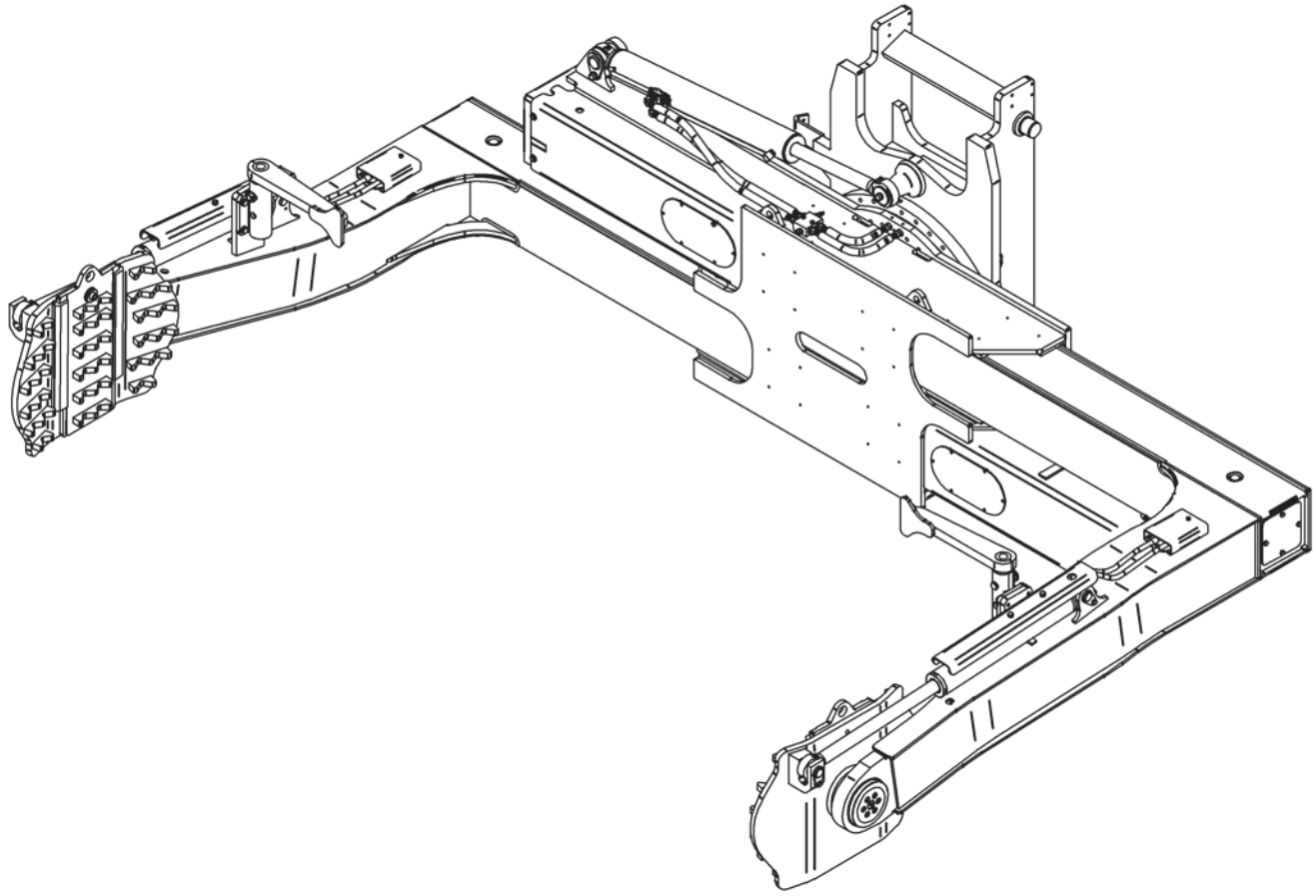
Operator's Manual

Maintenance · Service · Operation · Spare Parts

Dedicated Tyre Handler Model No.	100K THA
Part No.	100K15011R0
Integral Mount to Suit	TCM FD230
Serial No.	BRI 213486



cascade® corporation

Cascade Australia Pty Ltd
Rocklea
Queensland
Australia

How To Order Parts

Please be prepared with the following information when ordering replacement parts for your Cascade tyre handler.

- Machine model number
- Machine serial number
- Cascade part number
- Part description and quantity
- Ship to address
- Order number

The machine serial number and model number are listed on the front cover of this manual. The numbers will also be on the stamped name plate located on the tyre handler.

Due to Cascade’s policy of continuous improvement, product specifications are subject to change without notice. Hence, all spare part orders must include the machine details listed above to ensure the correct parts are supplied.

Table of Contents

1 MANUAL REVISIONS LIST

Date of Revision	Location	Description of Revision
20-06-2012		Released

2 INTRODUCTION

This manual is an important part of your equipment. It provides safety information and operation instructions to help you use and maintain your Cascade equipment.

Read this manual before using your equipment. Keep it with the equipment at all times for future reference.

This manual provides the installation instructions, periodic maintenance requirements, troubleshooting procedures and service guides for the Cascade Tyre Handler. Note that all specifications are in metric units where applicable.

The descriptions and specifications in this manual are subject to change without notice. Cascade Corporation reserves the right to improve equipment. Some product improvements may have taken place after this manual was published.

2.1 SPECIAL INSTRUCTION DEFINITIONS

These classifications and the icons defined on the following pages work together to alert you to situations which could be harmful to you, jobsite bystanders or your equipment. When you see these words and icons in the book or on the machine, carefully read and follow all instructions. YOUR SAFETY IS AT STAKE.

WARNING

A statement preceded by ⚠ or **WARNING** is information that **MUST** be acted upon to prevent bodily injury. A warning is always displayed inside a ruled box.

CAUTION

A statement preceded by **CAUTION** is information that must be acted upon to prevent machine damage.

IMPORTANT

A statement preceded by **IMPORTANT** is information that possesses special significance.

NOTE

A statement preceded by **NOTE** is information that is useful to know about the product and may make operation easier.

2.2 SAFETY INFORMATION

Failure to read this manual by anyone who will operate, service, or work around this tyre manipulator is a misuse of the equipment. Death or serious injury may result from improper use or maintenance of this machine.

INCORRECT OPERATION, LUBRICATION, MAINTENANCE OR REPAIR OF THIS ATTACHMENT CAN BE DANGEROUS AND MAY RESULT IN SERIOUS INJURY OR DEATH.

If this attachment is equipped with hydraulic accessories, be aware of high pressure fluid hazards and take appropriate precautions. Ensure all hose covers are in good condition at all times.

Ensure that all ground personnel remain out of the operating area of the machine.

Follow safe practices when servicing attachments.

Do not modify or weld on any area of this attachment without consulting Cascade or their service agent. Most structural components are manufactured from high tensile plate and require special procedures for any welding. Failure to do so will void any warrantees and may result in injury or death if any structural components are affected.

A “Rated Loads” information sign should be applied to both arms on this attachment. Failure to comply with these figures may result in product damage, personal injury or death. Some attachment load ratings may be higher than the capability of the machine on which they are mounted. Refer to the truck manual or rating plate for actual maximum capacity.

NOTES

3 INSTALLATION INSTRUCTIONS

3.1 TRUCK SYSTEM REQUIREMENTS

- The lift truck must supply sufficient hydraulic pressure to handle the heaviest rated load for the attachment. The unit has relief valves to protect all functions.
  (Refer to Hydraulic circuit drawing for the correct pressure settings.)
- Ensure the hydraulic flow is within the recommendations. Excessive flow will cause heat and eventually damage the tyre handler.
- Ensure that the feed hoses from the truck have been flushed before connecting to the tyre handling valves. Failure to perform this operation can result in damage to the hydraulic components.
- Proportional hydraulic valves are required for all tyre handlers of 6000kg and above capacity. They are recommended for the lower capacity units.

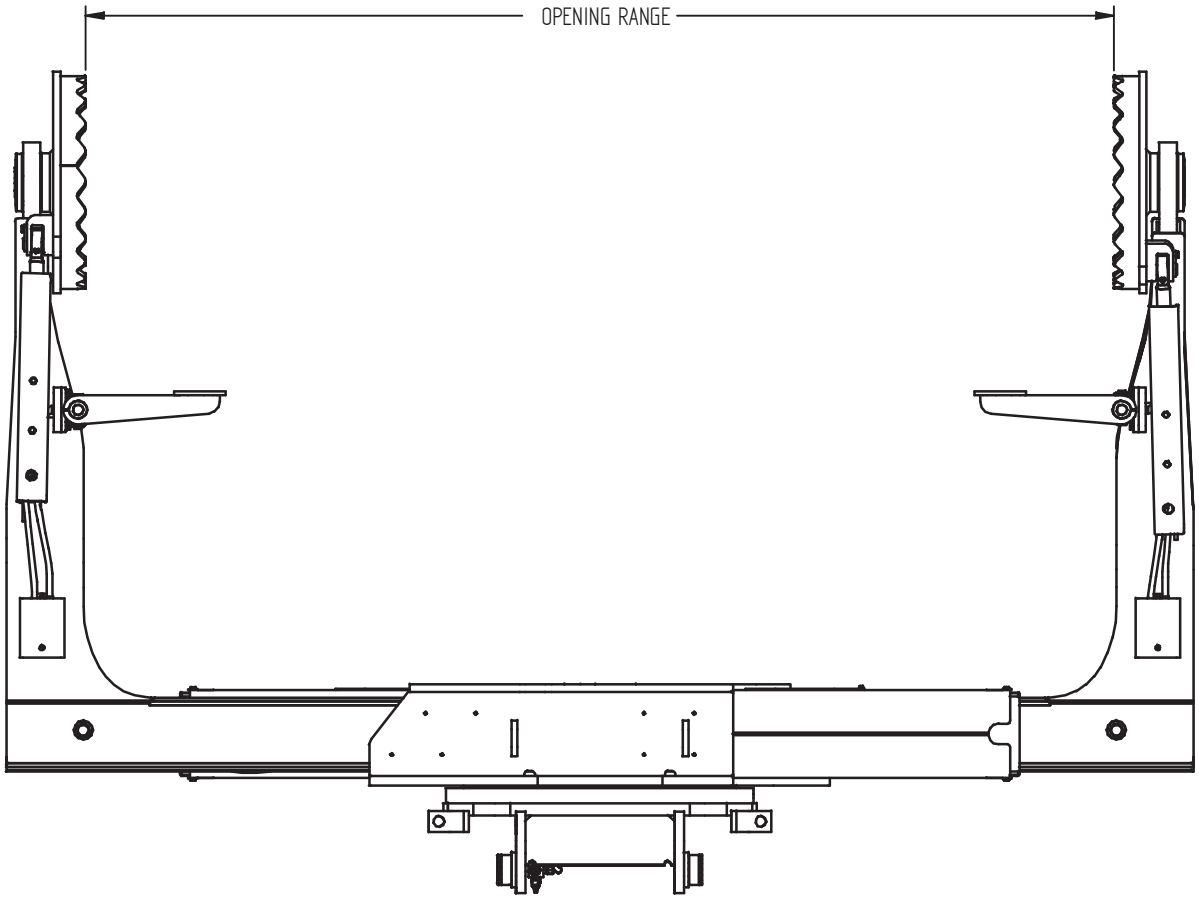
3.2 FITTING OF ATTACHMENT TO FORK TRUCK

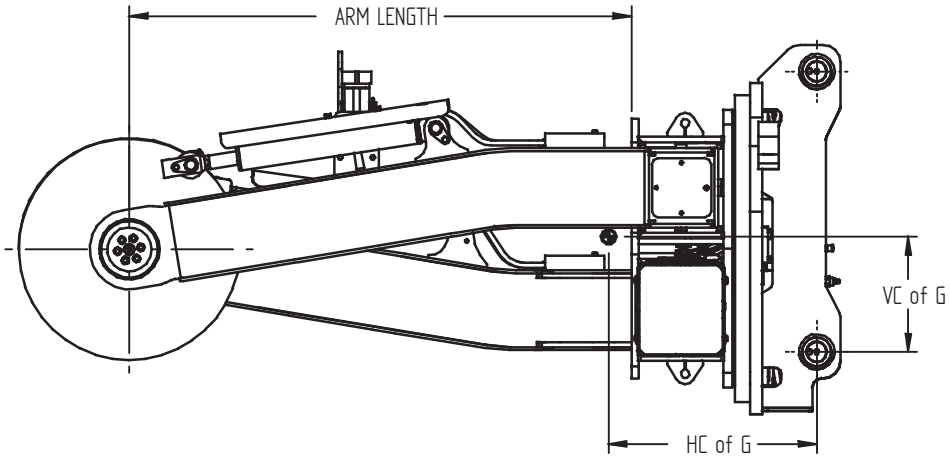
- Install the Tyre Handler to the Fork Truck as per the original truck manufacturer's carriage installation instructions.
- All hydraulic hosing and electric cabling (if applicable) is to be installed as per the supplied layout diagrams in this manual.
- If the operation of the tyre handler appears erratic it may be necessary to purge air from the system.
- Fit test gauges and ensure all functions are set to the correct operating pressure. Refer to the service section of the manual for the location of the relief valves.
- Always operate all functions to the end of their stroke a number of times before test lifting a tyre.
- Raise tyre clamp to ensure adequate ground clearance.
- Stay clear of all pinch points when testing.
- Check all hydraulic connections for any leaks.
- Check lift chains are securely attached with locking device if supplied.

CAUTION:	During and after installation, check to ensure that the Tyre Handler attachment will not interfere with any part of the fork truck at any stage of operation. If any interference is apparent or anticipated, contact Cascade Australia.

4 SPECIFICATIONS

MODEL NUMBER	100K THA
PART NUMBER	15011
SWL CAPACITY	10,000 kg
LOAD CENTRE / ARM LENGTH	2200 mm
MAX. TYRE DIA	4000 mm (Max. opening between pads: 4400 mm)
MIN. TYRE DIA	1650 mm (Min. opening between pads: 1350 mm)
MAX. TYRE WIDTH	1600 mm
HYDRAULIC SIDE TILT	Cylinder + /- 36 degree
HYDRAULIC FORWARD TIPPING	Hydraulic Cylinder - 90 degrees total
HYDRAULIC SIDE SHIFT	0-200 mm (varies with the clamp opening)
MAX OPERATING PRESSURE	175 bar
RECOMMENDED OIL FLOW	75 lpm
FORKLIFT MOUNTING	Integral
UNIT WEIGHT	5850 kg – including carriage
CENTRE OF GRAVITY HORIZ	940 mm
CENTRE OF GRAVITY VERT	530 mm


OPENING RANGE


ARM LENGTH
VC of G
HC of G

5 SAFETY RULES

Safety procedure and operator instructions/restrictions mentioned be low should be read a nd observed at all times during operation this will help you avoid accidents.

5.1 GENERAL

Safety is a first priority when it comes to Ca scade Tyre han dlers. This Equipment is designed to handle tyres with ease a nd safety. It is also use r's responsibility to maintain and operate this tyre handler with caution, skill & good judgment at all times to avoid accidents.

Trainees or untrained p ersons should only operate this unit under direct supervisio n of qualifie d person. Ensure induction log is completed before operating unit.

Always operate the tire handler in accordance to the load capacities specified. Do not overload or exceed the safe working load capacity.

Do not leave Tyre Handler with load suspended or unattended.

Do not walk under suspended loads.

Before operating this unit always carry out the preparation before each shift checklist as mentioned in section 6.5.

Never modify or alter any of the mechanical, electrical or hydraulic supply of th e unit witho ut explicit written approval from CASCADE.

In addition to these general rules always follow the site specified safety protocols.

A copy of this manual shall remain with the Tyre handler at all times.

WARNING FAILURE TO OBEY THE SAFETY RULES MENTIONED MAY RESULT IN DEATH, SERIOUS INJURY, INSTABILITY OR EQUIPMENT DAMAGE. IMPROPER OPERATIONS WILL VOID WARRANTY

6 OPERATOR INSTRUCTIONS

6.1 GENERAL

When ordering parts, communicating warranty information, or referring to the unit in any wa y, always include the assigned model and serial numbers.

6.2 SAFETY FACTORS

There are three important factors involved in the safe operation of this unit. They are:

- The operator must have the competence to know the machine and how to safely control it.
- The clamp must be in good mechanical condition.
- The unit must never be loaded to exceed the maximum rated capacity.

The safety precautions presented in this sectio n should be read and o bserved at all times during operation.

6.3 LOAD LIMITS

The clamp is designed to be operated within specific maximum allowable load limits, as noted in this manual. Overloading will result in potentially serious safety hazards and shortened service life of the unit. Exceeding the rated ca pacity of the clamp will cause insta bility and possible structural failure. Warranty of this unit will be void on an y part determined to have been misused due to overloading, improper operation, or lack of maintenance.

6.4 WORK STATION POSITIONING

A firm, level, and dry su rface is the best location from which to operate this equipment. Overhead obstructions should be avoided. Care should be used to make certain that all personnel are clear of the work area, before the operation begins. At job site s where the terrain is n ot graded or uniform, the operation of the clamp should be restricted to compensate for instability

6.5 PREPARATION BEFORE EACH SHIFT

This procedure is for the daily pre-start check for a Cascade tyre handler

Important: This attachment is a clamping attachment and the pre-start checks listed are important to ensure that each design function is operating as it was designed.

Before conducting the following checks, ensure that the test area is free of personnel and it is safe to conduct these tests

- Check for external oil leaks of hoses, fittings and hydraulic cylinders.
- Check for any visible damage. Ensure all the hydraulic couplings are secure.
- Ensure that both arms close when clamp function is selected.
- Ensure both arms open when the open function is selected.
- Ensure both arms move to the right when the sideshift right function is selected.

Note: Do not sideshift arms until the cylinders bottom out. Conduct function test with arms approximately in the mid position.

- Ensure both arms move to the left when the sideshift left function is selected.
  Note: Do not sideshift arms until the cylinders bottom out. Conduct function test with arms approximately in the mid position.

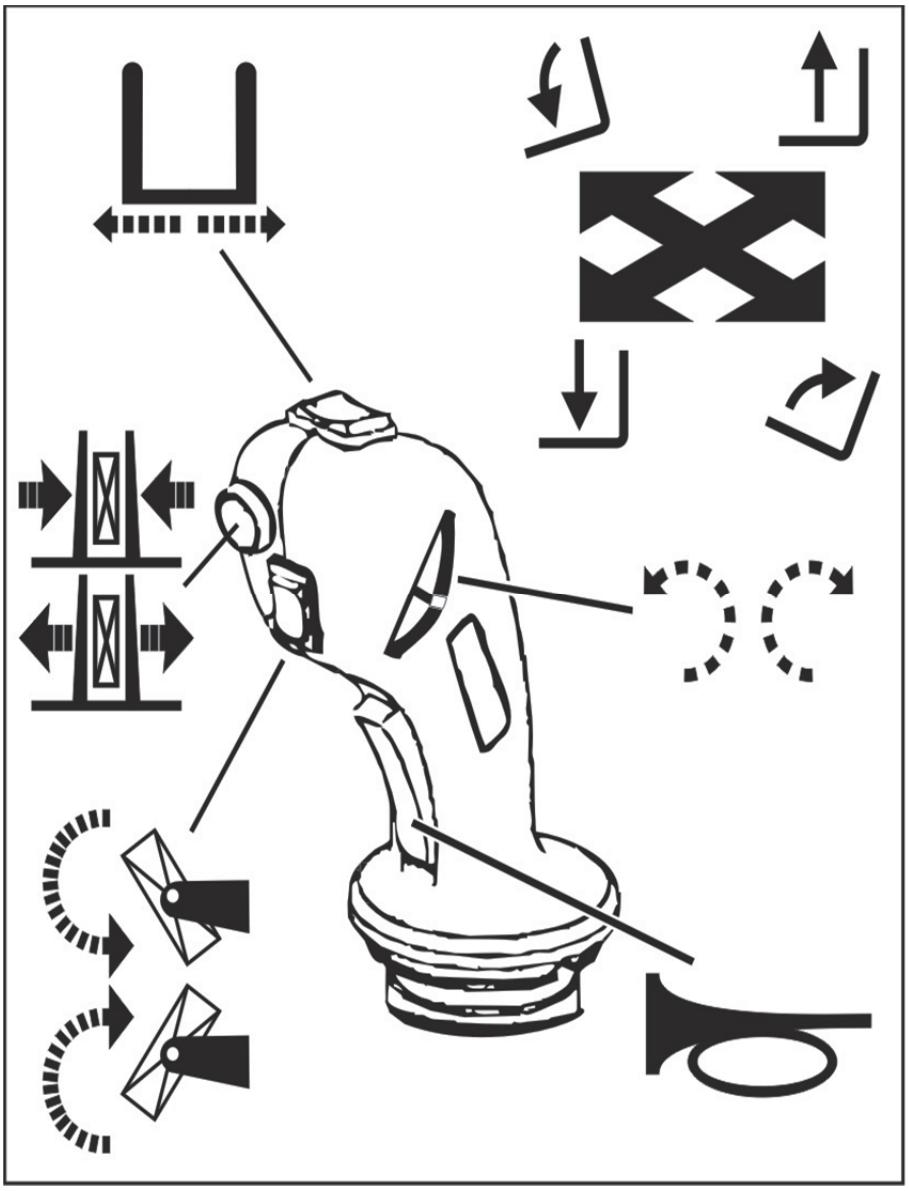
- Ensure both tyre clamp pads tip forward when forward tipping function is selected.
- Ensure both tyre clamp pads tip backward when rear tipping function is selected.
- Clamp a tyre with the attachment and position the tyre horizontal to the ground and approximately 150mm above the ground. Shut down the machine and secure the vehicle. Place a datum line on each arm and leave for at least 5 minutes. Check the datum line after 5 minutes for any outward arm movement. If the arms have not moved, the clamp circuit is functioning correctly. If the arms have moved, notify your service provider and tag the machine out until the clamp circuit is verified as being correct.

- Check the open circuit by moving the open function lever or switch only. The arms should not open. Repeat the open test also using the clamp open switch. The arms should open normally.
  Caution: Ensure the tyre is at ground level and horizontal for this test.
- Tip the tyre approximately half way and hold. The load should remain stationary. If any movement is detected, notify your service provider and tag the machine out until the fault is corrected.

- Position the arms centrally in the body with a tyre clamped between the pads. Sideshift the load +/- 200mm either side of centre and ensure that the sideshift function is smooth and correct.
  Caution: This test should be done with the attachment horizontal to the ground only. Do not sideshift the arms until the cylinders bottom out and do not alter from right to left without a pause. These abuses could cause eccentric loading and or pressure intensification in the clamp cylinders. This will affect the efficiency of the sideshift function.

6.6 OPERATING CONTROLS

Typical joystick functions

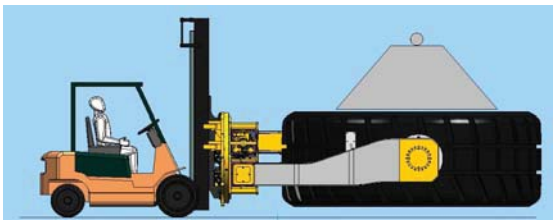


CLAMP
GUARD

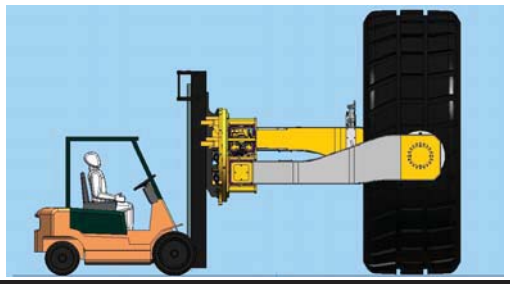
6.7 OPERATING RESTRICTIONS

DANGER – failure to obey the following may result in death, serious injury, instability or equipment damage. This section should be placed in truck cabin & made visible to the operator at all times.

