

INSTALLATION INSTRUCTIONS

and PERIODIC MAINTENANCE

12A

Trilateral Head with Mast

Mast Type 1.2

Manual Number 8340738

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corporation**

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<u>Recommended Hydraulic Supply</u>	<u>2</u>	Follow the suggested installation procedures for best results. If you have any questions or need more information, contact your nearest Cascade Service Department for assistance. Refer to back cover.
<u>Truck Requirements</u>	<u>3</u>	Read the WARNING Statements placed throughout this Manual to emphasize safety during attachment installation.
<u>Installation</u>	<u>4</u>	IMPORTANT: Field alterations may impair performance or capability and could result in loss of warranty. Consult Cascade for any required modifications.
<u>Periodic Maintenance</u>	<u>8</u>	IMPORTANT: Trilateral head with mast are metric. Supply fittings adapted as required for application. NOTE: All specifications are shown in US and (Metric) units where applicable. All fasteners have a torque value range of ±10% of stated value.

OVERVIEW

Cascade Trilateral Heads move with a combination side to side (transverse) and rotate the fork carriage (or loading mechanism) 180°. These attachments are mounted on a Cascade mast to provide overall stability and increased residual capacity. The mast uses the truck main valves for the HOIST and TILT functions. The trilateral head uses the truck auxiliary valves for the TRANSVERSE and PIVOT/ROTATE functions. The truck/attachment combination is designed to operate in narrow aisle applications to retrieve or deposit loads from shelving.

Special Requirements for Dealers and End-Users

The following is required prior to installation:

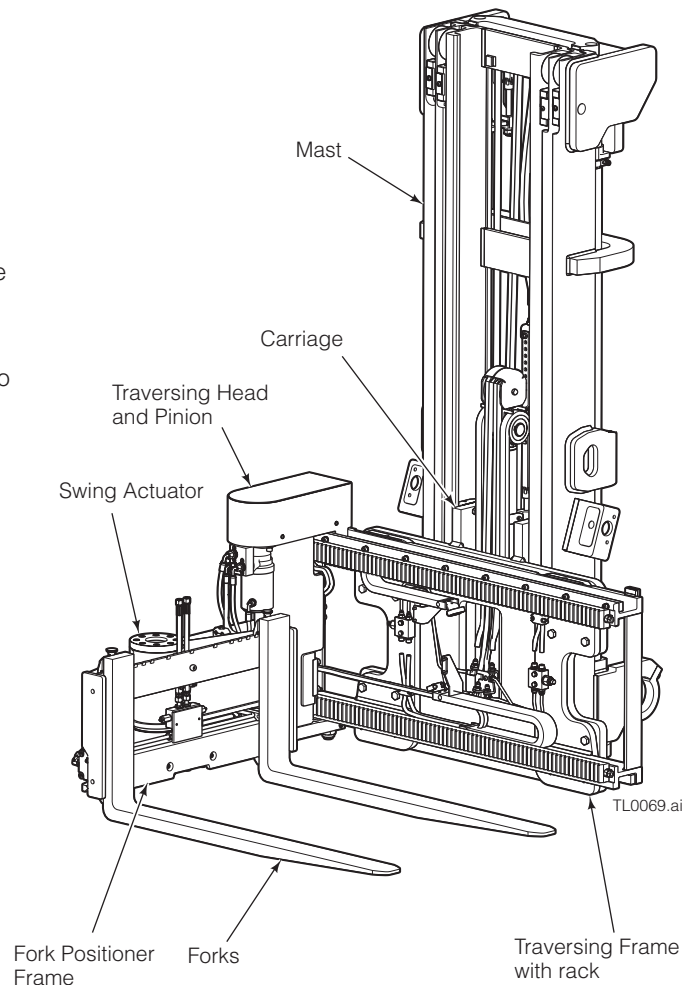
- **Lift truck with the (typical) capacity** – Range of 6500 to 7500 lbs (2950 to 3400 kg)
- **Mast Mounting Type** – Axle or Pin
- **Tilt Function** – Option to replace with solid links.
- Dedicated return-to-tank line.
- **Wheel stance** – Wide stance
- **Tire type** – Polytire

Components

Mast and Carriage – Three stage heavy-duty mast and carriage specifically designed with extra side thrust bearings for side loading when loads are picked up or removed.

Double Internal Hose Reel – The mast is equipped with double internal hose reel for TRANSVERSE and PIVOT/ROTATE functions.

