAL ASSEMBLY

| PART NUMBER: | | | SCALE: |
|---|---|---|---|
| 02 02 18 001 3 / 106050 | | | NA |
| DRAWN BY: SWB | APPROVED BY: | DATE: 1/19/2015 | SHEET: 7 OF 9 |

| Item # | Title | Document # | MACOLA | Qty |
|---|---|---|---|---|
| 58 | OUTRIGGER VERTICAL LEG COVER PLATE | 42 06 04 023 0 | 113107 | 2 |
| 59* | HYDRAULIC, .125 STRAIGHT GREASE FITTING | HF2002S | HF2002S | 3 |
| 60 | TIE DOWN BLOCK, 4.25 SPREAD_1.5 BOLTS | 41 02 15 068 1 | 106414 | 4 |
| 61 | WASHER, FLAT 1.50 USS | WAF24U5 | WAF24U5 | 8 |
| 62 | BOLT, 1.500 - 6 UNC X 28 LG | 41 02 15 075 0 | BL124448U86 | 8 |
| 63 | NUT, NYLON LOCK 1-1/2"-6 | NUN24U | NUN24U | 8 |
| 64* | HYDRAULIC, #6 JIC X #6 PIPE 90 | HF806069M | HF806069M | 4 |
| 65* | ATLAS LADDER ASSEMBLY | 32 02 18 001 0 | 106009 | 1 |
| 66* | ATLAS PINION GUARD | 32 02 03 011 1 | 107213 | 1 |
| 67* | HEX BOLT 3/8-16 X .750 USS G5 | BL306012U516 | BL306012U516 | 3 |
| 68* | ATLAS, VP120 5 SECTION VLV BNK W/ FITTINGS, POWER UP GRAV DN | 32 07 17 012 0 | 129497 | 1 |
| 69* | HEX BOLT 3/8-16 X 1.50 USS G5 | BL306024U516 | BL306024U516 | 3 |
| 70* | WASHER FLAT 1/2 USS | WAF08U5 | WAF08U5 | 4 |
| 71* | BOLT HEX 1/2-13 X 2.00 USS G5 | BL308032U513 | BL308032U513 | 4 |
| 72 | PUMP SHUTTLE VALVE ASSEMBLY | VA13002 | VA13002 | 1 |
| 73* | BOLT HEX 1/4-20 X 2 USS G5 | BL304032U520 | BL304032U520 | 2 |
| 74* | HEX NUT 1/4-20 STOVERLOCK USS | NUS04U | NUS04U | 2 |
| 75* | HYDRAULIC MOTOR | HC01008 | HC01008 | 1 |
| 76* | MOTOR LOCKING BOLT | FAA1112MM28 | FA1112MM28 | 2 |
| 77 | HYDRAULIC, #4 M JIC X #4 M BSPP | HF220404S | HF220404S | 1 |
| 78 | HYDRAULIC, #2 M PIPE X #4 F | HF10204FS | HF10204FS | 1 |
| 79 | HYDRAULIC, #2-2 COUPLING | HF520202000 | HF520202000 | 1 |
| 80 | HYDRAULIC, BREATHER VENT | HC06001 | HC06001 | 1 |
| 82* | BOLT, HEX .437-14 X 1.25 USS G5 | BL307020U514 | BL307020U514 | 3 |
| 84* | ATLAS 5 SPOOL VALVE MOUNTING PLATE | 41 02 03 053 0 | 107324 | 1 |
| 85* | ATLAS SHUTTLE BLOCK MOUNTING PLATE | 42 02 18 001 0 | 106413 | 1 |
| 86* | CHASSIS, 1.5" BOLT HEAD STOP | 40 00 00 069 0 | 125440 | 1 |
| 87* | ATLAS CONTROLS FOOT PEDAL DECAL | DE06037 | DE06037 | 1 |

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS HEAD AND PEDESTAL ASSEMBLY

| PART NUMBER: | | | SCALE: |
|---|---|---|---|
| 02 02 18 001 3 / 106050 | | | NA |
| DRAWN BY: SWB | APPROVED BY: | DATE: 1/19/2015 | SHEET: 8 OF 9 |

| Item # | Title | Document # | MACOLA | Qty |
|---|---|---|---|---|
| 88* | ATLAS MECHANICAL JOYSTICK LEFT DECAL | DE06039 | DE06039 | 1 |
| 89* | ATLAS MECHANICAL JOYSTICK RIGHT DECAL | DE06038 | DE06038 | 1 |
| 90 | WASHER FLAT 1 USS | WAF16U5 | WAF16U5 | 1 |
| 91* | ATLAS BEARING GREASE HOSE FITTING KIT | HS7ATLASBRGGREA | HS7ATLASBRGGREA | 1 |
| 92 | ATLAS RING GEAR GUARD WELDMENT - FRONT | 32 02 03 019 1 | 107204 | 1 |
| 93 | ATLAS RING GUARD WLDMT - REAR | 32 02 03 015 0 | 107205 | 1 |
| 94 | HYDRAULIC, #10 JIC X #10 M OR 90 EXTRA LONG | HF11010JM9LL | HF11010JM9LL | 1 |
| 95 | HYDRAULIC, FITTING #10M JIC X 12M OR 90 | HF11012JM9 | HF11012JM9 | 1 |

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS HEAD AND PEDESTAL ASSEMBLY

PART NUMBER: 02 02 18 001 3 / 106050

SCALE:

DRAWN BY:

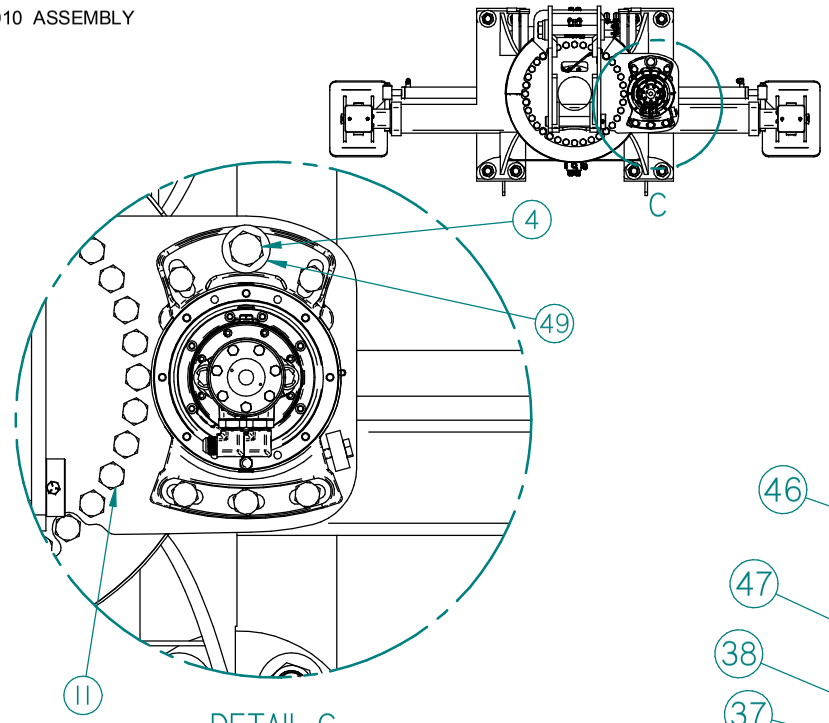
APPROVED BY:

DATE:

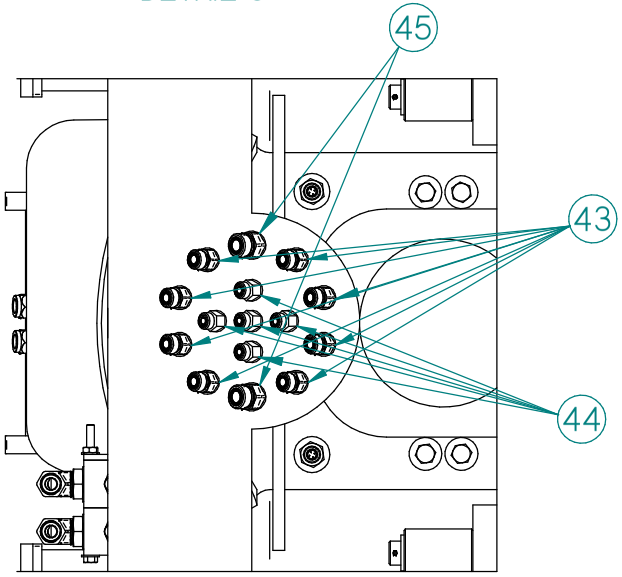
SHEET: 9 OF 9

010 ASSEMBLY

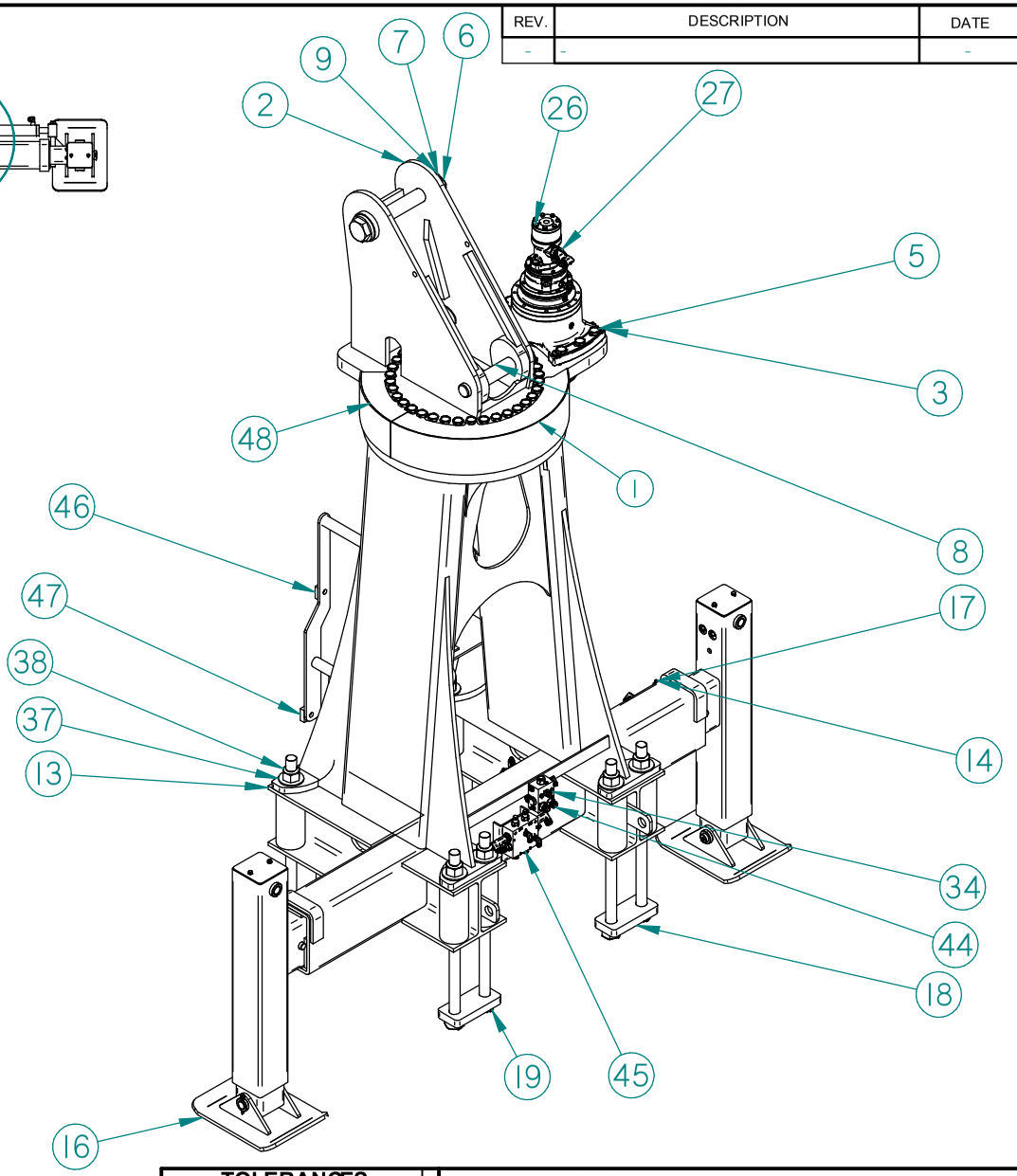
| REV. | DESCRIPTION | DATE | BY |
|---|---|---|---|
| - | - | - | - |




DETAIL C




BOTTOM VIEW OF
BULKHEAD PLATE




**TOLERANCES**

| | |
|---|---|
| 1 DEC. | ± 0.100 |
| 2 DEC. | ± 0.050 |
| 3 DEC. | ± 0.010 |
| ANGLE: | ± 1.000° |
| FRACTION: | ± 1/32" |
| DIM. UNITS: | INCHES |
| SURFACE FINISH: | 125/32 |

*UNLESS OTHERWISE SPECIFIED*

DEC. = DECIMAL PLACE(S)

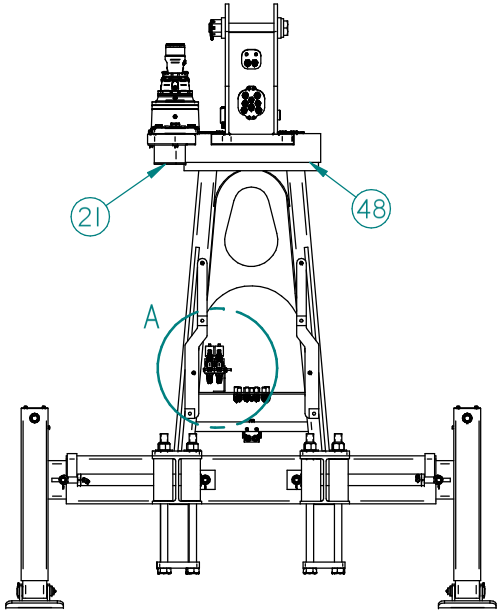

LIGHTNING LOADER PETERSEN INDUSTRIES

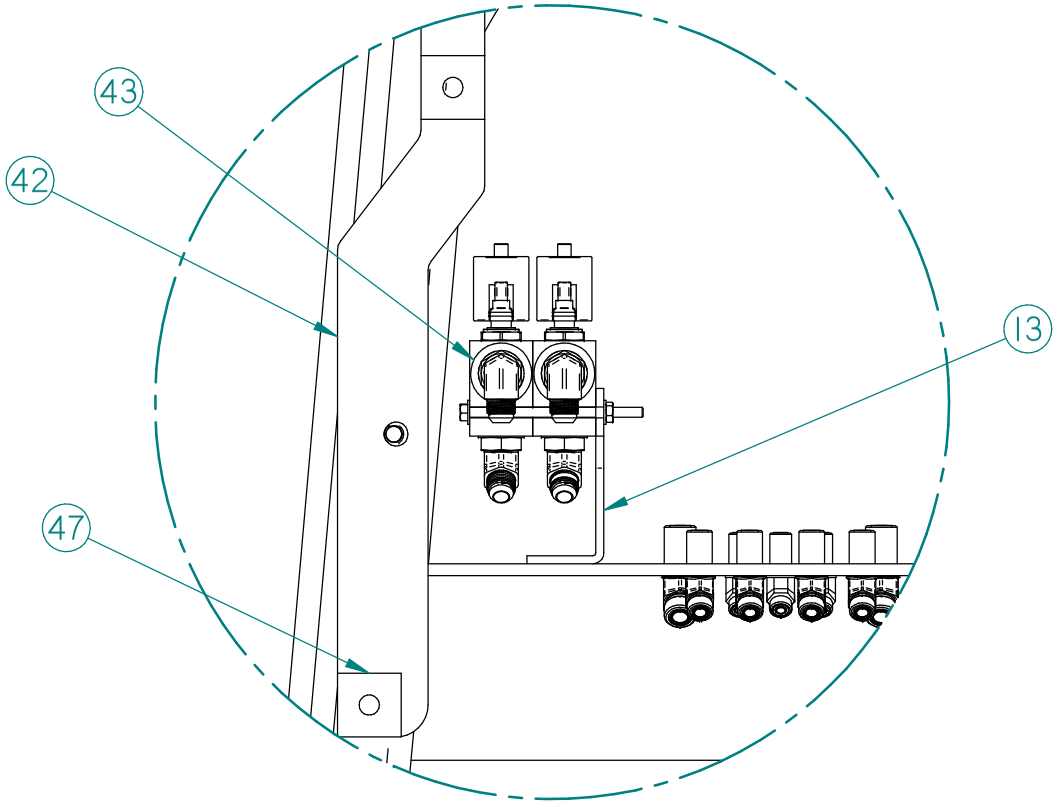
PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


TITLE: ATLAS DWT HEAD AND PEDESTAL ASSEMBLY

| PART NUMBER: | SCALE: |
|---|---|
| 02 02 18 002 1 / 106051 | 1:25 |

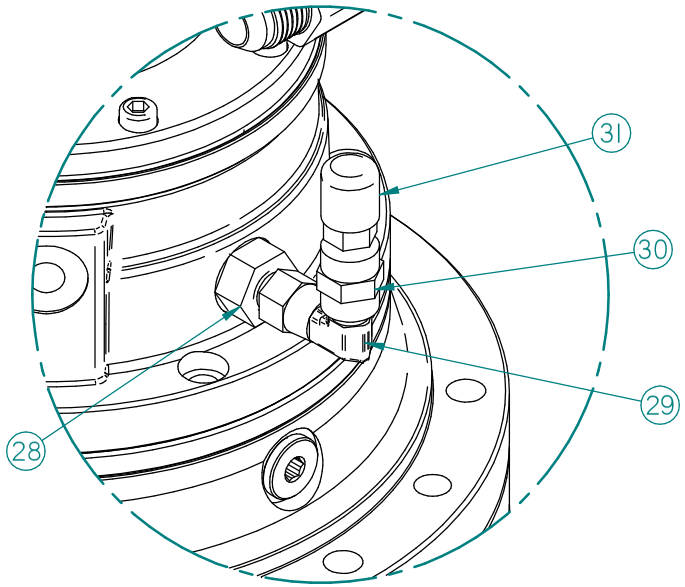
| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 03/01/2017 | 1 OF 6 |




DETAIL A

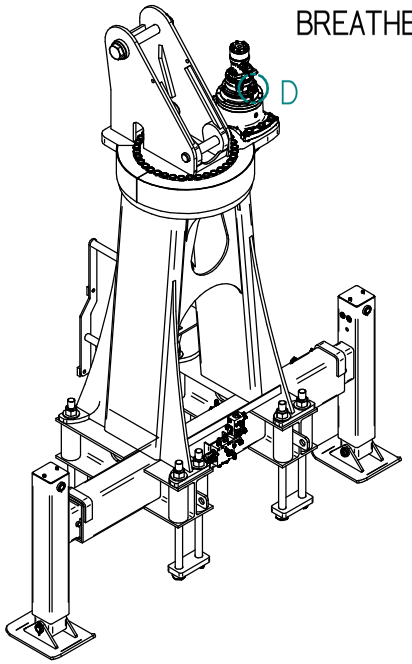
| | | | |
|---|---|---|---|
| PETERSEN INDUSTRIES INC.<br>4000 S.R. 60 WEST<br>LAKE WALES, FL. 33859-8234<br>TEL: (863) 676-1493 FAX: (863) 676-6844 | | | |
| TITLE: ATLAS DWT HEAD AND PEDESTAL ASSEMBLY | | | |
| PART NUMBER: 02 02 18 002 1 / 106051 | | | SCALE: 1:6 |
| DRAWN BY: SWB | APPROVED BY: | DATE: 03/01/2017 | SHEET: 2 OF 6 |

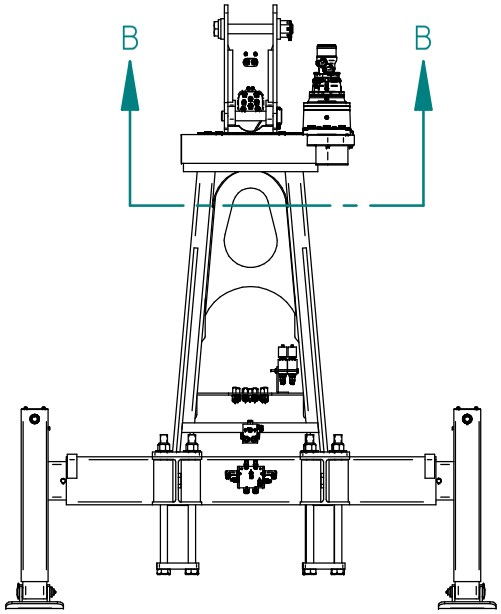


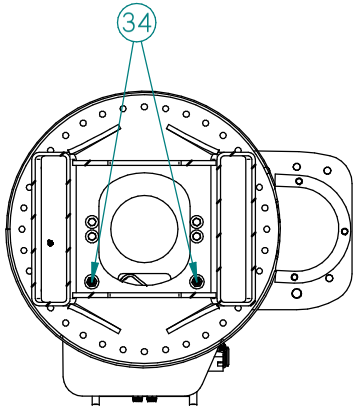

DETAIL D

GEARBOX

BREATHER



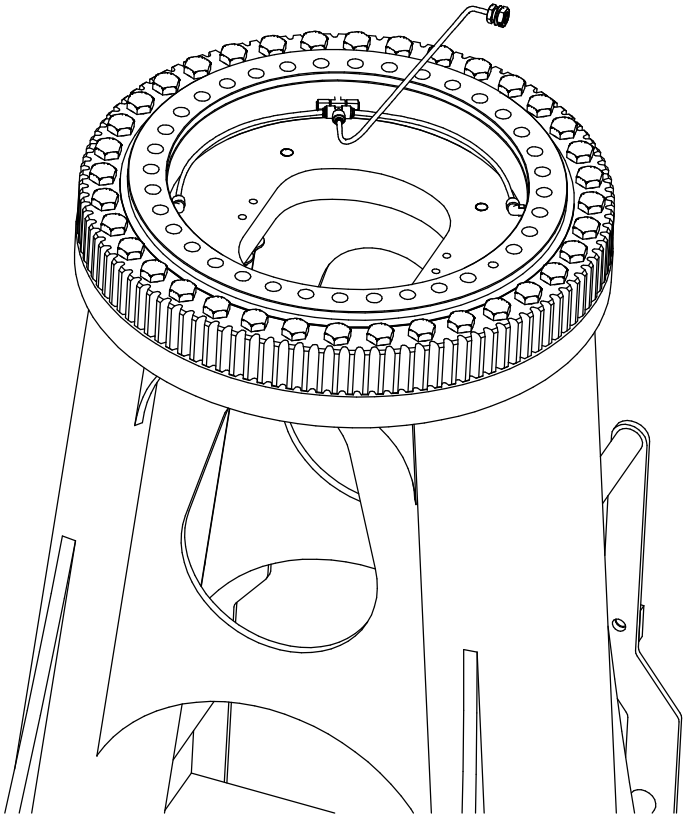

SECTION B-B

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS DWT HEAD AND PEDESTAL ASSEMBLY

| PART NUMBER: | | | SCALE: |
|---|---|---|---|
| 02 02 18 002 1 / 106051 | | | 1:20 |
| DRAWN BY: SWB | APPROVED BY: | DATE: 03/01/2017 | SHEET: 3 OF 6 |

THIS DEPICTS THE PLUMBING FOR THE GREASE LINES ON THE SLEWING BEARING. TWO OF THE OPPOSING PORTS SHOULD BE PLUGGED WITH #2 NPT PLUGS, THE OTHER TWO OPPOSING PORTS SHOULD RECIEVE 90 DEGREE FITTINGS CONNECTED BY A TEE WHICH THEN RUNS UP TO A BULKHEAD FITTING ON THE SIDE OF THE HEAD. THERE IS ALSO A T FITTING INSTALLED INTO THE PORT BEHIND THE T FITTING OF THE GREASE LINE. THIS T FITTING IS CAPPED OFF AND IS USED TO ZIP TIE THE GREASE LINE TO THE FITTING TO PREVENT IT FROM FALLING DOWN. NOTE THAT THE HEAD ISN'T SHOWN IN THIS DIAGRAM FOR CLARITY.



PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS DWT HEAD AND PEDESTAL ASSEMBLY

| PART NUMBER: | | | SCALE: |
|---|---|---|---|
| 02 02 18 002 1 / 106051 | | | |
| DRAWN BY: | APPROVED BY: | DATE: | SHEET: 4 OF 6 |

010 ASSEMBLY

| Item # | Title | Document # | MACOLA | Qty |
|---|---|---|---|---|
| 1 | ATLAS RING GEAR GUARD WELDMENT - FRONT | 32 02 03 019 1 | 107204 | 1 |
| 2 | ATLAS HEAD ASSEMBLY | 02 01 06 002 1 | 107211 | 1 |
| 3 | HYDRAULIC, ACTUATOR RR GEARBOX | HC01007 | HC01007 | 1 |
| 4 | BOLT, 1.00-8 X 4.00 USS G5 | BL316064U508 | BL316064U508 | 1 |
| 5 | BOLT, STRUCTURAL, HEAVY HEX, .75 - 10 UNC X 3 LG | BL112048U810 | BL112048U810 | 5 |
| 6 | HEX BOLT 2-4.5 X 15 UNC G8 | BL132240U845 | BL132240U845 | 1 |
| 7 | NUT, SLOTTED 2.00 HEAVY USS | NUB32HU | NUB32HU | 1 |
| 8 | PIN, 2 X 12 1/2 1145 CP ROD | 41 01 06 031 0 | PI30303F | 1 |
| 9 | BOLT, 0.4375-14 X 4 USS G8 | BL307064U814 | BL307064U814 | 2 |
| 10* | NUT, STOVERLOCK 0.4375 USS | NUS07U | NUS07U | 2 |
| 11* | BOLT, STRUCTURAL, HEAVY HEX, .75 - 10 UNC X 4 LG | BL112064U810 | BL112064U810 | 72 |
| 12* | ATLAS 28" SLEWING BEARING | BEVW03132 | BEVW03132 | 1 |
| 13 | PEDESTAL, ATLAS DWT WELDMENT | 32 02 03 014 0 | 106011 | 1 |
| 14 | OUTRIGGER IN/OUT CYLINDER | CY05001 | CY05001 | 2 |
| 15* | 1.5" OD x 1.032" ID x 0.125" FLAT WASHER | WABI624 | WABI624 | 4 |
| 16 | MODEL 3 OUTRIGGER VERTICAL LEG ASSEMBLY | 22 06 04 002 2 | 113103 | 2 |
| 17 | COTTER PIN 3/16 X 2 | FA020332 | FA020332 | 4 |
| 18 | TIE DOWN BLOCK, 4.25 SPREAD_1.5 BOLTS | 41 02 15 068 1 | 106414 | 4 |
| 19 | BOLT, 1.500 - 6 UNC X 28 LG | 41 02 15 075 0 | BL124448U86 | 8 |
| 20* | HYDRAULIC, #6 JIC X #6 PIPE 90 | HF806069M | HF806069M | 4 |
| 21 | ATLAS PINION GUARD | 32 02 03 011 1 | 107213 | 1 |
| 22* | WASHER LOCK 3/8 SPLIT | WAS065 | WAS065 | 3 |
| 23* | HEX BOLT 3/8-16 X .750 USS G5 | BL306012U516 | BL306012U516 | 3 |
| 24* | WASHER FLAT 1/2 USS | WAF08U5 | WAF08U5 | 4 |
| 25* | BOLT HEX 1/2-13 X 2.00 USS G5 | BL308032U513 | BL308032U513 | 4 |
| 26 | HYDRAULIC MOTOR | HC01008 | HC01008 | 1 |
| 27 | MOTOR LOCKING BOLT | FAA1112MM28 | FA1112MM28 | 2 |
| 28 | HYDRAULIC, #4 M JIC X #4 M BSPP | HF220404S | HF220404S | 1 |

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS DWT HEAD AND PEDESTAL ASSEMBLY

| PART NUMBER: | SCALE: |
|---|---|
| 02 02 18 002 1 / 106051 | NA |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 03/01/2017 | 5 OF 6 |

010 ASSEMBLY

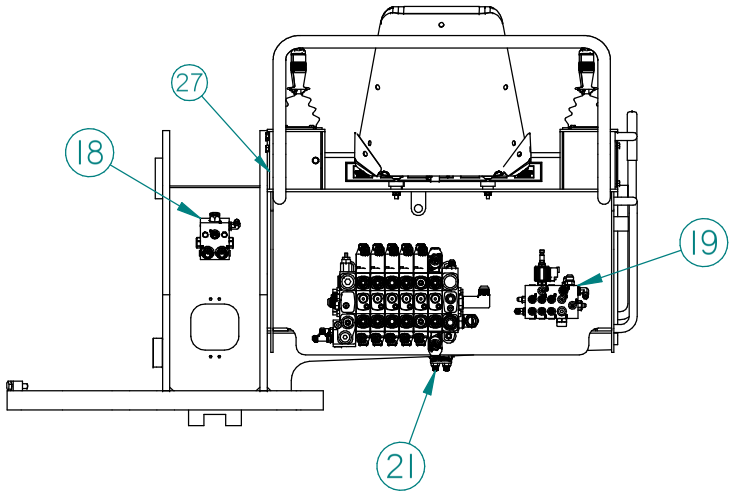
| Item # | Title | Document # | MACOLA | Qty |
|---|---|---|---|---|
| 29 | HYDRAULIC, #2 M PIPE X #4 F | HF10204FS | HF10204FS | 1 |
| 30 | HYDRAULIC, #2-2 COUPLING | HF520202000 | HF520202000 | 1 |
| 31 | HYDRAULIC, BREATHER VENT | HC06001 | HC06001 | 1 |
| 32* | HYDRAULIC, FITTING #10M JIC X 12M OR 90 | HF11012JM9 | HF11012JM9 | 2 |
| 34 | HEX BOLT 5/16-18 X 3 USS G5 | BL305048U518 | BL305048U518 | 2 |
| 34 | ELECTRICAL, PROXY SENSOR MAIN BOOM UP_ OUTRIGGER DOWN | EL01042 | EL01042 | 2 |
| 35* | WASHER LOCK 5/16 SPLIT | WAS055 | WAS055 | 2 |
| 36* | HEX NUT 5/16-24 SAE STOVERLOCK | NUS05S | NUS05S | 2 |
| 37 | WASHER, FLAT 1.50 USS | WAF24U5 | WAF24U5 | 8 |
| 38 | NUT, NYLON LOCK 1-1/2"-6 | NUN24U | NUN24U | 8 |
| 42 | DWT, CONTROLS ADJUSTMENT PLATE | 42 07 01 086 1 | 129605 | 2 |
| 43 | VALVE, ATLAS SWING LIMITING ASSEMBLY | 21 07 13 002 0 | 129028 | 1 |
| 43 | HYDRAULIC, #8 X #8 45 BULKHEAD ORFS | HF7080840RFS | HF7080840RFS | 8 |
| 44 | VALVE, ATLAS ANTI CAV FOR DWT WITH FITTINGS | 32 07 17 014 0 | 129505 | 1 |
| 44 | HYDRAULIC, #6 X #6 45 BULKHEAD ORFS | HF7060640RFS | HF7060640RFS | 5 |
| 45 | VALVE, ATLAS SOFT STOP MANIFOLD WITH FITTINGS | 32 07 17 015 0 | 129506 | 1 |
| 45 | HYDRAULIC, #10 X #10 45 BULKHEAD ORFS | HF7101040RFS | HF7101040RFS | 2 |
| 46 | DWT, CONTROL HANDLE SPACER | 42 07 17 007 0 | 129606 | 2 |
| 47 | DWT, CONTROL HANDLE SPACER 2 | 42 07 17 008 0 | 129608 | 2 |
| 48 | ATLAS RING GUARD WLDMT - REAR | 32 02 03 015 0 | 107205 | 1 |
| 49 | WASHER FLAT 1 USS | WAF16U5 | WAF16U5 | 1 |
| 50* | ATLAS BEARING GREASE HOSE FITTING KIT | HS7ATLASBRGGREA | HS7ATLASBRGGREA | 1 |
| 51* | HYDRAULIC, .125 STRAIGHT GREASE FITTING | HF2002S | HF2002S | 1 |

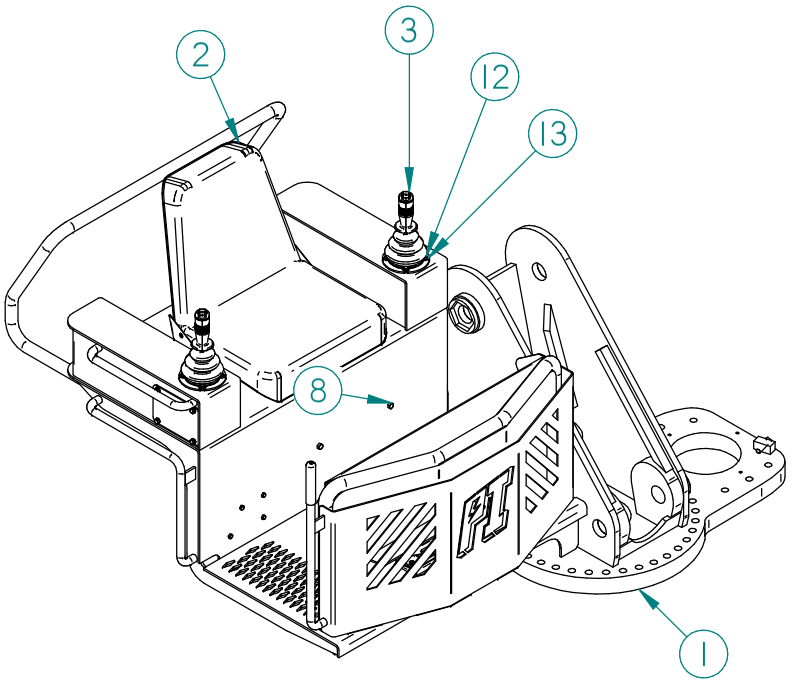
PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

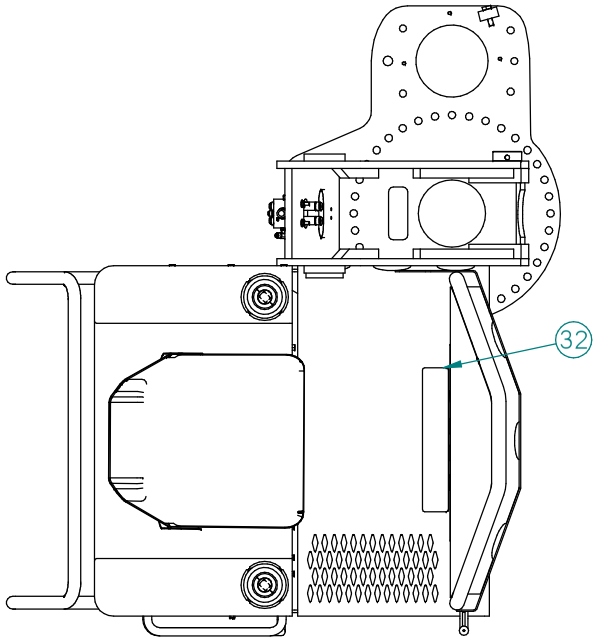
TITLE: ATLAS DWT HEAD AND PEDESTAL ASSEMBLY

| PART NUMBER: | | | SCALE: |
|---|---|---|---|
| 02 02 18 002 1 / 106051 | | | NA |
| DRAWN BY: SWB | APPROVED BY: | DATE: 03/01/2017 | SHEET: 6 OF 6 |

NOTE: SEAT SHOWN IS REPRESENTATIVE ONLY

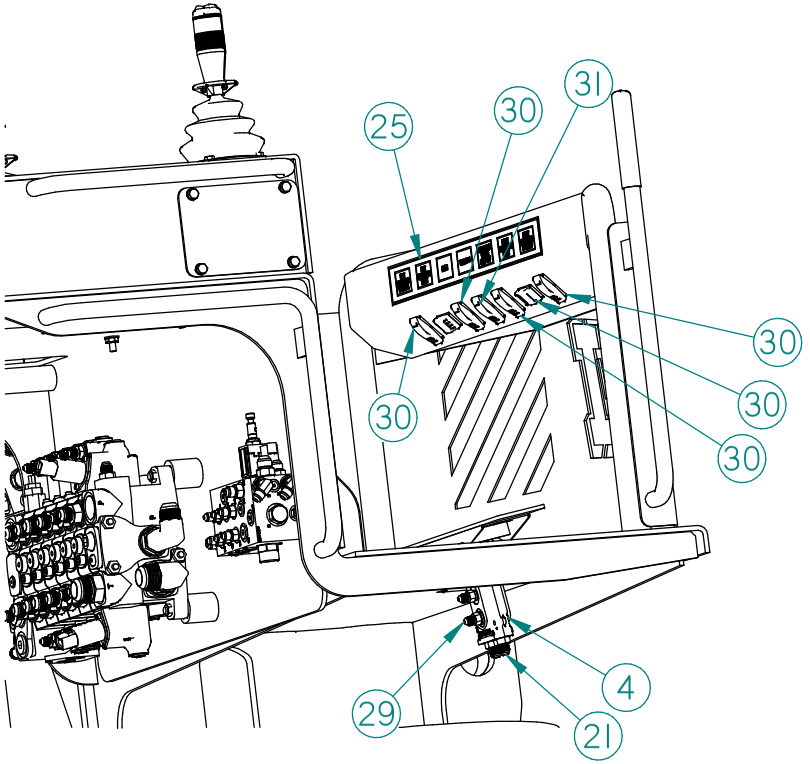


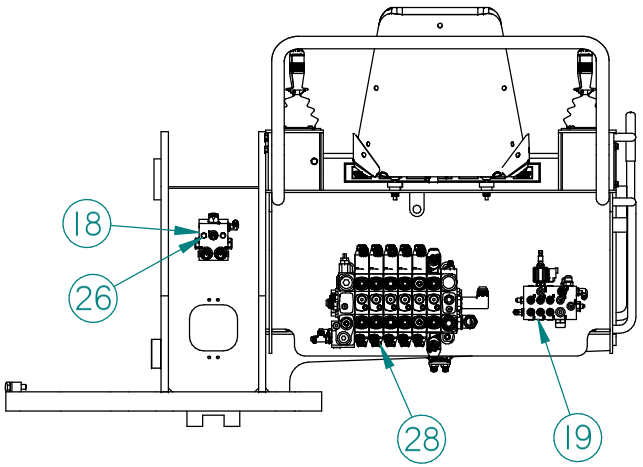




PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

| | | | |
|---|---|---|---|
| TITLE: ATLAS HEAD ASSEMBLY | | | |
| PART NUMBER: 02 01 06 001 2 / 107210 | | | SCALE: 1:20 |
| DRAWN BY: SWB | APPROVED BY: | DATE: 10/19/2015 | SHEET: 1 OF 3 |




PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS HEAD ASSEMBLY

PART NUMBER: 02 01 06 001 2 / 107210

SCALE:

DRAWN BY:

APPROVED BY:

DATE:

SHEET: 2 OF 3

| Item # | Title | Document # | MACOLA | Qty |
|---|---|---|---|---|
| 1 | ATLAS HEAD WITH SIDE SEAT WELDMENT | 32 02 03 006 3 | 107200 | 1 |
| 2 | ACCESSORY, UNIVERSAL SEAT ASSEMBLY | AC0104 | AC0104 | 1 |
| 3 | VALVE, JOYSTICK PILOT 2 AXIS WITH SWITCH FOR VPI20 ATLAS | VA02VPI207 | VA02VPI207 | 2 |
| 4 | 2 AXIS PILOT FOOT CONTROLLER | AC2802 | AC2802 | 1 |
| 5" | BOLT HEX 1/4-20 USS G5 | BL304012U520 | BL304012U520 | 8 |
| 6" | WASHER LOCK 1/4 SPLIT USS | WAS045 | WAS045 | 4 |
| 7" | NUT HEX 1/4 USS | NUA04U | NUA04U | 4 |
| 8 | HEX BOLT 3/8-16 X 3.00 USS G5 | BL306048U516 | BL306048U516 | 3 |
| 9" | WASHER LOCK 3/8 SPLIT | WAS065 | WAS065 | 9 |
| 10" | HEX NUT 3/8 -16 USS | NUA06U | NUA06U | 3 |
| 11" | HYDRAULIC, FITTING #4 M.JIC-#6 M.OR | HF100406JM | HF100406JM | 12 |
| 12 | BOLT HEX 1/4-20 X 1 USS G5 | BL304016U520 | BL304016U520 | 8 |
| 13 | WASHER, FLAT .250 USS | WAF04U5 | WAF04U5 | 16 |
| 14" | NUT, NYLON LOCK, .250 USS | NUN04U | NUN04U | 8 |
| 15" | WASHER FLAT 5/16 USS | WAF05U5 | WAF05U5 | 6 |
| 16" | HEX NUT 5/16-24 SAE STOVERLOCK | NUS05S | NUS05S | 4 |
| 17" | HEX BOLT 3/8-16 X .750 USS G5 | BL306012U516 | BL306012U516 | 4 |
| 18 | VALVE, ANTI CAVITATION MANIFOLD | VA12003 | VA12003 | 1 |
| 19 | VALVE, PILOT BRAKE BLOCK | VA12002 | VA12002 | 1 |
| 20" | ATLAS SEAT SWITCH | AC0113 | AC0113 | 1 |
| 21 | HYDRAULIC, FITTING WITH ORIFICE CHECKS | VA06C004 | VA06C004 | 2 |
| 22" | HEX NUT 5/16-18 USS | NUA05U | NUA05U | 2 |
| 23" | STANDOFF 1-1/2 X 21/64 _ 1-5/8 | 41 07 02 001 0 | 129433 | 3 |
| 24" | ELECTRICAL, 10 TERMINAL CONNECTOR | EL01086 | EL01086 | 7 |
| 25 | ATLAS CONTROL BOX DECAL | 01 00 00 033 0 | DE06014 | 1 |
| 26 | HEX BOLT 5/16-18 X 3.50 USS G5 | BL305056U518 | BL305056U518 | 2 |
| 27 | HEAD, ATLAS JOYSTICK BOX COVER, LEFT SIDE | 41 02 03 057 1 | 107358 | 1 |
| 28 | ATLAS, VPI20 6 SECTION VALVE BANK WITH FITTINGS | 32 07 17 001 0 | 129496 | 1 |
| 29 | HYDRAULIC, FITTING #4M JIC X #4M OR | HF10404JM | HF10404JM | 2 |
| 30 | ELECTRICAL, SPDT ROCKER SWITCH ON-OFF-ON MOMENTARY | EL01084 | EL01084 | 6 |
| 31 | ELECTRICAL, SPDT ROCKER SWITCH ON-OFF-ON LATCHING | EL01084 | EL01085 | 1 |
| 32 | CONTROLS, FOOT PEDAL EXTENDER PLATE | 42 07 13 053 0 | 129495 | 1 |

| FASTENER TABLE | |
|---|---|
| LOCATION | FASTENER DESCRIPTION |
| OPERATOR SEAT | |
| 6 SECTION VALVE BANK | 3/8"-16 x 3" & STOVER NUT |
| ANTI-CAV BLOCK ON BACK OF HEAD | 5/16"-18 X 3.5", FLAT WASHER & USS NUT |
| PILOT BRAKE BLOCK | 1/4"-20 X 3/4" |
| PILOT JOYSTICKS | 1/4"-20 x 1, FLAT WASHER, NYLON LOCK NUT |
| PILOT FOOT PEDAL | 1/4"-20 x 3/4, LOCK WASHER & USS |
| JOYSTICK COVER BOXES | 3/8"-16 x 3/4" & LOCK WASHERS |
| JOYSTICK RIGHT SIDE PLATE | 5/16"-18 x 3/4" & LOCK WASHERS |

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS HEAD ASSEMBLY

PART NUMBER: 02 01 06 001 2 / 107210

SCALE: 1:20

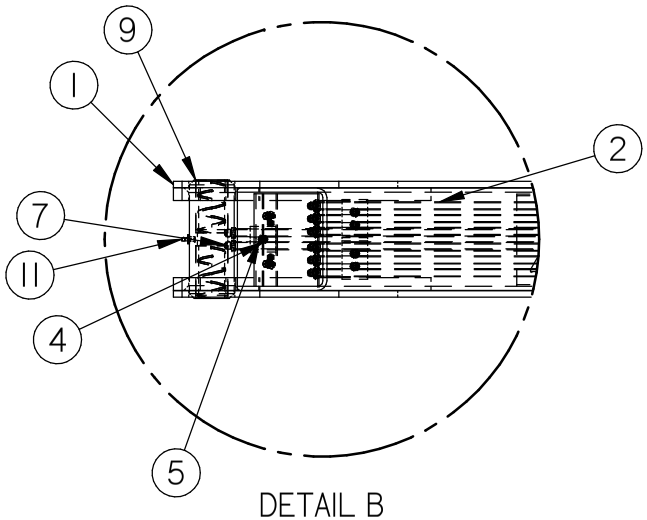
DRAWN BY: SWB

APPROVED BY:

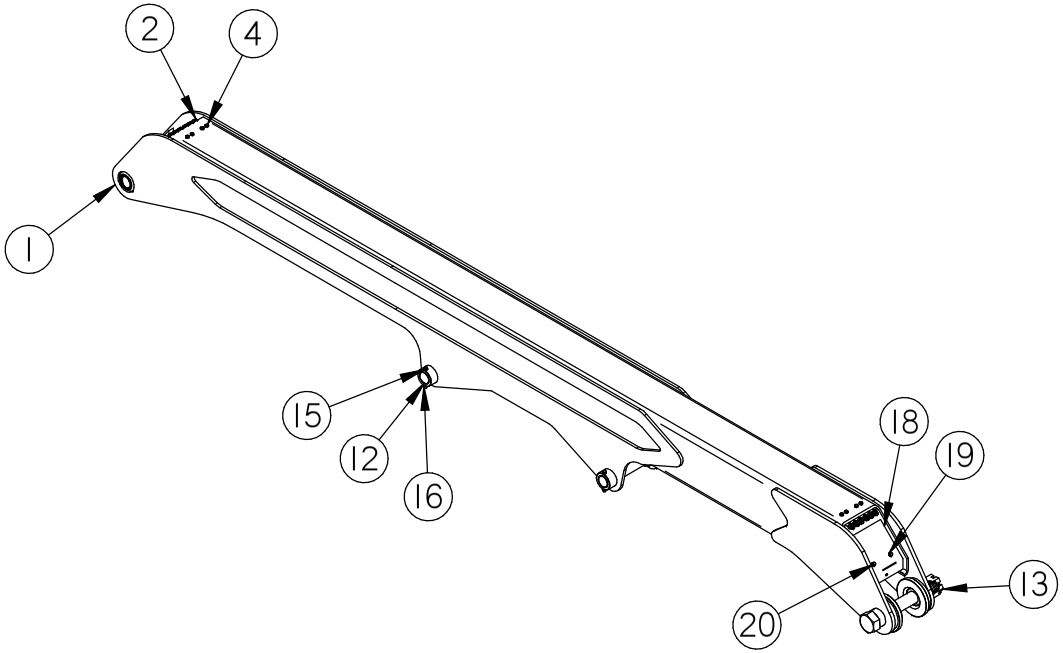
DATE: 10/19/2015

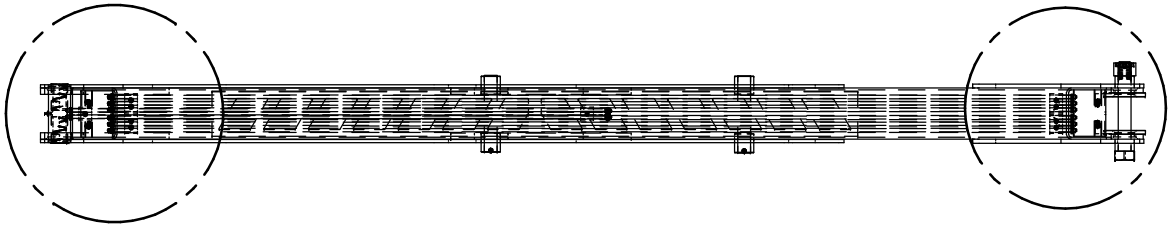
SHEET: 3 OF 3

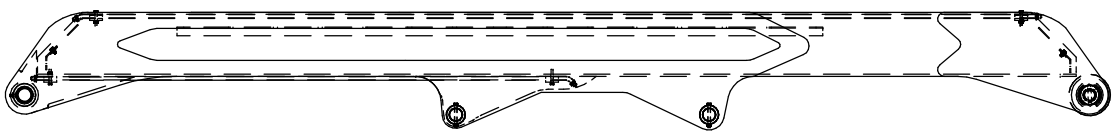
010 ASSEMBLY

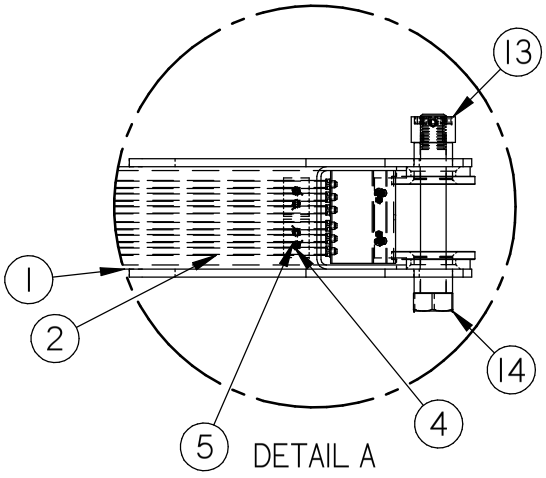



DETAIL B






DETAIL A


PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


| | | | |
|---|---|---|---|
| TITLE: ATLAS MAIN BOOM ASSEMBLY | | | |
| PART NUMBER: 02 03 18 001 0 / 108616 | | | SCALE: 1:30 |
| DRAWN BY: SWB | APPROVED BY: | DATE: 10/19/2015 | SHEET: 1 OF 2 |

| Item # | Title | Document # | Macola | Quantity |
|---|---|---|---|---|
| 1 | ATLAS MAIN BOOM WELDMENT | 32 03 04 001 0 | 108025 | 1 |
| 2 | HYDRAULIC TUBE, 45 DG - 150-1/2" LG ATLAS | 41 03 05 033 0 | TU03020 | 6 |
| 3* | 3 HOLE CLAMP NYLATRON | 40 00 00 066 0 | CLT3N | 4 |
| 4 | HEX BOLT 5/16-18 X 2.00 USS G5 | BL305032U518 | BL305032U518 | 10 |
| 5 | HEX NUT 5/16-18 USS STOVERLOCK | NUS05U | NUS05U | 9 |
| 6* | WASHER FLAT 5/16 USS | WAF05U5 | WAF05U5 | 9 |
| 7 | HYDRAULIC TUBE, FIXED MAIN BOOM 45 DG - 84" LG | TU05003 | TU05003 | 2 |
| 8* | 2 HOLE CLAMP NYLATRON | 40 00 00 067 0 | CLT2N | 2 |
| 9 | BUSHING, 2-1/2" X 2" X 4-1/8" NYLATRON ATLAS | 41 03 05 034 0 | BU503005 | 2 |
| 11 | 1/8" STRAIGHT GREASE FITTING | HF2002S | HF2002S | 1 |
| 12 | 2" X 12" PIN | 41 03 04 009 0 | 108608 | 2 |
| 13 | NUT, SLOTTED 2.00 HEAVY USS | NUB32HU | NUB32HU | 1 |
| 14 | HEX BOLT 2-4.5 X 14 UNC G8 | BL132224U845 | BL1322224U845 | 1 |
| 15 | HEX BOLT 3/8-16 X 3.50 USS G5 | BL306056U516 | BL306056U516 | 2 |
| 16 | NUT HEX 3/8 -16 UNC STOVERLOCK | NUS06U | NUS06U | 2 |
| 17* | ATLAS MAIN BOOM END CAP MOUNTING PLATE WELDMENT | 31 03 04 001 0 | 108623 | 2 |
| 18 | ATLAS MAIN BOOM END CAP | 41 03 04 014 0 | 108622 | 2 |
| 19 | WASHER LOCK 5/16 SPLIT | WAS055 | WAS055 | 4 |
| 20 | HEX BOLT 5/16-18 X 3/4 USS G5 | BL305012U518 | BL305012U518 | 4 |
| 21* | ATLAS MAIN BOOM TO TIP BOOM SPACER | 41 03 04 016 0 | 108625 | 2 |
| 22* | MAIN BOOM, BUSHING | 42 03 04 004 0 | BU507008 | 2 |

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS MAIN BOOM ASSEMBLY

PART NUMBER: 02 03 18 001 0 / 108616

SCALE: 1:30

DRAWN BY: SWB

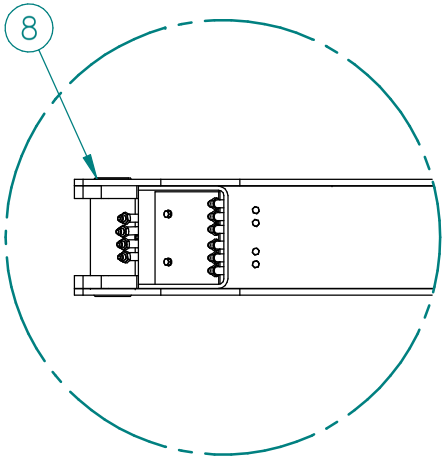
APPROVED BY:

DATE: 10/19/2015

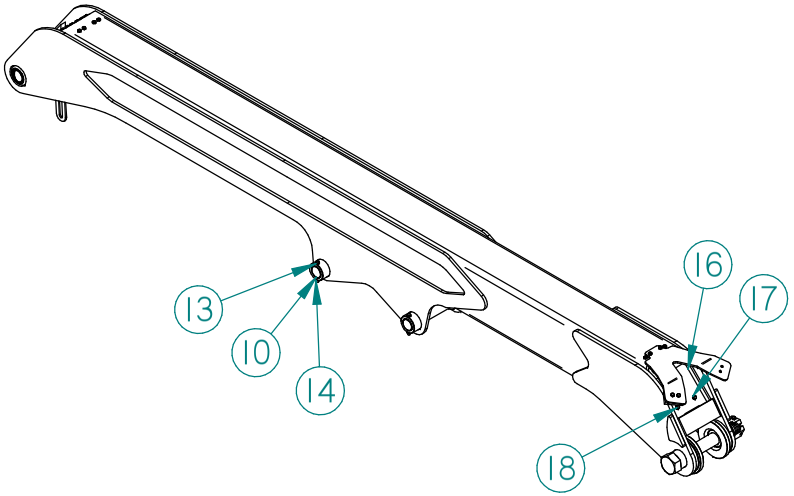
SHEET: 2 OF 2

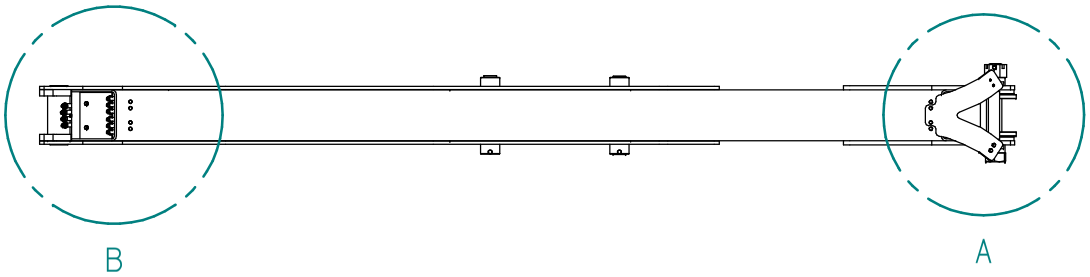
| REV. | DESCRIPTION | DATE | BY |
|---|---|---|---|
| 1 | ADDED 10 GA SPACER, IF NEEDED | 2/1/19 | SWB |

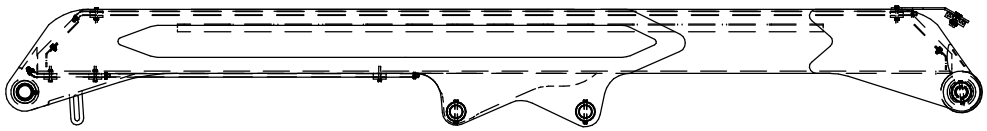
010 ASSEMBLY

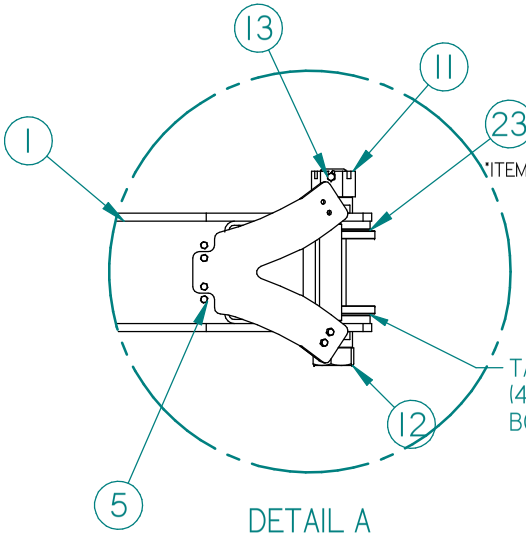



DETAIL B






*ITEM 23 ONLY USED IF NEEDED

DETAIL A

**TOLERANCES**

| | |
|---|---|
| 1 DEC. | ± 0.100 |
| 2 DEC. | ± 0.050 |
| 3 DEC. | ± 0.010 |
| ANGLE: | ± 1.000° |
| FRACTION: | ± 1/32" |
| DIM. UNITS: | INCHES |
| SURFACE FINISH: | 125/32 |

*UNLESS OTHERWISE SPECIFIED*

DEC. = DECIMAL PLACE(S)


LIGHTNING LOADER PETERSEN INDUSTRIES

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


TITLE: ATLAS MAIN BOOM 146.5 ASSEMBLY

PART NUMBER: 02 03 18 002 1 / 108628

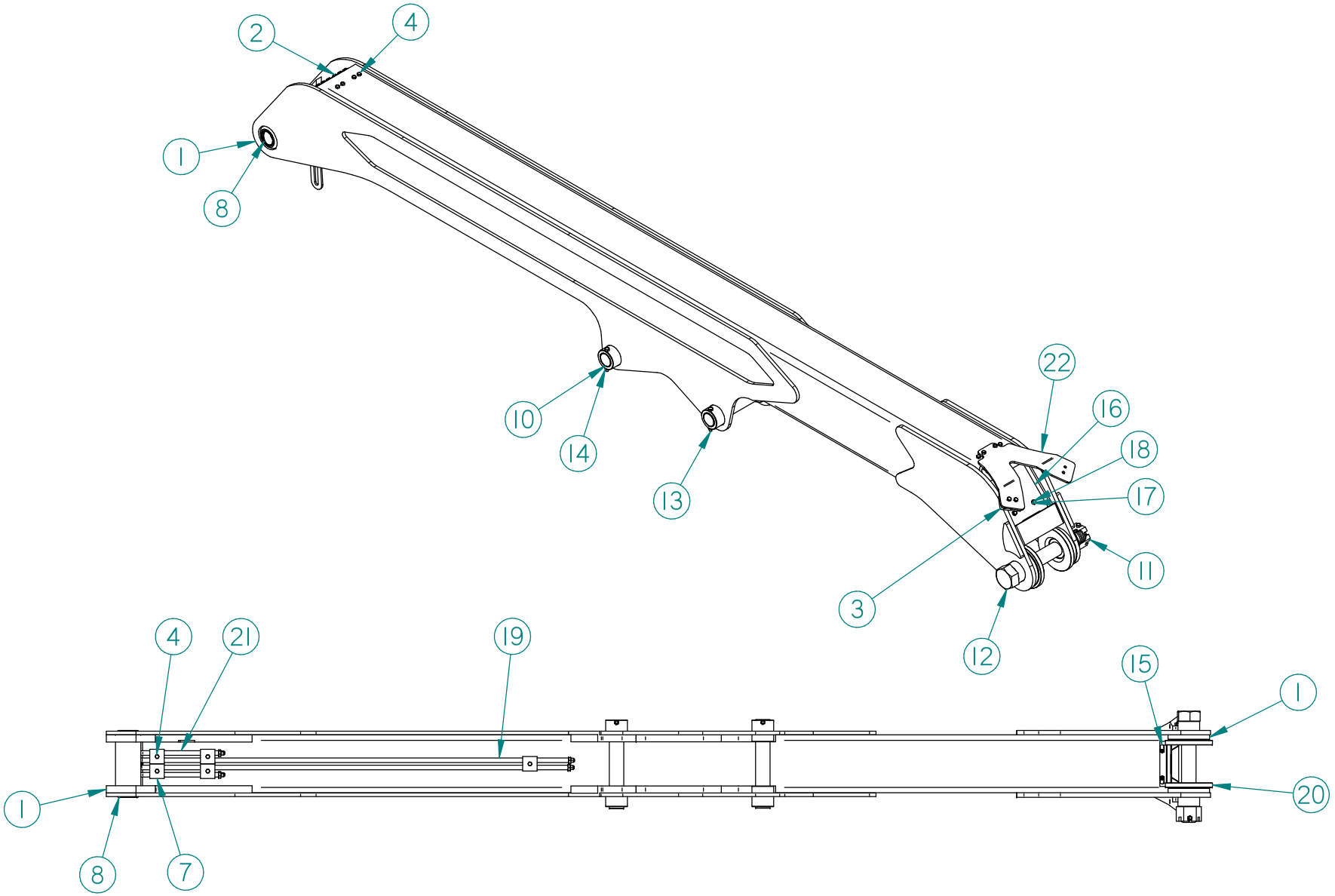
SCALE: 1:30

DRAWN BY: SWB

APPROVED BY:

DATE: 10/19/2015

SHEET: 1 OF 3




PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS MAIN BOOM 146.5 ASSEMBLY

| PART NUMBER: | | | SCALE: |
|---|---|---|---|
| 02 03 18 002 1 / 108628 | | | 1:20 |
| DRAWN BY: SWB | APPROVED BY: | DATE: 10/19/2015 | SHEET: 2 OF 3 |

| Item # | Title | Document # | Macola | Quantity |
|---|---|---|---|---|
| 1 | ATLAS MAIN BOOM WELDMENT | 32 03 04 004 2 | 108026 | 1 |
| 2 | HYDRAULIC TUBE, TL MAIN BOOM 45° - 132" LONG | 41 03 05 037 0 | TU03010 | 6 |
| 3 | 3 HOLE CLAMP NYLATRON | 40 00 00 066 0 | CLT3N | 5 |
| 4 | HEX BOLT 5/16-18 X 2.00 USS G5 | BL305032U518 | BL305032U518 | 15 |
| 5 | HEX NUT 5/16-24 SAE STOVERLOCK | NUS05S | NUS05S | 14 |
| 6* | WASHER FLAT 5/16 USS | WAF05U5 | WAF05U5 | 14 |
| 7 | 2 HOLE CLAMP NYLATRON | 40 00 00 067 0 | CLT2N | 5 |
| 8 | BUSHING, 2-1/2" X 2" X 4-1/8" NYLATRON ATLAS | 41 03 05 034 0 | BU503005 | 2 |
| 9* | HYDRAULIC, .125 STRAIGHT GREASE FITTING | HF2002S | HF2002S | 1 |
| 10 | 2" X 12" PIN | 41 03 04 009 1 | 108608 | 2 |
| 11 | NUT, SLOTTED 2.00 HEAVY USS | NUB32HU | NUB32HU | 1 |
| 12 | HEX BOLT 2-4.5 X 14 UNC G8 | BLI32224U845 | BLI32224U845 | 1 |
| 13 | HEX BOLT 3/8-16 X 3.50 USS G5 | BL306056U516 | BL306056U516 | 3 |
| 14 | NUT HEX 3/8 -16 UNC STOVERLOCK | NUS06U | NUS06U | 3 |
| 15 | ATLAS MAIN BOOM END CAP MOUNTING PLATE WELDMENT | 31 03 04 001 0 | 108623 | 2 |
| 16 | ATLAS MAIN BOOM END CAP | 41 03 04 014 0 | 108622 | 2 |
| 17 | WASHER LOCK 5/16 SPLIT | WAS055 | WAS055 | 4 |
| 18 | HEX BOLT 5/16-18 X 3/4 USS G5 | BL305012U518 | BL305012U518 | 4 |
| 19 | HYDRAULIC TUBE, TL MAIN BOOM 45 DG - 62" LONG | 41 03 05 029 0 | TU02002 | 2 |
| 20 | TL MAIN BOOM TO TIP BOOM THRUST WASHER - STIFFENER | 42 03 04 004 0 | BU507008 | 2 |
| 21 | HYD TUBE, .625 OD X .065 WLL X 45 DEG 12: LNG ATLS | 21 03 18 001 0 | TU04012 | 2 |
| 22 | ATLAS MAIN BOOM TO TIP BOOM HOSE BRACKET | 41 03 04 020 0 | 108632 | 1 |
| 23 | ATLAS MAIN BOOM TO TIP BOOM SPACER 2 | 41 03 04 021 0 | 108633 | 2 |

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS MAIN BOOM 146.5 ASSEMBLY

PART NUMBER: 02 03 18 002 1 / 108628

SCALE: NA

DRAWN BY: SWB

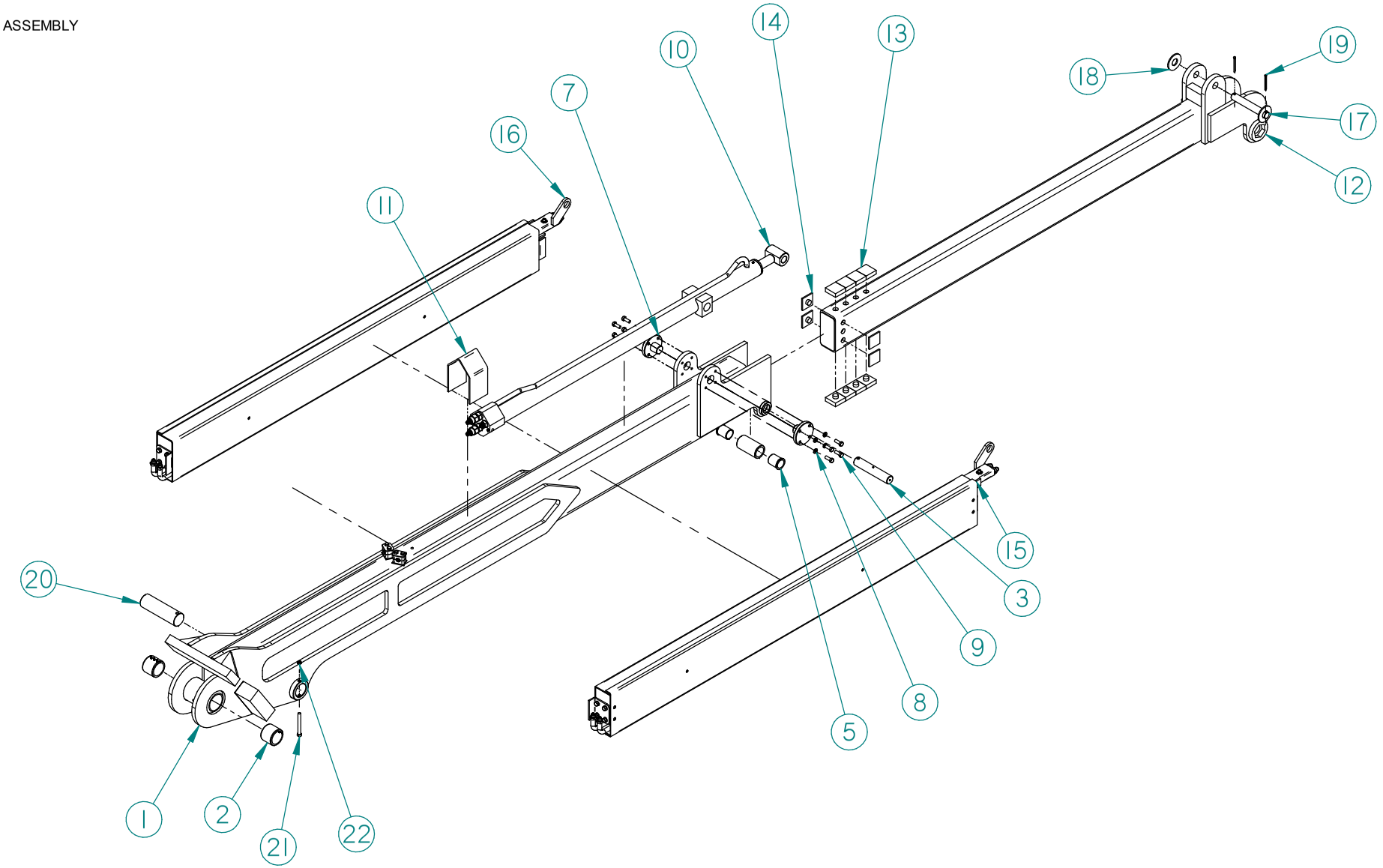
APPROVED BY:

DATE: 10/19/2015

SHEET: 3 OF 3

| REV. | DESCRIPTION | DATE | BY |
|---|---|---|---|
| 1 | CHANGED BUSHINGS TO CONNEX STEEL BUSHINGS | 4/30/19 | JAC |

010 ASSEMBLY




**TOLERANCES**

| | |
|---|---|
| 1 DEC. | ± 0.100 |
| 2 DEC. | ± 0.050 |
| 3 DEC. | ± 0.010 |
| ANGLE: | ± 1.000° |
| FRACTION: | ± 1/32" |
| DIM. UNITS: | INCHES |
| SURFACE FINISH: | 125/32 |

*UNLESS OTHERWISE SPECIFIED*

DEC. = DECIMAL PLACE(S)


LIGHTNING LOADER PETERSEN INDUSTRIES

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


TITLE: ATLAS TIP BOOM ASSEMBLY

PART NUMBER: 02 04 08 002 1 / 109106

SCALE: 1:20

DRAWN BY: SWB

APPROVED BY:

DATE: 03/31/2017

SHEET: 1 OF 2

| Item # | Title | Document # | MACOLA | Qty |
|---|---|---|---|---|
| 1 | ATLAS TIP BOOM WELDMENT | 32 04 04 005 1 | 109267 | 1 |
| 2 | BUSHING, 2-1/2" X 2" X 2" STL ATLAS TIP BOOM | BU601001 | BU601001 | 2 |
| 3 | TIP EXT ROLLER PIN, OUTRIGGER LEG PIVOT, FOOT CONNECT | 41 04 04 018 0 | PI18105F | 1 |
| 4* | TIP EXTENSION SUPPORT ROLLER | 41 04 04 001 1 | 115131 | 1 |
| 5 | BUSHING 1.2656" X 1.5" X 1.75" | 40 00 00 062 0 | BU402007 | 2 |
| 6* | HYDRAULIC, .125 STRAIGHT GREASE FITTING | HF2002S | HF2002S | 2 |
| 7 | TRUNION TIP EXTENSION CYLINDER MOUNT | 41 04 04 004 1 | 109205 | 2 |
| 8 | WASHER LOCK 3/8 SPLIT | WAS065 | WAS065 | 8 |
| 9 | HEX BOLT 3/8-16 X 1.00 USS G5 | BL306016U516 | BL306016U516 | 8 |
| 10 | ATLAS TIP EXTENSION CYLINDER SHAFT ASSEMBLY | 22 14 01 013 1 | 121106 | 1 |
| 11 | TIP BOOM TIP EXTENSION GUARD | 41 04 04 027 1 | 109238 | 1 |
| 12 | TL3 TIP EXTENSION INNER TUBE WELDMENT | 21 04 04 010 3 | 109153 | 1 |
| 13 | ATLAS TIP EXT NYLATRON PAD | 41 04 04 054 0 | 108612 | 8 |
| 14 | TIP EXTENSION SQUARE WEAR PUCK | 41 04 04 028 1 | 109210 | 4 |
| 15 | ATLAS HOSE RECOIL BOX ASSEMBLY - RIGHT | 21 04 04 025 1 | 123132 | 1 |
| 16 | ATLAS HOSE RECOIL BOX ASSEMBLY - LEFT | 21 04 04 026 1 | 123133 | 1 |
| 17 | TIP EXT CYLINDER ROD END PIN | 41 04 04 012 1 | PI1612F | 1 |
| 18 | WASHER FLAT 1 USS | WAF16U5 | WAF16U5 | 2 |
| 19 | COTTER PIN 3/16 X 2 | FA020332 | FA020332 | 2 |
| 20 | 2" X 6.625" PIN | 41 04 04 070 0 | 109262 | 1 |
| 21 | HEX BOLT 3/8-16 X 3.50 USS G5 | BL306056U516 | BL306056U516 | 1 |
| 22 | NUT HEX 3/8 -16 UNC STOVERLOCK | NUS06U | NUS06U | 1 |

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

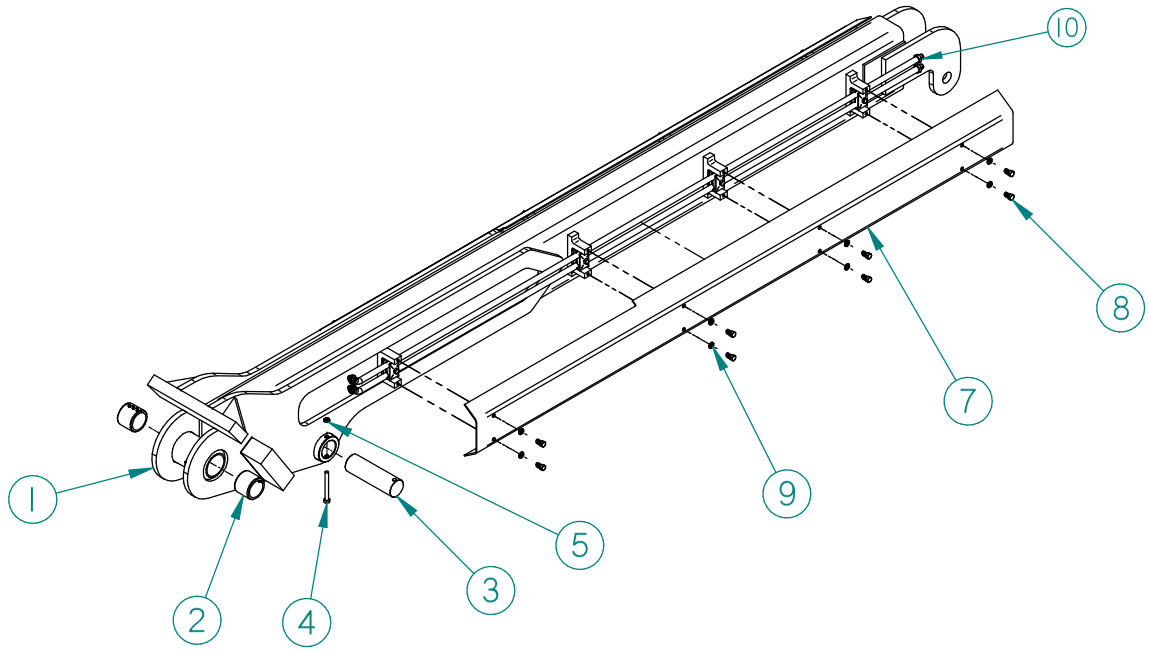
TITLE: ATLAS TIP BOOM ASSEMBLY

| PART NUMBER: | SCALE: |
|---|---|
| 02 04 08 002 1 / 109106 | NA |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 03/31/2017 | 2 OF 2 |

| REV. | DESCRIPTION | DATE | BY |
|---|---|---|---|
| 1 | CHANGED BUSHINGS TO CONNEX STEEL BUSHINGS | 4/30/19 | JAC |

010 ASSEMBLY




| Item # | Title | Document # | MACOLA | Qty |
|---|---|---|---|---|
| 1 | ATLAS FIXED TIP BOOM WELDMENT 107 | 32 04 04 006 1 | 109270 | 1 |
| 2 | BUSHING, 2-1/2" X 2" X 2" STL ATLAS TIP BOOM | BU601001 | BU601001 | 2 |
| 3 | 2" X 6.625" PIN | 41 04 04 070 0 | 109262 | 1 |
| 4 | HEX BOLT 3/8-16 X 3.50 USS G5 | BL306056U516 | BL306056U516 | 1 |
| 5 | NUT HEX 3/8 -16 UNC STOVERLOCK | NUS06U | NUS06U | 1 |
| 7 | ATLAS TIP BOOM TUBE COVER | 41 04 04 080 0 | 109274 | 2 |
| 8 | HEX BOLT 3/8-16 X .750 USS G5 | BL306012U516 | BL306012U516 | 16 |
| 9 | WASHER LOCK 3/8 SPLIT | WAS065 | WAS065 | 16 |
| 10 | HYDRAULIC TUBE 5/8 OD X .065 WALL _ 84 | 51 02 16 001 0 | TU05003 | 4 |

**TOLERANCES**

| | |
|---|---|
| 1 DEC. | ± 0.100 |
| 2 DEC. | ± 0.050 |
| 3 DEC. | ± 0.010 |
| ANGLE: | ± 1.000° |
| FRACTION: | ± 1/32" |
| DIM. UNITS: | INCHES |
| SURFACE FINISH: | 125/32 |

*UNLESS OTHERWISE SPECIFIED*

DEC. = DECIMAL PLACE(S)


LIGHTNING LOADER PETERSEN INDUSTRIES

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


TITLE: ATLAS FIXED TIP BOOM ASSEMBLY

PART NUMBER: 02 04 08 003 1 / 109107

SCALE: 1:20

DRAWN BY: SWB

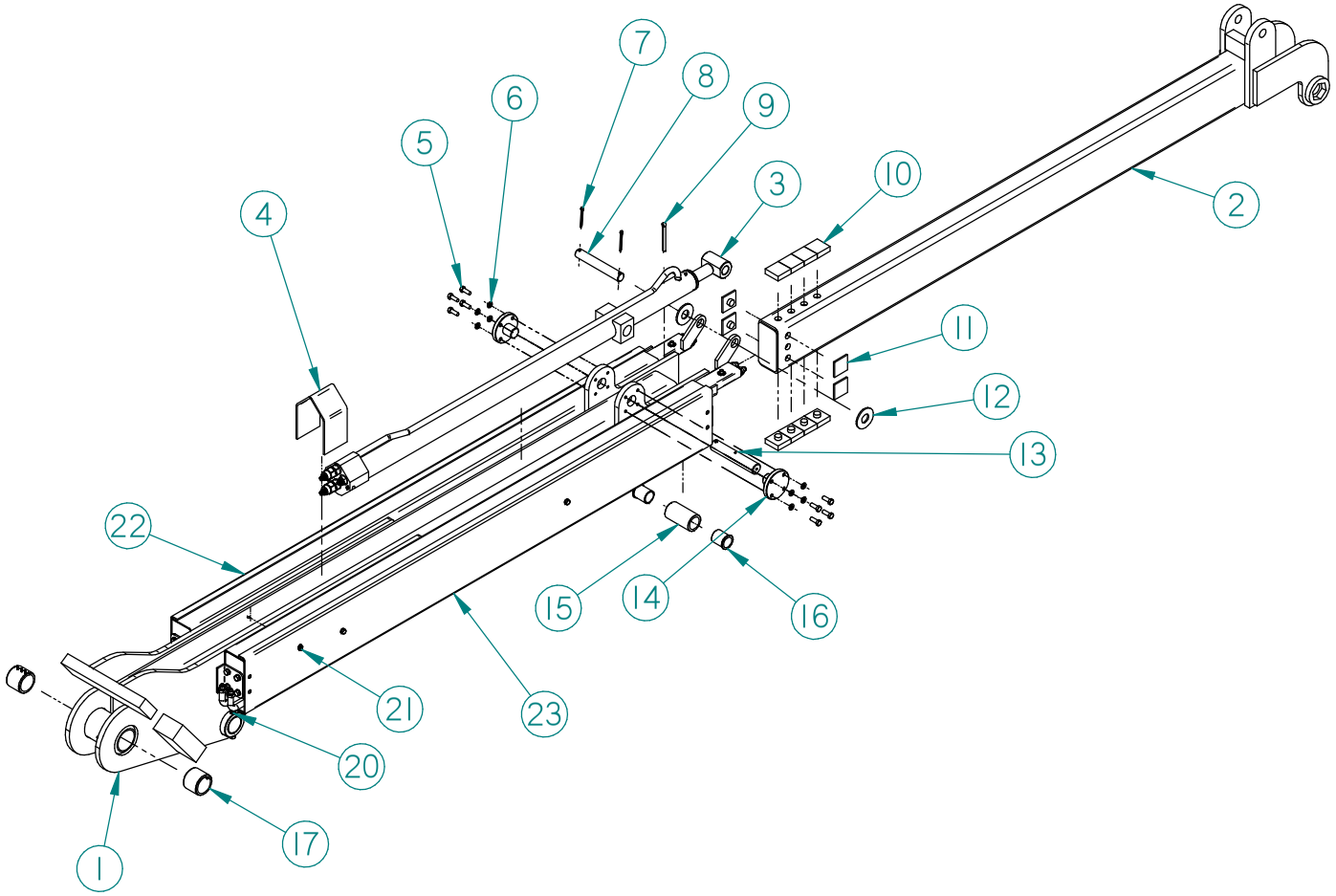
APPROVED BY:

DATE: 02/15/2017

SHEET: 1 OF 1

| REV. | DESCRIPTION | DATE | BY |
|---|---|---|---|
| 1 | REVISED TIP BOOM STOPS | 1/5/2017 | JAC |
| 2 | CHANGED BUSHINGS TO STEEL CONNEX | 5/1/19 | JAC |

010 ASSEMBLY




**TOLERANCES**

| | |
|---|---|
| 1 DEC. | ± 0.100 |
| 2 DEC. | ± 0.050 |
| 3 DEC. | ± 0.010 |
| ANGLE: | ± 1.000° |
| FRACTION: | ± 1/32" |
| DIM. UNITS: | INCHES |
| SURFACE FINISH: | 125/32 |

*UNLESS OTHERWISE SPECIFIED*

DEC. = DECIMAL PLACE(S)


PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


TITLE: ATLAS TIP BOOM ASSEMBLY

PART NUMBER: 02 04 08 001 2 / 109105

SCALE: 1:20

DRAWN BY: SWB

APPROVED BY:

DATE: 03/03/2016

SHEET: 1 OF 2

| Item # | Title | Document # | MACOLA | Qty |
|---|---|---|---|---|
| 1 | ATLAS TIP BOOM WELDMENT | 32 04 04 001 1 | 114010 | 1 |
| 2 | TL3 TIP EXTENSION INNER TUBE WELDMENT | 21 04 04 010 3 | 109153 | 1 |
| 3 | ATLAS TIP EXTENSION CYLINDER SHAFT ASSEMBLY | 22 14 01 013 1 | 121106 | 1 |
| 4 | TIP BOOM TIP EXTENSION GUARD | 41 04 04 027 1 | 109238 | 1 |
| 5 | HEX BOLT 3/8-16 X 1.00 USS G5 | BL306016U516 | BL306016U516 | 8 |
| 6 | WASHER LOCK 3/8 SPLIT | WAS065 | WAS065 | 8 |
| 7 | COTTER PIN 3/16 X 2 | FA020332 | FA020332 | 2 |
| 8 | TIP EXT CYLINDER ROD END PIN | 41 04 04 012 1 | PI16112F | 1 |
| 9 | COTTER PIN 5/16 X 3 | FA020548 | FA020548 | 1 |
| 10 | ATLAS TIP EXT NYLATRON PAD | 41 04 04 054 0 | 108612 | 8 |
| 11 | TIP EXTENSION SQUARE WEAR PUCK | 41 04 04 028 1 | 109210 | 4 |
| 12 | WASHER FLAT 1 USS | WAF16U5 | WAF16U5 | 2 |
| 13 | TIP EXT ROLLER PIN, OUTRIGGER LEG PIVOT, FOOT CONNECT | 41 04 04 018 0 | PI18105F | 1 |
| 14 | TRUNION TIP EXTENSION CYLINDER MOUNT | 41 04 04 004 1 | 109205 | 2 |
| 15 | TIP EXTENSION SUPPORT ROLLER | 41 04 04 001 1 | 115131 | 1 |
| 16 | BUSHING 1.2656" X 1.5" X 1.75" | 40 00 00 062 0 | BU402007 | 2 |
| 17 | BUSHING, 2-1/2" X 2" X 2" STL ATLAS TIP BOOM | BU601001 | BU601001 | 2 |
| 18* | 2" X 6.625" PIN | 41 04 04 070 0 | 109262 | 1 |
| 19* | HEX BOLT 3/8-16 X 3.50 USS G5 | BL306056U516 | BL306056U516 | 1 |
| 20 | NUT HEX 3/8 -16 UNC STOVERLOCK | NUS06U | NUS06U | 1 |
| 21 | HYDRAULIC, .125 STRAIGHT GREASE FITTING | HF2002S | HF2002S | 1 |
| 22 | ATLAS HOSE RECOIL BOX ASSEMBLY - LEFT | 21 04 04 026 1 | 123133 | 1 |
| 23 | ATLAS HOSE RECOIL BOX ASSEMBLY - RIGHT | 21 04 04 025 1 | 123132 | 1 |

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS TIP BOOM ASSEMBLY

PART NUMBER: 02 04 08 001 2 / 109105

SCALE: NA

DRAWN BY: SWB

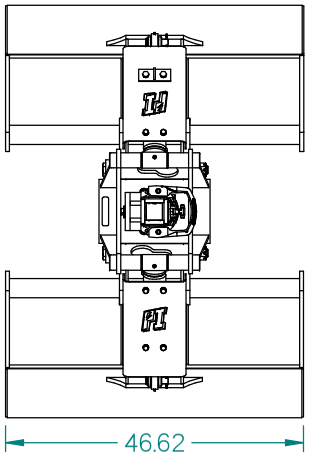
APPROVED BY:

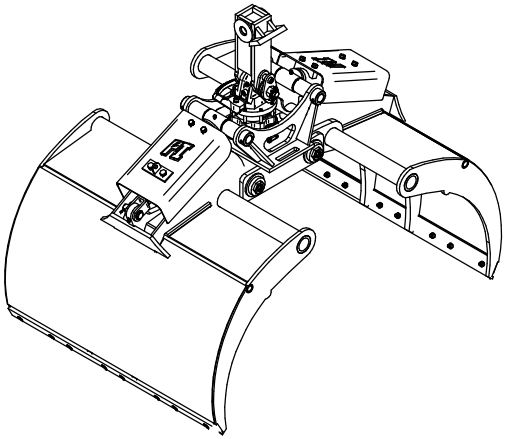
DATE: 03/03/2016

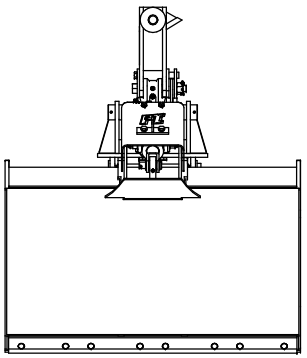
SHEET: 2 OF 2

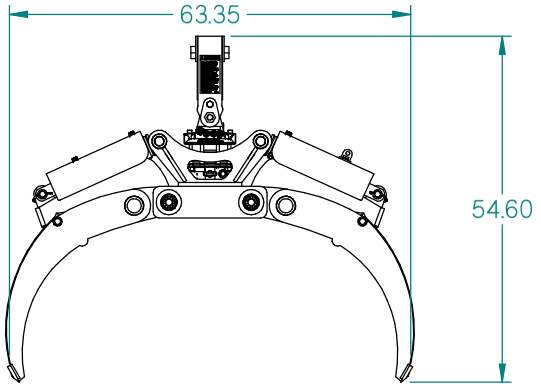
010 ASSEMBLY

| REV. | DESCRIPTION | DATE | BY |
|---|---|---|---|
| 1 | REVISED GIMBAL MOUNTING PIN | 09/30/2016 | SWB |
| 2 | REVISED BUCKET SADDLE WELDMENT | 10/04/2016 | SWB |
| 3 | REVISED BUCKET SADDLE WELDMENT | 11/28/18 | SWB |








NOTE: DUAL CYLINDER BUCKET WEIGHS 1040 LBS

**TOLERANCES**

| | |
|---|---|
| 1 DEC. | ± 0.100 |
| 2 DEC. | ± 0.050 |
| 3 DEC. | ± 0.010 |
| ANGLE: | ± 1.000° |
| FRACTION: | ± 1/32" |
| DIM. UNITS: | INCHES |
| SURFACE FINISH: | 125/32 |

*UNLESS OTHERWISE SPECIFIED*

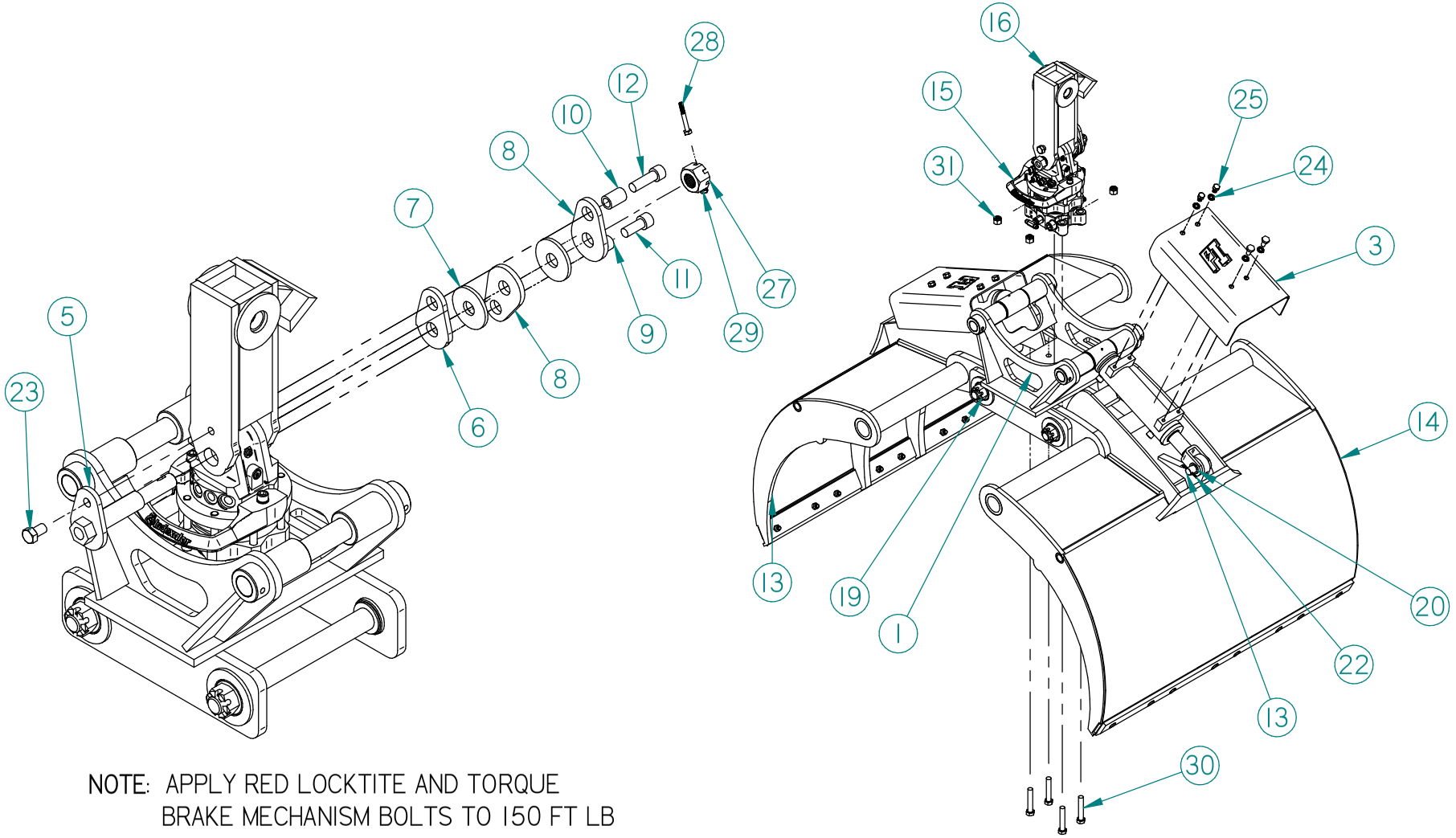
DEC. = DECIMAL PLACE(S)


PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


TITLE: DUAL CYLINDER BUCKET ASSEMBLY

| PART NUMBER: | SCALE: |
|---|---|
| 11 11 11 001 3 / 102103 | 1:30 |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 03/03/2016 | 1 OF 3 |




NOTE: APPLY RED LOCKTITE AND TORQUE
BRAKE MECHANISM BOLTS TO 150 FT LB

FOR ATLAS CONTROLS ONLY

TO SETUP ROTATOR FOR TL
CONTROLS USE
32 11 11 008 0

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: DUAL CYLINDER BUCKET ASSEMBLY

| PART NUMBER: | | | SCALE: |
|---|---|---|---|
| 11 11 11 001 3 / 102103 | | | 1:20 |
| DRAWN BY: SWB | APPROVED BY: | DATE: 03/03/2016 | SHEET: 2 OF 3 |

| Item # | Title | Document # | MACOLA | Quantity |
|---|---|---|---|---|
| 1 | DCB, BUCKET SADDLE WELDMENT | 32 11 11 004 2 | 102543 | 1 |
| 2* | DUAL CYLINDER BUCKET, CYLINDER PIN | 42 11 11 020 0 | 102526 | 2 |
| 3 | BUCKET, DCB CYLINDER COVER | 41 11 09 056 1 | 102204 | 2 |
| 4* | WASHER BRAKE, 4 X 1 5/16 X 1/4 | WAF642004 | WAF642004 | 2 |
| 5 | GIMBAL MOUNTING PIN ASSEMBLY | 31 11 11 008 2 | 102208 | 1 |
| 6 | DCB, GIMBAL BRAKE PLATE W/ CUTOUT | 42 11 11 021 0 | 102527 | 1 |
| 7 | BUCKET BRAKE WASHER 3 X 1.063 X .25 | WAF632004 | WAF632004 | 2 |
| 8 | GIMBAL BRAKE PLATE | 42 11 11 022 0 | 102528 | 2 |
| 9 | METRIC BOLT SPACER | 41 11 11 012 0 | 102504 | 1 |
| 10 | STANDARD BOLT SHOULDER | 41 11 11 011 1 | 102503 | 1 |
| 11 | SCREW, CAP M16 X 2.0 X 40 | SCAM1640 | SCAM1640 | 1 |
| 12 | GEARBOX MOUNTING BOLT | SCA1032C | SCA1032C | 1 |
| 13 | SAE CLEVIS PIN 1 X 3 | FA011648 | FA011648 | 2 |
| 14 | DUAL CYLINDER BUCKET, JAW ASSEMBLY | 22 11 11 001 0 | 102541 | 2 |
| 15 | DUAL CYLINDER BUCKET, ROTATOR, ATLAS ASSEMBLY | 32 11 11 005 0 | 102547 | 1 |
| 16 | BUCKET GIMBAL WELDMENT 4" X 5" X 11" | 31 11 09 046 1 | 102200 | 1 |
| 17* | CYLINDER W/ NO SPACER ASSEMBLY | 11 14 02 001 2 | 121195 | 2 |
| 18* | PIN, GRAPPLE ARM | 31 11 11 007 0 | 102207 | 2 |
| 19 | SLOTTED NUT 1-1/4 UNC GR5 | NUB20U | NUB20U | 2 |
| 20 | WASHER, BUSHING 1.00 X 1.50 | WAB1624 | WAB1624 | 8 |
| 21* | WASHER BUSHING, 1 1/2 X 2 1/4 | WAB2436 | WAB2436 | 4 |
| 22 | COTTER PIN 3/16 X 2 | FA020332 | FA020332 | 2 |
| 23 | HEX BOLT .625-11 X 1.00 USS G5 | BL310016U511 | BL310016U511 | 1 |
| 24 | WASHER LOCK 1/2 SPLIT USS | WAS085 | WAS085 | 8 |
| 25 | BOLT, HEX 1/2-13 X 3/4 USS G5 | BL308012U513 | BL308012U513 | 6 |
| 26* | BOLT, STRUCTURAL, HEAVY HEX, .50 - 13 UNC X 1.00 LG | BL408016U5 | BL408016U5 | 2 |
| 27 | NUT SLOTTED 1-14 SAE GR5 | NUB16S5 | NUB16S5 | 1 |
| 28 | BOLT HEX 1/4-20 X 2 USS G5 | BL304032U520 | BL304032U520 | 1 |
| 29 | HEX NUT 1/4-20 STOVERLOCK USS | NUS04U | NUS04U | 1 |
| 30 | HEX BOLT .625-11 X 3.50 USS G5 | BL310056U511 | BL310056U511 | 4 |
| 31 | NUT, HEX .625 USS | NUS10U | NUS10U | 4 |
| 32* | DCB, TARP HOOK BRACKET WELDMENT | 32 11 11 006 0 | 102550 | 1 |
| 33* | RESTRICTOR WARNING STICKER | DE02005 | DE02005 | 1 |

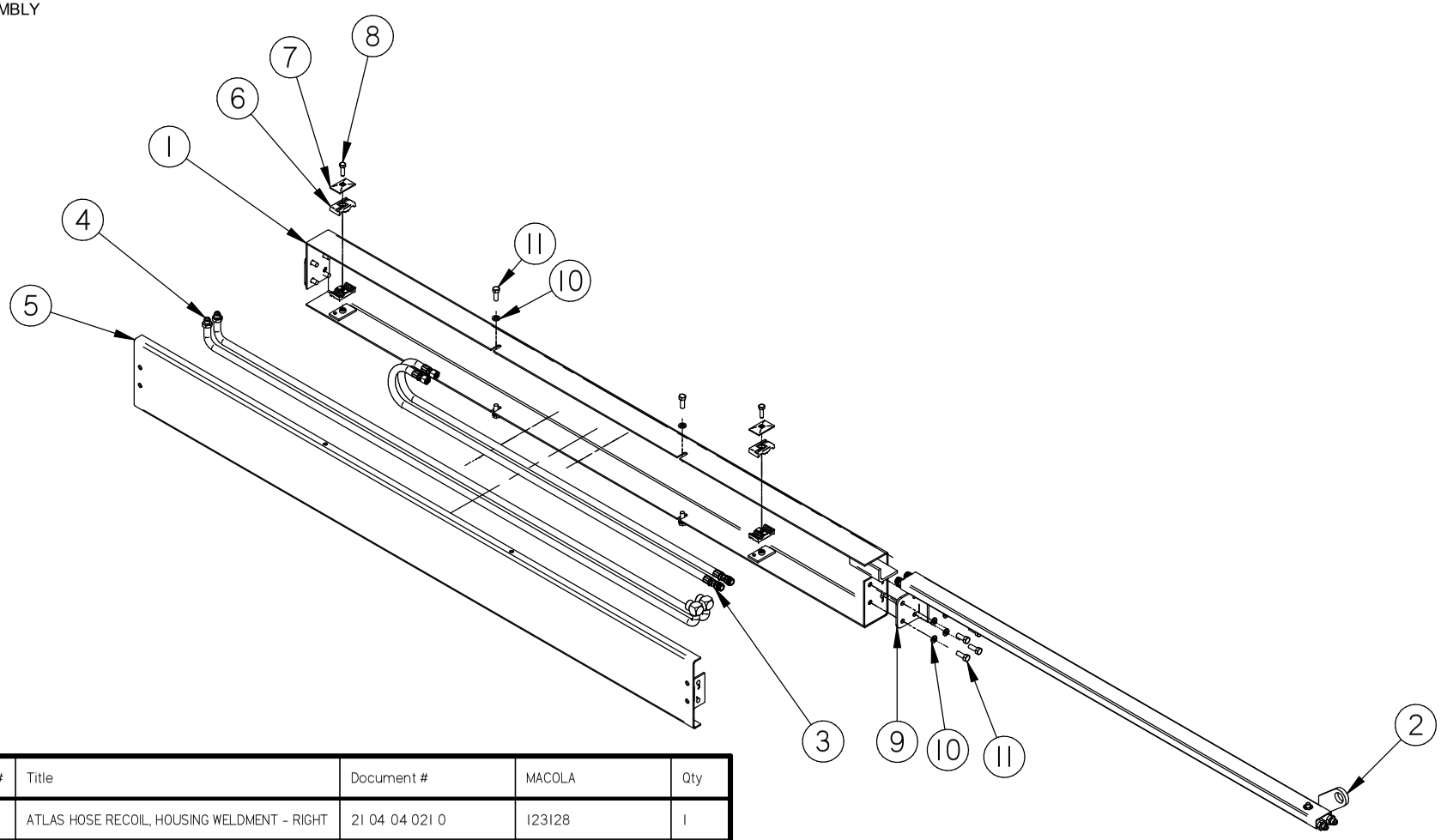

PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


TITLE: DUAL CYLINDER BUCKET ASSEMBLY

| PART NUMBER: | SCALE: |
|---|---|
| 11 11 11 001 3 / 102103 | NA |

| DRAWN BY: | APPROVED BY: | DATE: | SHEET: |
|---|---|---|---|
| SWB | | 03/03/2016 | 3 OF 3 |

010 ASSEMBLY




| Item # | Title | Document # | MACOLA | Qty |
|---|---|---|---|---|
| 1 | ATLAS HOSE RECOIL, HOUSING WELDMENT - RIGHT | 21 04 04 021 0 | 123128 | 1 |
| 2 | TIP BOOM, HOSE RECOIL SLIDE ASSY RH | 21 04 04 014 1 | 123124 | 1 |
| 3 | HOSE CUT 48" #6-S RECOIL BOX | 51 04 07 001 0 | HS10768FS | 2 |
| 4 | TUBE, ATLAS RECOIL BOX - CURVED | 41 04 04 064 0 | TU04008 | 2 |
| 5 | ATLAS HOSE RECOIL, COVER WELDMENT | 21 04 04 027 0 | 123134 | 1 |
| 6 | CLAMP, PLASTIC ONLY (2-HOLE) (1 SET) | CLP220 | CLP220 | 2 |
| 7 | CLAMP, TOP PLATE ONLY (2-HOLE) | CL5G225 | CL5G225 | 2 |
| 8 | BOLT, HEX HD, 5/16 - 18 UNC 1.250 LG | BL305012U518 | BL305012U518 | 2 |
| 9 | HOSE RECOIL COVER BRACKET | 41 04 04 068 0 | 123153 | 2 |
| 10 | WASHER LOCK 3/8 SPLIT | WAS065 | WAS065 | 12 |
| 11 | HEX BOLT 3/8-16 X 1.00 USS G5 | BL306016U516 | BL306016U516 | 12 |


PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844


TITLE: ATLAS HOSE RECOIL BOX ASSEMBLY - RIGHT

PART NUMBER: 21 04 04 025 0 / 123132

SCALE: 1:15

DRAWN BY: SWB

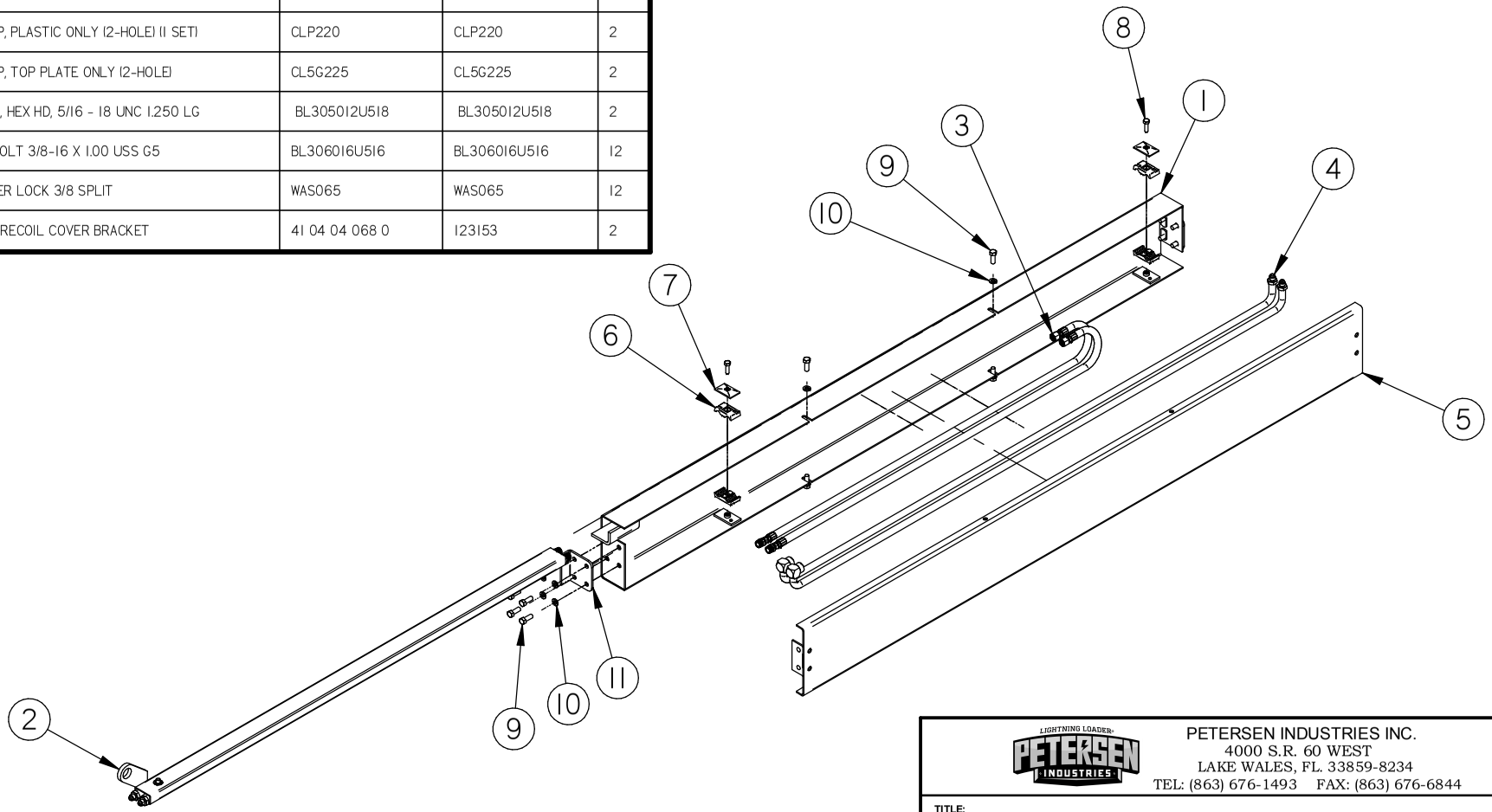
APPROVED BY:

DATE: 02/29/2016

SHEET: 1 OF 1

010 ASSEMBLY

| Item # | Title | Document # | MACOLA | Qty |
|---|---|---|---|---|
| 1 | ATLAS HOSE RECOIL, HOUSING WELDMENT - LEFT | 21 04 04 022 0 | 123129 | 1 |
| 2 | TIP BOOM, HOSE RECOIL SLIDE ASSY LH | 21 04 04 015 1 | 123123 | 1 |
| 3 | HOSE CUT 48" #6-S RECOIL BOX | 51 04 07 001 0 | HS10768FS | 2 |
| 4 | TUBE, ATLAS RECOIL BOX - CURVED | 41 04 04 064 0 | TU04008 | 2 |
| 5 | ATLAS HOSE RECOIL, COVER WELDMENT | 21 04 04 027 0 | 123134 | 1 |
| 6 | CLAMP, PLASTIC ONLY (2-HOLE) (1 SET) | CLP220 | CLP220 | 2 |
| 7 | CLAMP, TOP PLATE ONLY (2-HOLE) | CL5G225 | CL5G225 | 2 |
| 8 | BOLT, HEX HD, 5/16 - 18 UNC 1.250 LG | BL305012U518 | BL305012U518 | 2 |
| 9 | HEX BOLT 3/8-16 X 1.00 USS G5 | BL306016U516 | BL306016U516 | 12 |
| 10 | WASHER LOCK 3/8 SPLIT | WAS065 | WAS065 | 12 |
| 11 | HOSE RECOIL COVER BRACKET | 41 04 04 068 0 | 123153 | 2 |




PETERSEN INDUSTRIES INC.
4000 S.R. 60 WEST
LAKE WALES, FL. 33859-8234
TEL: (863) 676-1493 FAX: (863) 676-6844

TITLE: ATLAS HOSE RECOIL BOX ASSEMBLY - LEFT

PART NUMBER: 21 04 04 026 0 / 123133

SCALE: 1:15

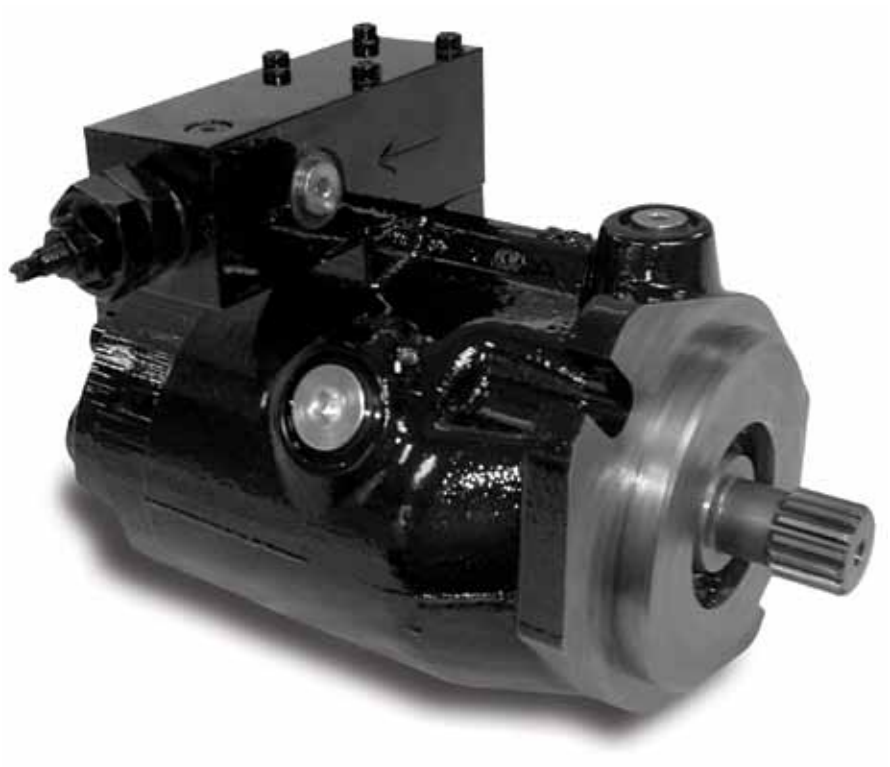
DRAWN BY: SWB

APPROVED BY:

DATE: 02/29/2016

SHEET: 1 OF 1

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding



# P1/PD Series: 18cc to 140cc Medium Pressure Axial Piston Pumps

Variable Displacement – Service Information
Bulletin HY28-2665-02/SVC/EN
Effective: January 1, 2014

Parker

ENGINEERING YOUR SUCCESS.

The product information, specifications, and descriptions contained in this publication have been compiled for the use and convenience of our customers from information furnished by the manufacturer; and we can not, and do not, accept any responsibility for the accuracy or correctness of any description, calculation, specification, or information contained herein. No such description, calculation, specification, or information regarding the products being sold has been made part of the basis of the bargain, nor has same created or amounted to an express warranty that the products would conform thereto. We are selling the goods and merchandise illustrated and described on this publication on an “as is” basis, and disclaim any implied warranty, including any warranty of merchantability or warranty of fitness for any particular purpose whatsoever, with respect to the goods and merchandise sold. All manufacturer warranties shall be passed on to our customers, but we shall not be responsible for special, indirect, incidental, or consequential damages resulting from the use of any of the products or information contained or described on this publication. Further, we reserve the right to revise or otherwise make product improvements at any time without notification.

## WARNING - USER RESPONSIBILITY

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

## OFFER OF SALE

The items described in this document are hereby offered for sale by Parker-Hannifin Corporation, its subsidiaries or its authorized distributor. This offer and its accepteance are governed by the provisions stated in the detailed "Offer of Sale" elsewhere in this document.

# Contents

General Information..... 4
Start up procedure..... 5
Troubleshooting..... 6
18cc, Model Ordering Code..... 8
28cc, Model Ordering Code..... 9
45cc, Model Ordering Code..... 10
60cc, Model Ordering Code..... 11
75cc, Model Ordering Code..... 12
100cc, Model Ordering Code..... 13
140cc, Model Ordering Code..... 14
Technical data..... 15

## Parts Data

018 & 028 pump exploded view..... 16
045 pump exploded view..... 17
Parts list for 018, 028, 045..... 18
060, 075, 100 & 140 pump exploded view..... 20
Parts list for 060, 075, 100, 140..... 21
Electronic Control Exploded View..... 22
Parts list for Electronic Control..... 23
Case to inlet check valves..... 24
Volume stop..... 25
Seal and parts kits..... 26-27
L-compensator..... 28-29
C-compensator..... 30
AE, AF, AL, AM,AN compensator..... 31

## Assembly/Disassembly information

Compensator disassembly/inspection..... 32
Compensator assembly..... 33
018, 028, 045 disassembly..... 34
018, 028, 045 Inspection..... 37
018, 028, 045 rework limits..... 38
018, 028, 045 assembly..... 39
018, 028, 045 assembly tools..... 42
018, 028, 045 test procedure..... 44
060, 075, 100, 140 disassembly..... 46
060, 075, 100, 140 inspection..... 48
060, 075, 100, 140 rework limits..... 49
060, 075, 100, 140 assembly..... 50
060, 075, 100, 140 assembly tools..... 54
060, 075, 100, 140 test procedure..... 56

Conversions and formulas..... 59
Offer of sale..... 63

**MOUNTING**

These pumps are designed to operate in any position. The pump shaft must be in alignment with the shaft of the source driver and should be checked with a dial indicator. The mating pilot bore and coupling must be concentric. This concentricity is particularly important if the shaft is rigidly connected to the driven load without a flexible coupling.

**SHAFT INFORMATION**

**Splined:** The shafts will accept a maximum misalignment of 0.15mm, 0.005 inch, total indicator reading. Angular misalignment at the external and internal spline axis must be less than ± 0,002 mm per mm of shaft radius, ± 0.002 inches per inch of shaft radius. The coupling interface must be lubricated. PARKER recommends lithium molydisulfide or similar grease. The internal coupling should be hardened to Rc 27-34 and must conform to SAE-J498c, class 5 flat root side fit.
**Keyed:** High strength heat treated keys must be used. Replacement keys must be hardened to 27-34 Rc. The key corners must be chamfered 0.81-1.0 mm, 0.032”-0.040”, at 45° to clear radii that exist in the keyway.

**SIDE LOAD CAPABILITY**

The P1/PD series is designed for inline-drive. Side loading on the shaft is not recommended. If this is unavoidable consult your nearest PARKER representative.

**FLUID CONNECTIONS**

Connect inlet and outlet lines to the port block of the pump. The maximum case pressure is 2 bar (30 psi) continuous, 4 bar (60 psi) intermittent. The case pressure must never exceed inlet pressure by more than .5 bar (7 psi). When connecting case drain line make certain that drain plumbing passes above highest point of the pump before passing to the reservoir. The case leakage line must be of sufficient size to prevent back pressure in excess of 2 bar (30 psi) and returned to the reservoir below the surface of the oil as far from the supply inlet as possible. All fluid lines, whether pipe, tubing, or hose must be adequate size and strength to assure free flow through the pump. An undersize inlet line will prevent the pump from operating properly at full rated speed. An undersize outlet line will cause back pressure and cause heat generation and increased noise. Flexible hose lines are recommended. If rigid piping is used, the workmanship must be accurate to eliminate strain on the pump port block or to the fluid connections. Sharp bends in the lines must be eliminated wherever possible. All system piping must be cleaned and flushed before installing pump. Make sure the entire hydraulic system is free of dirt, lint, scale, or other foreign material.
**Caution:** Do not use galvanized pipe. Galvanized coating can flake off with continued use.

**SYSTEM RELIEF VALVES**

Although the P1/PD series pumps have very fast off-stroke compensator response, system relief valves are recommended in all cases for safety considerations.

**RECOMMENDED FLUIDS**

The fluid recommended for use in these pumps has a petroleum base and contains agents which provide oxidation inhibition and anti-rust, anti-foam and de-aerating properties as described in PARKER standard HF-1. Where anti-wear additive fluids are specified, see PARKER standard HF-0.

**VISCOSITY INDEX**

90 V. I. minimum. Higher values extend the range of operating temperature but may reduce the service life of the fluid.

**TEMPERATURE**

Determined by the viscosity characteristics of the fluid used. Because high temperatures degrade seals, reduce the service life of the fluid and create hazards, fluid temperature should not exceed 110°C (230°F) at the case drain.

**MAINTENANCE**

The pump is self-lubricating and preventative maintenance is limited to keeping system fluid clean by changing filters frequently. Keep all fittings and screws tight. Do not operate at pressures and speeds in excess of the recommended limit. If the pump does not operate properly, check the troubleshooting chart before attempting to overhaul the unit. Overhauling may be accomplished by referring to the disassembly, rework limits of wear parts, and assembly procedures as provided in this service manual.

**FLUID CLEANLINESS**

Fluid must be cleaned before and continuously during operation, by filters that maintain a cleanliness level of ISO 20/18/14. Better cleanliness levels will significantly extend the life of the components. As contaminant generation may vary with each application, each must be analyzed to determine proper filtration to maintain the required cleanliness level.

**STARTUP PROCEDURE FOR NEW INSTALLATIONS**

- Read and understand the instruction manual.
- Identify components and their function.
- Visually inspect components and lines for possible damage.
- Insure that all necessary ports are properly connected.
- Check reservoir for cleanliness. Drain and clean as required.
- Check fluid level and fill as required with filtered fluid to a minimum ISO cleanliness level of 20/18/14.
- Fill pump case with clean oil prior to starting.
- If pump is mounted vertically with the shaft up, bleed the air out the D1 drain port located near the mounting flange.
- Check alignment of drive.
- Check oil cooler and activate it, if included in circuit. Check fluid temperature.
- Reduce pressure settings of compensator and relief valve. Make sure accurate pressure readings can be made at appropriate places.
- If solenoids in system, check for actuation.
- Jog the pump drive. Check for proper shaft rotation. Make sure pump fills properly.
- Start the pump drive.
- Bleed system of air. Recheck fluid level.
- Cycle unloaded machine at low pressure and observe actuation (at low speed, if possible).
- Increase pressure settings gradually in steps. Check for leaks in all lines especially in pump and motor inlet lines.
- Make correct pressure adjustments.
- Gradually increase speed. Be alert for trouble as indicated by changes in sounds, system shocks, and air in fluid.
- Equipment is operational.

**Typical Ajustment Ranges and Initial Settings (unless customer specified at time of order)**

| Function | Adjustment range | Adjustment value | Recommended or Initial Setting |
|---|---|---|---|
| Pressure compensators | | | |
| "C0" | 80-280 bar (1160-4060 PSI) | 40 bar/turn (580 PSI/turn) | Factory supplied at minimum |
| "C1" | 20-80 bar (290-1160 PSI) | 18.6 bar/turn (260PSI/turn) | Factory supplied at minimum |
| "AM" | 80-280 bar (1160-4060 PSI) | 40 bar/turn (580 PSI/turn) | Factory supplied at minimum |
| Load sense pressure | | | |
| "L0" | 8-35 bar (116-500 PSI) | 28 bar/turn (410 PSI/turn) | 24 bar (350 PSI) |
| Differential pressure | | | |
| "AM" | 37 bar (540 PSI) | Adjustment not recommended | Factory Set do not adjust |
| Maximum Volume stop | | | |
| 018 | 100-40% | 9% per turn (1.6 cc/turn) | 100% |
| 028 | 100-40% | 8.2% per turn (2.3 cc/turn) | 100% |
| 045 | 100-20% | 7.5% per turn (3.4 cc/turn) | 100% |
| 060 | 100-30% | 6.8% per turn (4.1 cc/turn) | 100% |
| 075 | 100-35% | 6.2% per turn (4.65 cc/turn) | 100% |
| 100 | 100-50% | 5.5% per turn (5.5 cc/turn) | 100% |
| 140 | 100-50% | 4.8% per turn (6.72 cc/turn) | 100% |
| Minimum Volume stop | | | |
| 018 | 0-68% | 10% per turn (1.8 cc/turn) | 0% |
| 028 | 0-40% | 9% per turn (2.6 cc/turn) | 0% |
| 045 | 0-40% | 8.2% per turn (3.7 cc/turn) | 0% |
| 060 | 0-50% | 4.6% per turn (2.76 cc/turn) | 0% |
| 075 | 0-45% | 4.3% per turn (3.23 cc/turn) | 0% |
| 100 | 0-45% | 3.9% per turn (3.9 cc/turn) | 0% |
| 140 | 0-25% | 3.3% per turn (4.62 cc/turn) | 0% |

Component problems and circuit problems are often interrelated. An improper circuit may operate with apparent success but will cause failure of a particular component within it. The component failure can be the effect, not the cause of the problem. This general guide is offered to help in locating and eliminating the cause of problems by studying their effects.

| Effect of Trouble | Possible Cause | Fault Which Needs Remedy |
|---|---|---|
| noisy pump | air in fluid | leak in inlet line |
| | | low fluid level |
| | | turbulent fluid |
| | | return lines above fluid level |
| | | gas leak from accumulator |
| | | excessive pressure drop in the inlet line from a pressurized reservoir |
| | | inlet line strainer acting as air trap |
| | cavitation in rotating group | fluid too cold |
| | | fluid too viscous |
| | | fluid too heavy |
| | | shaft speed to high |
| | | inlet line too small |
| | | inlet strainer too small |
| | | inlet strainer too dirty |
| | | operating altitude too high |
| | | inlet pressure too low |
| | misaligned shaft | faulty installation |
| | | distortion in mounting |
| | | axial interference |
| | | faulty coupling |
| | | excessive overhung loads |
| | mechanical fault in pump | piston and shoe looseness or failure |
| | | bearing failure |
| | | incorrect port plate rotation |
| | | eroded or worn parts in the displacement control |
| erosion on barrel ports and port plate | air in fluid | see noisy pump above |
| | cavitation | see noisy pump above |
| pressure shocks | cogging load | mechanical considerations |
| | worn relief valve | needed repairs |
| | worn compensator | replace |
| | slow response in check valves | replace or relocate |
| | excessive decompression energy rates | improve decompression control |
| | barrel blow-off | rotating group worn, excessive case pressure |
| compensator instability | excessive line capacitance (line volume, line stretch, acumulator effects) | reduce line size or lengths |
| | | eliminate hose |

| Effect of Trouble | Possible Cause | Fault Which Needs Remedy |
|---|---|---|
| high wear in pump | excessive loads | reduce pressure settings |
| | | reduce speeds |
| | contaminant particles in fluid | improper filter maintenance |
| | | filters too coarse |
| | | introduction of dirty fluid to system |
| | | reservoir openings |
| | | improper reservoir breather |
| | | improper line replacement |
| | improper fluid | fluid too thin or thick for operating temperature range |
| | | breakdown of fluid with time/temperature/heating effects |
| | | incorrect additives in new fluid |
| | | destruction of additive effectiveness with chemical aging |
| | improper repair | incorrect parts |
| | | incorrect procedures, dimensions, finishes |
| | unwanted water in fluid | condensation |
| | | faulty breather/strainer |
| | | heat exchanger leakage |
| | | faulty clean-up practice |
| | | water in makeup fluid |
| heating of fluid | excessive pump leakage | recheck case drain flow and repair as required |
| | | fluid too thin |
| | | improper assembly, port timing |
| | relief valve | set too low (compared to load or to compensator) |
| | | instability caused by back pressure, worn parts |
| | compensator | set too high (compared to relief) |
| | | worn parts |
| | pump too large for fluid needs | select smaller pump displacement |
| | heat exchanger | water turned off or too little flow |
| | | water too hot |
| | | fan clogged or restricted |
| | | efficiency reduced by mud or scale deposits |
| | | intermittent hydraulic fluid flow |
| | reservoir | too little fluid |
| | | improper baffles |
| | | insulating air blanket that prevents heat rejection |
| | | heat pickup from adjacent equipment |

| | 018 | P | | | S | | | 5 | A | | | | | | | | 00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pump Series | Displacement 18cc/rev. (1.10 in³/rev) | Open Circuit | Mounting & Ports | Shaft Options | Single Shaft Seal | Shaft Rotation | Configuration | Fluorocarbon Seal Material | Design Letter | Control Options | Additional Control Options | Port Orientation | Adjustable Displacement Stops | Port Type | Thru-Drive Mounting Pad/Coupling | Paint | Special Features |

| Pump Series | |
|---|---|
| P1 | Mobile |
| PD | Industrial |

| Mounting & Ports | |
|---|---|
| S | SAE A Pilot SAE Threaded Work Ports with SAE Aux Ports |
| A | SAE A Pilot Metric Work Ports with BSPP Aux Ports |
| M | ISO - 80mm Pilot Metric Work Ports with Metric Aux Ports |
| B | ISO - 80mm Pilot Metric Work Ports with BSPP Aux Ports |

| Shaft Options | |
|---|---|
| 01 | Splined shaft - SAE 19-4 11T |
| 02 | Keyed shaft - SAE 19-1 .75" Dia. |
| 04 | ISO keyed 20MM Dia. |
| 06 | Splined shaft - SAE A 9T* |

*Not available with Thru-Drive

| Shaft Rotation | |
|---|---|
| R | Clockwise |
| L | Counterclockwise |

| Configuration | |
|---|---|
| M | Mobile (P1) |
| S | Industrial (PD) |

| Control Options | |
|---|---|
| C0 | Pressure limiter 1160.30 - 4061.05 PSI (80 - 280 bar) |
| C1 | Pressure limiter 290.08 - 1160.30 PSI (20 - 80 bar) |
| L0 | Load sensing 145.04-435.11 PSI ΔP (10-30 bar ΔP) with pressure limiter 1160.30 - 4061.05 PSI (80 - 280 bar) |
| L2 | Load sensing 145.04-435.11 PSI ΔP (10-30 bar ΔP) with bleed & pressure limiter 1160.30 - 4061.05 PSI (80 - 280 bar) |
| AN* | Pilot operated pressure limiter with ISO4401 interface & SAE 4 Vent Port |
| AM | Pilot operated pressure limiter with mechanical adjustment and SAE 4 Vent Port |
| AE | Pilot operated pressure limiter with mechanical and electrical adjustment 12 VDC |
| AF | Pilot operated pressure limiter with mechanical and electrical adjustment 24 VDC |
| ## | See chart below for electronic control options |

*Not functional control as such

| Additional Control Options | |
|---|---|
| 0 | No other options |
| 2 | Displacement sensor ** |

** mandatory with "W**", "X**", "Y**", "Z**" "*D*" and "*Y*"

| Port Orientation | |
|---|---|
| E | End Ports |
| R | Side ported with ripple chamber |
| T | Side ported with Thru-Drive |

| Adjustable Displacement Stops | |
|---|---|
| 0 | None |
| 1 | Adjustable maximum displacement stop |
| 2 | Adjustable minimum displacement stop |
| 3 | Adjustable maximum and minimum displacement stop |

| Port Type | |
|---|---|
| 0 | Flange Ports* |
| 2 | Threaded Ports |

*With Thru-Drive Only

| Thru-Drive Mounting Pad/Coupling | |
|---|---|
| 0 | No Thru-Drive |
| A | SAE 82-2(A), 16(A), 9T coupling |
| H | SAE 82-2(A), 19(--), 11T coupling |

| Paint | |
|---|---|
| 00 | No Paint |
| PB | Black Paint |

**Electronic Control Options**

| # | # |
|---|---|

| # | |
|---|---|
| 0 | No ECU |
| D | Proportional displacement control |
| Y | Proportional pressure and displacement control |

| # | |
|---|---|
| P | Electronic valve with zero displacement default |
| T | Electronic valve with max displacement default |
| S | Electronic valve with zero displacement default and hydromechanical Pmax |
| U | Electronic valve with max displacement default and hydromechanical Pmax |
| W | Electronic valve with zero displacement default (CANBUS compatible) |
| Y | Electronic valve with max displacement default (CANBUS compatible) |
| X | Electronic valve with zero displacement default and hydromechanical Pmax (CANBUS compatible) |
| Z | Electronic valve with max displacement default and hydromechanical Pmax (CANBUS compatible) |

*** W, X, Y and Z only available with *D* and *Y*



Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

| | 028 | P | | | S | | | 5 | A | | | | | | | | 00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pump Series | Displacement 28cc/rev. (1.71 in³/rev) | Open Circuit | Mounting & Ports | Shaft Options | Single Shaft Seal | Shaft Rotation | Configuration | Fluorocarbon Seal Material | Design Letter | Control Options | Additional Control Options | Port Orientation | Adjustable Displacement Stops | Port Type | Thru-Drive Mounting Pad/Coupling | Paint | Special Features |

| Pump Series | |
|---|---|
| P1 | Mobile |
| PD | Industrial |

| Mounting & Ports | |
|---|---|
| S | SAE B Pilot SAE Work Ports with SAE Aux Ports |
| A | SAE B Pilot Metric Work Ports with BSPP Aux Ports |
| M | ISO - 100MM Pilot Metric Work Ports with Aux Ports |
| B | ISO - 100MM Pilot Metric Work Ports with BSPP Aux Ports |

| Shaft Options | |
|---|---|
| 01 | Splined shaft - SAE B-B 15T |
| 02 | Keyed shaft - SAE B-B 1" Dia. |
| 04 | ISO keyed 25MM Dia. |
| 08 | Splined shaft - SAE B 13T |

| Shaft Rotation | |
|---|---|
| R | Clockwise |
| L | Counterclockwise |

| Configuration | |
|---|---|
| M | Mobile (P1) |
| S | Industrial (PD) |

| Control Options | |
|---|---|
| C0 | Pressure limiter 1160.30 - 4061.05 PSI (80 - 280 bar) |
| C1 | Pressure limiter 290.08 - 1160.30 PSI (20 - 80 bar) |
| L0 | Load sensing 145.04-435.11 PSI ΔP (10-30 bar ΔP) with pressure limiter 1160.30 - 4061.05 PSI (80 - 280 bar) |
| L2 | Load sensing 145.04-435.11 PSI ΔP (10-30 bar ΔP) with bleed & pressure limiter 1160.30 - 4061.05 PSI (80 - 280 bar) |
| AN* | Pilot operated pressure limiter with ISO4401 interface & SAE 4 Vent Port |
| AM | Pilot operated pressure limiter with mechanical adjustment and SAE 4 Vent Port |
| AE | Pilot operated pressure limiter with mechanical and electrical adjustment 12 VDC |
| AF | Pilot operated pressure limiter with mechanical and electrical adjustment 24 VDC |
| ## | See chart below for electronic control options |

*Not functional control as such

| Additional Control Options | |
|---|---|
| 0 | No other options |
| 2 | Displacement sensor ** |

** mandatory with "W**", "X**", "Y**", "Z**" "*D*" and "*Y*"

| Port Orientation | |
|---|---|
| E | End Ports |
| R | Side ported with ripple chamber |
| T | Side ported with through drive |

| Adjustable Displacement Stops* (For E & R Port Orientation Only) | |
|---|---|
| 0 | None |
| 1 | Adjustable maximum displacement stop |
| 2 | Adjustable minimum displacement stop |
| 3 | Adjustable maximum and minimum displacement stop |

*Not available with Thru-Drive

| Port Type | |
|---|---|
| 0 | Flange Ports |
| 2 | Threaded Ports |

| Thru-Drive Mounting Pad/Coupling | |
|---|---|
| 0 | No Thru-Drive |
| A | SAE 82-2 (A), 16 (A), 9T coupling |
| H | SAE 82-2 (A), 19 (--), 11T coupling |
| B | SAE 101-2 (B), 22 (B) , 13T coupling |
| Q | SAE 101-2 (B), 25 (B-B), 15T coupling |

| Paint | |
|---|---|
| 00 | No Paint |
| PB | Black Paint |

| Electronic Control Options | |
|---|---|
| # | # |

| # | |
|---|---|
| 0 | No ECU |
| D | Proportional displacement control |
| Y | Proportional pressure and displacement control |

| # | |
|---|---|
| P | Electronic valve with zero displacement default |
| T | Electronic valve with max displacement default |
| S | Electronic valve with zero displacement default and hydromechanical Pmax |
| U | Electronic valve with max displacement default and hydromechanical Pmax |
| W | Electronic valve with zero displacement default (CANBUS compatible) |
| Y | Electronic valve with max displacement default (CANBUS compatible) |
| X | Electronic valve with zero displacement default and hydromechanical Pmax (CANBUS compatible) |
| Z | Electronic valve with max displacement default and hydromechanical Pmax (CANBUS compatible) |

*** W, X, Y and Z only available with *D* and *Y*

| | 045 | P | | | S | | | 5 | A | | | | | | | 00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pump Series | Displacement 45cc/rev. (2.75 in³/rev) | Open Circuit | Mounting & Ports | Shaft Options | Single Shaft Seal | Shaft Rotation | Configuration | Fluorocarbon Seal Material | Design Letter | Control Options | Additional Control Options | Port Orientation | Adjustable Displacement Stops | Port Type | Thru-Drive Mounting Pad & Coupling | Paint | Special Features |

| Pump Series | |
|---|---|
| P1 | Mobile |
| PD | Industrial |

| Mounting & Ports | |
|---|---|
| S | SAE B Pilot with SAE Threaded or Flange Work Ports with SAE Aux Ports |
| A | SAE B Pilot with Metric Threaded or Metric Flange Work Ports with BSPP Aux Ports |
| M | ISO - 100MM Pilot Metric Threaded or Metric Flange Work Ports with Aux Ports |
| B | ISO - 100MM Pilot Metric Threaded or Metric Flange Work Ports with Aux Ports |

| Shaft Options | |
|---|---|
| 01 | Splined shaft - SAE B-B 15T |
| 02 | Keyed shaft - SAE B-B 1" Dia. |
| 04 | ISO keyed 25MM Dia. |
| 08 | Splined shaft - SAE B 13T |

| Shaft Rotation | |
|---|---|
| R | Clockwise |
| L | Counterclockwise |

| Configuration | |
|---|---|
| M | Mobile (P1) |
| S | Industrial (PD) |
| U | Universal (SAE Mounting Option, S, Only) |

| Control Options | |
|---|---|
| C0 | Pressure limiter 1160.30 - 4061.05 PSI (80 - 280 bar) |
| C1 | Pressure limiter 290.08 - 1160.30 PSI (20 - 80 bar) |
| L0 | Load sensing 145.04-435.11 PSI ΔP (10-30 bar ΔP) with pressure limiter 1160.30 - 4061.05 PSI (80 - 280 bar) |
| L2 | Load sensing 145.04-435.11 PSI ΔP (10-30 bar ΔP) with bleed & pressure limiter 1160.30 - 4061.05 PSI (80 - 280 bar) |
| AN* | Pilot operated pressure limiter with ISO4401 interface & SAE 4 Vent Port |
| AL | Pilot operated pressure limiter with Load sensing (only available with "T" Torque Limiter option, i.e. "ALT ") |
| AM | Pilot operated pressure limiter with mechanical adjustment and SAE 4 Vent Port |
| AE | Pilot operated pressure limiter with mechanical and electrical adjustment 12 VDC |
| AF | Pilot operated pressure limiter with mechanical and electrical adjustment 24 VDC |
| ## | See chart below for electronic control options |

*Not functional control as such

| Additional Control Options | |
|---|---|
| 0 | No other options |
| 2 | Displacement sensor ** |
| T | Torque Limiter Control (Used with AM, AN or AL control options) |

** mandatory with "W**", "X**", "Y**", "Z**" "*D*" and "*Y*"

| Port Orientation | |
|---|---|
| E | End Ports |
| R | Side ported with ripple chamber |
| T | Side ported with through drive |

| Adjustable Displacement Stops* (For E & R Port Orientation Only) | |
|---|---|
| 0 | None |
| 1 | Adjustable maximum displacement stop |
| 2 | Adjustable minimum displacement stop |
| 3 | Adjustable maximum and minimum displacement stop |

*Not available with Thru-Drive

| Port Type | |
|---|---|
| 0 | Flange Ports |
| 2 | Threaded Ports |

| Thru-Drive Mounting Pad/Coupling | |
|---|---|
| 0 | No Thru-Drive |
| A | SAE 82-2 (A), 16 (A), 9T coupling |
| H | SAE 82-2 (A), 19 (--), 11T coupling |
| B | SAE 101-2 (B), 22 (B), 13T coupling |
| Q | SAE 101-2 (B), 25 (B-B), 15T coupling |

| Paint | |
|---|---|
| 00 | No Paint |
| PB | Black Paint |

| Electronic Control Options | |
|---|---|
| # | # |

| # | |
|---|---|
| 0 | No ECU |
| D | Proportional displacement control |
| Y | Proportional pressure and displacement control |

| # | |
|---|---|
| P | Electronic valve with zero displacement default |
| T | Electronic valve with max displacement default |
| S | Electronic valve with zero displacement default and hydromechanical Pmax |
| U | Electronic valve with max displacement default and hydromechanical Pmax |
| W | Electronic valve with zero displacement default (CANBUS compatible) |
| Y | Electronic valve with max displacement default (CANBUS compatible) |
| X | Electronic valve with zero displacement default and hydromechanical Pmax (CANBUS compatible) |
| Z | Electronic valve with max displacement default and hydromechanical Pmax (CANBUS compatible) |

*** W, X, Y and Z only available with *D* and *Y*



Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

| | 060 | | | | S | | | 5 | A | | | | | | | | 00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pump Series | Displacement 60cc/rev. (3.66 in³/rev) | Open Circuit | Mounting & Ports | Shaft Options | Single Shaft Seal | Shaft Rotation | Configuration | Fluorocarbon Seal Material | Design Letter | Control Options | Additional Control Options | Port Orientation | Adjustable Displacement Stops | Port Type | Thru-Drive Mounting Pad & Coupling | Paint | Special Features |

| Pump Series | |
|---|---|
| P1 | Mobile |
| PD | Industrial |

| Open Circuit | |
|---|---|
| P | Open Circuit (One Side of Center) |
| X | Open Circuit (100% over Center) |

| Mounting & Ports | |
|---|---|
| S | SAE C Pilot SAE Flange Connection Ports with SAE Aux Ports |
| A | SAE C Pilot Metric Flange Connection Ports with BSPP Aux Ports |
| M | ISO - 125MM Pilot Metric Flange Connection Ports with Metric Aux Ports |
| B | ISO - 125MM Pilot, Metric Flange Connection Ports with BSPP Aux Ports |
| C | SAE C 2-Bolt Pilot SAE Flange Connection Ports with SAE Aux Ports |
| D | SAE C 2-Bolt Pilot SAE Flange Connection Ports with BSPP Aux Ports |

| Shaft Options | |
|---|---|
| 01 | Splined shaft - SAE C 14T |
| 02 | Keyed shaft - SAE C 32-1 KEY |
| 04 | Keyed shaft - ISO / DIN KEY 32MM Dia. |

| Shaft Rotation | |
|---|---|
| R | Clockwise |
| L | Counterclockwise |

| Configuration | |
|---|---|
| M | Mobile (P1) |
| S | Industrial (PD) |
| U | Universal |

| Control Options | |
|---|---|
| C0 | Pressure limiter 1160.30 - 4061.05 PSI (80 - 280 bar) |
| C1 | Pressure limiter 290.08 - 1160.30 PSI (20 - 80 bar) |
| L0 | Load sensing 145.04-435.11 PSI ΔP (10-30 bar ΔP) with pressure limiter 1160.30 - 4061.05 PSI (80 - 280 bar) |
| L2 | Load sensing 145.04-435.11 PSI ΔP (10-30 bar ΔP) with bleed & pressure limiter 1160.30 - 4061.05 PSI (80 - 280 bar) |
| AN* | Pilot operated pressure limiter with ISO4401 interface & SAE 4 Vent Port |
| AL | Pilot operated pressure limiter with Load sensing ( only available with "T" Torque Limiter option, i.e. "ALT ") |
| AM | Pilot operated pressure limiter with mechanical adjustment and SAE 4 Vent Port |
| AE | Pilot operated pressure limiter with mechanical and electrical adjustment 12 VDC |
| AF | Pilot operated pressure limiter with mechanical and electrical adjustment 24 VDC |
| ## | See chart below for electronic control options |

*Not functional control as such

| Additional Control Options | |
|---|---|
| 0 | No other options |
| 2 | Displacement sensor ** |
| T | Torque Limiter Control (Used with AM, AN or AL control options) |

** mandatory with "W**", "X**", "Y**", "Z**" "*D*" and "*Y*"

| Port Orientation | |
|---|---|
| E | End Ports |
| S | Side Ports |
| T | Side Ports with Thru-Drive |

| Adjustable Displacement Stops* (For E & S Port Orientation Only) | |
|---|---|
| 0 | None |
| 1 | Adjustable maximum displacement stop |
| 2 | Adjustable minimum displacement stop |
| 3 | Adjustable maximum and minimum displacement stop |

*Not available with Thru-Drive

| Port Type | |
|---|---|
| 0 | Flange Ports |
| 2 | SAE Threaded Ports (Available only on "E" port and "S" or "C" mount) |
| 4 | BSPP Threaded Ports (Available only on "E" port and "D" mount) |

| Thru-Drive Mounting Pad/Coupling | |
|---|---|
| 0 | No Thru-Drive |
| A | SAE 82-2 (A), 16 (A), 9T coupling |
| H | SAE 82-2 (A), 19 (--), 11T coupling |
| B | SAE 101-2 (B), 22 (B), 13T coupling |
| Q | SAE 101-2 (B), 25 (B-B), 15T coupling |
| J | SAE 101-2 (B), rotated 45 degrees, 22 (B), 13T coupling |
| K | SAE 101-2 (B), rotated 45 degrees, 25 (B-B), 15T coupling |
| C | SAE 127-4 (C), 32 (C), 14T coupling |

| Paint | |
|---|---|
| 00 | No Paint |
| PB | Black Paint |

| Electronic Control Options | |
|---|---|
| # | # |

| | |
|---|---|
| 0 | No ECU |
| D | Proportional displacement control |
| Y | Proportional pressure control |

| | |
|---|---|
| P | Electronic valve with zero displacement default |
| T | Electronic valve with max displacement default |
| S | Electronic valve with zero displacement default and hydromechanical Pmax |
| U | Electronic valve with max displacement default and hydromechanical Pmax |
| W | Electronic valve with zero displacement default (CANBUS compatible) |
| Y | Electronic valve with max displacement default (CANBUS compatible) |
| X | Electronic valve with zero displacement default and hydromechanical Pmax (CANBUS compatible) |
| Z | Electronic valve with max displacement default and hydromechanical Pmax (CANBUS compatible) |

*** W, X, Y and Z only available with *D* and *Y*

| | 075 | | | | S | | | 5 | A | | | | | 0 | | | 00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pump Series | Displacement 75cc/rev. (4.58 in³/rev) | Open Circuit | Mounting & Ports | Shaft Options | Single Shaft Seal | Shaft Rotation | Configuration | Fluorocarbon Seal Material | Design Letter | Control Options | Additional Control Options | Port Orientation | Adjustable Displacement Stops | Flange Ports | Thru-Drive Mounting Pad & Coupling | Paint | Special Features |

| Pump Series | |
|---|---|
| P1 | Mobile |
| PD | Industrial |

| Open Circuit | |
|---|---|
| P | Open Circuit (One Side of Center) |
| X | Open Circuit (100% over Center) |

| Mounting & Ports | |
|---|---|
| S | SAE C Pilot SAE Flange<br>Connection Ports with SAE Aux Ports |
| A | SAE C Pilot Metric Flange<br>Connection Ports with BSPP Aux Ports |
| M | ISO - 125MM Pilot Metric Flange<br>Connection Ports with Metric Aux Ports |
| B | ISO - 125MM Pilot, Metric Flange<br>Connection Ports with BSPP Aux Ports |
| C | SAE C 2-Bolt Pilot SAE Flange<br>Connection Ports with SAE Aux Ports |
| D | SAE C 2-Bolt Pilot SAE Flange<br>Connection Ports with BSPP Aux Ports |

| Shaft Options | |
|---|---|
| 01 | Splined shaft - SAE C 14T |
| 02 | Keyed shaft - SAE C 32-1 KEY |
| 04 | Keyed shaft - ISO / DIN KEY 32MM Dia. |

| Shaft Rotation | |
|---|---|
| R | Clockwise |
| L | Counterclockwise |

| Configuration | |
|---|---|
| M | Mobile (P1) |
| S | Industrial (PD) |
| U | Universal |

| Control Options | |
|---|---|
| C0 | Pressure limiter<br>1160.30 - 4061.05 PSI (80 - 280 bar) |
| C1 | Pressure limiter<br>290.08 - 1160.30 PSI (20 - 80 bar) |
| L0 | Load sensing 145.04-435.11 PSI ΔP<br>(10-30 bar ΔP) with pressure limiter<br>1160.30 - 4061.05 PSI (80 - 280 bar) |
| L2 | Load sensing 145.04-435.11 PSI ΔP<br>(10-30 bar ΔP) with bleed & pressure limiter<br>1160.30 - 4061.05 PSI (80 - 280 bar) |
| AN* | Pilot operated pressure limiter with<br>ISO4401 interface & SAE 4 Vent Port |
| AM | Pilot operated pressure limiter with<br>mechanical adjustment and SAE 4 Vent Port |
| AE | Pilot operated pressure limiter with<br>mechanical and electrical adjustment 12 VDC |
| AF | Pilot operated pressure limiter with<br>mechanical and electrical adjustment 24 VDC |
| ## | See chart below for electronic control options |

*Not functional control as such

| Additional Control Options | |
|---|---|
| 0 | No other options |
| 2 | Displacement sensor ** |
| T | Torque Limiter Control<br>(Used with AM, AN or L0 control options) |

** mandatory with "W**", "X**",
"Y**", "Z**" "*D*" and "*Y*"

| Port Orientation | |
|---|---|
| E | End Ports |
| S | Side Ports |
| T | Side Ports with Thru-Drive |

| Adjustable Displacement Stops* (For E & S Port Orientation Only) | |
|---|---|
| 0 | None |
| 1 | Adjustable maximum displacement stop |
| 2 | Adjustable minimum displacement stop |
| 3 | Adjustable maximum and minimum displacement stop |

*Not available with Thru-Drive

| Thru-Drive Mounting Pad/Coupling | |
|---|---|
| 0 | No Thru-Drive |
| A | SAE 82-2 (A), 16 (A), 9T coupling |
| H | SAE 82-2 (A), 19 (--), 11T coupling |
| B | SAE 101-2 (B), 22 (B), 13T coupling |
| Q | SAE 101-2 (B), 25 (B-B), 15T coupling |
| J | SAE 101-2 (B), rotated 45 degrees,<br>22 (B), 13T coupling |
| K | SAE 101-2 (B), rotated 45 degrees,<br>25 (B-B), 15T coupling |
| C | SAE 127-4 (C), 32 (C), 14T coupling |

| Paint | |
|---|---|
| 00 | No Paint |
| PB | Black Paint |

| Electronic Control Options | |
|---|---|
| # | # |

| # | |
|---|---|
| 0 | No ECU |
| D | Proportional displacement control |
| Y | Proportional pressure control |

| # | |
|---|---|
| P | Electronic valve with zero displacement default |
| T | Electronic valve with max displacement default |
| S | Electronic valve with zero displacement default and hydromechanical Pmax |
| U | Electronic valve with max displacement default and hydromechanical Pmax |
| W | Electronic valve with zero displacement default (CANBUS compatible) |
| Y | Electronic valve with max displacement default (CANBUS compatible) |
| X | Electronic valve with zero displacement default and hydromechanical Pmax (CANBUS compatible) |
| Z | Electronic valve with max displacement default and hydromechanical Pmax (CANBUS compatible) |

*** W, X, Y and Z only available with *D* and *Y*



Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

| | 100 | | | | S | | | 5 | A | | | | | 0 | | | 00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pump Series | Displacement 100cc/rev. (6.1 in³/rev) | Open Circuit | Mounting & Ports | Shaft Options | Single Shaft Seal | Shaft Rotation | Configuration | Fluorocarbon Seal Material | Design Letter | Control Options | Additional Control Options | Port Orientation | Adjustable Displacement Stops | Flange Ports | Thru-Drive Mounting Pad & Coupling | Paint | Special Features |

| Pump Series | |
|---|---|
| P1 | Mobile |
| PD | Industrial |

| Open Circuit | |
|---|---|
| P | Open Circuit (One Side of Center) |
| X | Open Circuit (100% over Center) |

| Mounting & Ports | |
|---|---|
| S | SAE C Pilot SAE Flange<br>Connection Ports with SAE Aux Ports |
| A | SAE C Pilot Metric Flange<br>Connection Ports with BSPP Aux Ports |
| M | ISO - 125MM Pilot Metric Flange<br>Connection Ports with Metric Aux Ports |
| B | ISO - 125MM Pilot, Metric Flange<br>Connection Ports with BSPP Aux Ports |

| Shaft Options | |
|---|---|
| 01 | Splined shaft - SAE C-C 17T |
| 02 | Keyed shaft - SAE C-C 38-1 |
| 04 | Keyed shaft - ISO / DIN 40MM Dia. |
| 06 | Splined shaft - SAE C 14T |

| Shaft Rotation | |
|---|---|
| R | Clockwise |
| L | Counterclockwise |

| Configuration | |
|---|---|
| M | Mobile (P1) |
| S | Industrial (PD) |
| U | Universal |

| Control Options | |
|---|---|
| C0 | Pressure limiter<br>1160.30 - 4061.05 PSI (80 - 280 bar) |
| C1 | Pressure limiter<br>290.08 - 1160.30 PSI (20 - 80 bar) |
| L0 | Load sensing 145.04-435.11 PSI ΔP<br>(10-30 bar ΔP) with pressure limiter<br>1160.30 - 4061.05 PSI (80 - 280 bar) |
| L2 | Load sensing 145.04-435.11 PSI ΔP<br>(10-30 bar ΔP) with bleed & pressure limiter<br>1160.30 - 4061.05 PSI (80 - 280 bar) |
| AN* | Pilot operated pressure limiter with<br>ISO4401 interface & SAE 4 Vent Port |
| AM | Pilot operated pressure limiter with<br>mechanical adjustment and SAE 4 Vent Port |
| AE | Pilot operated pressure limiter with<br>mechanical and electrical adjustment 12 VDC |
| AF | Pilot operated pressure limiter with<br>mechanical and electrical adjustment 24 VDC |
| ## | See chart below for electronic control options |

*Not functional control as such

| Additional Control Options | |
|---|---|
| 0 | No other options |
| 2 | Displacement sensor ** |
| T | Torque Limiter Control<br>(Used with AM, AN or L0 control options) |

** mandatory with "W**", "X**",
"Y**", "Z**" "*D*" and "*Y*"

| Port Orientation | |
|---|---|
| E | End Ports |
| S | Side Ports |
| T | Side Ports with Thru-Drive |

| Adjustable Displacement Stops* (For E & S Port Orientation Only) | |
|---|---|
| 0 | None |
| 1 | Adjustable maximum displacement stop |
| 2 | Adjustable minimum displacement stop |
| 3 | Adjustable maximum and minimum displacement stop |

*Not available with Thru-Drive

| Thru-Drive Mounting Pad/Coupling | |
|---|---|
| 0 | No Thru-Drive |
| A | SAE 82-2 (A), 16 (A), 9T coupling |
| H | SAE 82-2 (A), 19 (--), 11T coupling |
| B | SAE 101-2 (B), 22 (B), 13T coupling |
| Q | SAE 101-2 (B), 25 (B-B), 15T coupling |
| J | SAE 101-2 (B), rotated 45 degrees,<br>22 (B), 13T coupling |
| K | SAE 101-2 (B), rotated 45 degrees,<br>25 (B-B), 15T coupling |
| C | SAE 127-4 (C), 32 (C), 14T coupling |
| N | SAE 127-4 (C), 38 (C-C), 17T coupling |

| Paint | |
|---|---|
| 00 | No Paint |
| PB | Black Paint |

| Electronic Control Options | |
|---|---|
| # | # |

| # | |
|---|---|
| 0 | No ECU |
| D | Proportional displacement control |
| Y | Proportional pressure control |

| # | |
|---|---|
| P | Electronic valve with zero displacement default |
| T | Electronic valve with max displacement default |
| S | Electronic valve with zero displacement default and hydromechanical Pmax |
| U | Electronic valve with max displacement default and hydromechanical Pmax |
| W | Electronic valve with zero displacement default (CANBUS compatible) |
| Y | Electronic valve with max displacement default (CANBUS compatible) |
| X | Electronic valve with zero displacement default and hydromechanical Pmax (CANBUS compatible) |
| Z | Electronic valve with max displacement default and hydromechanical Pmax (CANBUS compatible) |

*** W, X, Y and Z only available with *D* and *Y*

| | 140 | | | | S | | | 5 | A | | | | | 0 | | | 00 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pump Series | Displacement 140cc/rev. (8.54 in³/rev) | Open Circuit | Mounting & Ports | Shaft Options | Single Shaft Seal | Shaft Rotation | Configuration | Fluorocarbon Seal Material | Design Letter | Control Options | Additional Control Options | Port Orientation | Adjustable Displacement Stops | Flange Ports | Thru-Drive Mounting Pad & Coupling | Paint | Special Features |

| Pump Series | |
|---|---|
| P1 | Mobile |
| PD | Industrial |

| Open Circuit | |
|---|---|
| P | Open Circuit (One Side of Center) |
| X | Open Circuit (100% over Center) |

| Mounting & Ports | |
|---|---|
| S | SAE D Pilot SAE Flange<br>Connection Ports with SAE Aux Ports |
| A | SAE D Pilot BSPP Flange<br>Connection Ports with BSPP Aux Ports |
| M | ISO - 180MM Pilot Metric Flange<br>Connection Ports with Metric Aux Ports |
| B | ISO - 180MM Pilot Metric Flange<br>Connection Ports with BSPP Aux Ports |

| Shaft Options | |
|---|---|
| 01 | Splined shaft - SAE D 13T |
| 02 | Keyed shaft - SAE D 44-1 |
| 04 | Keyed shaft - ISO / DIN 50MM Dia. |

| Shaft Rotation | |
|---|---|
| R | Clockwise |
| L | Counterclockwise |

| Configuration | |
|---|---|
| M | Mobile (P1) |
| S | Industrial (PD) |
| U | Universal |

| Control Options | |
|---|---|
| C0 | Pressure limiter<br>1160.30 - 4061.05 PSI (80 - 280 bar) |
| C1 | Pressure limiter<br>290.08 - 1160.30 PSI (20 - 80 bar) |
| L0 | Load sensing 145.04-435.11 PSI ΔP<br>(10-30 bar ΔP) with pressure limiter<br>1160.30 - 4061.05 PSI (80 - 280 bar) |
| L2 | Load sensing 145.04-435.11 PSI ΔP<br>(10-30 bar ΔP) with bleed & pressure limiter<br>1160.30 - 4061.05 PSI (80 - 280 bar) |
| AN* | Pilot operated pressure limiter with<br>ISO4401 interface & SAE 4 Vent Port |
| AM | Pilot operated pressure limiter with<br>mechanical adjustment and SAE 4 Vent Port |
| AE | Pilot operated pressure limiter with<br>mechanical and electrical adjustment 12 VDC |
| AF | Pilot operated pressure limiter with<br>mechanical and electrical adjustment 24 VDC |
| ## | See chart below for electronic control options |

*Not functional control as such

| Additional Control Options | |
|---|---|
| 0 | No other options |
| 2 | Displacement sensor ** |
| T | Torque Limiter Control<br>(Used with AM, AN or L0 control options) |

** mandatory with "W**", "X**",
"Y**", "Z**" "*D*" and "*Y*"

| Port Orientation | |
|---|---|
| E | End Ports |
| S | Side Ports |
| T | Side Ports with Thru-Drive |

| Adjustable Displacement Stops* (For E & S Port Orientation Only) | |
|---|---|
| 0 | None |
| 1 | Adjustable maximum displacement stop |
| 2 | Adjustable minimum displacement stop |
| 3 | Adjustable maximum and minimum displacement stop |

*Not available with Thru-Drive

| Thru-Drive Mounting Pad/Coupling | |
|---|---|
| 0 | No Thru-Drive |
| A | SAE 82-2 (A), 16 (A), 9T coupling |
| B | SAE 101-2 (B), 22 (B), 11T coupling |
| Q | SAE 101-2 (B), 25 (B-B), 13T coupling |
| J | SAE 101-2 (B), rotated 45 degrees,<br>22 (B), 15T coupling |
| K | SAE 101-2 (B), rotated 45 degrees,<br>25 (B-B), 13T coupling |
| C | SAE 127-4 (C), 32 (C), 14T coupling |
| N | SAE 127-4 (C), 38 (C-C), 17T coupling |
| D | SAE 152-4 (D), 44 (D), 13T coupling |

| Paint | |
|---|---|
| 00 | No Paint |
| PB | Black Paint |

| Electronic Control Options | |
|---|---|
| # | # |

| # | |
|---|---|
| 0 | No ECU |
| D | Proportional displacement control |
| Y | Proportional pressure control |

| # | |
|---|---|
| P | Electronic valve with zero displacement default |
| T | Electronic valve with max displacement default |
| S | Electronic valve with zero displacement default and hydromechanical Pmax |
| U | Electronic valve with max displacement default and hydromechanical Pmax |
| W | Electronic valve with zero displacement default (CANBUS compatible) |
| Y | Electronic valve with max displacement default (CANBUS compatible) |
| X | Electronic valve with zero displacement default and hydromechanical Pmax (CANBUS compatible) |
| Z | Electronic valve with max displacement default and hydromechanical Pmax (CANBUS compatible) |

*** W, X, Y and Z only available with *D* and *Y*

## Technical Data

| Model | P1/PD 018 | P1/PD 028 | P1/PD 045 | P1/PD 060 | P1/PD 075 | P1/PD 100 | P1/PD 140 |
|---|---|---|---|---|---|---|---|
| Maximum Displacement, $cm^3$/rev<br>cu.in./rev | 18<br>1.10 | 28<br>1.71 | 45<br>2.75 | 60<br>3.66 | 75<br>4.58 | 100<br>6.01 | 140<br>8.54 |
| Outlet Pressure – Continuous, bar<br>psi | 280<br>4000 | | | | | | |
| Intermittent*, bar<br>psi | 320<br>4500 | | | | | | |
| Peak, bar<br>psi | 350<br>5000 | | | | | | |
| P1 Maximum Speed (1.3 bar abs inlet), rpm | 3600 | 3400 | 3100 | 2800 | 2700 | 2500 | 2400 |
| P1 (1.0 bar abs inlet), rpm | 3300 | 3200 | 2800 | 2500 | 2400 | 2100 | 2100 |
| P1 (0.8 bar abs inlet), rpm | 2900 | 2900 | 2400 | 2200 | 2100 | 1900 | 1800 |
| PD Maximum Speed (1.0 bar abs inlet), rpm | 1800 | | | | | | |
| PD (0.8 bar abs inlet), rpm | 1800 | | | | | | |
| Minimum Speed, rpm | 600 | | | | | | |
| Inlet Pressure – Maximum, bar<br>psi | 10 (gage)<br>145 | | | | | | |
| Rated, bar<br>psia | 1.0 absolute (0.0 gage)<br>14.5 | | | | | | |
| Minimum, bar<br>psia | 0.8 absolute (-0.2 gage)<br>11.6 | | | | | | |
| Case Pressure – Peak, bar | 4.0 absolute (3.0 gage)<br>and less than 0.5 bar above inlet pressure | | | | | | |
| Rated, bar | 2.0 absolute (1.0 gage)<br>and less than 0.5 bar above inlet pressure | | | | | | |
| Fluid Temperature Range, °C<br>°F | -40 to +95<br>-40 to +203 | | | | | | |
| Fluid Viscosity – Rated, cSt | 6 to 160 | | | | | | |
| Max. Intermittent, cSt | 5000 (for cold starting) | | | | | | |
| Min. Intermittent, cSt | 5 | | | | | | |
| Fluid Contamination – Rated, ISO | 20/18/14 | | | | | | |
| Maximum, ISO | 21/19/16 | | | | | | |
| SAE Mounting – Flange | 82-2 (A) | 101-2 (B) | 101-2 (B) | 127-2 (C) or 127-4 (C) | | 127-4 (C) | 152-4 (D) |
| ISO Mounting - Flange | 80 mm | 100 mm | 100 mm | 125 mm | 125 mm | 125 mm | 180 mm |
| SAE Keyed Shafts | 19-1, A | 25-1, BB | 25-1, BB | 32-1, C | 32-1, C | 38-1, CC | 44-1, D |
| ISO Keyed Shafts | 20 mm | 25 mm | 25 mm | 32 mm | 32 mm | 40 mm | 50 mm |
| SAE Spline Shafts | 9T, A<br>11T, A | 13T, B<br>15T, BB | 13T, B<br>15T, BB | 14T, C | 14T, C | 17T, CC | 13T, D |
| Weight – End Port, kg (lb) | 13.4 (29.5) | 17.7 (39.0) | 23 (50) | 29 (64) | 30 (66) | 51 (112) | 66 (145) |
| Side Port, kg (lb) | 14.2 (31.3) | 18.1 (40.0) | 24 (52) | 30 (67) | 31 (68) | 53 (117) | 67 (147) |
| Thru-Drive, kg (lb) | — | 22 (48) | 27 (59) | 34 (75) | 35 (77) | 55 (121) | 82 (180) |
| Moment of Inertia $kg{\cdot}mm^2$ | 760 | 1555 | 3208 | 4548 | 5041 | 12027 | 21400 |
| Moment of Inertia Thru-Drive $kg{\cdot}mm^2$ | NA | 1618 | 3268 | 4687 | 5207 | 12402 | 22343 |

*Intermittent pressure is defined as less than 10% of operation time, not exceeding 6 successive seconds.