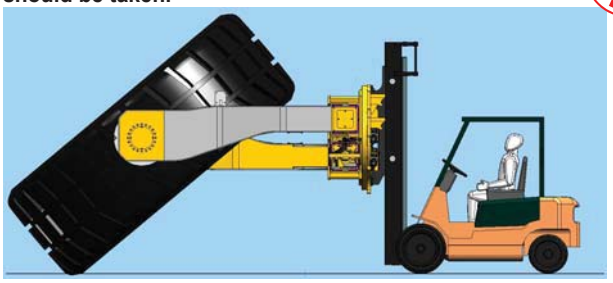
NEVER handle tyre's filled with ballast. If load limits exceeds rated capacity it may result in structural failure.



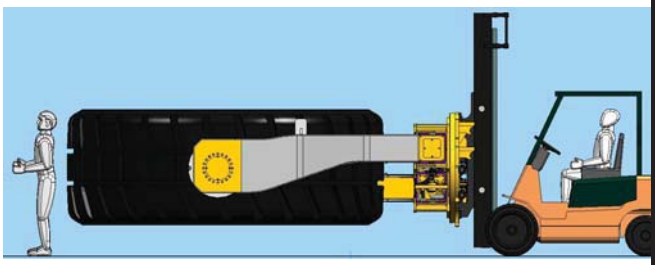
NEVER transport tyre in vertical position. Always transport in horizontal position, parallel and low to ground.



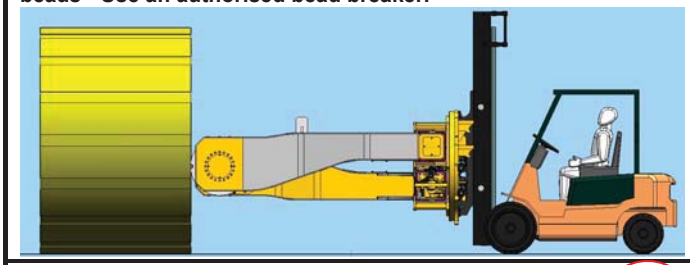
NEVER drag tyre – unit is designed to lift and position tyre. NEVER handle greasy tyres. Handling wet tyres should be avoided if possible; otherwise extreme care & caution should be taken.



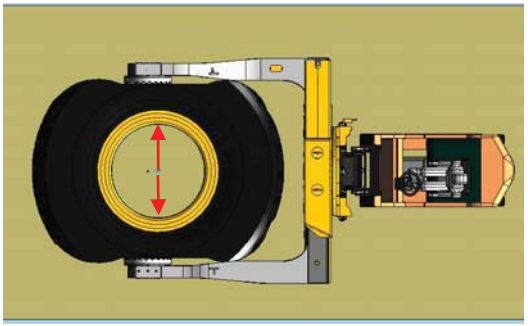
NEVER operate the unit while persons not required for Operation are present in work area.



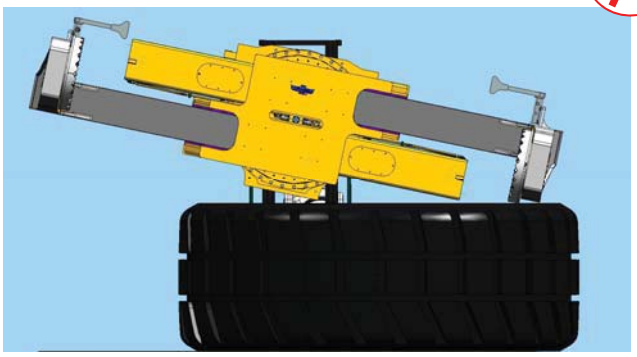
NEVER use tyre handler attachment to impact-load, Hammer-push, jack, drag or tow a vehicle or object. This attachment may be used to break the front bead ONLY provided both arms are engaged together without impact. This attachment is not to be used to break rear beads - Use an authorised bead breaker.



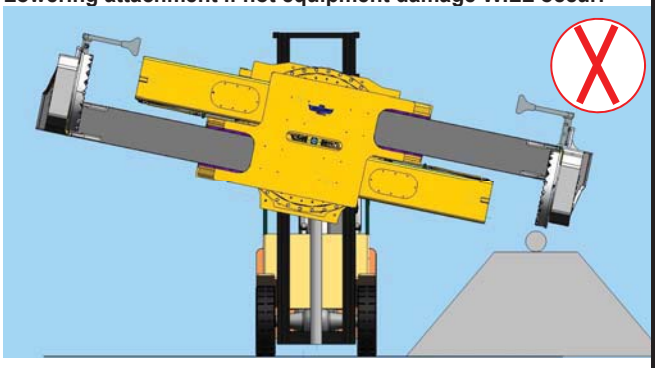
NEVER inflate or deflate tyre when clamped. Serious damage or injury WILL occur.



NEVER use one arm of tyre handler to break beads. Equipment damage WILL occur.



NEVER sling a load using one arm.
NEVER drop One arm onto ground.
Always try to maintain both arms parallel to ground while Lowering attachment if not equipment damage WILL occur.



WARNING

The operator should be alert, at all times, for the presence of personnel in the work area. Operations must be suspended until the work area is cleared.

6.8 OPERATOR TRAINING

The Cascade Tyre Clamp is designed for operator simplicity. Prior to operating this unit, the operator must become thoroughly familiar with control functions, operating procedures, and safety precautions. In addition, the operator must be prepared to take any remedial action needed in an emergency situation. Refer Appendix 1 “INDUCTION LOG”. INDUCTION LOG MUST BE COMPLETED BEFORE OPERATING THIS UNIT.

6.9 CLAMP CONTROLS

The controls for the clamp are located in the cab of the carrier vehicle. Their function and operation are shown on the previous diagram.

6.10 TASK PERFORMANCE

Prior to operating this unit, become thoroughly familiar with the operating requirements and restrictions. The best location for the working tyre handler is on firm, level and firm ground. Avoid overhead obstructions such as power lines, etc.

To begin operation:

1. Maneuver the vehicle into a position which provides proper orientation of the CLAMP to the tyre and as close to the centerline as possible.

2. Position the opened hand to properly grasp the tyre.

3. Advance the carrier vehicle, manipulate the controls to perform the desired function, and grasp the tyre as close to the centerline as possible. This avoids high off centre loads.

4. To release the tyre will require 2 deliberate actions by the operator, the intent is to prevent accidental load release.

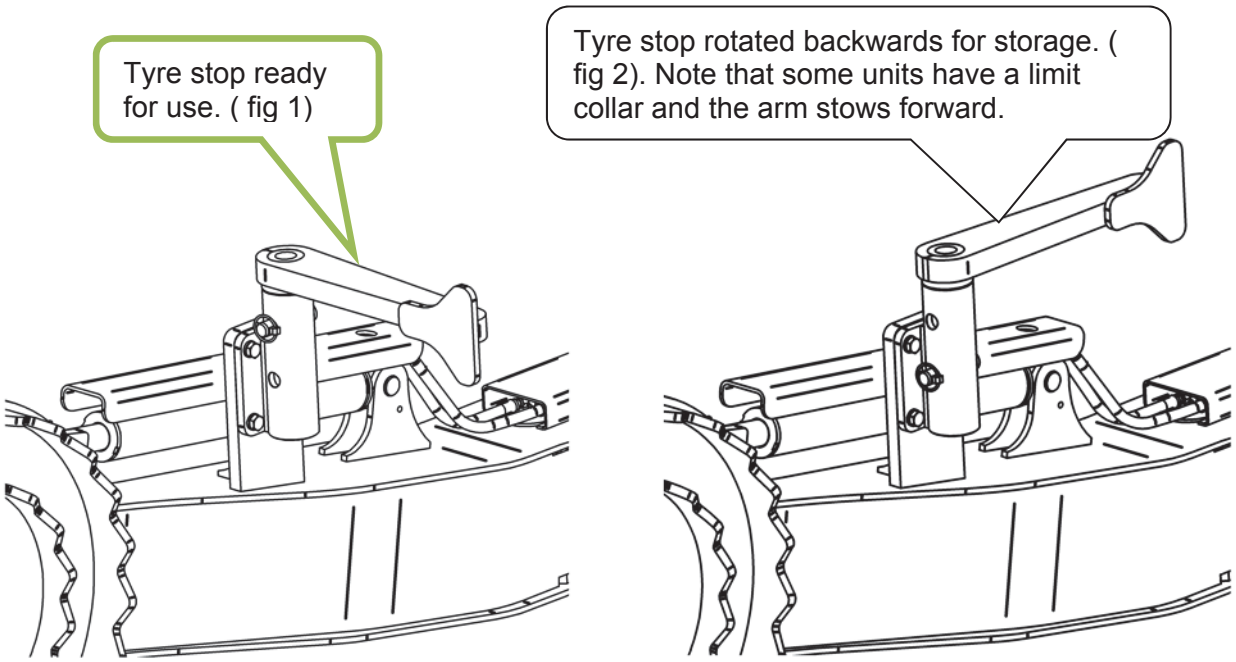
5. The clamp arms of the tyre handler can sideshift with a load. The sideshift should be limited to 200mm either side of centre. Do not continuously sideshift a load left and right in one operation as this can cause pressure intensification and will damage the tyre handler.

6. The main body of the tyre handler can rotate 360 degree continuous when fitted with drive boxes or + / - 35 degree (depending on which model) for the cylinder drive units. This rotation allows precise bolt pattern line up when installing the rim / tyre.

7. The gripping pads of the tyre handler can rotate 360 degree continuous when fitted with slew drives or 90 degree with cylinder drive.

WARNING
Apply clamp load on ly when arms are horizont al or near horizontal. Do not re-cla mp load when arms are vertical.

WARNING
When Tyre stops are not in use they should be positioned facing backwards. If positioned forward, they may damage the cylinder guards.



WARNING
Do not exceed +/- 15 degree Rotation when ha ndling a loader tyre fitted with chains. Do not tip combination horizontally.

WARNING
Do not exceed 200 mm of sideshift either side of the centred position of the attachment. This can induce instability in the machine.

WARNING
Operation of sideshift should be carried out only when both arms are approximately parallel to ground.

WARNING
Attempting to use the clamping action of the tyre handler to seat the bead of the tyre is a hazardous practice, and should not be attempted.

WARNING
Fall back arms or Tyre stops should only be deployed (as shown in fig 1 & 3) when personnel are entering the fall zone. Fall back arms should be stowed at all other times as shown in fig 2

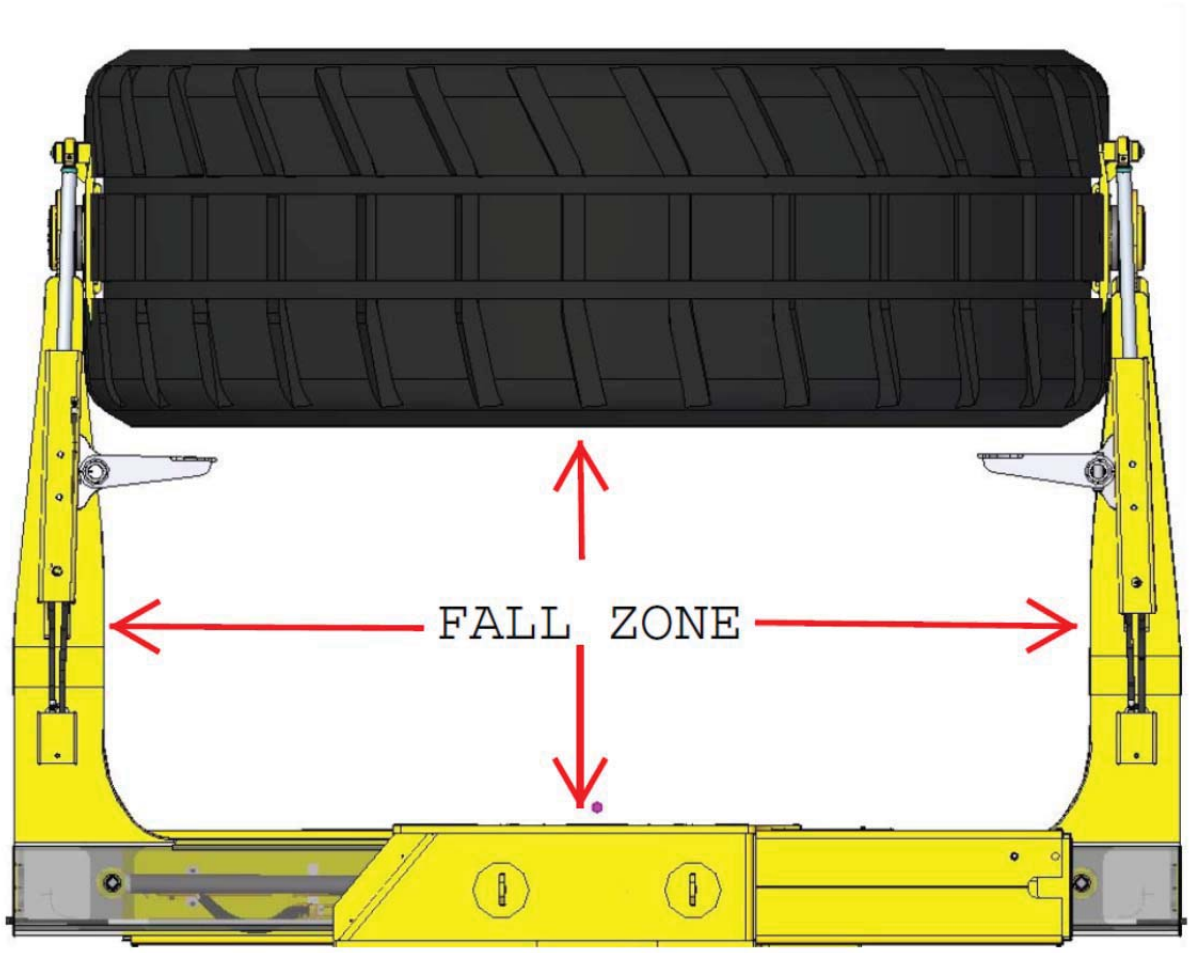


Fig 3

6.11 TYRE HANDLER OPERATING RESTRICTIONS

The Tyre handler is intended to be a tyre lifting and positioning unit. There are possible misapplications of this machine that can cause serious damage.

Use of a single arm for lifting or carrying a load will void the tyre handler warranty.

Use of one arm of the tyre handler for bead breaking will void the warranty.

Never use one arm to break the beads.

A separate bead breaker or a push bar that transfers the load to both arms of the tyre handler must be used to separate the tyre from the rim. It is acceptable to use the tyre handler for holding the sidewall and flange away from the bead while the o rings and locking rings are being installed.

7 MAINTENANCE PROCEDURES

7.1 IMPORTANT SAFETY INFORMATION

WARNING

Before servicing any hydraulic com ponent, relieve pressure in the system. Turn the truck off and open the truck auxiliary control valves several times in both directions.
After completing any service procedure, always test the function throu gh five complete cycles. First test the att achment empty to ble ed air trapped in the system to th e truck syst em. Then test the attachment with a load to be sure it operates correctly before returning it to full service.
Stay clear of the load while testing. Do not raise the load more than 10 cm (4 in.) off floor while testing.

7.2 MAINTENANCE INTERVALS & CHECKS

7.2.1 WEEKLY MAINTENANCE

Lubricate all grease nip ples on Tyre Handler attachment. Bearing life will be extended with p eriodic lubrication. It is recommended to **not** apply grease to the Arm slide bearings. Instea d apply a thi n film of Molybdenum disulphide dry lube (Molybond) or CRC 5.56 or equivalent, to the bearing portion of the arm bars if required. Do not allow rust to form on the steel b earing surfaces as this will lead to reduced bearing life.

If arm travel becomes noisy or slip-stick occurs, use CRC 5.56 spray lubricant to smooth the arm travel. In some harsh environments, it may be necessary to apply more frequently than weekly.

7.2.2 100 HOUR MAINTENANCE

Every time the lift tru ck is serviced or every 1 00 hours of truck oper ation, whichever comes first, complete the following maintenance procedures:

- Inspect the cylinder anchor points for correct hold.
- Check for loose or missing bolts, worn or damaged hoses and hydraulic leaks.
- Arm bearing life will be extended wi th periodic li ght lubrication. Apply a thin film of molybond dry lube or CRC 5.56 or e quivalent to the bearing portion of the arm bar. Do not grease the arm slide bearing. Dry lube or CRC are the most suitable lubricant.
- Check for structural defects such as bends, dents or cracks.
- Check operation of all functions.

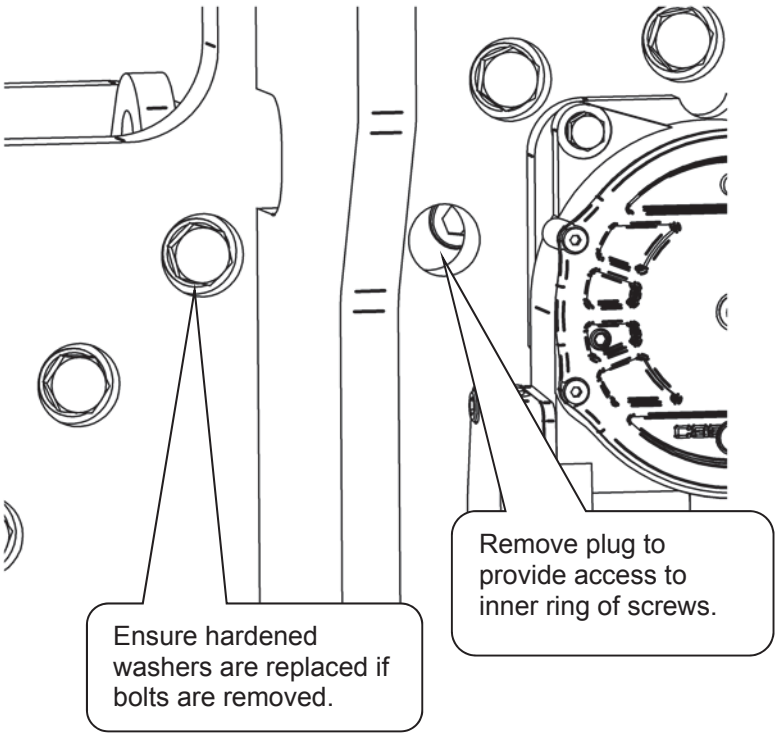
7.2.3 500 HOUR MAINTENANCE

After each 500 hours of lift truck operation, in addition to the 100 hour maintenance procedures perform the following:

- Check sample the socket head capscrews and hex head bolts securing the base carriage assembly and the slew ring geared assembly for the proper torque value. Use the torque specifications shown in the Torque Value table in this ma nual. It is best to check the bolts in the upper q uadrant of the bearing.

- Never reuse the main slew bearing mounting fasteners. Always replace with new fasteners.
- If hardened washers are fitted, these must be used when fitting new fasteners.

- Lubricate slew ring bearing and gear with EP-2 grease. Rotate in 30 degree increments and grease in each position. There are 4 grease points on the OD of the bearing.
- Check clamp cylinders are holding pressure. Use clamp test port on revolving connection.
- Check the tightness of the cap screws holding the pad retainer plate on both arms.



WARNING
A sample of baseplate and base bearing assembly bolts must be checked for proper torque at 500 hours. A complete inspection is required every 2000 hours. Failure to keep the bolts tightened can result in attachment damage and serious injury.
It is recommended that a sample of bolts be checked after the first 20 hours of operation. For the correct torque settings refer assembly drawings. Never reuse old bolts.

WARNING
Do not clean main ring gear or any rotating, sliding parts using high pressure cleaners. Deposition of liquid may cause components to rust and void warranty.

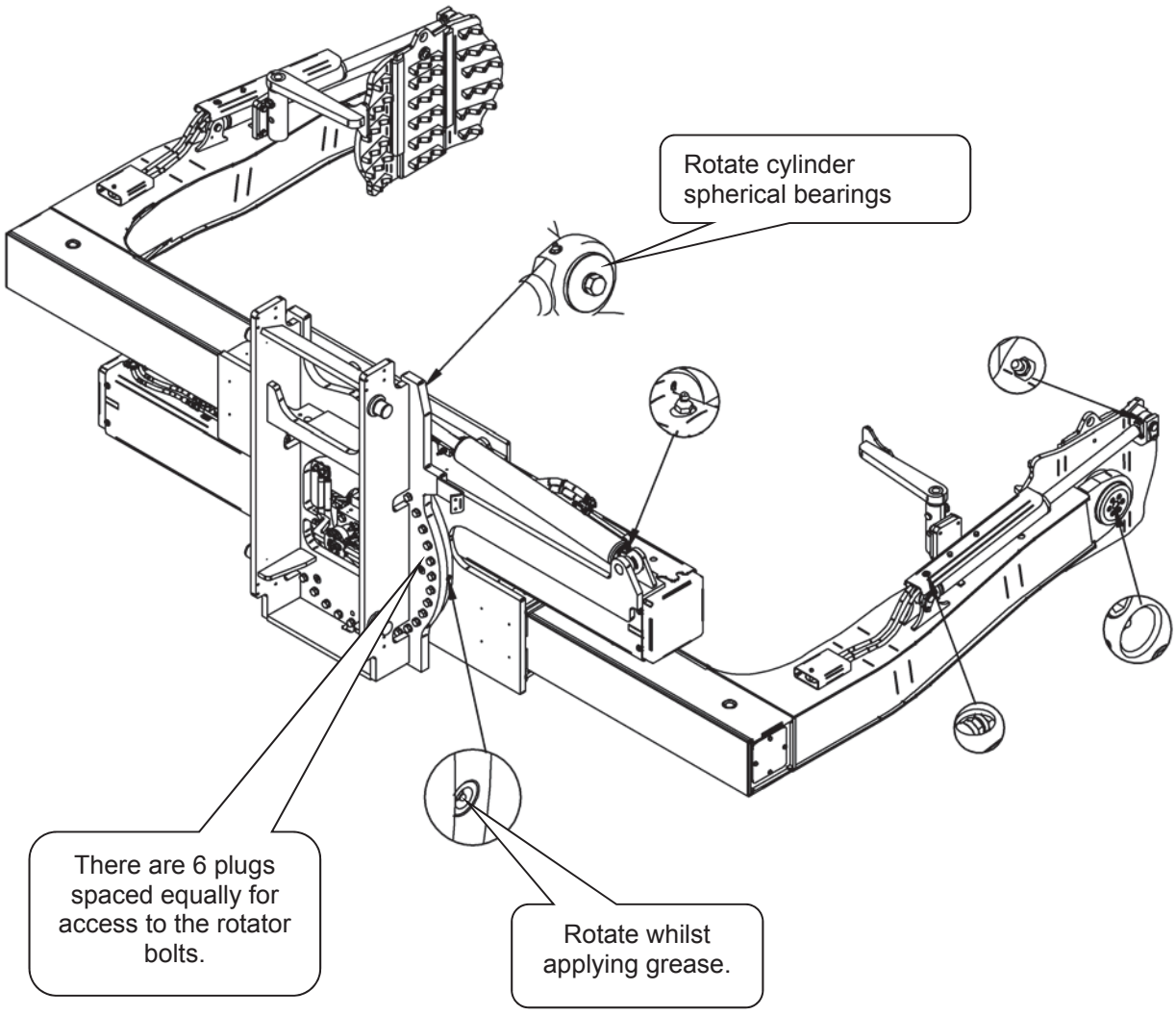
7.2.4 1000 HOUR MAINTENANCE

After each 1000 hours of lift truck operation, in addition to the 100 hour and 500 hour maintenance procedures, perform the following:

- Inspect the arm bearings for excessive wear. Replace or shim if necessary.
- Inspect the pad pivot bearings for wear. Replace or shim if necessary.