Trilateral Head – Full length frame with racks to transverse the arm base left and right. The arm base rotates the fork carriage (or loading mechanism) 90° from either the center, left or right of the truck. This allows for loads to be retrieved from shelving without requiring the truck to turn to face the load.



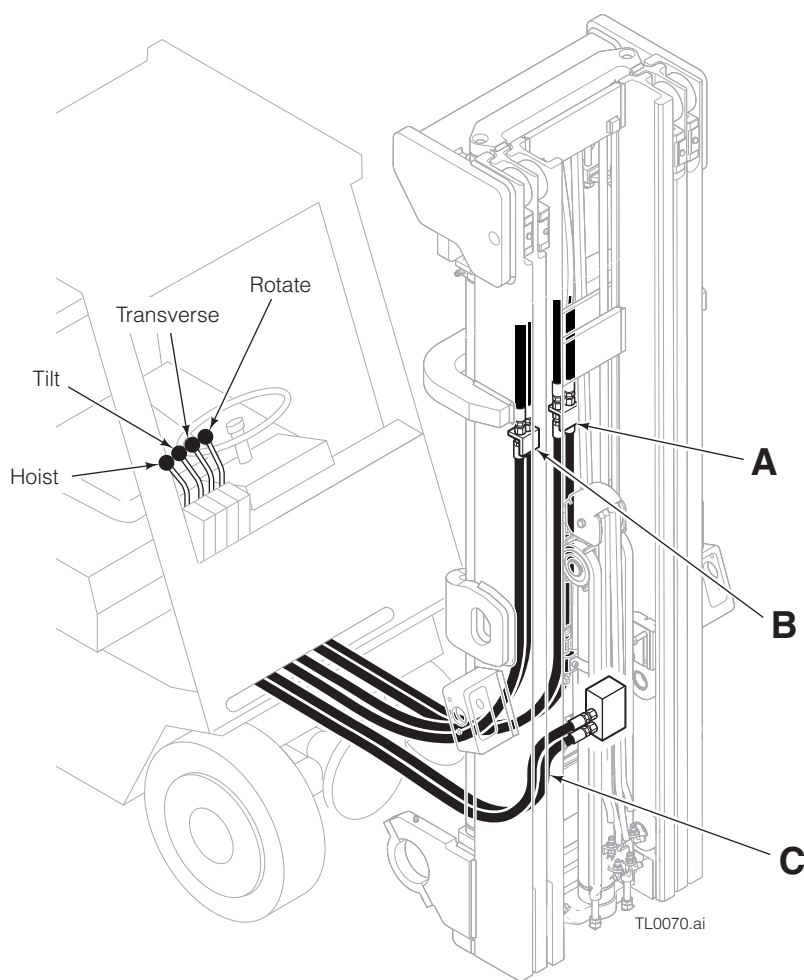
RECOMMENDED HYDRAULIC SUPPLY

Hydraulic Functions – Installation requires three or four hydraulic functions as shown below. Two truck auxiliary valves are required in addition to the two truck main valves. The mast provide internal hose reeving for the TRANSVERSE and PIVOT/ROTATE circuits.

NOTE: The TILT function does not deviate from truck manufacturer settings.

Hoses and Fittings –

- Hoist – Hoses and fittings for the HOIST function should be No. 6 with 0.375 in. (10 mm) minimum ID.
- Transverse, Rotate Functions – Hoses and fittings for the TRANSVERSE and PIVOT/ROTATE functions should be No. 6 with 0.375 in. (10 mm) minimum ID.



Hoist Function

C Truck Main valve

Tilt Function

(Not shown) Truck main valve

Transverse Function

B Auxiliary Valve with RH Internal Hose Reeving

Rotate/Pivot Function

A Auxiliary Valve with LH Internal Hose Reeving

TRUCK REQUIREMENTS

Truck Relief Settings

Hoist, Tilt, Transverse, Rotate

2030 psi (140 bar, 14.0 MPa) Recommended and Maximum

Truck Flow Volume ^①

12A	Min. ^②	Recommended	Max. ^③
Hoist	1 GPM (4 l/min.)	15 GPM (56 l/min.)	19 GPM (72 l/min.)
Transverse, Rotate	2.1 GPM (8 l/min.)	3.2 GPM (12 l/min.)	3.2 GPM (12 l/min.)