## Typical Control Reponse Times*

| Control Description | Pump Operating Condition | Typical Control Response Time (ms) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 018 | 028 | 045 | 060 | 075 | 100 | 140 |
| "C" Pressure Limiter | Maximum Displacement to Zero | 25 | 25 | 25 | 37 | 21 | 26 | 30 |
| | Zero Displacement to Maximum | 80 | 80 | 106 | 119 | 89 | 108 | 125 |
| "L" Load Sensing | Maximum Displacement to Zero | 40 | 40 | 30 | 54 | 40 | 43 | 45 |
| | Zero Displacement to Maximum | 70 | 70 | 120 | 186 | 97 | 189 | 280 |
| "A" Pilot Operated Control | Maximum Displacement to Zero | 25 | 25 | 46 | 43 | 37 | 39 | 40 |
| | Zero Displacement to Maximum | 80 | 80 | 131 | 125 | 115 | 123 | 130 |

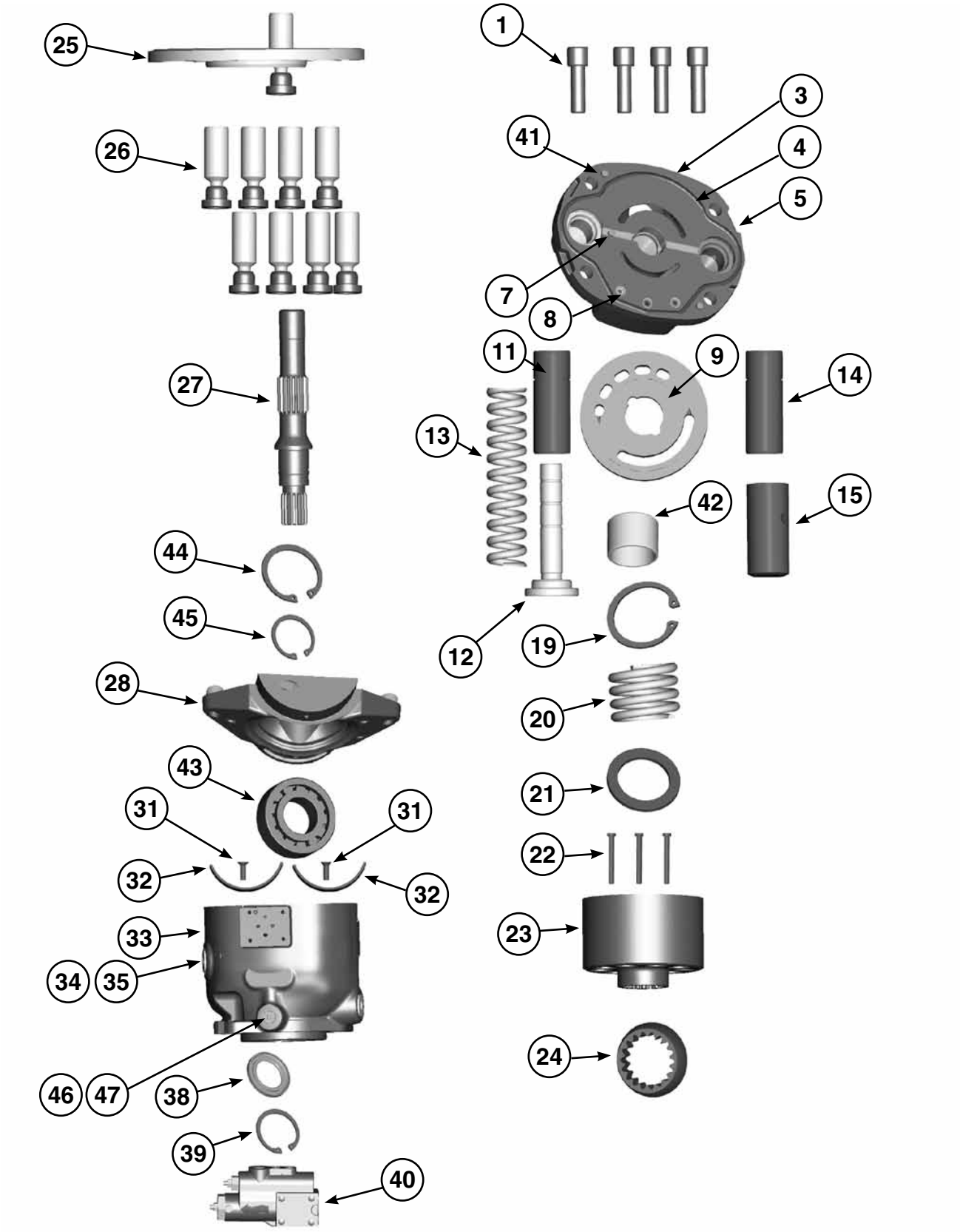
* Based on NFPA testing standards

**For max volume stops:**

| Pump Size | % Stroke reduction per turn | | |
|---|---|---|---|
| P*060 | 6.76 | P*018 | 9 |
| P*075 | 6.2 | P*028 | 8.2 |
| P*100 | 5.5 | P*045 | 7.5 |
| P*140 | 4.8 | | |

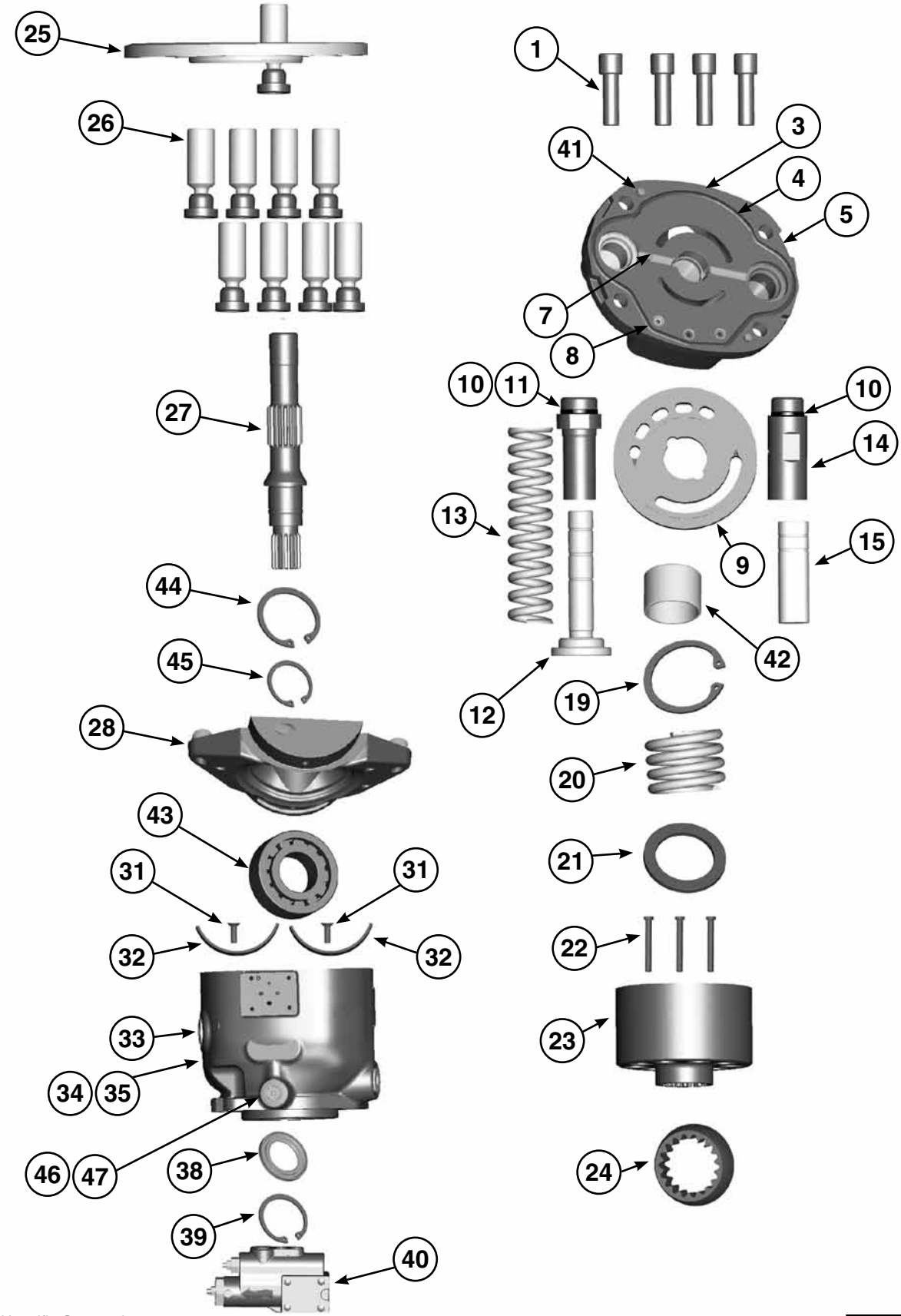
**Control Adjustment Sensitivity:**

- Load Sense 28 Bar/Turn
- Pressure Compensator 80 to 280 bar range (C0) = 40 Bar/Turn
- Pressure Compensator 20 to 80 bar range (C1) = 18.6 Bar/Turn
- Pressure compensator (AM) 10 to 40 bar range = 20 Bar/Turn





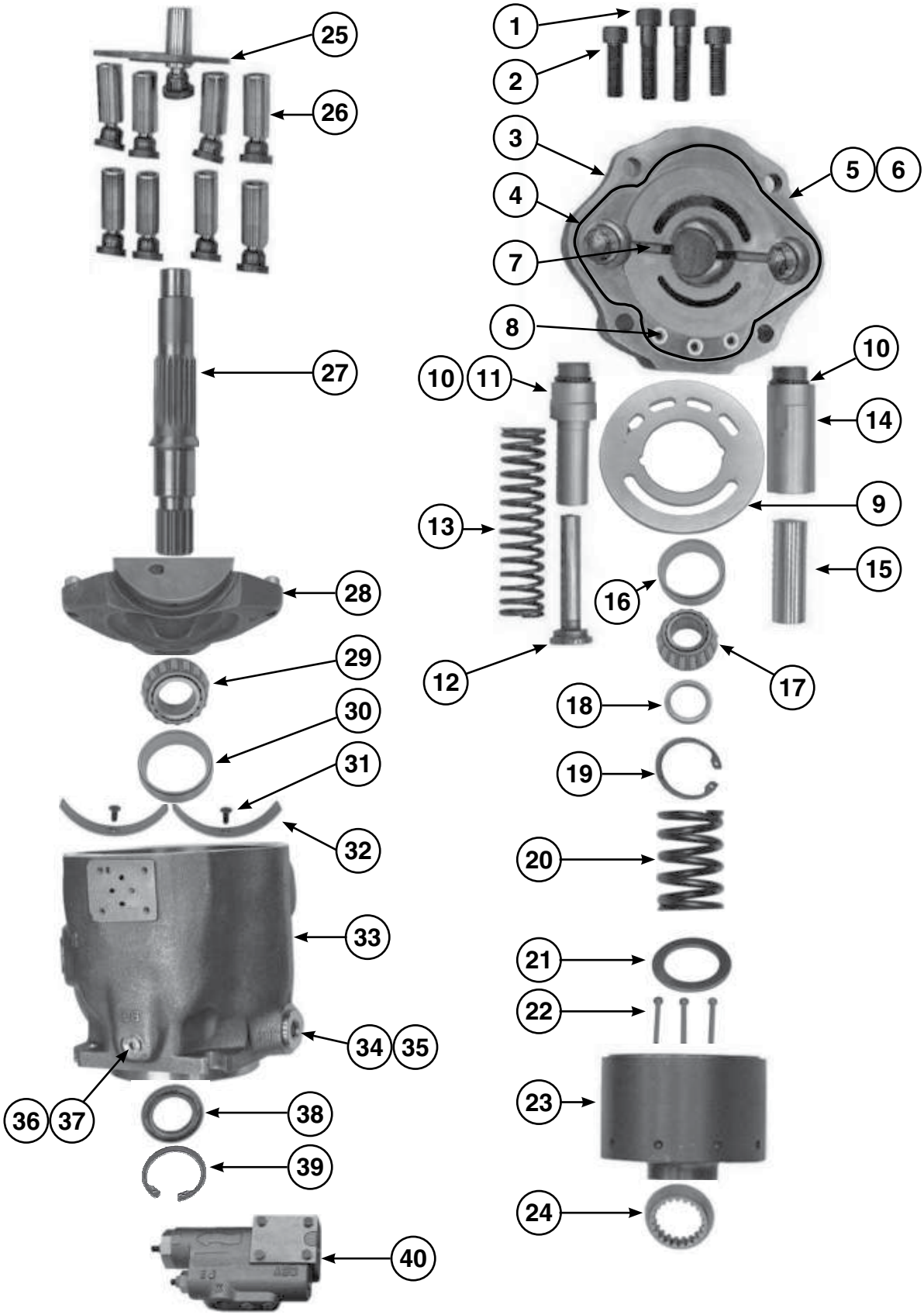

Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA


25
26
27
44
45
28
43
31
31
32
32
33
34
35
46
47
38
39
40
1
41
3
4
5
7
8
10
11
10
14
13
9
15
42
12
19
20
21
22
23
24

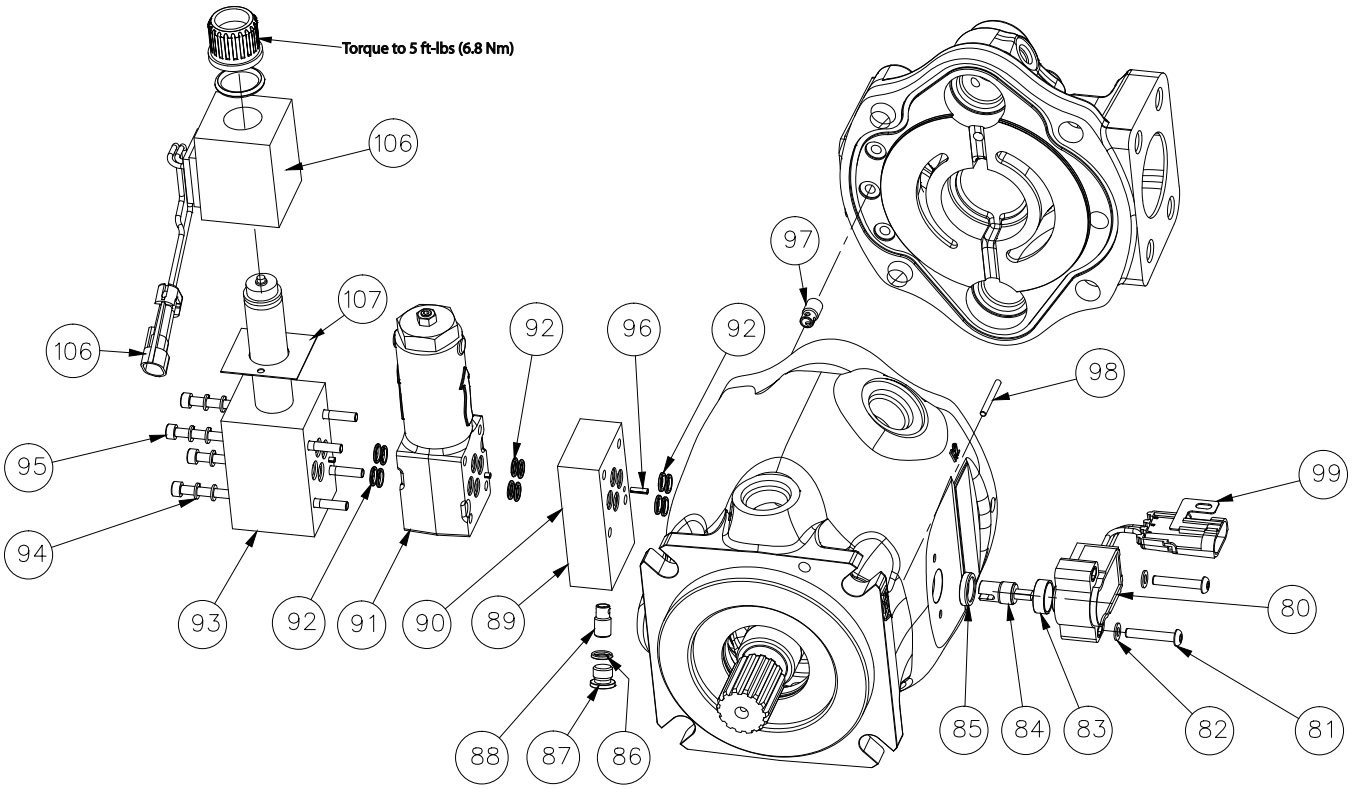
| ITEM # | QTY | 018 PART # | 028 PART # | 045 PART # | DESCRIPTION |
|---|---|---|---|---|---|
| 1 | 4 | 210 x209 | 210 x 211 | 361-12229-0 | Socket head cap screw |
| 3 | 1 | Contact Factory for port block ordering information | | | Port Block |
| 4* | 1 | 2050V-7 | 2160V-7 | 675-00162-0 | Port block O-Ring |
| 5 | 2 | 108X2V | 108X2V | 108X2V | Boss Plug (not shown) |
| 7 | 1 | 299X67 | 324-30014-0 | 324-30014-0 | Port Plate Pin |
| 8* | 3 | 605-10077-0 | 605-10077-0 | 605-10077-0 | O-Ring |
| 9 | 1 | 03E-94415-0 | 03E-94969-0 | 03E-94339-0 | Port plate, clockwise, industrial (PD) |
| | | 03E-94414-0 | 03E-94970-0 | 03E-94340-0 | Port plate, counter clockwise, industrial (PD) |
| | | 03E-94413-0 | 03E-94969-0 | 03E-94341-0 | Port plate, clockwise, mobile (P1) |
| | | 03E-94416-0 | 03E-94970-0 | 03E-94342-0 | Port plate, counter clockwise, mobile (P1) |
| | | 03E-94963-0 | 03E-94376-0 | 03E-95374-0 | Port plate, CW, industrial (PD), ripple chamber |
| | | 03E-94964-0 | 03E-94377-0 | 03E-95080-0 | Port plate, CCW, industrial (PD), ripple chamber |
| | | 03E-94965-0 | 03E-94378-0 | 03E-95374-0 | Port plate, clockwise, mobile (P1), ripple chamber |
| | | 03E-94966-0 | 03E-94379-0 | 03E-95375-0 | Port plate, CCW, mobile (P1), ripple chamber |
| 10* | 2 | ** | ** | 695-00912-0 | Bias and control rod O-ring |
| 11 | 1 | 03E-94427-0 | 03E-94390-0 | 03E-94355-0 | Bias Guide |
| 12 | 1 | 03E-94428-0 | 03E-94391-0 | 03E-94354-0 | Bias Piston |
| 13 | 1 | 03E-94430-0 | 03E-94393-0 | 03E-94356-0 | Bias Spring |
| 14 | 1 | 03E-94427-0 | 03E-94390-0 | 03E-94353-0 | Control guide |
| 15 | 1 | 03E-94426-0 | 03E-94389-0 | 03E-94352-0 | Control piston |
| 19 | 1 | 256X521 | 256X525 | 356-65144-0 | Retaining ring, internal |
| 20 | 1 | 787635 | 03E-94387-0 | 03E-94350-0 | Barrel hold down spring |
| 21 | 2 | 786996 | 03E-94388-0 | 03E-94351-0 | Barrel hold down washer |
| 22 | 3 | 787000 | 03E-94386-0 | 03E-95903-0 | Barrel hold down pin |
| 23 | 1 | 03E-94717-0 | 03E-94375-0 | 03E-94338-0 | Barrel |
| 24 | 1 | 787002 | 03E-94385-0 | 03E-94348-0 | Spherical washer |
| 25 | 1 | 786994 | 03E-94384-0 | 03E-94347-0 | Retainer plate |
| 26 | 9 | 789641 | S2E-18415-0 | S2E-18413-0 | Piston and shoe assembly |
| 27 | 1 | 03E-94409-0 | 03E-94372-0 | 03E-94335-0 | 01 shaft option, no thru drive |
| | | 03E-94411-0 | 03E-94374-0 | 03E-94337-0 | 01 shaft option with thru drive |
| | | 03E-94410-0 | 03E-94373-0 | 03E-94948-0 | 02 shaft option, no thru drive |
| | | 03E-94806-0 | 03E-94900-0 | 03E-94908-0 | 02 shaft option with thru drive |
| | | 03E-94800-0 | 03E-94903-0 | 03E-94923-0 | 04 shaft option, no thru drive |
| | | 03E-94801-0 | 03E-94904-0 | 03E-94922-0 | 04 shaft option with thru drive |
| | | 03E-94718-0 | ** | ** | 06 shaft option, no thru drive |
| | | ** | ** | ** | 06 shaft option with thru drive |
| | | 03E-94804-0 | 03E-95166-0 | 03E-94990-0 | 08 shaft option, no thru drive |
| | | 03E-94762-0 | 03E-95492-0 | 03E-95197-0 | 08 shaft option with thru drive |
| 28 | 1 | S2E-19079-0 | S2E-18414-0 | S2E-18412-0 | Cam |
| 31 | 2 | 03E-94359-0 | 03E-94359-0 | 03E-94359-0 | Bearing retainer Orifice |
| 32 | 2 | 03E-94432-0 | 03E-94395-0 | 03E-94358-0 | Cam bearing |
| 33 | 1 | ** | ** | ** | Housing (not sold seperatley) |
| 34 | 2 | 108X6 | 108X8 | 488-35055-0 | Plug, SAE ORB |
| | | Consult Parker Rep. | | | Plug, BSPP |
| | | Consult Parker Rep. | | | Plug, ISO |
| 35* | 2 | 695-00908-0 | 695-00908-0 | 695-00910-0 | SAE O-ring |
| 38* | 1 | 787140 | P2-060-3304 | 620-82125-5 | Shaft Seal |
| 39 | 1 | 256X535 | 256X544 | 356-65158-0 | Seal Retainer |
| 40 | 1 | see separate compensator ordering information | | | Compensator |
| 41 | 2 | 324-30024-0 | 324-30024-0 | 324-30014-0 | Cover dowel pin |
| 42 | 1 | 216-10013-0 | 789814 | 230-82227-0 | Port block bushing |
| 43 | 1 | 230-82514-0 | 789815 | 230-82516-0 | Cylindrical roller bearing |
| 44 | 1 | 256X222 | 256X222 | 356-65159-0 | External retaining ring (shaft) |
| 45 | 1 | 256X544 | 256X544 | 356-65144-0 | Internal retaining ring (housing) |
| 46 | 1 | 108X4 | 108X4 | 108X4 | Boss plug |
| 47* | 1 | 695-00904-0 | 695-00904-0 | 695-00904-0 | O-ring |

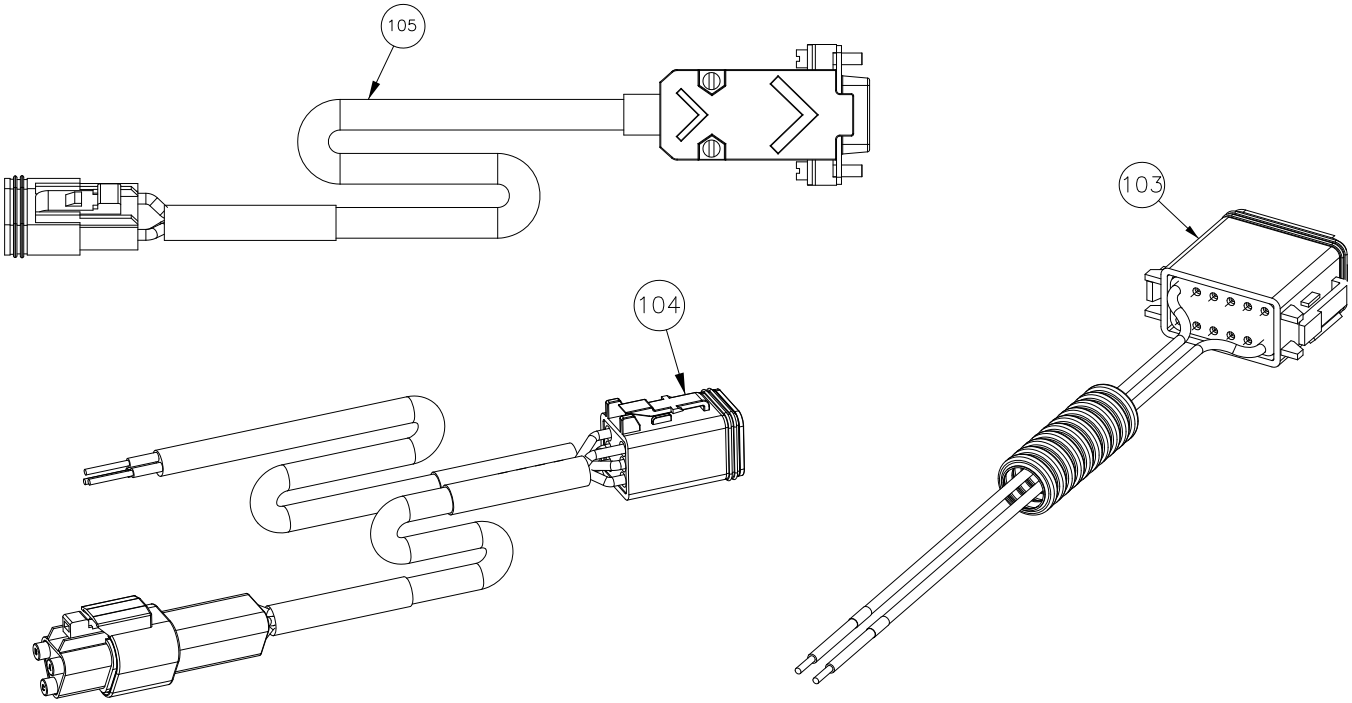
* denotes Item is included in the seal kit

## Notes


1
2
3
4
5
6
7
8
9
10
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40

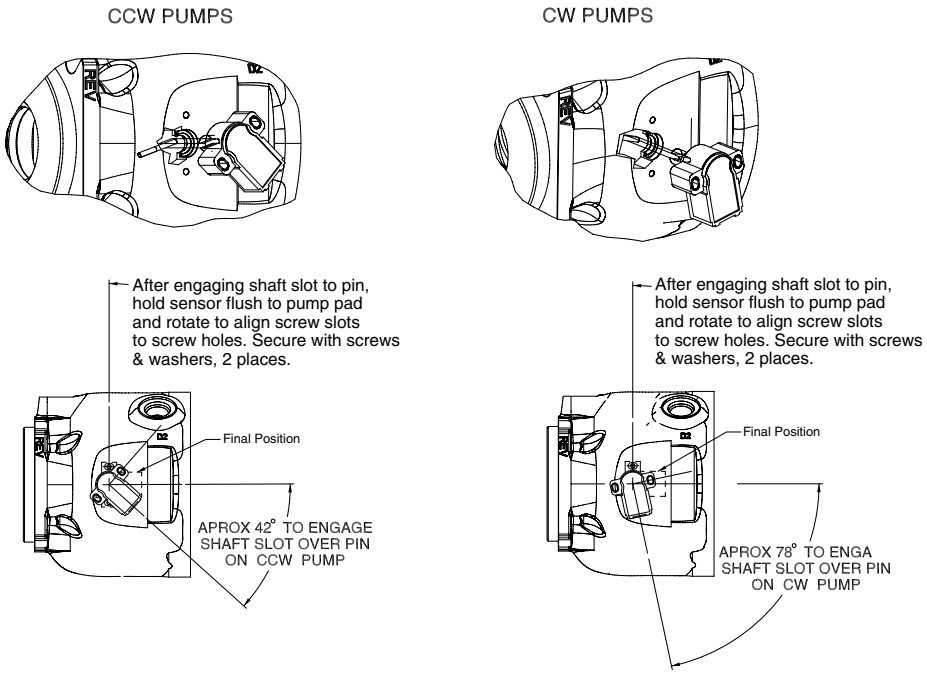
| ITEM # | QTY | 060 PART # | 075 PART # | 100 PART # | 140 PART # | DESCRIPTION |
|---|---|---|---|---|---|---|
| 1 | 4 (2:075) | 361-13250-0 | 361-13270-0 | 361-14290-0 | 361-15270-0 | Socket head cap screw |
| 2 | 0 (2:075) | ** | 361-13250-0 | ** | ** | Socket head cap screw (075 only) |
| 3 | 1 | Contact factory for port block ordering information. | | | | Port Block |
| 4* | 1 | 675-00164-0 | 675-00165-0 | 675-00169-0 | 675-00173-0 | Port block O-Ring |
| 5 | 2 | 488-35001-0 | 488-35001-0 | 488-35001-0 | 488-35001-0 | Boss Plug (not shown) |
| 6* | 2 | 695-00904-0 | 695-00904-0 | 695-00904-0 | 695-00904-0 | O-ring boss plug |
| 7 | 1 | 324-30014-0 | 324-30014-0 | 324-30014-0 | 324-30014-0 | Port Plate Pin |
| 8* | 3 | 605-10077-0 | 605-10077-0 | 605-10070-0 | 605-10070-0 | O-Ring |
| 9 | 1 | 03E-94038-0 | 03E-93169-0 | 03E-93785-0 | 03E-93252-0 | Port plate, clockwise, industrial (PD) |
| | | 03E-94039-0 | 03E-93170-0 | 03E-93786-0 | 03E-93253-0 | Port plate, counter clockwise, industrial (PD) |
| | | 03E-94040-0 | 03E-93171-0 | 03E-93787-0 | 03E-93254-0 | Port plate, clockwise, mobile (P1) |
| | | 03E-94041-0 | 03E-93172-0 | 03E-93788-0 | 03E-93255-0 | Port plate, counter clockwise, mobile (P1) |
| 10* | 2 | 695-00912-0 | 695-00912-0 | 695-00914-0 | 695-00916-0 | Bias and control rod O-ring |
| 11 | 1 | 03E-94054-0 | 03E-93150-0 | 03E-93800-0 | 03E-93248-0 | Bias Guide |
| | | ** | 03E-94498-0 | 03E-94827-0 | 03E-94743-0 | Bias Guide, Overcenter Order Code Option “X” |
| 12 | 1 | 03E-94053-0 | 03E-93149-0 | 03E-93799-0 | 03E-94658-0 | Bias Piston |
| | | ** | ** | ** | — | — |
| | | ** | ** | ** | — | — |
| 13 | 1 | 03E-94055-0 | 03E-93151-0 | 03E-93801-0 | 03E-93963-0 | Bias Spring |
| | | ** | 03E-94499-0 | 03E-94829-0 | 03E-94752-0 | Bias Spring, Overcenter Order Code Option “X” |
| 14 | 1 | 03E-94052-0 | 03E-93148-0 | 03E-93798-0 | 03E-93246-0 | Control guide |
| | | ** | 03E-94608-0 | 03E-94828-0 | 03E-93246-0 | Control guide, Overcenter Order Code Option “X” |
| 15 | 1 | 03E-94051-0 | 03E-93147-0 | 03E-93797-0 | 03E-94252-0 | Control piston |
| | | ** | 03E-93147-0 | 03E-93797-0 | 03E-94751-0 | Control piston, Overcenter Order Code Option “X” |
| 16 | 1 | 230-82237-0 | 230-82237-0 | 230-82244-0 | 230-82239-0 | Tapered roller bearing cup |
| 17 | 1 | INCLUDED IN ITEM 16 | | 230-82518-0 | INCLUDED IN ITEM 16 | Tapered roller bearing cone |
| 18 | 1 | S2E-18591-0K | S2E-18591-0K | S2E-18640-0K | S2E-18527-0K | Bearing Shim Kit (includes all standard shim sizes) |
| 19 | 1 | 356-65152-0 | 356-65144-0 | 356-65146-0 | 356-65147-0 | Retaining ring, internal |
| 20 | 1 | 03E-94049-0 | 03E-93145-0 | 03E-93795-0 | 03E-93959-0 | Barrel hold down spring |
| 21 | 1 | 03E-94050-0 | 03E-93146-0 | 03E-93796-0 | 03E-93244-0 | Barrel hold down washer |
| 22 | 3 | 03E-95904-0 | 03E-95905-0 | 03E-95906-0 | 03E-95907-0 | Barrel hold down pin |
| 23 | 1 | 03E-94036-0 | 03E-93129-0 | 03E-93783-0 | 03E-93242-0 | Barrel |
| 24 | 1 | 03E-94047-0 | 03E-93142-0 | 03E-93794-0 | 03E-93241-0 | Spherical washer |
| 25 | 1 | 03E-94046-0 | 03E-93139-0 | 03E-93793-0 | 03E-93240-0 | Retainer plate |
| 26 | 9 | S2E-18296-0 | S2E-17003-0 | S2E-17912-0 | S2E-17323-0 | Piston and shoe assembly |
| 27 | 1 | 03E-94032-0 | 03E-93999-0 | 03E-93779-0 | 03E-93227-0 | 01 shaft option, no thru drive |
| | | 03E-94033-0 | 03E-94000-0 | 03E-93780-0 | 03E-93228-0 | 01 shaft option with thru drive |
| | | 03E-94034-0 | 03E-94001-0 | 03E-93781-0 | 03E-93231-0 | 02 shaft option, no thru drive |
| | | 03E-94035-0 | 03E-94002-0 | 03E-93782-0 | 03E-93232-0 | 02 shaft option with thru drive |
| | | 03E-94768-0 | 03E-94003-0 | 03E-94006-0 | 03E-93233-0 | 04 shaft option, no thru drive |
| | | 03E-94767-0 | 03E-93127-0 | 03E-94007-0 | 03E-93234-0 | 04 shaft option with thru drive |
| | | ** | ** | 03E-94500-0 | 03E-95070-0 | 06 shaft option, no thru drive |
| | | ** | ** | 03E-94462-0 | ** | 06 shaft option with thru drive |
| 28 | 1 | S2E-18411-0 | S2E-17443-0 | S2E-17961-0 | S2E-17957-0 | Cam |
| 29 | 1 | 230-82236-0 | 230-82236-0 | 230-82519-0 | 230-82241-0 | Tapered roller bearing cone (and cup 140) |
| 30 | 1 | 230-82235-0 | 230-82235-0 | 230-82245-0 | ** | Tapered roller bearing cup |
| 31 | 2 | 03E-93763-0 | 03E-93763-0 | 03E-93763-0 | 03E-93763-0 | Bearing retainer Orifice |
| 32 | 2 | 03E-94057-0 | 03E-93950-0 | 03E-93952-0 | 03E-93953-0 | Cam bearing |
| 33 | 1 | ** | ** | ** | ** | Housing (not sold seperatley) |
| 34 | 2 | 488-35014-0 | 488-35014-0 | 488-35014-0 | 488-35024-0 | Plug, SAE ORB |
| | | 447-01056-2 | 447-01056-2 | 447-01056-2 | 477-01068-2 | Plug, BSPP |
| | | 447-01065-5 | 447-01065-5 | 447-01065-5 | 477-01066-5 | Plug, ISO |
| 35* | 2 | 695-00910-0 | 695-00910-0 | 695-0912-0 | 695-0916-0 | SAE O-ring |
| 36 | 1 | 488-35061-0 | 488-35061-0 | 488-35061-0 | 488-35061-0 | Plug, SAE ORB |
| | | 447-01053-2 | 447-01053-2 | 447-01053-2 | 447-01053-2 | Plug, BSPP |
| | | 447-01061-5 | 447-01061-5 | 447-01061-5 | 447-01061-5 | Plug, ISO |
| 37* | 1 | 695-00904-0 | 695-00904-0 | 695-00904-0 | 695-00904-0 | SAE O-ring |
| | | 605-10064-5 | 605-10061-5 | 605-10061-5 | 605-10061-5 | BSPP O-ring |
| 38* | 1 | 620-82118-5 | 620-82118-5 | 620-82121-5 | 620-82120-5 | Shaft Seal |
| 39 | 1 | 356-65146-0 | 356-65146-0 | 356-65147-0 | 356-65148-0 | Seal Retainer |
| 40 | 1 | See separate compensator ordering information. | | | | Compensator |
| * denotes Item is included in the seal kit | | | | | | |

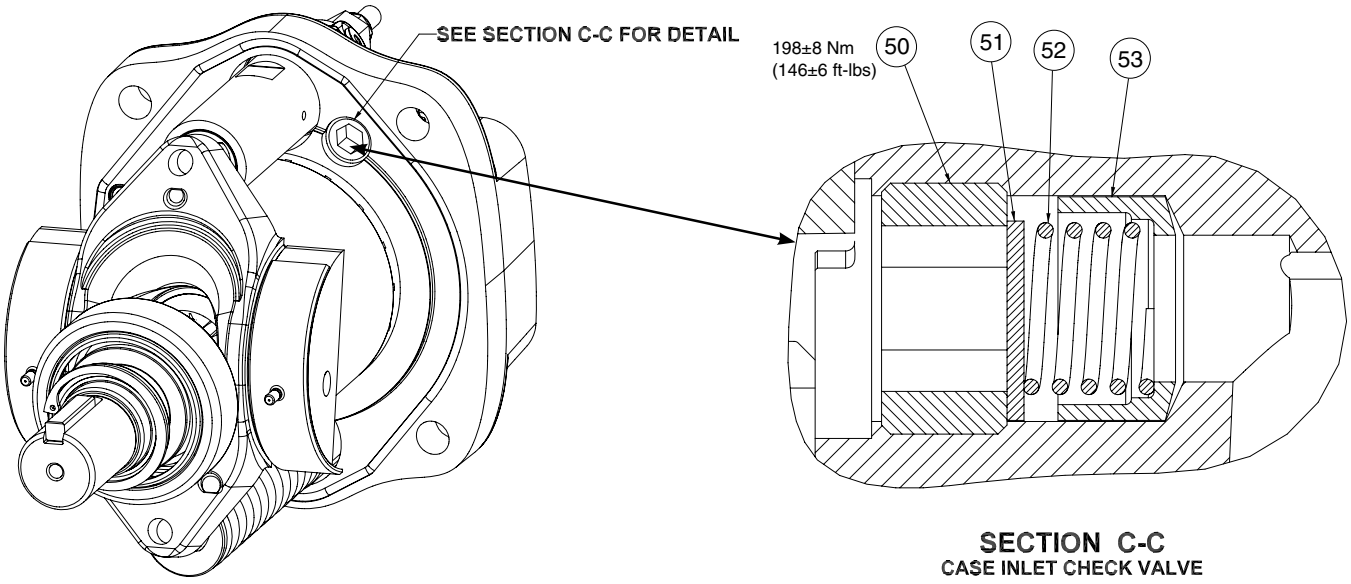

Torque to 5 ft-lbs (6.8 Nm)
106
107
106
97
92
96
92
98
95
94
99
80
93
92
91
90
89
88
87
86
85
84
83
82
81


105
104
103

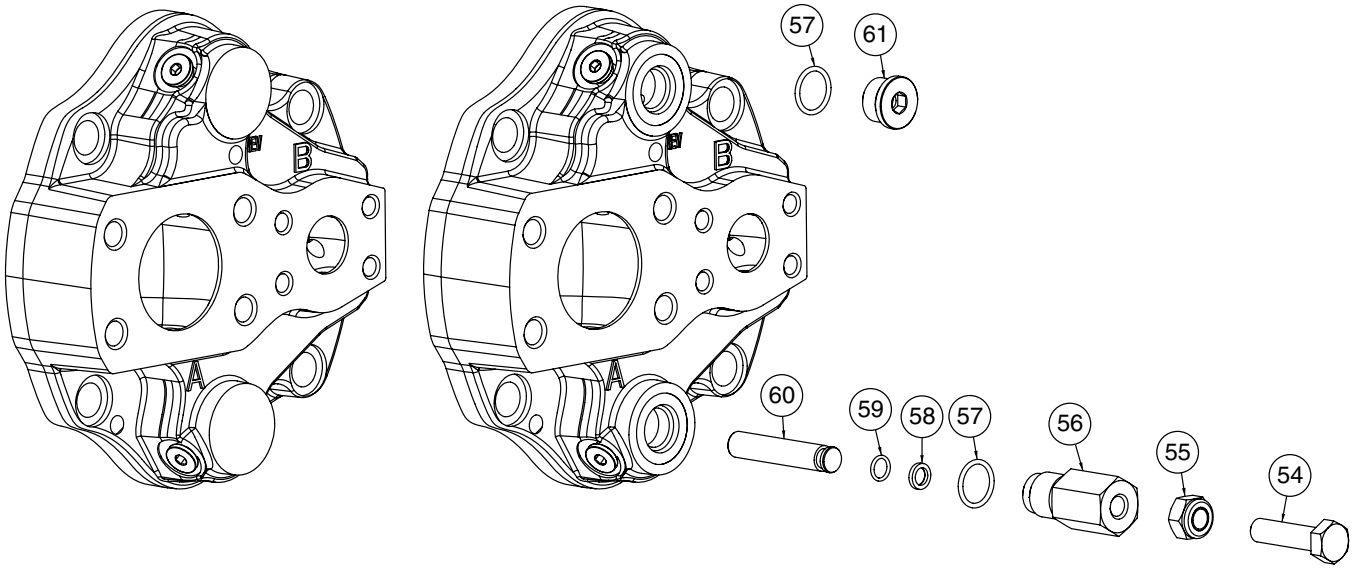
| RDEC Parts list | | | |
|---|---|---|---|
| **ITEM #** | **QTY** | **Part #** | **DESCRIPTION** |
| 80 | 1 | 03E-95420-0 | Rotary Position sensor |
| 81 | 2 | 210X73 | Socket head cap screw |
| 82 | 2 | 234X7 | Washer |
| 83 | 1 | 03E-95249-0 | Position sensor spacer |
| 84 | 1 | 03E-95201-0 | Shaft position connector 18 and 45 thru 75 |
| | | 03E-95545-0 | Shaft position connector 28 |
| | | 03E-95205-0 | Shaft position connector 100 and 140 |
| 85 | 1 | 789764 | Seal |
| 86 | 1 | 675-00904-0 | O-Ring Seal |
| 87 | 1 | 108X4V | O-Ring boss plug |
| 88 | 1 | S13-40266-0 | Check Valve |
| 89 | 1 | S2E-19182-5 | External Servo Assembly* |
| 90 | 1 | 03E-95347-0 | External servo manifold |
| 91 | 1 | S2E-19174-5 | Maximum pressure valve CCW |
| | | S2E-19173-5 | Maximum pressure valve CW |
| 92 | 12 | 605-10069-0 | O-Ring Seal |
| 93 | 1 | 517-00178-5 | Proportional valve 0 disp default CW |
| | | 517-00180-5 | Proportional valve max disp default CW |
| | | 517-00179-5 | Proportional valve 0 disp default CCW |
| | | 517-00181-5 | Proportional valve max disp default CCW |
| 94 | 8 | 350-10167-0 | Lock Washer |
| 95 | 4 | 361-07360-8 | Socket head cap screw** |
| | | 210x105 | Socket head cap screw*** |
| | | 210x110 | Socket head cap screw**** |
| 96 | 1 | 325-36002-0 | Roll Pin |
| 97 | 1 | S13-40266-0 | Check Valve |
| 98 | 1 | 03E-94859-0 | Cam pin |
| 99 | 1 | S2E-19190-0K | Position sensor mating connector |
| 100 | 1 | S2E-19254-0 | Electronic control unit (not shown) |
| 101 | 1 | S2E-19192-5K | Pressure sensor kit UNC threads(not shown) |
| | | S2E-19523-5K | Pressure sensor kit BSPP threads (not shown) |
| 102 | 1 | S2E-19191-0K | Prerssure sensor mating connector (not shown) |
| 103 | 1 | S2E-19179-0 | 12 Pin cable assembly |
| 104 | 1 | S2E-19259-0 | CAN communication cable |
| 105 | 1 | S2E-19180-0 | Control communcation cable |
| 106 | 1 | 1210694 | Standard Coil |
| 107 | 1 | 121459 | Gasket |
| * Item 89 includes items 86, 87, 88, 90, 92 and 96 | | | |
| ** Used on control options S/X/U/Z | | | |
| *** Used on pumps without overcenter capability (P) and control options P/W/T/Y | | | |
| *** Used on pumps with over center capability (X) and control options P/W/T/Y | | | |

## Displacement Sensor Installation



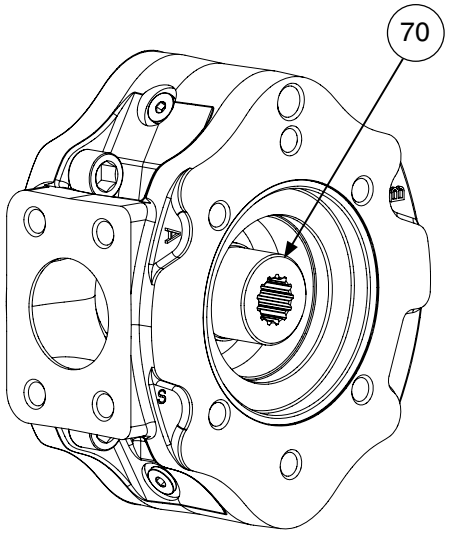



| CASE TO INLET CHECK VALVE | | | | |
|---|---|---|---|---|
| **Item No** | **Qty** | **018, 028, 045** | **060, 075, 100, 140** | **Description** |
| 50 | 1 | 314-10002-0 | 314-10000-0 | Hollow Set Screw |
| 51 | 1 | 03E-94720-0 | 03E-93931-0 | Check Valve Poppet |
| 52 | 1 | 03E-94721-0 | 03E-93987-0 | Spring |
| 53 | 1 | 03E-94722-0 | 03E-93988-0 | Check Valve Stop |




| Minimum and Maximum Volume Stop | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Item #** | **Qty** | **018** | **028** | **045** | **060** | **075** | **100** | **140** | **Description** |
| 54 | 1 | 362-11045-0 | | | | | | | Adjusting Screw |
| 55 | 1 | 334-00013-0 | | | 334-00011-0 | | | | Locknut, Adjusting Screw |
| 56 | 1 | 03E-93181-0 | | | 03E-93181-0 | | | | Volume Stop Plug |
| 57 | 1 | 695-00908-0 | | | 695-00908-0 | | | | O-ring, Volume Stop Plug |
| 58 | 1 | 618-15023-0 | | | 618-15023-0 | | | | Back Up Ring |
| 59 | 1 | 695-00011-0 | | | 695-00011-0 | | | | O-ring, Volume Stop Rod |
| 60 | 1 | 03E-94736-0 | 03E-95170-0 | 03E-93262-0 | | | | | Volume Stop Rod |
| 61 | 1 | 488-35018-0 | | | 488-35018-0 | | | | Plug(No Volume Stop) |
| Not Shown | 1 | 03E-95217-0 | 03E-95358-0 | 03E-93262-0 | ** | | | | Minimum Volume Stop Rod |
| KIT | | S2E-19203-5 | S2E-19204-5 | S2E-19114-5 | S2E-18987-5K | | S2E-18988-5K | | Adjustable Volume Stop |
| KIT | | S2E-19608-5 | S2E-19609-5 | Use Above Kit | | | | | Adjustable Minimum Volume Stop |

**Maximum and minimum volume stops use the same components except where noted.**




| Thru Drive Pad Coupling #70 | Thru Drive Couplings | | | | | | | O-ring |
|---|---|---|---|---|---|---|---|---|
| | 018 | 028 | 045 | 060 | 075 | 100 | 140 | |
| SAE A, 9 Tooth | S2E-19538-0 | S2E-19364-0 | 03E-94942-0 | 03E-93278-0 | 03E-93278-0 | 03E-94274-0 | 03E-93947-0 | 695-00237-0 |
| SAE A, 11 Tooth | S2E-19726-0 | S2E-19391-0 | 03E-94943-0 | 03E-94724-0 | 03E-94724-0 | 03E-94657-0 | ** | 695-00237-0 |
| SAE B, 13 Tooth | ** | S2E-19365-0 | 03E-94945-0 | 03E-93277-0 | 03E-93277-0 | 03E-94273-0 | 03E-93946-0 | 695-00243-0 |
| SAE BB, 15 Tooth | ** | S2E-19409-0 | 03E-94361-0 | 03E-93279-0 | 03E-93279-0 | 03E-94272-0 | 03E-93945-0 | 695-00243-0 |
| SAE C, 14 Tooth | ** | ** | ** | 03E-93276-0 | 03E-93276-0 | 03E-94271-0 | 03E-93944-0 | 695-00251-0 |
| SAE CC, 17 Tooth | ** | ** | ** | ** | ** | 03E-94270-0 | 03E-93943-0 | 695-00251-0 |
| SAE D&E, 13 Tooth | ** | ** | ** | ** | ** | ** | 03E-93942-0 | 695-00259-0 |

| Seal Kits | 018 | 028 | 045 | 060 | 075 | 100 | 140 |
|---|---|---|---|---|---|---|---|
| | S2E-18709-5K | S2E-19118-5K | S2E-19066-5K | S2E-18697-5K | S2E-18004-5K | S2E-18460-5K | S2E-18158-5K |

Note: Seal kits contain all the seals required for any pump configuration.

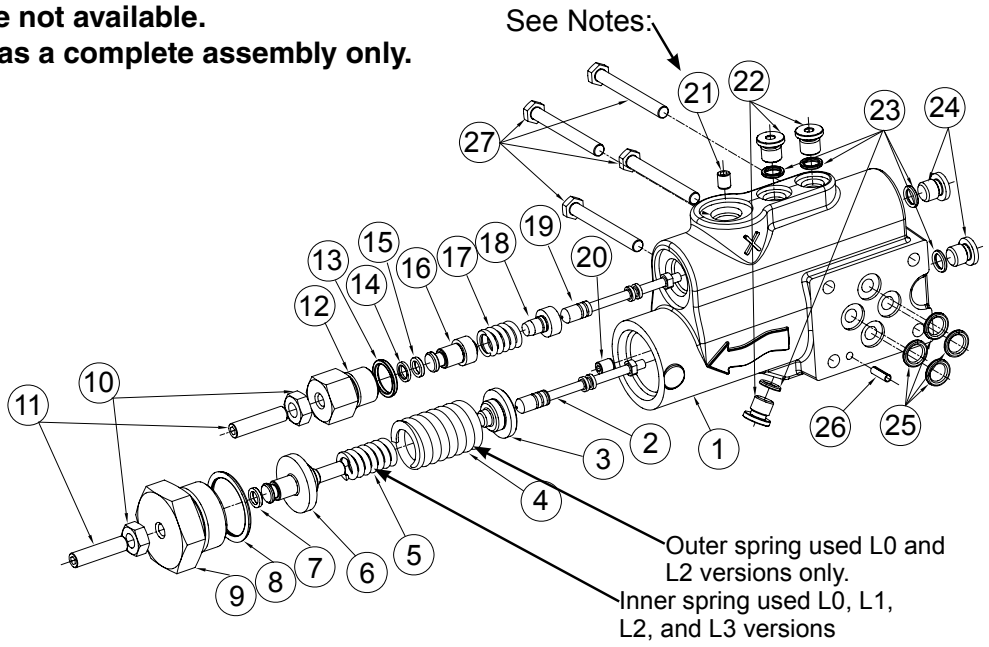
| Rotating Group Kits | 018 | 028 | 045 | 060 | 075 | 100 | 140 |
|---|---|---|---|---|---|---|---|
| CW Mobile P1 | S2E-18710-0K | S2E-19119-0K | S2E-19067-0K | S2E-18698-0K | S2E-18032-0K | S2E-18485-0K | S2E-18489-0K |
| CW Mobile P1 with Ripple Chamber | S2E-19205-0K | S2E-19209-0K | S2E-19235-0K | ** | ** | ** | ** |
| CCW Mobile P1 | S2E-18711-0K | S2E-19120-0K | S2E-19068-0K | S2E-18699-0K | S2E-18033-0K | S2E-18486-0K | S2E-18490-0K |
| CCW Mobile P1 w/ Ripple Chamber | S2E-19206-0K | S2E-19210-0K | S2E-19236-0K | ** | ** | ** | ** |
| CW Industrial PD | S2E-18712-0K | S2E-19121-0K | S2E-19069-0K | S2E-18700-0K | S2E-18483-0K | S2E-18487-0K | S2E-18491-0K |
| CW Industrial PD w/ Ripple Chamber | S2E-19207-0K | S2E-19211-0K | S2E-19126-0K | ** | ** | ** | ** |
| CCW Industrial PD | S2E-18713-0K | S2E-19122-0K | S2E-19070-0K | S2E-18701-0K | S2E-18484-0K | S2E-18488-0k | S2E-18492-0K |
| CCW Industrial PD w/ Ripple Chamber | S2E-19208-0K | S2E-19212-0K | S2E-19127-0K | ** | ** | ** | ** |

**Rotating Group Kit includes barrel s/a, pistons, retainer, washer, pins, port plate**

| Torque Limiter Control Kits | 045 | 060 | 075 | 100 | 140 |
|---|---|---|---|---|---|
| Torque Limiter Kit for AMT Control | S2E-19102-5 | S2E-19033-5 | S2E-18720-5 | S2E-18888-5 | S2E-18963-5 |
| Torque Limiter Kit for ALT Control | See Note | | ** | ** | ** |
| Torque Limiter Kit for L0T | ** | ** | S2E-18721-5 | S2E-18759-5 | S2E-18739-5 |

Torque Limiter Kits includes cartridge assembly, tubing and fittings.
**Note:** AM control can be converted to an AL control with conversion kit S2E-19117-0.
European customers will receive a solid spool in this kit. US customer will receive a set screw to plug orifice in spool.

**NOTE: Individual parts are not available.**
**The compensator is sold as a complete assembly only.**

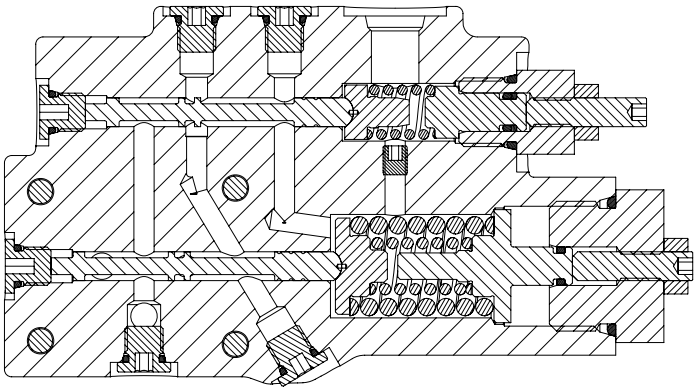



### Compensator Part Number

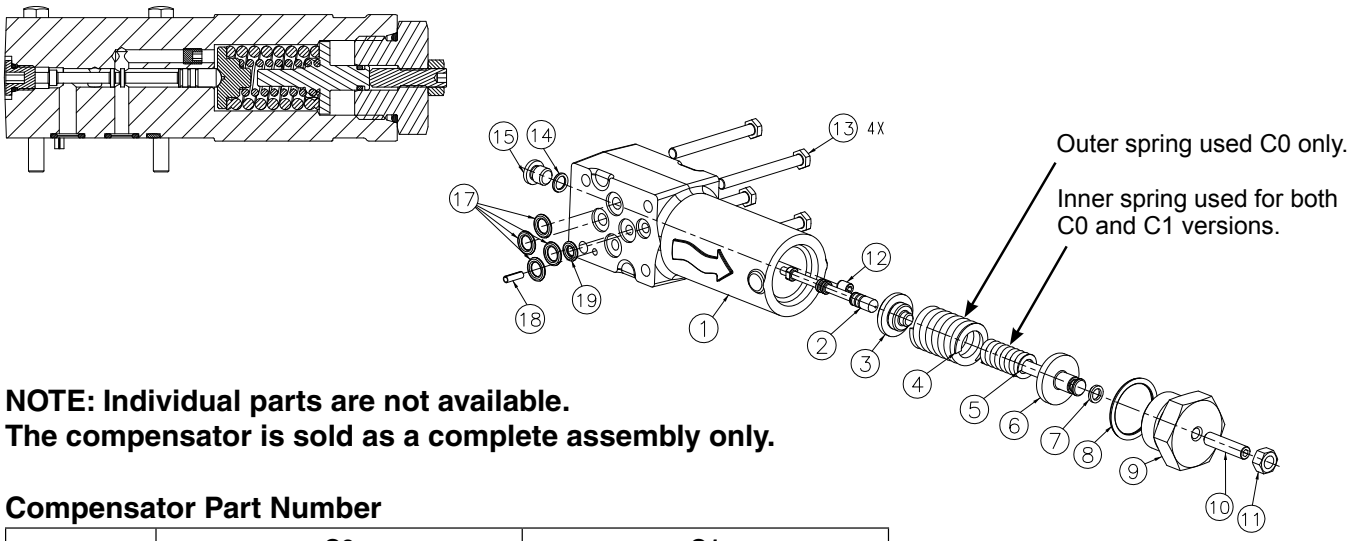
| Port | Rotation | L0 80 - 280bar (1150 - 4000 psi) | L1 20-80 bar (300-1150 psi) | L2 80 - 280bar (1150 - 4000 psi) | L3 20-80 bar (300-1150 psi) |
|---|---|---|---|---|---|
| SAE | CW | S2E-17823-5T | S2E-18245-5T | S2E-18584-5 T | N/A |
| | CCW | S2E-17824-5T | S2E-18244-5T | S2E-18586-5 T | N/A |
| ISO | CW | S2E-17939-5T | N/A | N/A | N/A |
| | CCW | S2E-17938-5T | N/A | N/A | N/A |
| BSPP | CW | S2E-17937-5T | N/A | N/A | N/A |
| | CCW | S2E-17936-5T | N/A | N/A | N/A |

| Item No. | Qty | Description | NOTES / Tightening Torque |
|---|---|---|---|
| 1 | 1 | Compensator Body | |
| 2 | 1 | Main Compensator Spool | |
| 3 | 1 | Main Compensator Spring Seat | |
| 4 | 1 | Main Compenator Outer Spring | L0 & L2 versions only |
| 5 | 1 | Main Compensator Inner Spring | |
| 6 | 1 | Main Compensator Spring Seat & Piston | |
| 7 | 2 | Compensator Seal Piston O-ring | |

Table CONTINUED on next page.



| Item No. | Qty | Description | NOTES / Tightening Torque | |
|---|---|---|---|---|
| 8 | 1 | Main Compensator Spring cap O-ring | | |
| 9 | 1 | Main Compensator Spring cap | 115 ± 7 N-m (85 ± 5 ft-lbs) | |
| 10 | 2 | Adjusting screw locknut | 7.9 ± 0.8 N-m (70 ±7 in-lbs) | |
| 11 | 2 | Adjusting screw | | |
| 12 | 1 | Load Sense Compensator Spring cap | 36.5 ± 1.5 N-m (27 ± 1 ft-lbs) | |
| 13 | 1 | Load Sense Compensator Spring cap O-ring | | |
| 14 | 1 | Load Sense Compensator Piston backup ring | | |
| 15 | 1 | Load Sense Compensator Piston O-ring | | |
| 16 | 1 | Load Sense Compensator Seal Piston | | |
| 17 | 1 | Load sense compensator spring | | |
| 18 | 1 | Load sense compensator spring seat | | |
| 19 | 1 | Load sense compensator spool | | |
| 20 | 1 | Socket set screw | (Loctite 242) 3.4 ± 0.4 N-m (30 ± 3 in-lbs) | |
| 21 | 1 | Socket set screw | L0 & L1 versions | (Loctite 242) 3.4 ± 0.4 N-m (30 ± 3 in-lbs) |
| | | Orifice | L2 & L3 versions | |
| 22 | 3 | SAE #2 O-ring boss plug | 4.0 ± 0.6 N-m (35 ± 5 in-lbs) | |
| 23 | 5 | SAE #2 O-ring | | |
| 24 | 2 | Hardened SAE #2 O-ring boss plug | 4.0 ± 0.6 N-m (35 ± 5 in-lbs) | |
| 25 | 4 | Teflon O-ring | | |
| 26 | 1 | Roll pin | | |
| 27 | 4 | Hex mounting screw | 5.0 ± 0.3 N-m (45 ± 3 in-lbs) | |




**NOTE: Individual parts are not available.**
**The compensator is sold as a complete assembly only.**

### Compensator Part Number

| Rotation | C0<br>80 - 280 bar (1150 - 4000 psi) | C1<br>20 - 80 bar (300 - 1150 psi) |
|---|---|---|
| CW | S2E-17904-5 T | S2E-18285-5 T |
| CCW | S2E-17905-5 T | S2E-18286-5 T |

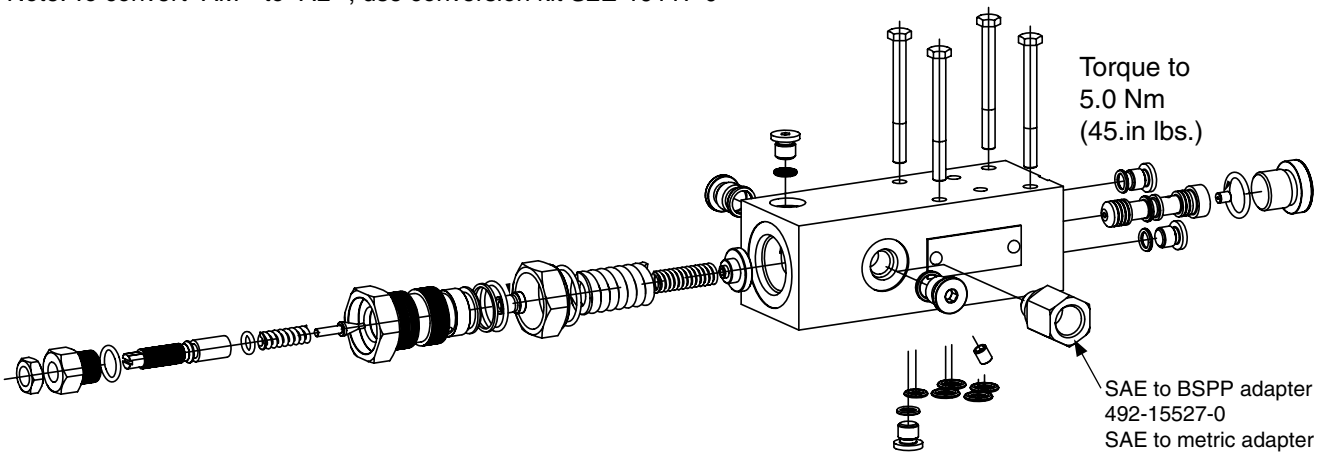
| Item no. | Quantity | Description | NOTES / Tightening Torque |
|---|---|---|---|
| 1 | 1 | Compensator body CW rotation | |
| | | Compensator body CCW rotation | |
| 2 | 1 | Spool | |
| 3 | 1 | Spring seat | |
| 4 | 1 | Outer spring | C0 versions only |
| 5 | 1 | Inner spring | |
| 6 | 1 | Spring seat & piston | |
| 7 | 1 | Seal piston o-ring | |
| 8 | 1 | Spring cap o-ring | |
| 9 | 1 | Spring cap | 115 ± 7 N-m (85 ± 5 ft-lbs) |
| 10 | 1 | Adjusting screw | |
| 11 | 1 | Adjusting screw locknut | 7.9 ± 0.8 N-m (70 ±7 in-lbs) |
| 12 | 1 | Socket set screw | (Loctite 242) 3.4 ± 0.4 N-m (30 ± 3 in-lbs) |
| 13 | 4 | Hex mounting screw | 5.0 ± 0.3 N-m (45 ± 3 in-lbs) |
| 14 | 1 | SAE #2 o-ring | |
| 15 | 1 | Hardened SAE #2 o-ring boss plug | 4.0 ± 0.6 N-m (35 ± 5 in-lbs) |
| 17 | 4 | Teflon O-ring | |
| 18 | 1 | Roll pin | |
| 19 | 1 | Teflon O-ring | |

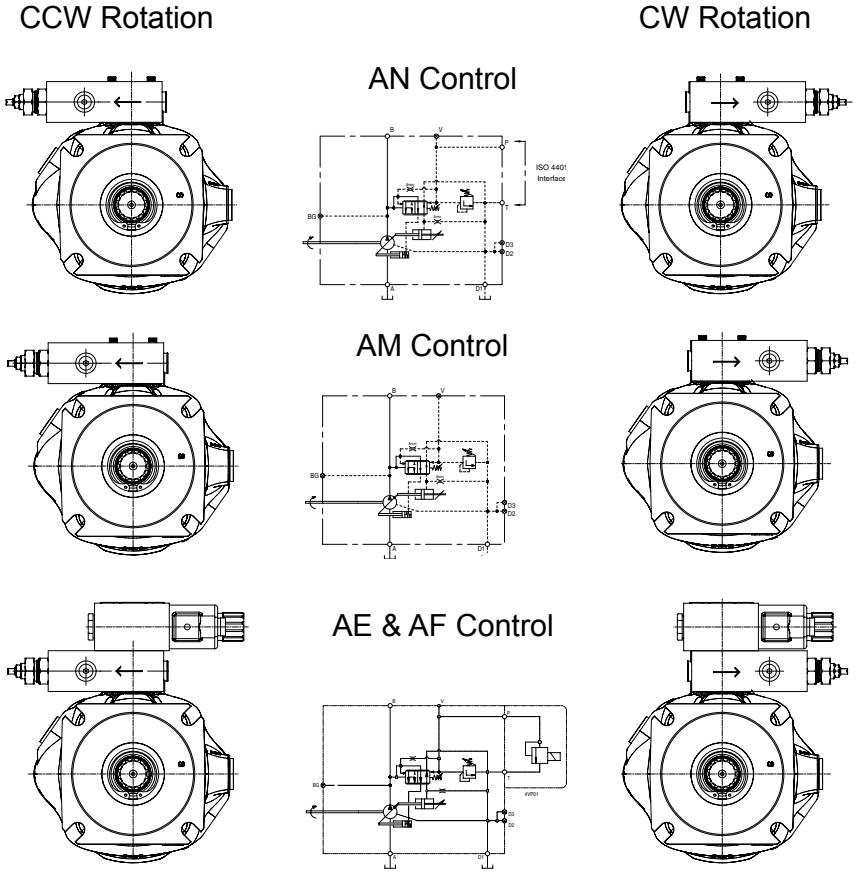
**NOTE: Individual parts are not available.**
**The compensator is sold as a complete assembly only.**

### Compensator Part Number

| Rotation | AM* | AN* | AL* | AE* | AF* |
|---|---|---|---|---|---|
| CW | S2E-18745-5T | S2E-18743-5T | S2E-19107-5T | S2E-18747-5T | S2E-18749-5T |
| CCW | S2E-18746-5T | S2E-18744-5T | S2E-19106-5T | S2E-18748-5T | S2E-18750-5T |

Note: To convert "AM*" to "AL*", use conversion kit S2E-19117-0



## COMPENSATOR DISASSEMBLY

**NOTES:**
Access plugs on end of compensator spool bores are hardened plugs. Do not interchange with other plugs in the control.

For rotation change, the complete compensator assembly will need to be replaced.

**Compensator Disassembly:**

1. Measure and record the extension of the two pressure adjusting screws.
2. Carefully remove the main compensator spring cap. Remove the two springs. Remove the seal piston and spring seat. Remove the o-ring boss access plug on the opposite side of the compensator. Remove the compensator spool. NOTE: the compensator spool and inner spring are not interchangeable with the load sense compensator spool and spring.
3. For "L" series compensators: Carefully remove the load sense compensator spring cap with spring seat/seal piston. Remove the spring. Remove the spring seat. Remove the o-ring boss access plug on the opposite side of the compensator. Remove the load sense compensator spool. NOTE: the load sense compensator spool and spring are not interchangeable with the main compensator spool and inner spring of the main compensator.
4. Remove all SAE o-ring boss access plugs.

## COMPENSATOR INSPECTION

**NOTE:** The compensator is supplied as an assembly. Individual parts are not available. If there is significant damage to any of the parts, the complete compensator will need to be replaced.

1. Inspect the main compensator spool and the load sense spool for scratches or other damage.
2. Inspect the springs for proper free extension length (see chart below).
3. Inspect the spool bores for damage. Apply a light oil film on the appropriate spool and check its fit in the bore. The spool should fit snugly in housing and not have any radial play.

| COMPENSATOR SPRING FREE LENGTH | | | |
|---|---|---|---|
| **Type** | **Item Number** | **Component** | **Tolerances** |
| C*/L* | 5 | Main compensator spring - inner | Free height: 25.9±0.5mm (1.020±0.020 in.) |
| C0/L0/L2 | 4 | Main compensator spring - outer | Free height: 39±0.7mm (1.535±0.028 in.) |
| L* | 17 | Load Sense spring | Free height: 14±0.4mm (0.551±0.016 in.) |
| R* | 6 | Bias spring | |

Reference item numbers on page 26.

**COMPENSATOR ASSEMBLY**

**NOTE: instructions are for load sense compensator. For other compensator types disregard steps related to extra spool assembly.**

Carefully clean and dry all parts prior to assembly. Use caution to insure that spools and other parts are not damaged during cleaning process. Use clean oil to lubricate seals and spools for easier assembly.

1. Remove and discard all o-rings. Install new o-rings on SAE boss plugs and seal pistons.

2. Apply a light film of oil to the o-ring on the main compensator seal piston. Install the main compensator seal piston in the main compensator spring cap.

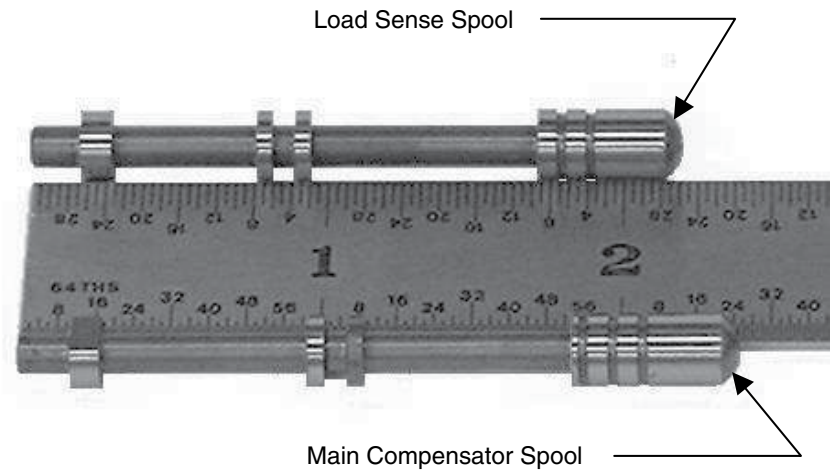
3. Place inner compensator spring on seal piston. Install the outer compensator spring over the inner spring on the seal piston. Position the spring seat over the springs. Insert this assembly into the main compensator housing bore. Torque the main compensator spring cap to 169-183 Nm (125-135 ft.-lb.).

4. Apply a light film of oil on the main compensator spool (the longer of the 2 spools). Insert the spool into the spool bore opposite the main compensator spring assembly in the compensator body. The rounded end of the spool should be installed first so it will contact the spring seat. Install a new o-ring on the hardened SAE boss fitting and place it into the port. Torque fitting to 4 ± 0.5 Nm (37 ± 5 in-lb).

5. Apply a light film of oil to the o-ring on the load sense seal piston. Install the load sense compensator seal piston seat in the load sense spring cap. Install the load sense spring over the seal piston. Position the spring seat over the spring. Install this assembly into the load sense bore of the compensator housing. Torque the load sense spring cap to 35-38 Nm (26-28 ft. lb.).

6. Apply a light film of oil to the load sense compensator spool (the shorter of the 2 spools). Insert the spool into the spool bore opposite the load sense spring assembly. The spool should be installed with the rounded end in first so it will contact the load sense spring seat. Install a new o-ring on the hardened SAE boss fitting and place it into the port. Torque fitting to 4 ± 0.5 Nm (37 ± 5 in-lb).

7. Install o-rings on remaining SAE boss fittings and install into housing. Torque SAE-2 fittings to 4 ± 0.5 Nm (37 ± 5 in-lb).



**PUMP DISASSEMBLY**

Pump disassembly for inspection should be limited to the following cases:
a) Malfunction or oil leakage resulting from damage or wear and tear.
b) Trouble-shooting procedures previously listed do not solve the problem.

For rotation change or shaft conversion, disassembly should be done only as far as necessary to complete conversion.

Disassembly and reassembly should be performed in a clean environment.

> **Caution:** Spring assemblies in the pump are normally set under high compression and bodily injury may occur if caution is not taken during disassembly.

It is usually not necessary to replace spring (20) fitted in cylinder barrel. Do not replace the spring unless absolutely necessary.

After disassembly, the internal parts should be coated with a film of clean oil and protected from dirt and moisture.

It is recommended that the length of the protruding portion of the compensator adjusting screws, on the control 40 be measured and noted as this information will prove useful during assembly.

Care must be taken to avoid dropping, damaging or contaminating the machined parts and the control valve.

For complete overhaul, all o-rings and seals should be discarded and replaced.

1. Identify the pump from information on the data tag. Figure 1

**Figure 1**


Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

**PUMP DISASSEMBLY**
**Continued**

2. Drain fluid from housing. Fluid drained from pump should be disposed of properly.
3. Mount pump in fixture to prevent movement while removing main housing bolts
4. Remove bolts holding the compensator assembly on the pump housing. Additional fluid may drain out of the passages when the compensator is removed. Set compensator aside for later disassembly and inspection
5. Remove the bolts attaching the port block to the main housing.
6. Carefully remove the port block. Use caution to avoid dropping the port plate. Note the location of the bias spring - piston assembly and the control piston assembly. The control piston, bias piston and bias spring may remain in pump when port block is removed. Remove and discard the three white Teflon seals on the port block. These seals should be replaced each time the pump is disassembled.
7. Remove the control piston and the bias piston - spring assembly.
   **NOTE:** For rotation change only, do not disassemble further, proceed to step 14.
8. Position the pump horizontally and remove the rotating group. Avoid separating the pistons from the barrel if possible. This will assist in identifying damage between an individual piston and bore during component inspection.

8a. If completing a seal change or complete overhaul on a 045 pump turn housing over and remove the snap ring and shaft seal from the housing before moving on to step 9.

9. Remove cam from housing. See Figure 2

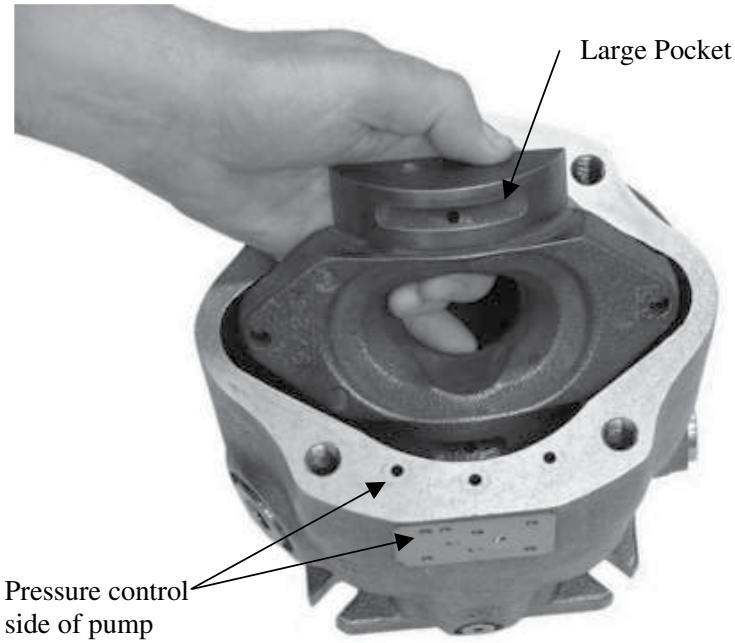



Figure 2

**PUMP DISASSEMBLY**
**Continued**

10. Remove cam bushing screws and cam bushings from pump.
11. Remove snap ring in housing and shaft bearing assembly.
12. If completing a seal change or a complete overhaul turn the housing over and remove the snap ring and shaft seal from the housing.
    12a. If you are working on an 045 pump please omit this step as this has already been completed in step 8a.
    12b. Always use a new shaft seal. Do not reuse old shaft seal.
13. If there is excessive wear on the port block bushing; remove the bushing from the port block.
14. If complete overhaul or rotation change, remove control piston and bias piston guides. The Control piston and bias piston guides are installed with Anaerobic thread lock. Place the port block in an oven at 163°C (325°F). **NOTE:** to prevent annealing of heat treated surfaces DO NOT USE A TORCH TO HEAT PISTON GUIDES. (45 Size only)

**COMPENSATOR DISASSEMBLY**

**NOTES:** Access plugs on end of compensator spool bores are hardened plugs. Do not interchange with other plugs in the control. For rotation change, the complete compensator assembly will need to be replaced.

1. Measure and record the extension of the two pressure adjusting screws.
2. Carefully remove the main compensator spring cap. Remove the two springs. Remove the seal piston and spring seat. Remove the o-ring boss access plug on the opposite side of the compensator. Remove the compensator spool. NOTE: the compensator spool and inner spring are not interchangeable with the load sense compensator spool and spring.
3. Load sense compensator: Carefully remove the load sense compensator spring cap with spring seat/seal piston. Remove the spring. Remove the spring seat. Remove the o-ring boss access plug on the opposite side of the compensator. Remove the load sense compensator spool. NOTE: the load sense compensator spool and spring are not interchangeable with the main compensator spool and inner spring of the main compensator.
4. Remove all SAE o-ring boss access plugs.

Proceed to inspection section of this manual.

**PUMP INSPECTION PROCEDURES**

Carefully clean and dry all parts prior to inspection. Refer to chart 1 for dimensional information regarding allowable tolerances.

1. Examine piston diameters for scratches or gouges. If any piston is severely-damaged, note which piston bore it came out of. Extra attention should be given to that bore in step 2. Check end play of piston shoe assembly. Check the bottom surface of the shoes for damage. The shoe surface should be square and flat. Measure the depth of the pocket of the shoe. Shoes may be lapped as a set if the pocket depth is within allowable limits. Confirm pocket depth after lapping to insure it is still within limits.
2. Examine bores in cylinder for scratches Check diameter of bores in 4different locations, including near the bottom of the barrel where the piston does not travel. If the dimensions vary by more than 0.0102 mm (0.0004 in.)or any dimension exceeds the allowable limit, the barrel needs to be replaced. Examine the barrel face for scratches and gouges. The barrel canbe reworked if dimensions are with specifications listed in chart 1.
3. The port plate can be lapped lightly if the face is only lightly scratched, otherwise it should be replaced.
4. Examine the retainer plate in the area of contact with the piston shoes. Anymarks beyond light polishing indicate that replacement is necessary. Check the surface of the spherical area of the retainer plate and the spherical guide ball. Inspect the back surface of the spherical guide ball where the load pins make contact. If indentations are present replace the guide ball.
5. Examine cam on top and bottom surface. If scratches or gouges appear to penetrate the surface treatment, the cam must be replaced.
6. The cam bearings cannot be reworked and should be replaced if worn through the Teflon surface.
7. Both the bias piston and the compensator piston should move freely in their respective bores. The pistons and bores should be free of scratches or gouges.
8. The seal area of the drive shaft should be smooth and not have marks due to seal wear. Keyed shafts should be inspected for signs of brinelling and damage to the key area. Splined shafts may have a contact wear pattern but should not show excessive wear on the spline area.
   **NOTE:** Spinning on shaft for P1/PD-018, 028 and 045 the cylindrical bearing should not have any signs of roller spalling, brinelling or discoloration. The bearing should be free to rotate without bind or rough feel.