7.3 TYRE HANDLER LUBRICATION DIAGRAM

Apply multi-purpose extreme-pressure NLGI 2 grease all grease points



8 TROUBLESHOOTING

IMPORTANT:	It is important that you gather all the facts regarding the problem before you begin service pr ocedures. The best way of doing this is to talk with the fork truck operator.

8.1 GUIDELINES

The following guidelines will help you decide where to begin your troubleshooting procedures:

- Clamp drops load after it has been picked up.
- Clamp will not carry load up to its rated capacity.
- Clamp arms travel slowly.
- Clamp arms do not move.
- Clamp drops the load when sideshifting.
- Clamp arms are uneven in movement.
- Rotator only partially rotates.
- Rotator shudders when operating.
- Sideshift doesn’t operate.

In all cases of operating problems, trouble shooting by observing the operation and recording test pressures and times must be performed first. Do not start to dismantle the tyre handler until you have a sound idea as to the cause or the problem.

When proportional valves are used, ensure that there is electrical power to all components. Ensure the truck pump is operating correctly and the tyre handler is receiving the recommended LPM of oil.

Check that the feed hoses from the truck valve are sized correctly for the recommended flow and there is a minimum of fittings. The number of 90 degree fittings must be kept to a minimum.

8.2 CHART

Trouble Shooting Chart		
Problem	**Possible Cause**	**Possible Solution**
Vibration and jerking when first operating unit	Lock of oil in reservoir.	Add hydraulic oil
	Low temperature of oil.	Manoeuvre with no load to warm oil.
Vibrations with every function when oil is hot.	Lack of oil in reservoir.	Add hydraulic oil
	Air in oil.	Purge oil from system.
All functions are slow	Suction hose crushed or filter blocked.	Replace or clean
	Main relief is set low or faulty.	Check main relief pressure.
Arms shudder when moving with no load.	Lack or lubrication on arm.	Lubricate.
	Rust damage on arm.	Clean and repair arm then lubricate.
	Arms bent.	Check and replace.
Arms travel slow and uneven with no load.	Arm is tight in frame.	Check bearing clearance and re-shim if required. Check pressure required to start movement of arm. Both arms should move equally with a pressure less than 400psi.
Arm travel slow but even.	Low oil flow from truck.	Check flow rate is to the recommended value.
Main body rotation is uneven.	Lack of lubrication.	Lubricate bearing and gears.
	Load is too high.	Re-centre load closer to rotation centre
	Seals in rotate cylinder.	Test and replace if required.
	Pressure setting is low.	Check and set correct pressure
Sideshift function is uneven under full load.	Pressure setting is low.	Check and set correct pressure
	Arms are tight in frame	See above.
Clamp will not hold any load.	Faulty valve or cylinder seals	Test clamp pressure. Replace or reseal as required.
Clamp will not hold maximum capacity loads.	Clamp pressure is low.	Test clamp pressure. Set to recommended.
	Grips on pads are worn.	Repair or replace.
Forward tilt function is slow.	Pressure set low	Test pressure. Set to recommended.
Forward tilts pads have uneven travel.	Flow divider is faulty.	Clean or replace
Trouble Shooting Chart		

Main arm travel is uneven	Flow divider is faulty.	Clean or replace
Main body doesn't rotate.	Rotate relief valve faulty.	Test and replace if required
Unit will not sideshift after clamping a load.	Pressure trapped in clamp feed lines.	Remove plug from equaliser port.

8.3 CLAMP CIRCUIT TEST

1. If fitted press the solenoid button (if equipped) and listen for a 'click' at the solenoid valve. If no sound is heard, first check the fuse, wiring and coil. Assure that the valve is not jammed.
   IMPORTANT: Solenoid-operated valves must be plumbed so that the solenoid is energized during the CLAMP/OPEN function.

2. Open and close the arms fully. If the arms move slowly or not at all, the CLAMP relief cartridge (see illustration next page) may be faulty or need adjustment. Replace or adjust the cartridge. If the arms move unequally, the FLOW DIVIDER cartridge may be faulty. Replace the cartridge.

3. Position the arms to mid-stroke. Turn the truck off and connect a 345 bar (5000 psi) pressure gauge to the G port on the valve.

4. Start the truck and close arms at normal speed to clamp on a rigid load (or Clamp Force Indicator), holding the lever in the CLAMP position for a few seconds.

5. Release the lever and watch the pressure gauge:
   - If the pressure drop is less than 10 bar (150 psi) initially, and additional drop does not exceed 2 bar (25 psi) per minute, the problem is not hydraulic.
   - If the pressure drop is more than 10 bar (150 psi) initially, and additional drop exceeds 2 bar (25 psi) per minute, the CLAMP check valve cartridge may be faulty. Replace the cartridge.

6. Close the arms fully and hold the lever in the CLAMP position for a few seconds. If the pressure still drops as before, the cylinders are faulty and must be serviced.

8.4 SIDESHIFT CIRCUIT TEST

NOTE: Perform CLAMP circuit test first to assure cylinders are operating properly.

1. If fitted, press the solenoid button (if equipped) and listen for a 'click' at the solenoid valve. If no sound is heard, first check the fuse, wiring and coil. Then assure that the valve is not jammed.
   IMPORTANT: Solenoid-operated valves must be plumbed so that the solenoid is **not energized** during the SIDE- SHIFT function.

2. Clamp a maximum load and sideshift LEFT and RIGHT observing sideshifting movement:

- If Clamp will not sideshift or sideshifts slowly, adjust SS relief clockwise (CW) until Clamp sideshifts. Then adjust counter-clockwise (CCW) 1/4-turn increments until sideshift speed slows (relief opening). Finish by adjusting cartridge clockwise (CW)1/4-turn.
- If Clamp will not sideshift after attempted relief adjustment, go to Step 3.

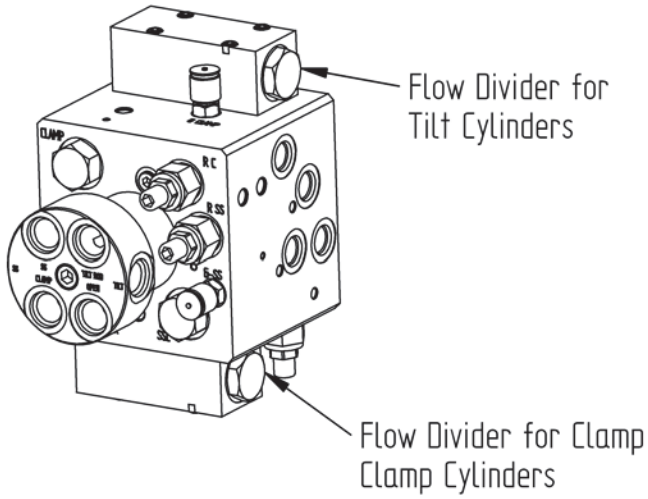
3. Remove the setscrew plug (4 mm or 5/32 in. Allen socket) from the equalization orifice located in the port. Refer valve service section. Readjust SS relief per Step 2.
4. If the Clamp sideshifts at the proper speed in one direction but not the other, the SS relief setting can be assumed OK, but the SSL or SSR check valve may be faulty. Swap or replace check valve cartridge(s).
5. If Clamp still sideshifts improperly in one or both directions, problem is not hydraulic.

9 CONTROL VALVE ASSEMBLY SERVICE

9.1 REVOLVING CONNECTION FEATURES

All the main hydraulic valves and cartridges for the operation of the tyre handler are contained in the revolving connection. This valve also contains 3 test points fo r checking the hydraulic pressure of the sideshift, clamp and tilt functions. Also fitted are 2 needle valves for adjusting the o perating speed of the main clamp arms.

CAUTION: CHECK ROTATION CLEARANCE WHEN & IF CARTRIDGES ARE CHANGED ON THIS VALVE.

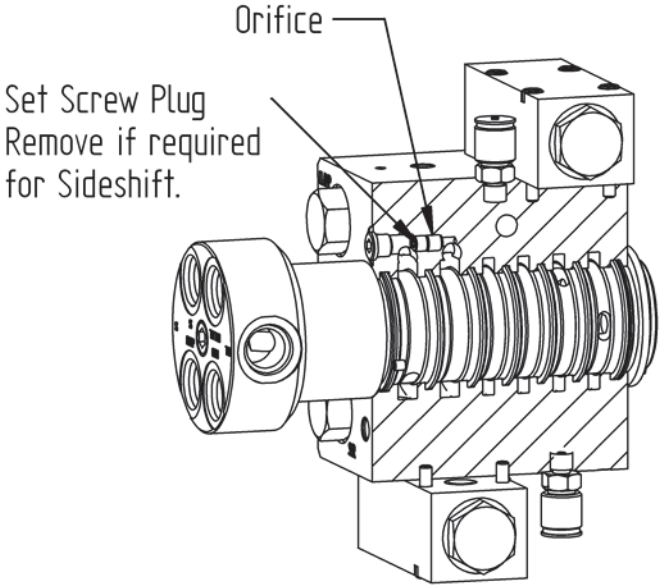


This image shows the revolving connection used in production from 2011. The adjustable needle valves are replaced by a flow divider.

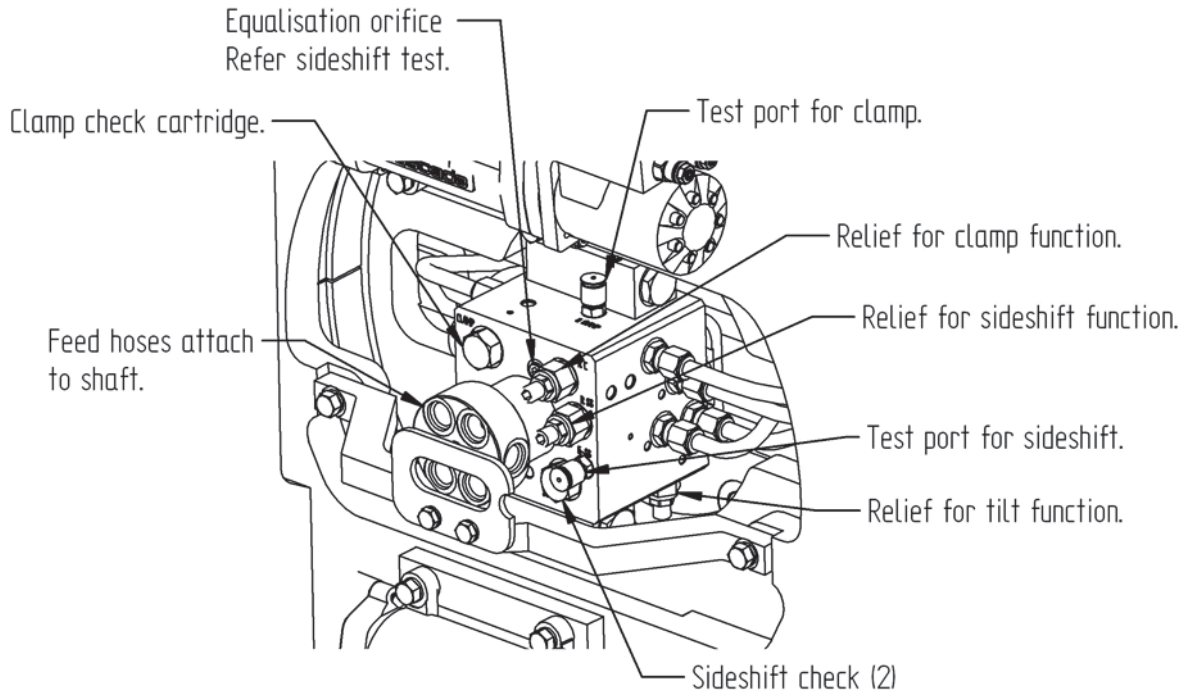
All the hydraulic valves are cartridge style and can be replaced and resealed individually.

9.2 SIDESHIFT TEST.

If the sideshift function operates with no load and doesn't operate with the maximum load, the relief valve setting should be checked first. Refer to the hydraulic circuit for the correct setting.



After setting the relief valve, proceed as follows. Clamp a load and then operate the sideshift function. If there is no sideshift and the truck pressure doesn't increase, the equaliser plug needs to be removed. Refer diagram in previous section for plug location. Remove the in-hex plug and with a 4mm allen key, remove the set screw from the hole as shown in the diagram above. Do not remove the orifice plug. Removing the set screw will allow the pressure to equalise in the feed hoses.



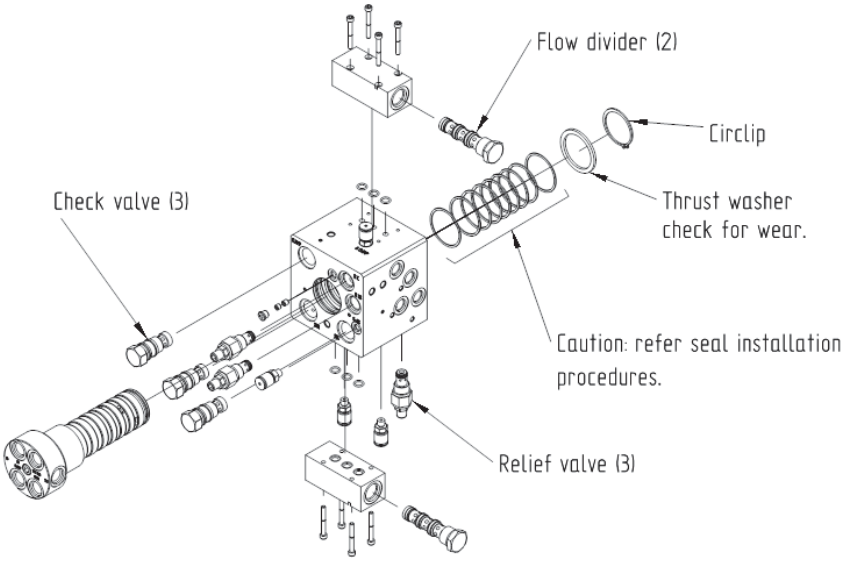
9.3 REVOLVING CONNECTION SEALS AND CARTRIDGES.

9.3.1 Disassemble.

- To service the revolving connection, the valve support must be removed, all feed tubes removed and the unit moved to the rear of the tyre handler.
- Clean the revolving connection before disassembling.
- Carefully remove the main shaft from the valve body after checking for any burrs on the shaft.
- Remove the seals inside the valve body using a soft brass seal remover. Avoid touching the sides and OD of the seal grooves.
- Any minor imperfections in the grooves can be removed with 400-grit emery paper.
- Remove all cartridges and clean in kerosene or similar solvent.
- Check all seals on cartridges and reseal if required.
- Replace all of the main shaft seals.
- Check fit of shaft and body for excessive wear.

9.3.2 Reassemble.

- Lubricate shaft and body with STP or petroleum jelly prior to reassembly.
- Rotate shaft as it is inserted into the body.
- Ensure the circlip is located correctly in its groove and the thrust washer is installed.
- If new relief valves are fitted, the pressures will need to be reset.

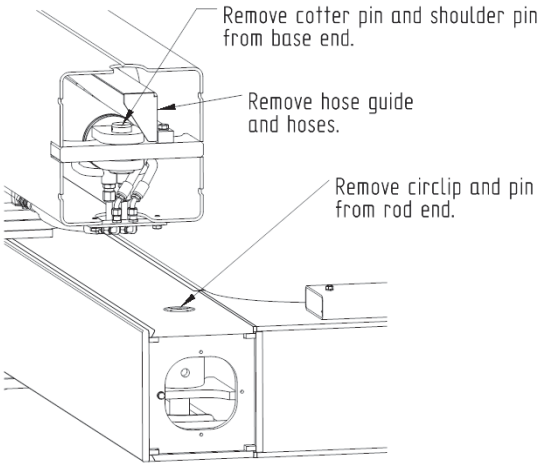


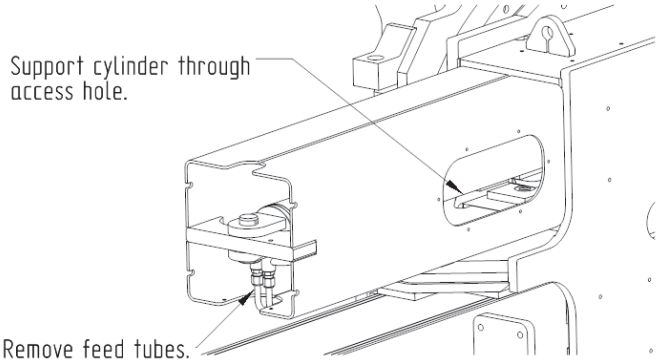
10 CYLINDER SERVICE.

10.1 REMOVING AND INSTALLING THE CLAMP CYLINDERS.

The cylinders can be removed whilst the unit is mounted on the truck. Do not remove the hydraulic supply till the cylinder rod has been disconnected from the arm. Note that the cylinders are heavy and a crane will be required to lift then from the unit.

- Extend arms till nearly half way out.
- Remove the inspection cover on the end of the slide arm.
- Remove the circlips and pin from the rod end.
- Note that the rod clevis is threaded to allow an eye bolt to be fitted. This is required for reassembly and for handling the cylinder.
- Retract the cylinder rod till nearly fully closed and relieve pressure in the lines.
- Remove the feed tubes to the cylinder and cap ports.
- Remove inspection plate from front of cylinder mounting box.
- Remove the hose support inside the cylinder mount box.
- Supporting the rod end of the cylinder through the front opening, remove the cotter pins and shoulder pin from the base end of the cylinder.
- Lower the cylinder and withdraw it from the cylinder box.

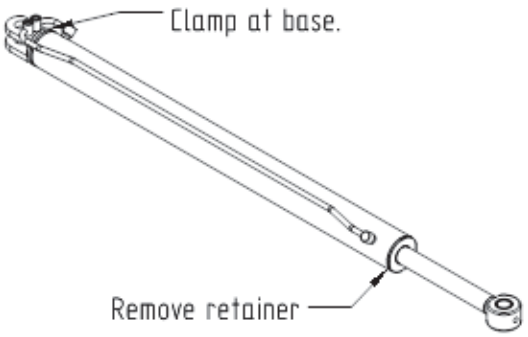




- Reinstalling the cylinders is the reverse of the above.
- The eye bolt can be used to locate the rod end into its anchor position with the use of a chain and shackles.
- Lubricate all pins with anti-seize.

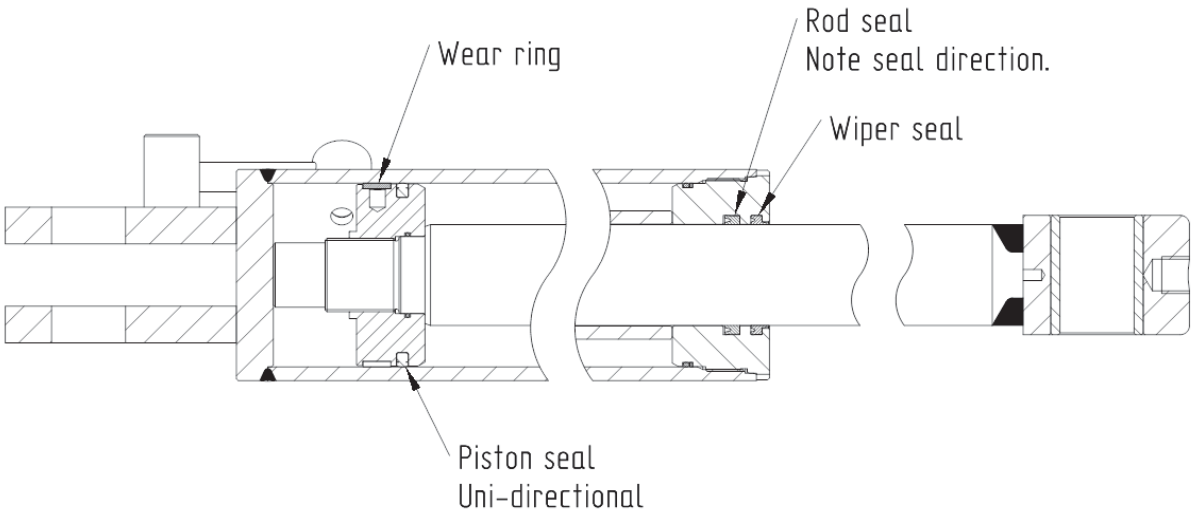
10.2 CYLINDER DISASSEMBLY.

- Clamp the cylinder at the extreme head end. Do not clamp the body.
- Unscrew the retainer.
- Remove the piston rod assembly.
- Remove the piston from the rod. This may require some heat as Loctite is used.
- Remove all seals without damaging any of the grooves.



10.3 CYLINDER INSPECTION.

- Inspect the rod, piston and retainer for any nicks or burrs. Minor imperfections can be removed with 400-grit emery cloth.
- Inspect the cylinder bore and remove any minor nicks with a butterfly hone.
- Inspect the outside of the barrel of any dents, etc.
- Inspect the feed tubes for any damage.

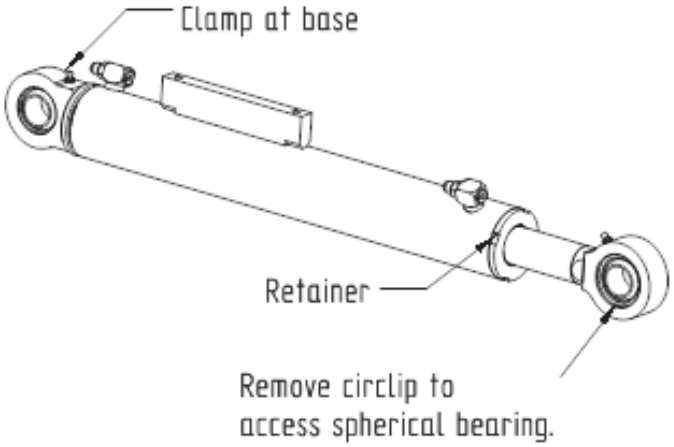


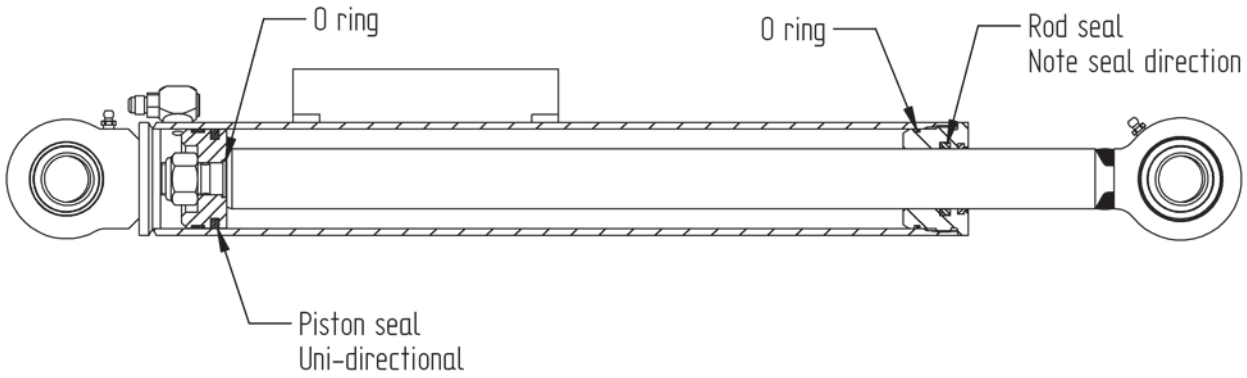
10.4 CYLINDER REASSEMBLY

- Using 400-grit emery cloth, polish the piston and retainer chamfer angles and the ID threads. Clean all parts thoroughly.
- Lubricate all new seals and O-rings with petroleum jelly or O-ring lube.
- Install all new piston and rod seals.
- Fit piston to rod after cleaning all threads and applying Loctite.
- Carefully centre the piston to the barrel and tap the rod/piston assembly into the barrel. Timber supports should be used to help with the alignment.
- Screw the retainer into the barrel and torque to the correct value.