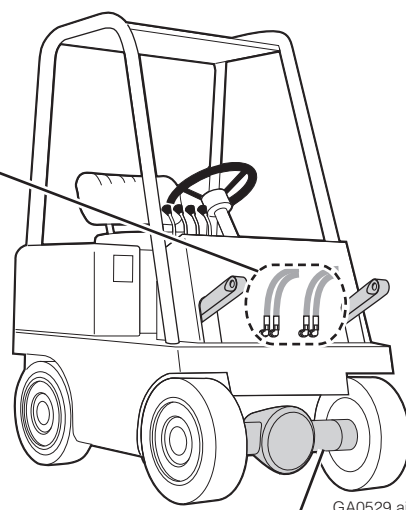
① Cascade Trilateral Head with Mast combinations are compatible with SAE 10W petroleum base hydraulic fluid meeting Mil. Spec. MIL-0-5606 or MIL-0-2104B. Use of synthetic or aqueous base hydraulic fluid is not recommended. If fire resistant hydraulic fluid is required, special seals must be used. Contact Cascade.

② Flow less than recommended will result in reduced system performance.

③ Flow greater than maximum can result in excessive heating, reduced system performance and short hydraulic system life.



WARNING: Rated capacity of the truck/attachment combination is a responsibility of the original truck manufacturer and may be less than that shown on the attachment nameplate. Consult the truck nameplate.



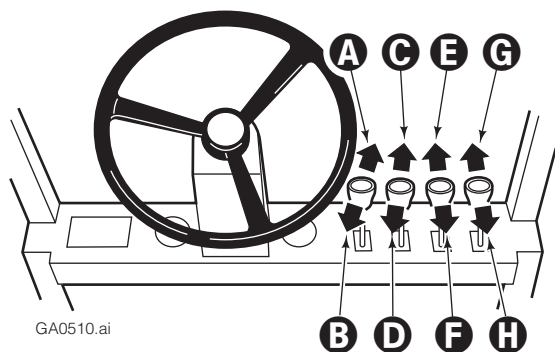
GA0529.ai

Lower Mast Mounts

Clean truck axle or pin mounts and inspect for damage. Repair as necessary.

Auxiliary Valve Functions

Check for compliance with ANSI (ISO) standards:



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Main Functions

- A** Hoist Down
- B** Hoist Up

- C** Tilt Forward
- D** Tilt Back

Auxiliary Functions

- E** Transverse Right
- F** Transverse Left

- G** Pivot Right (Rotate CW)
- H** Pivot Left (Rotate CCW)



WARNING: Truck control handle and attachment function activation shown here conforms to ANSI B56.1 (ISO 3691) recommended practices. Failure to follow these practices may lead to serious bodily injury or property damage. End user, dealer and OEMs should review any deviation from the practices for safe operation.

INSTALLATION

Tools Required

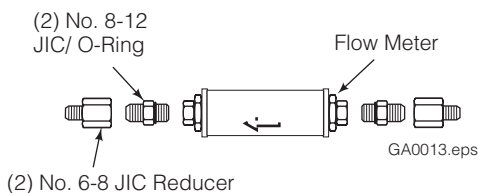
In addition to a normal selection of mechanic's hand tools, the following are required:

- Inline Flow Meter Kit:
 - 10 GPM (37 L/min.) - Cascade Part No. 671476.
 - 20 GPM (75 L/min.) - Cascade Part No. 671477.
- Pressure Gauge Kit:
 - 5000 psi (345 bar) - Cascade Part No. 671212.
- Assortment of fittings and hose.
- Magnetic Protractor/Level for vertical and horizontal adjustments.
- Pallet hand truck to install clamp assembly on mast.
- Overhead hoisting capability of 4000 lbs. (1815 kg).
- Metric allen wrench set to adjust pressure reliefs.