**COMPENSATOR INSPECTION**

**NOTE:** The compensator is supplied as an assembly. Individual parts are not available. If there is significant damage to any of the parts, the complete compensator will need to be replaced.

1. Inspect the main compensator spool and the load sense spool for scratches or other damage.
2. Inspect the springs for proper free extension length (see chart on page 30).
3. Inspect the spool bores for damage. Apply a light oil film on the appropriate spool and check its fit in the bore. The spool should fit snugly in housing and not have any radial play.

**Chart 1**
**Rework Limits**

| Item Number | Component | 018 Part No | 028 Part No | 045 Part No | Tolerances |
|---|---|---|---|---|---|
| 13<br>*Page 16 & 17* | Bias Spring | 03E-94430-0<br>78.3 mm | 03E-94393-0<br>87.5 mm | 03E-94356-0<br>116.4 mm | Free Height +/- 0.2mm |
| 20<br>*Page 16 & 17* | Barrel Spring | 787635<br>41.4 mm | 03E-94387-0<br>39.5 mm | 03E-94350-0<br>48.3 mm | Free Height +/- 0.2mm |
| 26<br>*Page 16 & 17* | Piston | 789519<br>Max End Play<br>0.10 mm<br><br>Min Shoe Flange Thickness<br>2.97 mm | S2E-18415-0<br>Max End Play<br>0.07 mm<br><br>Min Shoe Flange Thickness<br>3.98 mm | S2E-184130-0<br>Max End Play<br>0.10 mm<br><br>Min Shoe Flange Thickness<br>4.98 mm | Measure OD in 3 places, top, middle and bottom. Measurement should not vary by more than 0.01 mm<br><br>End Play between piston and shoe should not exceed value shown |
| 23<br>*Page 16 & 17* | Barrel | 03E-94717-0 | 03E-94375-0 | 03E-94338-0 | Measure piston bore ID in 3 places , top, middle, bottom. Measurement should not vary by more than 0.01 mm.<br><br>Max material to be removed by lapping is .0051 mm |
| 4<br>*Page 28 & 30* | P Max Compensator Spring-Outer | 03E-93158-0<br>39 mm | | | Free Height : +/- 0.7mm |
| 5<br>*Page 28 & 30* | P Max Compensator Spring- Inner | 03E-93159-0<br>26 mm | | | Free Height : +/- 0.5mm |
| 17<br>*Page 28* | Load Sense Spring | 03E-93825-0<br>14 mm | | | Free Height : +/- 0.4mm |

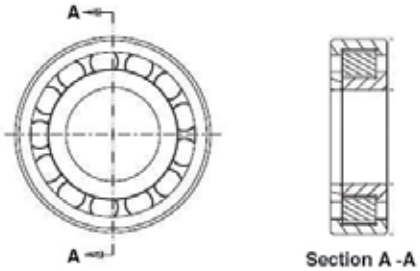
**PUMP ASSEMBLY PROCEDURES**

For major overhauls, all plugs should be removed, and the seals replaced. Prior to assembly, all parts should be thoroughly cleaned. Assembly should be performed in a clean work environment.

Do not use bearing grease during installation. Grease does not dissolve in hydraulic oil and may plug orifices or filters in the system. Clean petroleum jelly is preferred to lubricate o-rings and seals, and to adhere parts for assembly.

**NOTE:** For fluids other than petroleum based hydraulic oil, insure that petroleum jelly is compatible with the fluid. If not compatible, another product should be used instead.

Inspect all bearing surfaces and seal areas to insure that they are free from nicks, dings, scratches, and rust.




Cylindrical Bearing

1. Turn housing over. Using installation tool T1, press the shaft seal in the seal bore. Install the snap ring into the groove in the seal housing bore. **NOTE:** Install shaft and bearing on 45 unit before installing shaft seal. T1 tool not used on 45 unit, use T3 tool to insert shaft seal over input shaft.
2. Install cylindrical bearing on pump shaft (slip fit). Install external retaining ring to hold bearing in place on the shaft. Insert shaft assembly into the pump housing with the bearing sliding into the bearing diameter in the housing. Install internal retaining ring into the housing. (See drawing)
3. If barrel hold down spring was removed during disassembly process, install three pins to slots in barrel spline (45 Size only). Petroleum jelly can be used to hold pins in place while installing remaining parts. (Figure 4) Place barrel on fixture with pin side down. Install backup washer and hold down spring and second back up washer. Compress spring in press and install snap ring. Caution: Make sure snap ring is properly seated in groove prior to removing barrel from press.

Figure 4

4. Apply a light film of oil into the piston bores. Lightly lubricate the spherical surface of the guide ball. Install the nine pistons into the bores in the hold down plate. Install the spherical guide ball into the hold down plate. While holding the guide ball against the hold down plate, install the pistons into the barrel.

**PUMP ASSEMBLY PROCEDURES**
**Continued**

| Chart 2 | |
|---|---|
| Pump | Control and bias guide torque |
| 018 | Press Fit |
| 028 | Press Fit |
| 045 | 142 Nm (105 ft lbs) |

5. Install the locating pin on the port block face.
6. For 045: Apply Loctite Primer Grade T to guide threads and allow to dry. Install unlubricated o-rings on the control guide and bias guide. Apply Loctite 271 to guide threads. For left hand rotation the bias guide is installed nearest to the dowel pin (figure 5A.) For right hand rotation the control guide is installed nearest to the dowel pin (figure 5B.) Torque the control and bias guides as specified in Chart 2. For 018, 028: The guides are identical and press fit into the holes. (Not shown in picture below)

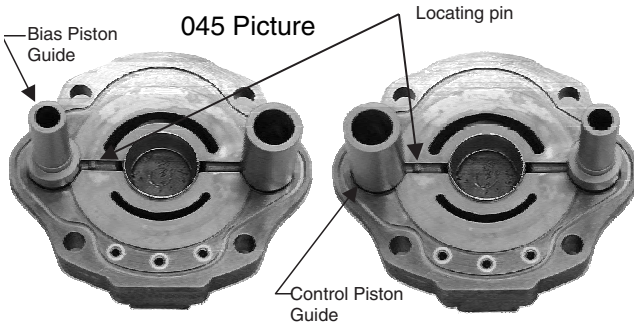



Figure 5A
Port Block with Left Hand configuration

Figure 5B
Port Block with Right Hand configuration

7. Apply light oil film to control piston and install it in the control guide bore.
8. Apply light oil film to the bias piston. Install the bias spring and the bias piston in the bias piston guide bore.
9. Apply a light layer of petroleum jelly to the back surface of the port plate. Install the port plate on the port block, lining up the slot on the port plate with the locating pin. (Refer to Figure 6)

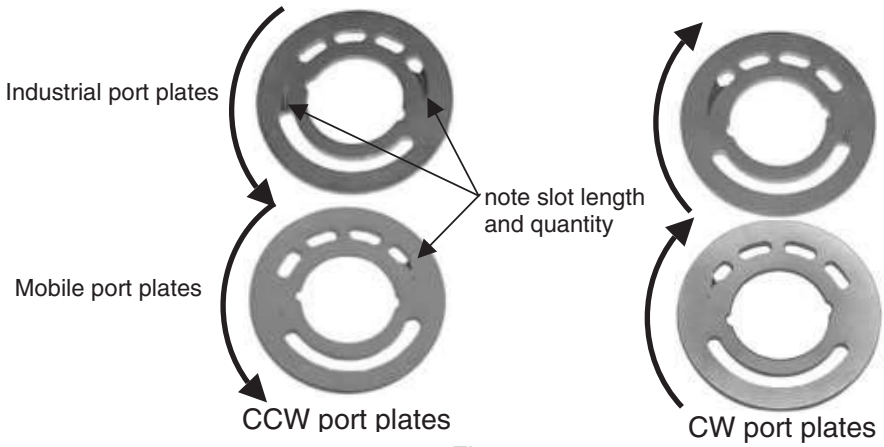



Figure 6

10. Install the large o-ring in the groove on the port block. Install the three teflon o-rings on the pressure communication ports of the port block.



Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

**PUMP ASSEMBLY PROCEDURES**
**Continued**

11. Install the cam bearings in the cradle area of the housing. The chamfer on the back of the bearing must face the outer wall of the housing. Use Loctite Primer Grade "T" or other suitable primer on screws and mating threads in housing. Apply Loctite #242 (use sparingly) to screw threads and install orifice screws to hold bearings in place. Torque screws to 3.4 ± 0.25 Nm (33 ± 3 in-lb).
12. Place thin film of clean oil on cam bearing surfaces. Install cam in housing. For 045, the cam must be tilted to permit entry into the housing. (Figure 2) **NOTE:** The large pocket on the bottom surface of the cam must be on the same side as the three pressure communication holes on the main housing. Pump rotation does not affect the assembly of the cam.
13. Install the drive shaft into the pump housing. Position pump horizontally. Install the rotating group over the pump shaft. Rotate the barrel to insure that it is seated against the cam. Insure that the pump shaft is seated properly in the front bearing.
14. Confirm that compensator rotation, port plate rotation, control and bias piston location indicate same direction of rotation.
15. Carefully install the assembled port block on the pump housing. Press the port block to compress the bias spring and install housing bolts. Tighten the bolts in a cross pattern to insure the port block does not get cocked on the housing. When port block is seated on the housing, torque bolts in a cross pattern as specified in chart 3.
16. Install o-ring seals and assembled compensator on side of pump housing. Pump rotation is indicated by arrow on compensator housing. Torque bolts to 5 ± 0.25 Nm (45 ± 3 in-lb). (See Figure 7)

| Chart 3 | |
|---|---|
| Pump | Housing bolt torque |
| 018 | 51 Nm (38 ft lbs) |
| 028 | 70 Nm (52 ft lbs) |
| 045 | 85 Nm (63 ft lbs) |

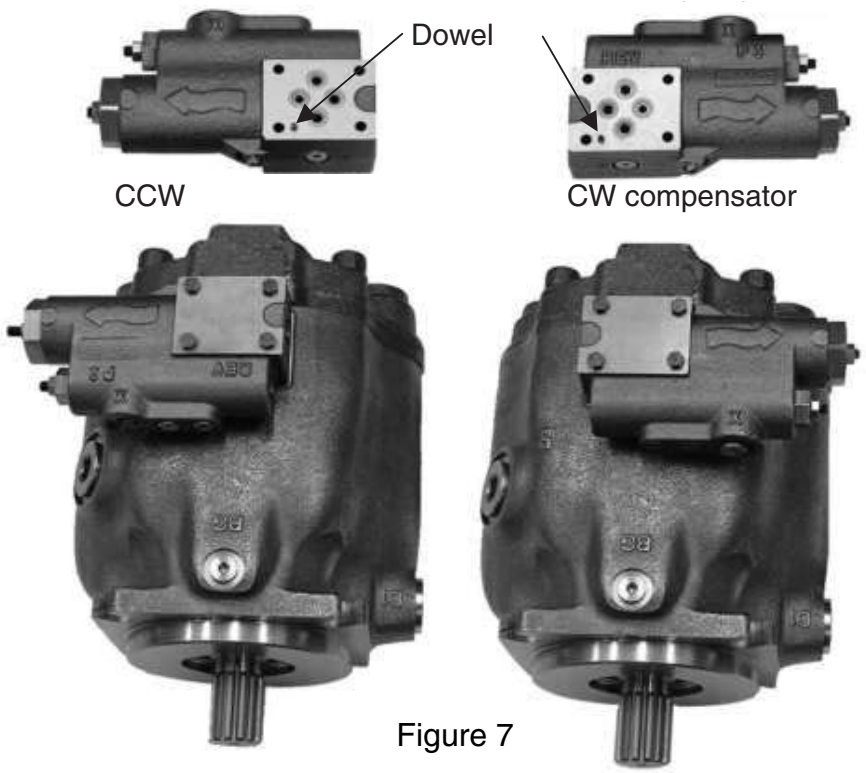
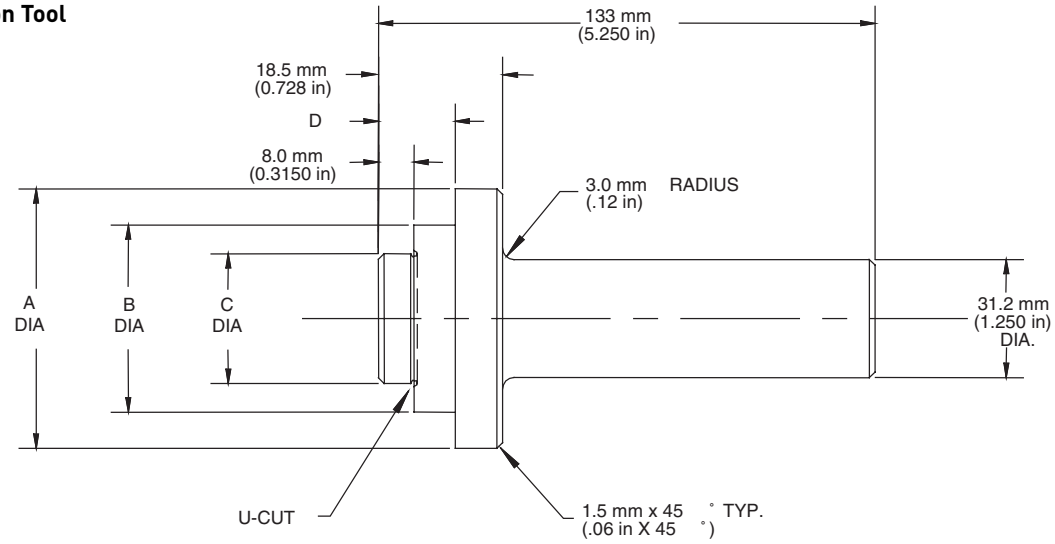


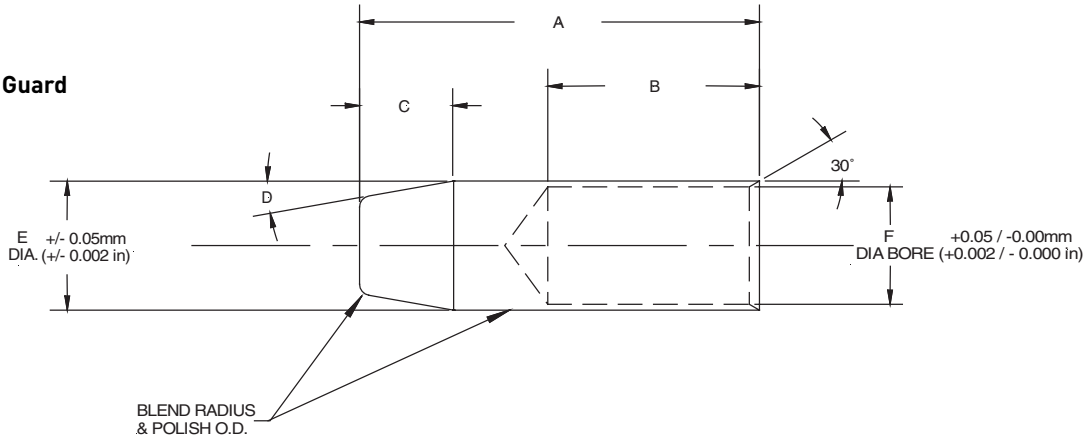

Figure 7

**T1 Seal Installation Tool**



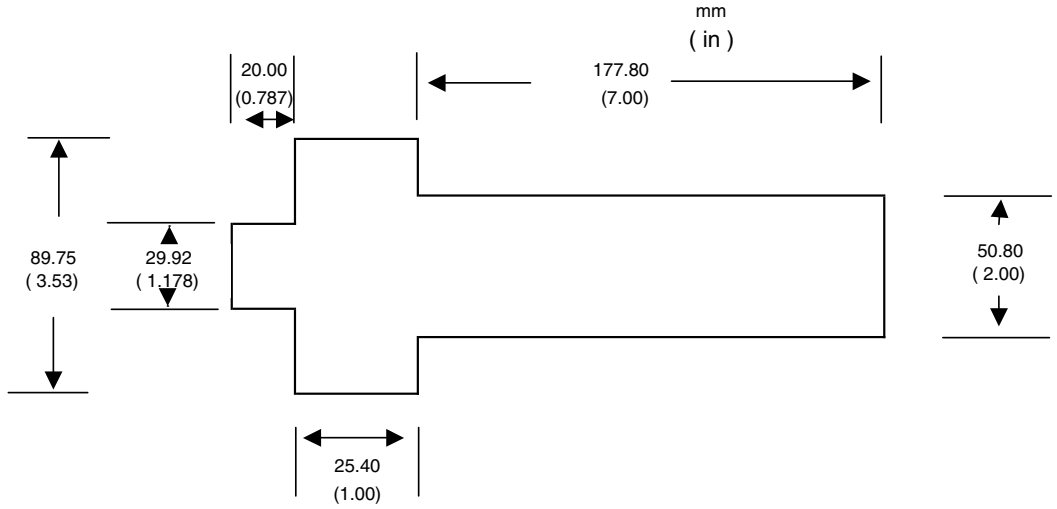

| T1 Seal installation tool | A | B | C | D |
|---|---|---|---|---|
| (018) | 2.250 | 1.62 | 1.18 | 0.406 |
| (028) | 2.250 | 2.00 | 1.378 | 0.447 |

**T3 Seal Guard**

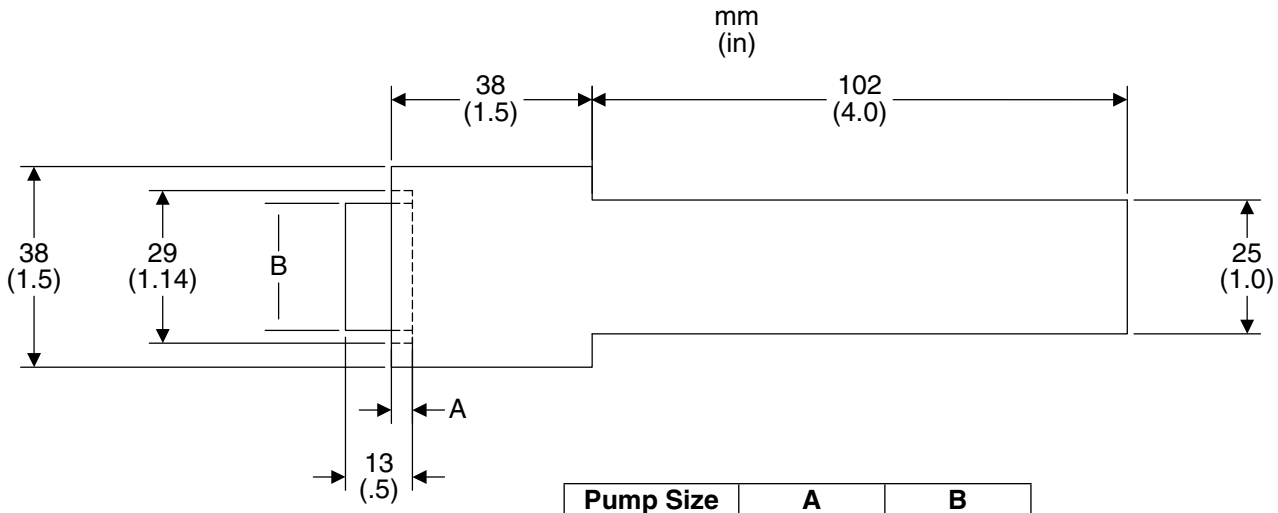



| Pump Model | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| 018<br>“01”, “02”, “04” Shafts | 76.20 mm<br>3.00 in. | 50.80 mm<br>2.00 in. | 19.05 mm<br>0.75 in. | 15° | 28.82 mm<br>1.135 in. | 20.45 mm<br>0.805 in. |
| 018<br>“06” Shaft | 76.20 mm<br>3.00 in. | 50.80 mm<br>2.00 in. | 19.05 mm<br>0.75 in. | 15° | 28.82 mm<br>1.135 in. | 16.76 mm<br>0.66 in. |
| 028 / 045<br>“01”, “02”, “04” Shafts | 76.20 mm<br>3.00 in. | 50.80 mm<br>2.00 in. | 19.05 mm<br>0.75 in. | 15° | 38.10 mm<br>1.50 in. | 26.00 mm<br>1.024 in. |
| 018/028/045<br>“08” Shaft | 76.20 mm<br>3.00 in. | 50.80 mm<br>2.00 in. | 19.05 mm<br>0.75 in. | 15° | 28.82 mm<br>1.135 in. | 22.50 mm<br>0.885 in. |

**T2 Front Bearing P1/PD045 Installation Tool**




**T5 Rear Bushing Installation Tool**




| Pump Size | A | B |
|---|---|---|
| 018 | 3.71 mm<br>0.146 in. | 19.9 mm<br>0.772 in. |
| 028 | 4.00 mm<br>0.157 in. | 21.6 mm<br>0.85 in. |
| 045 | 4.00 mm<br>0.157 in. | 24.1 mm<br>0.95 in. |

**PUMP TEST PROCEDURE**

Test criteria based on hydraulic oil ISO 32 per Parker HF-0 specifications.
Oil temperature: 50°C ± 2°C (120°F ±10°F). **NOTE:** insure that the hydraulic system does not overheat during this test procedure.
Operating speed: 0 - 2300 rpm ± 30 rpm.
Case pressure: Maximum 14.5 psi (1 bar)

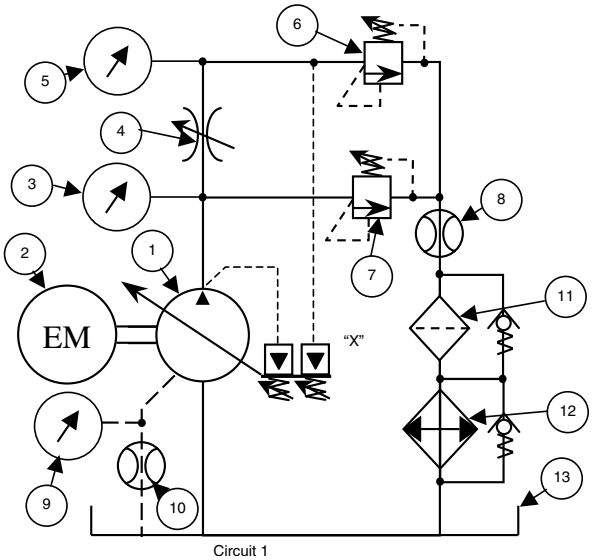
1. Mount pump on test fixture. Insure that shaft alignment is within specified tolerances.
2. Fill case with clean oil. Connect upper drain port to reservoir with no restrictions. Insure other drain ports are properly plugged.
3. Connect inlet and pressure lines. Insure that lines are filled with oil. Refer to circuit below. For units with “L” compensators, connect a suitable pilot line from port “X” to the pump discharge pressure line, down stream of the non-compensating flow valve.
4. Confirm direction of rotation for pump and drive are correct.
5. Reduce the main compensator setting to minimum. For units with “L” compensators, advance the load sense compensator adjustment until it bottoms out, and lock into position.
6. Set maximum volume stop (if included) to full displacement. If minimum volume stop is included, back adjustment all of the way out.
7. If possible, gradually increase pump speed to 1800 ± 30 rpm with no load.
8. Screw in compensator adjusting screw until it bottoms out, with no pressure on system load-relief valve.
9. Break-in pump at times and pressures listed below. Adjust the load-relief valve to the pressure listed for the times indicated. After break-in, reduce compensator setting to 280 bar (4060 psi), and adjust system load relief to cause pump to compensate three times to verify that pump compensates on and off stroke properly.

| Time | 30 seconds | 30 seconds | 30 seconds |
|---|---|---|---|
| Pressure | 62-69 Bar<br>900-1000 psi | 200-207 Bar<br>2900-3000 psi | 269-276 Bar.<br>3900-4000 psi |

**TEST CIRCUIT**

1. Test pump
2. Test stand prime mover
3. Pump pressure gauge
4. Non-compensating flow control
5. Load pressure gauge
6. Load relief valve
7. Safety bypass relief valve
8. Main flow meter
9. Case drain pressure gauge
10. Case drain flow meter
11. Filter assembly with bypass
12. Cooler assembly with bypass
13. Reservoir

NOTE: Items 4 and 5 are required for load sense pump test.



Circuit 1

| PERFORMANCE SPECIFICATIONS<br>PUMP WITH PRESSURE COMPENSATOR | | | | |
|---|---|---|---|---|
| **STEP REFERENCE** | **CONDITION** | **018** | **028** | **045** |
| 1 | Rated Speed | 1800 | 1800 | 1800 |
| 4 | Output Flow at minimum pressure | 32 lpm minimum | 49 lpm minimum | 80 lpm minimum |
| 5 | Output Flow at rated pressure of 280 bar | 30 lpm minimum | 47 lpm minimum | 77 lpm minimum |
| 6 | Case leakage at rated pressure of 280 bar | 1.6 lpm | 2.3 lpm | 5.3 lpm |
| 9* | Case leakage when compensated at 280 bar | 5.7 lpm | 5.7 lpm | 9.5 lpm |
| 10 | Input Torque when compensated at 280 bar | 17.5 Nm | 21.2 Nm | 42 Nm |
| 11 | Output Flow when pressure reduced to 273 bar with compensator set at 280 bar | 30 lpm minimum | 47 lpm minimum | 77 lpm minimum |

* When using the A series compensators increase compensated case leakage by 2.3 lpm

| TEST PROCEDURE<br>PUMP WITH PRESSURE COMPENSATOR | | | |
|---|---|---|---|
| **STEP REFERENCE** | **CONDITION** | **REQUIRED VALUE** | **MEASURED VALUE** |
| 1 | Set the pump speed to 1800 RPM | 1800 rpm | |
| 2 | Increase pump pressure compensator adjustment to maximum. | n/a | |
| 3 | Record input oil temperature | 43-54 ° C (110 – 130 °F) | |
| 4 | Set output load pressure to minimum. Record output flow | see performance chart | |
| 5 | Set output load pressure to 280 ± 2 bar (4060 ± 30 psi). Record output flow | see performance chart | |
| 6 | Record case leakage | see performance chart | |
| 7 | Set output pressure to 290 ± 2 bar (4200 ± 30 psi) | n/a | |
| 8 | Set pressure compensator to 280 ± 2 bar (4060 ± 30 psi) | n/a | |
| 9 | Record case leakage | see performance chart | |
| 10 | Record input torque | see performance chart | |
| 11 | Reduce output pressure to 273 ± 2 bar (3960 ± 30 psi). Record output flow | see performance chart | |
| 12 | Verify no external leaks | No leakage permitted | |

## PUMP DISASSEMBLY NOTES

A. Pump disassembly for inspection should be limited to the following cases:
a) Malfunction or oil leakage resulting from damage or wear and tear.
b) Trouble-shooting procedures previously listed do not solve the problem.

**Caution: Spring assemblies in the pump are normally set under high compression and bodily injury may occur if caution is not taken during disassembly.**

B. For rotation change or shaft conversion, disassembly should be done only as far as necessary to complete conversion.

C. Disassembly and reassembly should be performed in a clean environment.

D. It is usually not necessary to replace spring (20) fitted in cylinder barrel. Do not replace the spring unless absolutely necessary.

E. After disassembly, the internal parts should be coated with a film of clean oil and protected from dirt and moisture.

F. It is recommended that the length of the protruding portion of the compensator adjusting screws, be measured and noted, as this information will prove useful during assembly.

G. Care must be taken to avoid dropping, damaging or contaminating the machined parts and the control valve.

H. For complete overhaul, all o-rings and seals should be discarded and replaced.

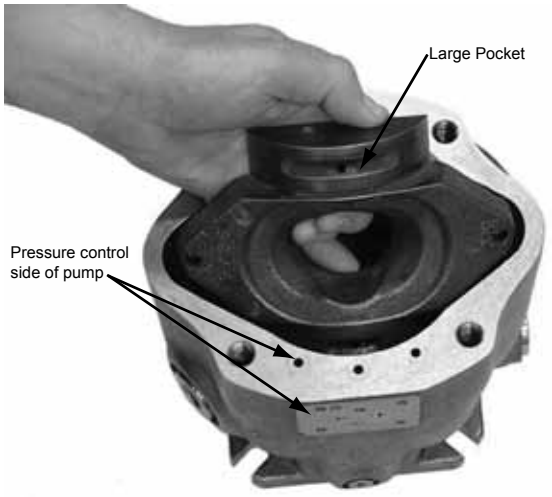
## PUMP DISASSEMBLY PROCEDURE

1. Identify the pump from information on the data tag. Figure 1
2. Drain fluid from housing. Fluid drained from pump should be disposed of properly.
3. Mount pump in fixture to prevent movement while removing main housing bolts
4. Remove bolts holding the compensator assembly on the pump housing. Additional fluid may drain out of the passages when the compensator is removed. Set compensator aside for later disassembly and inspection
5. Remove the bolts attaching the port block to the main housing.

**Figure 1 Pump Data Tag**

**PUMP DISASSEMBLY PROCEDURE** (continued)

6. Carefully remove the port block. Use caution to avoid dropping the port plate. Note the location of the bias spring - piston assembly and the control piston assembly. The control piston, bias piston and bias spring may remain in pump when port block is removed. Remove and discard the three white Teflon seals on the port block. These seals should be replaced each time the pump is disassembled.
7. Remove the control piston and the bias piston - spring assembly.
   **NOTE:**
   For rotation change only do not disassemble further, proceed to step 16.
8. Remove the tapered roller bearing cone and shim from the end of the shaft.
9. Position the pump horizontally and remove the rotating group. Avoid separating the pistons from the barrel if possible. This will assist in identifying damage between an individual piston and bore during component inspection.
10. Remove the drive shaft.
    **NOTE : For shaft change only, no further disassembly is required. Proceed to assembly procedure step 5.**
11. Remove the cam by rotating it 90 degrees and carefully extracting it from the pump housing. Note the large pocket under the cam fits on the pressure control side of the pump housing (same side as the three seals on the housing flange). Figure 2
12. Remove the front tapered roller bearing cone.
13. If there is excessive wear or damage, remove the tapered roller bearing cup from the bottom of the housing.
14. If completing a seal change or complete overhaul, turn the housing over and remove the snap ring and shaft seal from the housing. Note: do not reuse the shaft seal.
15. If there is excessive wear on the port block bearing cup, cone, or both; remove the tapered roller bearing cup from the port block.
16. If complete overhaul or rotation change, remove control piston and bias piston guides. The control piston and bias piston guides are installed with anerobic thread lock. Place the port block wih piston guides in oven at 163° C (325° F) NOTE: To prevent annealing of heat treated surfaces: DO NOT USE A TORCH TO HEAT PISTON GUIDES.



**PUMP INSPECTION PROCEDURE**

Carefully clean and dry all parts prior to inspection.

Refer to chart 1 for dimensional information regarding allowable tolerances.

1. Examine piston diameters for scratches or gouges. If any piston is severely damaged, note which piston bore it came out of. Extra attention should be given to that bore in step 2. Check end play of piston shoe assembly. Check the bottom surface of the shoes for damage. The shoe surface should be square and flat. Measure the thickness of the shoe. Shoes may be lapped as a set if the thickness is within allowable limits. Confirm shoe thickness after lapping to insure it is still within limits.
2. Examine bores in cylinder for scratches Check diameter of bores in 4 different locations, including near the bottom of the barrel where the piston does not travel. If the dimensions vary by more than 0.0102 mm (0.0004 in.) or any dimension exceeds the allowable limit, the barrel needs to be replaced. Examine the barrel face for scratches and gouges. The barrel can be reworked if dimensions are with specifications listed in chart 1.
3. The port plate can be lapped lightly if the face is only lightly scratched, otherwise it should be replaced.
4. Examine the retainer plate in the area of contact with the piston shoes. Any marks beyond light polishing indicate that replacement is necessary. Check the surface of the spherical area of the retainer plate and the spherical guide ball. Inspect the back surface of the spherical guide ball where the load pins make contact. If indentations are present replace the guide ball.
5. Examine cam on top and bottom surface. If scratches or gouges appear to penetrate the surface treatment, the cam must be replaced.
6. The cam bearings cannot be reworked and should be replaced if worn through the Teflon surface.
7. Both the bias piston and the compensator piston should move freely in their respective bores. The pistons and bores should be free of scratches or gouges.
8. The seal area of the drive shaft should be smooth and not have marks due to seal wear. The bearing surfaces should not have any indication of the bearing cone spinning on the shaft. Keyed shafts should be inspected for signs of brinelling and damage to the key area. Splined shafts may have a contact wear pattern but should not show excessive wear on the spline area.

| CHART 1 REWORK LIMITS | | | | | | |
|---|---|---|---|---|---|---|
| **Item Number** | **Component** | **Part number** | | | | **Tolerances** |
| | | **060** | **075** | **100** | **140** | |
| 13 *Page 20* | Bias spring | 03E-94055-0 | 03E-93151-0<br>141.5 mm<br>(5.57 in.) | 03E-93801-0<br>174.6 mm<br>(6.87 in.) | 03E-93963-0<br>212.3 mm<br>(8.36 in.) | Free height:<br>± 0.51mm<br>(± 0.020 in.) |
| 20 *Page 20* | Barrel hold down spring | 03E-94049-0 | 03E-93145-0<br>63.7 mm<br>( 2.50 in.) | 03E-93795-0<br>72.2 mm<br>(2.84 in.) | 03E-93959-0<br>68.6 mm<br>(2.70 in.) | Free height:<br>± 0.51 mm<br>(± 0.020 in.) |
| 23 *Page 20* | Barrel | 03E-94036-0 | 03E-93129-0 | 03E-93783-0 | 03E-93242-0 | Measure piston bore diameters in 3 places at the top, middle, and bottom. The measurements should not vary by not more than 0.010 mm (0.0004 in.)<br><br>Maximum material to be removed when lapping is 0.0051 mm (0.0002 in.) |
| 26 *Page 20* | Piston and shoe assembly<br><br>Sold in sets only | 03E-94036-0<br><br>Maximum end play 0.10 mm (0.004 in.)<br><br>Minimum shoe flange thickness 5.91 mm (0.233 in.) | S2E-17003-0<br><br>Maximum end play 0.10 mm (0.004 in.)<br><br>Minimum shoe flange thickness 5.91 mm (0.233 in.) | S2E-17912-0<br><br>Maximum end play 0.13 mm (0.005 in.)<br><br>Minimum shoe flange thickness 6.41 mm (0.252 in.) | S2E-17323-0<br><br>Maximum end play 0.13 mm (0.005 in.)<br><br>Minimum shoe flange thickness 6.41 mm (0.252 in.) | Measure piston outside diamter in 3 places at the top, middle, and bottom. The measurements should not vary by more than 0.0102 mm (0.0004 in)<br><br>End play between piston and shoe should not exceed values shown.<br><br>Total material allowed to be removed from shoe face when lapping is 0.076mm (0.003 in) |

## PUMP ASSEMBLY PROCEDURE

For major overhauls, all plugs should be removed, and the seals replaced. Prior to assembly, all parts should be thoroughly cleaned. Assembly should be performed in a clean work environment.

Do not use bearing grease during installation. Grease does not dissolve in hydraulic oil and may plug orifices or filters in the system. Clean petroleum jelly is preferred to lubricate o-rings and seals, and to adhere parts for assembly.

**NOTE: For fluids other than petroleum based hydraulic oil, insure that petroleum jelly is compatible with the fluid. If not compatible, another product should be used instead.**

Inspect all bearing surfaces and seal areas to insure that they are free from nicks, dings, scratches, and rust.

1. Using installation tool T2, press the front bearing cup into the bottom of the housing. Make sure the cup is seated firmly against the bottom of the housing.
2. Turn housing over. Using installation tool T1, press the shaft seal in the seal bore. Install the snap ring into the groove in the seal housing bore.
3. Using installation tool T5, press the rear bearing cup into the port block. Insure that the cup is seated firmly against the bottom of the housing.
4. Install the front bearing cone and shaft into the housing.
5. Install the rear bearing cone on the shaft.
6. Install the port block onto the housing using housing bolts and tighten to 27 ± 1.3 Nm (20 ± 1 ft. lb.).
7. Position the pump so shaft end is up.
8. Lay a parallel bar on the pump pilot.
9. Press down on the shaft and rotate it 3-5 times then measure the height of the shaft end to the parallel bar using dial calipers or a dial indicator.
10. Grasp the shaft and pull it up and rotate it 3-5 times. Measure the height of the shaft end to the parallel bar. Note: if the shaft slips or falls, the steps must be repeated to get an accurate measurement. Figure 3
11. Subtract the larger from the smaller to get the differential gap.
12. Repeat the procedure three times. Once recorded, take the average of the three measurements.
13. With the average, use chart 2 to determine the correct shim to install in the pump.
14. Rebuild the pump with the shaft bearings, and selected shim. Check end play, then disassemble port block and continue with pump assembly.
15. If barrel hold down spring was removed during disassembly process, install three pins to slots in barrel spline. Petroleum jelly can be used to hold pins in place while installing remaining parts. Place barrel on fixture with pin side down. Install backup washer and hold down spring. Compress spring in press and install snap ring.
    **Caution: Make sure snap ring is properly seated in the groove prior to removing the barel from the press.**

**PUMP ASSEMBLY PROCEDURE**
**Continued**

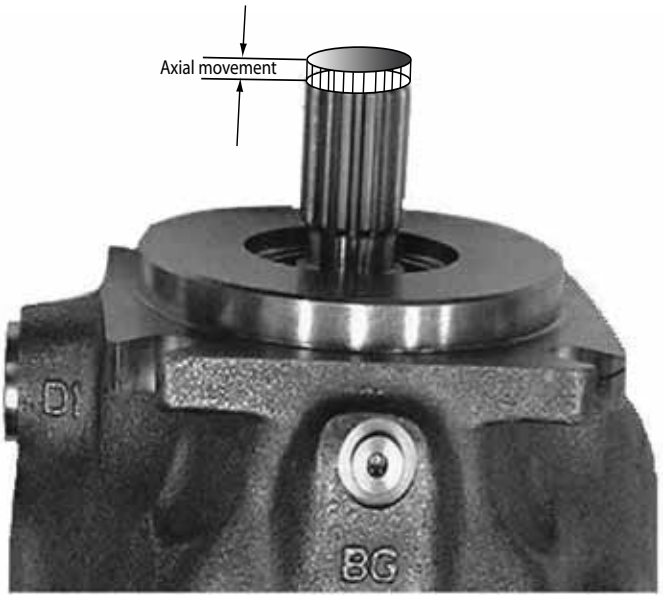



Figure 3

| Chart 2: Shim Thickness Selection | | | | | |
|---|---|---|---|---|---|
| Measured Differential | | Shim Thickness | Displacement | | |
| Minimum | Maximum | | 060/075 | 100 | 140 |
| 3.07 mm (.121 in) | 3.12 mm (.123 in) | 3.04 mm (.1196 in) | 03E-95262-0 | 03E-95268-0 | 03E-95265-0 |
| 3.15 mm (.124 in) | 3.22 mm (.126 in) | 3.12 mm (.1228 in) | 03E-95263-0 | 03E-95269-0 | 03E-95266-0 |
| 3.23 mm (.127 in) | 3.29 mm (.129 in) | 3.20 mm (.1259 in) | 03E-95264-0 | 03E-95270-0 | 03E-95267-0 |
| 3.30 mm (.130 in) | 3.36 mm (.132in) | 3.28 mm (.1291 in) | 03E-93180-0 | 03E-94148-0 | 03E-93260-0 |
| 3.37 mm (.133 in) | 3.44 mm (.135 in) | 3.36 mm (.1323 in) | 03E-93566-0 | 03E-94149-0 | 03E-93970-0 |
| 3.45 mm (.136 in) | 3.51mm (.138 in) | 3.44 mm (.1354in) | 03E-93567-0 | 03E-94150-0 | 03E-93971-0 |
| 3.52 mm (.139in) | 3.62 mm (.142 in) | 3.52 mm (.1386 in) | 03E-93568-0 | 03E-94151-0 | 03E-93972-0 |
| 3.63 mm (.143 in) | 3.70 mm (.145 in) | 3.60 mm (.1417 in) | 03E-93569-0 | 03E-94152-0 | 03E-93973-0 |
| 3.71 mm (.146 in) | 3.77 mm (.148 in) | 3.68 mm (.1449 in) | 03E-93570-0 | 03E-94153-0 | 03E-93974-0 |
| 3.78 mm (.149 in) | 3.85 mm (.151 in) | 3.76 mm (.1480 in) | 03E-93571-0 | 03E-94154-0 | 03E-93975-0 |
| 3.86 mm (.152 in) | 3.92 mm (.154 in) | 3.84 mm (.1512 in) | 03E-93572-0 | 03E-94155-0 | 03E-93976-0 |
| 3.93 mm (.155 in) | 4.00 mm (.157 in) | 3.92 mm (.1539 in) | 03E-93573-0 | 03E-94156-0 | 03E-93977-0 |
| 4.01 mm (.158 in) | 4.10 mm (.161 in) | 4.00 mm (.1575 in) | 03E-93574-0 | 03E-94157-0 | 03E-93978-0 |
| 4.11 mm (.162 in) | 4.18 mm (.164 in) | 4.08 mm (.1606 in) | 03E-93575-0 | 03E-94158-0 | 03E-93979-0 |
| 4.19 mm (.165 in) | 4.25 mm (.167 in) | 4.16 mm (.1638 in) | 03E-93576-0 | 03E-93864-0 | 03E-93980-0 |
| | | Shim Kits: | S2E-18591-0K | S2E-18640-0K | S2E-18527-0K |

**PUMP ASSEMBLY PROCEDURE**
**Continued**

| Chart 3 | |
|---|---|
| **Pump** | **Control and Bias Guide Torque** |
| 060 | 142 ± 6.5 Nm (105 ± 5 ft-lbs) |
| 075 | 142 ± 6.5 Nm 105 ± 5 ft-lbs) |
| 100 | 184 ± 8 Nm (136 ± 6 ft-lbs) |
| 140 | 203 ± 8 Nm (170 ± 6 ft-lbs) |

16. Apply a light film of oil into the piston bores. Lightly lubricate the spherical surface of the guide ball. Install the nine pistons into the bores in the hold down plate. Install the spherical guide ball into the hold down plate. While holding the guide ball against the hold down plate, install the pistons into the barrel.
17. Install the locating pin on the port block face.
18. Apply Loctite Primer 7469 to the guide threads and allow to dry. Install unlubricated o-rings on the control guide and bias guide. Apply Loctite 272 to the guide threads. For right hand rotation the control guide is installed nearest to the dowel pin (figure 4A). For left hand rotation the bias guide is installed nearest to the dowel pin (figure 4B). Torque the control and bias guides as specified in Chart 3

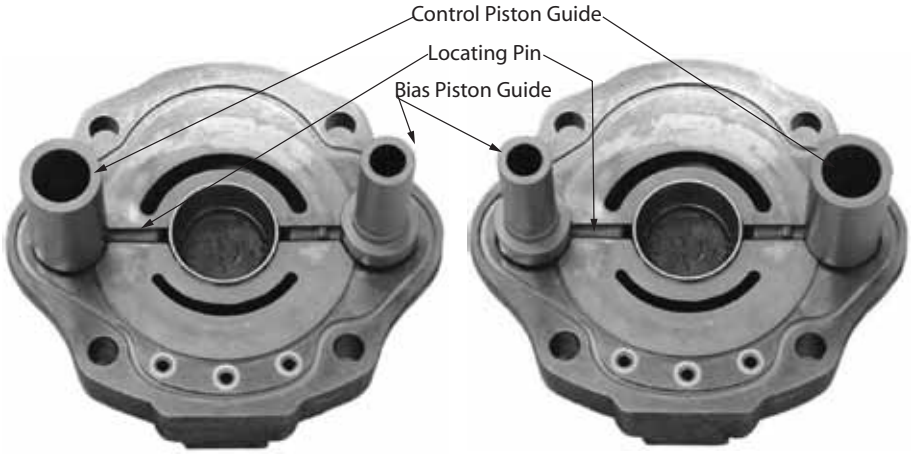



Figure 4A
Port block with
Right Hand configuration

Figure 4B
Port Block with
Left Hand configuration

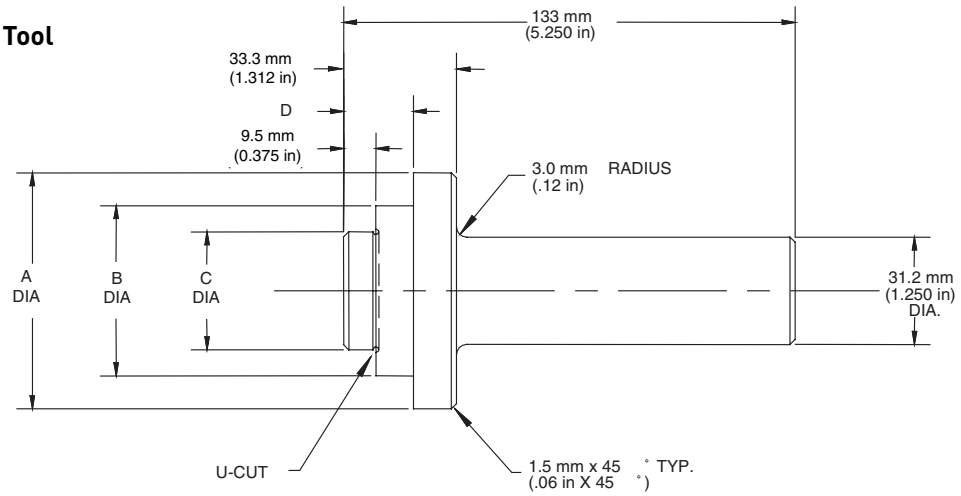
19. Apply light oil film to control piston and install it in the control guide bore. **NOTE:** The 140 size has a lubrication hole in the piston. Confirm that the hole is facing the port block. The control piston has nonsymmetrical lubrication grooves. The end with the closest grooves must be installed towards the port block.
20. Apply light oil film to the bias piston. Install the bias spring and the bias piston in the bias piston guide bore.
21. Apply a light layer of petroleum jelly to the back surface of the port plate. Install the port plate on the port block, lining up the slot on the port plate with the locating pin.

**PUMP ASSEMBLY PROCEDURE Continued**

22. Install the large o-ring in the groove on the pump port block. Install the three white Teflon o-rings in the pressure communication ports on the pump housing.
23. Install the cam bearings in the cradle area of the housing. The chamfer on the back of the bearing must face the outer wall of the housing. Use Loctite Primer Grade "T" or other suitable primer on screws and mating threads in housing. Apply Loctite #242 (use sparingly) to screw threads and install orifice screws to hold bearings in place. Torque screws to 3.4 ± 0.25 Nm (33 ± 3 in-lb).
24. Place thin film of clean oil on cam bearing surfaces. Install cam in housing. The cam must be tilted to permit entry into the housing. (Figure 2) NOTE: The large pocket on the bottom surface of the cam must be on the same side as the three pressure communication holes on the main housing. Pump rotation does not affect the assembly of the cam.
25. Install the drive shaft into the pump housing. Position pump horizontally. Install the rotating group over the pump shaft. Rotate the barrel to insure that it is seated against the cam. Insure that the pump shaft is seated properly in the front bearing.
26. Install bearing spacer as determined from the chart (see step 11.) Install the rear bearing on the drive shaft.
27. Confirm that compensator rotation, port plate rotation, control and bias piston location indicate same direction of rotation.
28. Carefully install the assembled port block on the pump housing. Press the port block to compress the bias spring and install housing bolts. Tighten the bolts in a cross pattern to insure the port block does not get cocked on the housing. When port block is seated on the housing, torque bolts in a cross pattern as specified in chart 4.
29. Install o-ring seals and assembled compensator on side of pump housing. Pump rotation is indicated by arrow on compensator housing. Torque bolts to 5 ± 0.25 Nm (45 ± 3 in-lb).

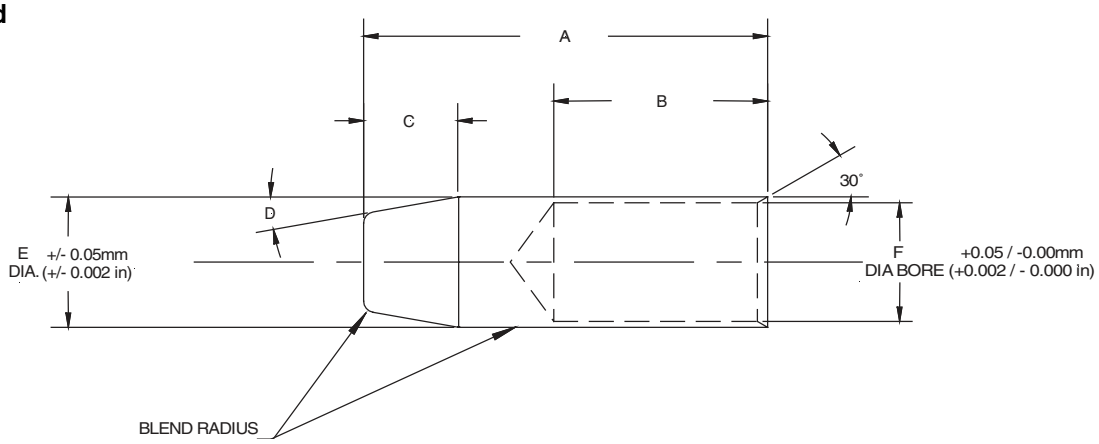
| Chart 4 | |
|---|---|
| **Pump** | **Housing Bolt Torque** |
| 060 | 135.6 ± 5 Nm (100 ± 4 ft-lbs) |
| 075 | 135.6 ± 5 Nm (100 ± 4 ft-lbs) |
| 100 | 229 ± 7 Nm (170 ± 5 ft-lbs) |
| 140 | 278 ± 7 Nm (205 ± 5 ft-lbs) |

### T1 Seal Installation Tool



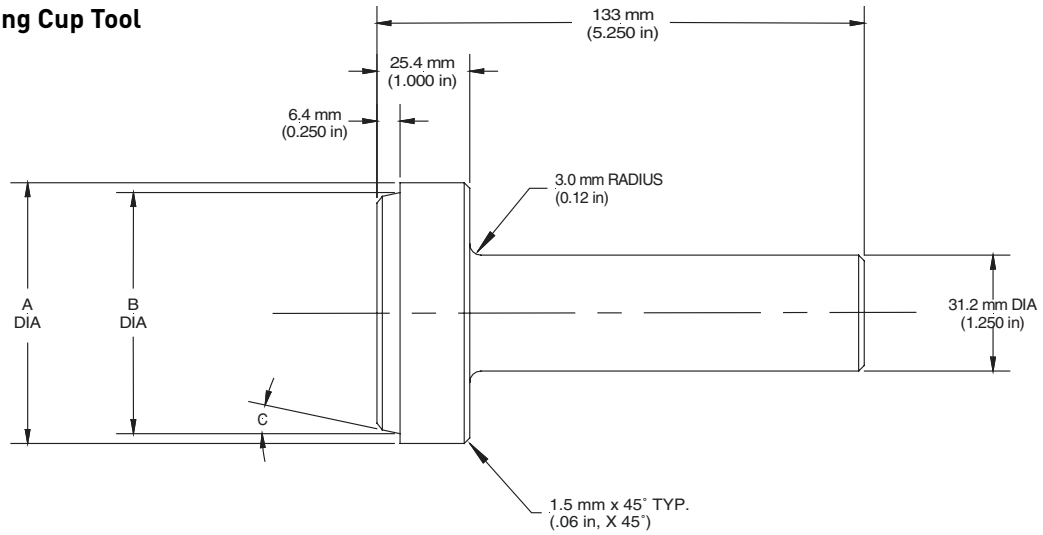

| Pump Model | Part Number | A | B | C | D |
|---|---|---|---|---|---|
| 060 & 075 | 213-0-004194 | 69.9 mm (2.750 in) | 50.3 mm (1.980 in) | 34.9 mm (1.375 in) | 20.3 mm (0.800 in) |
| 100 | 213-0-004208 | 63.5 mm (2.50 in) | 56.6 mm (2.230 in) | 43.3 mm (1.703 in) | 14.0 mm (0.550 in) |
| 140 | 213-0-004199 | 85.7 mm (3.375 in) | 70.6 mm (2.780 in) | 53.4 mm (2.10 in) | 19.1 mm (0.750 in) |

### T3 Seal Guard



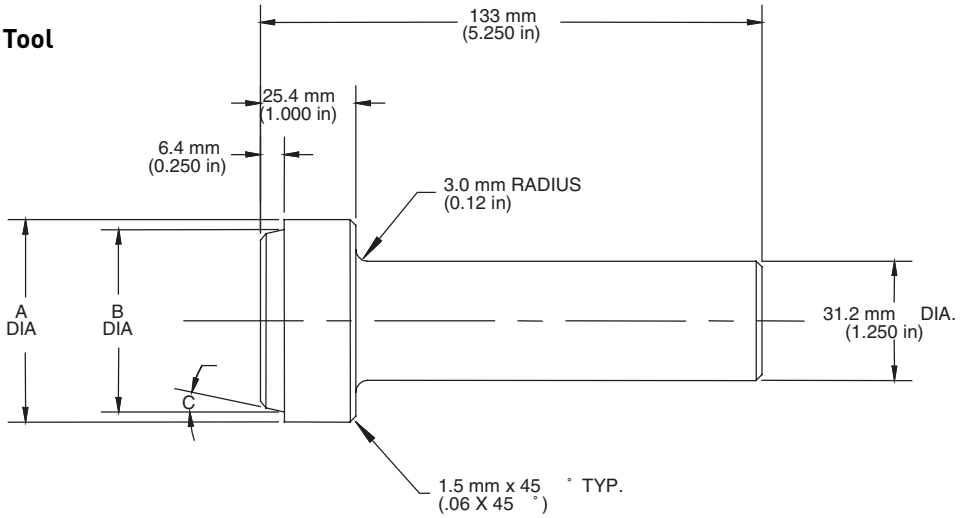

| Pump Model | Part Number | A | B | C | D | E | F |
|---|---|---|---|---|---|---|---|
| 060 & 075 | 213-0-004195 | 108 mm (4.25 in) | 57.1 mm (2.25 in) | 25.4 mm (1.00 in) | 10° | 34.90 mm (1.373 in) | 31.75 mm (1.250 in) |
| 100 SAE | 213-0-004206 | 108 mm (4.25 in) | 70.6 mm (2.78 in) | 25.4 mm (1.00 in) | 10° | 43.26 mm (1.703 in) | 38.1 mm (1.500 in) |
| 100 ISO | 213-0-004207 | 114 mm (4.50 in) | 76.2 mm (3.00 in) | 22.4 mm (0.88 in) | 15° | 43.26 mm (1.703 in) | 40.06 mm (1.577 in) |
| 140 SAE | 213-0-004200 | 108 mm (4.25 in) | 70.6 mm (2.78 in) | 25.4 mm (1.00 in) | 10° | 53.04 mm (2.088 in) | 44.48 mm (1.751 in) |
| 140 ISO | 213-0-004201 | 114 mm (4.50 in) | 76.2 mm (3.00 in) | 22.4 mm (0.88 in) | 15° | 53.04 mm (2.088 in) | 50.04 mm (1.970 in) |

### T2 Front Bearing Cup Tool




| Pump Model | Part Number | A | B | C |
|---|---|---|---|---|
| 060 & 075 | 213-0-004192 | 71.4 mm (2.812 in) | 66.0 mm (2.60 in) | 12° |
| 100 | 213-0-004204 | 92.1 mm (3.623 in) | 86.1 mm (3.390 in) | 15° |
| 140 | 213-0-004197 | 93.7 mm (3.687 in) | 89.3 mm (3.515 in) | 15° |

### T5 Rear Bearing Cup Tool




| Pump Model | Part Number | A | B | C |
|---|---|---|---|---|
| 060 & 075 | 213-0-004193 | 53.8 mm (2.120 in) | 48.7 mm (1.918 in) | 12° |
| 100 | 213-0-004205 | 65.1 mm (2.562 in) | 59.3 mm (2.335 in) | 15° |
| 140 | 213-0-004198 | 71.1 mm (2.80 in) | 65.1 mm (2.562 in) | 15° |

## PUMP TEST PROCEDURE

Test criteria based on hydraulic oil ISO 32 per Parker HF-0 specifications.
Oil temperature: 50°C ± 2°C (120°F ±10°F). **NOTE:** insure that the hydraulic system does not overheat during this test procedure.
Operating speed: 0 - 2300 rpm ± 30 rpm.
Case pressure: Maximum 14.5 psi (1 bar)

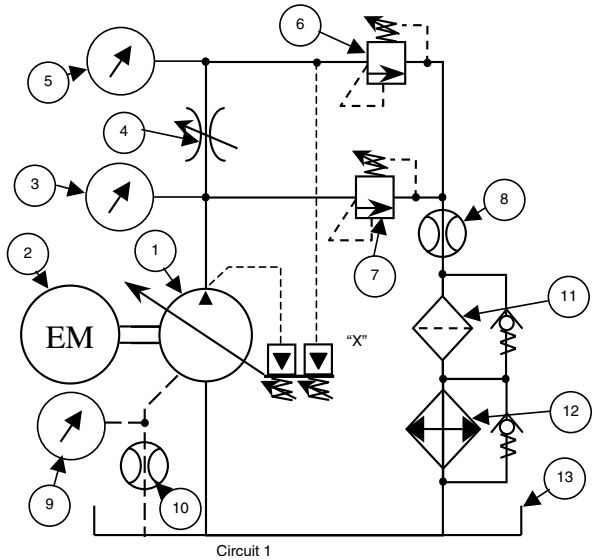
1. Mount pump on test fixture. Insure that shaft alignment is within specified tolerances.
2. Fill case with clean oil. Connect upper drain port to reservoir with no restrictions. Insure other drain ports are properly plugged.
3. Connect inlet and pressure lines. Insure that lines are filled with oil. Refer to circuit below. For units with "L" compensators, connect a suitable pilot line from port "X" to the pump discharge pressure line, down stream of the non-compensating flow valve.
4. Confirm direction of rotation for pump and drive are correct.
5. Reduce the main compensator setting to minimum. For units with "L" compensators, advance the load sense compensator adjustment until it bottoms out, and lock into position.
6. Set maximum volume stop (if included) to full displacement. If minimum volume stop is included, back adjustment all of the way out.
7. If possible, gradually increase pump speed to 1800 ± 30 rpm with no load.
8. Screw in compensator adjusting screw until it bottoms out, with no pressure on system load-relief valve.
9. Break-in pump at times and pressures listed below. Adjust the load-relief valve to the pressure listed for the times indicated. After break-in, reduce compensator setting to 280 bar (4060 psi), and adjust system load relief to cause pump to compensate three times to verify that pump compensates on and off stroke properly.

| Time | 30 seconds | 30 seconds | 30 seconds |
|---|---|---|---|
| Pressure | 62-69 Bar<br>900-1000 psi | 200-207 Bar<br>2900-3000 psi | 269-276 Bar<br>3900-4000 psi |

### TEST CIRCUIT

1. Test pump
2. Test stand prime mover
3. Pump pressure gauge
4. Non-compensating flow control
5. Load pressure gauge
6. Load relief valve
7. Safety bypass relief valve
8. Main flow meter
9. Case drain pressure gauge
10. Case drain flow meter
11. Filter assembly with bypass
12. Cooler assembly with bypass
13. Reservoir

NOTE: Items 4 and 5 are required for load sense pump test.



Circuit 1


Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

| PERFORMANCE SPECIFICATIONS<br>PUMP WITH PRESSURE COMPENSATOR | | | | | |
|---|---|---|---|---|---|
| **STEP REFERENCE** | **CONDITION** | **060** | **075** | **100** | **140** |
| 1 | Rated Speed (RPMK | 1800 | 1800 | 1800 | 1800 |
| 4 | Output Flow at minimum pressure | 102 - 108 lpm | 132 - 135 lpm | 174 - 182 lpm | 243 - 257 lpm |
| 5 | Output Flow at rated pressure of 280 bar | 95 lpm min. | 126 lpm min. | 165 lpm min. | 233 lpm min. |
| 6 | Case leakage at rated pressure of 280 bar | 4.5 lpm min. | 7.5 lpm min. | 9 lpm min. | 14 lpm min. |
| 9* | Case leakage when compensated at 280 bar | 11 lpm max. | 15.1 lpm max. | 15.9 lpm max. | 16.7 lpm max. |
| 10 | Input Torque when compensated at 280 bar | 38.9 Nm max. | 49.6 Nm max. | 67 Nm max. | 96.6 Nm max. |
| 11 | Output Flow when pressure reduced to 273 bar with compensator set at 280 bar | 99 lpm min. | 126 lpm min. | 165 lpm min. | 233 lpm min. |

* When using the A series compensators increase compensated case leakage by 2.3 lpm

| TEST PROCEDURE<br>PUMP WITH PRESSURE COMPENSATOR | | | |
|---|---|---|---|
| **STEP REFERENCE** | **CONDITION** | **REQUIRED VALUE** | **MEASURED VALUE** |
| 1 | Set the pump speed to 1800 RPM | 1800 rpm | |
| 2 | Increase pump pressure compensator adjustment to maximum. | n/a | |
| 3 | Record input oil temperature | 43-54 ° C (110 – 130 °F) | |
| 4 | Set output load pressure to minimum. Record output flow | see performance chart | |
| 5 | Set output load pressure to 280 ± 2 bar (4060 ± 30 psi). Record output flow | see performance chart | |
| 6 | Record case leakage | see performance chart | |
| 7 | Set output pressure to 290 ± 2 bar (4200 ± 30 psi) | n/a | |
| 8 | Set pressure compensator to 280 ± 2 bar (4060 ± 30 psi) | n/a | |
| 9 | Record case leakage | see performance chart | |
| 10 | Record input torque | see performance chart | |
| 11 | Reduce output pressure to 273 ± 2 bar (3960 ± 30 psi). Record output flow | see performance chart | |
| 12 | Verify no external leaks | No leakage permitted | |

| PERFORMANCE SPECIFICATIONS<br>PUMP WITH LOAD SENSE COMPENSATOR | | | | | |
|---|---|---|---|---|---|
| **STEP REFERENCE** | **CONDITION** | **060** | **075** | **100** | **140** |
| 1 | Rated Speed (RPM) | 1800 | 1800 | 1800 | 1800 |
| 4 | Load sense output flow setting at 50 ± 2 bar (725 ±30 psi) | 60-63 lpm | 77-79 lpm | 103 - 105 lpm | 145-147 lpm |
| 5 | Allowable flow variation from 50 to 260 ± 2 bar (725 to 3770 ± 30 psi) | 56-66 lpm | 73-83 lpm | 99-109 lpm | 136-156 lpm |

| TEST PROCEDURE<br>PUMP WITH LOAD SENSE COMPENSATOR | | | |
|---|---|---|---|
| **STEP REFERENCE** | **CONDITION** | **REQUIRED VALUE** | **MEASURED VALUE** |
| 1 | Set the pump speed to 1800 RPM | 1800 rpm | |
| 2 | Record input oil temperature | 43-54 ° C (110 – 130 °F) | |
| 3A | Set output load prssure to 50 ± 2 bar (725 ± 30 psi) | n/a | n/a |
| 3B | Adjust throttle valve and adjust differential setting until pressure at pump outlet is 20 ± 2 bar (290 ± 30 psi) higher than the load pressure gage | n/a | n/a |
| 4 | Adjust throttle valve to required flow raqte. Adjust output load presure valve if necessary to maintain 50 ± 2 bar (725 ± 30 psi) | See performance chart | |
| 5 | Increase the output pressure to 260 ± 2 bar (3770 ±30 psi). Verify that the flow remains within specified limits. | See performance chart | |
| 6 | Lock the load sense adjustment screw. Confirm differential pressure at 20 ± 2 bar (290 ± 30 psi). | n/a | n/a |
| 7 | Verify no external leaks | No leakage permitted | |

## CONVERSION FACTORS

| DEFINITION & UNIT | | |
|---|---|---|
| displacement | $in^3/rev \times 16.387 = cm^3/rev$ | $cm^3/rev \times 0.06102 = in^3/rev$ |
| flow | gpm x 3.78 = L/min | L/min x 0.2642 = gpm |
| power | hp x 0.7457 = kW | kW x 1.341 = hp |
| torque | lb-ft x 1.3567 = Nm | Nm x 0.7376 = lb-ft |
| pressure | $lbs/in^2$ (psi) x 0.06895 = bar<br>$lbs/in^2$ (psi) x 6.895 = kPa | bar x 14.50 = $lbs/in^2$ (psi)<br>kPa x 0.1450 = $lbs/in^2$ (psi) |
| weight | lb x 0.4536 = kg | kg x 2.205 = lbs |
| force | lb x 4.448 = N | N x 0.2248 = lbs |
| volume | $in^3 \times 16.387 = cm^3$ | $cm^3 \times 0.06102 = in^3$ |
| area | $in^2 \times 6.452 = cm^2$ | $cm^2 \times 0.1550 = in^2$ |
| length | in x 25.4 = mm | mm x 0.03937 = in |
| temperature | $\frac{\text{degree F-32}}{1.8} = °C$ | 1.8 x C+32 = °F |
| viscosity | cSt x 1.0 = $mm^2/sec$<br>SSU = cSt x 4.25 + 14 | $mm^2/sec$ x 1.0 = cSt<br>20 cSt = 99 SSU |

## FLUID POWER FORMULAS

| | | |
|---|---|---|
| Pump input torque | lbs. in. | $\frac{\text{pressure(psi)} \times \text{displacement } (in^3/rev)}{2\pi \times \text{mech. eff.}}$ |
| Pump input power | hp | $\frac{\text{rpm} \times (in^3/rev) \times \text{(psi)}}{395934 \times \text{overall eff.}}$ |
| Pump output flow | U.S. gpm | $\frac{\text{rpm} \times (in^3/rev) \times \text{volumetric eff.}}{231}$ |
| Fluid motor speed | rpm | $\frac{231 \times \text{flow rate(U.S. gpm)} \times \text{volumetric eff.}}{\text{displacement } (in^3/rev)}$ |
| Fluid motor torque | lbs. in. | $\frac{\text{pressure(psi)} \times \text{displacement } (in^3/rev) \times \text{mech. eff.}}{2\pi}$ |
| Fluid motor power | hp | $\frac{\text{rpm} \times (in^3/rev) \times \text{(psi)} \times \text{overall eff.}}{395934}$ |
| **(metric)** | | |
| Pump input torque | Nm | $\frac{\text{pressure(bar)} \times \text{displacement } (cm^3/rev)}{20\pi \times \text{mech. eff.}}$ |
| Pump input power | kW | $\frac{\text{rpm} \times (cm^3/rev) \times \text{(bar)}}{600000 \times \text{overall eff.}}$ |
| Pump output flow | Lpm | $\frac{\text{rpm} \times (cm^3/rev) \times \text{volumetric eff.}}{1000}$ |
| Fluid motor speed | rpm($min^{-1}$ ) (tr/mn) | $\frac{1000 \times \text{flow rate (Lpm)} \times \text{volumetric eff.}}{\text{displacement } (cm^3/rev)}$ |
| Fluid motor torque | Nm | $\frac{\text{pressure(bar)} \times \text{displacement } (cm^3/rev) \times \text{mech. eff.}}{20\pi}$ |
| Fluid motor power | kW | $\frac{\text{rpm} \times (cm^3/rev) \times \text{(bar)} \times \text{overall eff.}}{600000}$ |

Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

Jan 1st, 2014 - October 2013 service manual update log:
Update item #9 and 44 on 028 parts list
Updated item #22 on 045 parts list
Update item #22, 35 and 37 on 060,075,100,140 parts list
Added part # 106 and 107 to RDEC parts list
Added 018 through drive couplings
Added 028 BB through drive coupling
For L0, L1, L2 and L3 compensator moved note from item number 6 to item number 4
Updated exploded view on C0 and C1 compensator
Updated part number on CCW AL control
Added additional information to port adapters on A series compensators
Updated case flow readings when compensated on all pumps.
Added note on case flow readings when using A series compensators.

Parker Hannifin Corporation
Hydraulic Pump Division
Marysville, Ohio USA

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, Hydraulics Group, and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods or work described will be referred to as "Products".

**1. Terms and Conditions.** Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is expressly conditioned on Buyer's assent to these Terms and Conditions and to the terms and conditions found on-line at www.parker.com/saleterms/. Seller objects to any contrary or additional term or condition of Buyer's order or any other document issued by Buyer.

**2. Price Adjustments; Payments.** Prices stated on the reverse side or preceding pages of this document are valid for 30 days. After 30 days, Seller may change prices to reflect any increase in its costs resulting from state, federal or local legislation, price increases from its suppliers, or any change in the rate, charge, or classification of any carrier. The prices stated on the reverse or preceding pages of this document do not include any sales, use, or other taxes unless so stated specifically. Unless otherwise specified by Seller, all prices are F.O.B. Seller's facility, and payment is due 30 days from the date of invoice. After 30 days, Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

**3. Delivery Dates; Title and Risk; Shipment.** All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon tender to the carrier at Seller's facility (i.e., when it's on the truck, it's yours). Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's changes in shipping, product specifications or in accordance with Section 13, herein.

**4. Warranty.** Seller warrants that the Products sold hereunder shall be free from defects in material or workmanship for a period of eighteen months from the date of delivery to Buyer. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

**5. Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 60 days after delivery or, in the case of an alleged breach of warranty, within 30 days after the date within the warranty period on which the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for any amount due to Seller from Buyer) must be commenced within thirteen months from the date of tender of delivery by Seller or, for a cause of action based upon an alleged breach of warranty, within thirteen months from the date within the warranty period on which the defect is or should have been discovered by Buyer.

**6. LIMITATION OF LIABILITY.** UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.

**7. Contingencies.** Seller shall not be liable for any default or delay in performance if caused by circumstances beyond the reasonable control of Seller.

**8. User Responsibility.** The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

**9. Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, may be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer placing an order for the items which are manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

**10. Special Tooling.** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

**11. Buyer's Obligation; Rights of Seller.** To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest. Seller shall have a security interest in, and lien upon, any property of Buyer in Seller's possession as security for the payment of any amounts owed to Seller by Buyer.

**12. Improper Use and Indemnity.** Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

**13. Cancellations and Changes.** Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

**14. Limitation on Assignment.** Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

**15. Entire Agreement.** This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of the agreement. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

**16. Waiver and Severability.** Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

**17. Termination.** This agreement may be terminated by Seller for any reason and at any time by giving Buyer thirty (30) days written notice of termination. In addition, Seller may by written notice immediately terminate this agreement for the following: (a) Buyer commits a breach of any provision of this agreement (b) the appointment of a trustee, receiver or custodian for all or any part of Buyer's property (c) the filing of a petition for relief in bankruptcy of the other Party on its own behalf, or by a third party (d) an assignment for the benefit of creditors, or (e) the dissolution or liquidation of the Buyer.

**18. Governing Law.** This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement. Disputes between the parties shall not be settled by arbitration unless, after a dispute has arisen, both parties expressly agree in writing to arbitrate the dispute.

**19. Indemnity for Infringement of Intellectual Property Rights.** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

**20. Taxes.** Unless otherwise indicated, all prices and charges are exclusive of excise, sales, use, property, occupational or like taxes which may be imposed by any taxing authority upon the manufacture, sale or delivery of Products.

**21. Equal Opportunity Clause.** For the performance of government contracts and where dollar value of the Products exceed $10,000, the equal employment opportunity clauses in Executive Order 11246, VEVRAA, and 41 C.F.R. §§ 60-1.4(a), 60-741.5(a), and 60-250.4, are hereby incorporated.

© 2014 Parker Hannifin Corporation, all rights reserved

Bulletin HY28-2665-02/SVC/EN
Effective: 1-14

Parker Hannifin Corporation
**Hydraulic Pump Division**
14249 Industrial Parkway
Marysville, OH 43040 USA
phone 937 644 4435
fax 937 642 3639
www.parker.com

# Chelsea® Power Take-Off

## 890 Series Service Manual

aerospace
climate control
electromechanical
filtration
fluid & gas handling
hydraulics
pneumatics
process control
sealing & shielding

Parker Chelsea

ENGINEERING YOUR SUCCESS.

CHELSEA®

## ⚠ WARNING

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

## Offer of Sale

The items described in this document are hereby offered for sale by Parker Hannifin Corporation, its subsidiaries or its authorized distributors. This offer and its acceptance are governed by the provisions stated in the “Offer of Sale”.

© Copyright 2014, Parker Hannifin Corporation, All Rights Reserved

**Section 1** ..... 1-10
Disassembly/Assembly Instructions ..... 2
Model Number Designation ..... 3
Assembly Arrangements ..... 4
Exploded View – 890HEFJW-B5AF ..... 5
Bill of Materials – 890HEFJW-B5AF ..... 6
Exploded View – 890HBFJW-B5XS ..... 7
Bill of Materials – 890HBFJW-B5XS ..... 8
Exploded View – 890ECFJW-B5AF ..... 9
Bill of Materials – 890ECFJW-B5AF ..... 10

**Section 2** ..... 11-19
Disassembly ..... 12-15
Assembly ..... 16-19

**Section 3** ..... 20-24
Electrical Installation Sketch without E.O.C. for 890/892 Series (SK-459 Rev C) ... 21
Hose Installation Sketch for 890/892 Series (SK-504) ..... 22
Torque Chart ..... 23
Gear Chart ..... 24

**Section 4** ..... 25-28
Mounting the P.T.O. on the Transmission ..... 26-28

**Section 5** ..... 29-32
Troubleshooting ..... 30-32

Offer of Sale ..... 36



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

# SECTION 1



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## NOTES

| | |
|---|---|
| 1 | Visually inspect parts before assembly for flaws. |
| 2 | The item numbers identifying parts are the same item numbers used on the engineering drawings. |
| 3 | Ensure tools and fixtures are current and have the required inspection and calibration labels and/or tags. |
| 4 | The terms **OUTPUT** and **DRIVE** are used interchangeably. |
| 5 | Lubricate most bearings before assembly. Use MELCOMOL “Y”, EP-2 or equal. |
| 6 | When assembling bearings, always place the bearings rounded end into the part. |
| 7 | Use Parker O-Lube or equal to lubricate O-Rings and seals before assembly. |
| 8 | When assembling O-Rings, do not roll it into their grooves. Use a O-Ring tool for assembly. O-Rings are not to be twisted or damaged. |
| 9 | Always reference the current Chelsea Parts List for part numbers and assemblies. 890 Series is HY25-2890-M1/US |

## Suggested Tools

| | | | |
|---|---|---|---|
| Safety Glasses | Shop Press | Pliers | Gasket Scraper Tool |
| 3/4" Socket | 5/32" Hex Bit Driver | Hammer/Mallet | |

## Suggested Service Kits

| Part Number | Description |
|---|---|
| **328948-36X** | Kit Gasket & Installation |
| **7170-86X** | Kit Mounting |
| **329644-1X** | Kit Mounting & Installation (“XS”) |
| **329644-2X** | Kit Mounting & Installation (“AF”) |



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

**890 L A FJ W – B 5 XS**

## Basic Model
**890**
**890C**

## Mounting Option
(1), (2) **C** = HD Left Hand Mount w/Cooler
(1) **E** = MD EVS Left Hand Mount
* **F** = MD Side/Top Left Hand Mount w/Retarder
* **G** = MD Side/Top Mount w/Retarder
**H** = HD Left Hand Mount
(1), (2) **J** = HD Left Hand Mount w/Retarder
(1) **K** = HD Top Mount w/Retarder
(1) **L** = MD Left Hand Mount
(1) **M** = MD Left Hand Mount w/Retarder
(1) **P** = HD Left Hand Mount w/Retarder
(1) **R** = MD Right Hand Mount
(1) **T** = MD EVS Top Mount
(1) **U** = HD Top Mount
**X** = No Bracket & Hose Kit

* Not Released
(1) **"5"** Assembly Arrangement Only – (2) **"3"** Assembly Arrangement Only

## Gear Ratio
**A** = 24/40
**B** = 25/39
**C** = 26/38
**D** = 27/37
**E** = 29/35
**F** = 31/33
**G** = 33/31 (MD Only)
**H** = 34/30 (MD Only)

## Input Gear
**FJ** = Allison

## Output Option
**"5" Ass'y Arrangement Ouput Designations**
**AB** = 1-1/2" - 10T Spline Shaft w/DIN 120 Flange
**AC** = 1-1/2" - 10T Spline Shaft w/DIN 100 Flange
**AF** = Class "B-B" 2 & 4-Bolt Pump Mount
**AZ** = Class "B" 2 & 4-Bolt Pump Flange, Class "C" Shaft
**DA** = Class "D" 4-Bolt Pump Mount
**XK** = Class "B" 2 & 4-Bolt Pump Mount
**XS** = Class "C" 2 & 4-Bolt Pump Mount
**XV** = 1-1/2" - 10T Spline Shaft w/1410 Flange
**XY** = DIN 5462 Pump Mount
**ZS** = Class "C" 4-Bolt Pump Mount

**"3" Ass'y Arrangement Ouput Designations**
**AB** = 1-1/2" - 10T Spline Shaft w/DIN 120 Flange
**AC** = 1-1/2" - 10T Spline Shaft w/1410 Flange
**CF** = Class "B-B" 2 & 4-Bolt Pump Mount
**CK** = Class "B" 2 & 4-Bolt Pump Mount
**CS** = Class "C" 4-Bolt Pump Mount
**CZ** = Class "B" 2 & 4-Bolt Pump Flange, Class "C" Shaft
**XV** = 1-1/2" - 10T Spline Shaft w/1410 Flange
**XY** = DIN 5462 Pump Mount
**ZS** = Class "C" 4-Bolt Pump Mount

## Assembly Arrangement
**"5"** Gear Forward Left Side Mount
**"3"** Gear Forward Left Side Mount

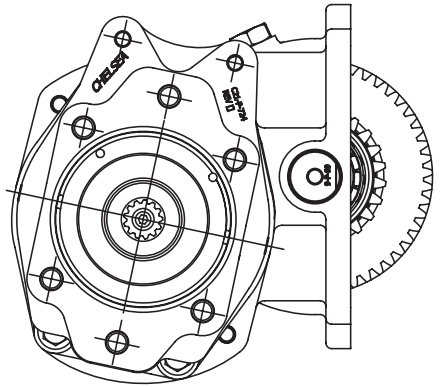
## Shift Option
**B** = 12V Hydraulic Valve
**D** = 24V Hydraulic Valve
**G** = 12V Remote Valve w/o E.O.C.
**H** = 24V Remote Valve w/o E.O.C.
**K** = 12V Hydraulic Valve w/E.O.C.
**L** = 24V Hydraulic Valve w/E.O.C.