10.5 TILT CYLINDER

- The tilt cylinders are mounted on the upper face of the clamp arms.
- Remove the pivot pins at each end of the cylinder and the feed hoses.
- The disassembly and reassembly process is similar to the clamp cylinder.
- Each end of the cylinder has a spherical bearing with can be replaced after removing a circlip.





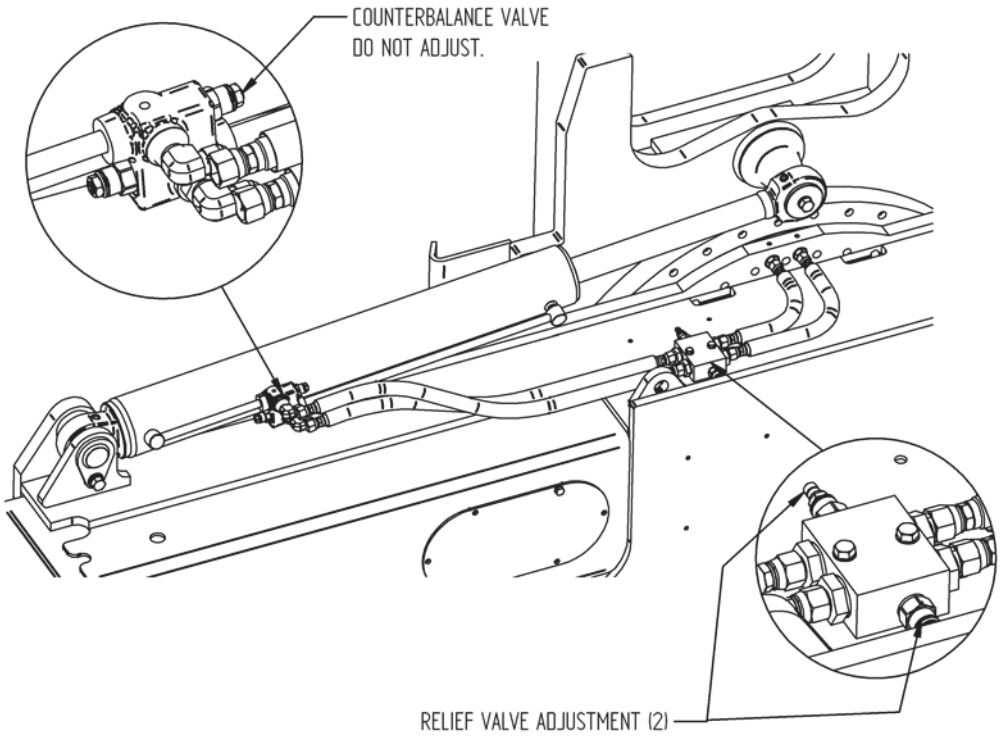
- Removal of the cylinder cover is required to remove the feed hoses.
- Check all welds at the attachment location for the bearing housings.
- Refer to the assembly drawing for assembly torques and replacement part numbers.

10.6 ROTATE CYLINDER

The rotate cylinder is mounted on the upper area of the base and the rod is attached to the carraige or base plate. The cylinder is protected by a cross port relief valve and has spherical bearings at each end.

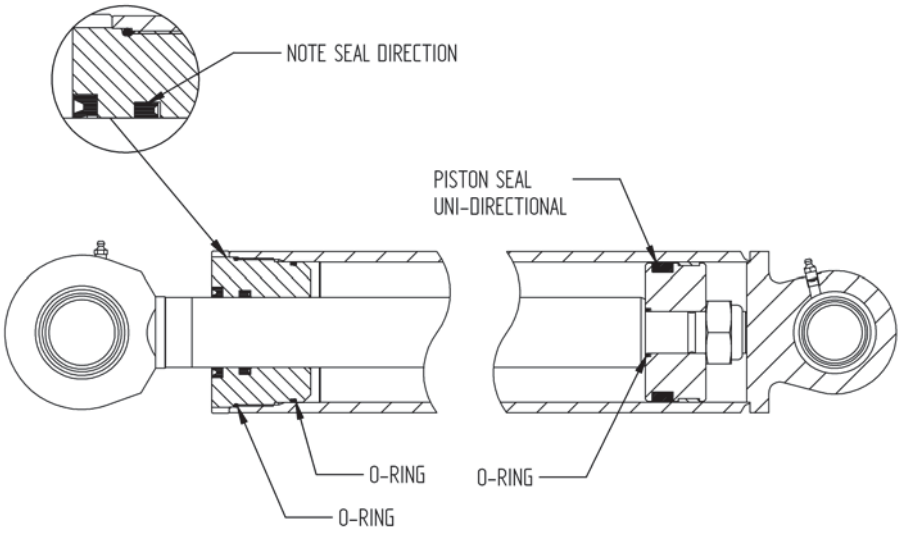
10.6.1 Cylinder removal.

- Lower the tyre handler to the ground such that the arms limit any rotation of the unit. If this is not possible block the base assembly to limit rotation.
- Relieve any pressure in the system.
- Remove the pivot pins at each end of the cylinder and the feed hoses.



10.6.2 Cylinder inspection

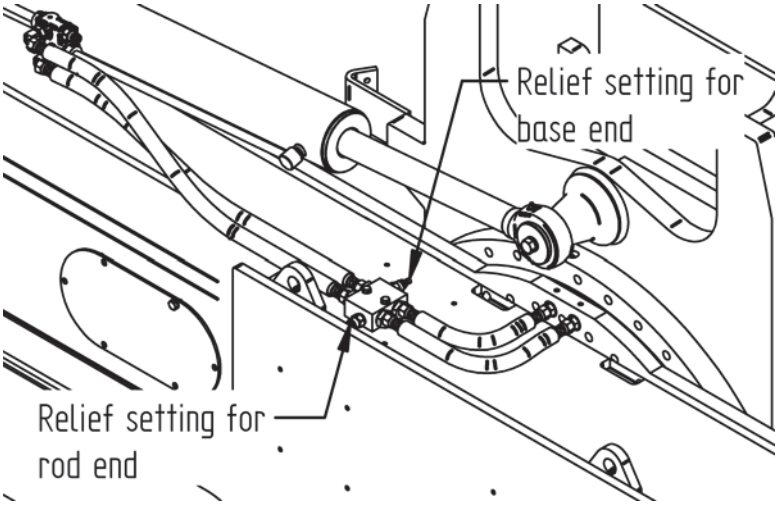
- The disassembly and reassembly process is similar to the clamp cylinder.
- Each end of the cylinder has a spherical bearing with can be replaced after removing a circlip.
- The cylinder is fitted with 2 counterbalance valves. **Do not adjust** these valves as they are factory-preset.



10.6.3 Setting relief pressures

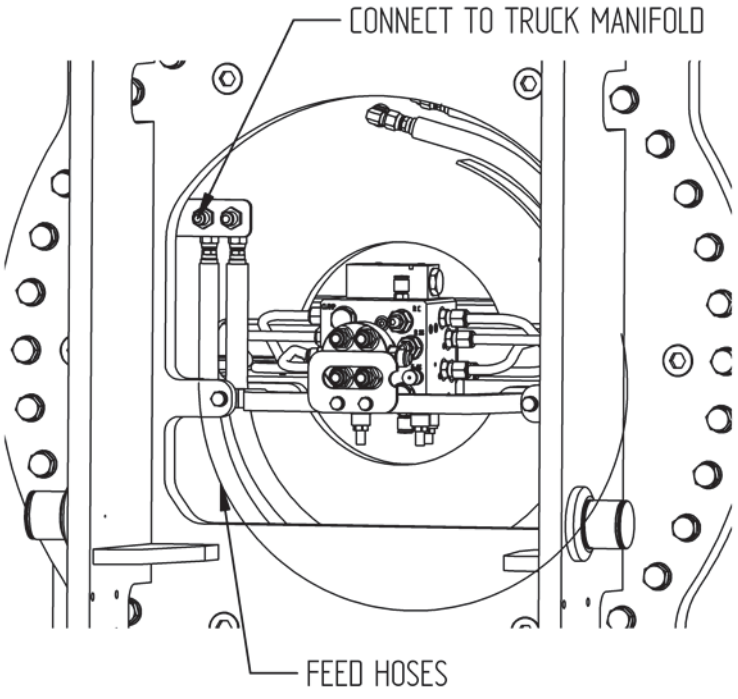
The relief settings are different for the base and the rod end of the cylinder.

- To set the relief, rotate the unit till the cylinder fully extends.
- Adjust the relief as shown to the value listed on the hydraulic circuit.
- Retract the cylinder rod fully into the barrel.
- Adjust the relief as shown to the value listed on the hydraulic circuit.



10.6.4 Feed hoses.

The rotate cylinder is fed by a set of hoses inside the main slew bearing. The hoses are enclosed inside protective covers which should be inspected at regular intervals for any wear or damage.



11 MAIN SLEW BEARING

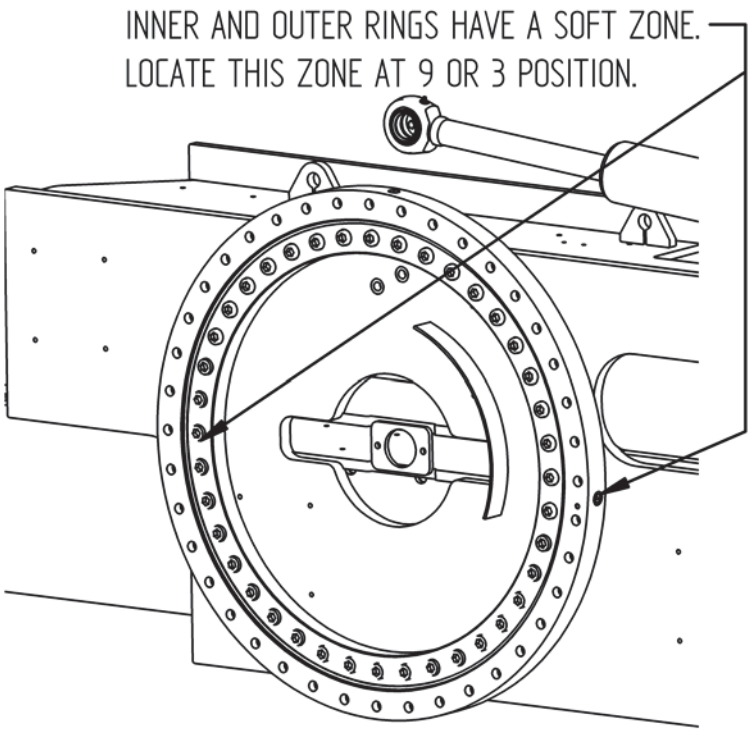
The tyre handler rotates on a large diameter slew bearing with a large number of bolts to attach the bearing to the carriage and to the base weldment. The bearing is not adjustable for wear. The unit has a drain hole or drain slot at the bottom of the bearing to allow any water trapped inside the rotator to escape. These must be kept clear as corrosion will damage the bearing raceways.

If the bearing is removed for service, new fasteners must be used to reattach the bearing. Never reuse the original fasteners.

Each bearing ring has a soft zone which will be marked. Ensure this zone is located at the 3 or 9 o'clock position. The outer ring soft zone is located at the ball loading plug.

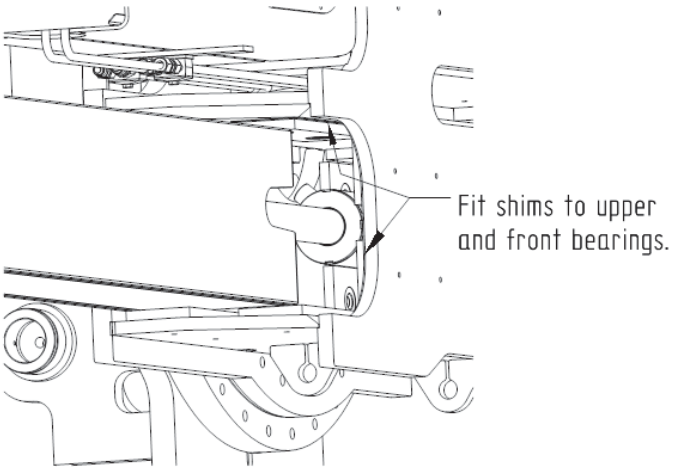
When tightening the fasteners use an alternate cross pattern and tighten to 80% of the rated torque. Then loosen each fastener and retighten in a cross pattern in increments up to the full rated torque. Refer to the chart for the torque values for each set of fasteners.

When hardened washers are used these must be reinstalled with the new fasteners. Also refer to the parts sheets for any additional information.

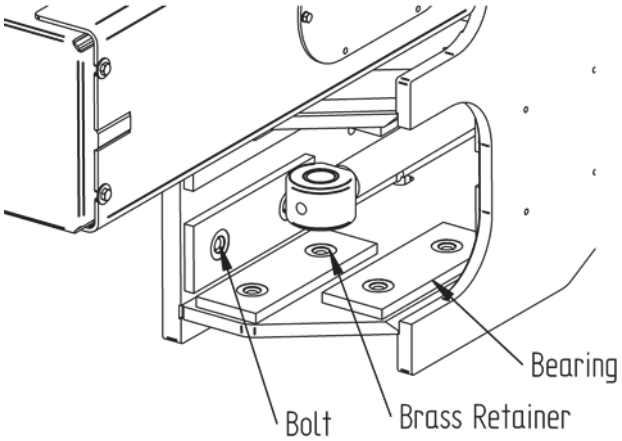


12 SHIMMING CLAMP ARMS.

12.1 SHIM SLIDE ARM

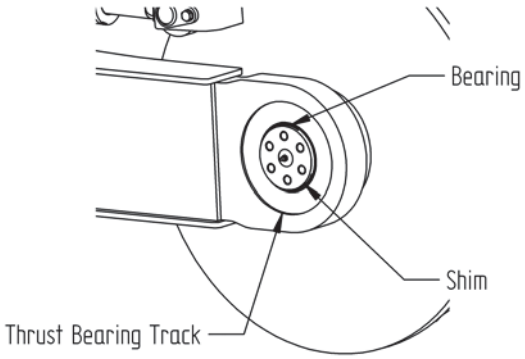


- The sliding clamp arms are guided by a number of plastic bearings retained in the main body by bronze plugs.
- Under the upper and front bearings are steel shims used to adjust the arm clearance.
- The required arm clearance is typically 1mm or under.
- The steel shims are available in 0.5 and 1.0mm thicknesses
- An adjustable ID measuring tool is used to set the inside dimension between the bearings. An external vernier can be used to measure the outside dimensions of the slide arm.
- The steel shims can be coated in a thin layer of grease to ensure they are located correctly as the arm is slide into the body.
- The steel shims must have an anti-corrosive coating such as zinc. If the shims rust the stack dimensions can change and jam the arm inside the body.
- The arms need to be completely removed from the body to adjust the bearings.
- The clamp cylinder can be used to draw the arm back into the body by using an eye bolt and chain.



12.2 SHIM PAD PIVOT

The tyre handle pads pivot on a large DU bush and the thrust load is taken by plastic bearings. Between the retainer plate and hub there are shims which allow any clearance to be removed. The thrust bearings should have as close as possible to zero clearance. Some preload is allowable.



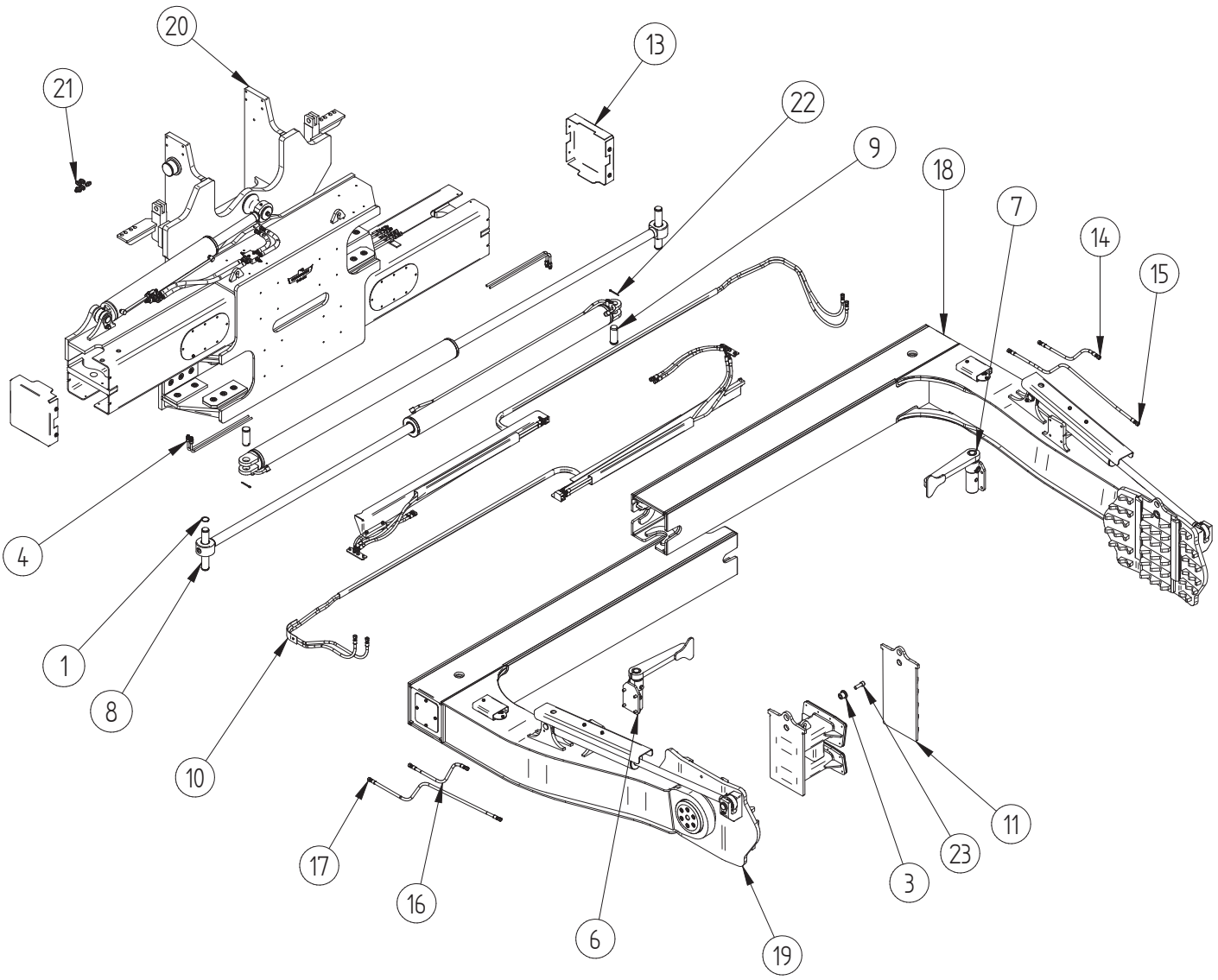
13 FASTENER TORQUE VALUES

Ref	Fastener	Size	Nm - lubed	Nm – non lubed (As supplied)
1	Baseplate to rotator bearing,	M24 – 10.9	755	1000
2	Rotator bearing to base weldment,	M24 – 12.9	920	1230
3	Baseplate to rotator bearing,	M20 – 10.9	430	530
4	Rotator bearing to base weldment,	M20 – 12.9	530	650
5	Valve mount bracket	M12 – 8.8	66	80
6	Pad retainer plate	M16 – 12.9	270	330
7	Pivot Pin Retainer Tilt Cylinder	M12 – 8.8	108	130
8	Inspection Covers	M8 – 8.8	20	25
9	Tyre Stop to Arm	M16 – 8.8	165	195
10	Bearing Retainer to Base	M10 – 8.8	30	30

14 MECHANICAL ASSEMBLY DRAWINGS

14.1 INDEX OF DRAWINGS & DIAGRAMS

1. Tyre Handler, Dedicated.
2. Assembly, Carriage.
3. Assembly, Rotate.
4. Assembly, Arm, L.H.
5. Assembly, Arm, R.H.
6. Assembly Tyre Stop R.H
7. Assembly Tyre Stop L.H
8. Assembly Drive Group.
9. Revolving connection.
10. Bracket.
11. Clamp cylinder.
12. Tilt cylinder.
13. Rotate Cylinder.
14. Relief Valve.
15. Hose Layout.
16. Feed Tubes.
17. Bearing Assembly.
18. Bearing Assembly.
19. Bearing Assembly.



1	1011267	CIRCLIP EXTERNAL 50 MM DIN 471	4
2	1829614	CLAMP CYLINDER	2
3	1829865	BOSS	2
4	1830439	ST THD CONNECT – # 8 TO 0.5" TUBE	4
5	1831098	LIFTING PLATE	2
6	1833152	TYRE STOP – RH	1
7	1833155	TYRE STOP – LH	1
8	1836685	PIN, ROD END	2
9	1836686	PIN, CLEVIS	2
10	1840351	HOSE LAYOUT	1
11	1840362	CLAMP PLATE – TYRE	2
12	1840364	TUBE – CYL END	4
ITEM	PART NO	DESCRIPTION	QTY

13	1841860	END COVER GROUP	2
14	1843287	HOSE ASSY – S-52018	1
15	1843291	HOSE ASSY – S-52018	1
16	1843292	HOSE ASSY – S-52018	1
17	1843293	HOSE ASSY – S-52018	1
18	1844750	CLAMP ARM ASSEMBLY LH	1
19	1844751	CLAMP ARM ASSEMBLY RH	1
20	1847068	CARRIAGE – BASE ASSEMBLY	1
21	611291	NIPPLE ST 7/8" JIC – 7/8" UNOR	6
22	6551	COTTER PIN – 0.25" DIA X 3" LG	2
23	769583	CAP SCREW M20 X 60	2
ITEM	PART NO	DESCRIPTION	QTY

cascade corporation

DESCRIPTION.