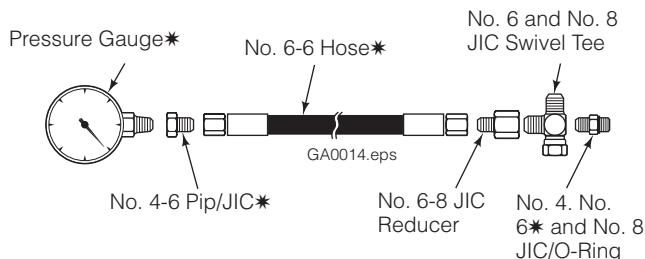
Flow Meter Kits

671476 – (10 GPM, 37 L/Min)

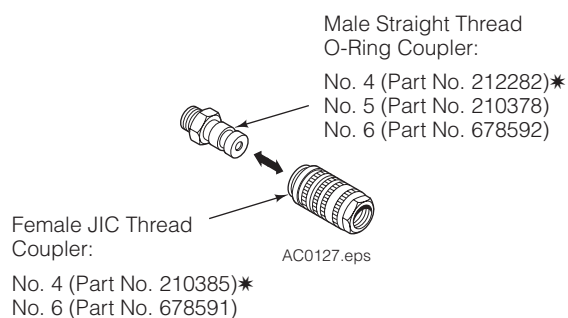
671477 – (20 GPM, 75 L/Min)



Pressure Gauge Kit 67212



Quick-Disconnects



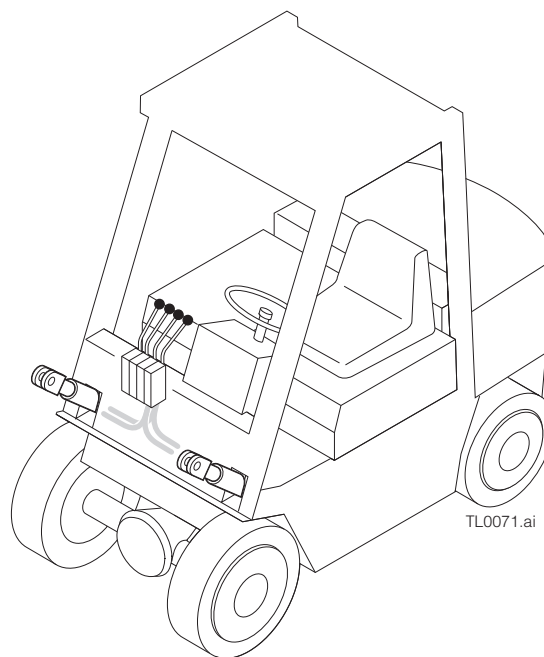
* **NOTE:** Diagnostics Kit 394382 includes items marked.

1 Prepare truck for mast

- A** Raise and block the front end of the truck 12 in. (30 cm) per ANSI B56.1 (ISO 3691), or drive the truck over a service pit. If required, remove existing mast. Clean and inspect mounting areas.



WARNING: Cap all open hydraulic supply ports and secure the truck against operation.



2 Install mast assembly

- A** Install the bearings in the mast lower axle or pin mounts. Lubricate the bearing surfaces with chassis grease.
- B** Install the mast on the truck. Tighten mounting capscrews using the truck manufacturer's torque specifications.
- C** Connect the mast to the tilt cylinders.
- D** Check mast anchor chains for proper tension.