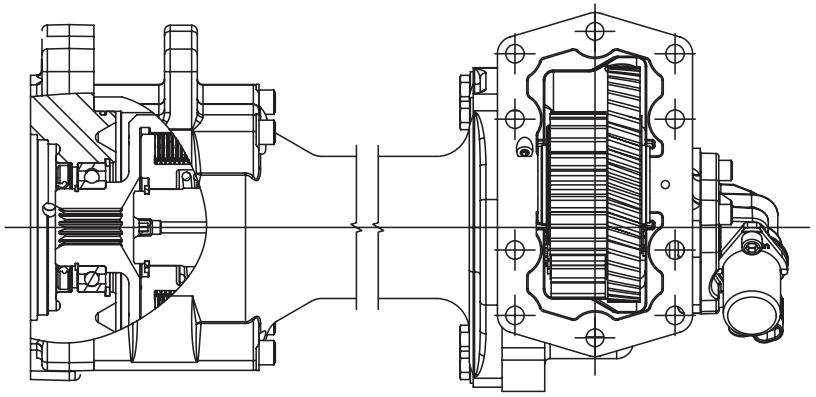
## Lube Option
**W** = Wet Spline



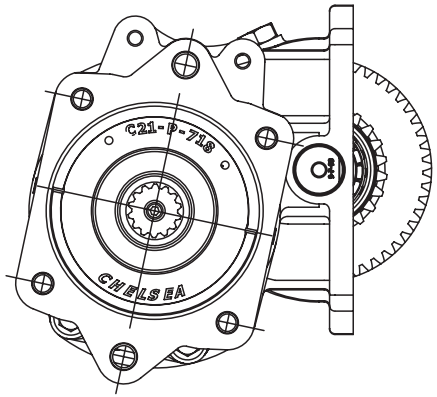
**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

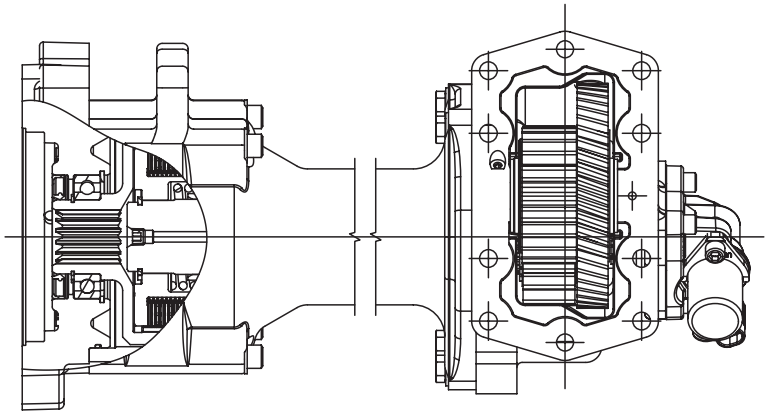
### "AF" Output – Assembly 5





### "XS" Output – Assembly 5

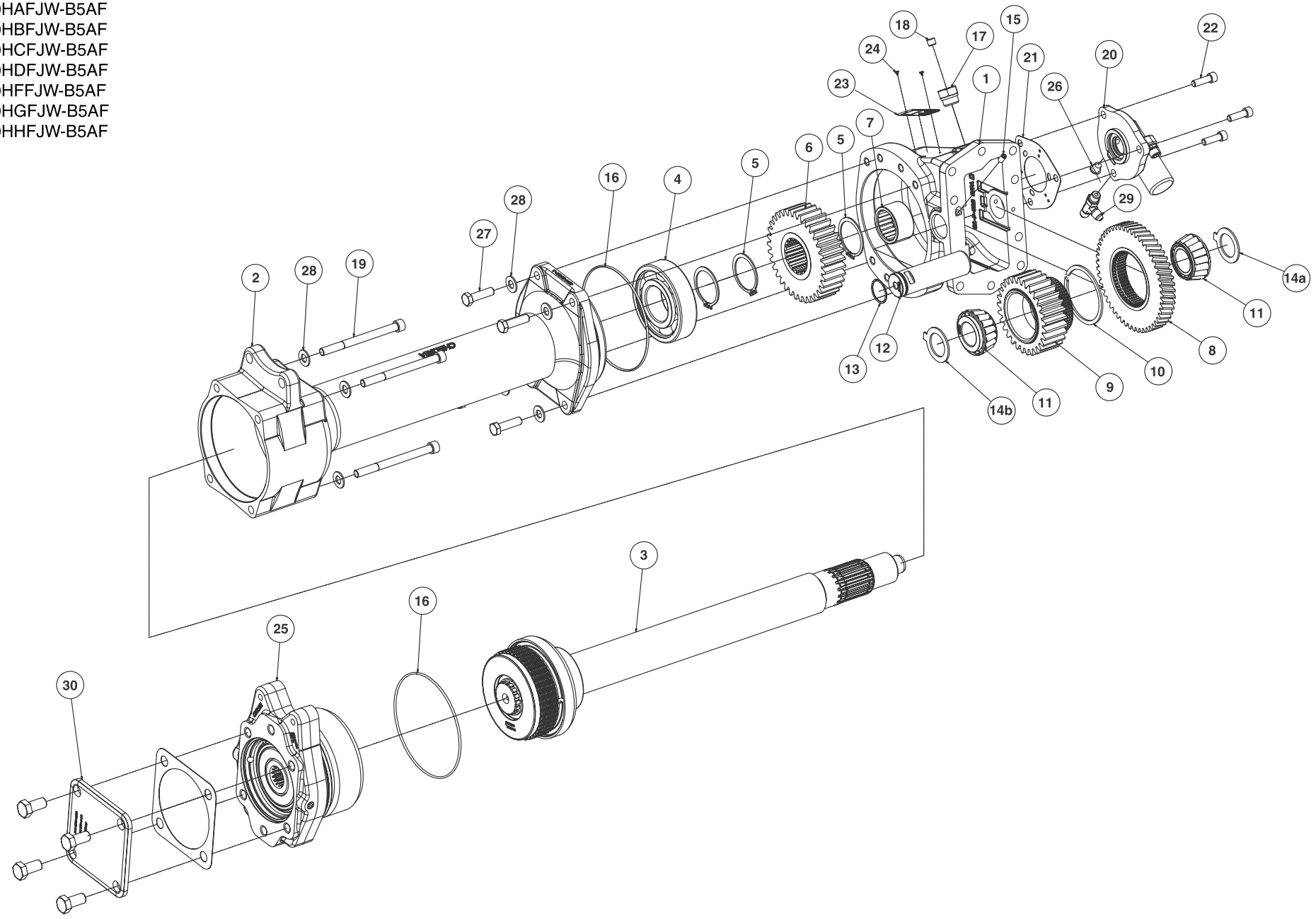




**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

890HAFJW-B5AF
890HBFJW-B5AF
890HCFJW-B5AF
890HDFJW-B5AF
890HFFJW-B5AF
890HGFJW-B5AF
890HHFJW-B5AF






**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## 890HEFJW-B5AF

| Item | Part Number | Description | Qty. |
|---|---|---|---|
| 1 | **1-P-629** | Housing | 1 |
| 2 | **54-P-22** | Bearing Retainer | 1 |
| 3 | **329607X** | Drive Shaft & Clutch Assembly | 1 |
| 4 | **550026** | Ball Bearing 1.7717" x 3.937 x .9843" | 1 |
| 5 | **379668** | Lockring | 3 |
| 6 | **2-P-865** (1) | Output Gear 35T | 1 |
| 7 | **560972** | Bearing Needle Roller Assembly 1.500" x 1.875 x 1.000" | 1 |
| 8 | **5-P-1428** (1) | Input Gear 50T | 1 |
| 9 | **5-P-1432** (1) | Gear Ratio 29T | 1 |
| 10 | **380064** | Lockring | 1 |
| 11 | **561026** | Bearing Cone Tapered 1.181" x .9843" | 2 |
| 12 | **9-P-99** | Idler Shaft 1.18" | 1 |
| 13 | **28-P-42** | O-Ring 1.051" x .070" | 1 |
| 14a | **14-P-82-1** | Spacer 1.191" x 1.75 x .080" | 1 |
| 14b | **14-P-82-1** | Spacer 1.191" x 1.75 x .080" | A.R. |
| | **14-P-82-2** | Spacer 1.191" x 1.75 x .085" | A.R. |
| | **14-P-82-3** | Spacer 1.191" x 1.75 x .090" | A.R. |
| | **14-P-82-4** | Spacer 1.191" x 1.75 x .094" | A.R. |

A.R. — As Required

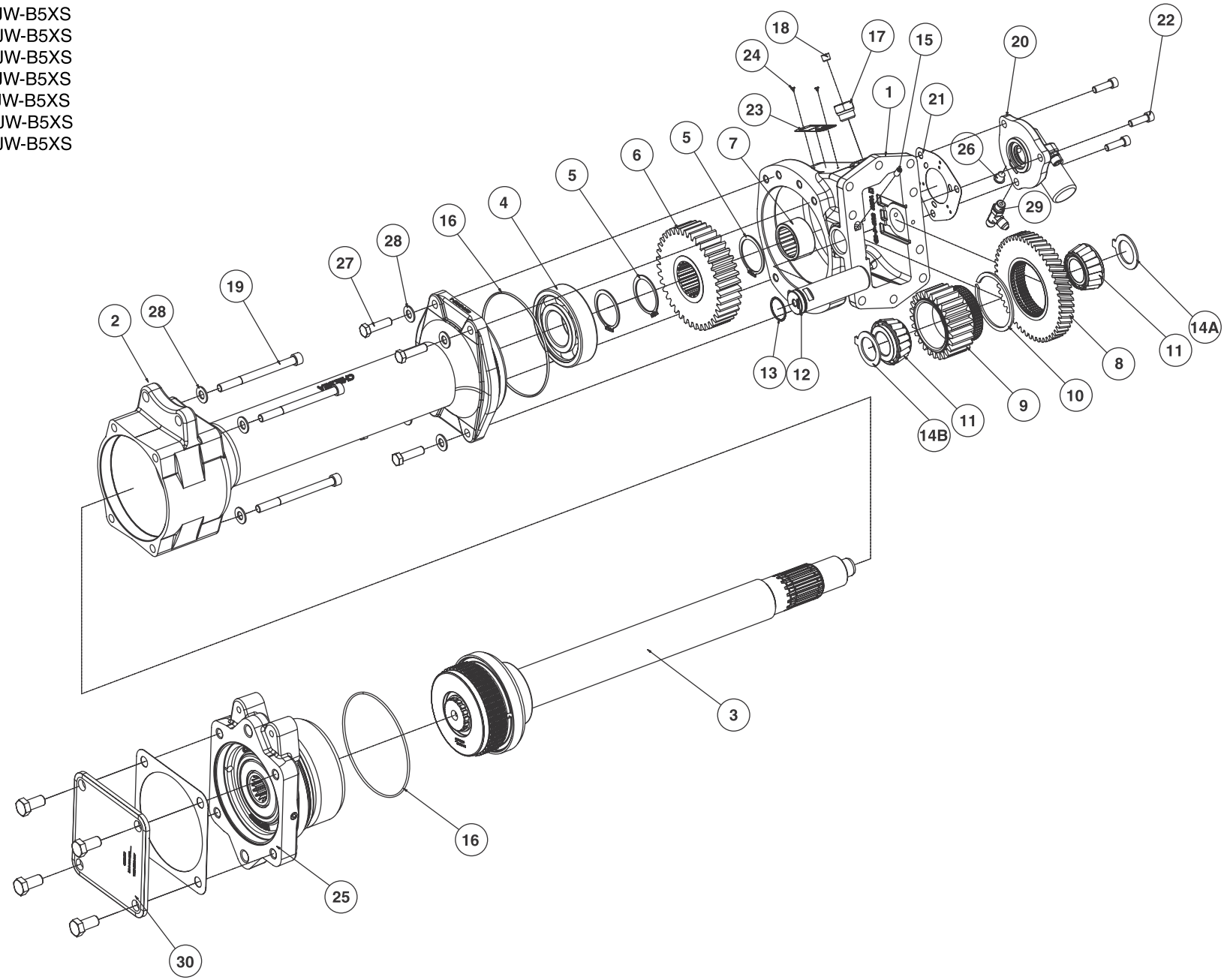
(1) **See Page 24 for other Gear Options**

| Item | Part Number | Description | Qty. |
|---|---|---|---|
| 15 | **378452-7** | Set Screw SH .250" - 20 x .500" | 1 |
| 16 | **28-P-245** | O-Ring 5.017" x .103" | 2 |
| 17 | **379242** | Adapter Straight .125" - 27 x .750" - 16 | 1 |
| 18 | **379231** | Pipe Plug .125" - 27 | 1 |
| 19 | **379433-18** | Capscrew SH .375" - 16 x 4.500" | 4 |
| 20 | **329463-12X** | 12V Valve Cap Assembly | 1 |
| 21 | **22-P-112** | Gasket | 1 |
| 22 | **378447-6** | Capscrew SH .312" - 18 x 1.000" | 3 |
| 23 | **68-P-51** | Name Plate | 1 |
| 24 | **378422** | Drive Screw | 2 |
| 25 | **329609-3X** | Output Assembly “AF” | 1 |
| 26 | **500897-5** | Shipping Plug | 2 |
| 27 | **378431-13** | Capscrew HH .375" - 16 x 1.375" | 4 |
| 28 | **380076-07** | Flat Hardened Washer .410" x .816 x .066" | 8 |
| 29 | **379659** | Tee .438" - 20 | 2 |
| 30 | **329658X** | Cover Kit “XK”, “AF”, “AZ” | 1 |



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

890HAFJW-B5XS
890HCFJW-B5XS
890HDFJW-B5XS
890HEFJW-B5XS
890HFFJW-B5XS
890HGFJW-B5XS
890HHFJW-B5XS






**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## 890HBFJW-B5XS

| Item | Part Number | Description | Qty. |
|---|---|---|---|
| 1 | **1-P-629** | Housing | 1 |
| 2 | **54-P-22** | Bearing Retainer | 1 |
| 3 | **329607X** | Drive Shaft & Clutch Assembly | 1 |
| 4 | **550026** | Ball Bearing 1.7717" x 3.937 x .9843" | 1 |
| 5 | **379668** | Lockring | 3 |
| 6 | **2-P-872** (1) | Output Gear 39T | 1 |
| 7 | **560972** | Bearing Needle Roller Assembly 1.500" x 1.875" x 1.000" | 1 |
| 8 | **5-P-1428** (1) | Input Gear 50T | 1 |
| 9 | **5-P-1438** (1) | Gear Ratio 25T | 1 |
| 10 | **380064** | Lockring | 1 |
| 11 | **561026** | Bearing Cone Tapered 1.181" x .9843" | 2 |
| 12 | **9-P-99** | Idler Shaft 1.18" | 1 |
| 13 | **28-P-42** | O-Ring | 1 |
| 14A | **14-P-82-1** | Spacer 1.191" x 1.75 x .080" | 1 |
| 14B | **14-P-82-1** | Spacer 1.191" x 1.75 x .080" | A.R. |
| | **14-P-82-2** | Spacer 1.191" x 1.75 x .085" | A.R. |
| | **14-P-82-3** | Spacer 1.191" x 1.75 x .090" | A.R. |
| | **14-P-82-4** | Spacer 1.191" x 1.75 x .094" | A.R. |

A.R. — As Required

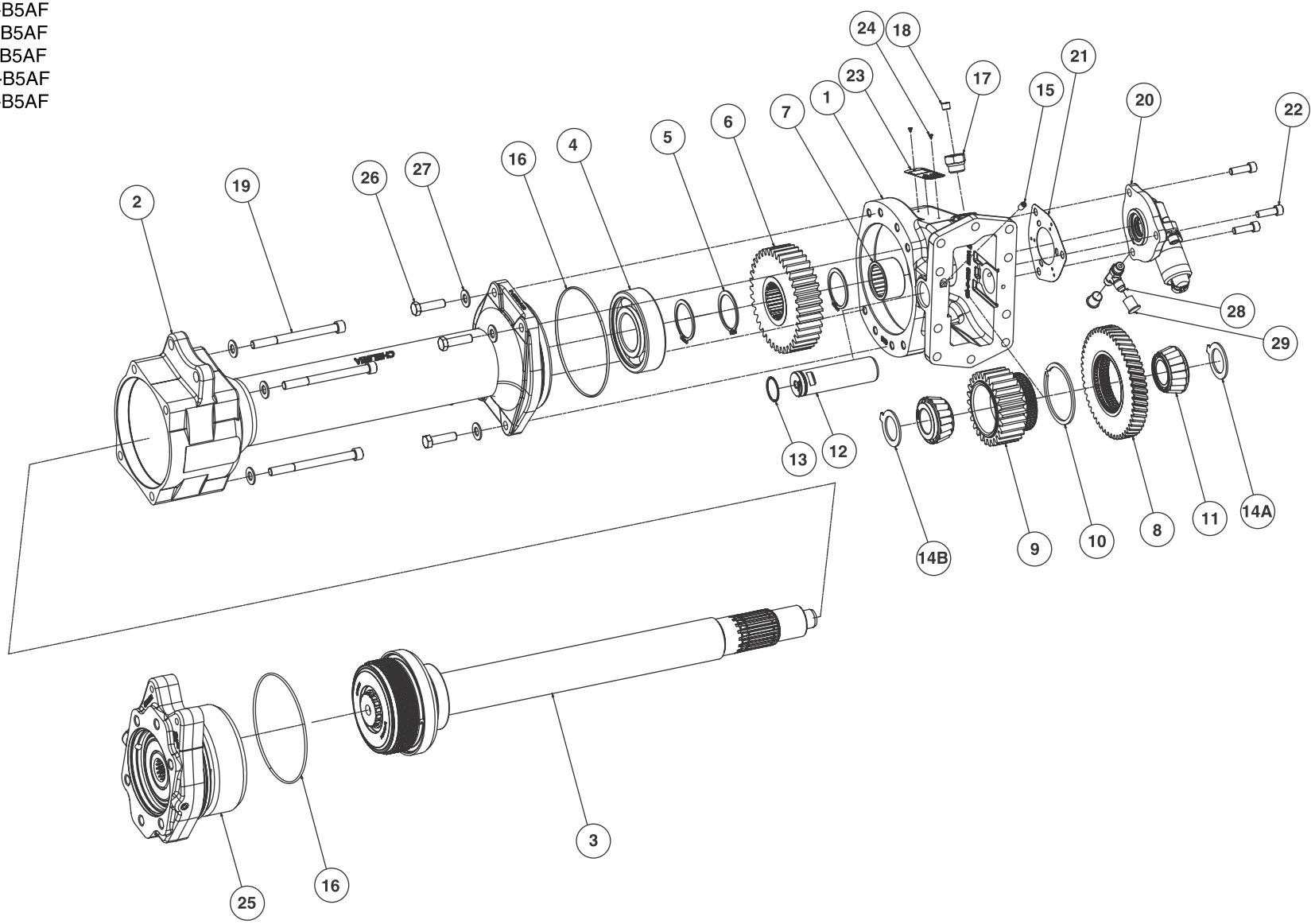
(1) **See Page 24 for other Gear Options**

| Item | Part Number | Description | Qty. |
|---|---|---|---|
| 15 | **378452-7** | Screw Set SH .250" - 20 x .500" | 1 |
| 16 | **28-P-245** | O-Ring 5.017" x .103" | 2 |
| 17 | **379242** | Adapter Straight .125" - 27 x .750" - 16 | 1 |
| 18 | **379231** | Pipe Plug .125" - 27 | 1 |
| 19 | **379433-18** | Capscrew SH .375" - 16 x 4.500" | 4 |
| 20 | **329463-12X** | 12V Valve Cap Assembly | 1 |
| 21 | **22-P-112** | Gasket | 1 |
| 22 | **378447-6** | Capscrew SH .312" - 18 x 1.000" | 3 |
| 23 | **68-P-51** | Name Plate | 1 |
| 24 | **378422** | Drive Screw | 2 |
| 25 | **329609-1X** | Output Assembly “XS” | 1 |
| 26 | **500897-5** | Shipping Plug | 2 |
| 27 | **378431-13** | Capscrew HH .375" - 16 x 1.375" | 4 |
| 28 | **380076-07** | Flat Hardened Washer .410" x .816 x .066" | 8 |
| 29 | **379659** | Tee .438" - 20 | 2 |
| 30 | **329654X** | Cover Kit “XS” | 1 |



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

890EAFJW-B5AF
890EBFJW-B5AF
890EDFJW-B5AF
890EEFJW-B5AF
890EFFJW-B5AF
890EGFJW-B5AF
890EHFJW-B5AF






**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## 890ECFJW-B5AF

| Item | Part Number | Description | Qty. |
|---|---|---|---|
| 1 | **1-P-629** | Housing | 1 |
| 2 | **54-P-22** | Bearing Retainer | 1 |
| 3 | **329607X** | Drive Shaft & Clutch Assembly | 1 |
| 4 | **550026** | Ball Bearing 1.7717" x 3.937 x .9843" | 1 |
| 5 | **379668** | Lockring | 3 |
| 6 | **2-P-873** (1) | Output Gear 38T | 1 |
| 7 | **560972** | Bearing Needle Roller Assembly 1.500" x 1.875" x 1.000" | 1 |
| 8 | **5-P-1428** (1) | Input Gear 50T | 1 |
| 9 | **5-P-1439** (1) | Gear Ratio 26T | 1 |
| 10 | **380064** | Lockring | 1 |
| 11 | **561026** | Bearing Cone Tapered 1.181" x .9843" | 2 |
| 12 | **9-P-99** | Idler Shaft 1.18" | 1 |
| 13 | **28-P-42** | O-Ring 1.05" x .070" | 1 |
| 14A | **14-P-82-1** | Spacer 1.191" x 1.75 x .080" | 1 |
| 14B | **14-P-82-1** | Spacer 1.191" x 1.75 x .080" | A.R. |
| | **14-P-82-2** | Spacer 1.191" x 1.75 x .085" | A.R. |
| | **14-P-82-3** | Spacer 1.191" x 1.75 x .090" | A.R. |
| | **14-P-82-4** | Spacer 1.191" x 1.75 x .094" | A.R. |

A.R. — As Required

(1) **See Page 24 for other Gear Options**

| Item | Part Number | Description | Qty. |
|---|---|---|---|
| 15 | **378452-7** | Screw Set SH .250" - 20 x .500" | 1 |
| 16 | **28-P-245** | O-Ring | 2 |
| 17 | **379242** | Adapter Straight .125" - 27 x .750" - 16 | 1 |
| 18 | **379231** | Pipe Plug .125" - 27 | 1 |
| 19 | **379433-18** | Capscrew SH .375" - 16 x 4.500" | 4 |
| 20 | **329463-12X** | 12V Valve Cap Assembly | 1 |
| 21 | **22-P-112** | Gasket | 1 |
| 22 | **378447-6** | Capscrew SH .312"- 18 x 1.000" | 3 |
| 23 | **68-P-51** | Name Plate | 1 |
| 24 | **378422** | Drive Screw | 2 |
| 25 | **329609-3X** | Output Assembly “AF” | 1 |
| 26 | **378431-13** | Capscrew HH .375" - 16 x 1.375" | 4 |
| 27 | **380076-07** | Flat Hardened Washer .410" x .816 x .066" | 8 |
| 28 | **379659** | Tee .438" - 20 | 2 |
| 29 | **379564-2** | Cap Thread .438" | 1 |


**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

# SECTION 2



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Notes

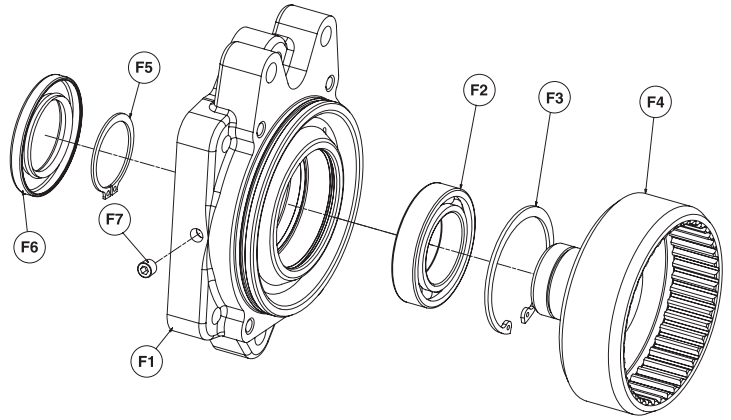
**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

When removing the 890 Series from the transmission and after pump and all the connections have been removed, it is recommended that the P.T.O. be removed in the following sequence.

1. The Tube section (**2**) may need some support to remove weight from the rear Bracket to ease the removal of the two Hex Capscrews
2. Loosen the two Hex Capscrews that hold the Output Flange section of the P.T.O. (**1**) to the transmission Bracket. Do not completely remove at this time.
3. Start to remove the Tube Assembly of the P.T.O. by removing the four Capscrews (**27**) and Washers (**28**) that mate the Tube to the P.T.O. Housing (**1**)
4. Slowly slide the Tube towards the back of the transmission.
5. While securely holding the Tube section remove the two Hex Capscrews from the rear Mounting Bracket while sliding the Tube back and down from the P.T.O. Housing.
6. Remove the main P.T.O. Housing (**1**) from the transmission by removing the seven Capscrews.

## Disassembly

1. Housing Assembly
   - 1.1. Remove T-Fitting 379659 from the Valve Cap Sub Assembly. Remove the Solenoid Valve Cap Assembly (**20**) from the P.T.O. housing (**1**) using a 1/4" Hex Bit to remove three Cap Screws (**22**).
   - 1.2. Remove Gasket (**21**) from the Pilot of Solenoid Valve Cap Assembly (**20**). See page 21 for break down of the Valve Cap Assembly.
   - 1.3. Remove Set Screw (**15**) to allow the Idler Shaft (**12**) to be removed.
   - 1.4. Press Idler Shaft (**12**) thru the aligned Washers (**14A & 14B**), Bearings (**11**) & Input/Ratio Gear (**8 & 9**) until it is fully unseated.
   - 1.5. Remove Tapered Roller Bearings (**11**) on both sides of the Input Gear Sub Assembly.
   - 1.6. **NOTE:** The Input Gear (**8**) and Ration Gear (**9**) cannot be separated due to the internal Snap Ring (**10**). If the Gear(s) need to be replaced, contact Chelsea Customer Service.
2. Tube Assembly Section
   - 2.1. Start by removing the O-Ring (**16**) from the end of the Tube (**2**) that mates to the main P.T.O. Housing (**1**).
   - 2.2. Next remove the Snap Ring (**5**) that retains the Output Gear (**6**) on the Shaft Assembly (**3**).
   - 2.3. Slide the Output Gear (**6**) off the Shaft Assembly (**3**).
   - 2.4. Remove the next two Snap Rings (**5**).
   - 2.5. At the Flange/Output end of the Tube Assembly (**2**) unscrew and remove the four Cap Screws (**19**) and Washers (**28**) from the Tube Assembly (**2**).
   - 2.6. Remove the Output Assembly (**25**) and O-Ring (**16**) from the Tube Assembly (**2**).
   - 2.7. Slide the Shaft Assembly (**3**) by pressing on the Shaft from the P.T.O. Housing (**1**) mating side of the Tube Assembly (**2**) towards the Flange/Output side of the Tube Assembly.
   - 2.8. After Output Shaft (**3**) has been removed from the Tube (**2**), remove Roller Bearing (**4**) from Tube (**2**).
3. Flange Assembly
   - 3.1. Remove the Oil Seal (**F6**) from the Flange Housing (**F1**).
   - 3.2. Next remove the Snap Ring (**F5**) from the Flange Housing (**F1**).
   - 3.3. The Output/Clutch Bell Gear (**F4**) can be removed at this time.
   - 3.4. Remove Snap Ring (**F3**) to press out Bearing (**F2**).
   - 3.5. Pipe Plug (**F7**) can be removed if required.




| Item | Part Number | Description | Qty. |
|---|---|---|---|
| F1 | **21-P-717** | Flange Pump “XS” S.A.E. “C” 2 or 4-Bolt | 1 |
| F2 | **561018** | Bearing Ball 1.772" x 2.953" x .630" | 1 |
| F3 | **379919** | Lockring | 1 |
| F4 | **2-P-867** | Gear Output 1.250" - 14T Spline (“XS” Output) | 1 or |
| F4 | **2-P-875** | Gear Output 1.000" - 15T Spline (“AF” Output) | 1 |
| F5 | **379668** | Lockring | 1 |
| F6 | **28-P-278** | Oil Seal 2.953" x 1.772" x .315" | 1 |
| F7 | **379231** | Plug Pipe .125" - 27 | 2 |
| N.S. | **28-P-259X** | O-Ring 3.984" x .139" (Wet Spline Pump Mounting) | 1 |

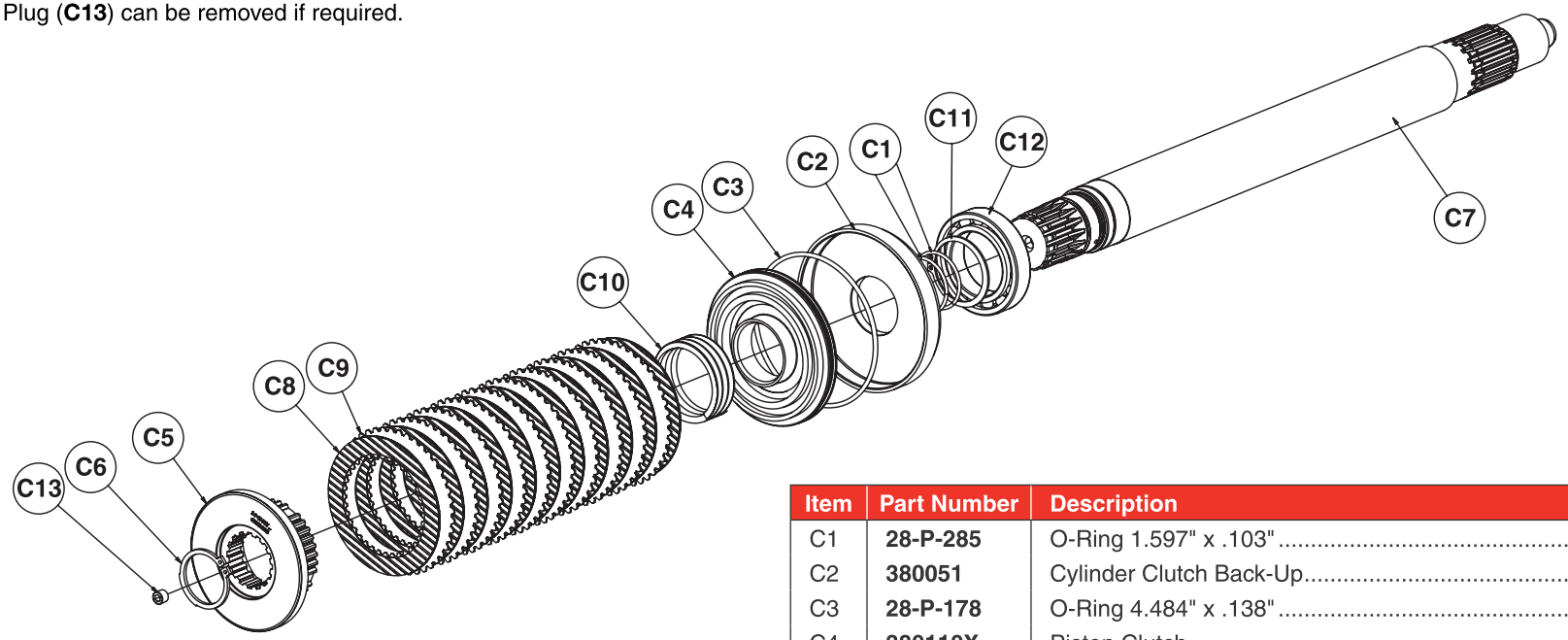
N.S. — Not Shown



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Disassembly

4. Driveshaft & Clutch Assembly
   - 4.1 Warning the Clutch Assembly is under spring tension.
   - 4.2. To remove the Clutch Pack from the Output Shaft (**C7**) start by compressing the Inner Clutch Gear (**C5**) and removing the Snap Ring (**C6**).
   - 4.3. Next remove the Clutch Gear (**C5**), Clutch Friction Discs (**C8**) and Clutch Plates (**C9**).
   - 4.4. Remove the Spring (**C10**), Clutch Piston (**C4**), and Back-Up Clutch Cylinder (**C2**).
   - 4.5. Remove the O-Ring (**C3**) from the Clutch Piston (**C4**).
   - 4.6. Remove the two O-Rings (**C1**) on the Output Shaft (**C7**).
   - 4.7. Remove the Bearing Retaining Lockring (**C11**) and then slide the Bearing (**C12**) off the Output Shaft Bearing (**C7**).
   - 4.8. Pipe Plug (**C13**) can be removed if required.



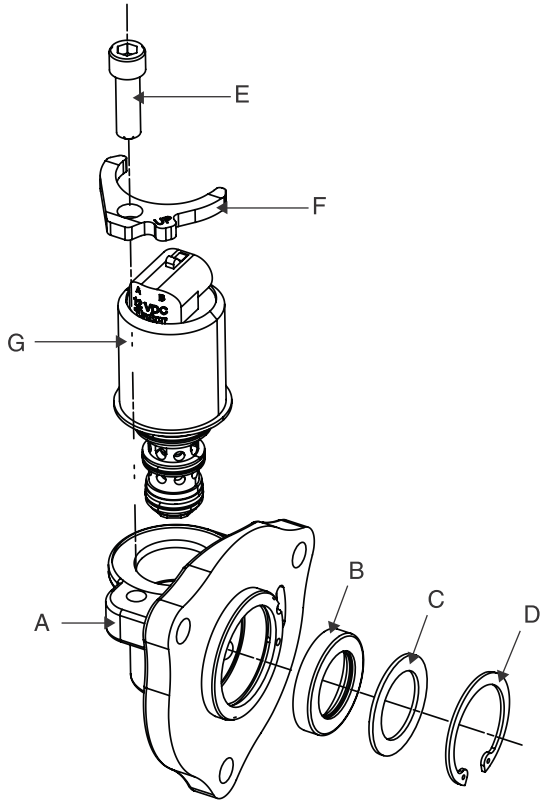

| Item | Part Number | Description | Qty. |
|---|---|---|---|
| C1 | **28-P-285** | O-Ring 1.597" x .103" | 2 |
| C2 | **380051** | Cylinder Clutch Back-Up | 1 |
| C3 | **28-P-178** | O-Ring 4.484" x .138" | 1 |
| C4 | **380110X** | Piston Clutch | 1 |
| C5 | **2-P-858** | Gear Output 36 Tooth | 1 |
| C6 | **380069** | Lockring | 1 |
| C7 | **3-P-1007** | Shaft Output | 1 |
| C8 | **379485** | Disc Friction | 11 |
| C9 | **380065** | Plate Clutch | 10 |
| C10 | **37-P-62** | Spring 2.140" x 1.729" | 1 |
| C11 | **380070** | Lockring | 1 |
| C12 | **561028** | Bearing Ball 1.969" x 3.150" x .630" | 1 |
| C13 | **379231** | Plug Pipe .125" - 27 | 1 |



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Disassembly

5. Valve & Cap Assembly
   5.1. Carefully remove the Retaining Ring (**D**) and Washer (**C**). Visually inspect the Oil Seal (**B**) now. If you see signs of wear or leakage, remove the Oil Seal (**B**).
   **Important:** Do not nick the Seal Bore. This could result in leakage or further damage to the P.T.O.
   5.2. Remove the Solenoid Valve Socket Capscrew (**E**).
   5.3. Remove the Solenoid Valve (**G**) from the Cap. Be careful not to damage the Seal. Check the O-Rings for damage. If they are damaged, replace the O-Rings.




| Item | Part Number | Description | Qty. |
|---|---|---|---|
| 39 | **329442-12X** | Valve & Cap Assembly (12V) (“KV” Pitch Only) | 1 or |
| | **329442-24X** | Valve & Cap Assembly (24V) (“KV” Pitch Only) | 1 |
| | **329463-12X** | Valve & Cap Assembly (12V) (“FJ” Pitch Only) | 1 or |
| | **329463-24X** | Valve & Cap Assembly (24V) (“FJ” Pitch Only) | 1 |
| A | **34-P-143** | Valve Cap | 1 |
| B | **28-P-119** | Oil Seal (Hi Pressure) | 1 |
| C | **378811** | Washer | 1 |
| D | **378849** | Retaining Ring | 1 |
| E | **378447-6** | Sockethead Capscrew .312" - 18 x 1.00" | 1 |
| F | **379995** | Clamp (“KV”) Included with 379993 Valve | 1 or |
| | **380012** | Clamp (“FJ”) used with 380011 Valve | 1 |
| | **380124** | Clamp (“FJ”) used with 380123 Valve | 1 |
| G | **379993-12** | Hydraulic Valve (12V) (“KV”) (White Connector) | 1 or |
| | **379993-24** | Hydraulic Valve (24V) (“KV”) (Black Connector) | 1 |
| | **380011-12** | Hydraulic Valve (12V) (“FJ”) (White Side Connector) | 1 or |
| | **380011-24** | Hydraulic Valve (24V) (“FJ”) (Black Side Connector) | 1 |
| | **380123-12** | Hydraulic Valve (12V) (“FJ”) (White Connector Top) (New Style) | 1 or |
| | **380123-24** | Hydraulic Valve (24V) (“FJ”) (Black Connector Top) (New Style) | 1 |

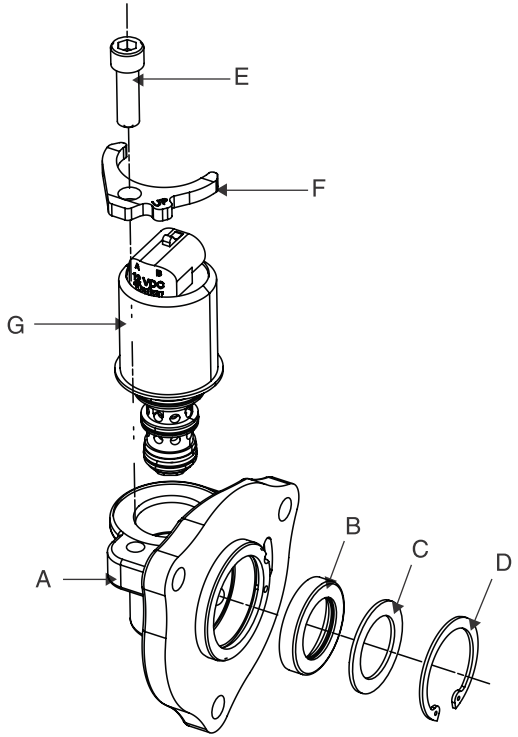


**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

1. Be sure selected parts are those called out on the Pick List.
2. Visually inspect parts before assembly for flaws.
3. The terms OUTPUT and DRIVE are used interchangeably.
4. Lubricate most bearings before assembly. Use MELCOMOL 'Y", EP-2 or equal.
5. When assembling bearings, always place the bearings rounded end into the part.
6. Use Parker O-Lube or equal to lubricate O-Rings and seals before assembly.
7. When assembling O-Rings, do not roll it into their grooves. Use an O-Ring tool for assembly. O-Rings are not to be twisted or damaged.
8. When assembling seals, the seal side is opposite the flat side which is identified by a stamped part number. The seal side must be in the direction of the oil/air pressure.

## Assembly

1. Valve & Cap Assembly
   - 1.1. If the Valve Assembly Oil Seal (**B**) was worn or damaged, replace it now. Lubricate a new Seal (**B**). Install it carefully with the proper driver. Next install the Washer (**C**) and Retaining Ring (**D**). **Important:** Avoid nicking the PTO Housing (**1**). This could cause leakage or other PTO damage.
   - 1.2. Lubricate and attach the Solenoid Valve (**G**) to the Cap.
   - 1.3. Next install the Clamp (**F**) and Sockethead Capsrew (**E**). Secure the Solenoid to the Valve Cap (**A**) with Hex Capscrew (**E**). Torque it to 96 – 120 in-lbs (11 – 14 Nm).
   - 1.4. Place a new Valve Cap Gasket (**21**) on the Valve Assembly. Make sure the holes are aligned. **Caution:** Do not use Sealing Compounds. It could affect the correct operation of the transmission.
   - 1.5. Attach the Valve Assembly (**20**) to the PTO Housing (**1**). Tighten the three Capscrews (**22**) and torque them to 192 – 240 in-lbs (22 – 27 Nm or 2.2 – 2.8 Kgm).



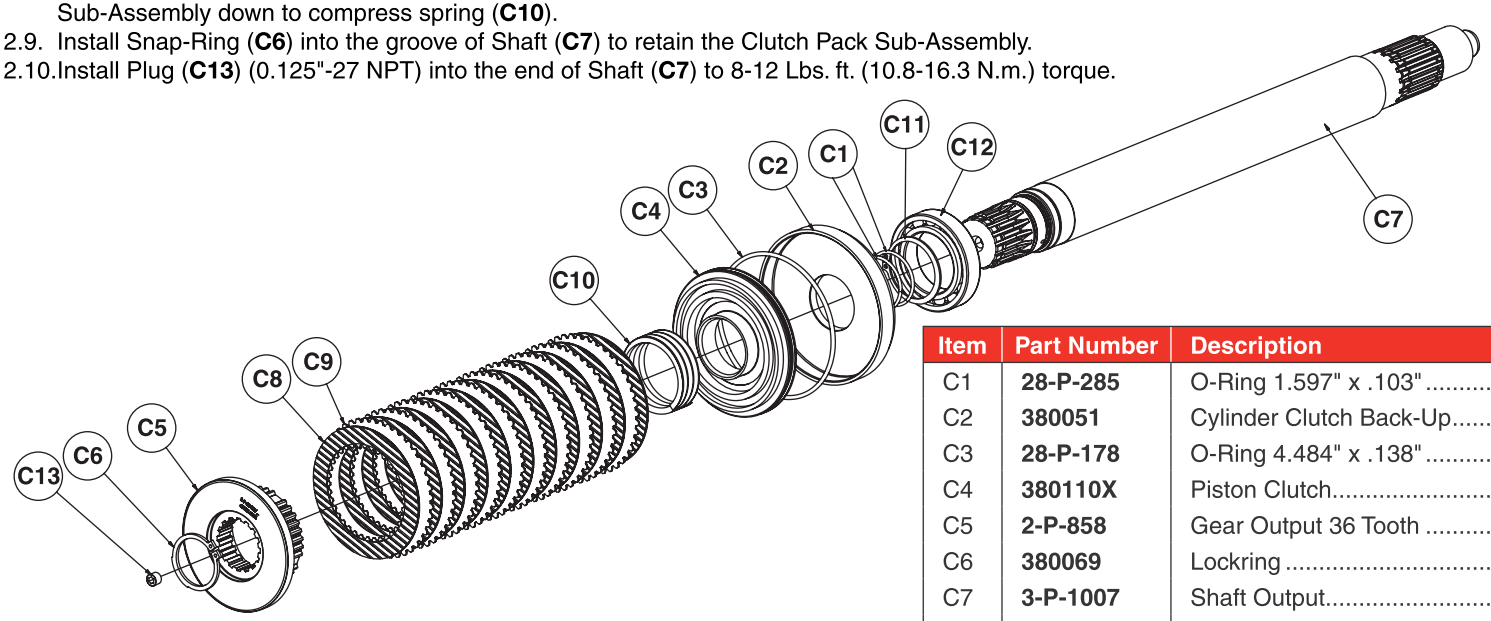

| Item | Part Number | Description | Qty. |
|---|---|---|---|
| 39 | **329442-12X** | Valve & Cap Assembly (12V) ("KV" Pitch Only) | 1 or |
| | **329442-24X** | Valve & Cap Assembly (24V) ("KV" Pitch Only) | 1 |
| | **329463-12X** | Valve & Cap Assembly (12V) ("FJ" Pitch Only) | 1 or |
| | **329463-24X** | Valve & Cap Assembly (24V) ("FJ" Pitch Only) | 1 |
| A | **34-P-143** | Valve Cap | 1 |
| B | **28-P-119** | Oil Seal (Hi Pressure) | 1 |
| C | **378811** | Washer | 1 |
| D | **378849** | Retaining Ring | 1 |
| E | **378447-6** | Sockethead Capscrew .312" - 18 x 1.00" | 1 |
| F | **379995** | Clamp ("KV") Included with 379993 Valve | 1 or |
| | **380012** | Clamp ("FJ") used with 380011 Valve | 1 |
| | **380124** | Clamp ("FJ") used with 380123 Valve | 1 |
| G | **379993-12** | Hydraulic Valve (12V) ("KV") (White Connector) | 1 or |
| | **379993-24** | Hydraulic Valve (24V) ("KV") (Black Connector) | 1 |
| | **380011-12** | Hydraulic Valve (12V) ("FJ") (White Side Connector) | 1 or |
| | **380011-24** | Hydraulic Valve (24V) ("FJ") (Black Side Connector) | 1 |
| | **380123-12** | Hydraulic Valve (12V) ("FJ") (White Connector Top) (New Style) | 1 or |
| | **380123-24** | Hydraulic Valve (24V) ("FJ") (Black Connector Top) (New Style) | 1 |



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Assembly

2. Drive Shaft Clutch Assembly
   - 2.1 Place Bearing (**C12**) onto Shaft (**C7**). Using a Press Tool, press the Bearing (**C12**) onto the Shaft (**C7**) allowing the Press Tool to fully seat against the end of the Shaft (**C7**).
     - 2.1.1. This will position the bearing properly for Snap-Ring installation.
   - 2.2. Place Snap-Ring (**C11**) over the end of Shaft (**C7**). Using Snap-Ring Pliers spread the legs of Snap-Ring over the Shaft and into the groove. Visually check to assure Snap-Ring is fully seated.
   - 2.3. Place O-Ring Sleeve over the end of Shaft (**C7**) allowing it to seat on the end of the Shaft beyond the lube hole. Lubricate O-Ring (**C1**) and slide over the O-Ring sleeve down to install into the groove in the Shaft (**C7**). Lubricate and place a second O-Ring (**C1**) onto the sleeve. Pull O-Ring Sleeve up in front of the lube hole. Proceed to slide the O-Ring (**C1**) down to install into the groove in the Shaft (**C7**).
   - 2.4. Lubricate O-Ring (**C3**) and install into the groove on the outer diameter of Clutch Piston (**C4**). Install Clutch Piston into the Back-Up Cylinder (**C2**). Place the Sub-Assembly onto the Shaft (**C7**) seating the Back-Up Cylinder (**C2**) against the shoulder of Shaft (**C7**).
   - 2.5. Install Clutch Pack onto Clutch Gear
   - 2.6. Alternately place ELEVEN Friction Discs (**C8**) and TEN Clutch Plates (**C9**) onto Inner Clutch Gear (**C5**) beginning and ending with a Friction Disc (**C8**).
   - 2.7. Slide the spring (**C10**) over the end of Shaft (**C7**) and Pilot onto the Clutch Piston 380053.
   - 2.8. Hold the completed Friction Disc / Clutch Plate Pack onto the Inner Clutch Gear (**C5**) and slide the Sub-Assembly onto the spline portion of Shaft (**C7**). Press the Sub-Assembly down to compress spring (**C10**).
   - 2.9. Install Snap-Ring (**C6**) into the groove of Shaft (**C7**) to retain the Clutch Pack Sub-Assembly.
   - 2.10. Install Plug (**C13**) (0.125"-27 NPT) into the end of Shaft (**C7**) to 8-12 Lbs. ft. (10.8-16.3 N.m.) torque.



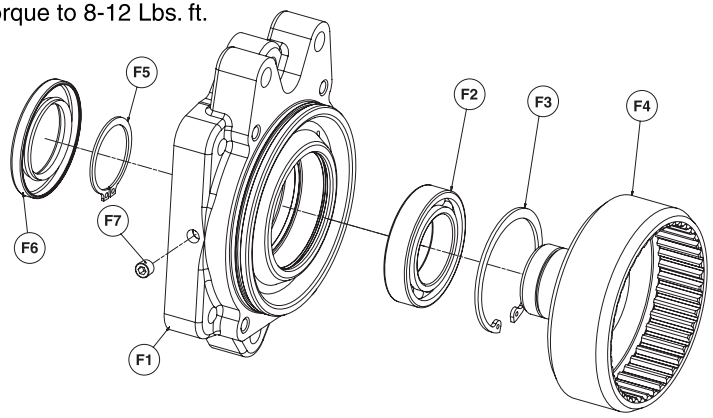

| Item | Part Number | Description | Qty. |
|---|---|---|---|
| C1 | **28-P-285** | O-Ring 1.597" x .103" | 2 |
| C2 | **380051** | Cylinder Clutch Back-Up | 1 |
| C3 | **28-P-178** | O-Ring 4.484" x .138" | 1 |
| C4 | **380110X** | Piston Clutch | 1 |
| C5 | **2-P-858** | Gear Output 36 Tooth | 1 |
| C6 | **380069** | Lockring | 1 |
| C7 | **3-P-1007** | Shaft Output | 1 |
| C8 | **379485** | Disc Friction | 11 |
| C9 | **380065** | Plate Clutch | 10 |
| C10 | **37-P-62** | Spring 2.140" x 1.729" | 1 |
| C11 | **380070** | Lockring | 1 |
| C12 | **561028** | Bearing Ball 1.969" x 3.150" x .630" | 1 |
| C13 | **379231** | Plug Pipe .125" - 27 | 1 |



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Assembly

3. Flange Assembly
   - 3.1. Place Bearing (**F2**) into the Pump Flange (**F1**). Using a Press Tool, press the Bearing (**F2**) into the Pump Flange (**F1**) until fully seated. Using Snap-Ring Pliers compress the legs of Snap-Ring (**F3**) and install into the Pump Flange (**F1**) to secure the Bearing. Lubricate and install O-Ring 28-P-245 into the groove located on the Male Pilot Diameter of the Pump Flange (**F1**).
   - 3.2. Install outer Clutch Gear (**F4**) into Bearing (**F2**) (slip fit) in the Pump Flange (**F1**). Rotate the Cap & Gear Assembly with Snap-Ring groove exposed. Using Snap-Ring Pliers spread the legs of Snap-Ring (**F5**) over the outer Clutch Gear Hub and into the groove. Visually check to assure Snap-Ring is fully seated.
   - 3.3. Place the proper Oil Seal Slide Tool into the Spline end of the outer Clutch Gear. Slide the Oil Seal (**F6**) over the Slide Tool. Pilot Seal Driver over the Seal Slide. Press the Oil Seal (**F6**) into Pump Flange Seal Bore flush with cast surface.
   - 3.4. Install Plug (**F7**) (0.125-27 NPT) into both sides of the Pump Flange (**F1**), torque to 8-12 Lbs. ft.




| Item | Part Number | Description | Qty. |
|---|---|---|---|
| F1 | **21-P-717** | Flange Pump “XS” S.A.E. “C” 2 or 4-Bolt | 1 |
| F2 | **561018** | Bearing Ball 1.772" x 2.953" x .630" | 1 |
| F3 | **379919** | Lockring | 1 |
| F4 | **2-P-867** | Gear Output 1.250" - 14T Spline (“XS” Output) | 1 or |
| F4 | **2-P-875** | Gear Output 1.000" - 15T Spline (“AF” Output) | 1 |
| F5 | **379668** | Lockring | 1 |
| F6 | **28-P-278** | Oil Seal 2.953" x 1.772" x .315" | 1 |
| F7 | **379231** | Plug Pipe .125" - 27 | 2 |
| N.S. | **28-P-259X** | O-Ring 3.984" x .139" (Wet Spline Pump Mounting) | 1 |

N.S. — Not Shown

4. Shaft & Tube Assembly
   - 4.1. Position Bearing (**4**) onto the Bearing Bore of tube (**2**). Using a Bearing Driver, press Bearing (**4**) until it is fully seated against the Bearing Backing Shoulder within Tube (**2**).
   - 4.2. Insert the Output Shaft/Clutch Pack Sub-Assembly (**3**) into the outer Clutch Gear of the Pump Flange Output Sub-Assembly. **NOTE:** The Clutch Pack Plates & Discs may require alignment for ease of assembly with outer Clutch Gear.
   - 4.3. Slip the Tube (**2**) over the Output Shaft/Pump Flange Output Sub-Assemblies aligning with Bearing 550026. Rotate Tube (**2**) to align Thru Holes to Threaded Holes in the Pump Flange. Use caution when assembling Tube onto the Pump Flange Pilot to prevent O-Ring damage. Insert Alignment Tool through the Bracket Mounting Holes in Tube (**2**) and into the C’bored Threaded Holes in the Pump Flange.
   - 4.4. Place four Washers (**28**) onto four Cap Screws (**27**). Secure Tube (**2**) to the Pump Flange Output Sub-Assembly by installing FOUR Cap Screws with Washers, torque the screws to 30-35 Lbs. ft.
   - 4.5. Using Snap-Ring Pliers expand the legs of Snap-Ring (**5**) over Shaft (**2**) and install into groove securing the Tube/Bearing Sub-Assembly to the Shaft. Using Snap-Ring Pliers expand the legs of Snap-Ring (**5**) over Shaft (**2**) and install into groove. Visually check to assure the Snap-Ring (**5**) is fully seated.
   - 4.6. Lubricate and install O-Ring (**16**) into the groove located on the Male Pilot Diameter of Tube (**2**).
   - 4.7. Place the Output Gear (**6**) over the end of the Shaft (**3**), align Spline and slide the Gear into place shouldering the Gear on the Snap-Ring.
   - 4.8. Using Snap-Ring Pliers expand the legs of Snap-Ring (**5**) over Shaft (**3**) and install into groove. Visually check to assure the Snap-Ring (**5**) is fully seated.


**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Assembly

5. Housing Assembly
   - 5.1. Using a Bearing Drive Tool install Caged Needle Roller Bearing (**7**) into P.T.O. Housing (**1**).
   - 5.2. Install Adapter Plug (**17**) into P.T.O. Housing (**1**) using a 7/8" Socket and torque to 25-30 Lbs. ft.
   - 5.3. Install Pipe Plug (**18**) into Adapter (**17**) Plug using a 3/16" Hex Bit and torque to 8-12 Lbs. ft.
   - 5.4. Place a Tapered Roller Bearing Cone (**11**) into both side bores of the Input Gear Sub-Assembly (**8, 9 & 10**).
   - 5.5. Place Tabbed Thrust Washer (**14A**) into the closed end of Housing (**1**) at the Idler Shaft Hole making sure the tab is located in the slot. Place the Input Gear Sub-Assembly & Bearings into the opening of the Housing (Input Gear towards the closed end of the Housing). Select and place a single Tabbed Washer (**14B**) to give proper Tapered Bearing endplay and insert the Washer making sure the tab is fully seated into the slot.
   - 5.6. Place Alignment Bar thru the idler Shaft Hole in Housing 1-P-629 (**1**) to align the Washers (**14A & B**), Bearings (**11**) and Input Gear (**8, 9 & 10**).
   - 5.7. Lube O-Ring (**13**) and install into the groove on the Idler Shaft (**12**). Locate alignment line on the threaded end of the Shaft. Place the Idler Shaft into the Housing Idler Hole so the alignment line is parallel and closest to the Housing mounting surface. Press Idler Shaft (**12**) thru the aligned Washers, Bearings and Input Gear until it is fully seated.
   - 5.8. Install Set-Screw (**15**) to 30 in-lbs max torque to lock the Idler Shaft (**12**) in place.
   - 5.9. Place the Gasket (**21**) onto the Pilot of Solenoid Valve Cap Sub-Assembly (**21**).
   - 5.10. Install the Solenoid Valve Cap Sub-Assembly (**21**) with the Solenoid oriented downward and to the right (threaded hole upward to the right) onto the P.T.O. Housing (**1**) using a 1/4" Hex Bit to secure THREE Cap Screws (**22**) and torque to 24-28 Lbs. ft.
   - 5.11. Install and secure T-fitting (**29**) into the Valve Cap Sub-Assembly (**21**).

6 Mating P.T.O. Housing and Tube Assembly
   - 6.1. Mate the Housing/Input Gear Sub-Assembly into the Tube/Output Gear Sub-Assembly. Use caution when assembling the Tube pilot into the P.T.O. Housing to prevent O-Ring damage.
   - 6.2. There are two possible orientations of the P.T.O. Housing Sub-Assembly to the Tube. Use the one noted when Assembly was first Disassembled
   - 6.3. Place Washer (**28**) onto Hex Head Screws (**27**). Fasten the Tube to the P.T.O. Housing using a 9/16" Hex Socket to secure the FOUR Hex Head Screws (**27**) with Washers and torque to 30-35 Lbs. ft.



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

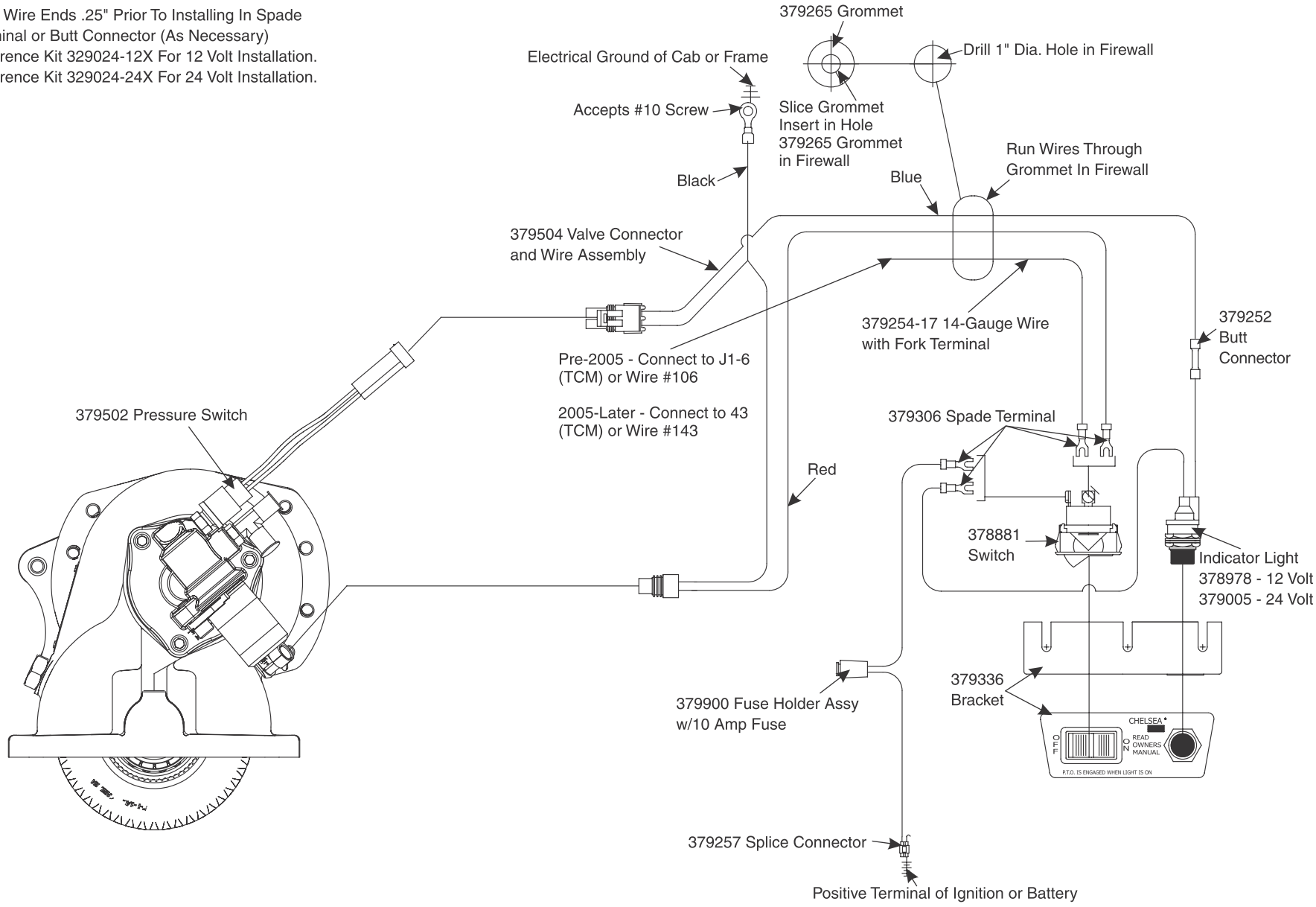
# SECTION 3



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Electrical Installation Sketch without E.O.C. for 890/892 Series (SK-459 Rev C)

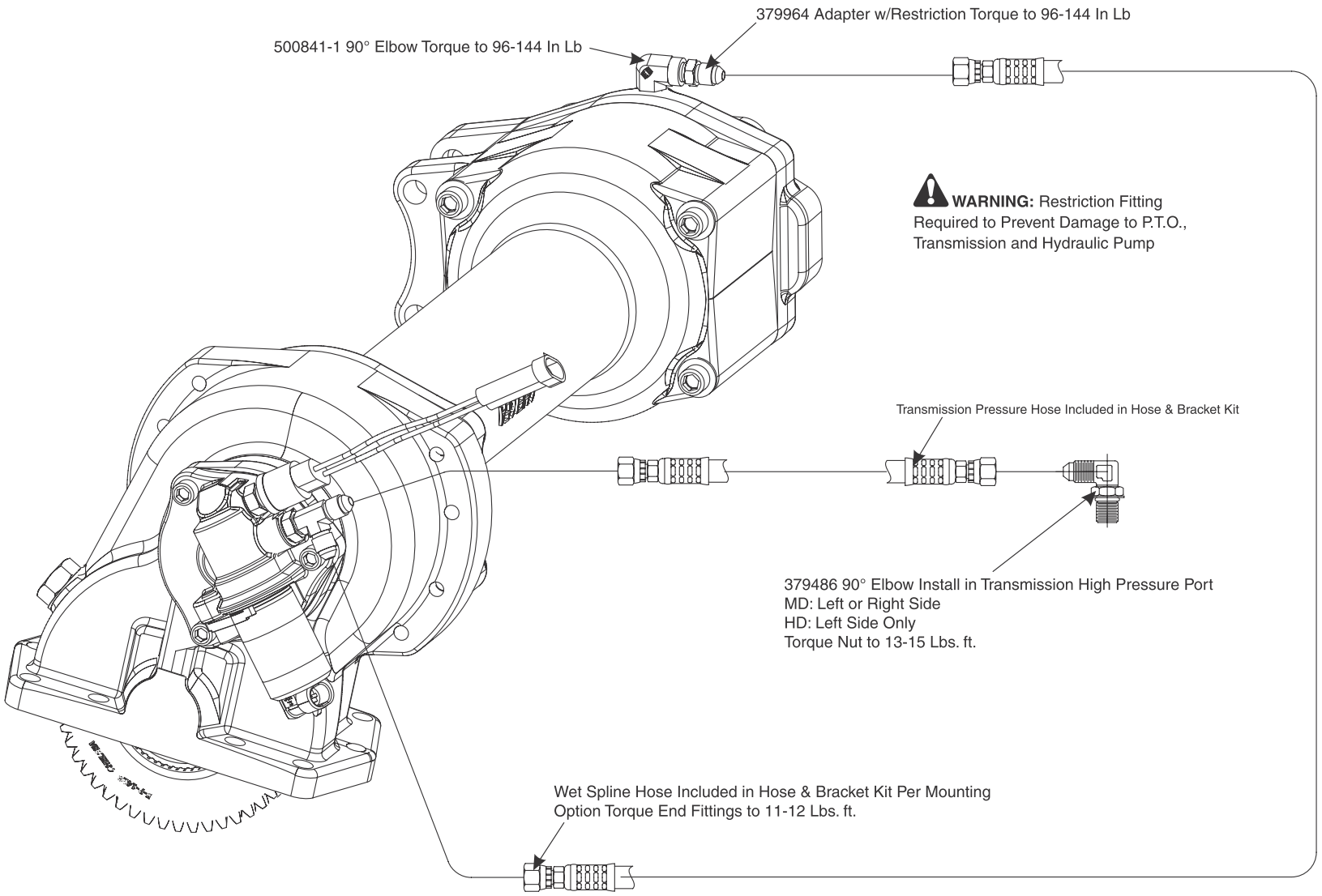
Strip Wire Ends .25" Prior To Installing In Spade Terminal or Butt Connector (As Necessary)
Reference Kit 329024-12X For 12 Volt Installation.
Reference Kit 329024-24X For 24 Volt Installation.






**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Hose Installation Sketch for 890/892 Series (SK-504)






**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

| Location | Torque (English) | Torque (Metric) |
|---|---|---|
| Idler Pin Set Screw | 20 - 30 In. Lbs. | 2 - 3 N.m. |
| Tube Assembly Cap Screws | 30 - 35 Lbs. ft. | 41 - 48 N.m. |
| Driveshaft Pipe Plug | 8 - 12 Lbs. ft. | 11 - 16 N.m. |
| Speed Sensor Port | | |
| With E.O.C. (379243) | 25 - 30 Lbs. ft. | 34 - 41 N.m. |
| Without E.O.C. | | |
| O-Ring Boss Plug (379242) | 25 - 30 Lbs. ft. | 34 - 41 N.m. |
| Pipe Plug (379231) | 8 - 12 Lbs. ft. | 11 - 16 N.m. |
| Valve Cap Assembly | 24 - 28 Lbs. ft. | 33 - 38 N.m. |
| Hydraulic Valve Clamp | 96 - 120 In. Lbs. | 11 - 13 N.m. |
| Shaft Nut “AB”, “AC”, “XV” (380486) | 80 Lbs. ft. | 109 N.m. |



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

| GEAR DESIGNATOR | INPUT GEAR | NO. TEETH A | RATIO GEAR | NO. TEETH B | OUTPUT GEAR | NO. TEETH C |
|---|---|---|---|---|---|---|
| 890*AFJ | 5-P-1428 | 50 | 5-P-1429 | 24 | 2-P-862 | 40 |
| 890*BFJ | 5-P-1428 | 50 | 5-P-1438 | 25 | 2-P-872 | 39 |
| 890*CFJ | 5-P-1428 | 50 | 5-P-1439 | 26 | 2-P-873 | 38 |
| 890*DFJ | 5-P-1428 | 50 | 5-P-1440 | 27 | 2-P-874 | 37 |
| 890*EFJ | 5-P-1428 | 50 | 5-P-1432 | 29 | 2-P-865 | 35 |
| 890*FFJ | 5-P-1428 | 50 | 5-P-1433 | 31 | 2-P-866 | 33 |
| 890*GFJ | 5-P-1428 | 50 | 5-P-1457 | 33 | 2-P-888 | 31 |
| 890*HFJ | 5-P-1428 | 50 | 5-P-1455 | 34 | 2-P-8881 | 30 |


**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

# SECTION 4



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Mounting the P.T.O. on the Transmission

Refer to HY25-1890-M1/US for Complete Installation Information

1. Begin by draining the oil from the transmission. Use caution, since the oil may be hot (**Fig. 1** ).

2. Remove the P.T.O. aperture plate with a 15mm socket (**Fig. 2**).

3. Remove the gasket and clean the aperture surface (**Fig. 3**).

**NOTE:** Do not reuse the gasket that comes with the transmission.

4. Using a screwdriver, install the dowel pins until they bottom out (**Fig. 4**)

**NOTE**: Do not use sealing compounds because they are generally incompatible with automatic transmission fluid.

5. Install the special gasket over the guide pins. The ribbed surface should face outward, toward the installer (**Fig. 5**).

**NOTE:** To ensure proper backlash and sealing of P.T.O. to transmission, only use gasket furnished with the P.T.O.

6. Install the remaining capscrews. Torque all to 40 - 50 Lbs. ft. (54 - 68 N.m. or 5.5 - 6.9 Kg.m) (**Fig. 6**).

7. Securely attach the high pressure line to the P.T.O. valve “T” fitting (1), torque to 11-12 Lbs. ft. [15-16 N.m.] (**Fig. 7**) (**Fig. 7a**).

**NOTE:** For 890 Series see SK-504 page 21 for complete plumbing installation of the transmission pressure hose and the wet spline hose.

8. Install elbow fitting supplied with P.T.O. into transmission main pressure port and torque nut to 13 - 15 Lbs. ft. or 156-180 pds-in.

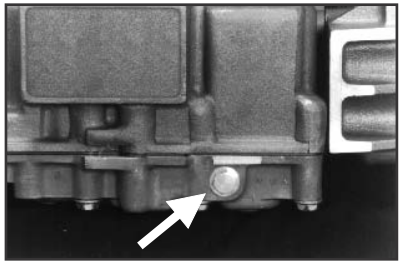


Fig. 1

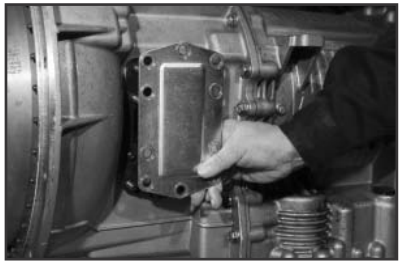


Fig. 2

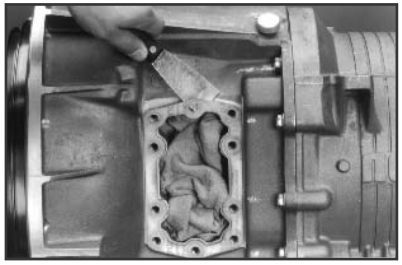


Fig. 3

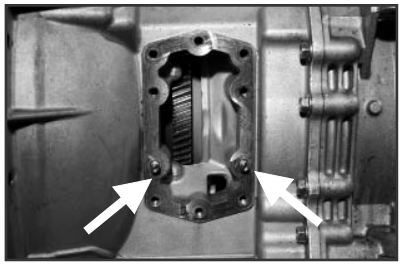


Fig. 4

Fig. 5

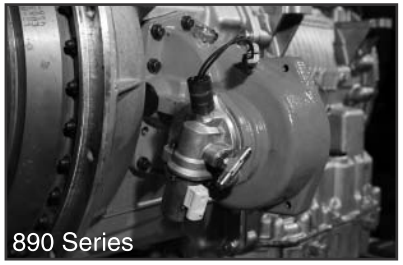


Fig. 6

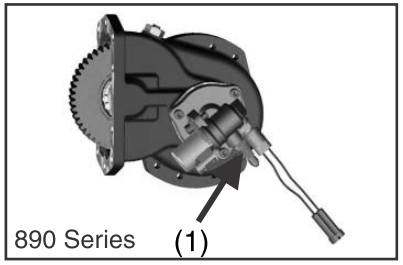


Fig. 7

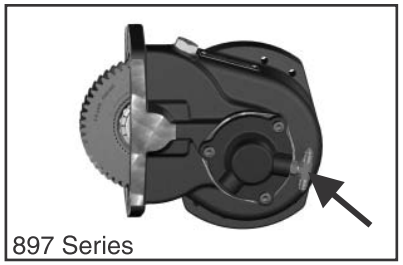


Fig. 7a



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

9. Securely attach the high pressure line to the elbow fitting at the transmission high pressure port and torque to 11-12 Lbs. ft. [15-16 N.m.]. This fitting is included with the P.T.O. (**Fig. 8**).

**NOTE:** See SK-504 page 21 for complete plumbing installation of the transmission hose and the wet spline hose.

10. The 3 bolts on the transmission that will line up with the bracket must be removed. New longer Bolts (380075 M12-1.75" x 55mm) will be used for mounting the bracket to the transmission for all transmissions except 3000 Series w/Retarders. For 3000 Series w/Retarder use bolt 380364 (M12-1.75" x 140mm) (**Fig. 9 & 9a**).

**NOTE:** See Bracket Installation Chart on page 19 of HY25-1890-M1/US Manual

11. The tube assembly is lined up and inserted into the Input Housing. As this is done, the bolts for the bracket should be started into the rear of the transmission (**Fig. 10**).

12. As soon as at least 1 bolt is started, the tube assembly cannot fall. The unit can be aligned and slipped together with the transmission taking the weight (**Fig. 11**).

**NOTE:** When attaching the tube to the input housing use 4 NEW cap screws supplied with the P.T.O.

13. The 4 Hex Head Cap Screws (378431-13, 3/8"-16 x 1.375") and flatwashers 380076-07 make the final attachment between the input housing and the tube assembly. Torque the Cap Screws to 30-35 Lbs. ft. [41-47 N.m.] (**Fig. 12**).

14. The 3 longer bolts in the transmission should be Torqued as Follows:
    3000 Family - 66-81 Lbs. ft. [90-110 N.m.]
    4000 Family - 74-89 Lbs. ft. [100-120 N.m.]
    (**Fig. 13**).

15. To complete installation of the P.T.O. see SK drawings on pages 15-17 for wiring and plumbing installation.

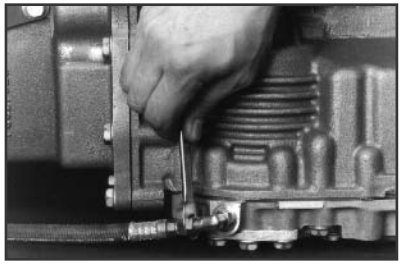


Fig. 8

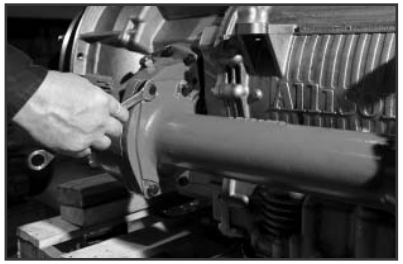


Fig. 12

Fig. 9

Fig. 9a

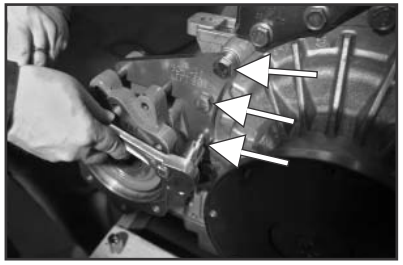


Fig. 13

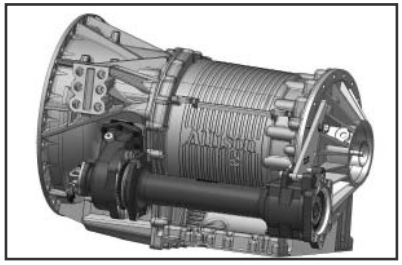


Fig. 10

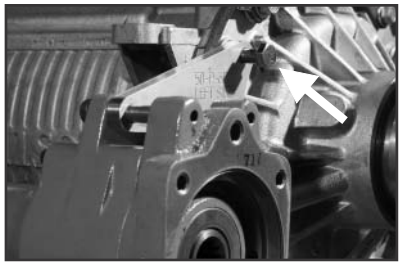


Fig. 11



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

16. When installing pumps use O-Ring supplied with P.T.O. between pump and P.T.O. output. Torque pump bolts to proper torque specifications. Refer to page 3 of HY25-1890-M1/US manual for proper pump bracket support requirements.

**NOTE:** Do not use gasket with O-Ring

As with all auxiliary power systems, there are different concerns and needs with varying applications, duty cycles, and driven equipment Chelsea endeavors to provide options that will ensure trouble free use of our products and system solutions.

For customers that would like an extra level of protection from pump seal leaks, there are double sealed pumps available from Parker to satisfy your needs. Please verify your requirements with your Parker/Chelsea P.T.O. and Pump experts.

**WARNING:** Do not run P.T.O. w/wet spline output option if pump is not installed and connected to hydraulic system. Failure to do so may damage P.T.O./ Transmission.

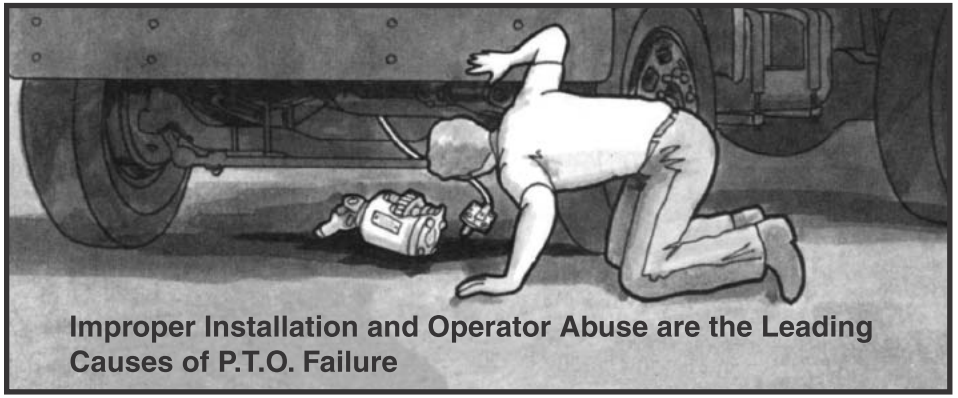


**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

# SECTION 5



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA



**Improper Installation and Operator Abuse are the Leading Causes of P.T.O. Failure**

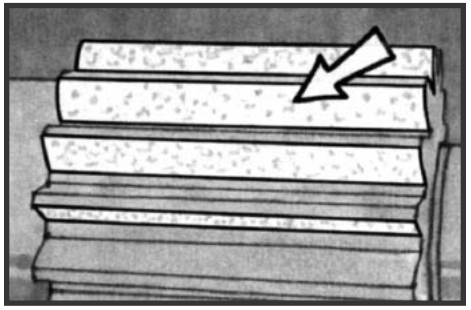
The Chelsea P.T.O. is designed and built to meet the rugged demands of the Mobile Equipment Industry. With proper use and maintenance, the Chelsea P.T.O. will provide a long service life, both on-highway and off. Yet, if a problem does arise, it is important to diagnose its causes and correct it at once.

The first place to look when troubleshooting a P.T.O. failure is in the application itself. Repeated or premature failure may be a sign of an incorrect application. This can be discovered by using the Chelsea HY25-3001/US General Information Catalog or HY25-3000/US Applications Catalog. Check to see if the proper P.T.O. was specified for the transmission, then find out if the torque handling capabilities of the P.T.O. are satisfactory for the job being done. A P.T.O. works best when it is properly specified for the transmission and job requirement.

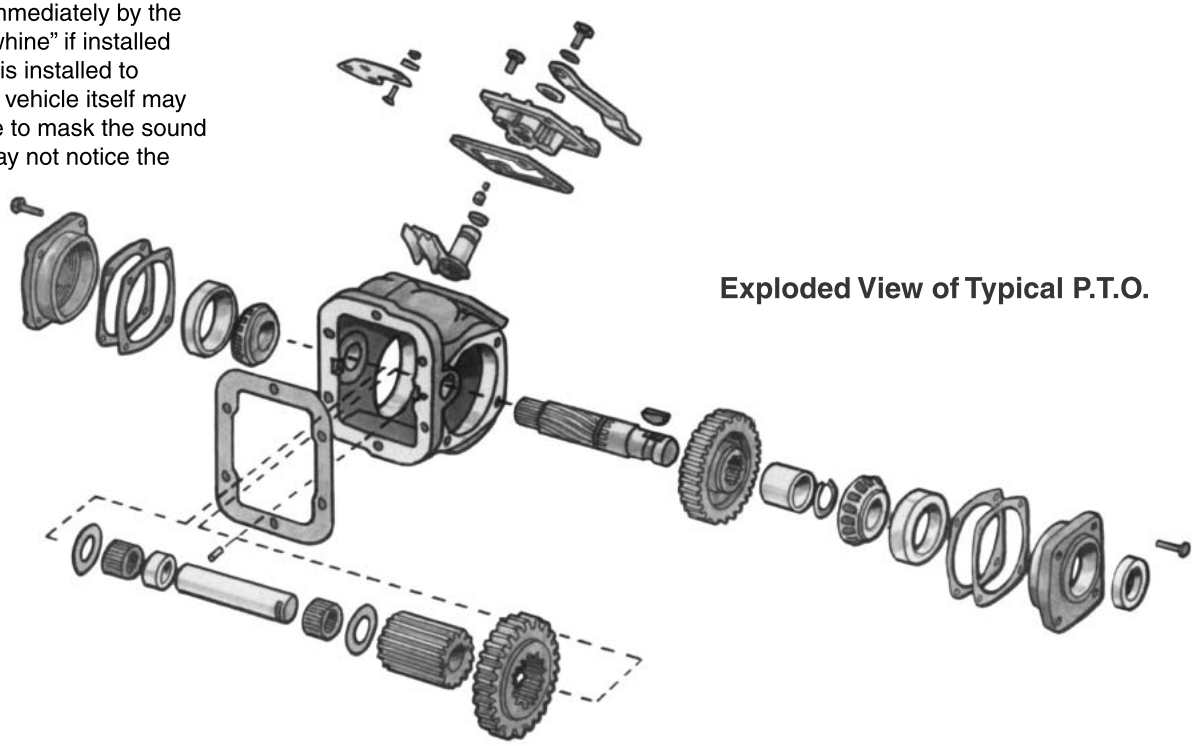
If the P.T.O. was correctly specified and then failed prematurely, there are two likely causes: improper installation and/or operator misuse. These are tough problems because they involve people as well as product. An improperly installed P.T.O. can normally be identified immediately by the sound it makes. It will “whine” if installed to tightly, or “clatter” if it is installed to loosely. Sometimes, the vehicle itself may contribute enough noise to mask the sound of the P.T.O. and one may not notice the problem.

If a problem is allowed to continue, then damage to the P.T.O. will result. A unit that has been mounted to loosely could result in broken gear teeth. A unit that is mounted too tightly could result in premature wear to the gear teeth. Also, when a P.T.O. is installed without enough filler blocks, spacers, or gaskets between it and the transmission, a deep wear pattern will occur on the gear teeth. These patterns will lead to fatigue and early tooth failure. To help prevent this from occurring, always test the P.T.O. for noise just after it is installed.

Whatever the reason for a P.T.O. failure, there will be confusion over who, or what, is at fault. More than likely the product will be blamed. Although the P.T.O. cannot defend itself, its failed parts will tell a story.



The first parts to inspect should be the gears. Check the surface of the gear teeth for signs of pitting . . . pitting is a normal wear pattern in most cases. However, contaminants in the oil or an installation that is too tight will cause severe pitting.