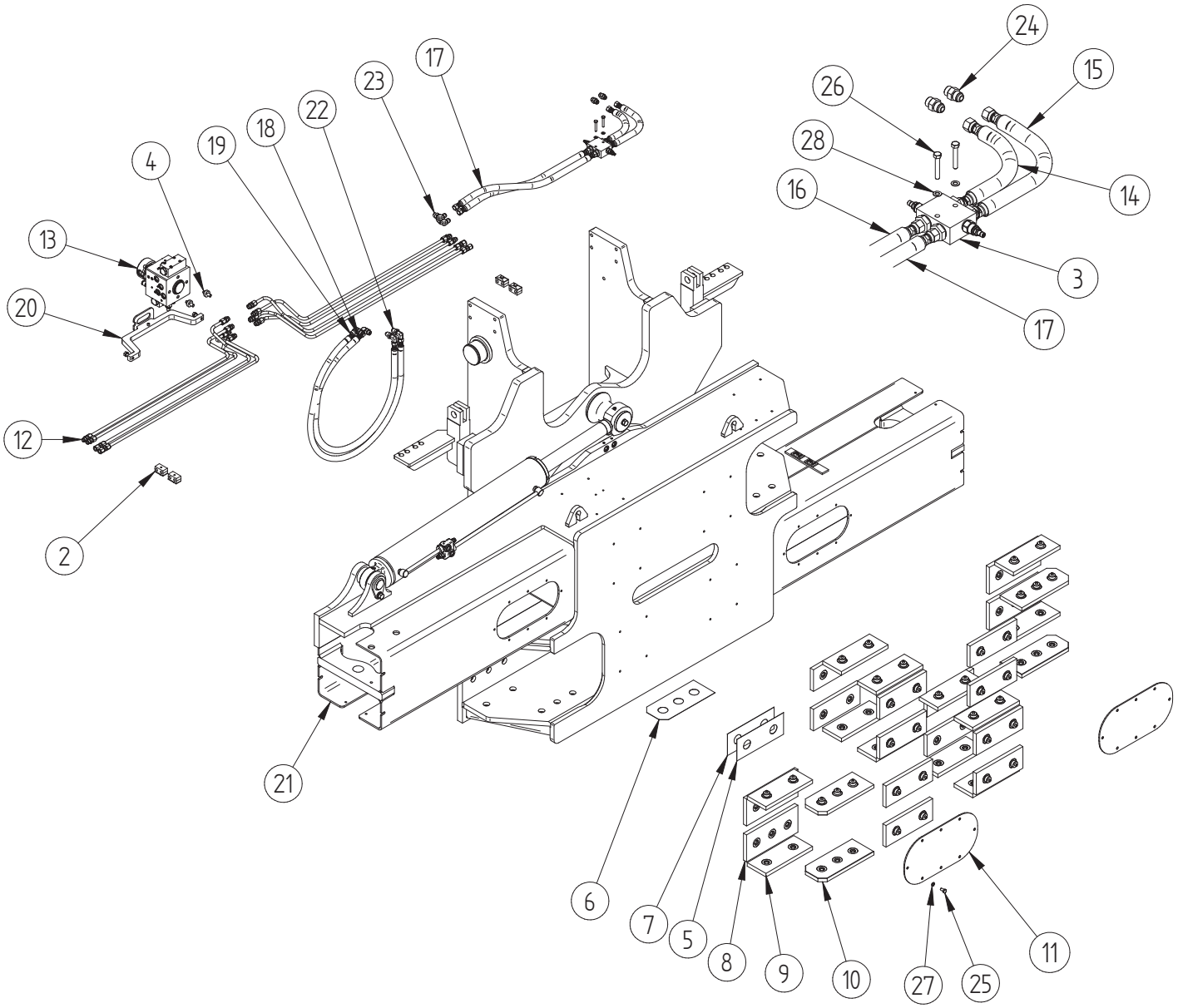
TIRE HANDLER – 10.000kg

DATE: 18/06/12

SHEET :

PART NO. / DWG NO. 100K15011

R 0



1	028518	NIPPLE ST 1/2 " BSPP - 3/4 " JIC	4
2	031422	CLAMP, HOSE, TWIN, 12.7mm	4
3	105627	VALVE, RELIEF, CROSS-PORT	1
4	1829754	RETAINER PIN - VALVE	2
5	1829890	SHIM - 2 HOLE	1
6	1829891	SHIM - 3 HOLE	1
7	1830610	SHIM - 2 HOLE - 1mm	1
8	1834455	BEARING ASSEMBLY - 3 HOLE	4
9	1834456	BEARING ASSEMBLY - 2 HOLE	24
10	1834457	BEARING ASSEMBLY - 3 HOLE CHF	4
11	1836606	COVER - BODY	2
12	1836679	FEED TUBES	1
13	1841819	REVOLVING CONNECTION - FLOW DIVIDER	1
14	1841995	HOSE ASSY - S-52018	1
ITEM	PART NO	DESCRIPTION	QTY

15	1841996	HOSE ASSY - S-52018	1
16	1841997	HOSE ASSY - S-52018	1
17	1841998	HOSE ASSY - S-52018	1
18	1843214	HOSE ASSY - S-52018	1
19	1843215	HOSE ASSY - S-52018	1
20	1844703	BRACKET ASSY	1
21	1847069	ROTATE - BASE ASSY	1
22	2454	BULKHEAD FITTING 90 DEGREE - # 8	2
23	601250	ELBOW 90 3/4" JIC - 3/4" UN	4
24	601377	NIPPLE ST 3/4" JIC - 3/4" UN	2
25	684594	BOLT HT M10 X 20	16
26	768527	BOLT HT M8 X 50	2
27	787383	WASHER SPRING M10	16
28	787398	WASHER FLAT M08	2
ITEM	PART NO	DESCRIPTION	QTY

cascade corporation

DESCRIPTION.

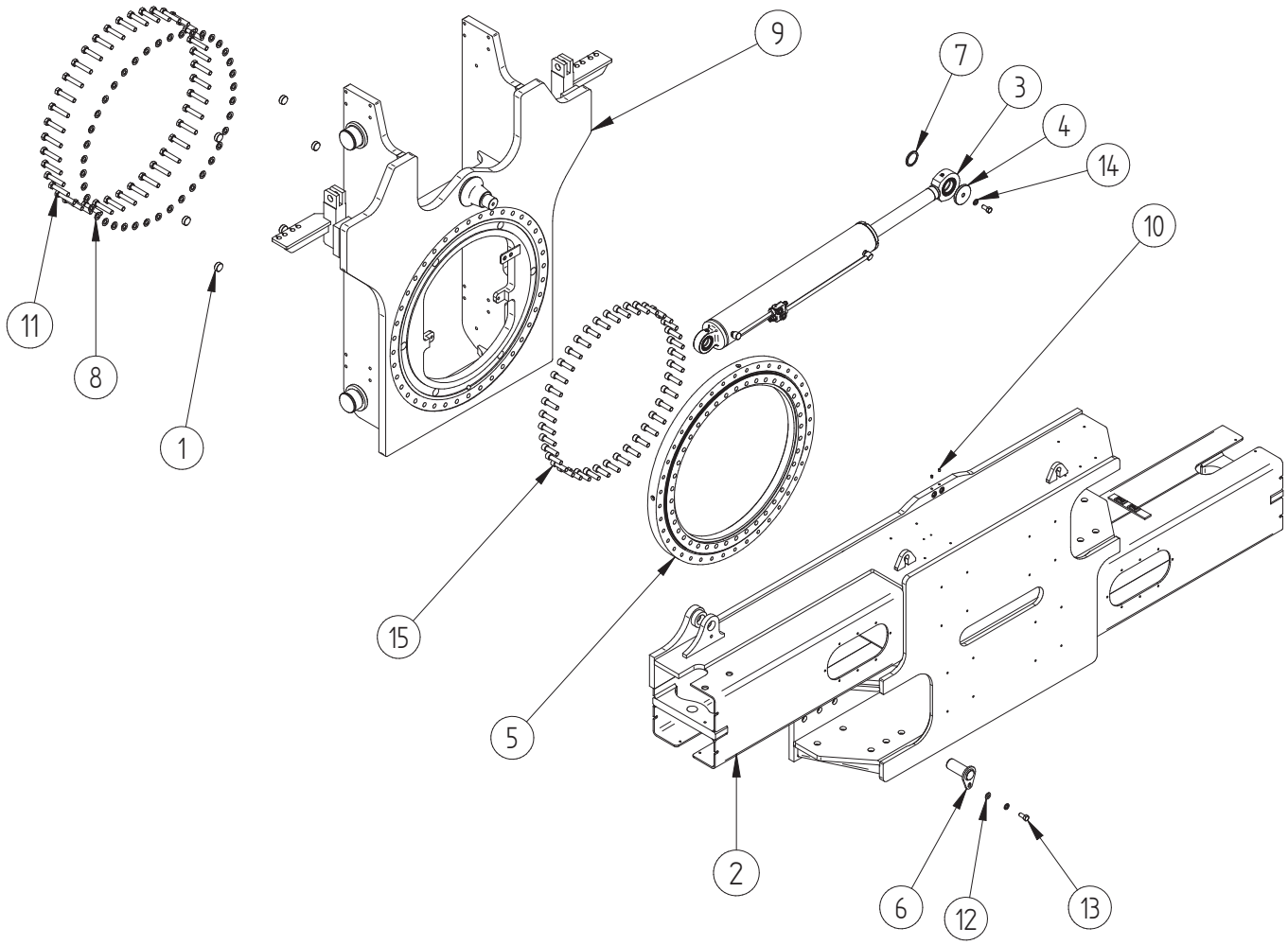
CARRIAGE - BASE ASSEMBLY

DATE: 18/06/12

SHEET :

PART NO. / DWG NO. 1847068

R 0



ITEM	PART NO	DESCRIPTION	QTY
1	028557	FLUSH SEAL PIPE PLUG 1.25" BSPP	6
2	1840323	BASE - CYLINDER ANCHOR WELDMENT	1
3	1840332	ROTATE CYLINDER	1
4	1840340	RETAINER CAP	1
5	1840352	BEARING ASSEMBLY - TYRE HANDLER	1
6	1840385	PIN WELDMENT 50 MM DIA	1
7	1840420	SPACER RING	1
8	1840421	WASHER FLAT - M20 - DIN 6916	40
9	1847070	BASE WLDMT - TCM FD-230	1
10	211393	EXPANSION PLUG 9MM	2
11	6405131	BOLT HT M20 X 100 GR 10.9	40
12	667225	WASHER - .625 HT	1
13	684295	BOLT HT M16 X 35	2
14	684586	WASHER SPRING M16	2
15	769584	CAP SCREW M20 X 70	40

cascade corporation

DESCRIPTION.

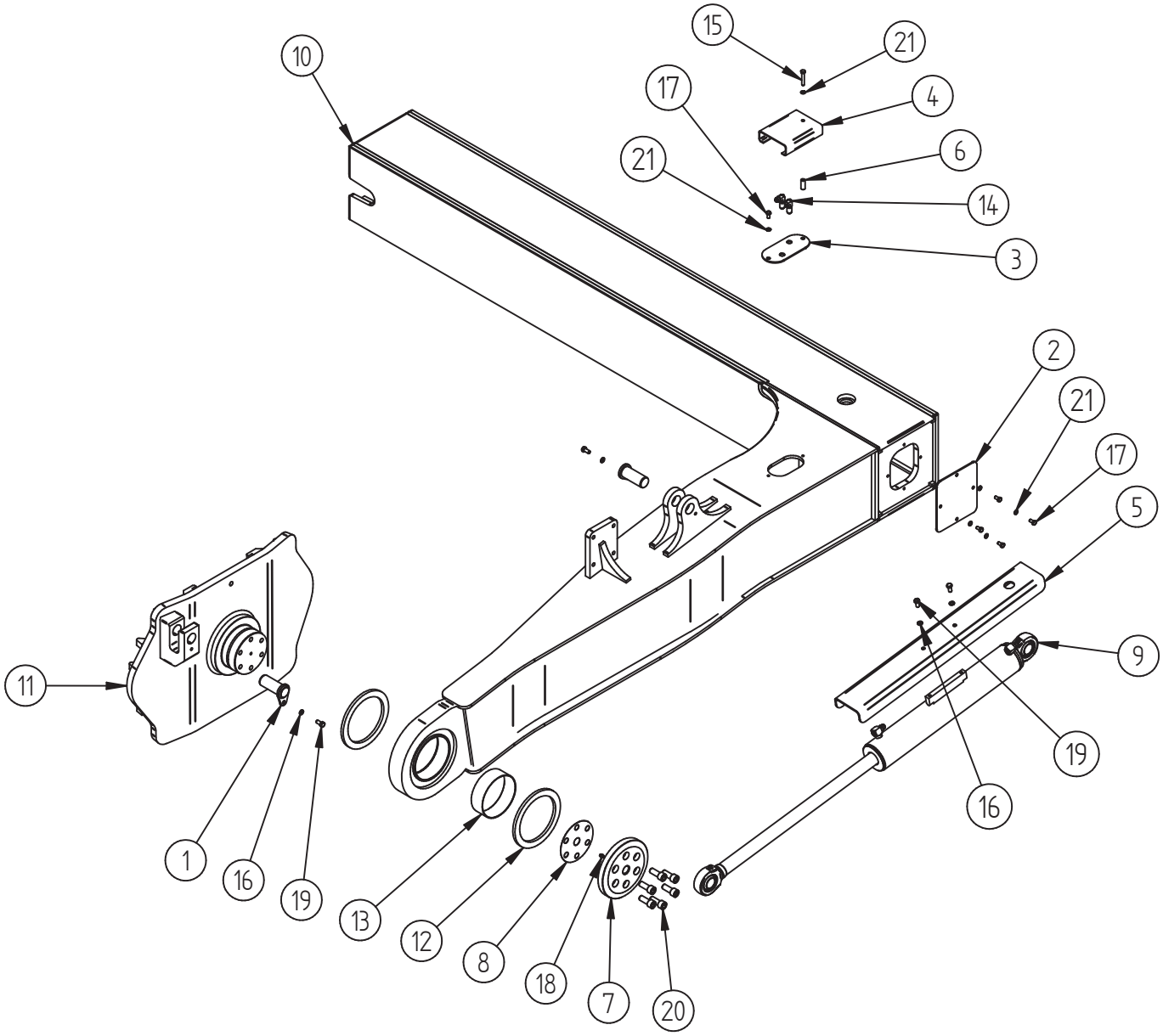
ROTATE - BASE ASSY

DATE: 18/06/12

SHEET :

PART NO. / DWG NO. 1847069

R 0



ITEM	PART NO	TITLE	QTY
1	1829701	PIN WELDMENT 45 MM DIA	2
2	1829851	COVER – ARM	1
3	1834462	MOUNTING PLATE	1
4	1834504	COVER – TILT HOSE	1
5	1835352	COVER	1
6	1835357	TUBE	1
7	1835441	CAP	1
8	1835442	SHIM	AR
9	1835475	TILT CYLINDER	1
10	1839028	CLAMP ARM WELDMENT LH	1
11	1840359	PAD WELDMENT LH	1

ITEM	PART NO	TITLE	QTY
12	1845995	THRUST WASHER	2
13	1845997	BUSH – 180 ID	1
14	2454	BULKHEAD – 90' ELBOW – #8	2
15	6405027	BOLT HT M10 X 60	1
16	683822	WASHER SPRING M12	4
17	684594	BOLT HT M10 X 20	5
18	7418	GREASE NIPPLE 1/8" NPT ST	1
19	767810	BOLT HT M12 X 25	4
20	769582	CAP SCREW M20 X 50	6
21	787383	WASHER SPRING M10	6

cascade corporation

DESCRIPTION.

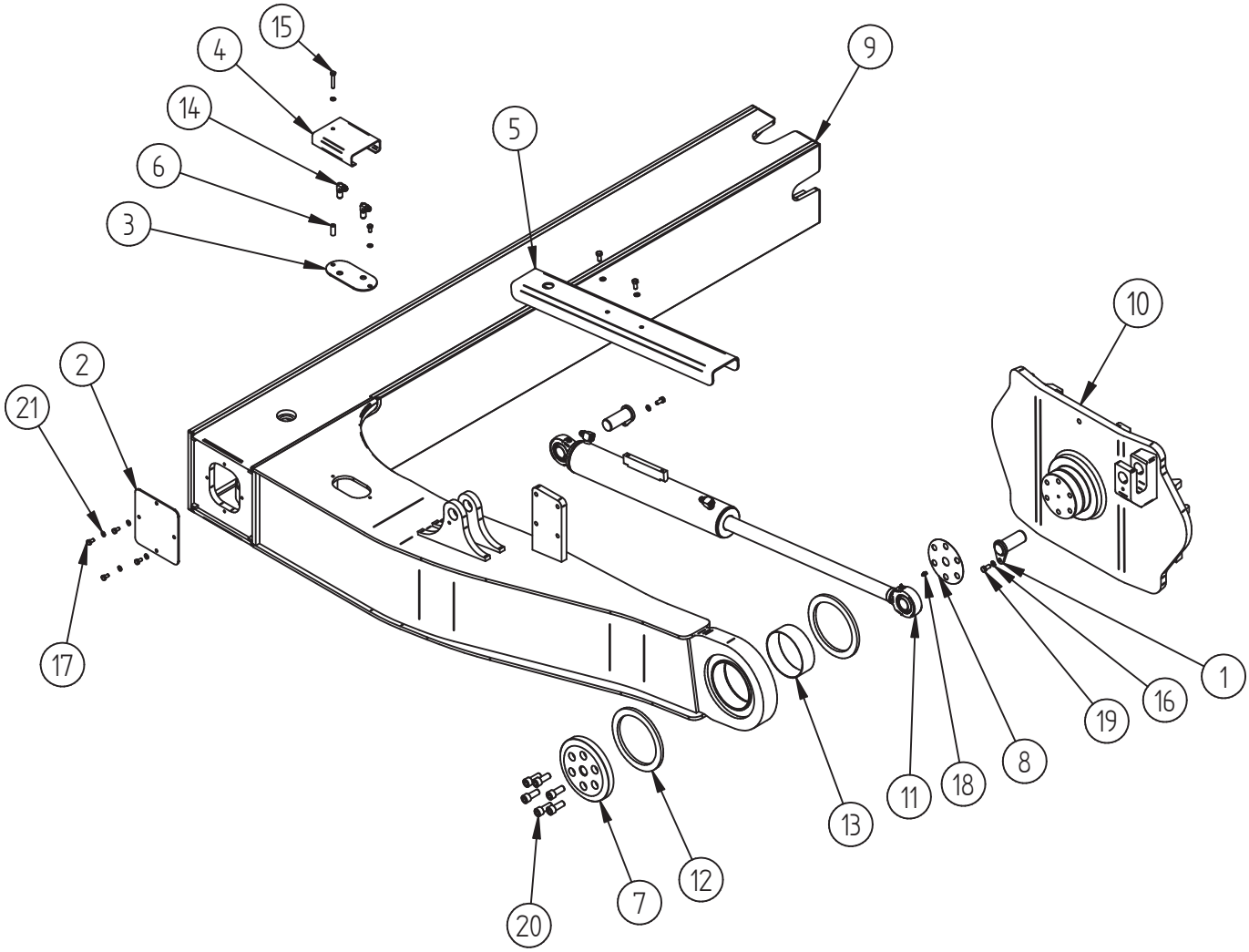
CLAMP ARM ASSEMBLY LH

DATE: 08/12/11

SHEET :

PART NO. / DWG NO. 1844750

R 1



ITEM	PART NO	TITLE	QTY
1	1829701	PIN WELDMENT 45 MM DIA	2
2	1829851	COVER – ARM	1
3	1834462	MOUNTING PLATE	1
4	1834504	COVER – TILT HOSE	1
5	1835352	COVER	1
6	1835357	TUBE	1
7	1835441	CAP	1
8	1835442	SHIM	AR
9	1839026	CLAMP ARM WELDMENT RH	1
10	1840355	PAD WELDMENT RH	1
11	1845806	TILT CYLINDER	1

ITEM	PART NO	TITLE	QTY
12	1845995	THRUST WASHER	2
13	1845997	BUSH – 180 ID	1
14	2454	BULKHEAD – 90' ELBOW – #8	2
15	6405027	BOLT HT M10 X 60	1
16	683822	WASHER SPRING M12	4
17	684594	BOLT HT M10 X 20	5
18	7418	GREASE NIPPLE 1/8" NPT ST	1
19	767810	BOLT HT M12 X 25	4
20	769582	CAP SCREW M20 X 50	6
21	787383	WASHER SPRING M10	6

cascade corporation

DESCRIPTION.

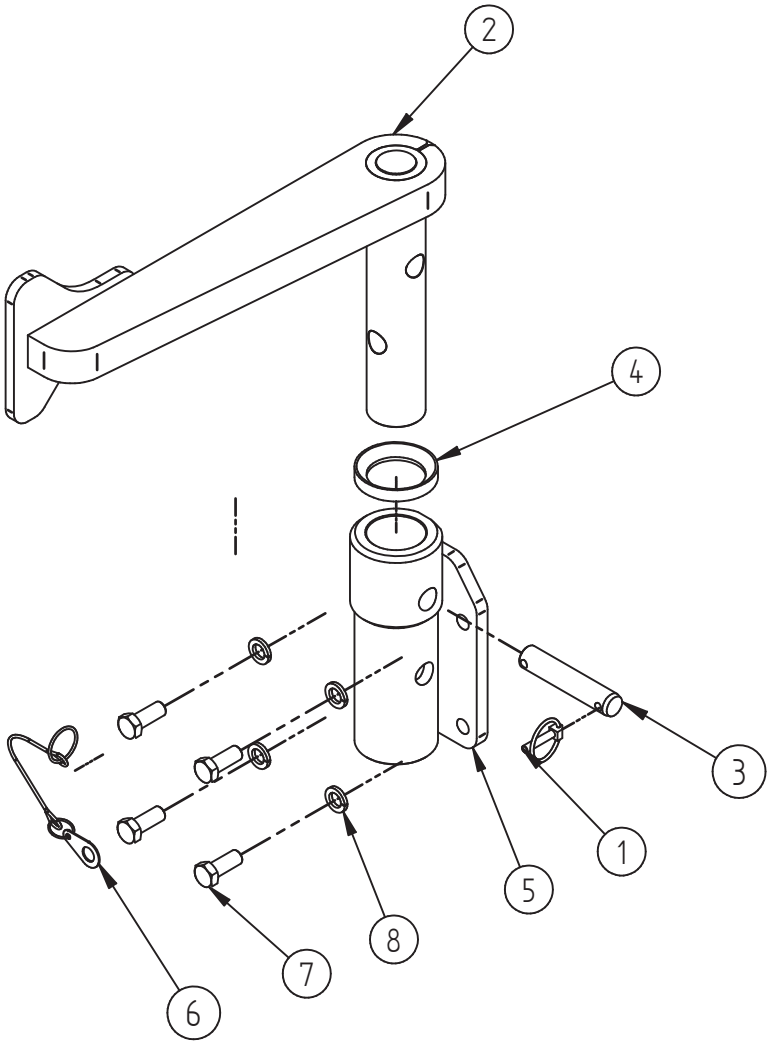
CLAMP ARM ASSEMBLY RH

DATE: 08/12/11

SHEET :

PART NO. / DWG NO. 1844751

R 2



ITEM	PART NO	TITLE	QTY
1	046604	LOCK PIN (COLD SHUT)	1
2	1833153	ARM WELDMENT - RH	1
3	1836601	PIN, ADJUSTABLE TYRE STOP	1
4	1836602	SPACER RING	1
5	1836603	WELDMENT, BASE	1
6	1847017	LANYARD ASSY	1
7	219529	BOLT HT M16 X 40 - GR 10.9	4
8	684586	WASHER SPRING M16	4

cascade corporation

DESCRIPTION.