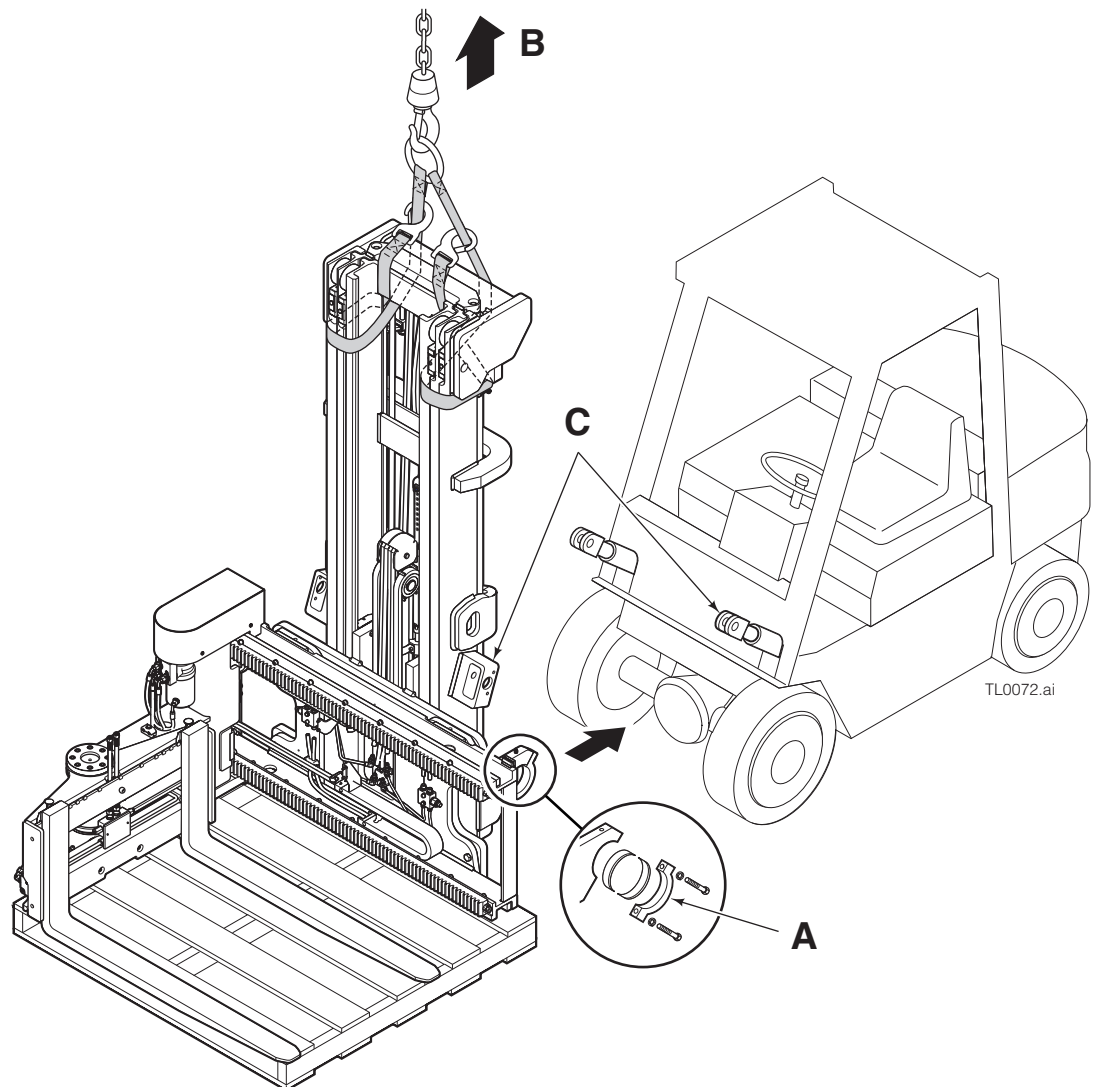
NOTE: Chains are factory adjusted for correct tension and carriage position.

If adjustment is necessary, adjust the mast chain anchors equally to provide a recommended clearance of 1.50 in. (38 mm) above the floor with the trilateral head fully lowered.

IMPORTANT: When making this adjustment make sure that the mast intermediate upright does not contact the upper stops on the mast outer upright.



WARNING: Verify that the overhead hoist and chains or straps are rated for the weight of the attachment. Refer to nameplate for attachment weight.



3 Prepare and connect supply hoses

Determine hose lengths required for A, B and C below.

- For HOIST circuit use No. 6 hose and fittings with a minimum ID of 0.375 in. (10 mm).
- For TRANSVERSE and PIVOT/ROTATE circuits use No. 6 hose and fittings with a minimum ID of 0.375 in. (10 mm).

Cut hoses to length and install hose fittings.

A Hoist – Mast hoist valve to truck main valve (1st control lever).