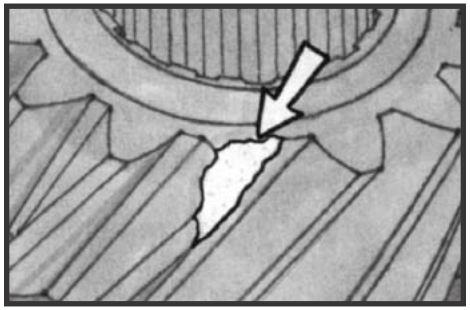


**Exploded View of Typical P.T.O.**



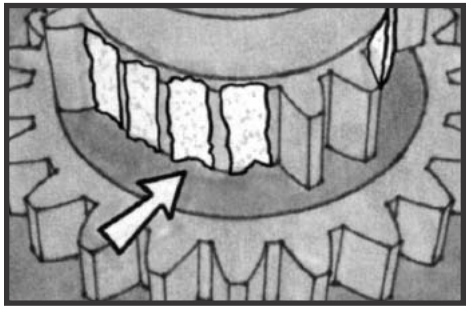
**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

Once pitting of the gear surfaces has begun, there is nothing that can stop it. Severe pitting will eventually lead to gear tooth failure, therefore the damaged gear should be replaced when a P.T.O. is repaired or rebuilt.

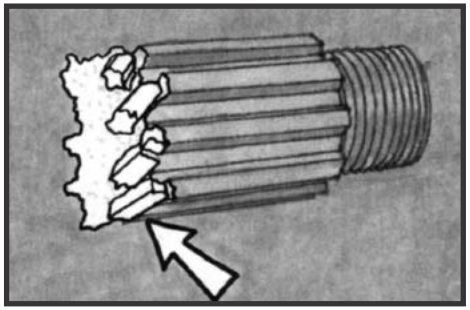


Sometimes a gear will chip a tooth because of mishandling or improper shifting. Even though a P.T.O. may continue to run with a chipped tooth, the damaged gear should be replaced immediately. It will damage the other teeth it comes in contact with during operation, not to mention the possible damage which could result from the loose chip. If the problem is allowed to continue, then failure to other parts in the P.T.O. or transmission could result.

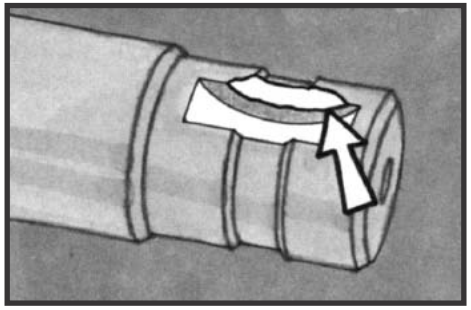
Another possible problem during vehicle operation is “shock load.” This occurs when the torque demands on a P.T.O. are suddenly greater than it was designed to take. “Shock load” could be caused by torque overloads, improper shifting, equipment failure, or excessive loads over a short period of time. If this happens, the P.T.O. is likely to fail immediately. The vehicle operator may not even be aware of the reason for the P.T.O. failure.



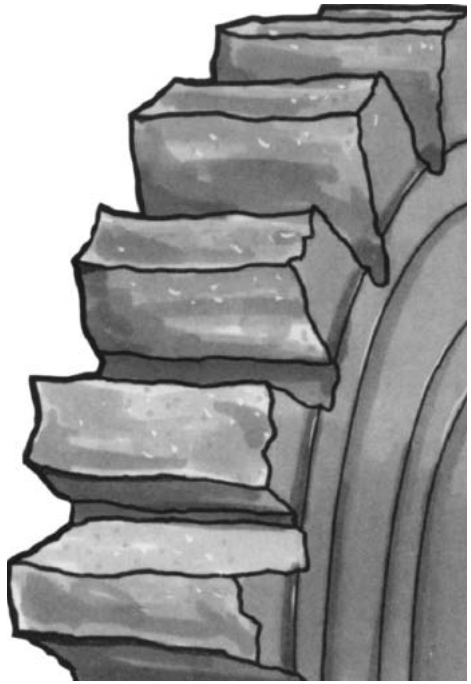
Worn gears can easily be affected by “shock load.” If the worn gears are not replaced, they can eventually lead to broken gear teeth. This is the most severe form of P.T.O. failure. Worn or damaged gears are likely to break because of their reduced load carrying capacity. To prevent the possibility of broken gear teeth, always inspect auxiliary equipment for possible freeze-up. Also, recheck P.T.O. application, operating conditions and P.T.O. installation.



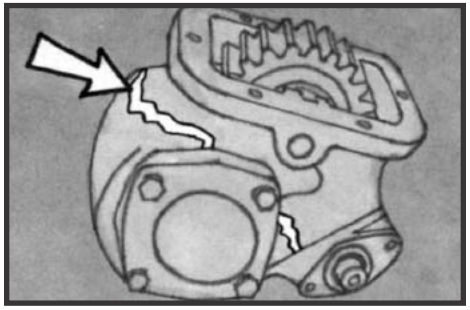
P.T.O. shafts are also vulnerable to operating abuse. If the shaft break is irregular, this usually indicates a torsional overload. Bending fatigue failure usually shows up as a smooth, flat break. To correct a P.T.O. shaft problem replace the failed shaft and check the speed and operating angle of the universal joint. Also, make sure the P.T.O. driveshaft is properly phased, (yokes in-line with each other). If a driveline is improperly installed it will cause vibration, which may lead to P.T.O. driveshaft or driven equipment problems.



When inspecting a P.T.O. output shaft, always inspect the keyway. Sometimes a P.T.O. will fail because of a displaced keyway on the shaft caused by a loose fitting yoke or equipment freeze-up. Proper maintenance on auxiliary equipment and replacing a worn yoke and/or P.T.O. driven shaft will prevent this problem.



**Deep Mesh Pattern Caused by Improper Backlash Adjustment**

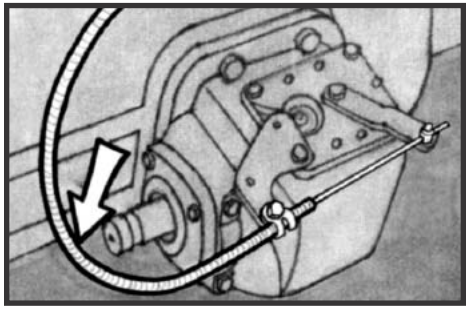


One of the most serious problems a P.T.O. can suffer is a cracked case. This condition can lead to oil loss and eventual transmission failure. Improper installation, poorly torqued bolts, or an unsupported direct mount pump can cause such a problem. A P.T.O. case can also be damaged by foreign objects meshing between the gear teeth, severe shock load, or even hitting an obstacle in the road.

Prevention is the best cure for P.T.O. case damage. Therefore, always torque the P.T.O. flange bolts in sequence and the proper specifications. Also, be sure to check the weight of the direct mount pump and, if it is over forty pounds, make a support bracket for it.

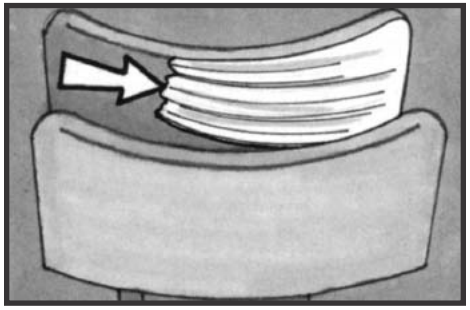


**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

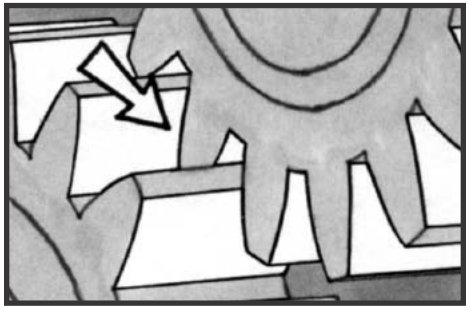


Shifting problems are sometimes a complaint an operator will have about his P.T.O. A P.T.O. that is hard to shift may be caused by a tight bend in the shifter cable, poor leverage, a gear that is installed backwards, or too tight of an installation. Many of these problems can be solved by inspecting the P.T.O. installation and making the proper adjustments regarding cable length, gear position, or shift lever.

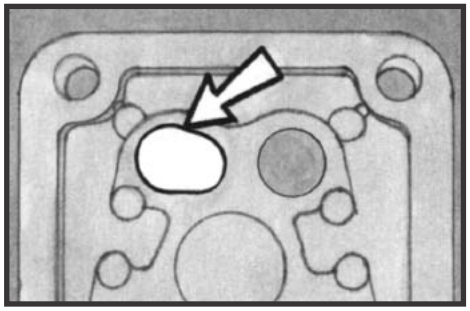
Remember, a lever-operated shift linkage should not be connected to a wire shift cover. The mechanical advantage of the lever is often too great for the wire shift cover and could severely damage it. Also inversely, don't use a cable with a lever shift cover. The cable isn't capable of transmitting the force necessary to shift a lever mechanism.



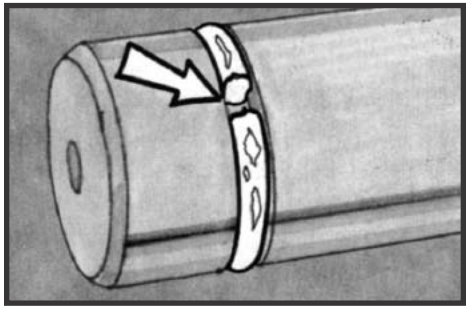
Most shifting complaints are caused by improper shifting procedure or incorrect linkage installation. Both of these situations will cause premature wear on the shift pad or fork and the shift rod or rail. To prevent this premature wear, avoid overshifting or undershifting the P.T.O. Overshifting causes the shifter fork to press against a P.T.O. gear during operation. This results in unnecessary friction and wear.



Undershifting allows incomplete gear tooth contact with the driver gear. This means only part of the tooth width is transmitting the torque and R.P.M. during P.T.O. operation. This situation can lead to gear failure or it could cause the P.T.O. to jump out of gear. These two problems can be overcome by checking linkage adjustments and proper operator training.



Shifting problems can also be caused by a worn or elongated shifter poppet hole. This causes the P.T.O. to jump out of gear and the parts in the shifter assembly to break or become loose. If this happens, replace those parts that are worn.



Seals and O-Rings may cause special problems in P.T.O. operations. Improper installation or heat build-up can cause O-Rings and seals to fail prematurely. Once seals or O-Rings fail, they should be replaced. The proper procedure for installing these parts is to lubricate them first so they will easily slide on the shaft.

| | | |
|---|---|---|
| **329644-1X** | Kit Mounting & Installation (“XS”) | |
| 379556 | Tee .438" - 20 | 1 |
| 3 AOEG5-S | Elbow 90° | 1 |
| 379964 | Adapter Restriction .438" - 20 x .125" - 27 | 1 |
| 500841-1 | Elbow .127" - 27 Pipe | 1 |
| 380071 | Capscrew SH Shoulder .375" - 16 x 3.375" | 2 |
| 380075 | Capscrew HH M12 x 1.750" x 2.170" | 3 |
| 28-P-245X | O-Ring 5.017" x .103" | 2 |
| 378431-13 | Capscrew HH .375" - 16 x 1.375" | 4 |
| SK-461 | Fitting Instructions | 1 |

| | | |
|---|---|---|
| **329644-2X** | Kit Mounting & Installation (“AF”) | |
| 379556 | Tee .438" - 20 | 1 |
| 3 AOEG5-S | Elbow 90° | 1 |
| 379964 | Adapter Restriction .438" - 20 x .125" - 27 | 1 |
| 500841-1 | Elbow .127" - 27 Pipe | 1 |
| 380071 | Capscrew SH Shoulder .375" - 16 x 3.375" | 2 |
| 380075 | Capscrew HH M12 x 1.750" x 2.170" | 3 |
| 28-P-245X | O-Ring 5.017" x .103" | 1 |
| 378431-13 | Capscrew HH .375" - 16 x 1.375" | 4 |
| SK-461 | Fitting Instructions | 1 |
| 28-P-259X | O-Ring 3.984" x .139" | 1 |

| | | |
|---|---|---|
| **328948-36X** | Kit Gasket & Installation | |
| 328946X | Caution Label Kit | 1 |
| 35-P-74 | Gasket Shim | 1 |
| 379085-2 | Instructions Label | 1 |
| 379624 | Product Warranty Card | 1 |
| HY25-1892-M1/US | Owners Manual | 1 |
| HY25-1002-M1/US | Safety Guide | 1 |

| | | |
|---|---|---|
| **7170-86X** | Kit Mounting / Stud Kit | |
| 379451 | Screw Pilot | 2 |
| 379453-10 | Capscrew M10 - 1.5" x 1.378" | 8 |
| 379486 | 90˚ Elbow | 1 |
| SK-355 | Installation | 1 |



**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Notes

**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

## Notes

**Parker Hannifin Corporation**
Chelsea Products Division
Olive Branch, MS 38654 USA

# Offer of Sale

The items described in this document and other documents and descriptions provided by Parker Hannifin Corporation, its subsidiaries and its authorized distributors ("Seller") are hereby offered for sale at prices to be established by Seller. This offer and its acceptance by any customer ("Buyer") shall be governed by all of the following Terms and Conditions. Buyer's order for any item described in its document, when communicated to Seller verbally, or in writing, shall constitute acceptance of this offer. All goods, services or work described will be referred to as "Products".

**1. Terms and Conditions.** Seller's willingness to offer Products, or accept an order for Products, to or from Buyer is subject to these Terms and Conditions or any newer version of the terms and conditions found on-line at www.parker.com/saleterms/. Seller objects to any contrary or additional terms or conditions of Buyer's order or any other document issued by Buyer.

**2. Price Adjustments; Payments.** Prices stated on Seller's quote or other documentation offered by Seller are valid for 30 days, and do not include any sales, use, or other taxes unless specifically stated. Unless otherwise specified by Seller, all prices are F.C.A. Seller's facility (INCOTERMS 2010). Payment is subject to credit approval and is due 30 days from the date of invoice or such other term as required by Seller's Credit Department, after which Buyer shall pay interest on any unpaid invoices at the rate of 1.5% per month or the maximum allowable rate under applicable law.

**3. Delivery Dates; Title and Risk; Shipment.** All delivery dates are approximate and Seller shall not be responsible for any damages resulting from any delay. Regardless of the manner of shipment, title to any products and risk of loss or damage shall pass to Buyer upon placement of the products with the shipment carrier at Seller's facility. Unless otherwise stated, Seller may exercise its judgment in choosing the carrier and means of delivery. No deferment of shipment at Buyers' request beyond the respective dates indicated will be made except on terms that will indemnify, defend and hold Seller harmless against all loss and additional expense. Buyer shall be responsible for any additional shipping charges incurred by Seller due to Buyer's acts or omissions.

**4. Warranty.** Seller warrants that all products sold, other than the 590 Series, conform to the applicable Parker Chelsea standard specification for the lesser period of 2 years (24 Months) from date of service or 2-1/2 years (30 Months) from date of build (as marked on the product name plate). Seller warrants that the 590 Series will conform to the applicable Seller standard specification for the lesser period of 2 years (24 Months) from date of service or 2000 hours of usage. The prices charged for Seller's products are based upon the exclusive limited warranty stated above, and upon the following disclaimer: **DISCLAIMER OF WARRANTY: THIS WARRANTY COMPRISES THE SOLE AND ENTIRE WARRANTY PERTAINING TO PRODUCTS PROVIDED HEREUNDER. SELLER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING DESIGN, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.**

**5. Claims; Commencement of Actions.** Buyer shall promptly inspect all Products upon delivery. No claims for shortages will be allowed unless reported to the Seller within 10 days of delivery. No other claims against Seller will be allowed unless asserted in writing within 30 days after delivery. Buyer shall notify Seller of any alleged breach of warranty within 30 days after the date the defect is or should have been discovered by Buyer. Any action based upon breach of this agreement or upon any other claim arising out of this sale (other than an action by Seller for an amount due on any invoice) must be commenced within 12 months from the date of the breach without regard to the date breach is discovered.

**6. LIMITATION OF LIABILITY. UPON NOTIFICATION, SELLER WILL, AT ITS OPTION, REPAIR OR REPLACE A DEFECTIVE PRODUCT, OR REFUND THE PURCHASE PRICE. IN NO EVENT SHALL SELLER BE LIABLE TO BUYER FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF, OR AS THE RESULT OF, THE SALE, DELIVERY, NON-DELIVERY, SERVICING, USE OR LOSS OF USE OF THE PRODUCTS OR ANY PART THEREOF, OR FOR ANY CHARGES OR EXPENSES OF ANY NATURE INCURRED WITHOUT SELLER'S WRITTEN CONSENT, EVEN IF SELLER HAS BEEN NEGLIGENT, WHETHER IN CONTRACT, TORT OR OTHER LEGAL THEORY. IN NO EVENT SHALL SELLER'S LIABILITY UNDER ANY CLAIM MADE BY BUYER EXCEED THE PURCHASE PRICE OF THE PRODUCTS.**

**7. User Responsibility.** The user, through its own analysis and testing, is solely responsible for making the final selection of the system and Product and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application and follow applicable industry standards and Product information. If Seller provides Product or system options, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the Products or systems.

**8. Loss to Buyer's Property.** Any designs, tools, patterns, materials, drawings, confidential information or equipment furnished by Buyer or any other items which become Buyer's property, will be considered obsolete and may be destroyed by Seller after two consecutive years have elapsed without Buyer ordering the items manufactured using such property. Seller shall not be responsible for any loss or damage to such property while it is in Seller's possession or control.

**9. Special Tooling.** A tooling charge may be imposed for any special tooling, including without limitation, dies, fixtures, molds and patterns, acquired to manufacture Products. Such special tooling shall be and remain Seller's property notwithstanding payment of any charges by Buyer. In no event will Buyer acquire any interest in apparatus belonging to Seller which is utilized in the manufacture of the Products, even if such apparatus has been specially converted or adapted for such manufacture and notwithstanding any charges paid by Buyer. Unless otherwise agreed, Seller shall have the right to alter, discard or otherwise dispose of any special tooling or other property in its sole discretion at any time.

**10. Buyer's Obligation; Rights of Seller.** To secure payment of all sums due or otherwise, Seller shall retain a security interest in the goods delivered and this agreement shall be deemed a Security Agreement under the Uniform Commercial Code. Buyer authorizes Seller as its attorney to execute and file on Buyer's behalf all documents Seller deems necessary to perfect its security interest.

**11. Improper use and Indemnity.** Buyer shall indemnify, defend, and hold Seller harmless from any claim, liability, damages, lawsuits, and costs (including attorney fees), whether for personal injury, property damage, patent, trademark or copyright infringement or any other claim, brought by or incurred by Buyer, Buyer's employees, or any other person, arising out of: (a) improper selection, improper application or other misuse of Products purchased by Buyer from Seller; (b) any act or omission, negligent or otherwise, of Buyer; (c) Seller's use of patterns, plans, drawings, or specifications furnished by Buyer to manufacture Product; or (d) Buyer's failure to comply with these terms and conditions. Seller shall not indemnify Buyer under any circumstance except as otherwise provided.

**12. Cancellations and Changes.** Orders shall not be subject to cancellation or change by Buyer for any reason, except with Seller's written consent and upon terms that will indemnify, defend and hold Seller harmless against all direct, incidental and consequential loss or damage. Seller may change product features, specifications, designs and availability with notice to Buyer.

**13. Limitation on Assignment.** Buyer may not assign its rights or obligations under this agreement without the prior written consent of Seller.

**14. Force Majeure.** Seller does not assume the risk and shall not be liable for delay or failure to perform any of Seller's obligations by reason of circumstances beyond the reasonable control of Seller (hereinafter "Events of Force Majeure"). Events of Force Majeure shall include without limitation: accidents, strikes or labor disputes, acts of any government or government agency, acts of nature, delays or failures in delivery from carriers or suppliers, shortages of materials, or any other cause beyond Seller's reasonable control.

**15. Waiver and Severability.** Failure to enforce any provision of this agreement will not waive that provision nor will any such failure prejudice Seller's right to enforce that provision in the future. Invalidation of any provision of this agreement by legislation or other rule of law shall not invalidate any other provision herein. The remaining provisions of this agreement will remain in full force and effect.

**16. Termination.** Seller may terminate this agreement for any reason and at any time by giving Buyer thirty (30) days written notice of termination. Seller may immediately terminate this agreement, in writing, if Buyer: (a) commits a breach of any provision of this agreement (b) appointments a trustee, receiver or custodian for all or any part of Buyer's property (c) files a petition for relief in bankruptcy on its own behalf, or by a third party (d) makes an assignment for the benefit of creditors, or (e) dissolves or liquidates all or a majority of its assets.

**17. Governing Law.** This agreement and the sale and delivery of all Products hereunder shall be deemed to have taken place in and shall be governed and construed in accordance with the laws of the State of Ohio, as applicable to contracts executed and wholly performed therein and without regard to conflicts of laws principles. Buyer irrevocably agrees and consents to the exclusive jurisdiction and venue of the courts of Cuyahoga County, Ohio with respect to any dispute, controversy or claim arising out of or relating to this agreement.

**18. Indemnity for Infringement of Intellectual Property Rights.** Seller shall have no liability for infringement of any patents, trademarks, copyrights, trade dress, trade secrets or similar rights except as provided in this Section. Seller will defend and indemnify Buyer against allegations of infringement of U.S. patents, U.S. trademarks, copyrights, trade dress and trade secrets ("Intellectual Property Rights"). Seller will defend at its expense and will pay the cost of any settlement or damages awarded in an action brought against Buyer based on an allegation that a Product sold pursuant to this Agreement infringes the Intellectual Property Rights of a third party. Seller's obligation to defend and indemnify Buyer is contingent on Buyer notifying Seller within ten (10) days after Buyer becomes aware of such allegations of infringement, and Seller having sole control over the defense of any allegations or actions including all negotiations for settlement or compromise. If a Product is subject to a claim that it infringes the Intellectual Property Rights of a third party, Seller may, at its sole expense and option, procure for Buyer the right to continue using the Product, replace or modify the Product so as to make it noninfringing, or offer to accept return of the Product and return the purchase price less a reasonable allowance for depreciation. Notwithstanding the foregoing, Seller shall have no liability for claims of infringement based on information provided by Buyer, or directed to Products delivered hereunder for which the designs are specified in whole or part by Buyer, or infringements resulting from the modification, combination or use in a system of any Product sold hereunder. The foregoing provisions of this Section shall constitute Seller's sole and exclusive liability and Buyer's sole and exclusive remedy for infringement of Intellectual Property Rights.

**19. Entire Agreement.** This agreement contains the entire agreement between the Buyer and Seller and constitutes the final, complete and exclusive expression of the terms of sale. All prior or contemporaneous written or oral agreements or negotiations with respect to the subject matter are herein merged.

**20. Compliance with Law, U. K. Bribery Act and U.S. Foreign Corrupt Practices Act.** Buyer agrees to comply with all applicable laws and regulations, including both those of the United Kingdom and the United States of America, and of the country or countries of the Territory in which Buyer may operate, including without limitation the U. K. Bribery Act, the U.S. Foreign Corrupt Practices Act ("FCPA") and the U.S. Anti-Kickback Act (the "Anti-Kickback Act"), and agrees to indemnify and hold harmless Seller from the consequences of any violation of such provisions by Buyer, its employees or agents. Buyer acknowledges that they are familiar with the provisions of the U. K. Bribery Act, the FCPA and the Anti-Kickback Act, and certifies that Buyer will adhere to the requirements thereof. In particular, Buyer represents and agrees that Buyer shall not make any payment or give anything of value, directly or indirectly to any governmental official, any foreign political party or official thereof, any candidate for foreign political office, or any commercial entity or person, for the purpose of influencing such person to purchase products or otherwise benefit the business of Seller.

07/14

# Parker Worldwide

## Europe, Middle East, Africa

**AE – United Arab Emirates,** Dubai
Tel: +971 4 8127100
parker.me@parker.com

**AT – Austria,** Wiener Neustadt
Tel: +43 (0)2622 23501-0
parker.austria@parker.com

**AT – Eastern Europe,** Wiener Neustadt
Tel: +43 (0)2622 23501 900
parker.easteurope@parker.com

**AZ – Azerbaijan,** Baku
Tel: +994 50 22 33 458
parker.azerbaijan@parker.com

**BE/LU – Belgium,** Nivelles
Tel: +32 (0)67 280 900
parker.belgium@parker.com

**BG – Bulgaria,** Sofia
Tel: +359 2 980 1344
parker.bulgaria@parker.com

**BY – Belarus,** Minsk
Tel: +375 17 209 9399
parker.belarus@parker.com

**CH – Switzerland,** Etoy
Tel: +41 (0)21 821 87 00
parker.switzerland@parker.com

**CZ – Czech Republic,** Klecany
Tel: +420 284 083 111
parker.czechrepublic@parker.com

**DE – Germany,** Kaarst
Tel: +49 (0)2131 4016 0
parker.germany@parker.com

**DK – Denmark,** Ballerup
Tel: +45 43 56 04 00
parker.denmark@parker.com

**ES – Spain,** Madrid
Tel: +34 902 330 001
parker.spain@parker.com

**FI – Finland,** Vantaa
Tel: +358 (0)20 753 2500
parker.finland@parker.com

**FR – France,** Contamine s/Arve
Tel: +33 (0)4 50 25 80 25
parker.france@parker.com

**GR – Greece,** Athens
Tel: +30 210 933 6450
parker.greece@parker.com

**HU – Hungary,** Budaoers
Tel: +36 23 885 470
parker.hungary@parker.com

**IE – Ireland,** Dublin
Tel: +353 (0)1 466 6370
parker.ireland@parker.com

**IT – Italy,** Corisico (MI)
Tel: +39 02 45 19 21
parker.italy@parker.com

**KZ – Kazakhstan,** Almaty
Tel: +7 7273 561 000
parker.easteurope@parker.com

**NL – The Netherlands,** Oldenzaal
Tel: +31 (0)541 585 000
parker.nl@parker.com

**NO – Norway,** Asker
Tel: +47 66 75 34 00
parker.norway@parker.com

**PL – Poland,** Warsaw
Tel: +48 (0)22 573 24 00
parker.poland@parker.com

**PT – Portugal,** Leca de Palmeira
Tel: +351 22 999 7360
parker.portugal@parker.com

**RO – Romania,** Bucharest
Tel: +40 21 252 1382
parker.romania@parker.com

**RU – Russia,** Moscow
Tel: +7 495 645-2156
parker.russia@parker.com

**SE – Sweden,** Spånga
Tel: +46 (0)8 59 79 50 00
parker.sweden@parker.com

**SK – Slovakia,** Banská Bystrica
Tel: +421 484 162 252
parker.slovakia@parker.com

**SL – Slovenia,** Novo Mesto
Tel: +386 7 337 6650
parker.slovenia@parker.com

**TR – Turkey,** Istanbul
Tel: +90 216 4997081
parker.turkey@parker.com

**UA – Ukraine,** Kiev
Tel: +380 44 494 2731
parker.ukraine@parker.com

**UK – United Kingdom,** Warwick
Tel: +44 (0)1926 317 878
parker.uk@parker.com

**ZA – South Africa,** Kempton Park
Tel: +27 (0)11 961 0700
parker.southafrica@parker.com

## North America

**CA – Canada,** Milton, Ontario
Tel: +1 905 693 3000

**MX – Mexico,** Toluca
Tel: +52 72 2275 4200

## Asia Pacific

**AU – Australia,** Castle Hill
Tel: +61 (0)2-9634 7777

**CN – China,** Shanghai
Tel: +86 21 2899 5000

**HK – Hong Kong**
Tel: +852 2428 8008

**IN – India,** Mumbai
Tel: +91 22 6513 7081-85

**JP – Japan,** Fujisawa
Tel: +81 (0)4 6635 3050

**KR – South Korea,** Seoul
Tel: +82 2 559 0400

**MY – Malaysia,** Shah Alam
Tel: +60 3 7849 0800

**NZ – New Zealand,** Mt Wellington
Tel: +64 9 574 1744

**SG – Singapore**
Tel: +65 6887 6300

**TH – Thailand,** Bangkok
Tel: +662 717 8140

**TW – Taiwan,** New Taipei City
Tel: +886 2 2298 8987

## South America

**AR – Argentina,** Buenos Aires
Tel: +54 3327 44 4129

**BR – Brazil,** Cachoeirinha RS
Tel: +55 51 3470 9144

**CL – Chile,** Santiago
Tel: +56 2 623 1216

**Pan Am,** Miami
Tel: +1 305-470-8800

© 2015 Parker Hannifin Corporation

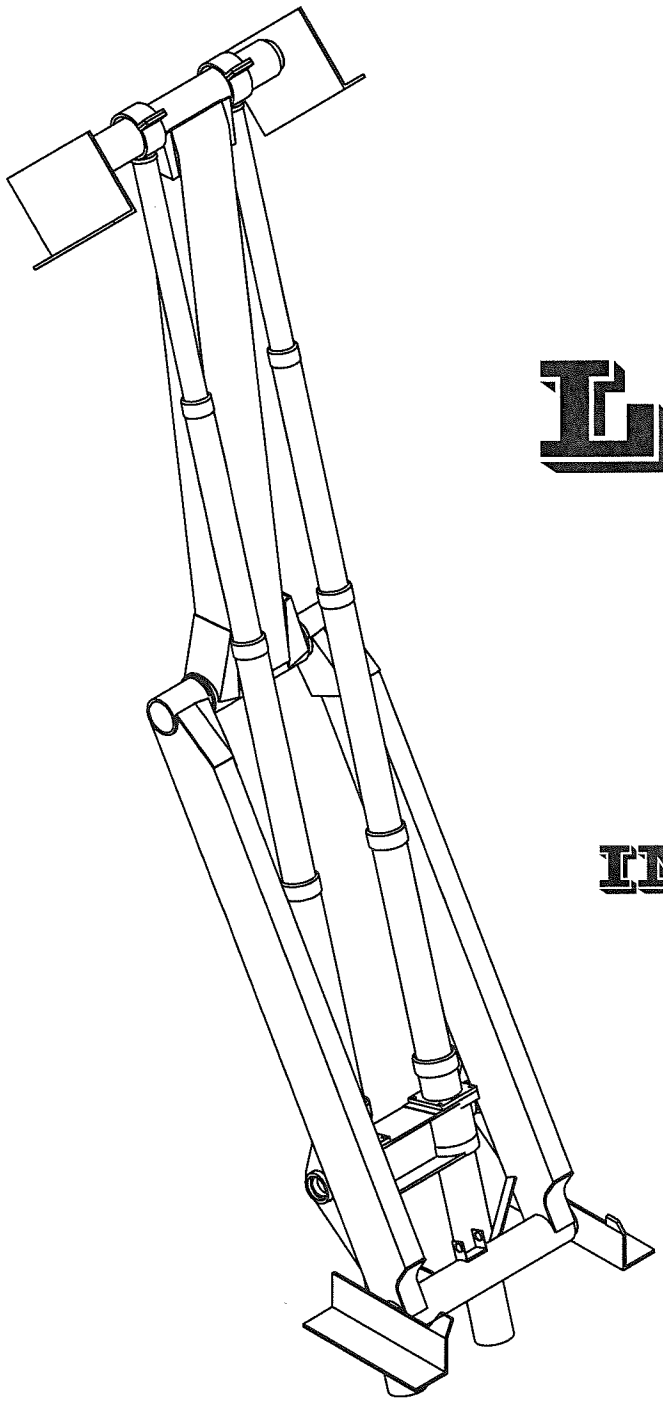
Supersedes HY25-6890-M1/US August 2014 HY25-6890-M1/US May 2015

**Parker Hannifin Corporation**
Chelsea Products Division
8225 Hacks Cross Road
Olive Branch, Mississippi 38654 USA
Tel: (662) 895-1011
Fax: (662) 895-1069
www.parker.com/chelsea

Parker | Chelsea

# Scott™

# LEVEL LIFT



# LL-3000

## INSTALLATION AND OPERATION

### SPECIFICATIONS

CYLINDER STAGES.....3 7/8", 3 3/8", 2 7/8", 2 3/8"

STROKE.....110 3/4"

PUMPS SET AT.....3500 PSI

FORM #125-760

# IMPORTANT INFORMATION

**Congratulations on your recent purchase of a Scott Hoist! This manual is only a small part of Tafco's continuing effort to serve our customers and bring the best products possible to you the customer. If you have any questions or experience any problems, contact your local Scott Hoist distributor.**

**This manual has been prepared to provide the owner and operator with the information required to properly install and operate the Scott Hoist and pump unit. It is important that you, the owner or operator, read this manual prior to installing, operating or performing any maintenance work on the unit.**

**For your convenience, we have provided this space for you to record your hoist and pump model and serial numbers and date of purchase as well as your dealership name and address.**

**Some of the information below is needed for ordering parts. Please fill in the information for faster service when ordering.**

**NOTE: Hoist serial number is located in the scissor hinge tube.**

**OWNERS NAME:**_____

**OWNERS ADDRESS:**_____

**HOIST MODEL NUMBER:**_____

**HOIST SERIAL NUMBER:**_____

**PUMP MODEL NUMBER:**_____

**PUMP SERIAL NUMBER:**_____

**PURCHASE DATE:**_____

**DEALER NAME:**_____

**DEALER ADDRESS:**_____

**DEALER TELEPHONE NUMBER:**_____

# CAPACITY CHART (TONS)

# LL3000 HOIST (SCISSOR HINGE BACK)

| BOX LENGTH (FEET) | CAB TO TRUNNION (INCHES) | OVER-HANG (INCHES) | DUMP ANGLE / MOUNTING LENGTH | | | | |
|---|---|---|---|---|---|---|---|
| | | | 35° / 230" | 40° / 202.25" | 45° / 181" | 50° / 164" | 55° / 150.4" |
| 18 | 151 | 12 | 45.31 | 39.93 | 35.76 | 32.45 | 29.77 |
| 18 | 139 | 24 | 51.78 | 45.63 | 40.87 | 37.08 | 34.02 |
| 18 | 127 | 36 | 60.41 | 53.24 | 47.68 | 43.26 | 39.96 |
| 20 | 175 | 12 | 40.28 | 35.49 | 31.79 | 28.84 | 26.46 |
| 20 | 163 | 24 | 45.31 | 39.93 | 35.76 | 32.45 | 29.77 |
| 20 | 151 | 36 | 51.78 | 45.63 | 40.87 | 37.08 | 34.02 |
| 22 | 191 | 12 | 36.25 | 31.94 | 28.61 | 25.96 | 23.81 |
| 22 | 187 | 24 | 40.28 | 35.49 | 31.79 | 28.84 | 26.46 |
| 22 | 175 | 36 | 45.31 | 39.93 | 35.76 | 32.45 | 29.77 |
| 24 | 223 | 12 | 32.95 | 29.04 | 26.01 | 23.60 | 21.65 |
| 24 | 211 | 24 | 36.25 | 31.94 | 28.61 | 25.96 | 23.81 |
| 24 | 199 | 36 | 40.28 | 35.49 | 31.79 | 28.84 | 26.46 |
| 26 | 247 | 12 | 30.21 | 26.62 | 23.84 | 21.63 | 19.85 |
| 26 | 235 | 24 | 32.95 | 29.04 | 26.01 | 23.60 | 21.65 |
| 26 | 223 | 36 | 36.25 | 31.94 | 28.61 | 25.96 | 23.81 |

NOTE: CAPACITY IN TONS AT 3500 PSI.

NOTE: (1) OVERHANG BASED ON 55" FROM CENTER LINE OF TAIL HINGE PIN TO CENTER LINE OF TRUCK TRUNNION, WITH A 2" CLEARANCE BETWEEN CAB AND BODY.

NOTE: (2) CAPACITIES GIVEN INCLUDE BODY WEIGHT PLUS PAYLOAD WEIGHT, AND ASSUME PAYLOAD TO BE CENTERED IN BODY FRONT TO BACK.

| MAXIMUM DUMP ANGLE CHART | | |
|---|---|---|
| DUMP ANGLE | MAXIMUM OVERHANG* | |
| 35 degrees | 59 inches | (62 1/2 inches) |
| 40 degrees | 52 1/2 inches | (56 inches) |
| 45 degrees | 48 inches | (50 1/2 inches) |
| 50 degrees | 44 inches | (46 1/2 inches) |
| 55 degrees | 41 1/2" | (43 1/2 inches) |

*Overhang is based upon 34 inches loaded frame height.
(36 inch loaded frame height shown in parenthesis.)

# INSTALLATION TIPS

1. **The hoist can be mounted with the Scissor Hinge either fore or aft for mounting versatility.**

2. **Plan how the hoist, safety prop, and pump will fit on the truck. The mounting area of the hoist must allow for proper movement of the hoist/ pump without interfering with truck cross members, fuel or air tanks etc.**

3. **The hoist upper mounts are positioned up between the bed cross sills. It may be necessary to shift the hoist slightly to avoid cutting or moving the bed cross sills. Keep in mind that this will slightly effect the hoist dump angle and capacity.**

4. **Determine where the PTO and pump can be located. The pump/ reservoir position will determine how the hoist will be plumbed. Keep the cylinder, pump and reservoir away from heat sources such as exhaust pipes.**

5. **Tilt cabs may require greater cab to bed clearance. This is necessary to allow the truck cab (when tilted) to clear the bed. Also any other obstruction (air cleaner stack, exhaust pipes, etc.) must be 2 inches or more from the bed being installed.**

6. **Take time to become familiar with all hoist parts and how they are to be mounted.**

7. **All work should be performed by qualified personnel.**

8. **Insure that this manual along with the pump installation manual are forwarded to the end user.**

9. **Never modify the hoist in any way. Install the hoist according to the installation manual.**

10. **These instructions are for typical installations. If your requirements are different due to body and truck configuration, it is the responsibility of the installer to insure the installation is completed correctly.**

**READ ALL PROVIDED MATERIAL AND SAFETY INSTRUCTIONS BEFORE INSTALLING HOIST!**

# LL-3000 HOIST INSTALLATION INSTRUCTIONS

1. Mount the tail hinge assembly. For a tandem axle truck the tail hinge is mounted as follows: The distance from the center of the pivot pin of the hinge assembly to the rear edge of the rear tire should be 0 to 2 inches. (see page 10) This placement will give a distance of approximately 44 inches from the center of the trunnion to the center of the tail hinge pin. (For single axle trucks, the distance from the front of the tail hinge to the rear spring hanger should be 1 to 6 inches). The tail hinge is placed close to the axle to avoid frame damage and to prevent severe weight transfer from the front of the rear wheels when dumping. After placement of the tail hinge is determined, cut out the top rear section of the frame, in which the tail hinge will set (see page 9). The hinge should be mounted flush with the top and end of the frame. It may be necessary to cut off the excess length of the truck frame. After the hinge assembly is in place, insure that the tail hinge is square with the truck frame. Weld the assembly securely to the frame.

2. Insert lower frame mounts and top hoist mounts into the hoist frame. Make sure the lower mount guide tabs are facing away from the scissor hinge. Insert cylinders into hoist saddle and bolt securely. Bolt cylinder top mounts to upper hoist tube. Note the proper orientation of the cylinder top mount ears as shown on page 10. After doing so, place the hoist on the truck frame in the position it is to be mounted. Refer to the mounting chart on page 3 for the mounting length (ML) at which the hoist is to be positioned.
   The mounting length is the distance from the center of the tail hinge hinge pin to the center of the hoist lower mount tube. The hoist can be mounted in the standard or reverse installation (shown on page 10) to allow for cylinder swing clearances.
   IMPORTANT: SO NOT WELD OR FASTEN LOWER MOUNTS TO TRUCK FRAME AT THIS TIME !

3. Determine if the Bed cross members will interfere with hoist upper mount plates when the bed is positioned on the truck frame with 2-3 inch of clearance between the cab and bed. If necessary, slide the hoist either fore or aft to allow hoist upper mount plates fall between bed cross members. (Note that moving the hoist towards the truck cab will increase capacity but decrease the dump angle and opposite results occur when moving the hoist away from the truck cab.
   IN THE EVENT THAT A CROSS MEMBER MUST BE NOTCHED TO ALLOW FOR THE PROPER POSITIONING OF THE HOIST, IT IS ADVISABLE TO INSERT A CROSS CHANNEL BETWEEN THE LONG BEAMS HUST TO THE FORE AND AFT OF THE HOIST. THE CROSS CHANNEL WILL BE 1" SMALLER THAN THE SIZE OF THE LONG BEAM. See page 9.

4. If the hoist hinging end in not supported by a truck frame cross member, install a support channel near the hinging end of the hoist frame. Hoist frame should run level along length of the truck frame. (see page 10).

5. Make sure that the hoist is square with the truck frame. Before attaching the lower mount angles, recheck for any possible interference (cylinder swing, etc.). Clamp the lower mount angles to the to the lower hoist mounts and weld the full length of the lower mount. Drill and bolt the lower mount angles to the side of the truck frame. DO NOT WELD THE LOWER MOUNTS TO THE TRUCK FRAME.

6. Mount the pump and reservoir at this time. Refer to the pump installation instructions in this manual (pages 15 & 17) and supplied with your pump and reservoir. Insure that proper clearance is provided with all hose, cable and PTO mounting.

7. Lower the truck bed onto the truck frame, positioning it exactly as it will be mounted when lowered. Recheck cab to bed clearance, bed cross member positioning and rear hinge positioning to insure proper location. Weld the vertical plate assembly of the tail hinge to the long beam of the bed. Refer to diagram on page 9 for proper mounting. Diagram also shows proper mounting on beds with aluminum long beams.

8. There are two methods to attach the upper hoist mounts to the bed long beams, shown on page 8. One method is to bolt the upper mount to the long beam and the other is to weld the upper mount to the long beam.
Both methods require a ¼ inch diagonal plate to be installed to the long beam, centered on the upper mount location. This will prevent the upper mount from rolling under. This plate is furnished by the installer due to the variety of long beam sizes.
   A. For bolt-on applications, a stringer plate must be welded to the upper mount. This allows for the upper mount to be bolted to the long beam. See page 8. Drill and bolt the stringer attachment plate to the long beam. It may be necessary to raise the bed to complete bolting of the upper mount. Be sure to properly block the bed when doing so.
   B. For applications in which the upper mount is welded, it can be welded in place as shown on page 8.

9. Connect the hydraulic hoses and fittings supplied with your hoist and pump. Use Loctite Hydraulic Sealant on all threaded NPT pipe joints. Fill the reservoir with a recommended fluid, as listed in the maintenance portion of this manual.

10. Grease all hoist, tail hinge and drive line grease fittings. This will prevent damage and insure smooth operation.

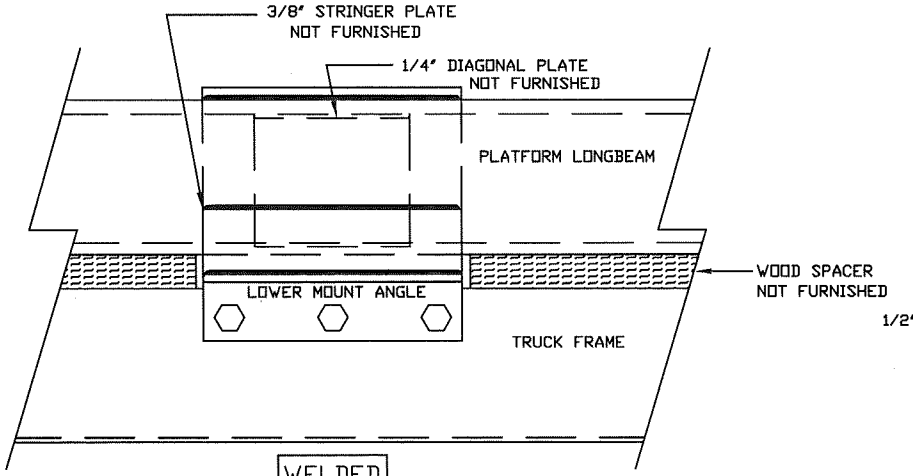
11. **Slowly raise the bed in steps, checking for clearance of all hoist and drive line components. Raising the hoist and stopping it in several positions to check for clearance will help prevent damage to the truck and hoist.**

12. **If the hoist is operation with no clearance problems, then raise the hoist to half the dump angle. SUPPORT THE BED WITH A SUITABLE OVERHEAD HOIST TO PREVENT LOWERING OT THE TRUCK BED. Fill the reservoir tank ¾ full of the recommended fluid. Continue to raise the hoist fully. Unhook the overhead hoist and lower the truck bed.**

13. **Raise and lower the hoist several times. Check the fluid in the reservoir according to the pump installation instructions.**

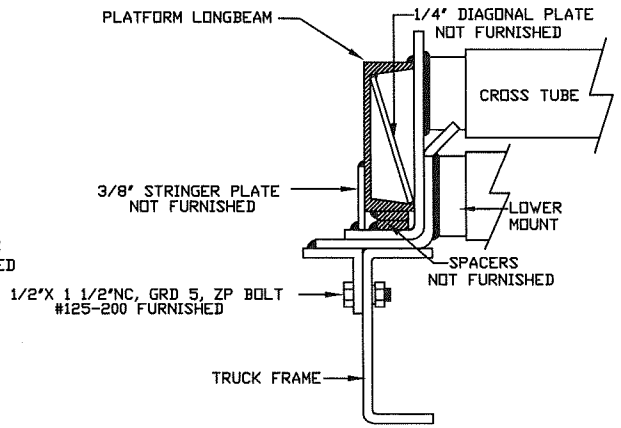
14. **ALL INSTALLATIONS MUST INCLUDE A SAFETY PROP. THE SAFETY PROP IS ONLY INTENDED TO SUPPORT AN EMPTY BODY AND IS NOT INTENDED TO BE USED WITH A LOADED BODY. Refer to page 14 in this manual for the safety prop mounting instructions.**

## NOTE: INSTALL AND OBSERVE ALL SAFETY AND WARNING DECALS SHOWN ON PAGE 11.



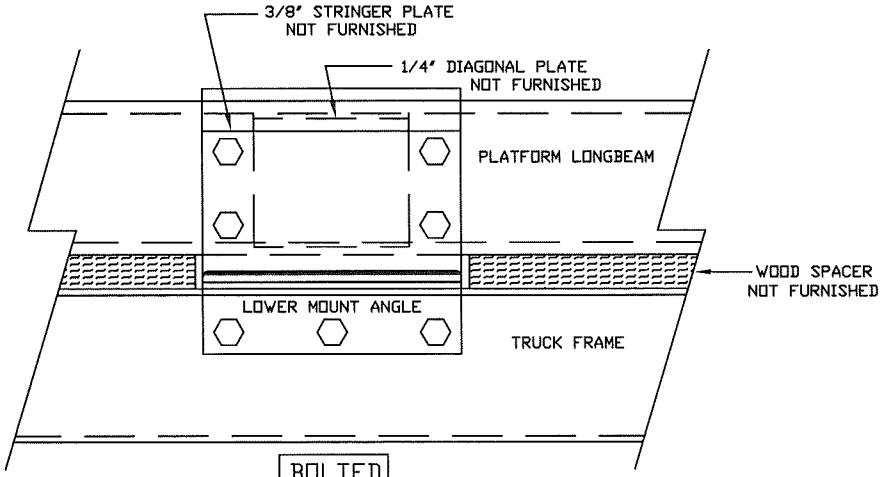

WELDED

SIDE VIEW



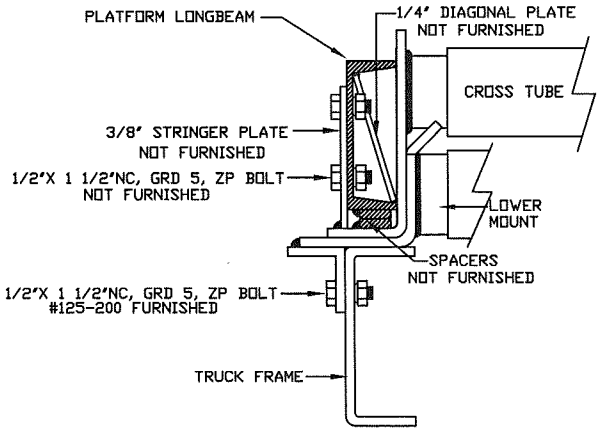

WELDED

END VIEW




BOLTED

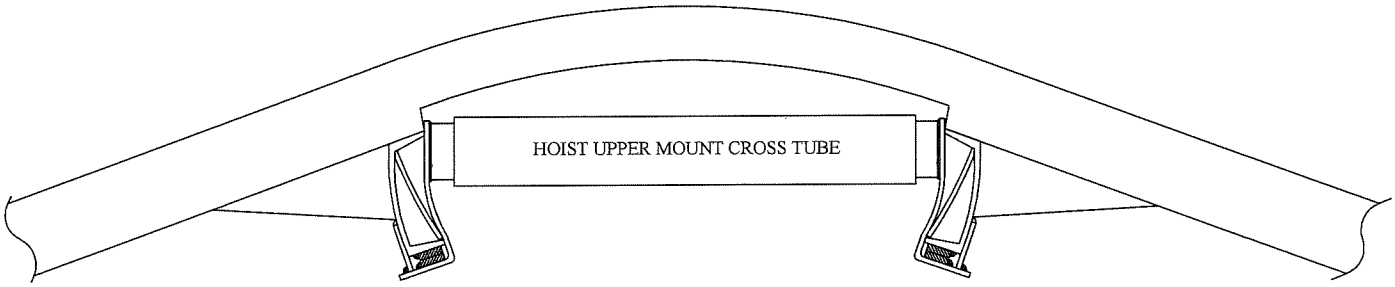
SIDE VIEW




BOLTED

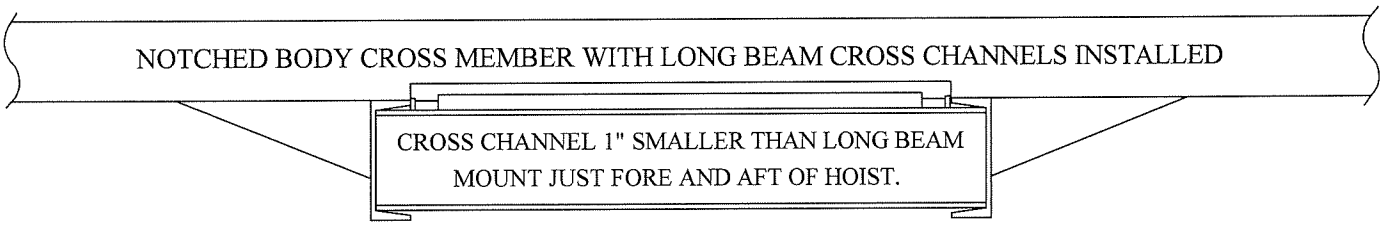
END VIEW

ON GRAIN BODIES, IT IS RECOMMENDED THAT CROSS CHANNELS BE INSTALLED BETWEEN THE BODY LONG BEAMS. MOUNT ONE CROSS CHANNEL DIRECTLY IN FRONT OF HOIST UPPER MOUNT PLATES AND ONE DIRECTLY BEHIND HOIST AS SHOWN BELOW. WELD CROSS CHANNELS SECURELY TO BODY LONG BEAMS.



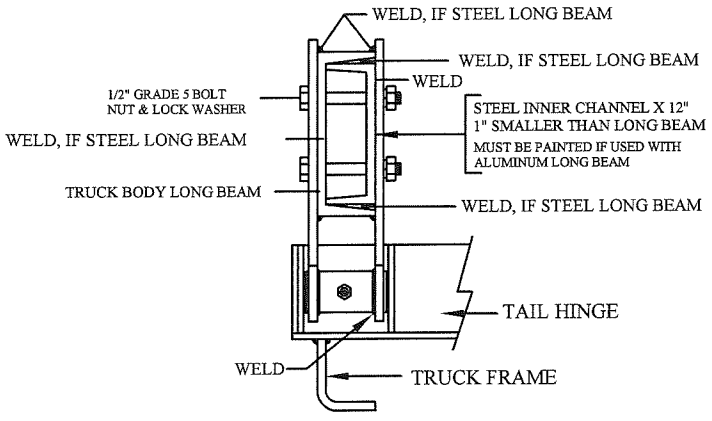

NOTCHED BODY CROSS MEMBER WITHOUT LONG BEAM CROSS CHANNELS INSTALLED

END VIEW

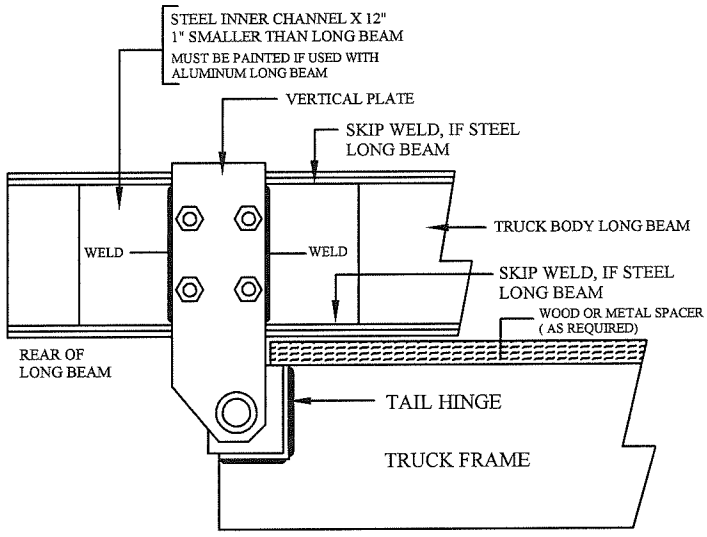



CROSS CHANNELS NOT FURNISHED

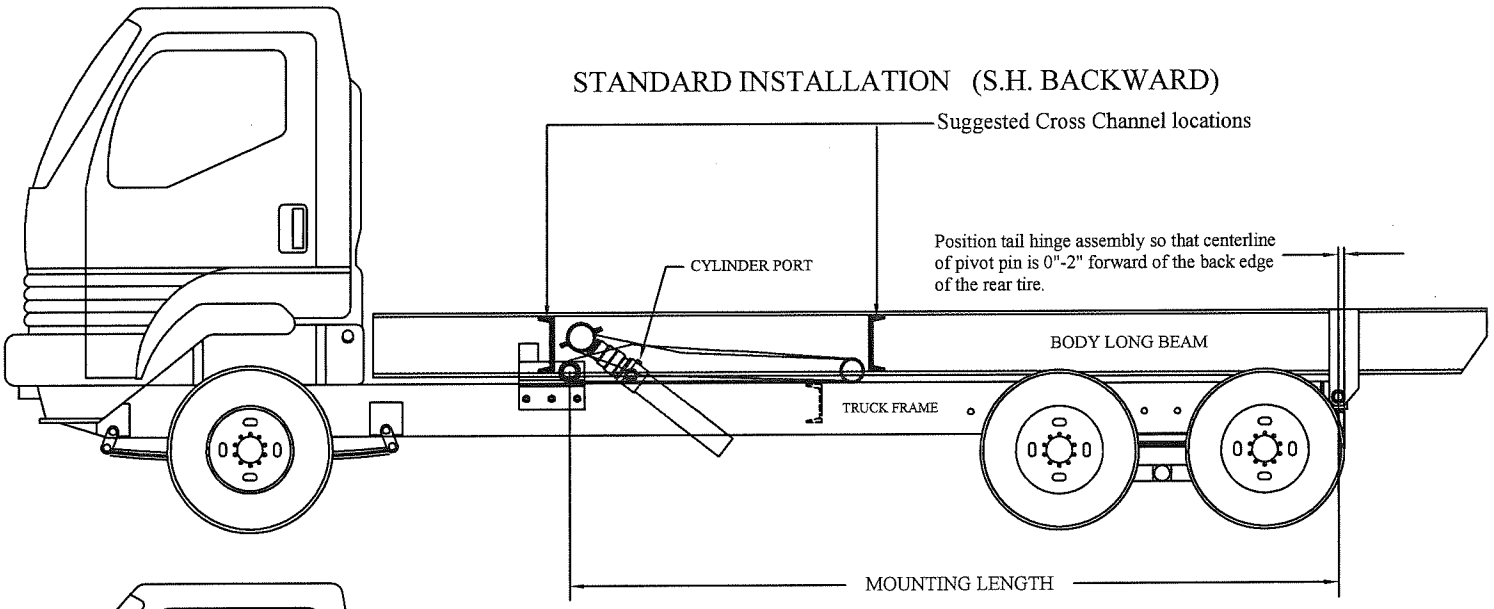
**FAILURE TO PROPERLY MOUNT AND REINFORCE THE TRUCK BODY AND HOIST COULD VOID THE BODY AND HOIST WARRANTY!!**



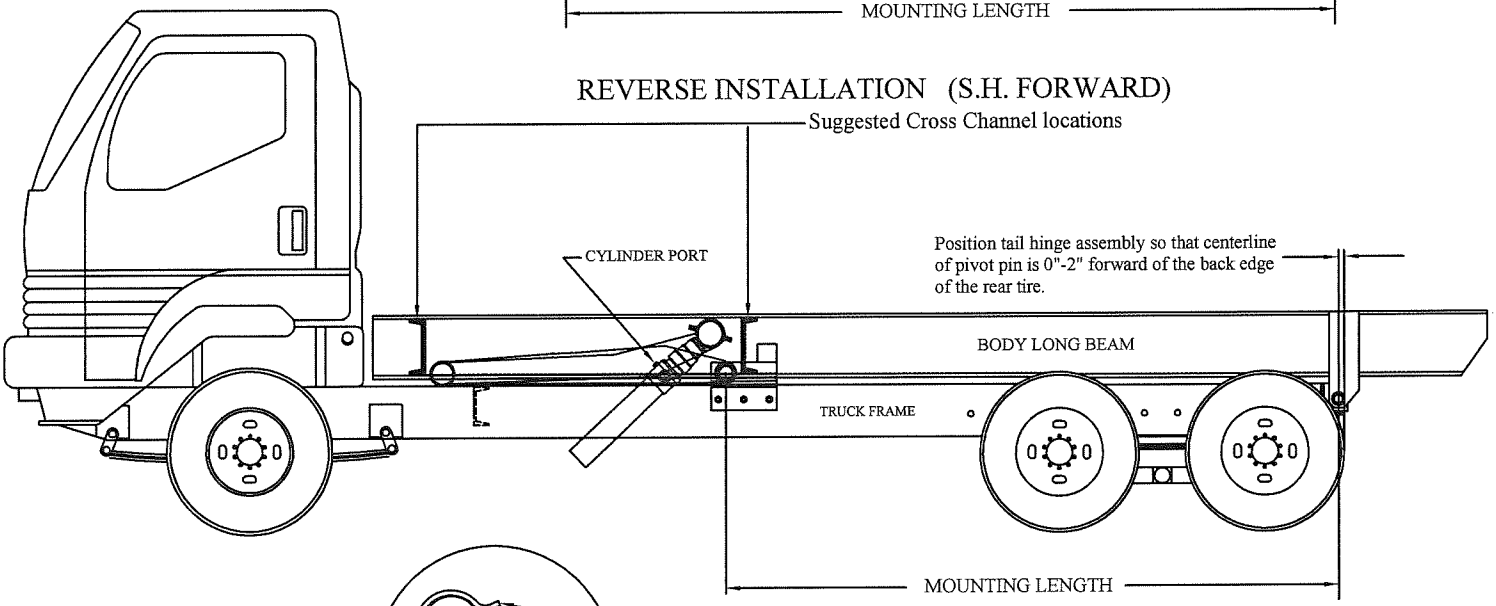

REAR VIEW ( DRIVERS SIDE ) BODY HINGE

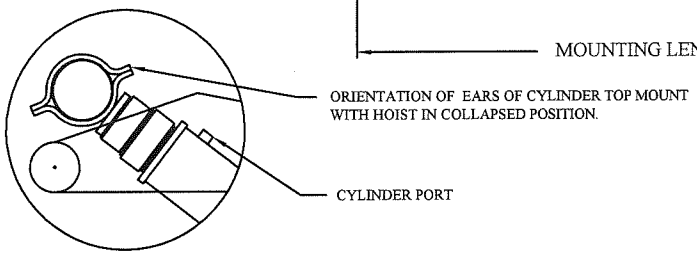


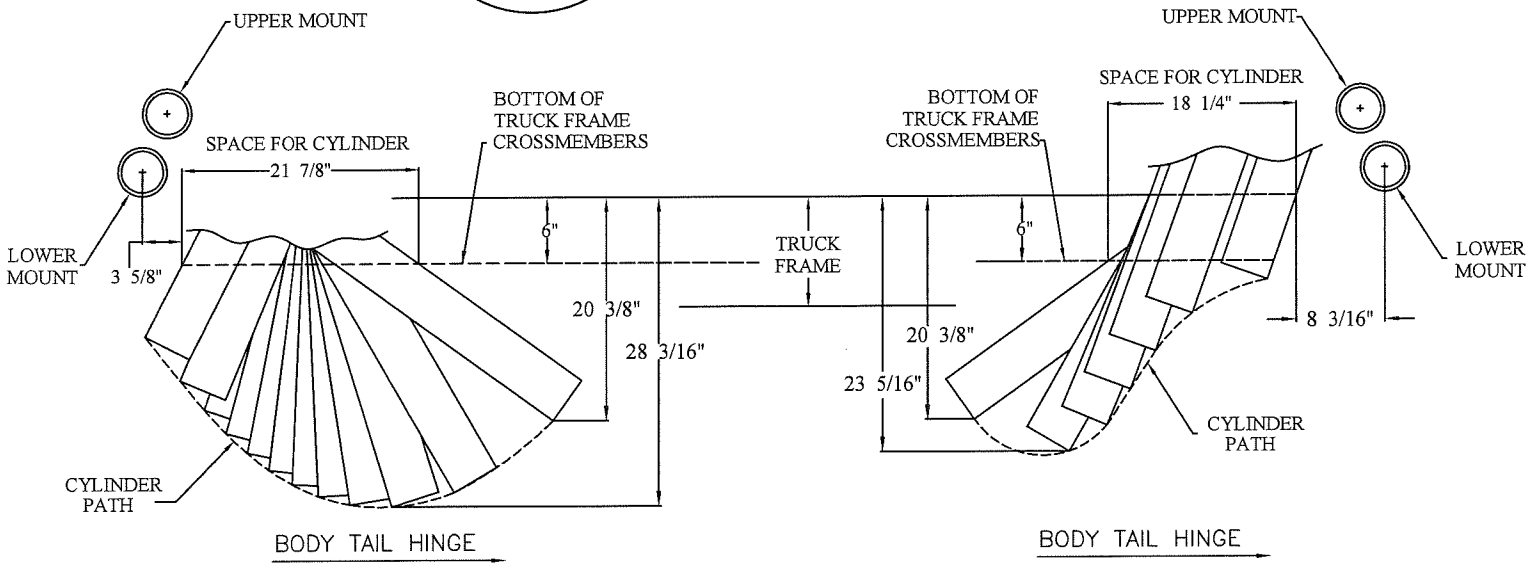
## STANDARD INSTALLATION (S.H. BACKWARD)




## REVERSE INSTALLATION (S.H. FORWARD)




LL3000 HOIST- STANDARD INSTALLATION

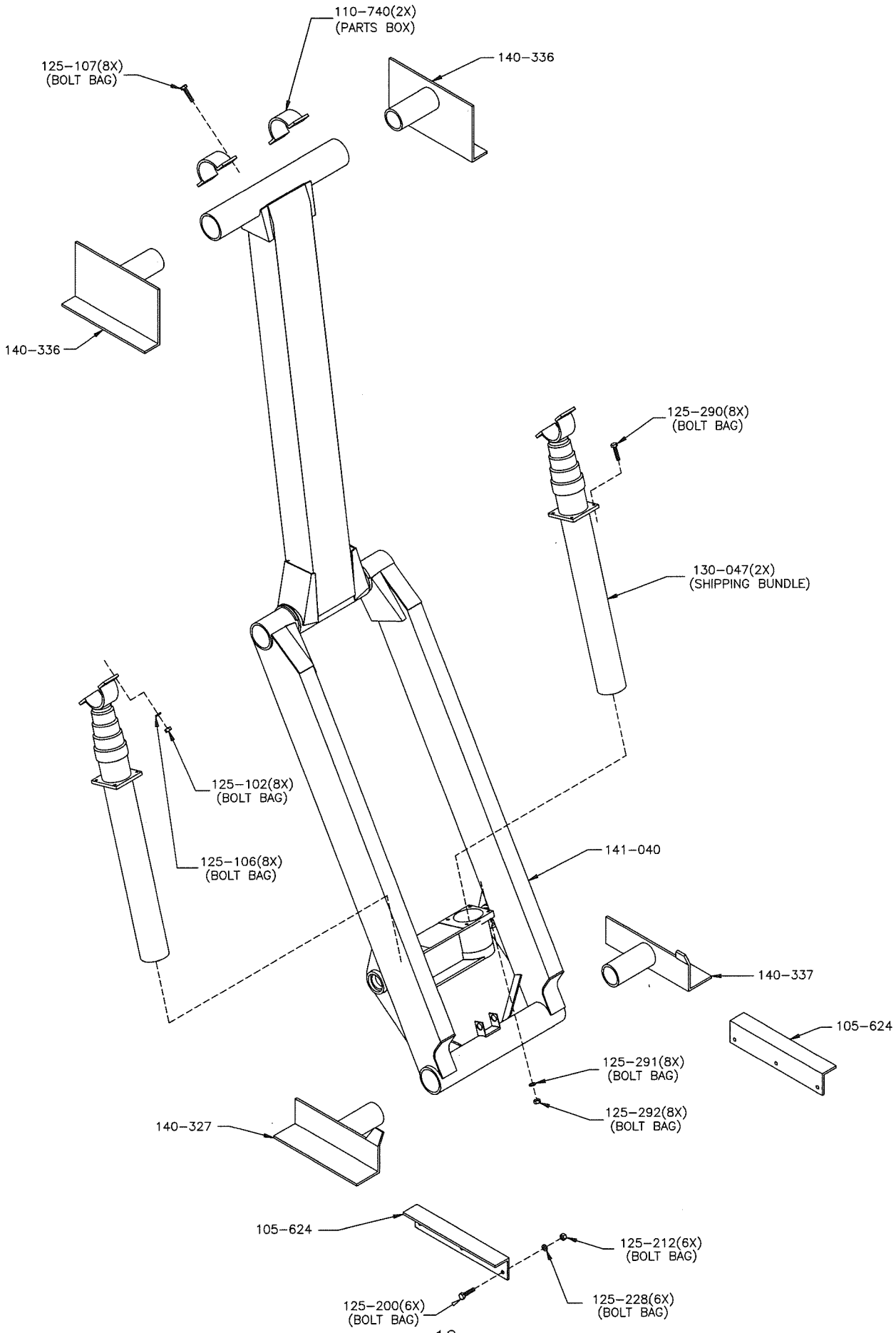
LL3000 HOIST- REVERSE INSTALLATION

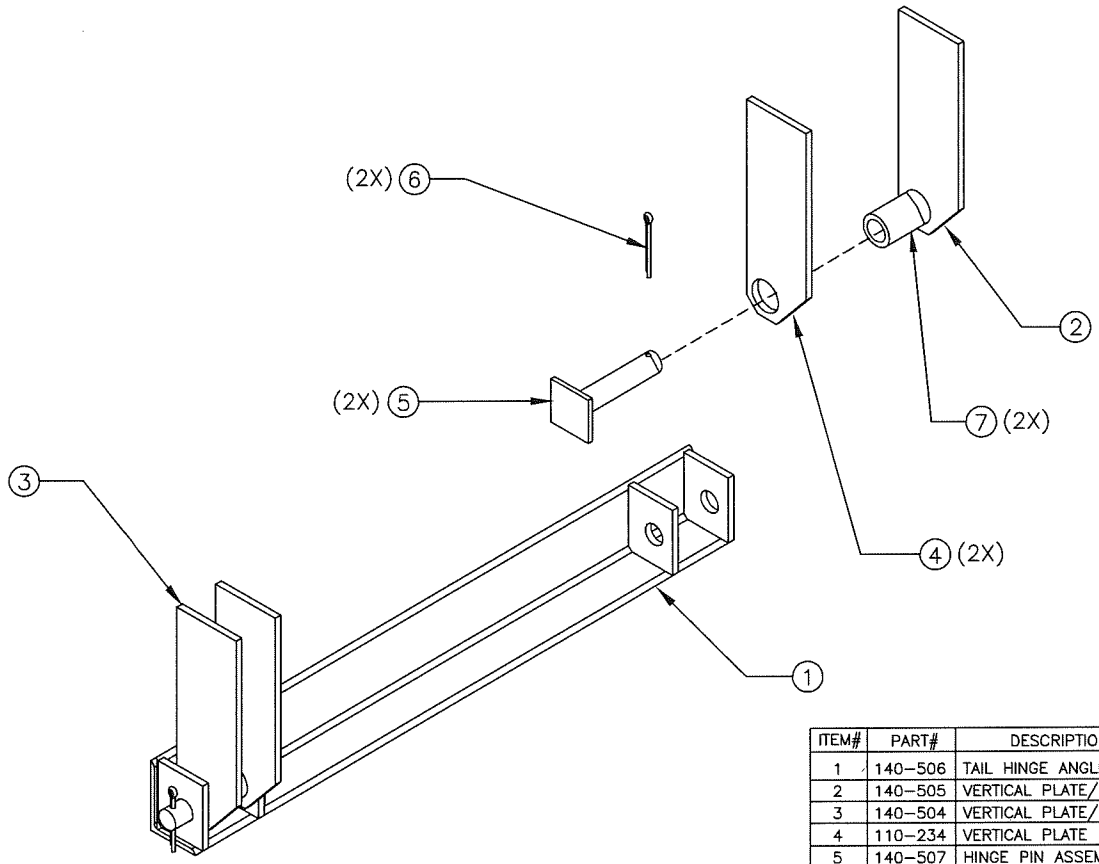
Apply on dashboard as near as possible to Hoist controls.

# CAUTION:

Improper positioning of hoist could cause damage to cylinders and truck chassis cross-members. See mounting instructions for cylinder motion.

130-334


110-740(2X)
(PARTS BOX)
125-107(8X)
(BOLT BAG)
140-336
140-336
125-290(8X)
(BOLT BAG)
130-047(2X)
(SHIPPING BUNDLE)
125-102(8X)
(BOLT BAG)
125-106(8X)
(BOLT BAG)
141-040
140-337
105-624
125-291(8X)
(BOLT BAG)
125-292(8X)
(BOLT BAG)
140-327
105-624
125-212(6X)
(BOLT BAG)
125-200(6X)
(BOLT BAG)
125-228(6X)
(BOLT BAG)

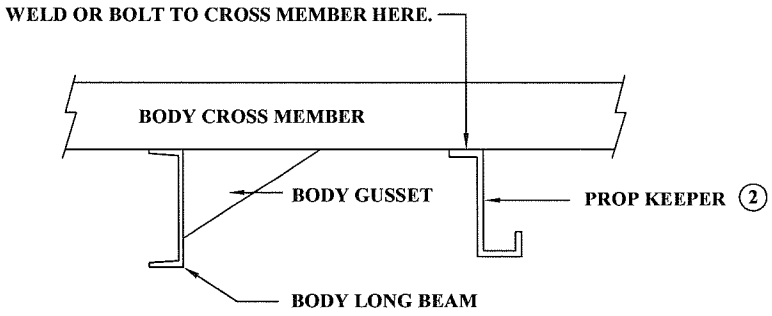



| ITEM# | PART# | DESCRIPTION | QTY |
|---|---|---|---|
| 1 | 140-506 | TAIL HINGE ANGLE ASSEMBLY | 1 |
| 2 | 140-505 | VERTICAL PLATE/BUSHING ASSEMBLY(R.H) | 1 |
| 3 | 140-504 | VERTICAL PLATE/BUSHING ASSEMBLY(L.H) | 1 |
| 4 | 110-234 | VERTICAL PLATE | 2 |
| 5 | 140-507 | HINGE PIN ASSEMBLY | 2 |
| 6 | 125-318 | 3/8" X 2 1/2" COTTER PIN | 2 |
| 7 | 125-285 | 1/4" DRIVE ZERKS | 2 |

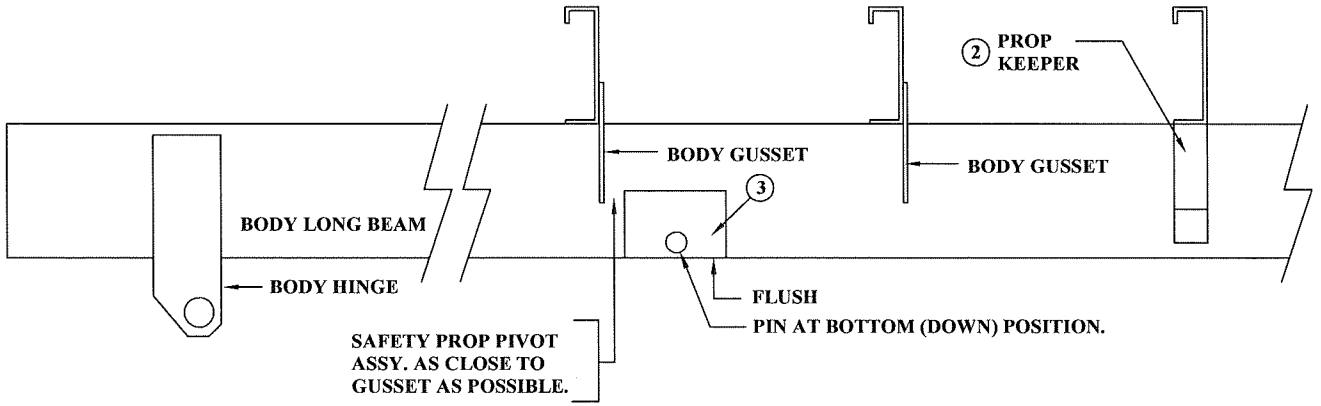
LL-3000 TAIL HINGE ASSEMBLY
PART# 140-525

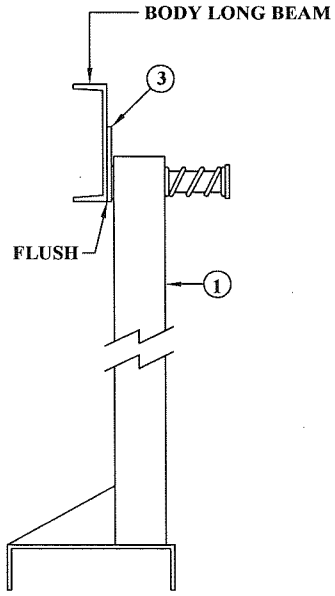
# NOTES:

# SAFETY PROP MOUNTING INSTRUCTIONS




| ITEM# | PART# | DESCRIPTION | QTY |
|---|---|---|---|
| 1 | 140-416 | SAFETY PROP LEG & PIVOT ASSY | 1 |
| 2 | 110-953 | SAFETY PROP KEEPER | 1 |




1. Raise & brace up the empty body.
2. Locate leg/pivot assembly(plate (3)), an appropriate distance forward of body hinge and as close to body gusset as possible. Pivot assembly mounting plate should be flush at the bottom with the bottom of the long beam, with the pin in the down position as shown.
3. Clamp the pivot plate to the long beam and weld all around with a 3/8" fillet weld.
   NOTE: To protect the compression spring from weld splatter, wrap with a wet paper towel.
4. Swing base of leg assembly forward into storage position. Slip prop keeper onto leg assembly and locate keeper to the most suitable crossmember. Clamp keeper to crossmember and weld or bolt permanantly. On shorter truck bodies it may be necessary to store safety prop backward. If this is the case- then the pivot assembly should be welded directly behind body gusset.
5. Apply "DANGER" safety prop decals to outside surface of both bed long beams.

## CAUTION: THE SAFETY PROP IS NOT DESIGNED TO SUPPORT LOADED BODY!

# TAFCO DIRECT MOUNT PUMP INSTALLATION

**The direct mount pump that Tafco supplies is a BI-ROTATIONAL pump with a 7/8" diameter-13 tooth splined shaft and a 2 bolt SAE "B" flange. The pump mounts directly to the PTO and should be positioned so you can use the side and / or end ports. It is recommended that you use the Tafco supplied tank and valve option with this pump. If you are not using the Tafco tank and valve, then you must insure the system you use meets all the requirements of the Scott Hoist you are installing.**

**The direct mount pump is BI-ROTATIONAL* and will rotate either direction. You must insure that you have the inlet hose (from the front of the tank to the pump) in the correct pump port that will allow oil to enter the pump and flow around the gear teeth. The oil does NOT flow between the teeth. The inlet line should be as close to the size of the inlet fitting as possible and should be a suction hose with crimp fittings. The pump hoses are supplied by the INSTALLER. The pressure hose from the pump to the control valve must have a working pressure rating equal to or exceeding the hoist maximum pressure setting.**

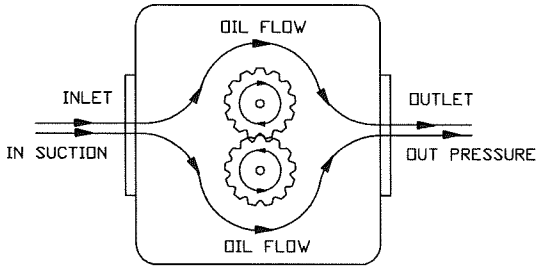
## NOTE: ALWAYS DOUBLE CHECK THE PTO ROTATION AND PUMP ROTATION TO INSURE YOU HAVE THE INLET AND OUTLET PROPERLY PLUMBED. SEE PAGE 16 FOR MORE INFORMATION.

***BI-ROTATIONAL means that you do not need to take the pump apart to reverse the rotation. You simply need to insure that the hose from your oil supply tank attaches to the port that allows the oil to flow around the two gears when the PTO is operating.**

1. **Measure and determine the location and desired height of the valve/ reservoir. The valve/ reservoir should be mounted to insure the valve to cylinder hoses will reach.**
2. **Bolt the mounting brackets to the valve/ reservoir and clamp the brackets to the truck frame in the desired location. Remove the valve/reservoir.**
3. **Drill and bolt the brackets to the frame and remount the valve/reservoir. Be careful of brake lines, fuel tank, fuel lines and wiring located inside the truck frame when drilling through the frame.**
4. **Refer to the CONTROL CABLE INSTALLATION INSTRUCTIONS (page 20). This will give you detailed instructions on the installation and adjustments of the control cable.**
5. **See page 16 for the proper plumbing of the direct mount pump and valve/reservoir assembly. Note the valve lifting port ( labeled 1 or B ) is connected to the bottom of the cylinder to raise the hoist. The other port is the lowering port. For power up and power down hoists, this valve port is connected to the rod end of the hoist cylinder. For power up only hoists, this valve port is plugged off.**

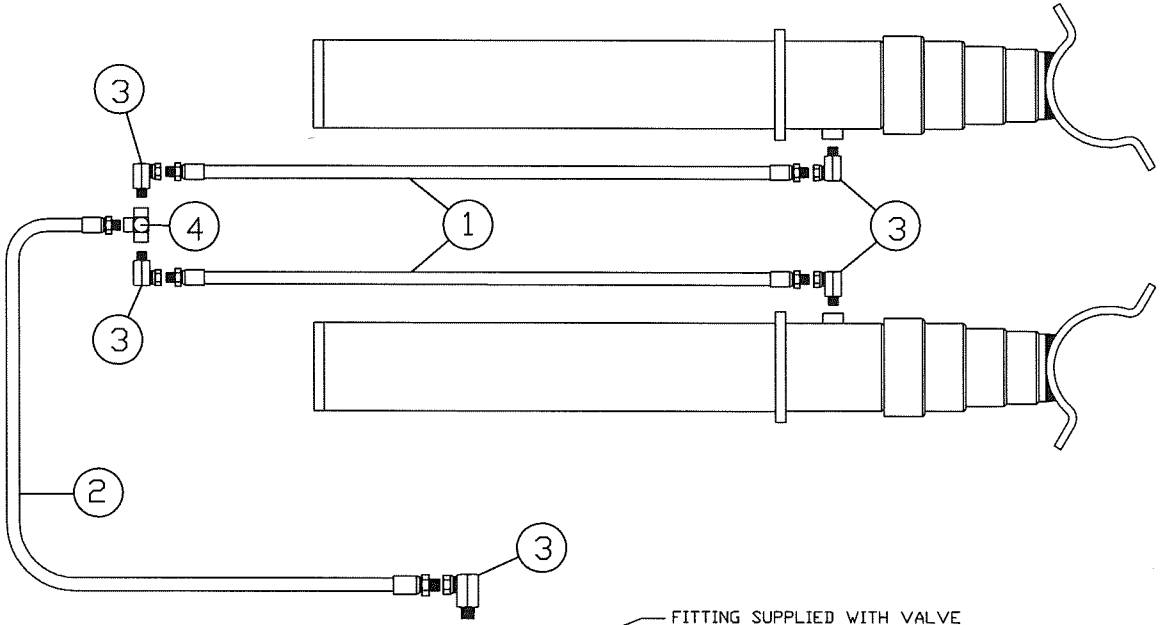
   **WARNING: HOISTS WHICH ARE POWER UP AND POWER DOWN MUST NOT BE MADE INTO POWER UP ONLY HOISTS !!**

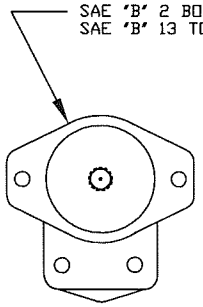
**Always insure the proper routing of the cable so you pull the cable knob out to raise and push the cable knob in to lower.**

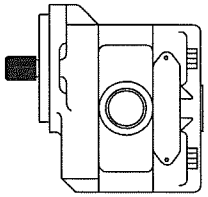



CHECK THE PTO AND PUMP ROTATION. THE GEARS MUST PULL THE OIL IN THROUGH THE INLET PORT, AROUND THE OUTSIDE OF THE GEARS, AND PUSH IT OUT THE PRESSURE PORT. IF YOUR ROTATION IS OPOSITE THE ABOVE VIEW THEN THE GEARS WILL TURN THE OTHER DIRECTION AND THE INLET AND THE OUTLET PORTS WILL BE REVERSED KEEPING IN MIND THAT THE OIL MUST FLOW AROUND THE GEARS AND NOT BETWEEN THEM.