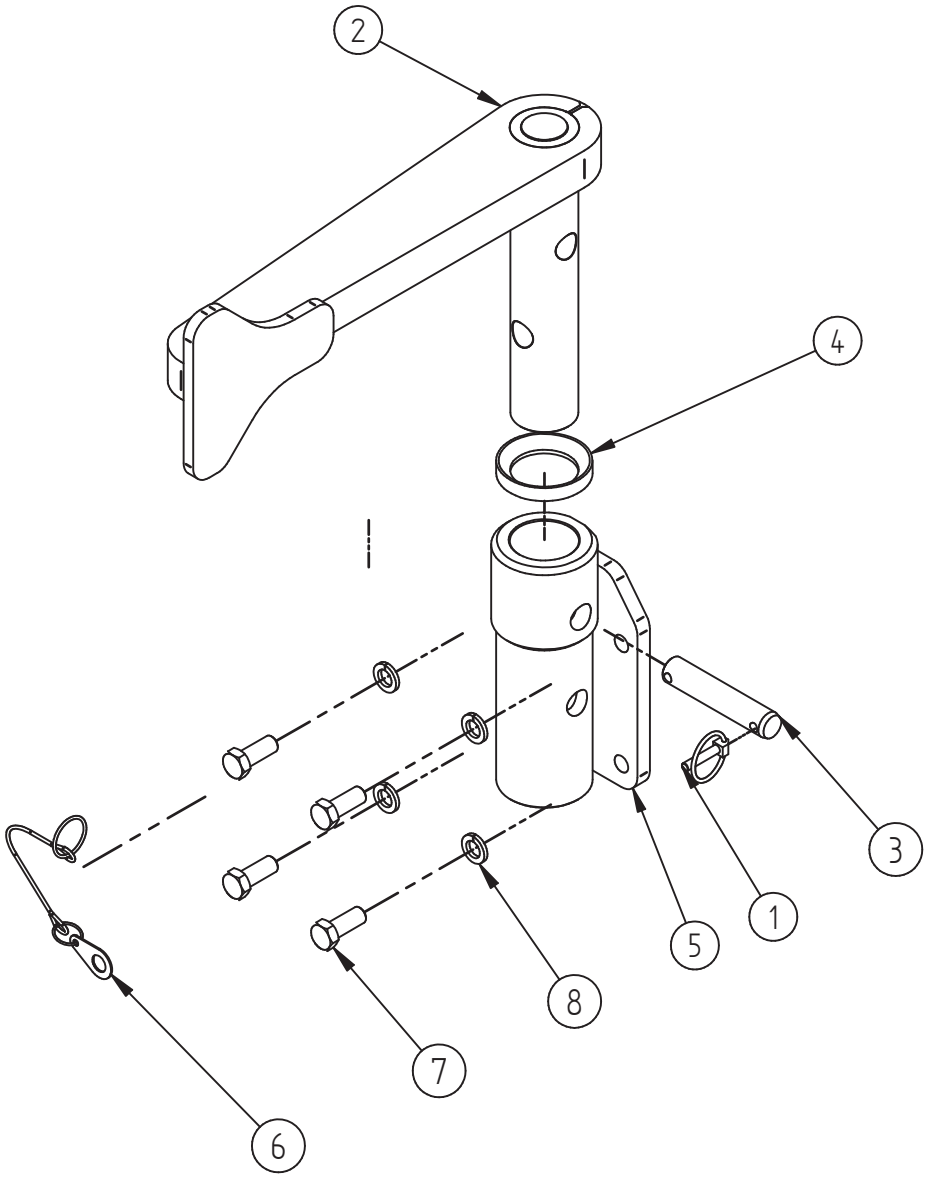
TYRE STOP - RH

DATE: 12/12/11

SHEET :

PART NO. / DWG NO. 1833152

R 4



ITEM	PART NO	TITLE	QTY
1	046604	LOCK PIN (COLD SHUT)	1
2	1833156	ARM WELDMENT - LH	1
3	1836601	PIN, ADJUSTABLE TYRE STOP	1
4	1836602	SPACER RING	1
5	1836603	WELDMENT, BASE	1
6	1847017	LANYARD ASSY	1
7	219529	BOLT HT M16 X 40 - GR 10.9	4
8	684586	WASHER SPRING M16	4

cascade corporation

DESCRIPTION.

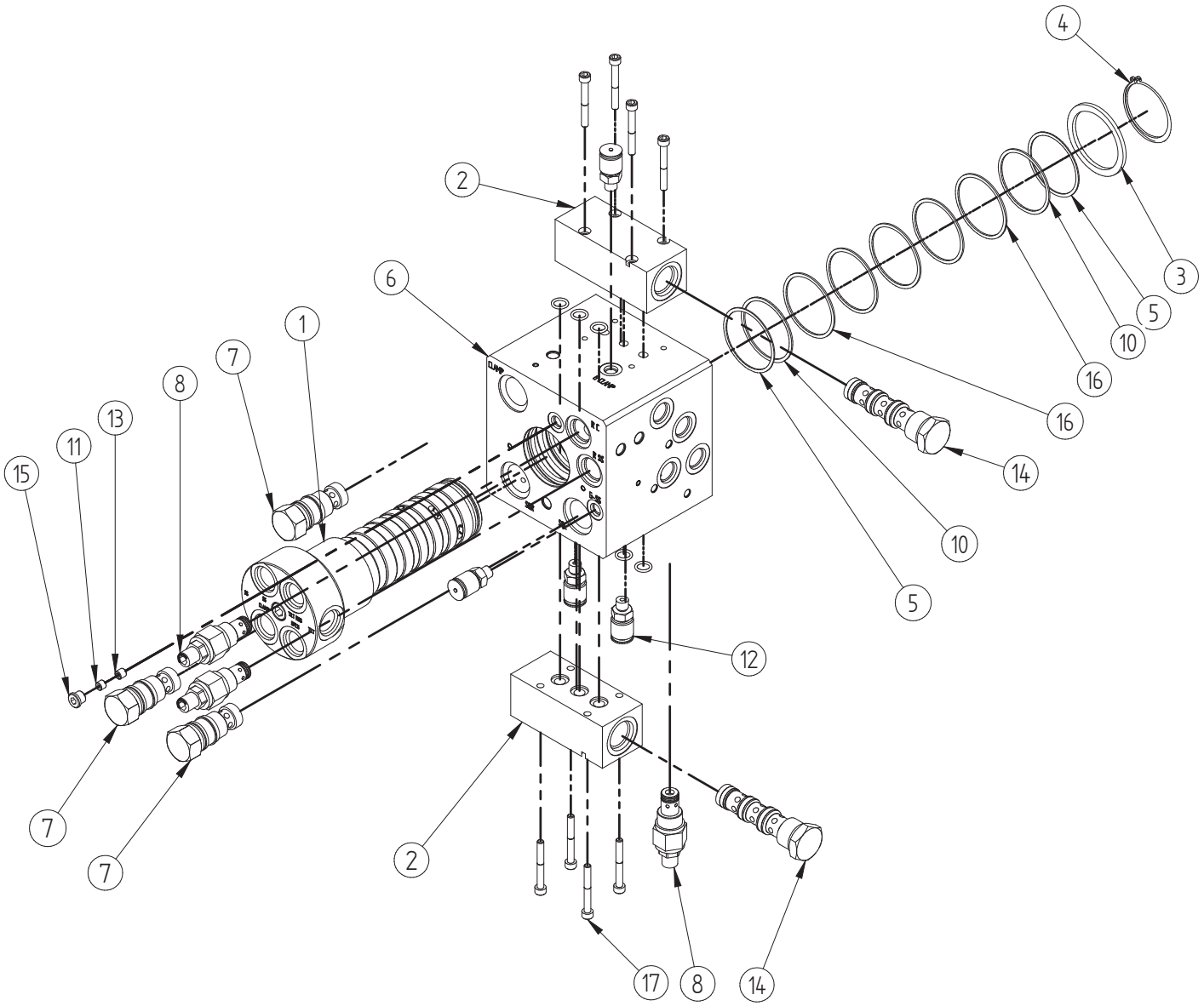
TYRE STOP - LH

DATE: 12/12/11

SHEET :

PART NO. / DWG NO. 1833155

R 4



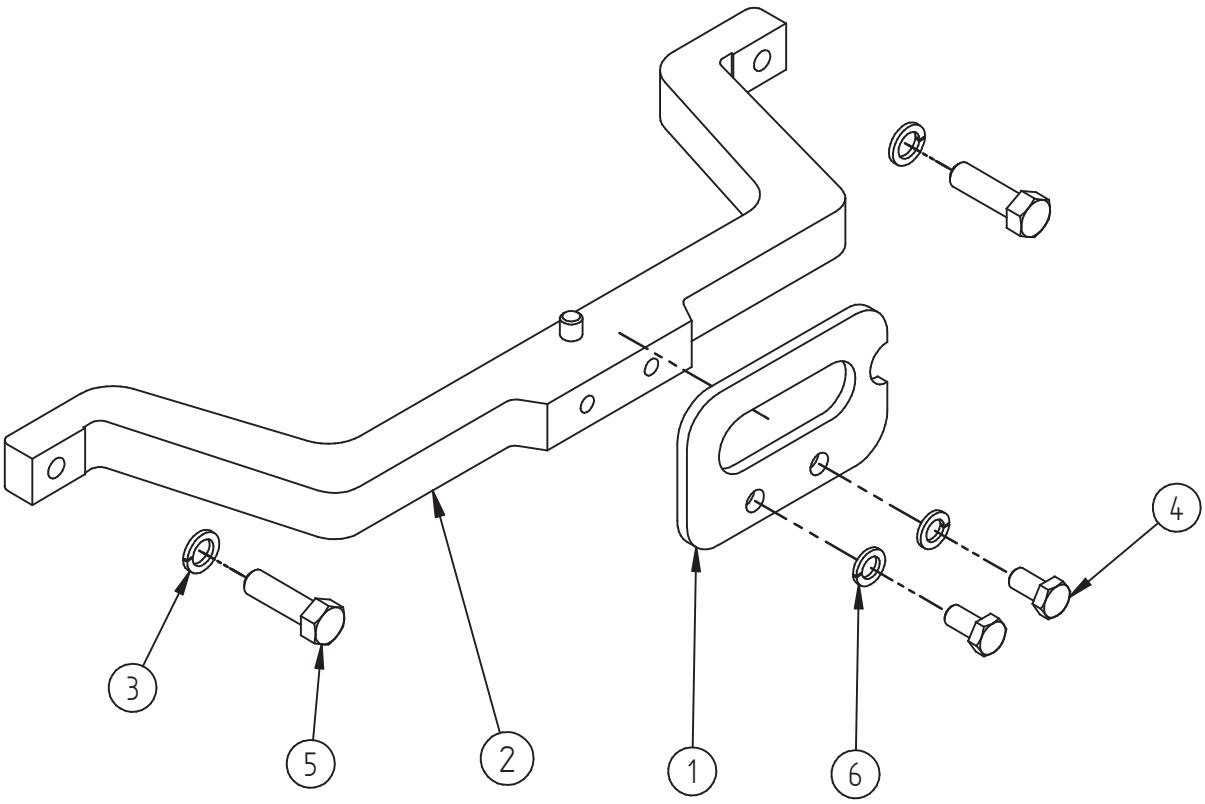
NOTE:
SEAL SERVICE KIT P/N 1843374
INCLUDES SEALS FOR ALL CARTRIDGES AND SHAFT SEALS

ITEM	PART NO	TITLE	QTY	ITEM	PART NO	TITLE	QTY
1	1829711	SHAFT ASSY	1				
2	1829715	BODY – FLOW DIVIDER	2	10	2789	O RING 2-228-70	2
3	1829746	THRUST WASHER	1	11	5304	SETSCREW	1
4	1834486	CIRCLIP EXTERNAL 56 MM	1	12	6004478	TEST PORT M16 X 2	4
5	1834488	BACKUP RING – 02-228H	2	13	6054498	ORIFICE	1
6	1841821	BODY PLUGGED	1	14	606.9467	FLOW DIVIDER	2
7	210379	VALVE CHECK P.O.	3	15	609234	PLUG IN HEX 7/16" UNOR	1
8	214405	VALVE RELIEF CARTRIDGE	3	16	661686	O RING 2-228-90	5
9*	2704	O RING 2-111	6	17	768122	CAP SCREW M6 X 50	8

cascade corporation

DESCRIPTION.
REVOLVING CONNECTION – FLOW DIVIDER

DATE: 18/04/11
SHEET :
PART NO. / DWG NO. 1841819
R 2



ITEM	PART NO	TITLE	QTY
1	1832247	RETAINER PLATE	1
2	1844704	VALVE RETAINER	1
3	683822	WASHER SPRING M12	2
4	684594	BOLT HT M10 X 20	2
5	768555	BOLT HT M12 X 40	2
6	787383	WASHER SPRING M10	2

cascade corporation

DESCRIPTION.

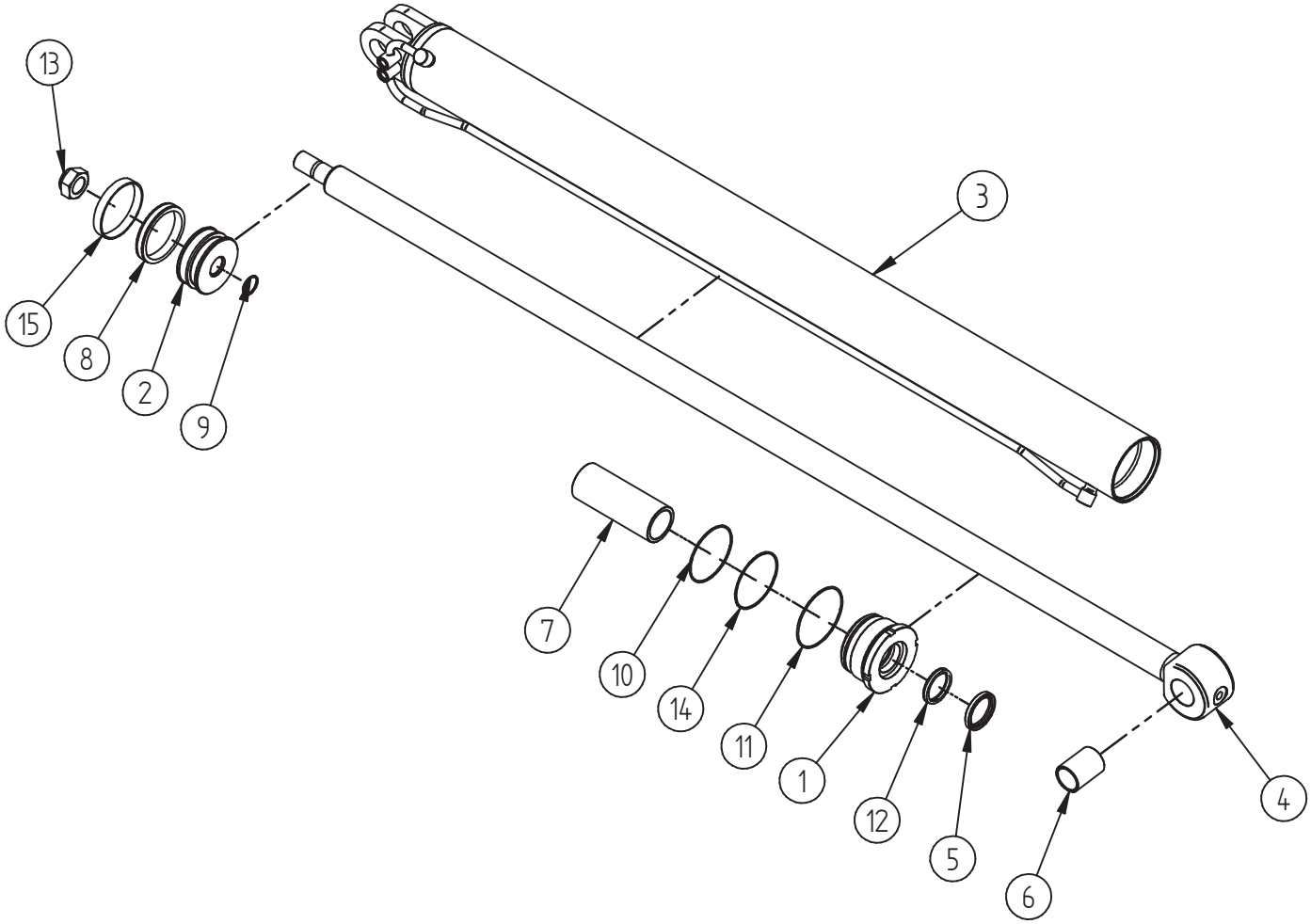
BRACKET ASSY

DATE: 03/05/11

SHEET :

PART NO. / DWG NO. 1844703

R 0



ITEM	PART NO	TITLE	QTY
1	1829615	GLAND	1
2	1829616	PISTON	1
3	1829617	BARREL WELDMENT	1
4	1829623	ROD WELDMENT	1
5	1829626	WIPER 2.5" - CANNED	1
6	1829627	SLEEVE	1
7	1829749	STOP TUBE	1
8	1836703	SEAL PISTON	1
9	2722	O RING 2-222	1
10	2809	O RING 2-248	1
11	2812	O RING 2-251	1
12	561560	ROD SEAL 2.5" ID	1
13	562060	NUT 1.5- 12 THD" UNF (STOVER) GR8	1
14	615152	BACK UP RING 8-248	1
15	660785	WEAR RING - PISTON	1

SEAL KIT P/N 1844763

cascade corporation

DESCRIPTION.

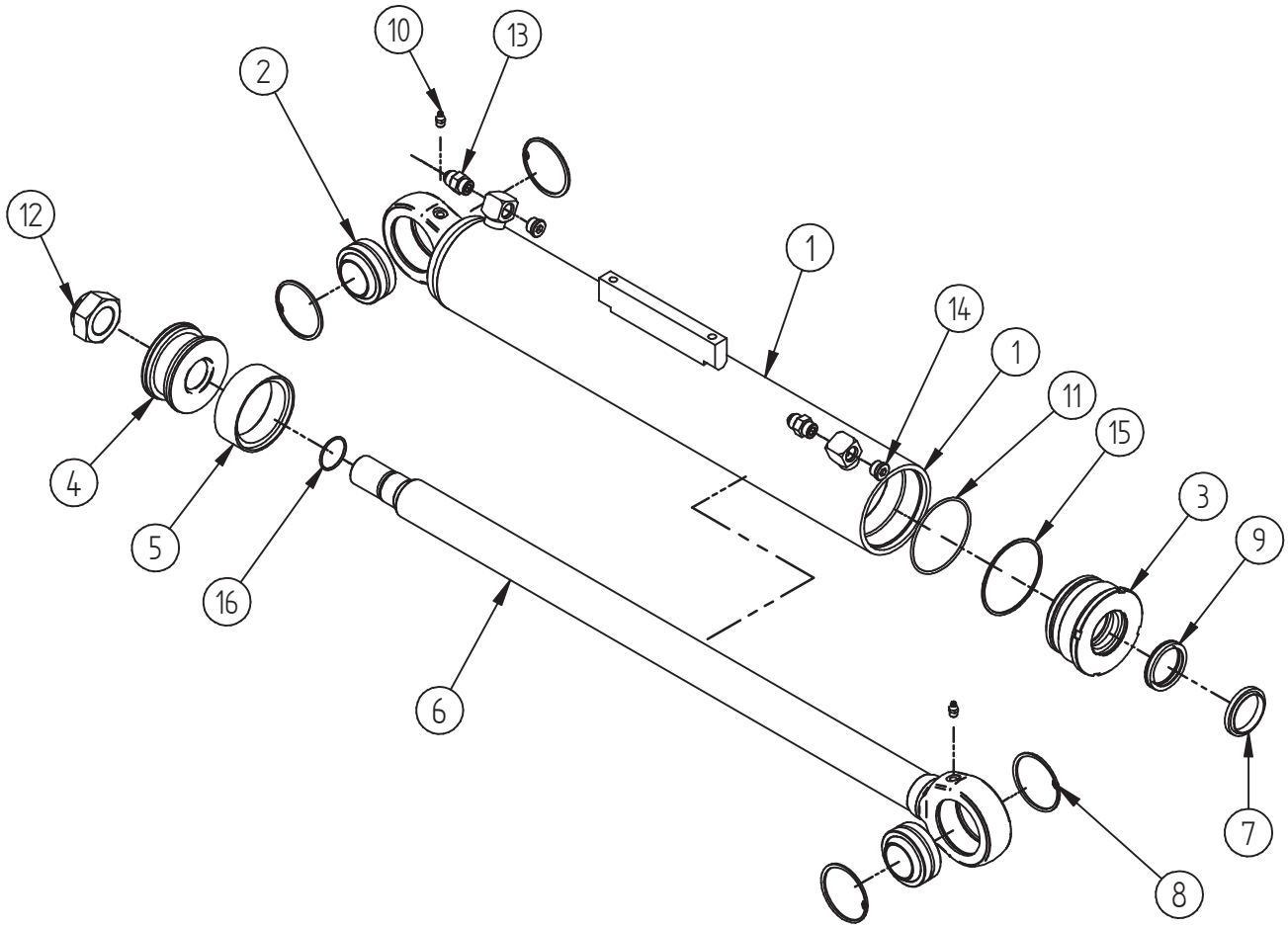
CLAMP CYLINDER

DATE: 03/05/11

SHEET :

PART NO. / DWG NO. 1829614

R 1



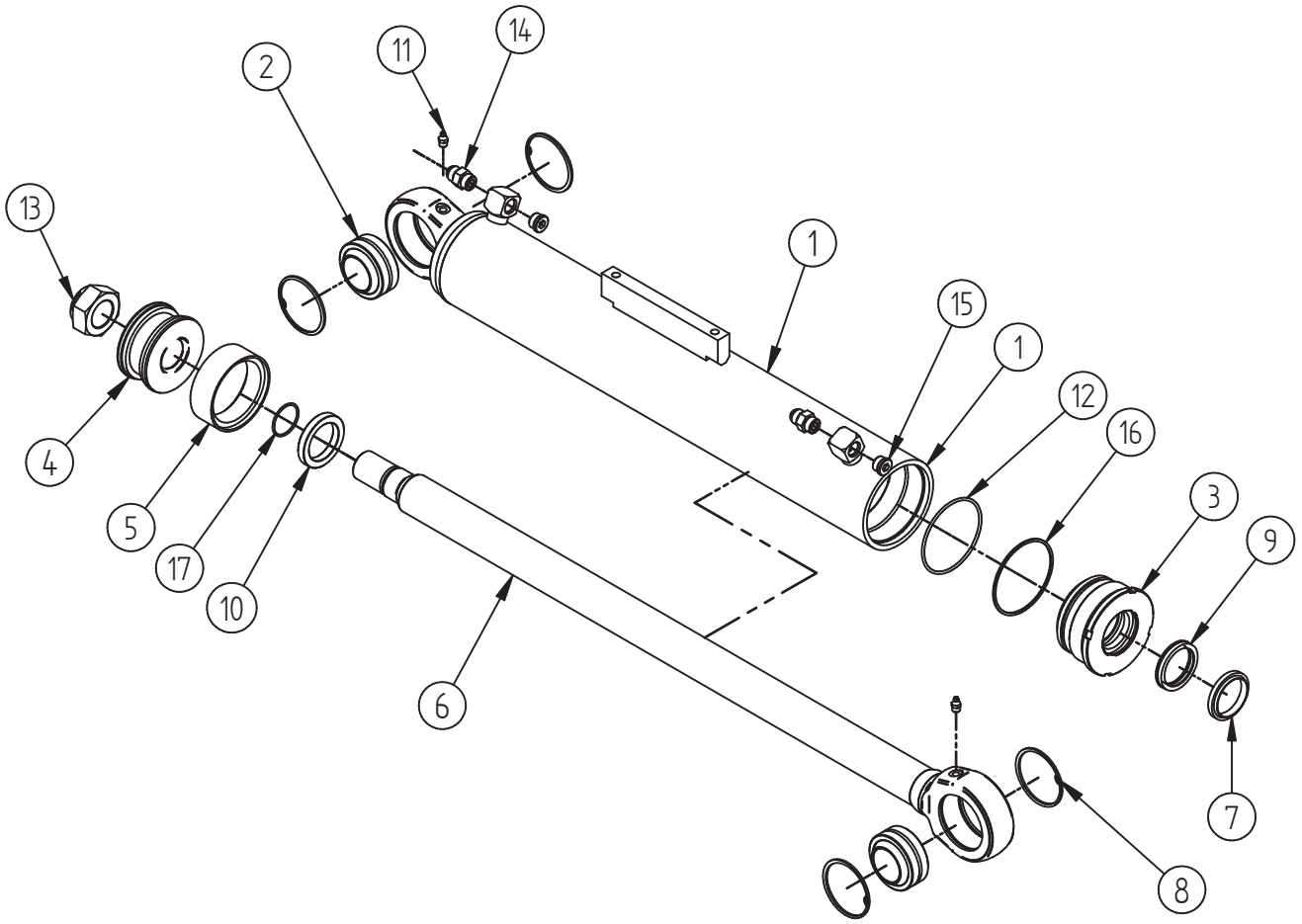
ITEM	PART NO	TITLE	QTY
1	1835476	BARREL WLDMT	1
2	1844754	SPHERICAL BEARING 45mm ID	2
3	1844755	GLAND	1
4	1844756	PISTON	1
5	1844757	PISTON SEAL	1 *
6	1844758	ROD WELDMENT	1
7	1844759	WIPER	1 *
8	1844760	CIRCLIP 75MM INTERNAL – DIN 472	4
9	1844761	ROD SEAL 2,0 " ID	1 *
10	423569	0.125 BSP ST GREASE NIPPLE	2
11	554564	O RING 2-240	1 *
12	562060	NUT 1.5- 12 THD" UNF (STOVER) GR8	1
13	601377	NIPPLE ST 3/4" JIC – 3/4" UNOR	2
14	602580	PLUG IN HEX 3/4" UNOR	2 '
15	615144	BACK UP RING 8-240	1 *
16	643385	O RING 2-121	1 *