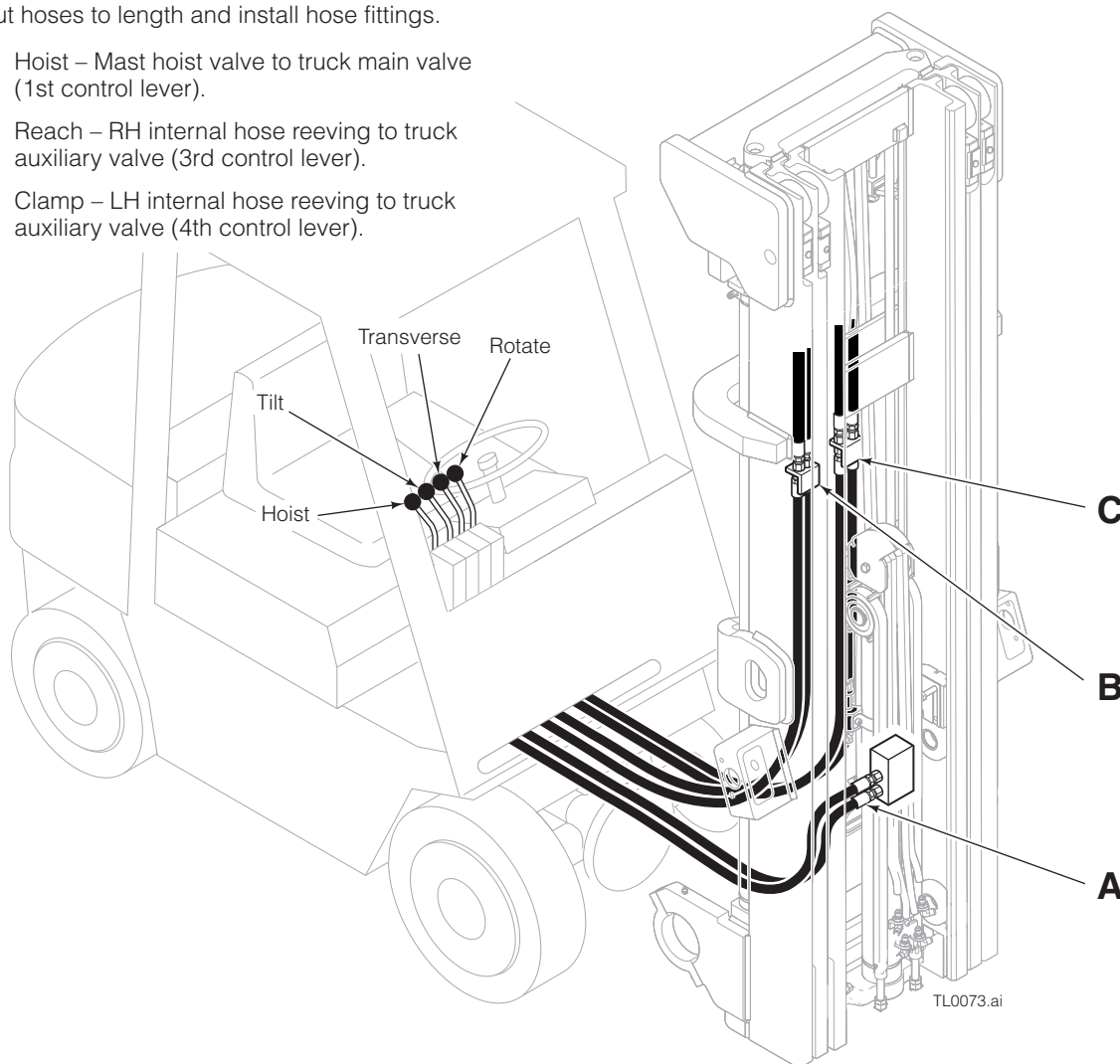
B Reach – RH internal hose reeving to truck auxiliary valve (3rd control lever).

C Clamp – LH internal hose reeving to truck auxiliary valve (4th control lever).

IMPORTANT: Use straight or 45 degree fittings wherever possible. Avoid sharp bends or pinch points. Use as few fittings as possible and keep hose lengths to a minimum.

If 90 degree connections are required, use tubing type hose end fittings (see illustration) for least flow restriction.

NOTE: The TILT function does not deviate from truck manufacturer settings.

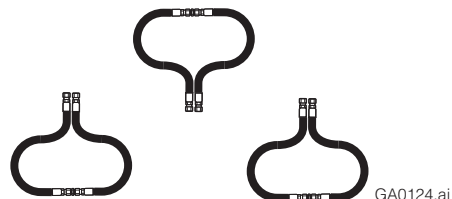


4 Flush supply hoses

A Install hoses to truck auxiliary valves. Temporarily connect the other ends together using union fittings.

B Operate auxiliary valves for 30 seconds.

C Remove union fittings.

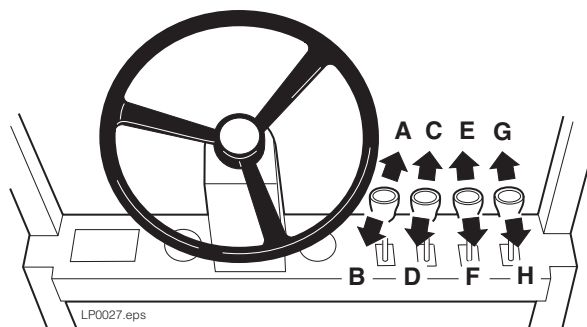


5 Cycle mast and trilateral head functions

- With no load, cycle all functions several times.
- Pick up and cycle a maximum load, check for proper speeds and smoothness of operation.
- Check for operation in accordance with ANSI (ISO) standards.
- Check for leaks at fittings, valve and cylinders.