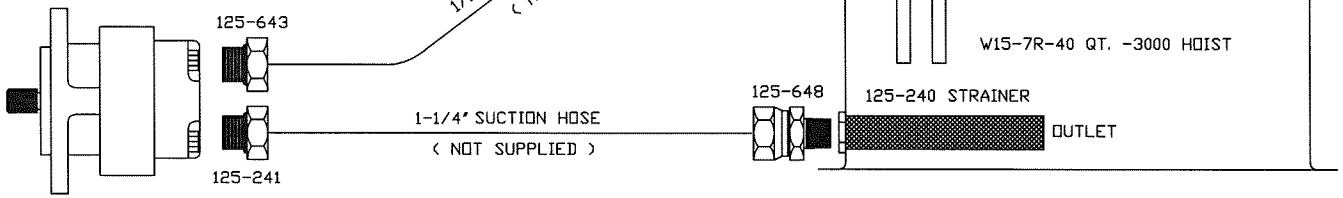
| | |
|---|---|
| 1 | 125-247 40" x 1/2" HP HOSE |
| 2 | 130-333 84" X 1/2" HP HOSE |
| 3 | 125-141 90 DEG. MALE-FEMALE PIPE SWIVEL 1/2" |
| 4 | 125-139 FEMALE 1/2" PIPE TEE. |



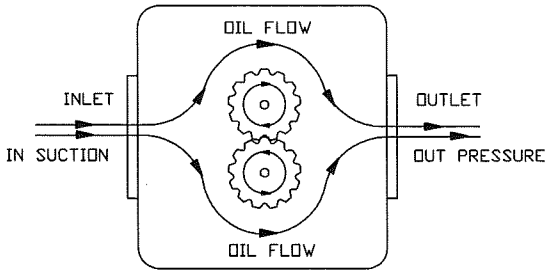



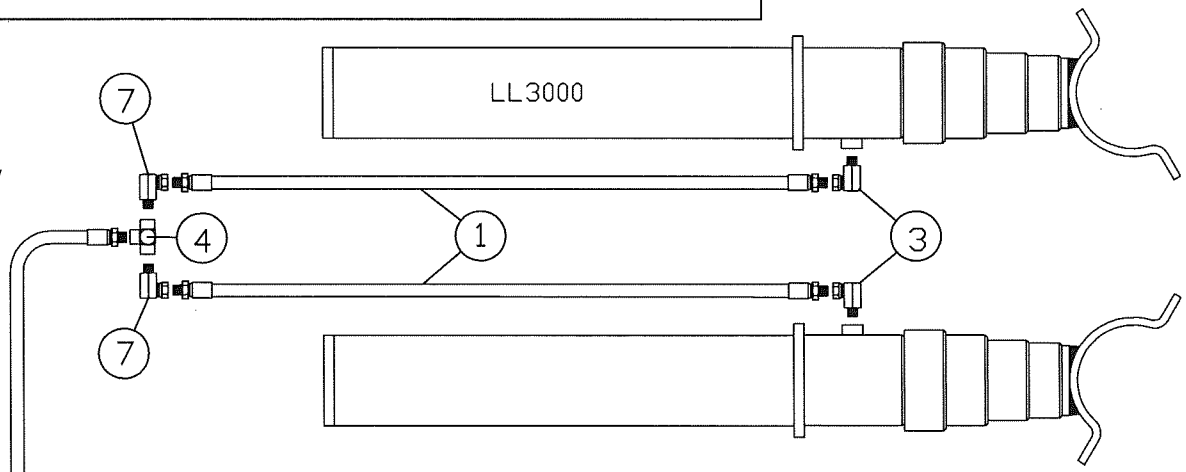
GP 2035/ MUNCIE PUMP
BI-ROTATIONAL

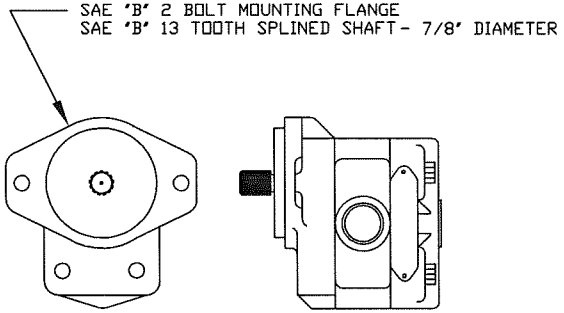


| | |
|---|---|
| 1 | 125-247 40" x 1/2" HP HOSE |
| 2 | 125-770 84" X 3/4" HP HOSE |
| 3 | 125-141 90 DEG. MALE-FEMALE PIPE SWIVEL 1/2" |
| 4 | 125-773 FEMALE 3/4" PIPE TEE. |
| 5 | 126-621 6901-12-12 90 DEG FITTING. |
| 6 | 126-622 6901-10-12 90 DEG FITTING. |
| 7 | 125-771 90 DEGREE MALE-FEMALE SWIVEL. |

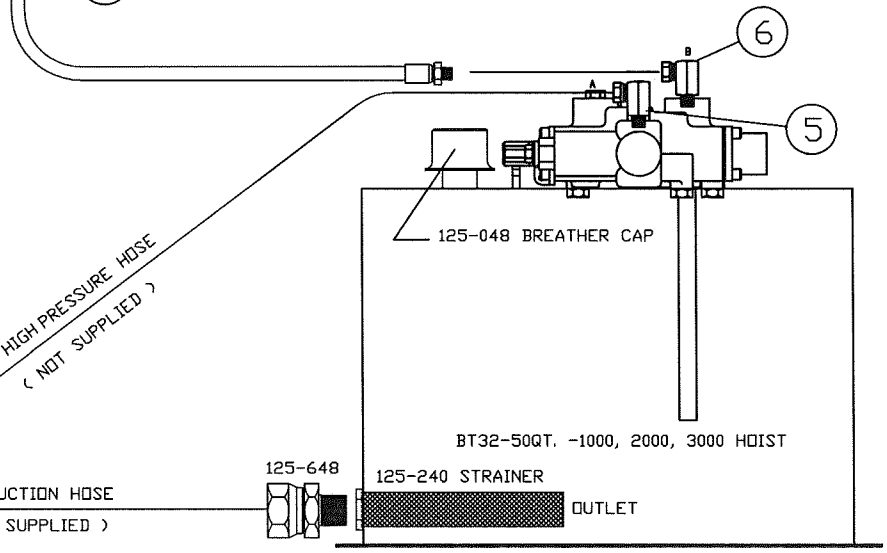


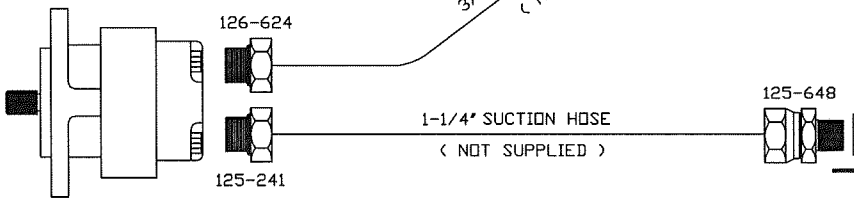

CHECK THE PTO AND PUMP ROTATION. THE GEARS MUST PULL THE OIL IN THROUGH THE INLET PORT, AROUND THE OUTSIDE OF THE GEARS, AND PUSH IT OUT THE PRESSURE PORT. IF YOUR ROTATION IS OPOSITE THE ABOVE VIEW THEN THE GEARS WILL TURN THE OTHER DIRECTION AND THE INLET AND THE OUTLET PORTS WILL BE REVERSED KEEPING IN MIND THAT THE OIL MUST FLOW AROUND THE GEARS AND NOT BETWEEN THEM.




GP 2035/ DAK PUMP
BI-ROTATIONAL



## PTO DRIVE-LINE PUMP / RESERVOIR INSTALLATION

1. **Measure and determine the location and desired height of the pump/ reservoir.**

2. **Bolt the pump brackets to the pump/ reservoir and clamp the brackets to the truck frame in the desired location.**

3. **FOR STEP 3, REFER TO PAGE 19.**
   **Check the pump shaft to insure it is parallel to the PTO output shaft and also with the truck frame rail. Determine the drive line angle. The ideal drive line angle is 1 to 7 degrees. If this angle is greater than 15 degrees, relocate the pump/ reservoir to achieve a drive line angle less than 15 degrees. Determine the exact length of hex shaft "B".**
   **It is of great importance that dimension "A" ( of drive shaft illustration on page 19) of 1/8" is maintained on the drive shaft when installing to slip joint. This will prevent the fall out of drive line due to loosening of set-screws and will prevent the shaft from slipping out of the PTO joint.**

   **NOTE: An improperly installed drive line will cause excessive noise and vibration and may result in pump and/or PTO failure.**

4. **Remove the pump/ Reservoir.**
   **Drill and bolt the brackets to the frame and remount the pump/reservoir. Be careful of brake lines, fuel tank, fuel lines and wiring inside the truck frame when drilling through the frame. Install the drive shaft insuring that the drive line yokes are in line. (see page 19).**

5. **Refer to the control cable installation instructions (page 20). This will give you detailed instructions on the installation and adjustments of the control cable.**

6. **See page 19 for the proper plumbing of the PTO pump to the hoist cylinder. Note the valve lifting port ( labeled 1 or B) is connected to the bottom of the cylinder to raise the hoist. The other port is the lowering port. For power up and power down hoists, this valve port is connected to the rod end of the hoist cylinder. For power up only hoists, this valve port is plugged off.**
   **WARNING: HOISTS WHICH ARE POWER UP AND POWER DOWN MUST NOT BE MADE INTO POWER UP ONLY HOISTS !!**
   **Always insure the proper routing of the cable so you pull the cable knob out to raise and push the cable knob in to lower.**

**CAUTION: Read all safety and operation information provided by the PTO manufacturer. Observe these and all safety instructions.**

## CAUTION !!

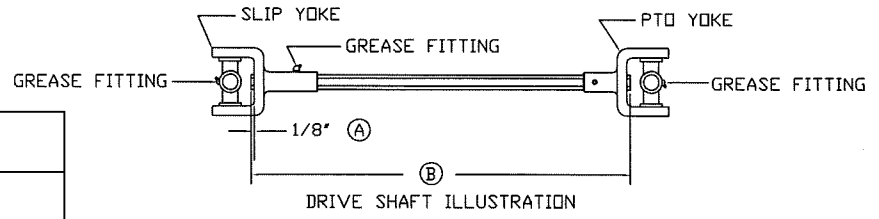
1. **DO NOT go under vehicle when the engine is running.**

2. **DO NOT work on a PTO or shaft while engine is running.**

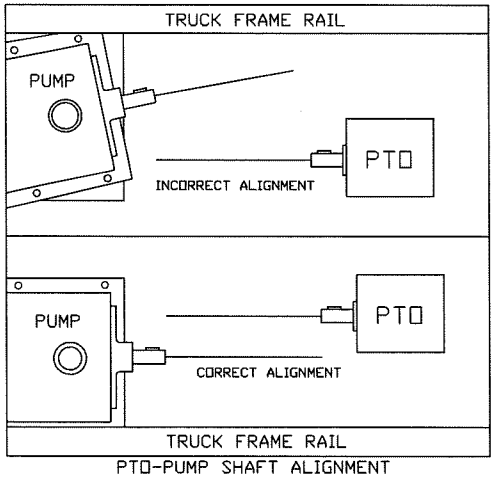
3. **DO NOT engage or disengage the PTO or driven equipment by hand from under the vehicle when the engine is running.**

4. **ALWAYS shut the engine off before working on or near the PTO system.**

| | |
|---|---|
| 1 | 125-247 40" x 1/2" HP HOSE |
| 2 | 130-333 84" X 1/2" HP HOSE |
| 3 | 125-141 90 DEG. MALE-FEMALE PIPE SWIVEL 1/2" |
| 4 | 125-139 FEMALE 1/2" PIPE TEE. |

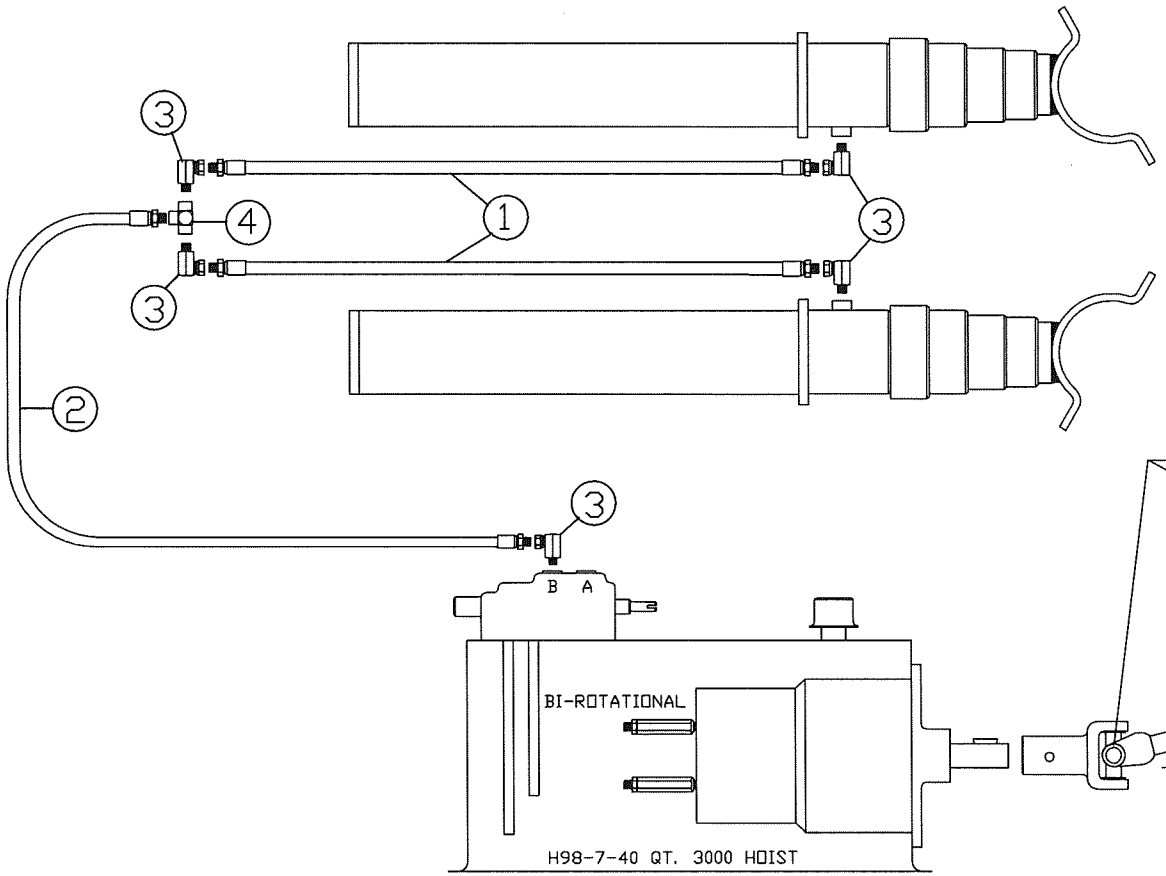


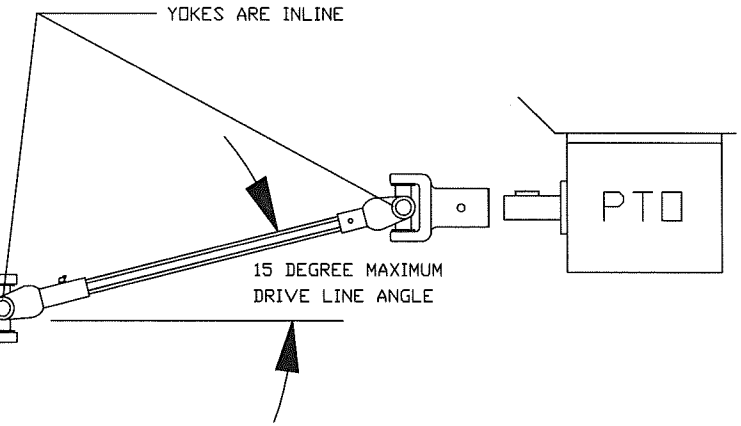
DRIVE SHAFT ILLUSTRATION



PTO-PUMP SHAFT ALIGNMENT

PUMP SHAFT AND PTO SHAFT MUST BE PARALLEL WITH EACH OTHER AND WITH THE TRUCK FRAME RAIL.



# WILLIAMS MACHINE & TOOL CO.

*MANUFACTURERS OF HYDRAULIC PISTON PUMPS*

## NEUTRAL LOCK–CONTROL CABLE INSTALLATION INSTRUCTIONS

**DANGER** DO NOT ALLOW ANY PART OF YOUR BODY UNDER THE TRUCK BOX UNTIL THE TRUCK BOX IS PROPERLY BLOCKED. SERIOUS INJURY OR DEATH WILL RESULT FROM TRUCK BOX FALLING IN 1 SECOND OR LESS.

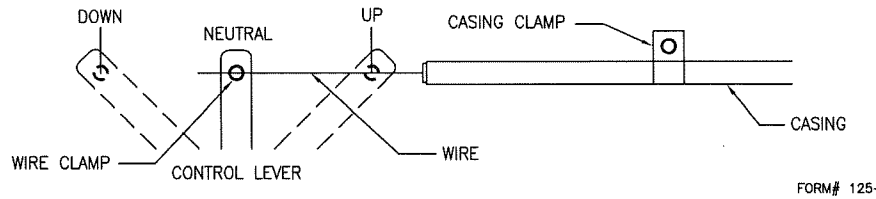
BEFORE BEGINNING ANY CONTROL CABLE INSTALLATION, PERFORM THE 3 STEPS BELOW:

1. MAKE SURE THE TRUCK BOX IS EMPTY – EMPTY THE LOAD.
2. THE TRUCK BOX MUST BE PROPERLY BLOCKED BY USING THE BODY PROPS ON THE TRUCK HOIST AND BY USING BLOCKS UNDER THE HOIST FRAME.
3. READ AND UNDERSTAND THESE INSTRUCTIONS SO PROPER INSTALLATION OF THE CABLE CAN BE ACCOMPLISHED.

## INSTALLATION INSTRUCTIONS

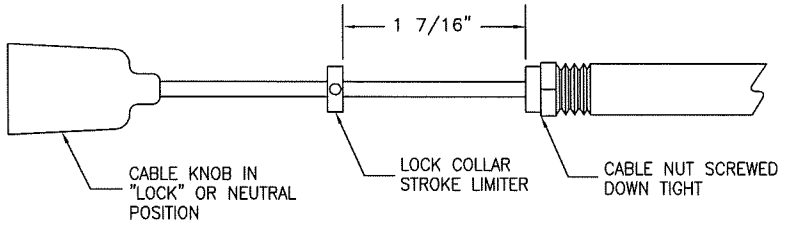
1. MOUNT THE CONTROL CABLE TO THE VEHICLE WITH SPECIAL ATTENTION THAT NO BENDS ARE SHARPER THAN A 10" RADIUS.
2. ROUTE THE CONTROL CABLE CASING AWAY FROM ALL HAZARDS WHICH MAY DAMAGE THE CABLE. KEEP THE CONTROL CABLE AWAY FROM CATALYTIC CONVERTERS, TAIL PIPES, EXHAUST PIPES, ETC. MAKE CERTAIN THE CONTROL CABLE IS NOT CRUSHED OR ROUTED WHERE MOVING PARTS MAY CRUSH IT.
3. A STROKE LIMITER(LOCK COLLAR) HAS BEEN INSTALLED ON THE CABLE HEAD. THIS LIMITER IS NECESSARY TO PREVENT OVER TRAVEL OF THE CABLE WHEN THE CABLE IS PUSHED IN, CAUSING THE CABLE WIRE TO KINK.
4. INSTALL CABLE TO THE CONTROL VALVE AND TIGHTEN THE CLAMPS PER DRAWING INSTRUCTIONS BELOW. SEE INSTRUCTION SHEET INCLUDED INSIDE THE CABLE CLAMP KIT FOR FURTHER DETAILS.

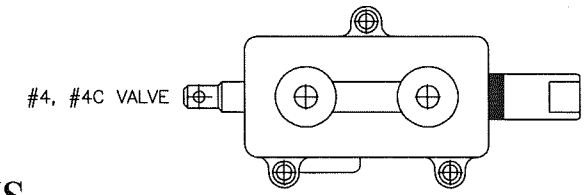
NOTE: WHEN INSTALLING CABLE ON AN EXISTING UNIT WITH HYDRAULIC LINES ALREADY CONNECTED, THE TRUCK BOX MUST BE PROPERLY BLOCKED TO PREVENT THE TRUCK BOX FROM FALLING. MOVING THE LEVER ON THE VALVE CAN CAUSE THE TRUCK BOX TO FALL IN ONE SECOND OR LESS. DEATH OR SERIOUS INJURY WILL RESULT IF THE LEVER IS MOVED WHILE SOMEONE IS UNDER THE TRUCK BOX.



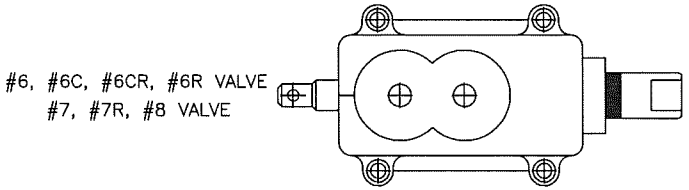

FORM# 125–932

# TO PREVENT CABLE WIRE FROM BEING OVER COMPRESSED IN CABLE PUSHED IN POSITION.

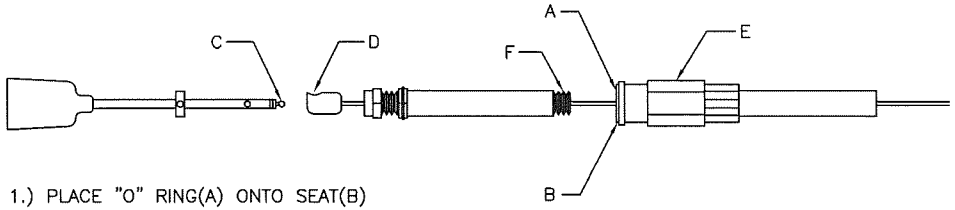



WILLIAMS




## ASSEMBLY INSTRUCTIONS FOR CABLE AND CABLE HEAD

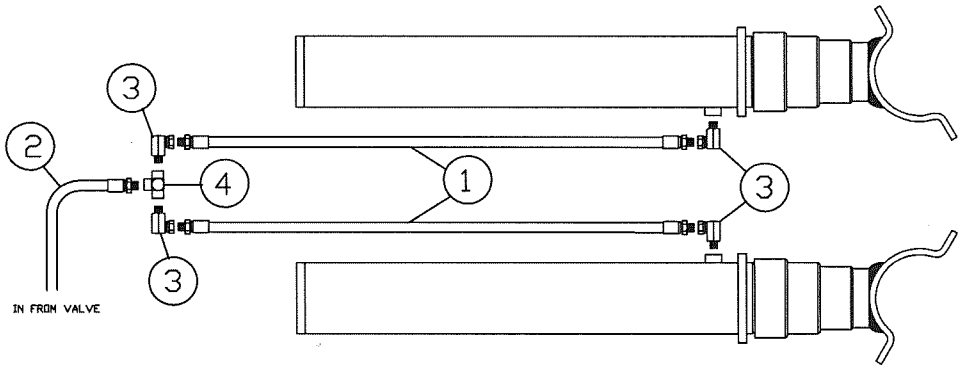


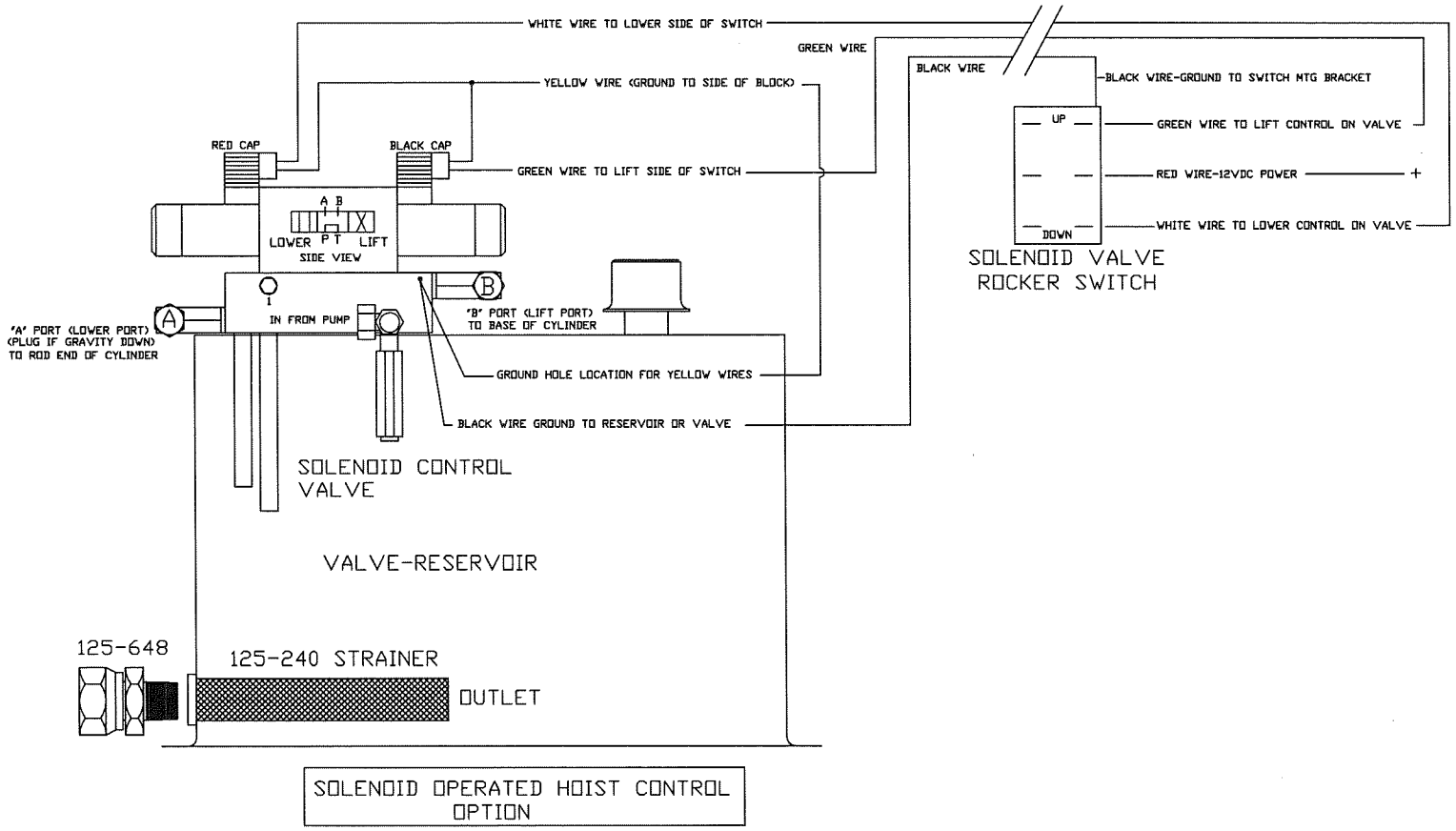

1.) PLACE "O" RING(A) ONTO SEAT(B)
2.) SLIDE BALL(C) INTO SLOT(D)
3.) PUSH NUT(E) ONTO THREADS(F) AND TIGHTEN SECURELY.

FORM# 125–932

# ELECTRIC SHIFT HOIST CONTROL OPTION - WILLIAMS VALVE ONLY

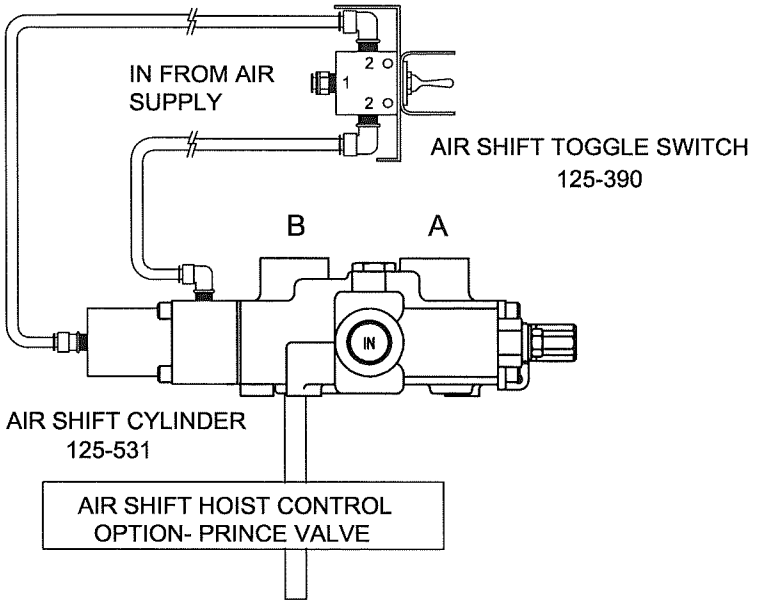
| | |
|---|---|
| 1 | 125-247 40" x 1/2" HP HOSE |
| 2 | 130-333 84" X 1/2" HP HOSE |
| 3 | 125-141 90 DEG. MALE-FEMALE PIPE SWIVEL 1/2" |
| 4 | 125-139 FEMALE 1/2" PIPE TEE. |

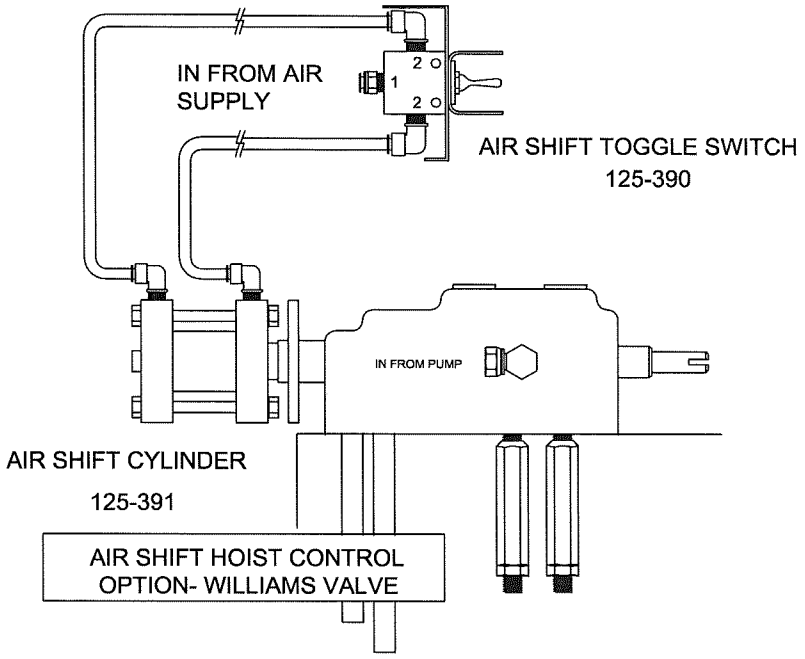



SOLENOID OPERATED HOIST CONTROL OPTION

# AIR SHIFT HOIST CONTROL OPTION



# SAFETY INSTRUCTIONS

1. **Always insure the Hoist Control in the cab works freely and is in good operating order. The controls must be clearly marked for function and operation.**

2. **Always check for overhead wires, obstructions, and people before raising the hoist.**

3. **Dump with the truck at rest, on level ground and with a balanced load. The hoist design gives added stability in normal dumping operations. The hoist is not designed to operate in extreme conditions.**

4. **The operator must stay in the cab, at the controls during the duration of the dumping cycle. If there are bystanders around the dumping area, the operator must have an outside observer present to insure that all bystanders are a safe distance away.**

5. **Never permit anyone under a loaded dump bed.**

6. **Bring a loaded dump body down slowly by easing the control knob inward. On double acting cylinders, make sure the pump is running when doing so or the reservoir may over flow, resulting in the loss of fluid and allowing air into the system.**

7. **Always use the safety prop to secure a raised dump bed before any maintenance or inspection is performed under the empty dump body as specified by the safety decals provided by Tafco Equipment Co. The safety prop is not designed or intended to support a loaded body. If repairs or maintenance is needed, you must unload the body before attempting any repairs.**

8. **Observe all PTO safety instructions provided by the PTO manufacturer as well as those listed in the hoist information.**

   A. **Do not go under the vehicle when the engine is running.**
   B. **Do not work on PTO or shaft when the engine is running.**
   C. **Do not engage or disengage the PTO or driven equipment by hand from under the vehicle when the engine is running.**

# OPERATION INSTRUCTIONS

## OPERATION WARNINGS !

A. **Do not operate hoist while truck is moving.**
B. **Make sure all loads are level in the truck bed.**
C. **Do not dump loads while on uneven or unstable ground.**
D. **Never operate PTO pump over the rated speed. (check with pump manufacturer for maximum speeds).**
E. **Disengage PTO while driving truck to prevent damage.**
F. **Do not increase pump pressure. Serious damage could occur if increased above the rated setting.**
G. **If the hoist is a power down hoist (double acting cylinders) do not continue to send power to lower the hoist after the body is fully lowered. Damage to the truck and the hoist could occur.**
H. **Never allow the hoist to bounce or jerk when stopping the hoist movement.**

1. TO RAISE OR LOWER A CONTROL CABLE HOIST.

A. **Set the emergency / parking brake.**
B. **Put the truck in neutral. Check area around truck for clearance.**
C. **Push the clutch in. Engage the PTO while the truck is at idle. Release the clutch.**
D. **To raise the hoist- depress the RED neutral release button on the end of the control knob. Pull control knob out rapidly.**
E. **To hold the hoist in any position- move control knob to center (neutral) position.**
F. **Stopping the hoist just before the cylinder(s) are fully extended will help increase the life of the hoist and pump.**
G. **To lower the hoist- depress the RED neutral release button. Push the pump control knob all the way in and hold the knob in until the box is down.**
H. **To stop the hoist from lowering, slowly return the control to the center position.**
I. **Disengage the PTO while driving truck.**
J. **Always make sure that the cable is centered when the box is fully lowered.**
K. **Never allow the hoist to bounce or jerk when stopping hoist movement. This could cause serious damage to the truck frame and the hoist. This could also void the warranty due to misuse of the hoist.**

## SAFETY PROP OPERATION

**WARNING!!**

**USE THE SAFETY PROP ONLY WITH AN EMPTY BOX. THE SAFETY PROP IS NOT DESIGNED TO SUPPORT A LOADED BOX. IF IT IS NECESSARY TO WORK ON A BOX OR HOIST, THE BOX MUST BE UNLOADED FIRST.**

A. **Slowly raise the truck body until the base of the Safety Prop will clear the truck frame.**
B. **The Safety Prop should be unlatched from the prop keeper. Once unlatched, The Safety Prop will hang down.**
C. **Slowly lower the body back down until the Safety Prop base rests firmly on the truck frame. DO NOT POWER HOIST DOWN !**
D. **To release the Safety Prop, raise the body until the base of the prop clears the truck frame. Swing the Safety Prop up and latch into the prop keeper. The body can then be lowered completely down to the truck frame.**

# MAINTENANCE INSTRUCTIONS

1. **Periodic maintenance and inspection will increase hoist life. Check all bolts, cotter pins, hydraulic lines, hydraulic reservoir levels, scissor assembly, universal joints, and drive line components every 50 cycles or weekly, whichever comes first.**

2. **Lubricate all grease fittings before using the hoist the first time and every 50 hoist cycles there after. Greasing the hoist will prevent hoist damage and help to maintain lifting capacity. Severe conditions may require more frequent servicing.**
   **The grease fittings on the LL3000 hoist are in the following locations:**
   - **A. UPPER CROSS TUBE.....2 FITTINGS**
   - **B. LOWER CROSS TUBE.....2 FITTINGS**
   - **C. CENTER HINGE.....3 FITTINGS**
   - **D. UPPER CYLINDER PIVOT.....1 FITTING PER CYL.**
   - **E. LOWER CYLINDER PIVOT.....1 FITTING PER CYL.**
   - **F. TAIL HINGE.....2 FITTINGS**

   **IF EQUIPED WITH A RESERVOIR MOUNTED PTO PUMP, THERE WILL BE 3 FITTINGS ON THE PTO DRIVE SHAFT. ONE ON THE SLIP YOKE AND 1 ON EACH UNIVERSAL JOINT.**

3. **Under normal use and working conditions, the hydraulic oil should be changed annually. The breather cap should be cleaned regularly. With heavy use or very dusty conditions, the hydraulic oil should be changed more often. KEEP THE OIL CLEAN. USE CLEAN CONTAINERS, FUNNELS AND AVOID ADDING IN DUSTY CONDITIONS!**

   **Use a quality hydraulic fluid SAE 10W or equivalent in normal conditions. Use Type A ( Dextron ) automatic transmission fluid in cold weather conditions.**

4. **Field repair of hydraulic components should not be attempted. This would include hydraulic cylinders, valves and pumps. These should be sent to a Tafco dealer/ distributor. Seals and o-rings on hydraulic cylinders should only be installed by a qualified hydraulic specialist. New parts can be obtained from your Tafco dealer/ distributor. Insure that the complete hydraulic system is flushed after any component failure.**

# TROUBLESHOOTING GUIDE

1. THE HOIST WILL NOT RAISE SMOOTHLY:
   - A: Air in the cylinder. (Refer to installation instructions-pages 5-7).
   - B: Lubricate hoist and tail hinge.
   - C: Check cylinder top cap orientation. (Refer to page 10).

2. THE HOIST RAISES VERY SLOW:
   - A: The oil is too thick for cold weather.
   - B: A hydraulic line is partially blocked or pinched.
   - C: The filter screen is dirty.
   - D: The pump is worn or defective.
   - E: The control valve is not moving the full stroke.

3. FAILURE TO RAISE THE HOIST FULLY:
   - A: Check the hydraulic oil level in the reservoir.
   - B: Air in the cylinder. (Refer to installation instructions-pages 5-7).
   - C: Lubricate the hoist components.

4. FAILURE TO RAISE LOAD:
   - A: Release bed tie downs.
   - B: Hoist capacity has been exceeded.
   - C: Check for blocked or pinched hydraulic line.
   - D: Control valve not moving the full stroke- check cable adjustment.
   - E: The pump intake is blocked from dirty oil or the oil is too thick from cold weather.
   - F: Check pump for proper operation.

5. FAILURE TO LOWER HOIST:
   - A: Control valve is not moving the full stroke. Check cable adjustment.
   - B: Check for blocked or pinched lines.

6. OIL SPILLAGE OUT OF RESERVOIR:
   - A: Too much oil in reservoir.
   - B: Too thick of oil causing oil to foam or air in the hydraulic lines. Cycle the hoist several times to bleed system.
   - C: Pump not engaged during lowering.
   - D: The body weight is too great, causing the hoist to lower too rapidly. A flow control valve must be installed in this situation.

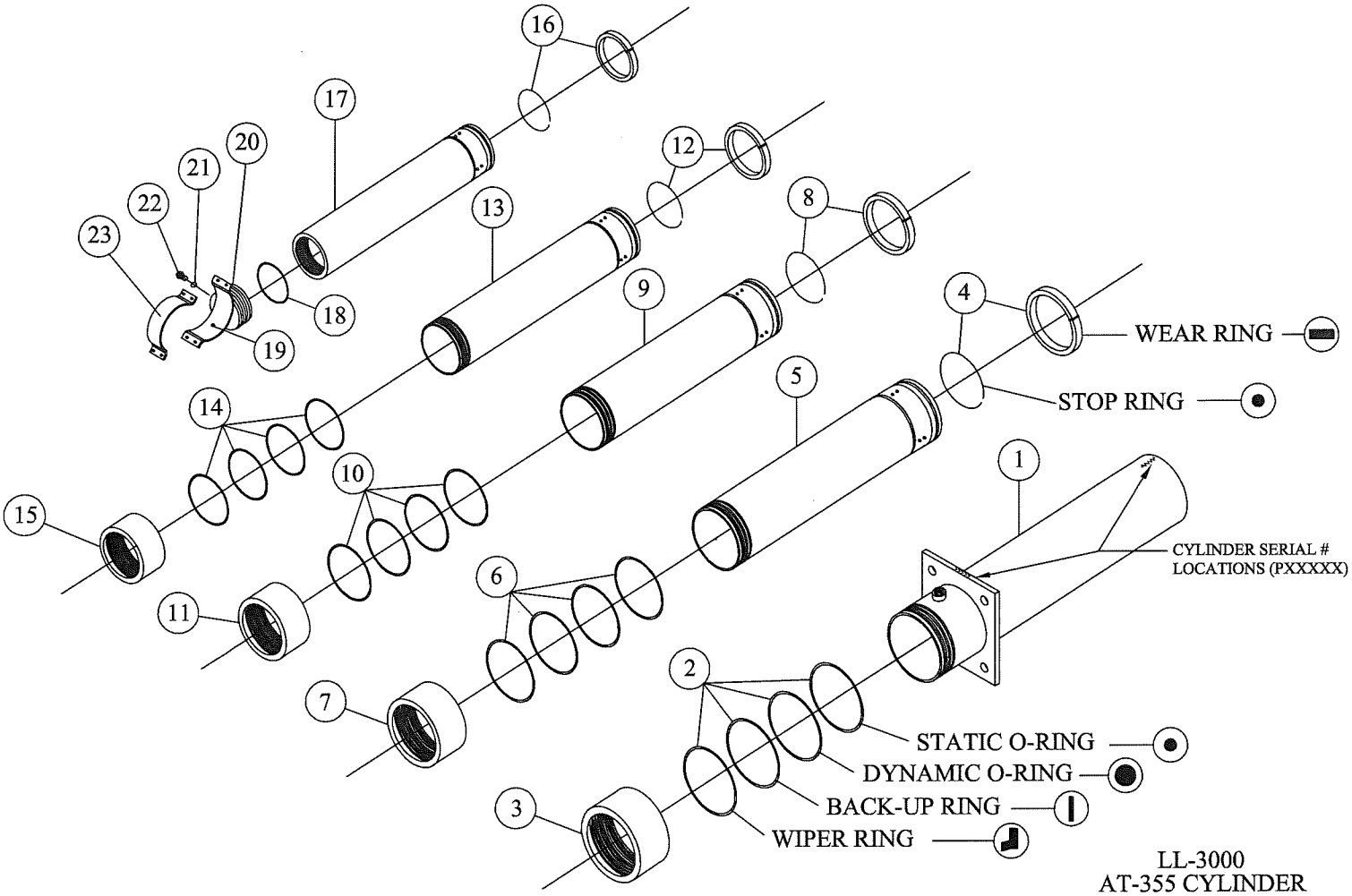
7. OIL LEAKAGE:
   - A: Make sure all fittings are properly sealed and tight.
   - B: Check all hoses. Use only fittings and hoses supplied by Tafco.
   - C. Gland nut leaking , may require cylinder repair. Contact your local Tafco dealer.

# CYLINDER REWORK INSTRUCTIONS

1. SPECIAL EQUIPMENT REQUIRED:
   - A. Bronze coated or brass vise inserts.
   - B. Hydraulic pressure available.
   - C. Gland nut and piston spanner wrenches.

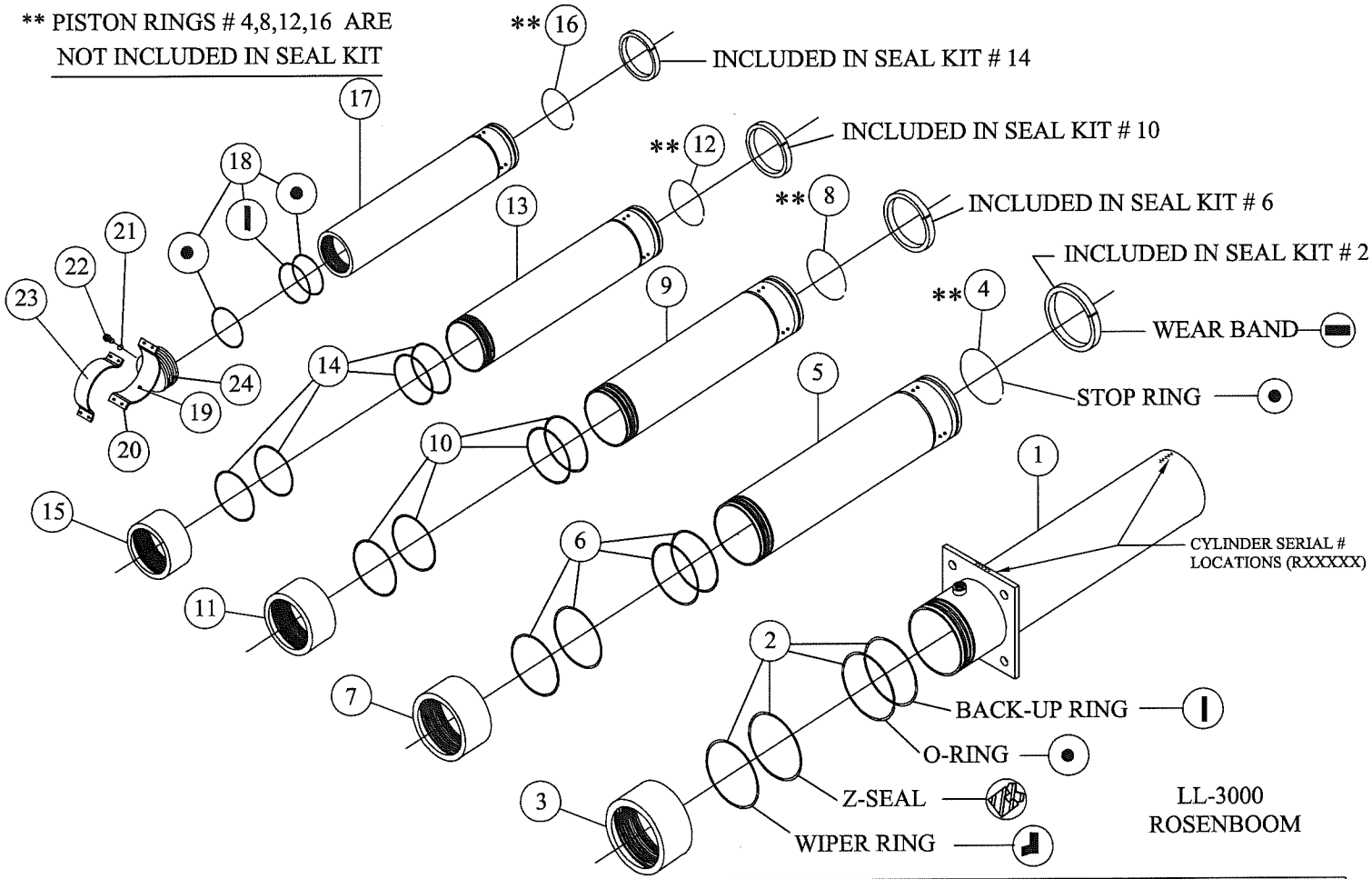
2. GENERAL:
   - A. Whenever clamping on a surface that moves past an o-ring or seal, extra care must be taken to prevent nicks, scratches, and deformation.
   - B. All parts that have scores or nicks on moving surfaces should be replaced with new parts.
   - C. Keep the cylinder parts very clean when reassembling.

3. DISASSEMBLY:
   - A. Extend cylinder stages either manually or with hydraulic pressure. WARNING: NEVER USE AIR PRESSURE TO EXTEND STAGES OR CYLINDERS.
   - B. Clamp on the cylinder body with a vise and unscrew the gland nut on the cylinder body.
   - C. Remove the gland nut with the cylinder rod or tube.
   - D. For telescopic or multiple stage cylinders, continue loosening gland nuts and removing smaller stages one at a time. WARNING: DO NOT USE PIPE WRENCHES OR OTHER TOOLS THAT WILL DAMAGE OR SCRATCH CYLINDER RODS AND TUBES.
   - E. Remove the gland nut(s) from the cylinder rod or tubes.
   - F. Remove all o-rings, backup rings, stop rings, and wear rings. HINT: Keeping all parts to a gland nut, piston, or cylinder tube together will help to identify parts. This will make the re-assembly of the cylinder easier.
   - G. Clean all the metal parts and dry them thoroughly.
   - H. Install all o-rings, backup rings, stop rings, and wear rings using clean grease to hold parts in place if necessary. Grease all o-rings before installing them. Be sure to have all parts fully seated in their respective grooves before attempting final assembly.
   - I. Oil all moving parts: piston, cylinder rod, cylinder tubes, etc.
   - J. Assemble all gland nuts on their respective cylinder tubes.
   - K. Reassemble cylinder in the reverse order that it was disassembled. Tighten and Loctite all gland nuts as you go. When reassembling the cylinder top mount to the cylinder rod, use Loctite 222. CAUTION: MAKE SURE NOT TO DAMAGE O-RINGS, SEALS, ETC. WHEN ASSEMBLING CYLINDER.
   - L. The cylinder is now ready to install in the hoist assembly.




LL-3000
AT-355 CYLINDER

| ITEM | PART NUMBER | DESCRIPTION | NO. REQ'D. |
|---|---|---|---|
| 1 | 130-243 | Cylinder Body Assembly | 1 |
| 2 | 130-154 | Seal Kit | 1 |
| 3 | 130-248 | Gland Nut | 1 |
| 4 | 130-155 | Repair Kit | 1 |
| 5 | 130.244 | Cylinder Tube (first moving stage) | 1 |
| 6 | 130-153 | Seal Kit | 1 |
| 7 | 130-249 | Gland Nut | 1 |
| 8 | 130-156 | Repair Kit | 1 |
| 9 | 130-245 | Cylinder Tube (second moving stage) | 1 |
| 10 | 130-152 | Seal Kit | 1 |
| 11 | 130-284 | Gland Nut | 1 |
| 12 | 130-157 | Repair Kit | 1 |
| 13 | 130-246 | Cylinder Tube (third moving stage) | 1 |
| 14 | 125-333 | Seal Kit | 1 |
| 15 | 130-285 | Gland Nut | 1 |
| 16 | 130-179 | Repair Kit | 1 |
| 17 | 130-247 | Cylinder Tube (forth moving stage) | 1 |
| 18 | 125-334 | Static O-ring | 1 |
| 19 | 125-286 | Grease Zerk | 1 |
| 20 | 130-286 | Top Mount & Stem Assembly | 1 |
| 21 | 126-026 | Nylon Seal | 1 |
| 22 | 126-025 | Bleeder Screw | 1 |
| 23 | 110-740 | Cylinder Top Cap | 1 |
| Not shown | 130-047 | LL-3000 Cylinder (AT-355) - Complete (less top cap) | 2 per hoist |



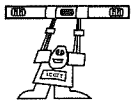

| ITEM | PART NUMBER | DESCRIPTION | NO. REQ'D. |
|---|---|---|---|
| 1 | 130-181 | Cylinder Body Assembly (015JB0078) | 1 |
| 2 | 130-188 | Seal Kit (093JA0011) | 1 |
| 3 | 126-370 | Gland Nut (060JW0011) | 1 |
| 4 | 126-342 | Stop ring (116AH0003) | 1 |
| 5 | 126-338 | Cylinder Tube (first moving stage) (071HB0005) | 1 |
| 6 | 130-187 | Seal Kit (093HA0007) | 1 |
| 7 | 126-371 | Gland Nut (060HV0013) | 1 |
| 8 | 126-341 | Stop ring (116AG0005) | 1 |
| 9 | 126-337 | Cylinder Tube (second moving stage) (071GB0004) | 1 |
| 10 | 130-186 | Seal Kit (093GA0007) | 1 |
| 11 | 126-372 | Gland Nut (060GT0017) | 1 |
| 12 | 126-340 | Stop ring (116AF0005) | 1 |
| 13 | 126-336 | Cylinder Tube (third moving stage) (071FB0006) | 1 |
| 14 | 130-185 | Seal Kit (093FA0002) | 1 |
| 15 | 126-374 | Gland Nut (060FS0017) | 1 |
| 16 | 126-339 | Stop ring (116AE0007) | 1 |
| 17 | 126-335 | Cylinder Tube (forth moving stage) (071ED0004) | 1 |
| 18 | 126-157 | Stem Seal Kit | 1 |
| 19 | 125-286 | Grease Zerk | 1 |
| 20 | 130-122 | Top Mount & Stem Assembly (013ZZ0055) | 1 |
| 21 | 126-088 | Bonded seal (108CE0002) | 1 |
| 22 | 126-373 | Bleeder Screw (016ZZ0863) | 1 |
| 23 | 110-740 | Cylinder Top Cap | 1 |
| 24 | 126-343 | Locking insert (174CZ0002) | 1 |
| | | | |
| Not shown | 130-071 | COMPLETE SEAL KIT (093JD0001) | 2 per hoist |
| Not shown | 130-047 | LL-3000 Cylinder - Complete (less top cap) | 2 per hoist |

# Scott™ HOIST WARRANTY

Tafco Equipment Co. warrants each new SCOTT Hydraulic Hoist frame to be free from defects in material and workmanship for a period of three years from the date of installation. This warranty does not extend to any hoist unit, or part thereof, which has been subjected to misuse, neglect, accident, improper installation, unequal-loading or loading over and above the recommended weight range. This warranty does not extend to such hoist units or parts which have been repaired or altered outside of our factory or to which any accessories other than SCOTT have been affixed, or to any hoist not installed by an authorized SCOTT dealer or distributor. Tafco's obligation under this warranty is limited to replacement or repair of any part or parts thereof, which within the warranty period shall be returned to our factory, Blue Earth, Minnesota, transportation charges prepaid, for inspection. If such inspection reveals that a defect in the material or manufacturing actually exists, then TAFCO, at its' option, may repair or replace the defective part. All purchase assemblies (such as the hydraulic pump) will be warrantied as per original manufacturer's policy. Pumps and cylinders carry a one year warranty as authorized by the manufacturer.

This warranty will not take effect until the application and registration form, which is provided at the time of the purchase and installation, is completed by the purchaser and returned to TAFCO. TAFCO does not assign to any of its' dealers, distributors or agents the right of warranty on its' behalf. If said dealer or distributor in performing a service or repair, returns to our factory on behalf of the purchaser such parts or hoist, the existence, validity or applicability of this warranty regarding such part or hoist remains solely the prerogative of TAFCO and not its' aforementioned agents.

All warranties must have a transaction number and approval prior to work being performed. TAFCO's policy is that a profit should not be made on warranty work, since this is part of a distributor or dealer function. Repair parts will be provided or replaced at TAFCO's discretion.



TAFCO
EQUIPMENT COMPANY
Highway 16 West- P.O. Box 339
Blue Earth, Mn. 56013
Phone (507) 526-3247

---

WARRANTY VALIDATION CERTIFICATE

No. _____

TO VALIDATE YOUR WARRANTY:
Complete this form and return it to the factory.

Note: Failure to complete and return this form as prescribed invalidates any warranty obligation by Tafco Equipment Co.

_____
Your name or business name

_____
Dealers name

_____
Your address

_____
Dealer's address

Hoist model _____
Date installed _____

Serial number _____
Installed by _____

I have read and fully understand the provisions and limitations of the warranty.

_____ Date _____
Customer's signature

VENCO®

HOISTS

# VC6628

## INSTALLATION & OWNER'S MANUAL

***Sold and Serviced by:***

***12110 BEST PLACE • CINCINNATI, OHIO 45241 • PHONE 1-800-226-2238 • FAX 1-513-326-5427***

***www.venturo.com***

# TABLE OF CONTENTS
# VC6628 OWNER'S MANUAL


| | |
|---|---|
| **SECTION 200** | **INSTALLATION** |
| 520951 | INSTALLATION WARNINGS |
| 416733 | CAUTIONARY NOTICE |
| 662851 | CAPACITY CHART, VC6628 |
| 662867 | VC6628 MOUNTING DIMENSIONS |
| 662864 | HOIST LIFTING HOLE LOCATIONS |
| 416086 | IMPORTANT WARNING |
| 662871 | HOIST MOUNTING INSTRUCTIONS |
| 662872 | HOIST MOUNTING INSTRUCTIONS |
| 662873 | HOIST MOUNTING INSTRUCTIONS |
| 520093 | INSTALLATION INSTRUCTIONS |
| 628861 | HINGE TO BED MOUNTING INSTRUCTIONS |
| 620246 | CABLE / HANDLE ASSEMBLY |
| 416755 | PTO PUMP CABLE INSTALLATION |
| 416763 | SPLIT PUMP |
| 416812 | BI-ROTATIONAL PUMP INSTALLATION |
| 552004 | SPDG HOSE CONNECTION DIAGRAM |
| 416287 | WILLIAMS PTO WARNING |
| 416128 | DECAL LOCATIONS |
| **SECTION 250** | **OPERATIONS** |
| 520952 | OPERATOR WARNINGS |
| 520079 | MAINTENANCE & OPERATION INSTRUCTIONS |
| 416644 | BODY PROP OPERATION GUIDE, GENERAL |
| 628645 | BODY PROP OPERATION GUIDE, ILLUSTRATIONS / INSTRUCTIONS |
| **SECTION 300** | **MAINTENANCE** |
| 662124 | VC6620/6628 HOISTS GREASE POINTS |
| **SECTION 400** | **REPLACEMENT PARTS** |
| 628820 | DECAL LIST |
| 662853 | REPLACEMENT PARTS DWG, VC6628 HOIST |
| 662854 | REPLACEMENT PARTS LIST, VC6628 HOIST |
| 620245 | REPLACEMENT PARTS DIAGRAM, PTO PUMP CABLE/CONCOLE |

USER NOTES (1)
USER NOTES (2)
WARRANTY POLICY

# SECTION 200

# INSTALLATION

VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

# READ THIS FIRST

INSTALLATION WARNINGS

- Read and fully understand entire owner's manual prior to installation.
- Refer to Body Builder's Guide BEFORE welding or drilling on chassis as not to void the chassis warranty.
- When drilling the chassis make sure all brake lines, wire harnesses, and hoses are protected so as not to cause damage to these items resulting in failure. All fasteners must be installed so they do not interfere with these items as well.
- Cover all fuel related items (hoses, brake lines, wiring, etc.) so as not to cause fire or explosions that will result in serious injury or death.
- Route all wiring and hoses away from exhaust systems. Heat from exhaust systems can cause melting of wiring and hoses, resulting in fire and/or explosions that could result in serious injury or death.
- Only use body prop when vehicle is on firm level ground, and with an UNLOADED body only!
- NEVER work under a raised body without the use of the body prop. Failure to do so can cause serious injury or death.
- Hydraulic system must be designed to work within the manufacturer's specifications. Systems with more flow or PSI can cause hoist to fail during the dumping of a load; which could cause damage, serious injury or death.
- NEVER adjust factory relief valve settings without consulting with the factory.
- Fluid under pressure can pierce the skin and enter the bloodstream, causing serious injury or death. Always wear eye protection and protective clothing when working around hydraulic systems.
- NEVER operate hoist from outside the cab. Doing so can cause serious injury or death.
- NEVER perform maintenance on a Hoist without applying the following:
  - Chassis brake set and engine turned off
  - Removing battery cable, if necessary
  - Properly deploying the Hoist body prop

▲ - Venco hoists are designed for and intended to be used on stationary trucks dumping on firm and level ground. Spreading applications and/or shock unloading are strictly prohibited and will void this warranty.

# !! READ THIS FIRST !!

## BE SURE TO DO THE FOLLOWING, AND YOU WILL AVOID THE MOST COMMON INSTALLATION MISTAKES.

▲1. HOIST MUST BE LEVEL
1.1. SEE APPLICABLE PAGE : 416086

2. MUST HAVE 2" SPACE
2.1. SEE APPLICABLE PAGE : 416086

▲3. SUFFICIENT OVERHANG
3.1. SEE APPLICABLE PAGE :

| | |
|---|---|
| VC416 : | 416266 |
| VC516 : | 516203 |
| VC520 NON SUB-FRAME : | 520601 |
| VC520 W/ SUB-FRAME : | 520602 |
| VC620 NON SUB-FRAME : | 620103 |
| VC620 W/ SUB-FRAME : | 620104 |
| VC628 : | 628020 |
| VC6620 : | 662052 |
| VC6628 : | 662851 |

4. USE PUMP WHICH MEETS VENCO SPECIFICATION(S)
4.1. SEE APPLICABLE PAGE : 416763

# VENCO HOIST MODEL VC6628

CAPACITIES ARE BASED ON WATER LEVELS AND NON-DIMINISHING LOADS. DUE TO THE VARIATIONS IN TRUCK EQUIPMENT AND CAB-AXLE LENGTHS (CA), *THE DATA PROVIDED ON THIS PAGE IS TO BE USED AS A GUIDELINE ONLY*.

DUMP CLASS: 90 CONVERSION CLASS: J WEIGHT: 1200 LBS.

POWER SOURCE:

- ES - ELECTRIC SINGLE CTING
- ED - ELECTRIC DOUBLE ACTING
- PD - POWER TAKE OFF DOUBLE ACTING

ADDITIONAL DATA:

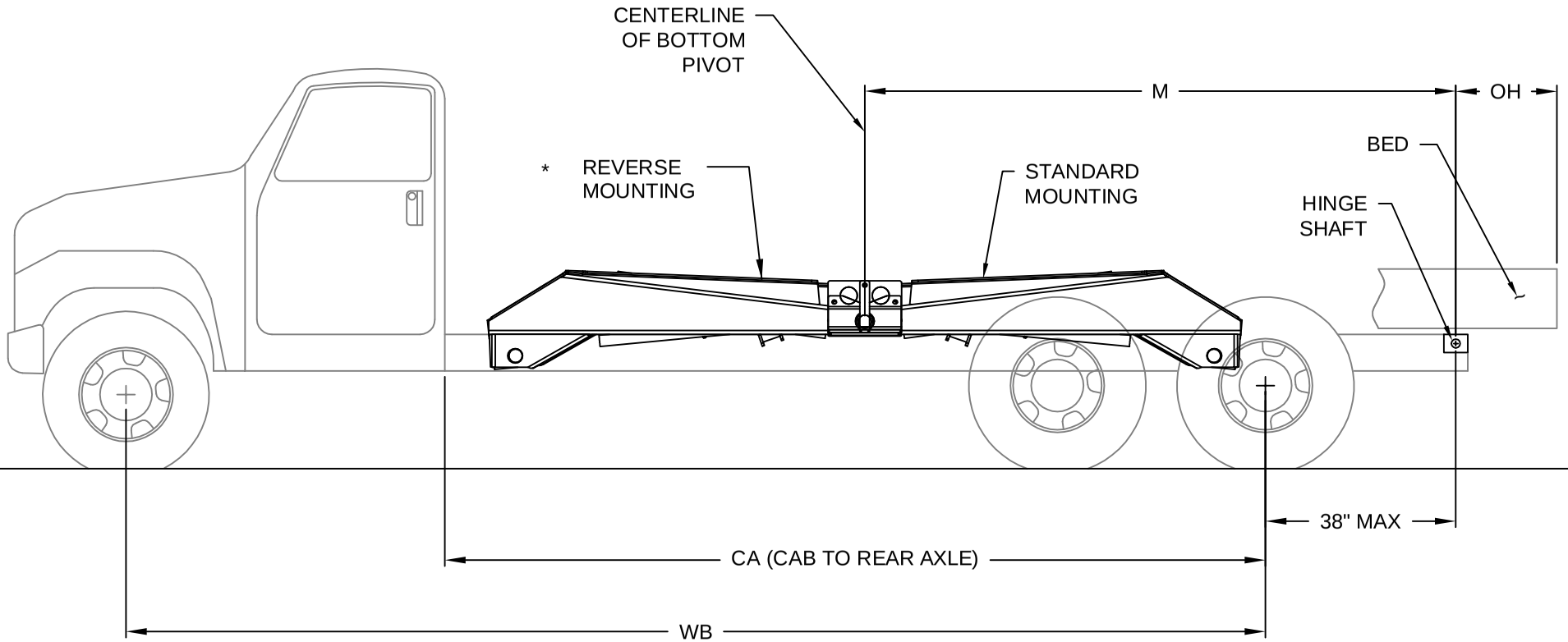
- DUAL CYLINDERS, 6" BORE x 28" STROKE
- CA: 138"-252" CT: 126"-240"
- DUMP ANGLE: 40° - 50°
- MOUNTING HEIGHT REQ'D: 10-1/2"

| CONVERSION APPLICATIONS VC6628 | | | | | |
|---|---|---|---|---|---|
| BODY | CA | CT | O.H. | 45° (TON) | 50°(TON) |
| 18' | 138" | 126" | 48" | 35.7 | 32.4 |
| 18' | 144" | 132" | 42" | 32.4 | 29.4 |
| 18' | 150" | 138" | 36" | 29.7 | 27.0 |
| 18' | 156" | 144" | 30" | 27.4 | 24.9 |
| 18' | 162" | 150" | 24" | 25.5 | 23.1 |
| 18' | 168" | 156" | 18" | 23.8 | 21.6 |
| 18' | 174" | 162" | 12" | 22.3 | 20.2 |
| 18' | 180" | 168" | 6" | 21.0 | 19.0 |
| 20' | 162" | 150" | 48" | 29.7 | 27.0 |
| 20' | 168" | 156" | 42" | 27.4 | 24.9 |
| 20' | 174" | 162" | 36" | 25.5 | 23.1 |
| 20' | 180" | 168" | 30" | 23.8 | 21.6 |
| 20' | 186" | 174" | 24" | 22.3 | 20.2 |
| 20' | 192" | 180" | 18" | 21.0 | 19.0 |
| 20' | 198" | 186" | 12" | 19.8 | 18.0 |
| 20' | 204" | 192" | 6" | 18.8 | 17.0 |
| 22' | 186" | 174" | 48" | 25.5 | 23.1 |
| 22' | 192" | 180" | 42" | 23.8 | 21.6 |
| 22' | 198" | 186" | 36" | 22.3 | 20.2 |
| 22' | 204" | 192" | 30" | 21.0 | 19.0 |
| 22' | 210" | 198" | 24" | 19.8 | 18.0 |
| 22' | 216" | 204" | 18" | 18.8 | 17.0 |
| 22' | 222" | 210" | 12" | 17.8 | 16.2 |
| 22' | 228" | 216" | 6" | 17.0 | 15.4 |
| 24' | 210" | 198" | 48" | 22.3 | 20.2 |
| 24' | 216" | 204" | 42" | 21.0 | 19.0 |
| 24' | 222" | 210" | 36" | 19.8 | 18.0 |
| 24' | 228" | 216" | 30" | 18.8 | 17.0 |
| 24' | 234" | 222" | 24" | 17.8 | 16.2 |
| 24' | 240" | 228" | 18" | 17.0 | 15.4 |
| 24' | 246" | 234" | 12" | 16.2 | 14.7 |
| 24' | 252" | 240" | 6" | 15.5 | 14.1 |

| DUMP BODY APPLICATIONS VC6628 * | | | | | |
|---|---|---|---|---|---|
| BODY | CA | CT | O.H. | 45° (TON) | 50°(TON) |
| 12' | 102" | 90" | 12" | 35.7 | 32.4 |
| 13' | 114" | 102" | 12" | 32.4 | 29.4 |
| 14' | 126" | 114" | 12" | 29.7 | 27.0 |
| 15' | 138" | 126" | 12" | 27.4 | 24.9 |
| 16' | 150" | 138" | 12" | 25.5 | 23.1 |
| 18' | 174" | 162" | 12" | 22.3 | 20.2 |

* VENCO hoists are designed for and intended to be used on stationary trucks dumping on firm and level ground. Spreading applications and/or shock unloading are strictly prohibited abd will void this warranty.

# VC6628 HOIST MOUNTING DIMENSIONS




STANDARD MOUNTING

| DUMP ANGLE | M |
|---|---|
| 40° | 146" |
| 45° | 130-1/2" |
| 50° | 118-1/4" |

FIGURE 1.C

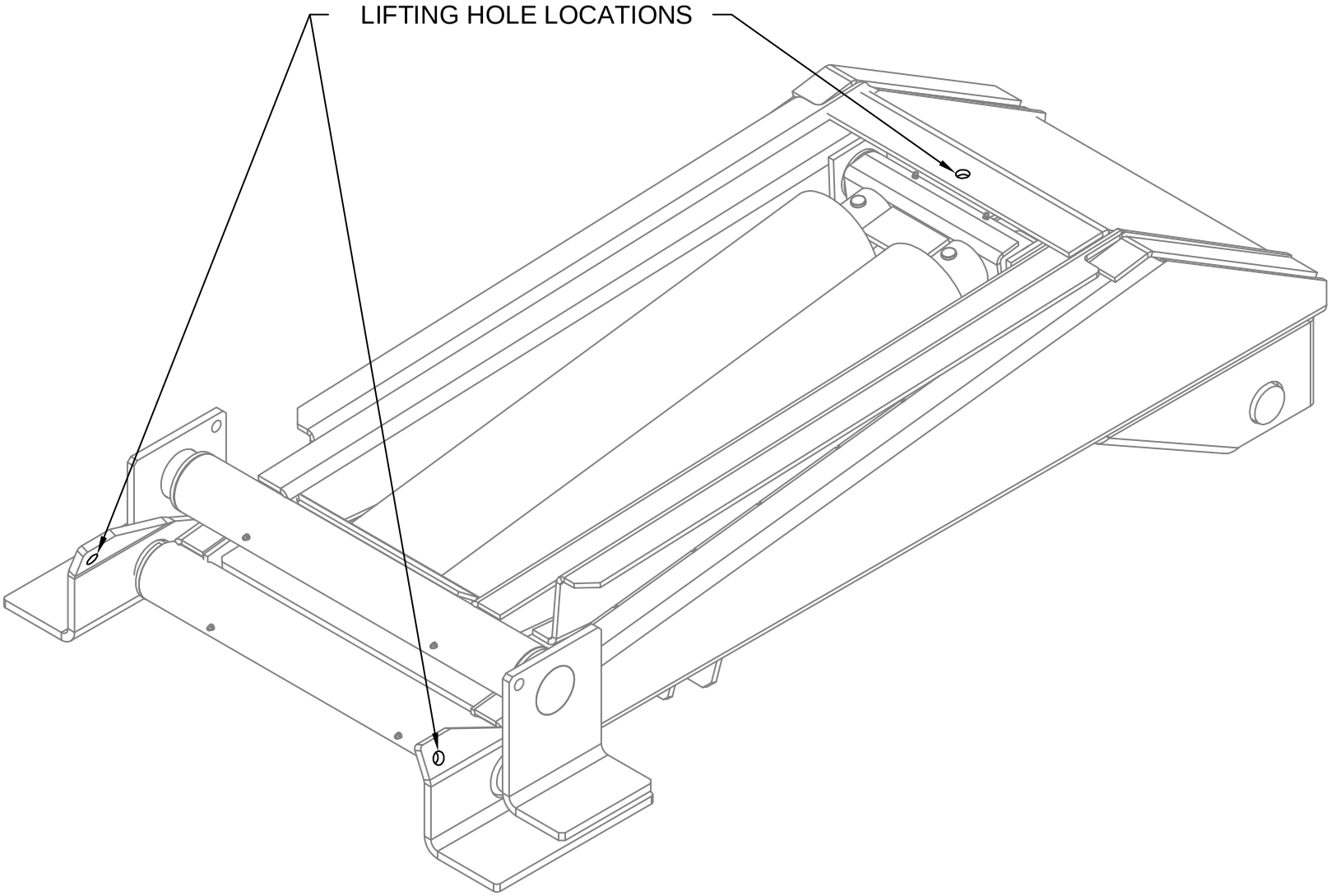
*REVERSE MOUNTING

| DUMP ANGLE | M |
|---|---|
| 40° | 140" |
| 45° | 129" |
| 50° | 115" |

VENCO®

VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

| TITLE | DATE | SECTION |
|---|---|---|
| MOUNTING DIMENSIONS | 10-05-16A | H200 |
| VC6628 | SUPERSEDES 12-16-15 | 662867 |




VENCO®

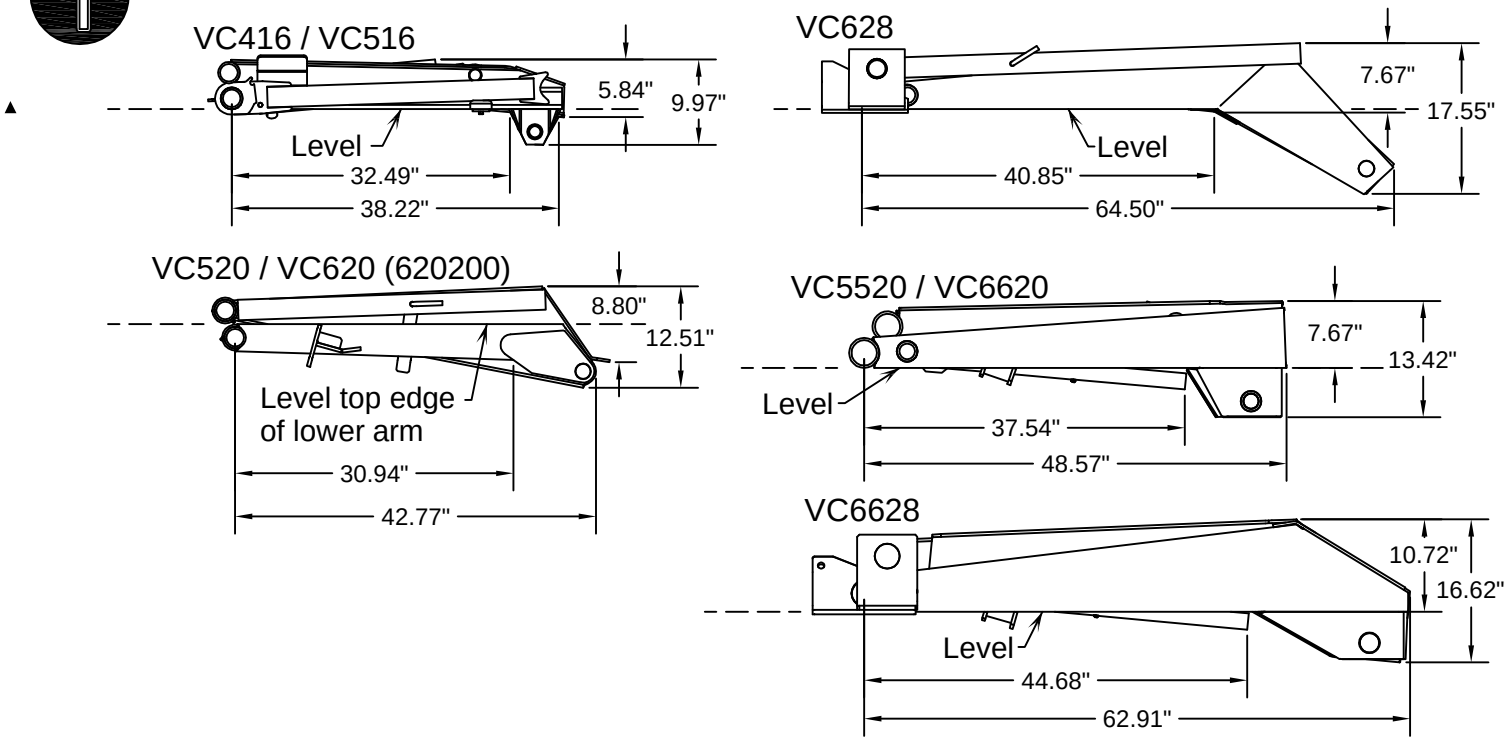
VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

| TITLE | DATE | SECTION |
|---|---|---|
| HOIST LIFTING HOLE LOCATIONS | 12-17-15B | - |
| VC6628 | SUPERSEDES 03-11-05A | 662864 |

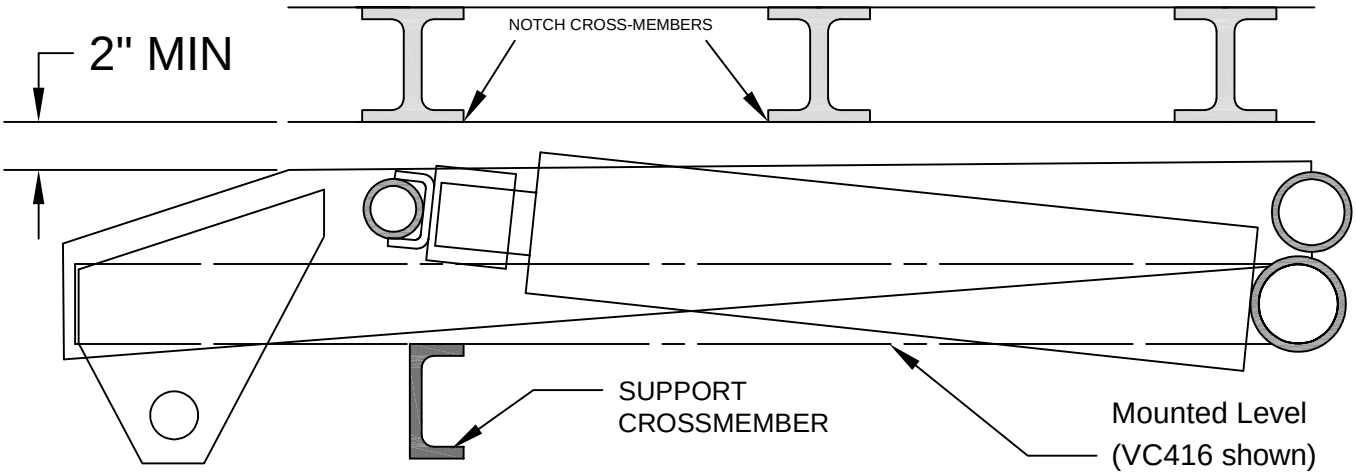
# !! IMPORTANT WARNING !!

## * ALL VENCO CONVERSION HOISTS → VC416 THRU VC6628 *

**1** When installing the hoist, be sure to keep the hoist on a horizontal plane - LEVEL - with the truck frame.




**2** !! IMPORTANT !!
A minimum clearance of 2" is required between the hoist (upper arm) and the body cross-members in order to prevent a mechanical lockout. If clearance is less than 2", then cross-members must be notched above arms.




!! IMPORTANT !!
THE HOIST SCISSOR MUST BE SUPPORTED WITH A CHASSIS-MOUNTED SUPPORT CROSSMEMBER. IF THE TRUCK CHASSIS DOES NOT HAVE A CROSSMEMBER TO SUPPORT THE HOIST IN A 'LEVEL' POSITION, THE INSTALLER 'MUST' INSTALL A SUPPORT CROSSMEMBER AS SHOWN ABOVE.

# HOIST MOUNTING INST. - VC6628

Refer to Capacity Chart drawing 662851.

**⚠ C A U T I O N ⚠**

- If the distance between the center of the rear axle and the rear hinge assembly exceeds 38", additional reinforcement of the truck frame is necessary

A. Mark the location for the rear hinge. Ideally, this location will be immediately behind a truck cross member, approximately 38" behind the center of the rear axle on a single axle truck (see drawing 662867).