SEAL KIT P/N 1844764
INCLUDES ITEMS MARKED *

cascade corporation

DESCRIPTION.
TILT CYLINDER

DATE: 21/04/11
SHEET :
PART NO. / DWG NO. 1835475
R 0



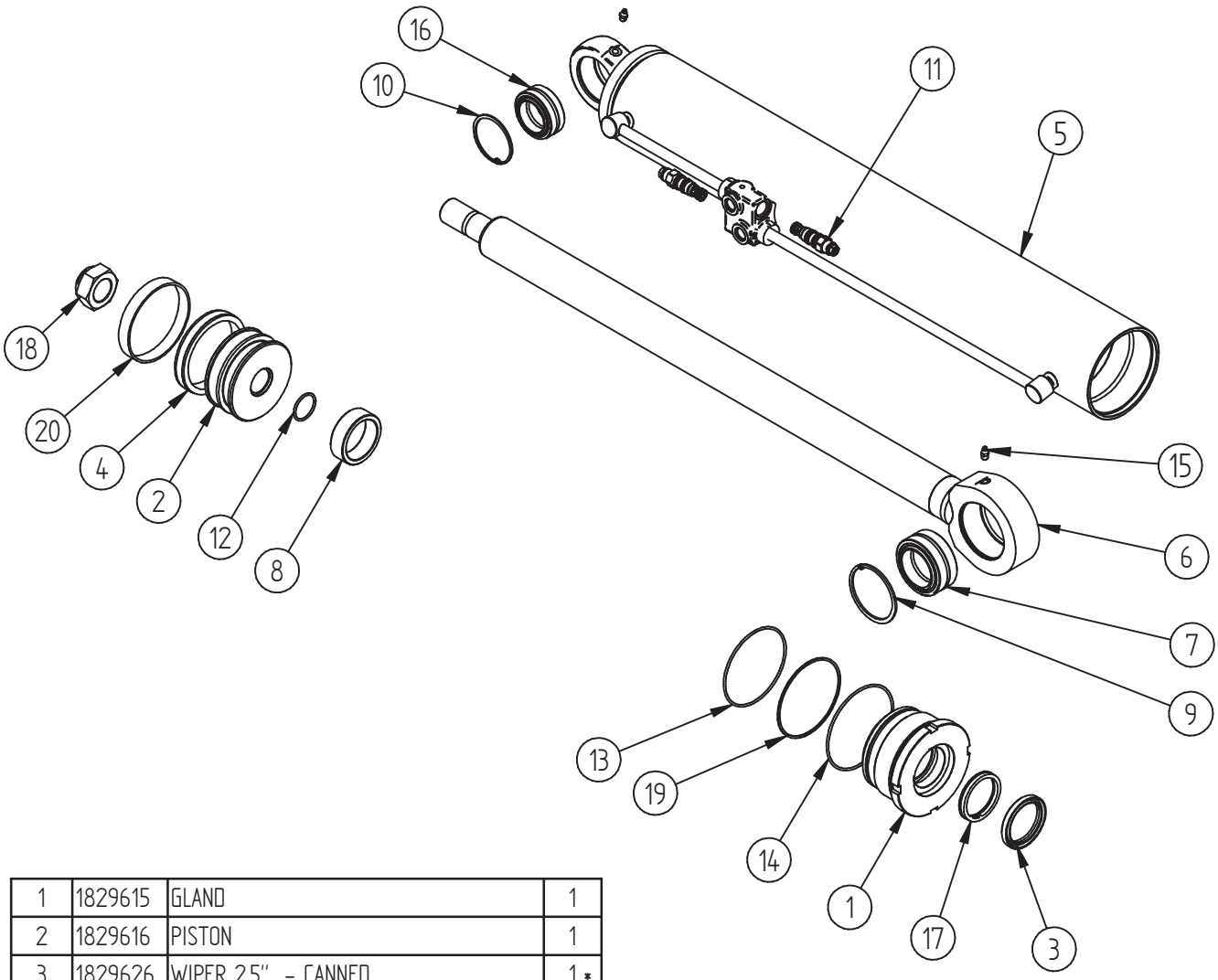
ITEM	PART NO	TITLE	QTY
1	1835476	BARREL WLDMT	1
2	1844754	SPHERICAL BEARING 45mm ID	2
3	1844755	GLAND	1
4	1844756	PISTON	1
5	1844757	PISTON SEAL	1 *
6	1844758	ROD WELDMENT	1
7	1844759	WIPER	1 *
8	1844760	CIRCLIP 75MM INTERNAL – DIN 472	4
9	1844761	ROD SEAL 2,0 " ID	1 *
10	1845471	SPACER – CYLINDER	1
11	423569	0.125 BSP ST GREASE NIPPLE	2
12	554564	O RING 2-240	1 *
13	562060	NUT 1.5- 12 THD" UNF (STOVER) GR8	1
14	601377	NIPPLE ST 3/4" JIC – 3/4" UNOR	2
15	602580	PLUG IN HEX 3/4" UNOR	2
16	615144	BACK UP RING 8-240	1 *
17	643385	O RING 2-121	1 *

SEAL KIT P/N 1844764
INCLUDES ITEMS MARKED *

cascade corporation

DESCRIPTION.
TILT CYLINDER

DATE: 05/08/11
SHEET :
PART NO. / DWG NO. 1845806
R 0



ITEM	PART NO	TITLE	QTY
1	1829615	GLAND	1
2	1829616	PISTON	1
3	1829626	WIPER 2.5" - CANNED	1 *
4	1836703	SEAL PISTON	1 *
5	1840333	BARREL WELDMENT	1
6	1840336	ROD WELDMENT	1
7	1840339	SPHERICAL BEARING - 60MM ID	1
8	1840396	STOP TUBE	1
9	1840422	CIRCLIP 90 MM INTERNAL - DIN 472	1
10	1844760	CIRCLIP 75MM INTERNAL - DIN 472	1
11	223773	COUNTERBALANCE VALVE	2
12	2722	O RING 2-222	1 *
13	2809	O RING 2-248	1 *
14	2812	O RING 2-251	1 *
15	423569	0.125 BSP ST GREASE NIPPLE	2
16	423853	SPHERICAL BEARING - 50MM ID	1
17	561560	ROD SEAL 2.5" ID	1 *
18	562060	NUT 1.5- 12 THD" UNF (STOVER) GR8	1
19	615152	BACK UP RING 8-248	1 *
20	660785	WEAR RING - PISTON	1 *

SEAL KIT P/N 1844763
INCLUDES ITEMS MARKED *

cascade corporation

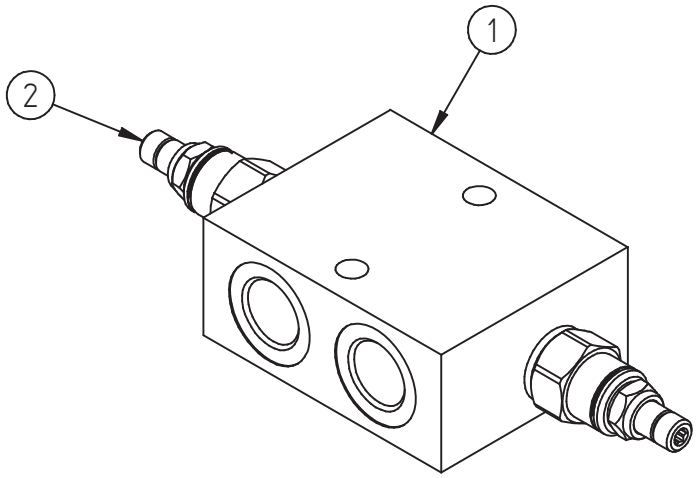
DESCRIPTION.
ROTATE CYLINDER

DATE: 28/04/11

SHEET :

PART NO. / DWG NO. 1840332

R 0



ITEM	PART NO	TITLE	QTY
1	1825121	BODY	1
2	661676	RELIEF VALVE .	2

cascade corporation

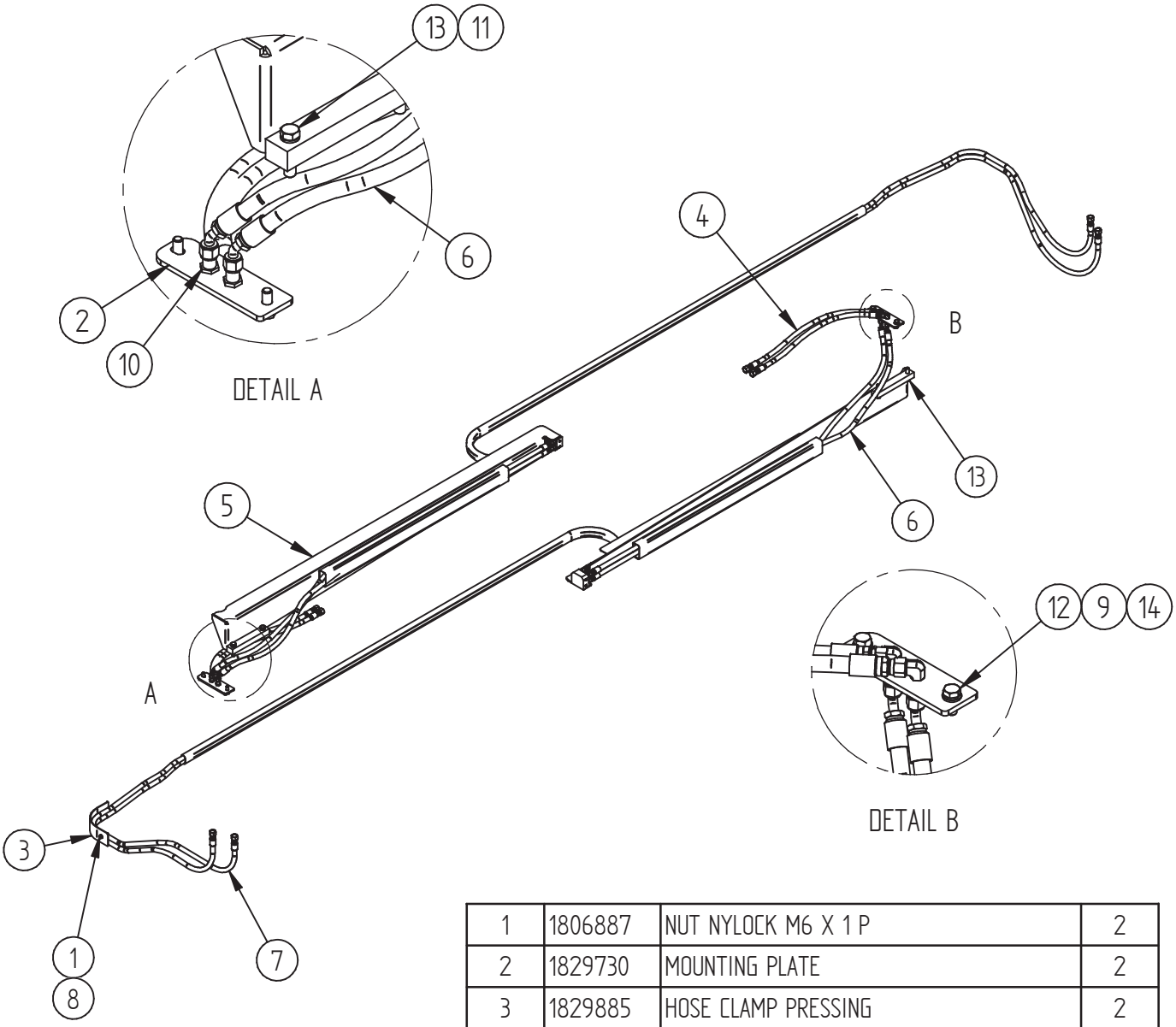
DESCRIPTION.
VALVE, RELIEF, CROSS-PORT

DATE: 18/04/11

SHEET :

PART NO. / DWG NO. 105627

R 0



ITEM	PART NO	TITLE	QTY
1	1806887	NUT NYLOCK M6 X 1 P	2
2	1829730	MOUNTING PLATE	2
3	1829885	HOSE CLAMP PRESSING	2
4	1840394	HOSE S-52003	4
5	1840411	HOSE SUPPORT	2
6	1840414	HOSE S-52004	4
7	1840415	FEED HOSE ASSY	2
8	202346	WASHER FLAT M06 DIN 125A ZP	2
9	206322	WASHER FLAT M10 - DIN125A - ZINC	4
10	2453	BULKHEAD ELBOW 9/16" JIC - 9/16" JIC	4
11	683822	WASHER SPRING M12	4
12	684649	BOLT HT M10 X 25	4
13	768557	BOLT HT M12 X 50	4
14	787383	WASHER SPRING M10	4

cascade corporation

DESCRIPTION.

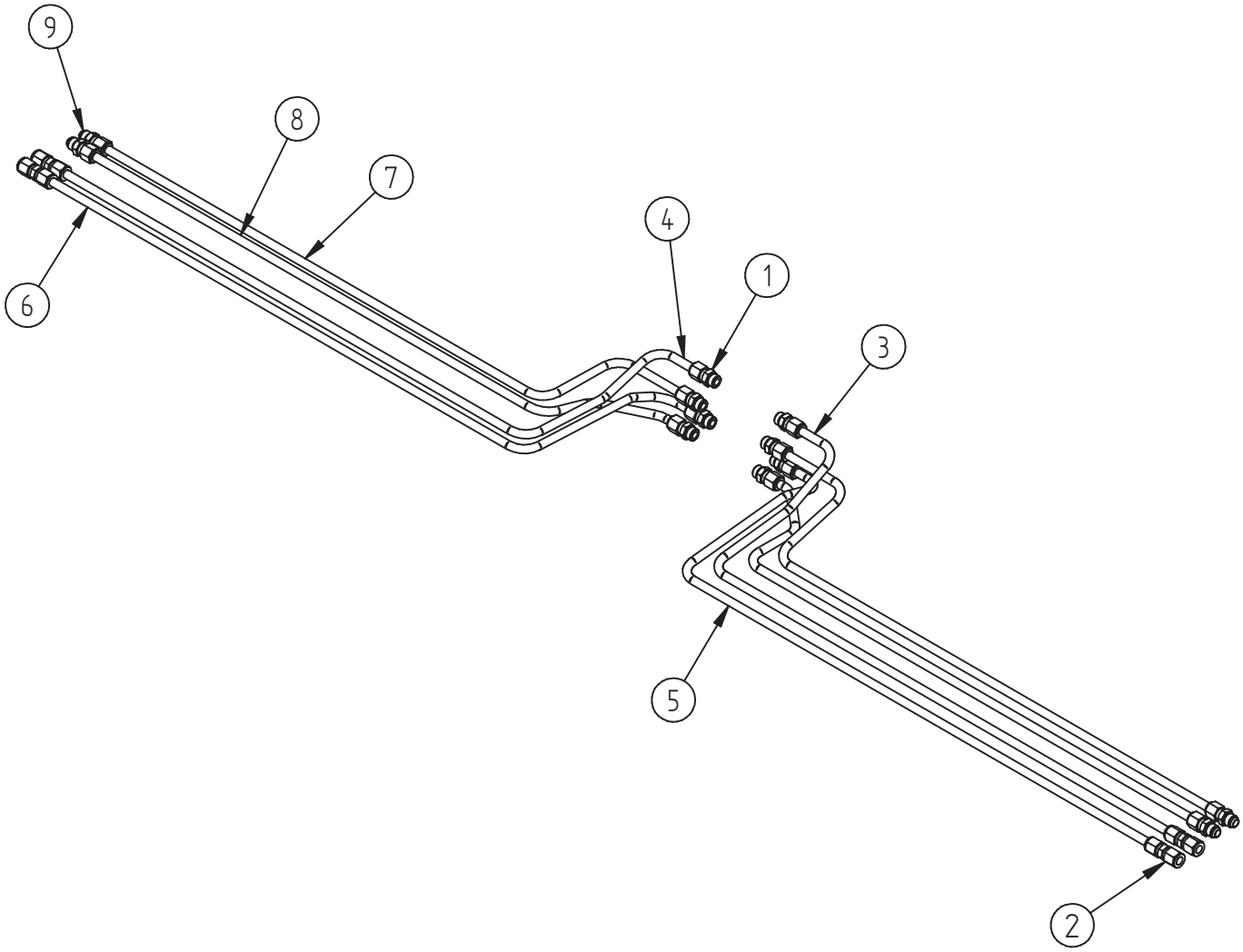
HOSE LAYOUT

DATE: 03/05/11

SHEET :

PART NO. / DWG NO. 1840351

R 1



ITEM	PART NO	TITLE	QTY
1	1830439	ST THREAD CONNECTOR – # 8 TO 0.5" TUBE	8
2	1835447	UNION – # 8	4
3	1836680	TUBE BENT	1
4	1836681	TUBE BENT	1
5	1836682	TUBE BENT	1
6	1836683	TUBE BENT	1
7	1836706	TUBE BENT	2
8	1836707	TUBE BENT	2
9	673680	UNION ADAPTOR 8 JIC	4

cascade corporation

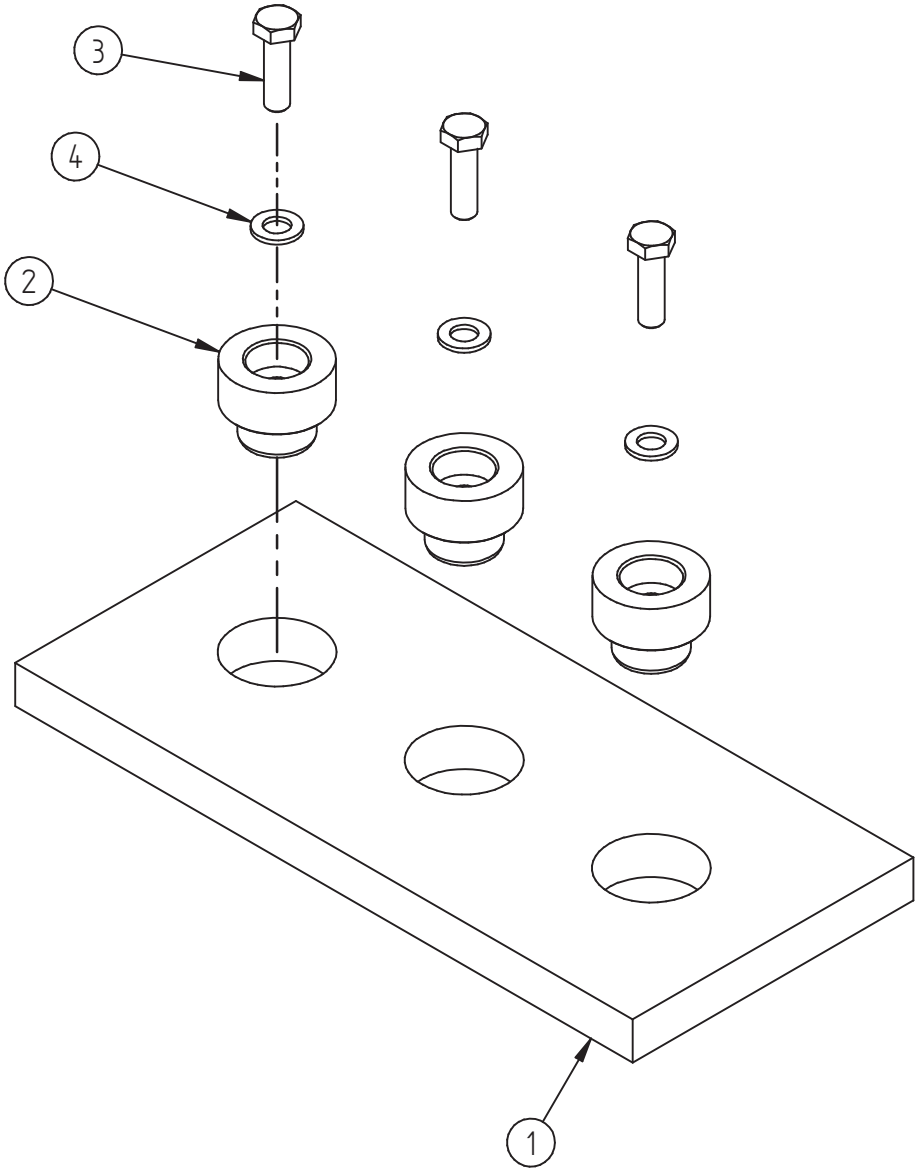
DESCRIPTION.
FEED TUBES

DATE: 18/04/11

SHEET :

PART NO. / DWG NO. 1836679

R 0



ITEM	PART NO	TITLE	QTY
1	1829782	BEARING	1
2	1829843	RETAINER – BEARING	3
3	200788	BOLT HT M10 X 35	3
4	206322	WASHER FLAT M10 – DIN125A – ZINC	3

cascade corporation

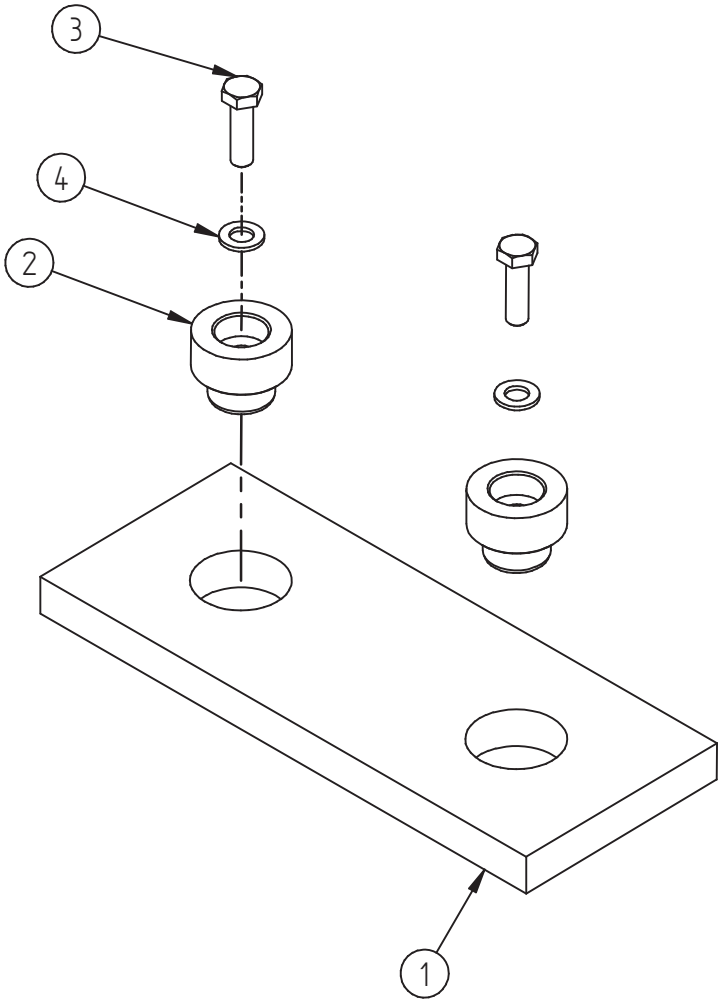
DESCRIPTION.
BEARING ASSEMBLY – 3 HOLE

DATE: 18/04/11

SHEET :