B. Cut a 90º slot in each side of the frame as shown in Figure 2 below.

C. Position the angle iron frame of the rear hinge assembly in the truck frame cut-outs. Make sure the rear hinge assembly is properly positioned on the truck frame. Weld all around truck frame rear hinge assembly joint (both sides). See DWG 628861 for information regarding the mounting of the Rear Hinge Brackets to the body.

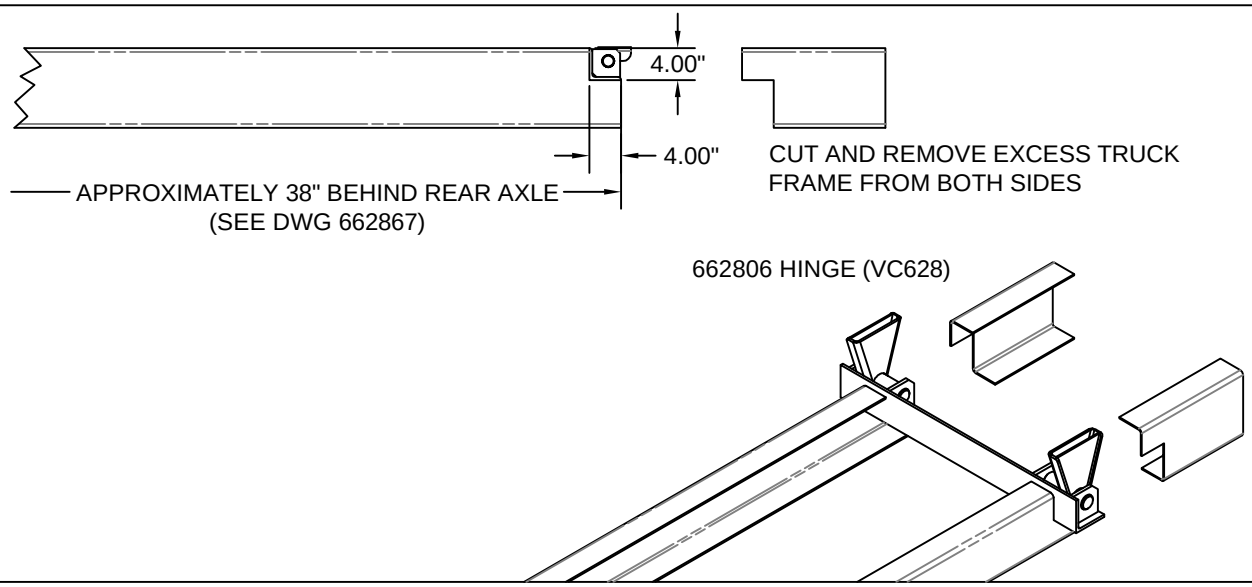



Figure 2 - Frame Modification and Rear Hinge Attachment

D. Locate the hoist on the truck frame, making sure to center and square the hoist to the truck frame. The VC hoist is designed to rest on the truck frame. A section of the hoist extends below the truck frame level. Therefore, the hoist may have to be moved slightly forward or backwards to avoid frame crossmembers. The distance between the rear hinge assembly center and the center of the lower pivot is referred to as the "M Dimension" The table on Mounting Dimensions drawing 662867 provide the dump angles associated with the "M Dimensions.

Note: Moving the hoist along the truck frame will affect the hoist's performance. A forward movement (towards the cab) decreases dump angle and increases capacity. A backwards movement increases dump angle and decreases capacity. Reference Capacity Chart drawings 662851.

# HOIST MOUNTING INST. - VC6628

E. After the hoist is positioned, place the mounting angles (Figure 3) under the lower pivot angles and against the truck frame. Clamp securely in place. Drill through the frame and install the mounting angle with two [2] 1/2-13 x 1-1/2" Grade 8 hex head cap screws, lock washers, hex nuts, and four [4] flat washers (both sides).

**⚠ C A U T I O N**

- The hoist lower pivot assembly must sit flush on the truck frame. If rivet head interference is encountered, use a filler block or countersink clearance holes in the bottom of the pivot assembly. DO NOT weld hoist mounting angle to truck frames - this may void the truck warranty.

F. Weld each end of the lower pivot angle to its mounting angle as shown in Figure 3. Note the welding symbols. Do not weld to the truck frame.

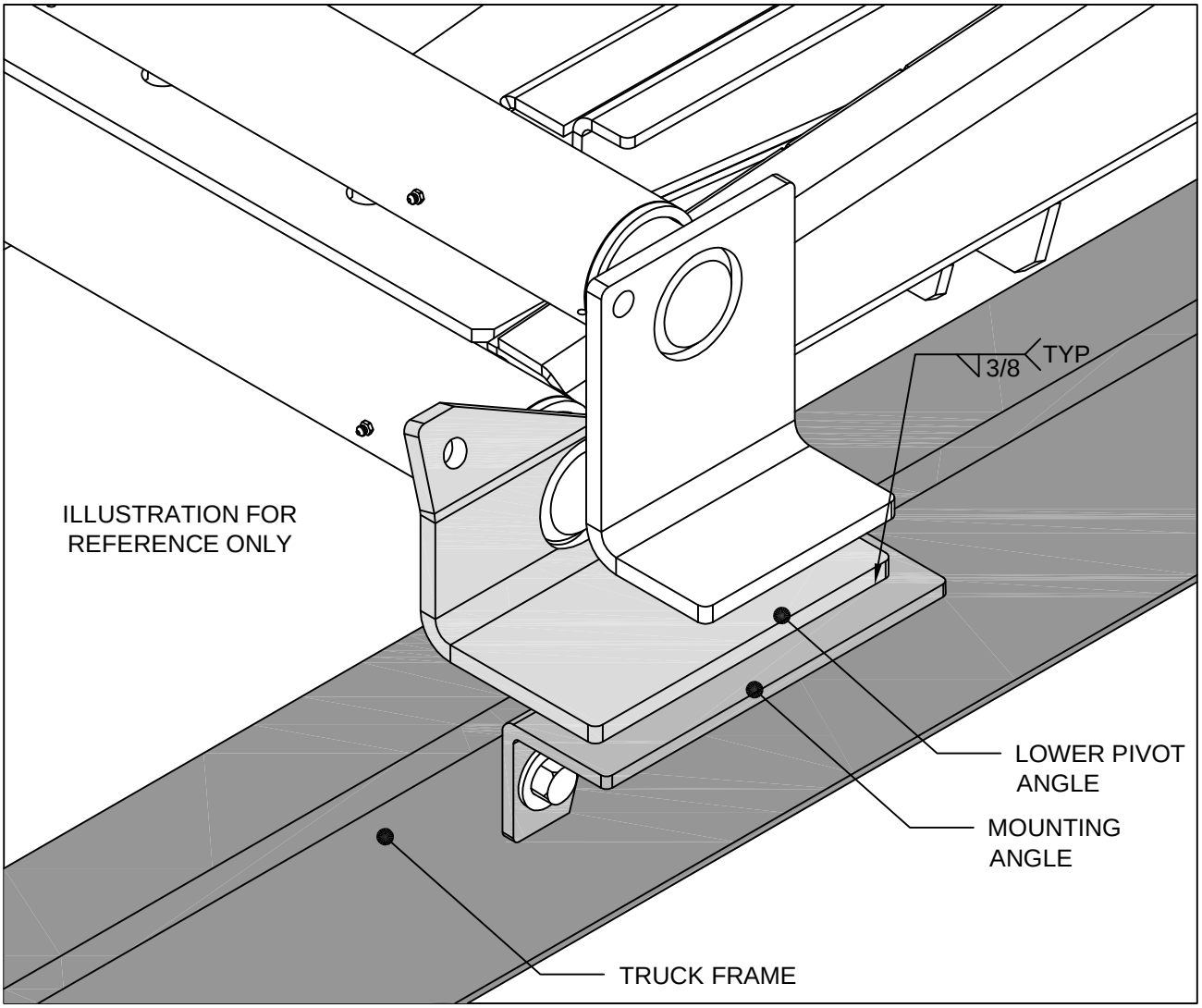



Figure 3. Mounting angle assembly.

# HOIST MOUNTING INSTRUCTIONS (CONT.)

G. Install hydraulic hoses per the following instructions:

1. 7' (or 7'-10") hose(s) installation - Connect one end of the hose to the front pump port (low pressure). Connect the other end of the hose to the rod end of the hoist cylinder (Figure 5).

2. 5' hose(s) installation - Connect one end of the hose to the rear pump port (high pressure). Connect the other end of the hose to the base end of the hoist cylinder (Figure 5).

H. Position and secure the filler strips (liner or sleeper) to the truck frame.

The VC6628 requires a minimum of 10-1/2" clearance above the truck frame.

NOTE: If the hoist needs to be mounted higher due to interference between the hoist knuckle and the truck frame, additional clearance above the truck frame will be required.

EXAMPLE:
Assuming that an 10-1/2" clearance is required and 6" long beams are on the truck body, a liner of at least 4 1/2" net will be required to obtain the minimum clearance required to mount the hoist.

6" + 4 1/2" = 10-1/2" minimum

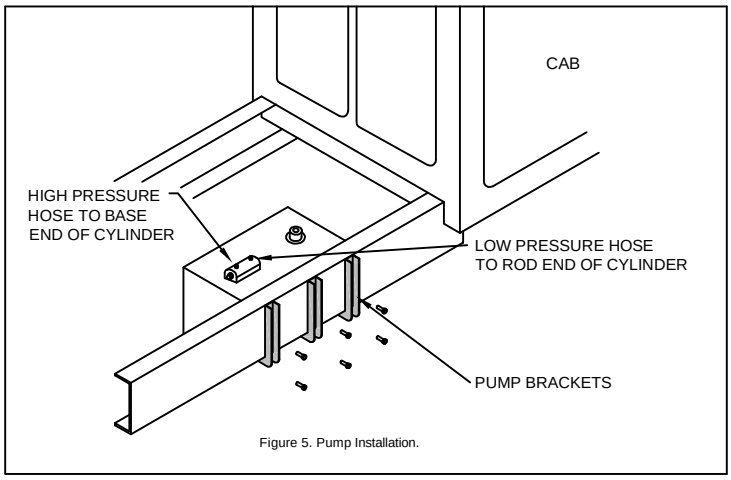


Figure 5. Pump Installation.

I. Position the body longitudinals (long beams) onto the truck frame / sub-frame.

NOTE: At least 2" clearance between the cab and closest point on the truck body is required.

J.

a. STANDARD HINGE (662806)
With the body aligned with the truck frame, push the hinge rockers outward as far as possible. Ensure that the longitudinal rails are sitting flat on the rockers, weld the body longitudinals to rockers (DWG 662871 Figure 2). See installation DWG 628861 for more information regarding the mounting of the rear hinge rockers to the body.

K. ***Refer to DWG 520093 on the following page***. Make sure that the dump body longitudinals are resting flush on the top of the lifting angles. Weld the top of both lifting angles (the vertical 'leg') to the top flanges of the body longitudinals - a reinforcement plate may be required to fill the space between the lifting angles and body longitudinals. Weld all around the lifting angles, body longitudinals, and reinforcement plates (if applicable). **Be sure that your installation follows the method shown on the following page** (DWG 520093).

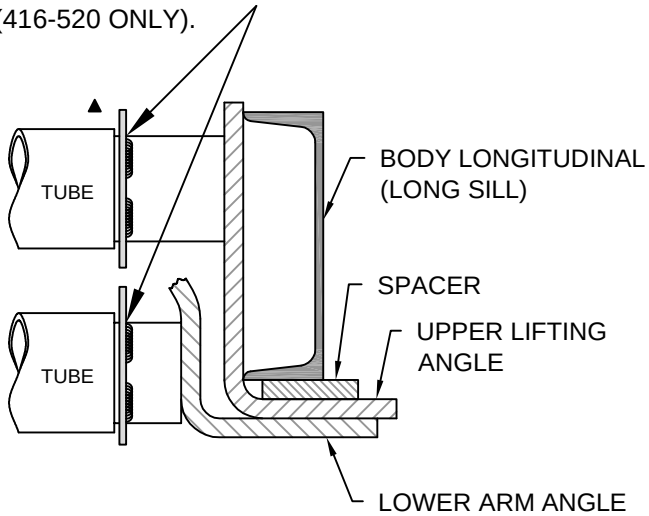
**C A U T I O N**

- Step "K" (above) is a critical installation procedure that must be carefully followed to ensure a successful hoist installation. Deviation from the suggested installation method may result in damage to the hoist.

IMPORTANT!
WHEN INSTALLING THE UPPER LIFTING ANGLES, THE GOAL IS TO COMPLETELY "BOX IN" THE LIFTING ANGLE, BODY LONG SILL SPACER, AND REINFORCEMENT PLATE - 100% WELD.

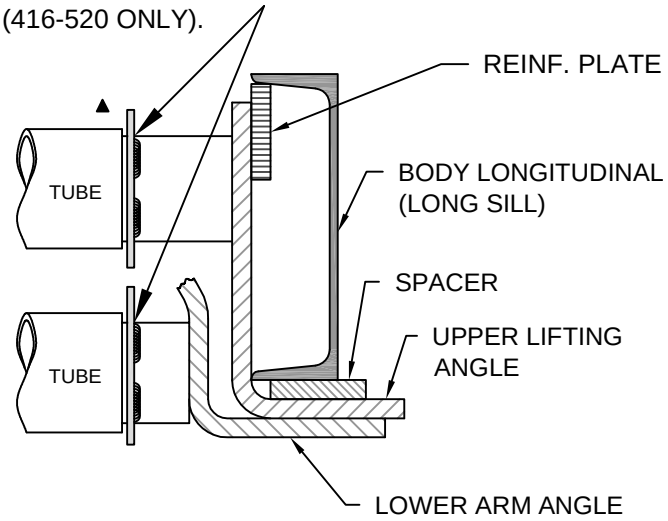
## SITUATION A:
## LIFTING ANGLE FULLY ENVELOPS BODY LONG SILL.

▲ COLLAR SHOULD BE PROPERLY LOCATED AND STITCH WELDED TO PIVOT ROD TO LIMIT SIDE-TO-SIDE MOVEMENT OF SCISSORS (416-520 ONLY).

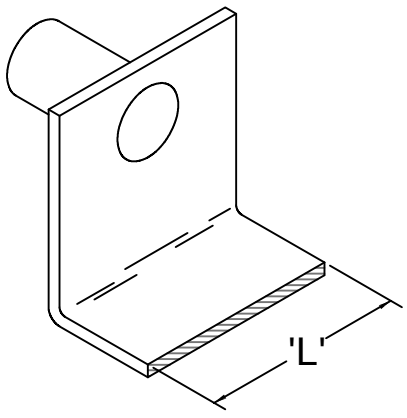



## SITUATION B:
## LIFTING ANGLE DOES NOT ENVELOP BODY LONG SILL AND A REINFORCEMENT PLATE IS REQUIRED.

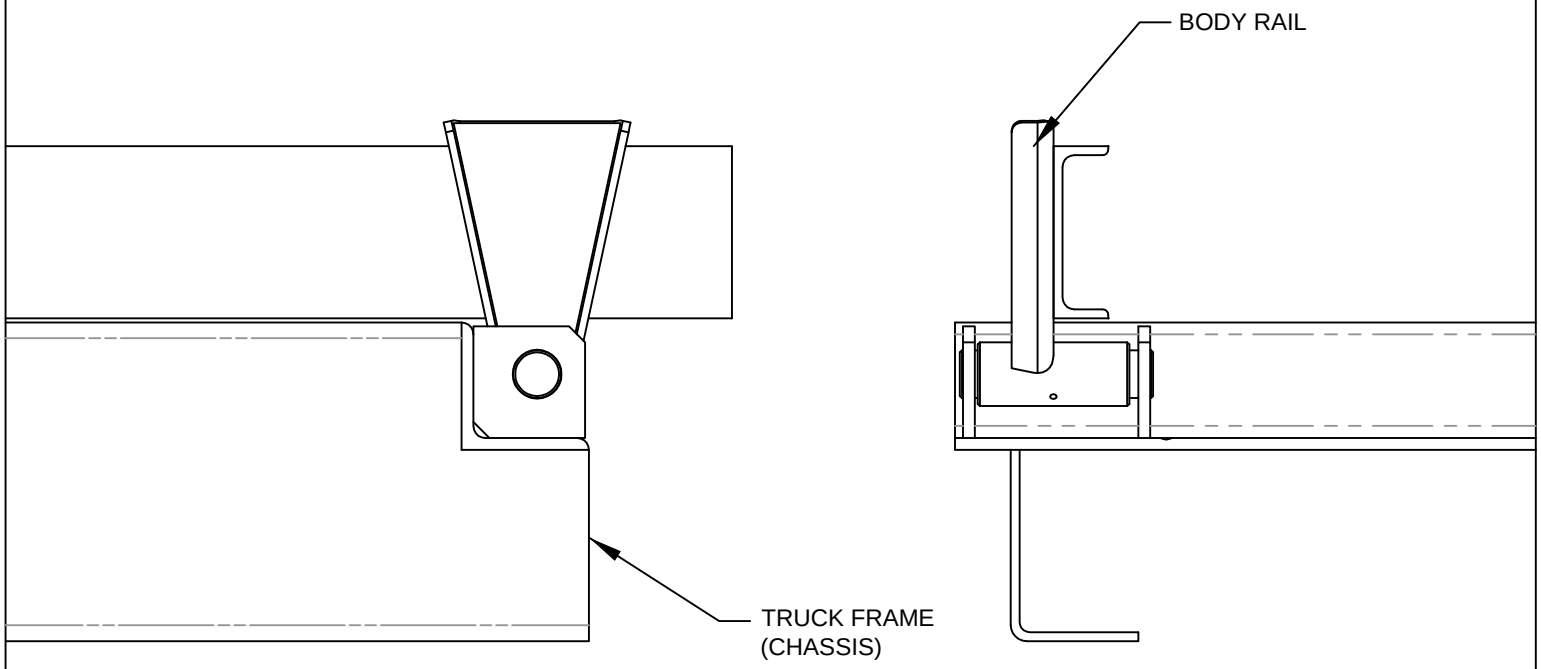
▲ COLLAR SHOULD BE PROPERLY LOCATED AND STITCH WELDED TO PIVOT ROD TO LIMIT SIDE-TO-SIDE MOVEMENT OF SCISSORS (416-520 ONLY).



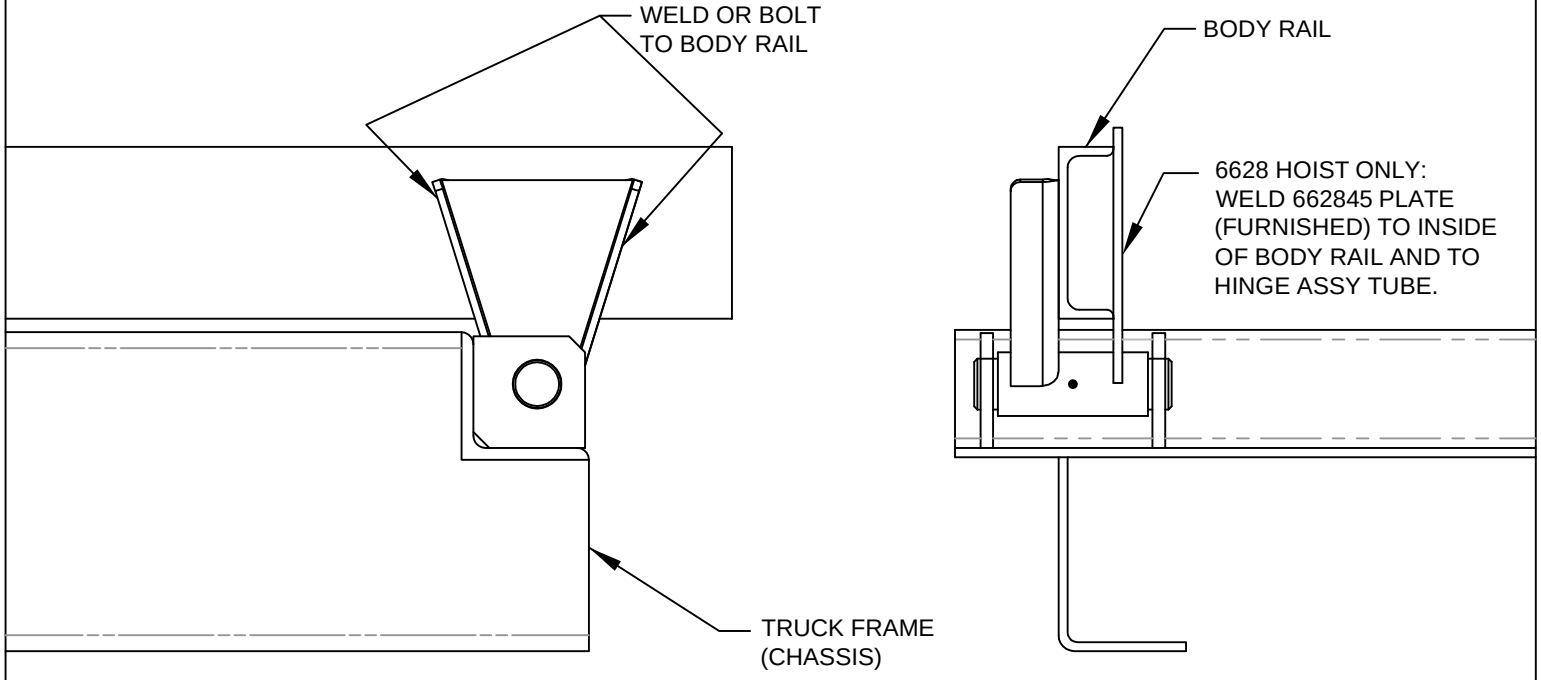

NOTE: THE SPACER AND REINFORCEMENT PLATE SHOULD BE THE SAME LENGTH AS THE LIFTING ARM. SEE 'L' DIMENSION BELOW.



# HINGE MOUNTING INST. VC628 - 6628




662057-1 HINGE
VC628-6620




662806 HINGE
VC6628 ONLY

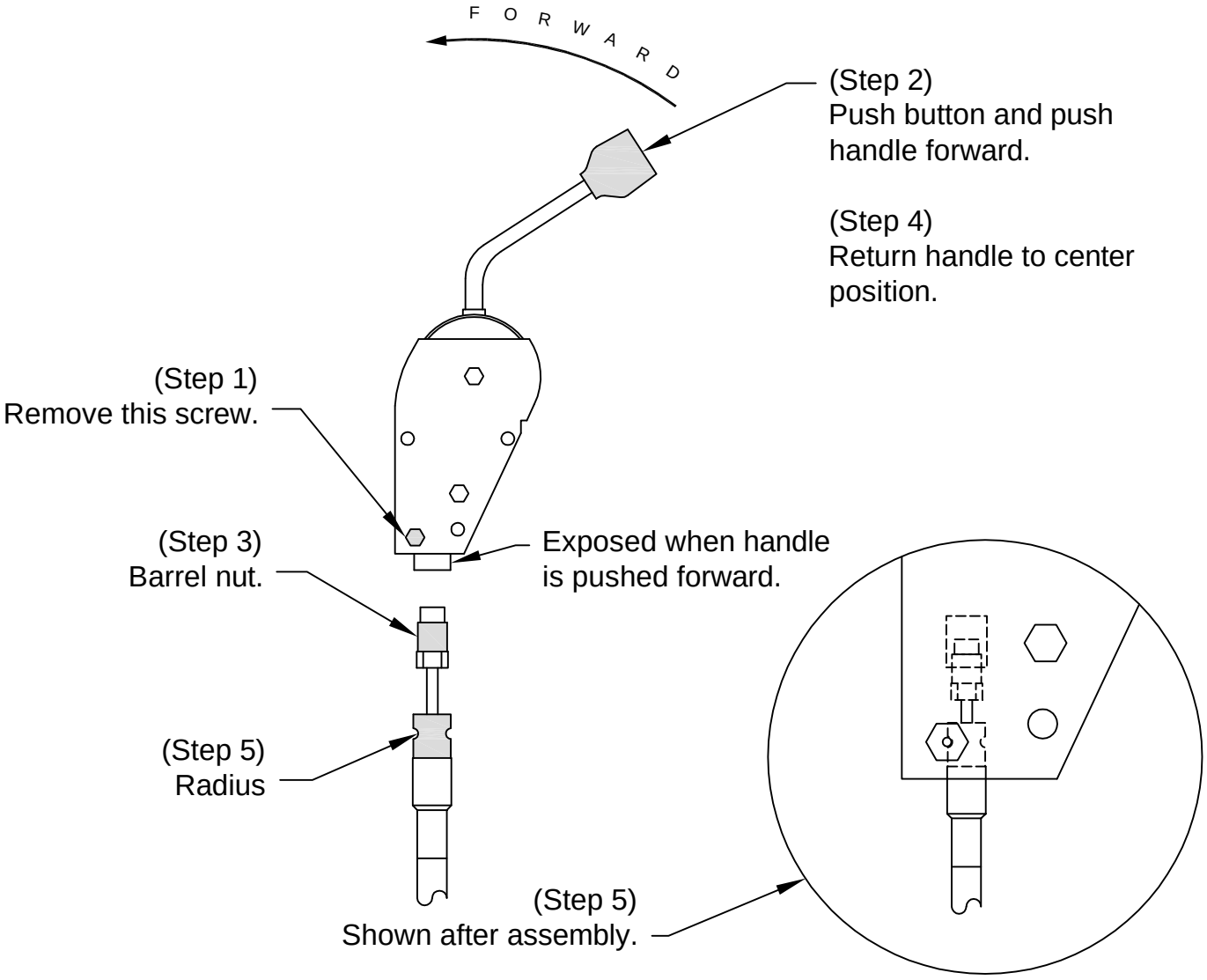
VENCO®

VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

| TITLE | DATE | SECTION |
|---|---|---|
| HINGE TO BED MNTG | 12-08-15 | H200 |
| VC628-6628 | SUPERSEDES - | 628861 |

# ATTACHING 620129 CABLE TO 620131 / 132 HANDLE

Step 1. Remove lowest screw & nut.
Step 2. Depress red button on top of handle. Push handle forward and hold.
Step 3. While holding handle, thread "barrel nut" into threaded hole in bottom and tighten.
Step 4. Release handle. Handle should return to center positon.
Step 5. Replace screw & nut, making sure that radius on cable end is aligned with screw hole. After tightening screw, move handle forward and backward to make sure cable end is secure in console.



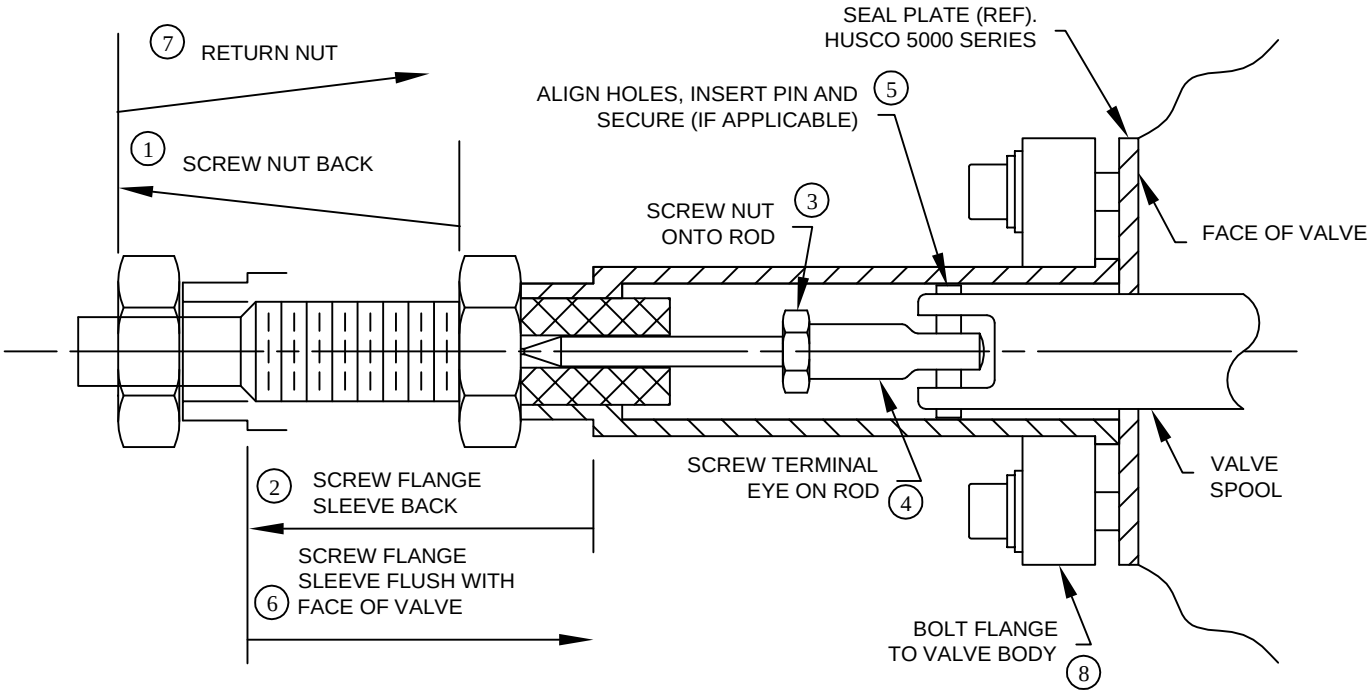

| | | | |
|---|---|---|---|
| VENCO® VENCO VENTURO INDUSTRIES LLC CINCINNATI, OHIO | TITLE: CABLE / HANDLE ASSY | DATE: 11-05-15B | SECTION: - |
| | PTO PUMP CABLE | SUPERSEDES: 03-17-14A | 620246 |

# PTO PUMP CABLE INSTALLATION

1. Thread 0.750-16 UNF jam nut entire length of threaded hub and onto cable.
2. Place flange on sleeve and turn flange / sleeve assembly entire length of threaded hub and onto cable.
3. Threade 0.250-28 UNF jam nut onto threaded rod until it bottoms.
4. Thread terminal eye onto threaded rod and bottom against jam nut, turn to align with spool slot and secure jam nut against terminal eye.
5. Slide terminal eye into slot in spool and align holes. Insert connecting pin and secure with cotter pin (if applicable).
6. With cable attached to valve and input device, thread the flange / sleeve assembly onto the threaded hub until it is flush with the valve face. When turning the flange / sleeve assembly, make sure the input device remains in the neutral position.
7. Tighten the 0.750-16 UNF jam nut against the sleeve to lock in position.
8. Bring flange into position and bolt assembly to valve housing using two [2] socket head cap screws and two [2] split lock washers under head and two [2] flat washers under lockwashers. Tighten screws sufficiently to flatten lock washers or secure flange (see CAUTION).

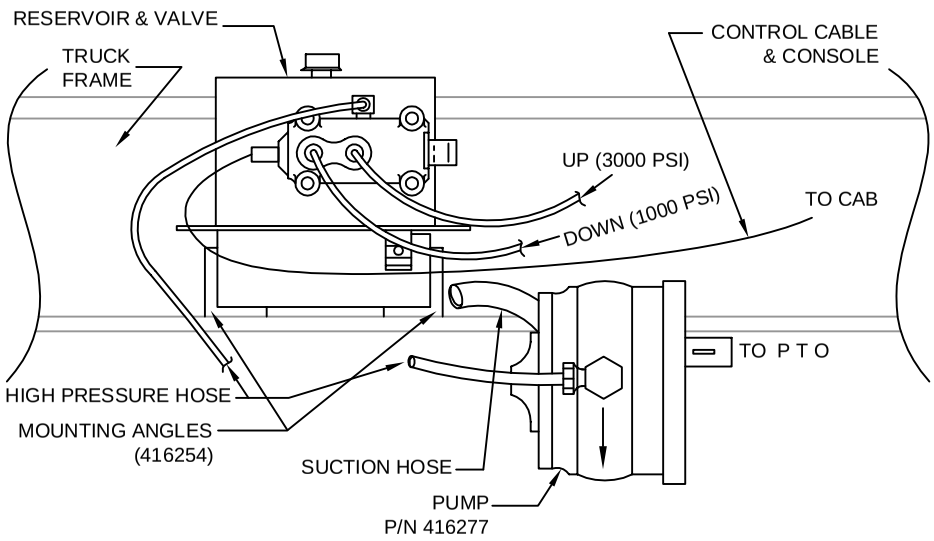
**⚠ CAUTION**

- Excessive torque or over-tightening will distort flange.



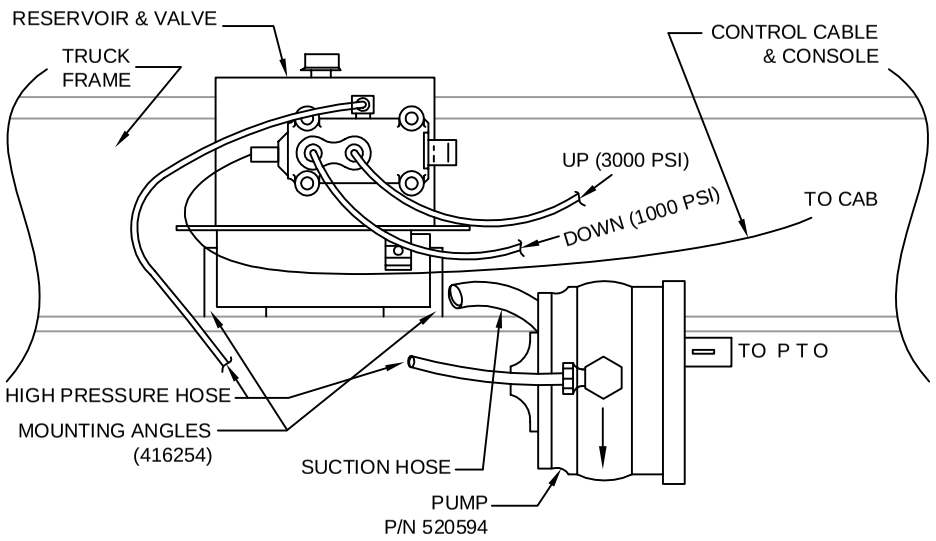

| | | | |
|---|---|---|---|
| VENCO VENTURO INDUSTRIES LLC<br>CINCINNATI, OHIO | TITLE<br>PTO PUMP CABLE INSTL | DATE<br>11-05-15B | SECTION<br>- |
| | VC416-6628 | SUPERSEDES<br>03-17-14A | 416755 |

## DIRECTIONAL PUMP CONFIGURATION FOR VC416-620




NOTE: ARROW ON PUMP HOUSING INDICATED ROTATION DIRECTION. FAILURE TO MATCH PTO ROTATION WITH PUMP ROTATION **WILL RESULT IN PUMP FAILURE**.

## BI-DIRECTIONAL PUMP CONFIGURATION FOR VC628 & UP




NOTE: FOR BI-ROTATIONAL PUMP MOUNTING AND HOSE CONNECTION INFORMATION, SEE DWG 416812 (IF APPLICABLE).

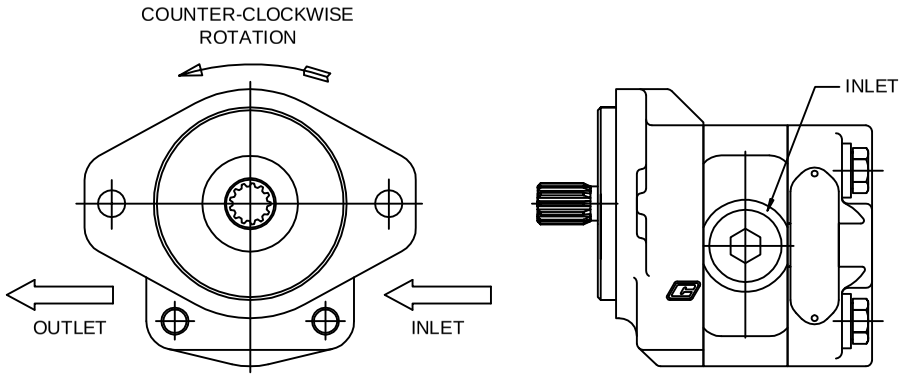
| Model | VC416 | VC516 | VC520 | VC620 | VC628 | VC5520 | VC6620 | VC6628 |
|---|---|---|---|---|---|---|---|---|
| Control Cable & Console | 620125 - Curved 620124 - Straight | | | | | | | |
| Cylinder Up Hose | 416044 | | 520574 | | | (2) 520574 | | |
| Cylinder Down Hose | 416045 | | | | 628041 | (2) 416045 | | (2) 628041 |
| High Pressure Hose (pump to valve) | 416045 (7' LG, 3/8 HOSE) | | | 620909 (10' LG, 3/8 HOSE) FOR VC620 NON-SF | 620909 (10' LG, 3/8 HOSE) | | | |
| | | | | 416045 (7' LG, 3/8 HOSE) FOR VC620 SF | | | | |
| Suction Hose (reservoir to pump) | 416079 (7' LG, 1.00" I.D.) | | | 620910 (10' LG, 1.00" I.D.) FOR VC620 NON-SF | 520088F (10' LG, 1-1/4" I.D.) | | | |
| | | | | 416079 (7' LG, 1.00" I.D.) FOR VC620 SF | | | | |
| Pump/Valve/Tank | 620011 (9 QUART) | | | | 662077 (21 QUART) | | | |
| Pump (Only) | 416277 | | | | 520594 | | | |

# BI-ROTATIONAL PUMP INSTALLATION

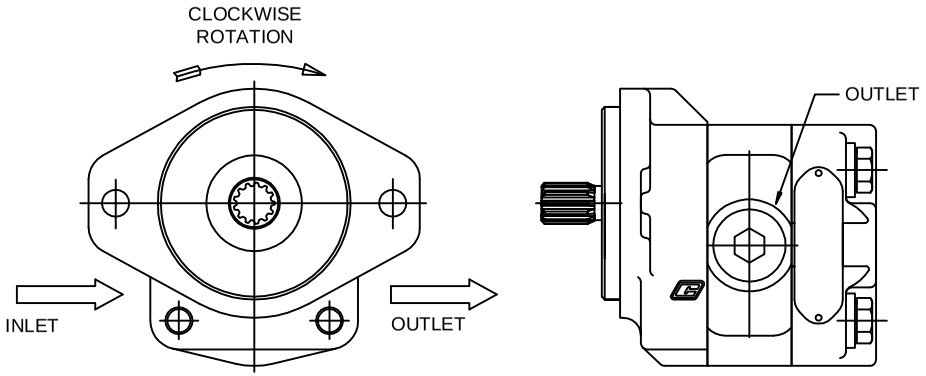
TO VERIFY THE INLET PORT ON A BI-ROTATIONAL PUMP, DETERMINE WHICH WAY THE SHAFT OF THE PUMP IS GOING TO TURN FROM THESE TWO SAMPLE DIAGRAMS AND PLUMB ACCORDINGLY.

**NOTE:** **DO NOT OPERATE THE PUMP WITHOUT OIL**.

CLOCKWISE ROTATION PTO REQUIRES
COUNTER-CLOCKWISE ROTATION PUMP

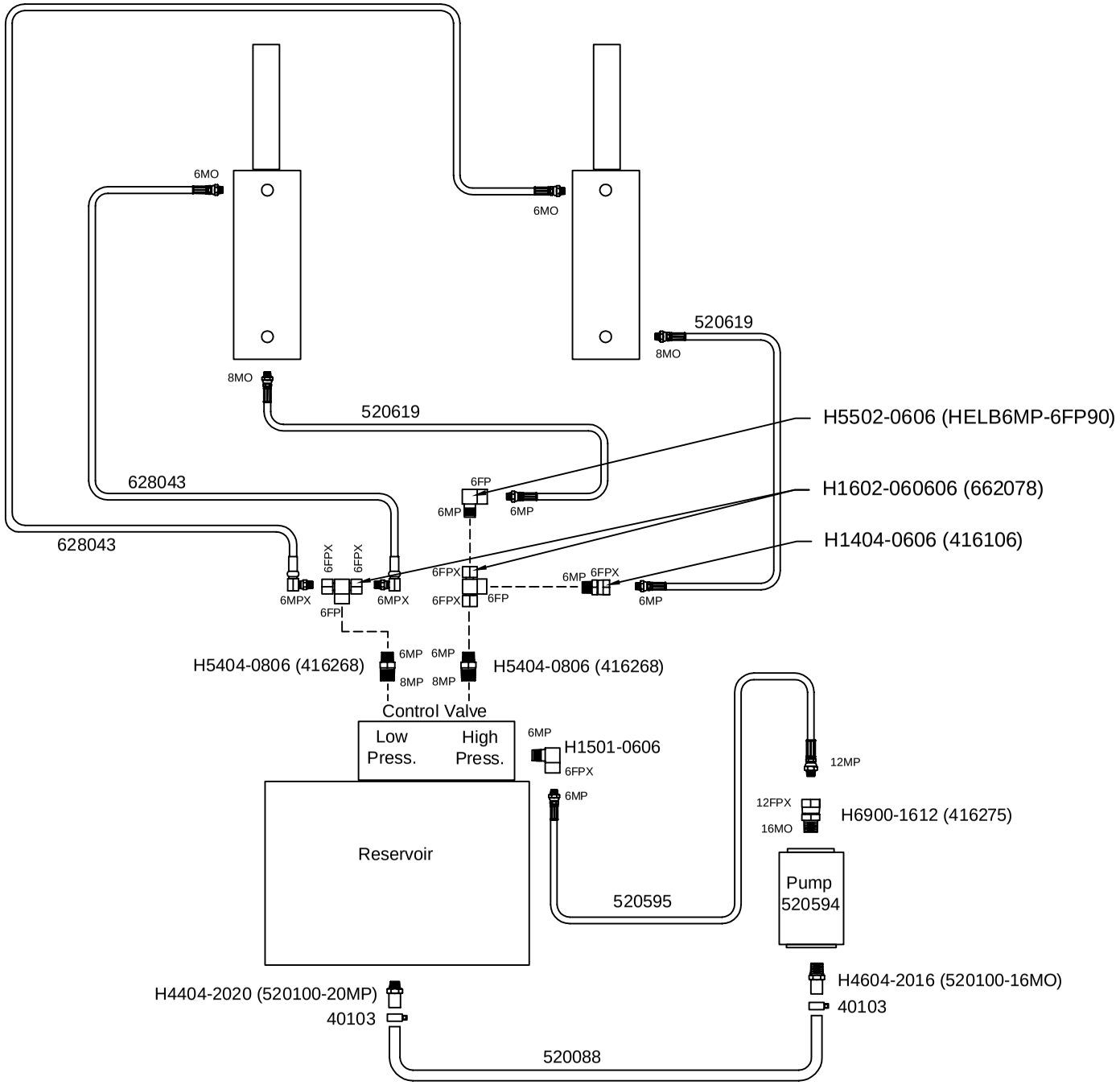



COUNTER-CLOCKWISE ROTATION PTO
REQUIRES CLOCKWISE ROTATION PUMP




VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

| TITLE | DATE | SECTION |
|---|---|---|
| BI-ROTATIONAL PUMP INSTALLATION | 12-09-15A | - |
| VC628-6628 | SUPERSEDES 06-02-05 | 416812 |




VENCO®

VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

| TITLE | DATE | SECTION |
|---|---|---|
| SPDG HOSE CONNECTION DIAGRAM | 09-09-16C | - |
| VC6620/6628 | SUPERSEDES 07-20-16B | 552004 |

Williams® Machine & Tool Co.

MANUFACTURERS OF HYDRAULIC PISTON PUMPS

## ⚠ CAUTION ⚠

- The gear pump you have purchased is a single rotation Gear Pump. Installation of this Gear Pump into a system that does not match the rotation of the Gear Pump may result in personal injury and/or property damage.

The Gear Pump you have purchased is a single rotatation Gear Pump. The direction of rotation can be found by using the Williams Machine and Tool Co.'s Model Number. Directly following the Model Number are the letters CCW or CW. These letters indicate the direction of rotation for the Gear Pump. CCW indicates a counter-clockwise rotation. CW indicates a clockwise rotation. Pump shaft rotation is determined by viewing pump from the shaft end.

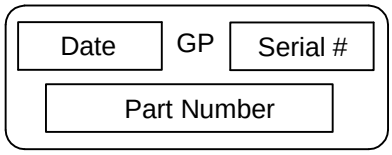
Example: GP1538 CCW. The CCW indicates a counter-clockwise roation.

To verify the direction of rotation of your Gear Pump, perform the following steps:

1.) Locate the Part Number on the Gear Pump. The Part Number, Serial Number, and date code are located on the rear of the Gear Pump.

2.) Part Numbers ending in an even number are clockwise roation (CW). Part Numbers ending in an odd number are counter-clockwise rotation (CCW).

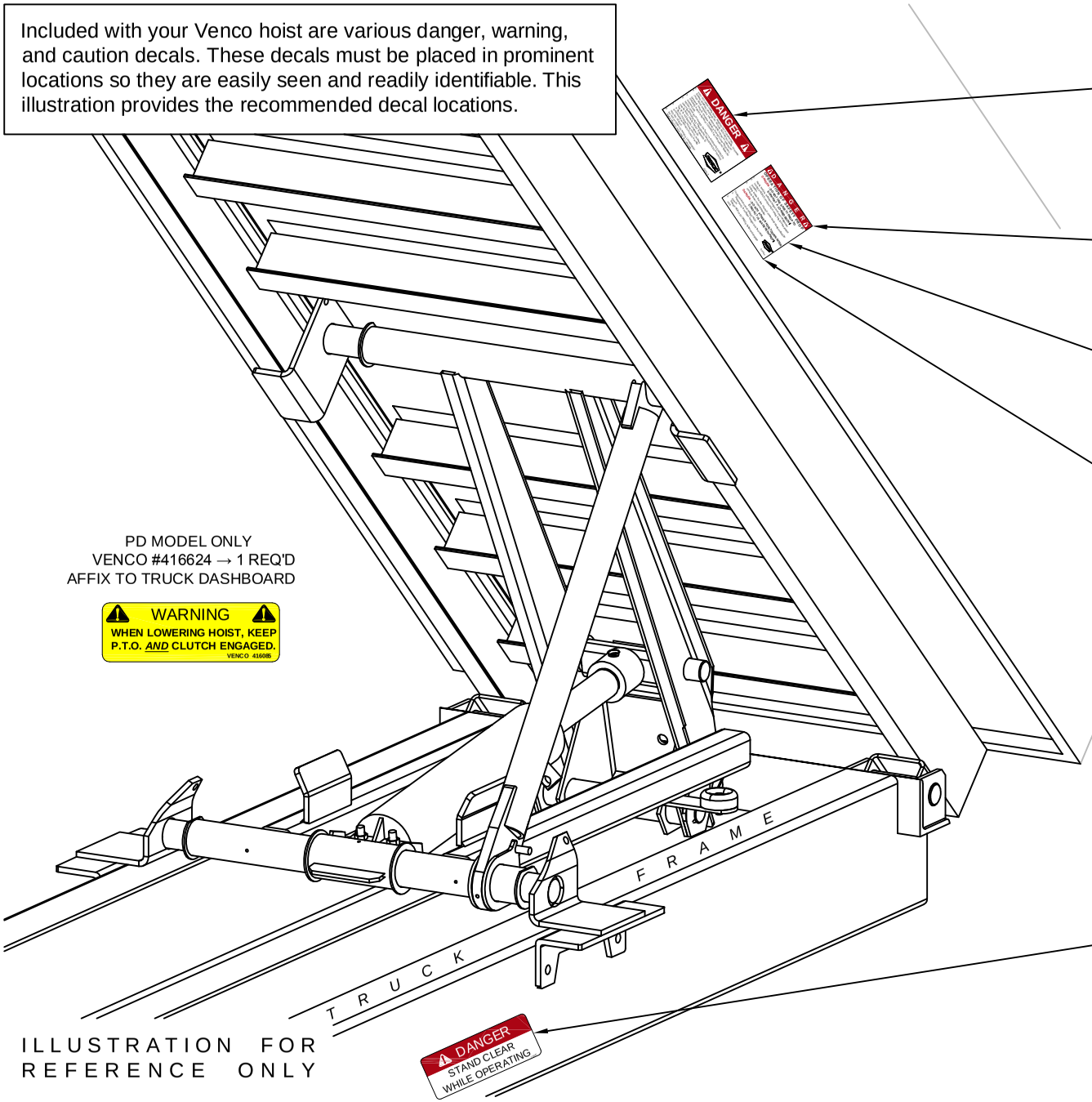
Example: 1830201. The last number is 1 (an odd number). This indicates a counter-clockwise rotation (CCW).




The following chart specifies torque requirements for the SAE O' ring plugs installed into the side or rear ports of the Gear Pump. Any combination of inlet and outlet ports may be used, ie., inlet large rear port. outlet small side port; inlet large side and outlet small rear ports; or both side ports or both rear ports. One inlet and one outlet part must be plugged for proper Gear Pump operation.

| PORT SIZE (SAE) | TORQUE (FT. LBS) |
|---|---|
| 3/4 - 16 | 15 - 20 |
| 7/8 - 14 | 20 - 25 |
| 1 - 1/16 - 12 | 30 - 35 |
| 1 - 5/16 - 12 | 45 - 50 |
| 1 - 5/8 - 12 | 65 - 70 |

Included with your Venco hoist are various danger, warning, and caution decals. These decals must be placed in prominent locations so they are easily seen and readily identifiable. This illustration provides the recommended decal locations.




VENCO #416052
2 REQ'D (1 EACH SIDE)

VENCO #416084
1 REQ'D FOR EACH SIDE
SAFETY PROP
(SWING-DOWN)

VENCO #416626
1 REQ'D FOR EACH SIDE
SAFETY PROP
(INDEXING)

VENCO #416624
1 REQ'D FOR EACH SIDE
SAFETY PROP
(LINKAGE)

PD MODEL ONLY
VENCO #416624 → 1 REQ'D
AFFIX TO TRUCK DASHBOARD




VENCO #15254
2 REQ'D (1 EACH SIDE)

ILLUSTRATION FOR REFERENCE ONLY

VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

| TITLE | DATE | SECTION |
|---|---|---|
| DECAL LOCATIONS | 10-27-15F | H200 |
| VC416-6628, TRLR416-6628 | SUPERSEDES 10-31-14E | 416128 |

# SECTION 250

# OPERATION

VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

# READ THIS FIRST

OPERATOR - WARNINGS

- Read and fully understand entire owner's manual prior to operating this equipment.
- Do not dump while on uneven ground or if vehicle is uneven side to side. Dumping while uneven can cause vehicle to overturn and cause property damage, equipment damage, serious injury or death.
- Stay clear of dump body when dumping. Moving vehicle parts or the moving load could cause serious injury or death.
- NEVER be under a raised body, and keep all others clear when raising body. Body could inadvertently fall causing serious injury or death. Reference operator section for proper body prop use.
- Only allow qualified personnel to work on this equipment that understands its functions.
- Overloading Hoist can cause equipment malfunction, serious injury or death.
- NEVER operate this Hoist from outside the cab. This could cause serious injury or death.
- Make sure all warning and caution labels are legible and properly placed. Refer to the installation section for placement and the replacement parts section for replacement decals.
- When performing maintenance, truck should be turned off and emergency brake set along with body prop set under an UNLOADED body. NEVER prop a loaded body. Body could inadvertently fall, causing serious equipment damage, personal injury or death.
- We strongly recommend you contact your truck equipment distributor to perform any type of repair or maintenance on your equipment. If you do not have a local distributor, call VENCO VENTURO INDUSTRIES LLC for the closest authorized distributor.

# HOIST MAINTENANCE AND OPERATION INSTRUCTIONS

A. Hoist unit lubrication
1. Lubricate all grease fittings on the hoist unit.
2. Lubricate the rear hinge assembly.
3. The hoist system should be serviced at the same time the truck is serviced, and sooner if the hoist unit is performing heavy duty service.
4. Pump Reservoir → Shall be filled with the recommended oil per the manufacturer's instructions. Periodically check the hydraulic fluid and change when the truck engine oil is changed.

B. PTO Pump Operation
With the hoist and body completely installed, cycle the hoist several times to purge the hydraulic system of air. Operate the hoist system per the instructions in this manual and per the PTO manufacturer's instructions.

**⚠ C A U T I O N ⚠**

- Do not operate the pump at more than 1000 RPM. Severe hoist system damage could result. The PTO speed to engine speed is governed by the gear ratio of the PTO drive installed in the truck transmission.
- For long service and safety from VC hoists, it is important that the following procedure be followed each time the hoist is operated:

1. Engage the PTO from the truck cab and adjust the engine speed to obtain the correct PTO and lift speed desired.
2. Pull the pump stick out. This will cause the hoist to raise.
3. When the pump has reached its maximum capacity, the pump will bypass through the relief valve. To prevent the pump from bypassing, push the pump knob to the center / middle position. Whenever the pump knob is centered, the hoist will stop moving and hold its position.

**⚠ C A U T I O N ⚠**

- Do not allow the pump to bypass for long periods of time, as this will put stress on the hydraulic and electrical systems of the hoist.

4. To lower the hoist, push the pump stick in.
NOTE: The Venco hoist powered by PTO drive pumps must be 'powered down'. Failure to 'power down' will cause the reservoir to overflow.
5. To lock the hoist against the truck frame when it is in the down position, push the pump knob in. When the pump bypasses, place the knob n the center 'hold' position.
6. Disengage PTO from transmission per the manufacturer's instructions.

**⚠ C A U T I O N ⚠**

- Do not drive the truck without first disengaging the PTO. Failure to disengage the PTO may result in severe damage to the pump and pump drive unit.

# BODY PROP OPERATION GUIDE - GENERAL INFORMATION

D. Body prop(s): Federal Regualtion 1926.601, Paragraph10, requires the use of a body prop. Accordingly, all Venco hoist units will have included as a standard item a body prop (safety strut). See Paragraphs D.1. & D.2. below.

1. The body prop is designed for use only when the truck body is **empty**. The purpose of the body prop is to provide a safety strut for use when maintenance or inspections are performed on an **unloaded** truck body in the raised position.

2. One [1] body prop shall be furnished for truck bodies up to and including 15 feet. For bodies longer than 15 feet in length, two [2] body props should be used.

3. Venco hoists are equipped with one of three types of body props: ***Indexing***, ***Swing-down*** or ***Linkage***. The chart below shows the hoist model number and the corresponding body prop types available.

| HOIST BODY PROP CONFIGURATION CHART | | | | |
|---|---|---|---|---|
| **HOIST MODEL** | **STD. BODY PROP TYPE** | **OPTIONAL LINKAGE BODY PROP** | **DUAL BODY PROP** | **OPERATIONAL DECAL PART NUMBER** |
| VC416/516 | INDEXING | OPTIONAL | NOT AVAILABLE | INDEX= 416626, LINKAGE= 416624 |
| VC520 | INDEXING | OPTIONAL | NOT AVAILABLE | INDEX= 416626, LINKAGE= 416624 |
| VC620 | SWING-DOWN | OPTIONAL | NOT AVAILABLE | SWING-DOWN=416084, LINKAGE=416624 |
| VC628 | SWING-DOWN | NOT AVAILABLE | OPTIONAL | SWING-DOWN=416084 |
| VC6620 | SWING-DOWN | NOT AVAILABLE | OPTIONAL | SWING-DOWN=416084 |
| VC6628 | SWING-DOWN | NOT AVAILABLE | STANDARD | SWING-DOWN=416084 |

NOTE: For an illustration and operating instructions for each body prop type, see page 416645 in this manual.

4. ***Special Precautions for Swing-down Body Props -***
   - Make sure the truck is parked on a ***flat level surface.***
   - Use a suitable tool to pull out the Spring-loaded release pin (stowage device) to release the body prop from the hoist frame. This will release the body prop allowing it to swing downward to a vertical position.
   - Make sure that the body prop is aligned with the body prop foot rest (the body prop will be in a vertical position), then allow the truck body to move downward until the body prop is seated in the foot rest.
     NOTE: DO NOT POWER DOWN AFTER MAKING CONTACT WITH BODY PROP FOOT REST
   - To disengage the body prop, raise the truck body until the body prop swings freely away from the foot pad. Using a suitable tool, place the tool in a leverage position on the body prop and propel sharply to the left and upward (or to the right and upward) so that the locking pin can be compressed and seated in the locking pin hole. Make certain the body prop is latched securely before the hoist is operated.

**WARNING**

- Do not place arms, hands, or any part of the body between the truck longitudinals (long beams) or moving parts to pull the body prop release / locking pin.

**WARNING**

- Do not use the body prop(s) to support a loaded truck body.
- Body prop(s) should be free swinging to a vertical position after the locking pin is released

**WARNING**

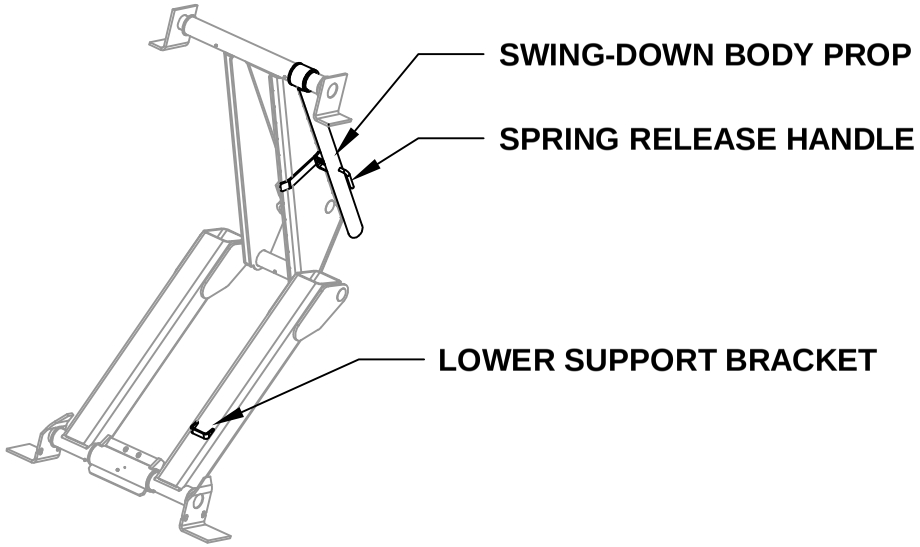
- Read operation of safety strut and caution labels ***before*** operating the hoist.

**WARNING**

- Use care when reseating the body prop(s) in the locked position.

# BODY PROP OPERATION GUIDE - ILLUSTRATIONS & INSTRUCTIONS

## VC628 - VC6628 *(STANDARD)* SWING-DOWN BODY PROP




***NOTE: DUAL BODY PROPS ARE STANDARD ON HOIST MODEL VC6628.*** REFER TO THE HOIST BODY PROP CONFIGURATION CHART ON DRAWING 416644 TO DETERMINE THE AVAILABILITY OF DUAL BODY PROPS FOR OTHER HOIST MODELS.

**⚠ D A N G E R ⚠**

### OPERATION OF SAFETY PROP

DANGER: **DO NOT USE SAFETY PROP TO SUPPORT A LOADED BODY!**

1. Raise body to sufficient height and shut off all power.
2. Unlock PROP(S) and permit to swing freely to the vertical position.
3. Using inside-the-cab controls, lower body slowly until PROP contacts lower support bracket.

DANGER: **DO NOT POWER HOIST DOWN AFTER CONTACT IS MADE WITH PROP!**

To discontinue use of safety PROP:

1. Raise body to sufficient height and shut off all power.
2. Swing PROP to STORED position and engage lock.

VENCO®

416084-A

# SECTION 300

# MAINTENANCE

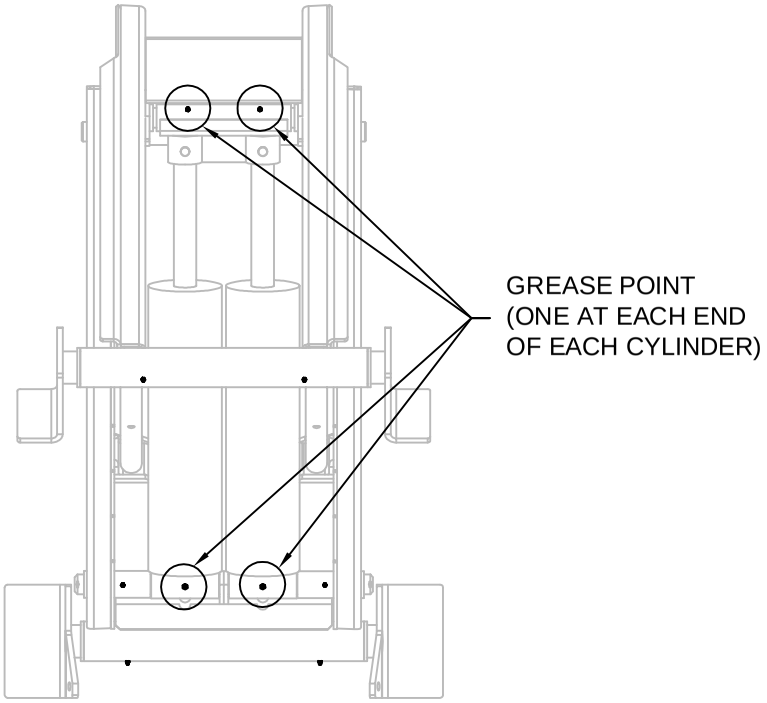
# &

# SERVICE

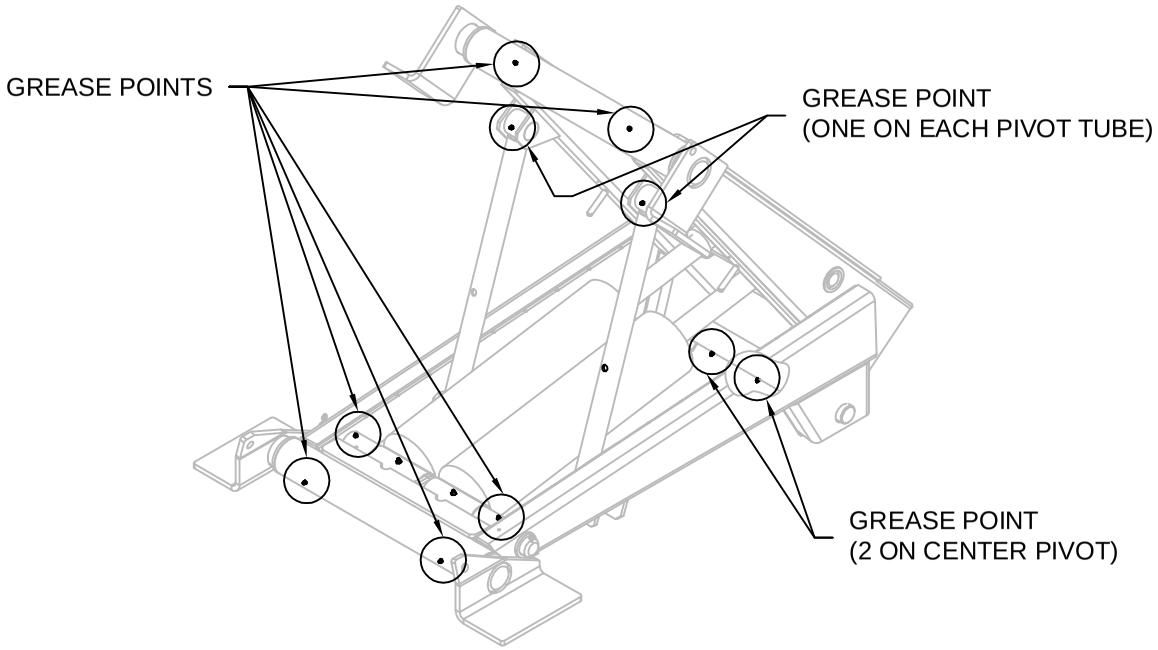
VENCO®

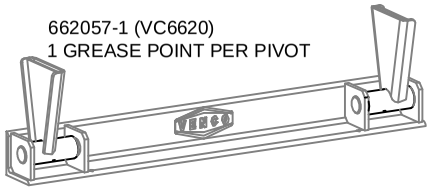
VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

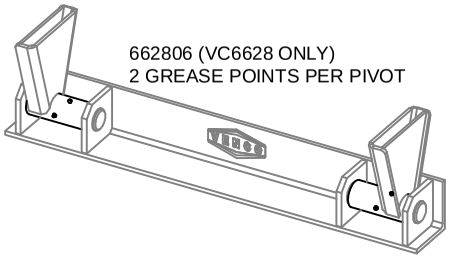
# HOIST GREASE POINTS




TOP VIEW




TO ENSURE THE RELIABLE PERFORMANCE OF YOUR VENCO HOIST, IT IS NECESSARY THAT YOU GREASE THE HOIST AT THE TIME OF TRUCK SERVICE WITH CHASSIS GREASE. THE GREASE POINTS FOR THE HOIST SCISSORS AND REAR HINGES ARE SHOWN ABOVE. ADDITIONAL FITTINGS FOR TWIN CYLINDER HOISTS AND ADDITIONAL BODY PROPS ARE ALSO NOTED.

VENCO®

VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

| TITLE | DATE | SECTION |
|---|---|---|
| GREASE POINTS FOR HOISTS | 12-14-15 | - |
| VC6620/6628 | SUPERSEDES<br>- | 662124 |

# SECTION 400

# REPLACEMENT PARTS

VENCO®

VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

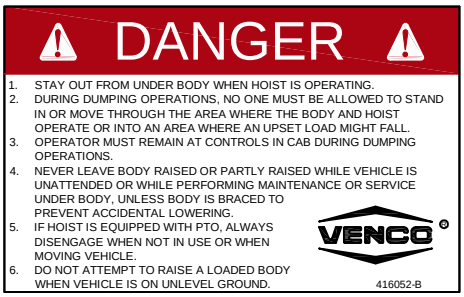
PART NO.: 416052

DECAL: DANGER STAY CLEAR

FUNCTION: To provide operator with a summary of key hoist operating procedures.

QUANTITY: 2

PLACEMENT: One on each side of body.




▲

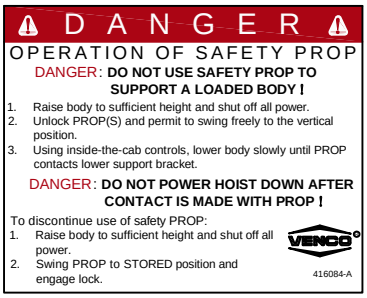
PART NO.: 416084 (**VC620-VC6628 MODELS ONLY**)

DECAL: SAFETY PROP OPERATION

FUNCTION: To inform the operator of proper operation of safety prop.

QUANTITY: 1 For each safety prop.

PLACEMENT: On side of body closest to safety prop(s).




▲

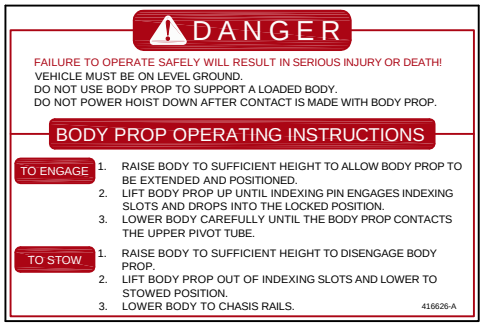
PART NO.: 416626 (**VC416,516 & 520 MODELS ONLY**)

DECAL: SAFETY PROP OPERATION, 'INDEXING' ONLY

FUNCTION: To inform the operator of proper operation of safety prop.

QUANTITY: 1 For each safety prop.

PLACEMENT: On side of body closest to safety prop(s).




PART NO.: 15254

DECAL: CAUTION STAND CLEAR

FUNCTION: To inform the operator to stay clear of body / hoist.

QUANTITY: 2

PLACEMENT: One on each side of truck frame.

PART NO.: 416085

DECAL: WARNING WHEN LOWERING

FUNCTION: To inform the operator to keep P.T.O. and clutch engaged when lowering the hoist.

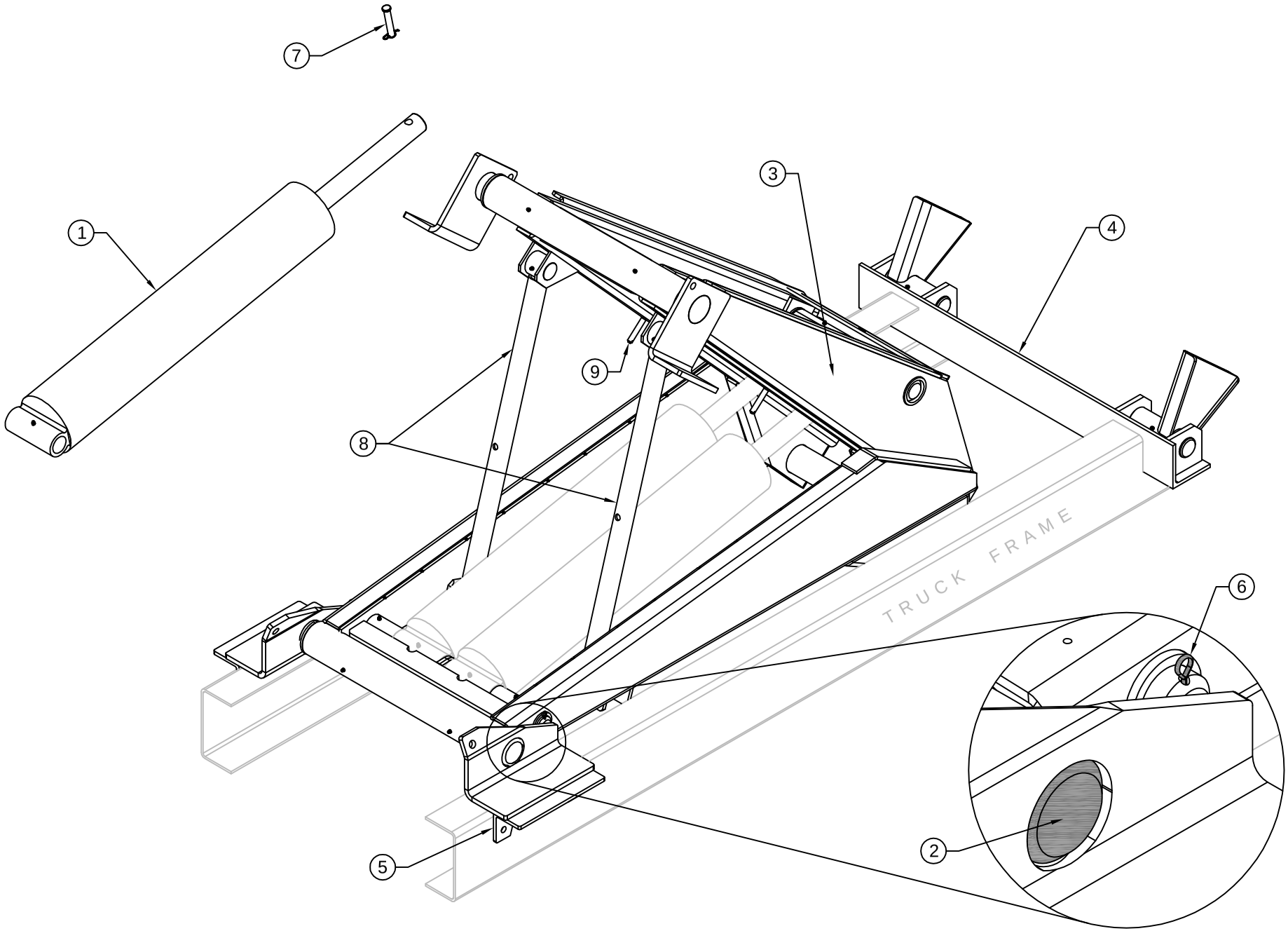
QUANTITY: 1

PLACEMENT: Affixed to truck dashboard.

▲

VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

| TITLE | DATE | SECTION |
|---|---|---|
| DECAL LIST | 11-05-15E | - |
| VC/TRLR 416-6628 | SUPERSEDES 03-26-14D | 628820 |




VENCO®

VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

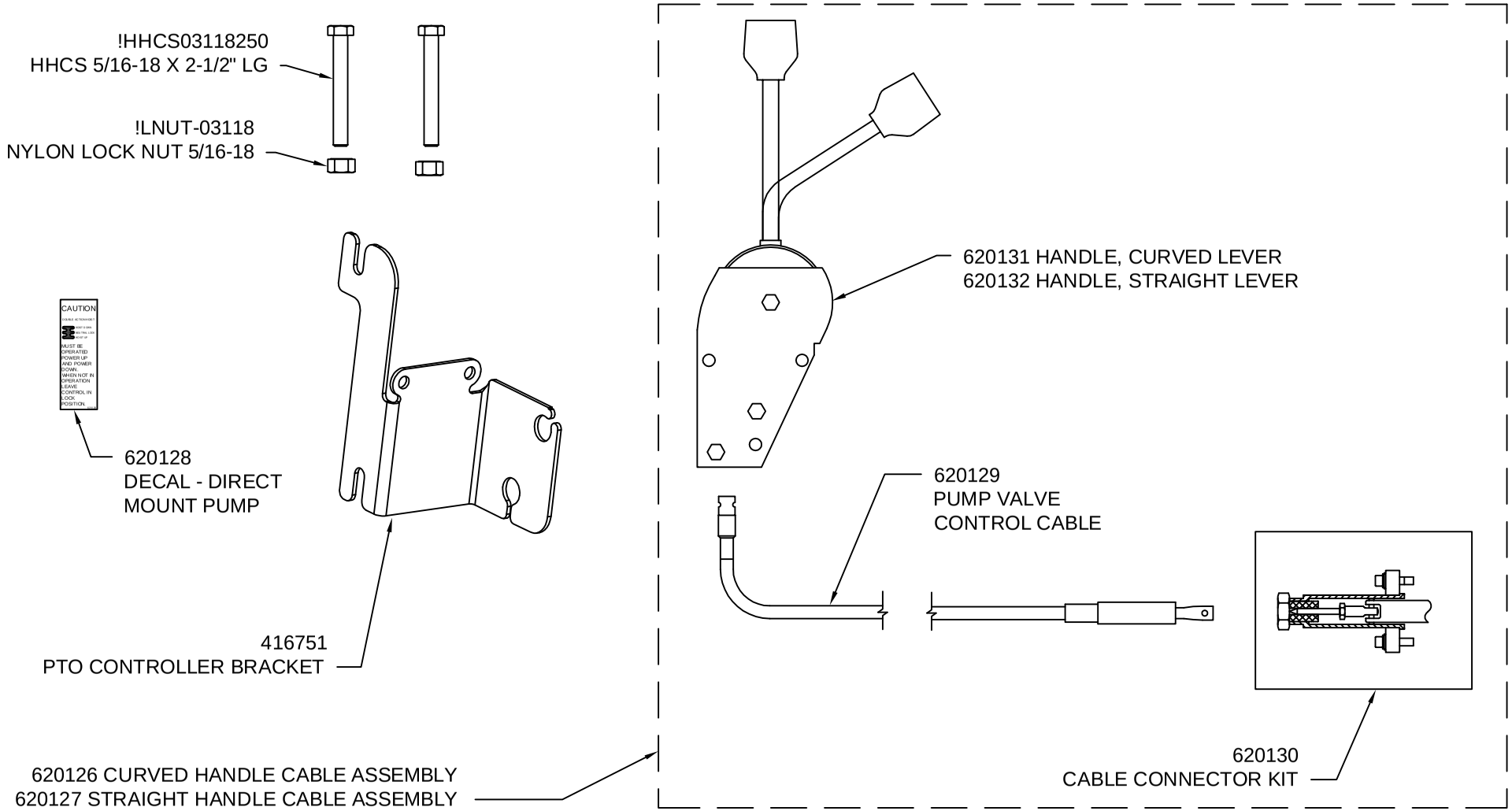
| TITLE | DATE | SECTION |
|---|---|---|
| REPLACEMENT PARTS DRAWING | 12-17-15D | H400 |
| VC6628 | SUPERSEDES 08-07-00C | 662853 |

# 662853 REPLACEMENT PARTS LIST

| ITEM | PART NUMBER | QTY. | DESCRIPTION |
|---|---|---|---|
| 1 | 628900 | 2 | CYLINDER; 6" BORE X 20" STROKE |
| 2 | 662808 | 1 | LOWER CYLINDER PIVOT SHAFT |
| 3 | 662809 | 1 | SCISSORS ASSEMBLY |
| 4 | 662806 | 1 | REAR HINGE ASSEMBLY |
| 5 | 520920 | 2 | MOUNTING ANGLE |
| 6 | 41610 | 2 | COTTER PIN; 1/4" X 3" |
| 7 | 416545 | 2 | 5/8 X 3 1/2" CLEVIS PIN W/ RUE RING ASSEMBLY |
| 8 | 662836 | 2 | BODY PROP (STANDARD) |
| 9 | 662860 | 2 | PIN; BODY PROP KEEPER |
| 10 | - | - | - |
| 11 | - | - | - |
| 12 | - | - | - |
| 13 | - | - | - |
| 14 | - | - | - |
| 15 | - | - | - |
| 16 | - | - | - |
| 17 | - | - | - |
| 18 | - | - | - |
| 19 | - | - | - |
| 20 | - | - | - |
| 21 | - | - | - |
| 22 | - | - | - |
| 23 | - | - | - |
| 24 | - | - | - |
| 25 | - | - | - |
| 26 | - | - | - |
| 27 | - | - | - |
| 28 | - | - | - |
| 29 | - | - | - |
| 30 | - | - | - |
| 31 | - | - | - |
| 32 | - | - | - |
| 33 | - | - | - |
| 34 | - | - | - |
| 35 | - | - | - |

REPLACEMENT PARTS DWG REF 662853

# CABLE & CONSOLE KITS; 620125 (CURVED) & 620124 (STRAIGHT)




VENCO VENTURO INDUSTRIES LLC
CINCINNATI, OHIO

| TITLE | DATE | SECTION |
|---|---|---|
| REPLACEMENT PARTS DWG & LIST | 10-29-15B | H400 |
| PTO PUMP CABLE | SUPERSEDES 03-17-14A | 620245 |

# USER NOTES

# USER NOTES

# VENCO HOISTS LIMITED WARRANTY POLICY

**Venco products are built to last…we guarantee them.**
**As a purchaser of any new Venco product covered by warranty, you will receive 3 years of the most complete coverage available…and, at no added cost to you.**

## 3-Year Limited Warranty Policy

This limited policy warrants new products of Venco to be free from defects in material and workmanship for a period of three (3) years from date of original installation. OEM products or accessories purchased by Venco as part of or offered with our product will carry the OEM manufacturer's respective warranty. Our warranty covers:

- ***Repair or replacement of product***
- ***Labor to repair or replace product***
- ***Freight to return and/or replace product***

We shall not be liable for any contingent liabilities arising out of the improper function of any products. Warranty shall become void if the product is improperly installed, modified, damaged, abused or used for application other than intended use. Venco hoists are designed for and intended to be used on stationary trucks dumping on firm and level ground. Spreading applications and/or shock unloading are strictly prohibited and will void this warranty. There is no warranty of merchantability, fitness for a particular purpose, warranty arising from course of dealing or usage of trade, or any other implied or expressed warranty, except as made specifically herein. This warranty supersedes all previous warranties, written or implied.

## Warranty Claims

Venco Venturo Industries LLC will make a good faith effort for prompt correction or other adjustment with respect to any product, which proves to be defective after our inspection and within the warranty period. Before any repairs are attempted or before returning any product, your Venco Distributor is required to obtain a warranty claim number. This number is necessary for any claim to be considered. To obtain a warranty claim number, Venco requires the model and serial number. Only authorized Venco Distributors can perform warranty. For the name and address of your local Venco Distributor call the **Warranty Claim Department - 513-772-8448.**

**WARNING** - It is the responsibility of the installer to ensure the installation is completed according to the manufacturer's recommendations, ensure the ultimate user understands how to operate product in a safe manner, and understands the need for regular service and maintenance by an authorized Venco Distributor. No modifications or alterations may be made to any Venco product without the expressed written consent of Venco Venturo Industries LLC. Installation of any Venco product must be done by an authorized Venco Distributor, to the standards of the industry; including maintenance, service and affixing of all instruction, safety and warning decals. Users should be instructed as to the safe operation at time of delivery. Maintenance, service, operation and safety warning decals are available on request from Venco Venturo Industries LLC.

**VENCO VENTURO INDUSTRIES LLC**
12110 BEST PLACE | CINCINNATI, OHIO 45241
P: 800-226-2238 | F: 513-326-5427
www.venturo.com

Revised: January 2015 12-00073_VNC3-D