PART NO. / DWG NO. 1834455

R 0



ITEM	PART NO	TITLE	QTY
1	1829783	BEARING	1
2	1829843	RETAINER - BEARING	2
3	200788	BOLT HT M10 X 35	2
4	206322	WASHER FLAT M10 - DIN125A - ZINC	2

cascade corporation

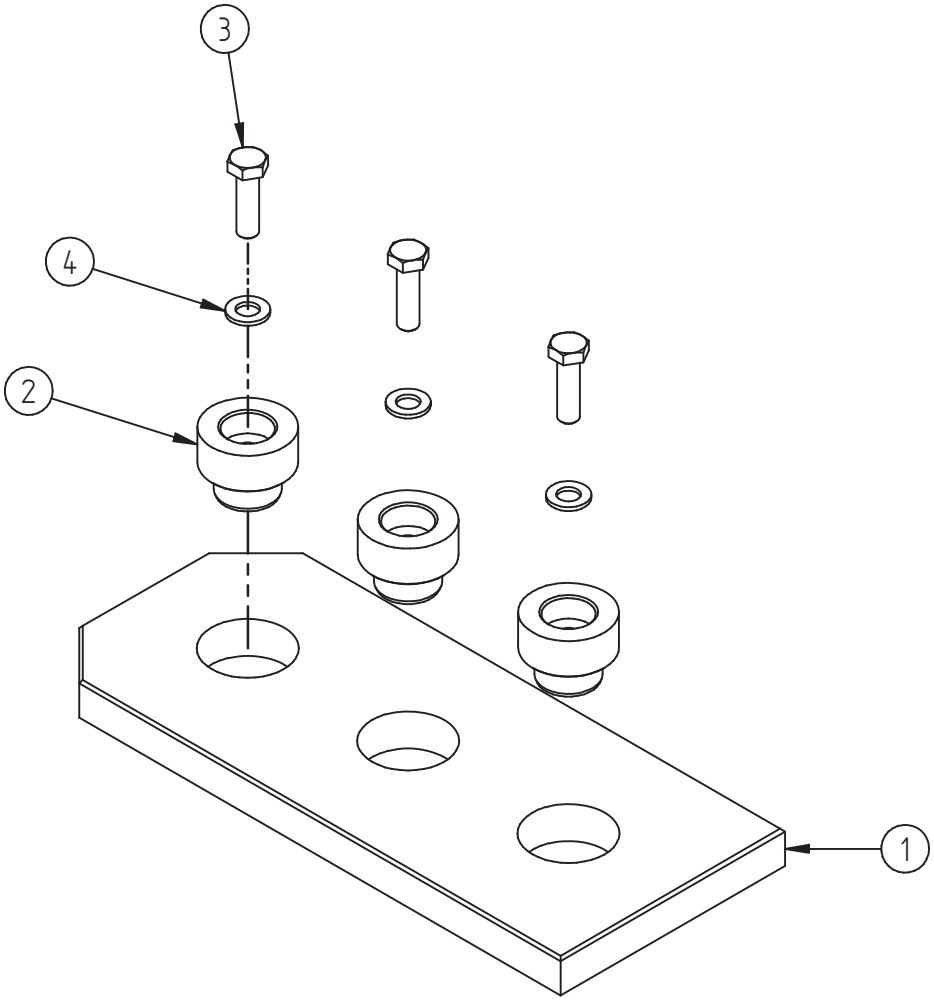
DESCRIPTION.
BEARING ASSEMBLY - 2 HOLE

DATE: 18/04/11

SHEET :

PART NO. / DWG NO. 1834456

R 1



ITEM	PART NO	TITLE	QTY
1	1829781	BEARING	1
2	1829843	RETAINER - BEARING	3
3	200788	BOLT HT M10 X 35	3
4	206322	WASHER FLAT M10 - DIN125A - ZINC	3

cascade corporation

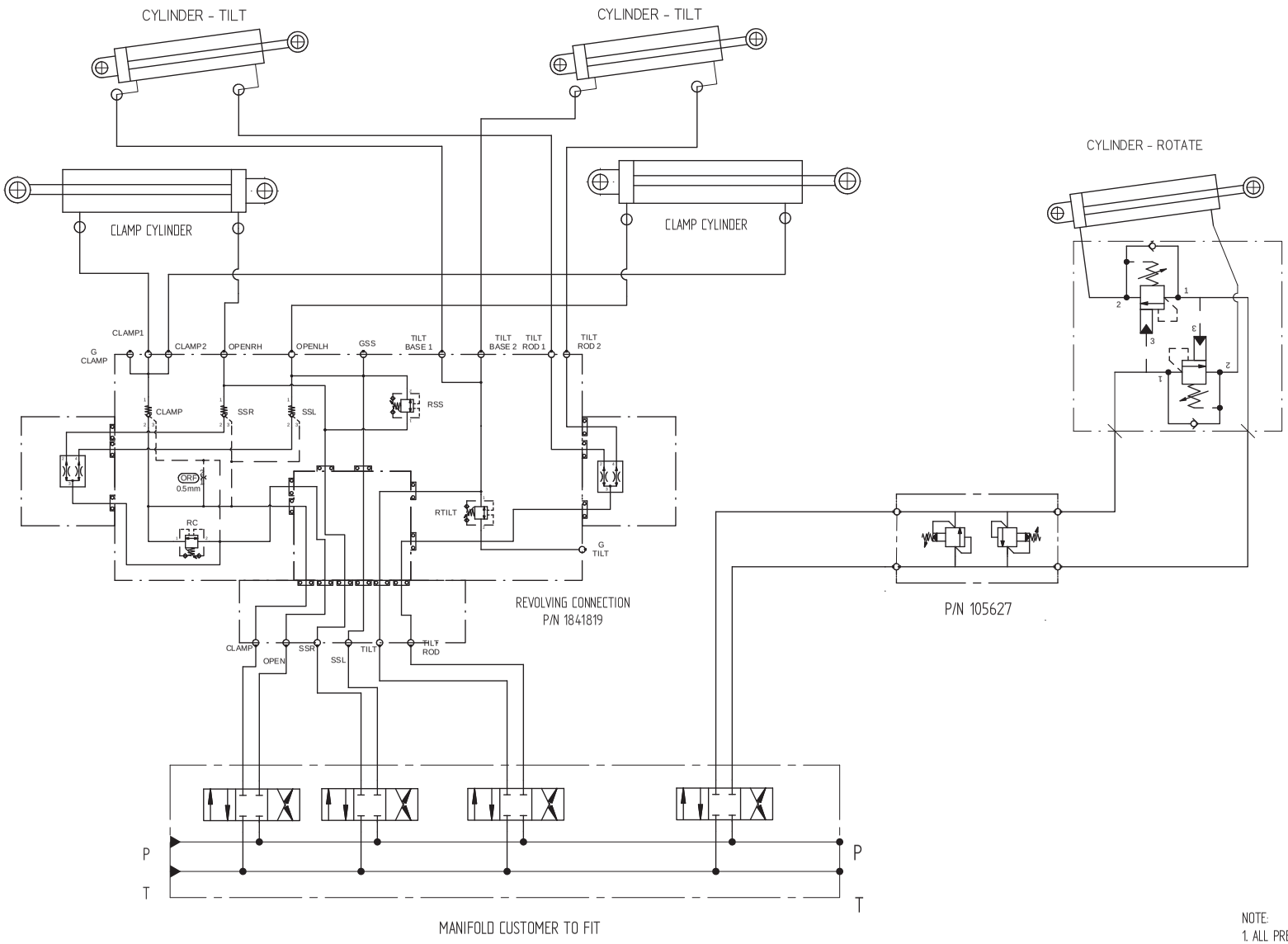
DESCRIPTION.
BEARING ASSEMBLY - 3 HOLE CHF

DATE: 18/04/11
SHEET :
PART NO. / DWG NO. 1834457
R 0

15 HYDRAULIC CIRCUIT & LAYOUT DIAGRAMS

15.1 INDEX OF HYDRAULIC CIRCUIT & LAYOUT DIAGRAMS

DO NOT SCALE



USED ON TYRE HANDLER	MAX PRESSURE CLAMP	PRESSURE SIDESHIFT	PRESSURE PAD ROTATE	PRESSURE BODY ROTATE (Rod end)	PRESSURE BODY ROTATE (base end)
SK - 27200	15 MPa	17 MPa	13 MPa	12 MPa	9.5 MPa
SK - 27149	15 MPa	17 MPa	13 MPa	12 MPa	9.5 MPa
SK - 27140	15 MPa	17 MPa	13 MPa	12 MPa	9.5 MPa
SK - 27142	15 MPa	17 MPa	13 MPa	12 MPa	9.5 MPa
SK - 27154	15 MPa	17 MPa	13 MPa	12 MPa	9.5 MPa
SK - 27158	13 MPa	17 MPa	13 MPa	12 MPa	9.5 MPa
SK - 27162	15 MPa	17 MPa	13 MPa	12 MPa	9.5 MPa
SK - 27167	15 MPa	17 MPa	13 MPa	12 MPa	9.5 MPa

NOTE:
1. ALL PRESSURES MUST BE CHECKED AFTER INSTALLATION TO FORKLIFT. THIS ALLOWS FOR THE EFFECTS OF THE SYSTEM BACK PRESSURE WHEN SETTING THE RELIEF PRESSURE.
2. PROPORTIONAL CONTROL VALVES ARE RECOMMENDED
3. BACKPRESSURE SHOULD NOT EXCEED 2 MPa

ECN :	MATERIAL OPTIONS : CUSTOMER SUPPLIED DIRECTIONAL MANIFOLD CIRCUIT IS FOR UNITS MANUFACTURED FROM JAN 2011	DRAWN : B.W	DATE 19/01/12
	FINISH:	PE :	APPR :
	REFER CASCADE ENG STANDARDS FOR DRAFTING CONV. CMC = CASCADE MATL CODE CPS = CASCADE PROCESS CODE CWS = CASCADE WELD SPEC	cascade corporation	
	UNLESS OTHERWISE STATED ALL DIMENSIONS IN MILLIMETERS	WT : SCALE : SHEET : 1 OF 1	DESCRIPTION: HYDRAULIC CIRCUIT - CYLINDER ROTATE
			PART NO. / DWG NO. S-52068 R 5

16 ELECTRIC CIRCUIT & LAYOUT DIAGRAMS

16.1 INDEX OF ELECTRIC CIRCUIT & LAYOUT DIAGRAMS

NO ELECTRIC'S FITTED.

17 ASSEMBLY PARTS LIST

Included in this manual is a complete parts list for the Tyre handler. When ordering spare parts, please quote the part numbers as they appear in this parts list.

All parts lists are as noted on drawings.

18 TYRE HANDLER WELD & STRUCTURAL INSPECTION.

All weld areas mentioned in the below sections should be examined frequently with a critical eye for detail. This inspection should look for weld imperfections, fatigue cracks, dents or any structural damages on Tyre Handler.

Inspection should include

- TYRE HANDLER ARMS – REFER ATTACHED SHEET
- BASE & REAR CARRIAGE ASSEMBLY – REFER ATTACHED SHEET

If any Non-destructive tests are required to be carried out for further inspection Cascade recommends NATA accredited representative.

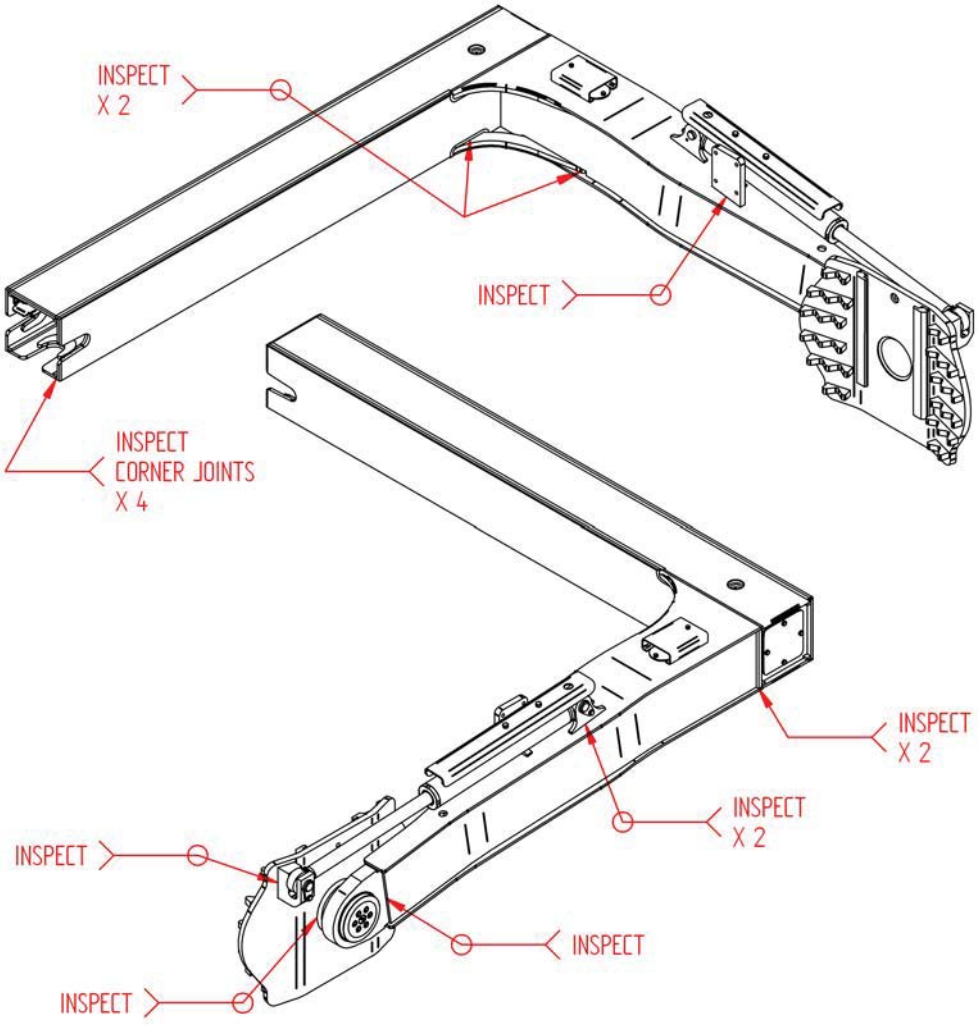
If Magnetic flaw detection test is used it should be carried out as per AS1171-1998

If Ultrasonic Testing is used AWS D-14.1 Sections 10.13 through 10.15.11 is recommended.

Warning: Any defects found should be immediately recorded, reported and fixed. Failing to take necessary steps may cause serious injury.

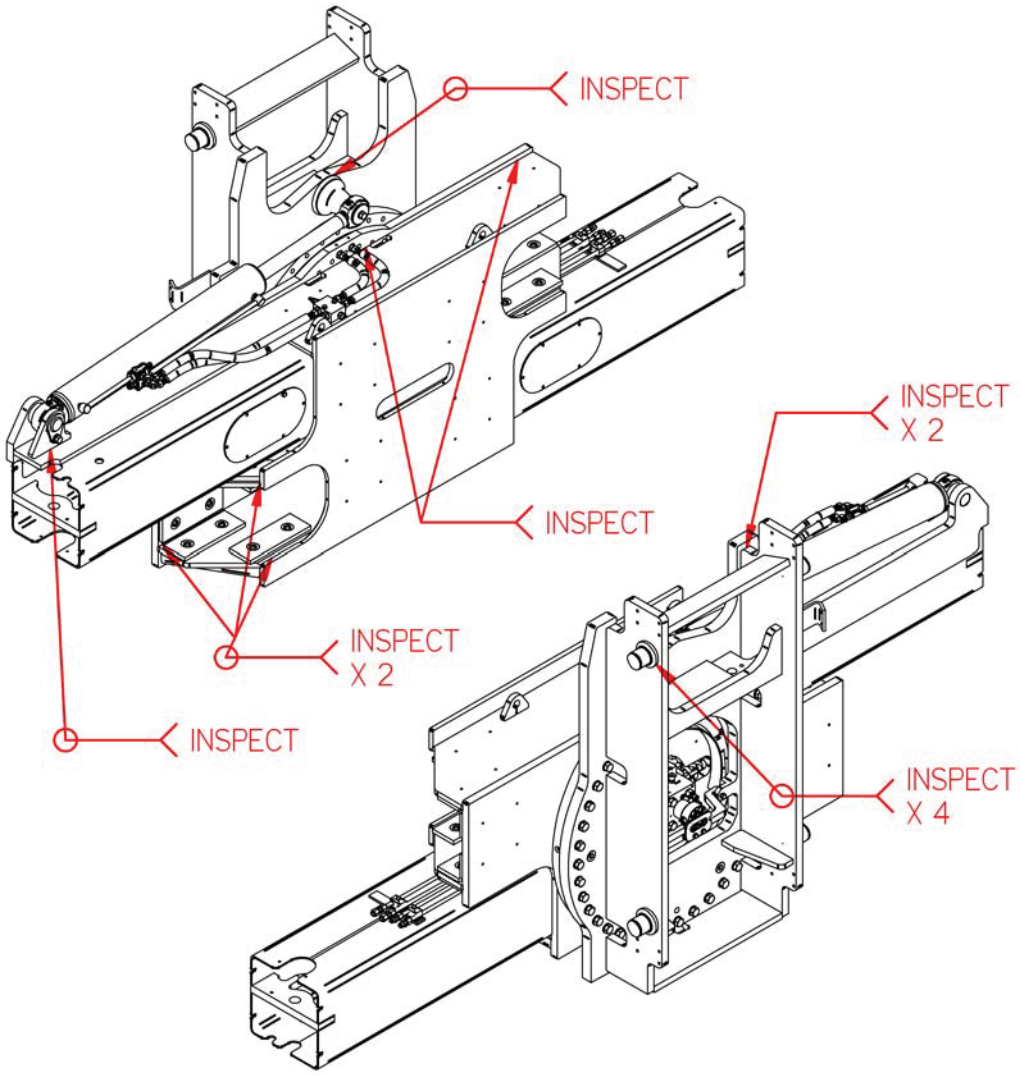
18.1 ARM INSPECTION

RATING OF SEVERITY: 1- Advised Supervisor 2- Advised Supervisor - Plan for Repairs 3-Advised Supervisor - Repair Immediately							
DATE	LOCATION OF CRACK	LENGTH OF CRACK	RATE OF SEVERITY			COMMENTS	ACTIONS TAKEN
SUPERVISOR NAME:							
SUPERVISOR SIGNATURE:			DATE:				



18.2 BASE & REAR CARRIAGE INSPECTION.

RATING OF SEVERITY: 1- Advised Supervisor 2- Advised Supervisor - Plan for Repairs 3-Advised Supervisor - Repair Immediately							
DATE	LOCATION OF CRACK	LENGTH OF CRACK	RATE OF SEVERITY			COMMENTS	ACTIONS TAKEN
SUPERVISOR NAME:							
SUPERVISOR SIGNATURE:			DATE:				



19 WARRANTY

19.1 LIFT TRUCK PRODUCT WARRANTY POLICY

Cascade Australia's warranty statement has been amended to include WARRANTY LABOUR on attachments, hose reels, masts and lift truck product service parts at 70% of your retail labour rate.

CASCADE AUSTRALIA DOES NOT WARRANT PRODUCT DAMAGED OR ALTERED DURING FIELD REPAIR:

- Cascade Australia may request return of any part for which a claim is filed. Retain all parts including packing for return upon request.
- Do not return any part without an inwards goods authorisation (IGA).
- We recommend utmost care be taken when repacking any Cascade Australia product to avoid damaging critical surfaces.
- Refer to your Cascade Australia Service Manual before performing field repair. If an attempted repair does not solve your problem, contact a Cascade Australia Service Representative for assistance. **CASCADE AUSTRALIA DOES NOT WARRANT REPEAT REWORK.**

SO THAT WE CAN PROCESS YOUR CLAIMS QUICKLY:

- The **complete** Cascade Australia attachment and serial number must be on your claim form.
- Hose reels, junction blocks and accessory items should be identified with the part number and the date code.
- If we should receive a claim without the proper number or vital information, it will be returned to you. If returned, please provide additional information and return as soon as possible.
- Include your latest retail labour rate on every claim. Cascade Australia policy is to reimburse for labour commensurate with our Standard Times Schedule at 70% of your retail labour rate. Troubleshooting time is limited to one hour unless authorised by a Technical Representative. Travel allowance is figured at sixty kilometers traveled per hour.
- We should receive your claim within 30 days of the date of repair.
- **Restrict your repairs to adjustments and/or replacements of Cascade Australia parts (repairs, i.e. Honing, grinding, drilling, welding etc. are not covered by warranty) unless previously authorised to perform a specific modification or alteration by a Cascade Australia Service Representative.**
- Installation expenses, adjustments and recommended Periodic Maintenance are not considered warrantable procedures.

CASCADE AUSTRALIA: **Warrants its products to conform to published specifications as found in its quotations, specification sheets, brochures and price lists. Please note that brochures and price lists are subject to change without notice. Please consult current price lists and brochures.**

CASCADE AUSTRALIA NEW PRODUCTS: Consisting of attachments, masts, hose reels and service parts are warranted for 12 months following the date of installation.

CASCADE AUSTRALIA RE-MANUFACTURED PRODUCTS: Are warranted for 6 months following date of installation.

WHAT CUSTOMERS AND DEALERS MUST DO: To preserve Cascade Australia's warranty, dealers and customers must carefully follow applicable Cascade Australia installation instructions, service manuals and operator guides when maintaining and operating Cascade Australia equipment. Customers must obtain Cascade Australia authorisation for repairs other than removal or replacement of defective parts. Unauthorised repairs or alterations, use of parts not provided by Cascade Australia, or failure to follow Cascade Australia's installation instructions, service manuals and operator guides will result in loss of warranty.

FOR INFORMATION: On warranty, installation, or service contact the nearest Cascade Australia representative. For the name of the nearest representative or for product information, call +61733737300.

EXCLUSIONS: Cascade Australia does not warrant that its products will perform any particular task. Cascade Australia assumes no responsibility for loss, damage or injury to persons or property, or for consequential damages, resulting from the possession or use of its products. Cascade Australia's warranty does not cover wear, tear, abnormal applications, normal or scheduled maintenance.

THERE ARE NO WARRANTIES EITHER EXPRESS OR IMPLIED INCLUDING ANY WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE, WHICH EXTEND BEYOND THOSE STATED IN THIS WARRANTY AND THE PRODUCT DESCRIPTION ON THE FACE OF CASCADE AUSTRALIA'S ORDER ACKNOWLEDGMENT.

Appendix 1

TYRE HANDLER INDUCTION LOG

Induction Date: _____

Mine: _____

Operator Name: _____

Company: _____

Inducted By: _____

Signature of Inductee: _____