WARNING: Make sure all personnel are clear of the attachment during testing.

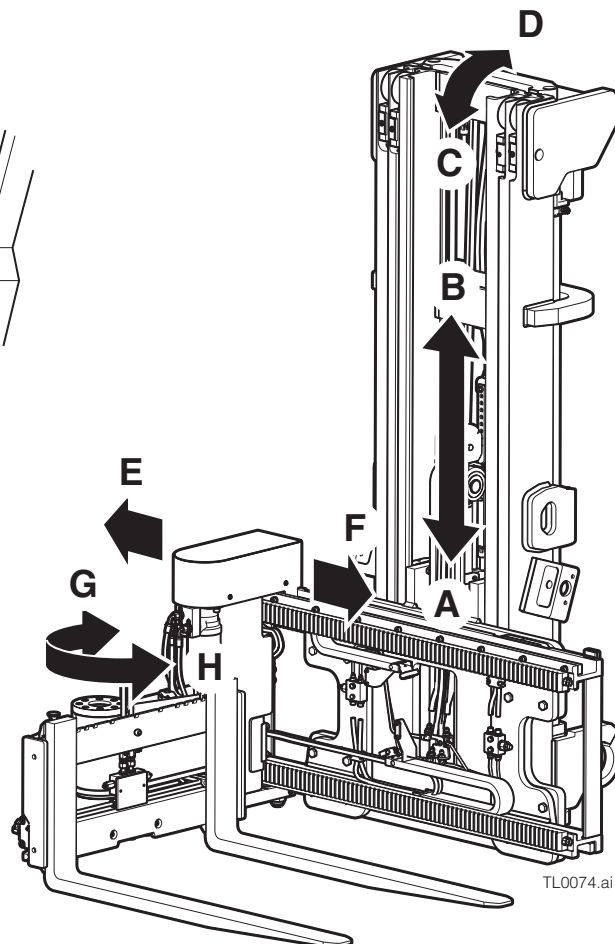


Main Valve Functions

- A** Hoist Down
- B** Hoist Up
- C** Tilt Forward
- D** Tilt Back

Auxiliary Valve Functions

- E** Traverse Right
- F** Traverse Left
- G** Pivot Right (Rotate CW)
- H** Pivot Left (Rotate CCW)



WARNING: Truck control handle and attachment function activation shown here conforms to ANSI B56.1 (ISO 3691) recommended practices. Failure to follow these practices may lead to serious bodily injury or property damage. End user, dealer and OEMs should review any deviation from the practices for safe operation.

PERIODIC MAINTENANCE

Daily

Check items shown each day. Report problems to a supervisor.

- Check for loose or missing bolts, worn or damaged hoses and hydraulic leaks. Tighten hoses.
- Clean and remove debris from the rollers, guides, rack and pinion for the sideshift function.
- To perform this operation it is suggested to use a metallic brush with Loctite 7063 or similar.
- Grease the rack and pinion system using a paint brush with RED MT grease 2 Tecnolube or similar grease.

100-Hour Maintenance

Every time the lift truck is serviced or every 100 hours of truck operation, whichever comes first, complete the following maintenance procedures:

- Verify mast is vertical during normal operation. Adjust as necessary.
- Lubricate mast upright rails. Cascade approved lubricant, Power Punch MPG White lithium Multi-Purpose Grease.

IMPORTANT: Regular application of Cascade approved lube will prevent premature mast rail, roller and thrust block wear.

500-Hour Maintenance

Every time the lift truck is serviced or every 500 hours of truck operation, whichever comes first, complete the following maintenance procedures:

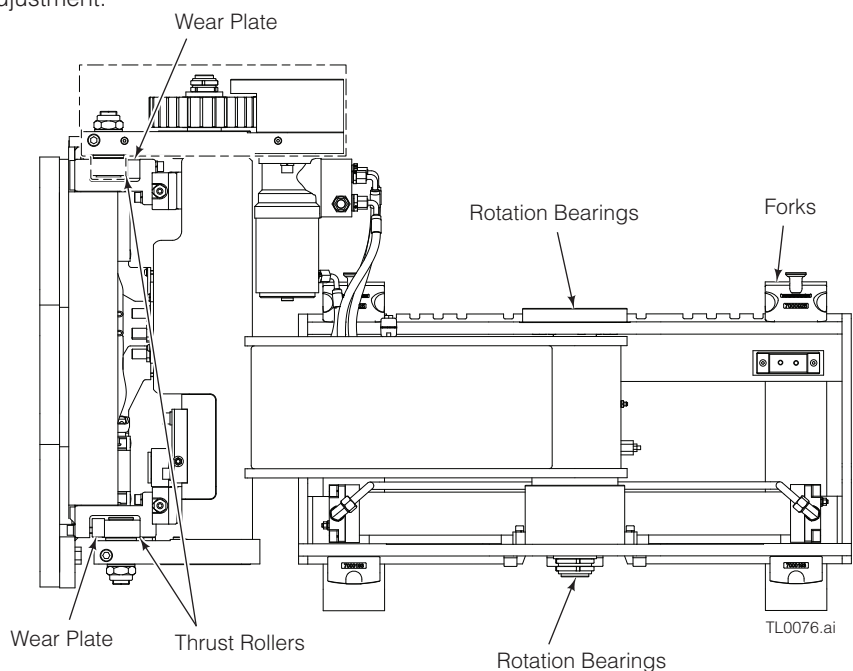
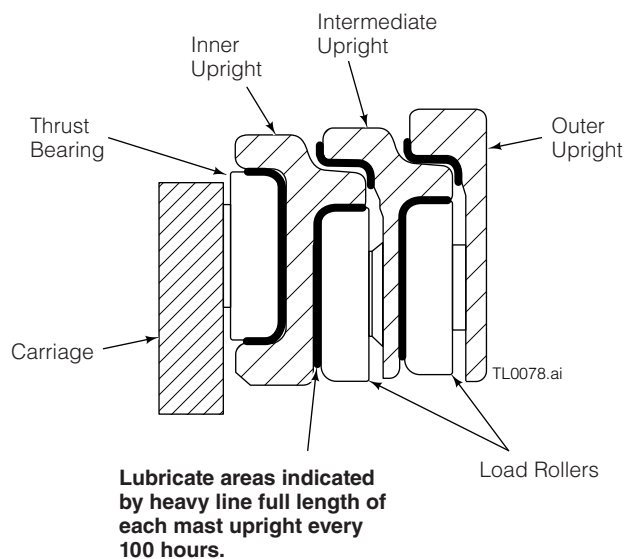
- Inspect chains for proper tension and adjustment.
- Lubricate full length of mast chains with chain lube (Cascade Part No. 200867).
- Verify the mast lower mounts are tightened to 107 ft.-lbs. (145 Nm).
- Inspect and adjust (if necessary) the thrust bearing side-to-side clearance in mast upright and carriage. Check carriage alignment and verify that the total side-to-side clearance is 0.06 in. (1.5 mm) maximum at the tightest point throughout the travel of the carriage.



WARNING: After completing any service procedure, always test each function through five complete cycles. First test with no load, then test with a load to make sure the attachment operates correctly before returning it to the job.



WARNING: Failure to lubricate uprights properly may result in flaking material that can get into the operator's eyes and cause personal injury.



PERIODIC MAINTENANCE

1000-Hour Maintenance

Every time the lift truck is serviced or every 1000 hours of truck operation, whichever comes first, complete the following maintenance procedures:

- Grease all the moving parts with general purpose chassis grease through the grease fittings or paintbrush. In case of low temperature storage environment, use grease FLUOROCARBON GEL 875L-MS.
- Check retaining capscrews and the following components:
 - Rack and pinion for the sideshift function
 - Rollers for the sideshifting function (Upper & Lower)
 - Rotation bearings

2000-Hour Maintenance

Every time the lift truck is serviced or every 1000 hours of truck operation, whichever comes first, complete the following maintenance procedures:

- If equipped, replace load rollers and thrust bearings in mast and carriage.
- **Fork Inspection** – After 2000 hours of truck operation, forks in use shall be inspected at intervals of not more than 12 months (for single shift operations) or whenever any defect or permanent deformation is detected. Severe applications will require more frequent inspection.

Fork inspection shall be carried out by trained personnel to detect any damage that might impair safe use. Any fork that is defective shall be removed from service. Reference ANSI B56.1 (ISO 3691).

Inspect for the following defects:

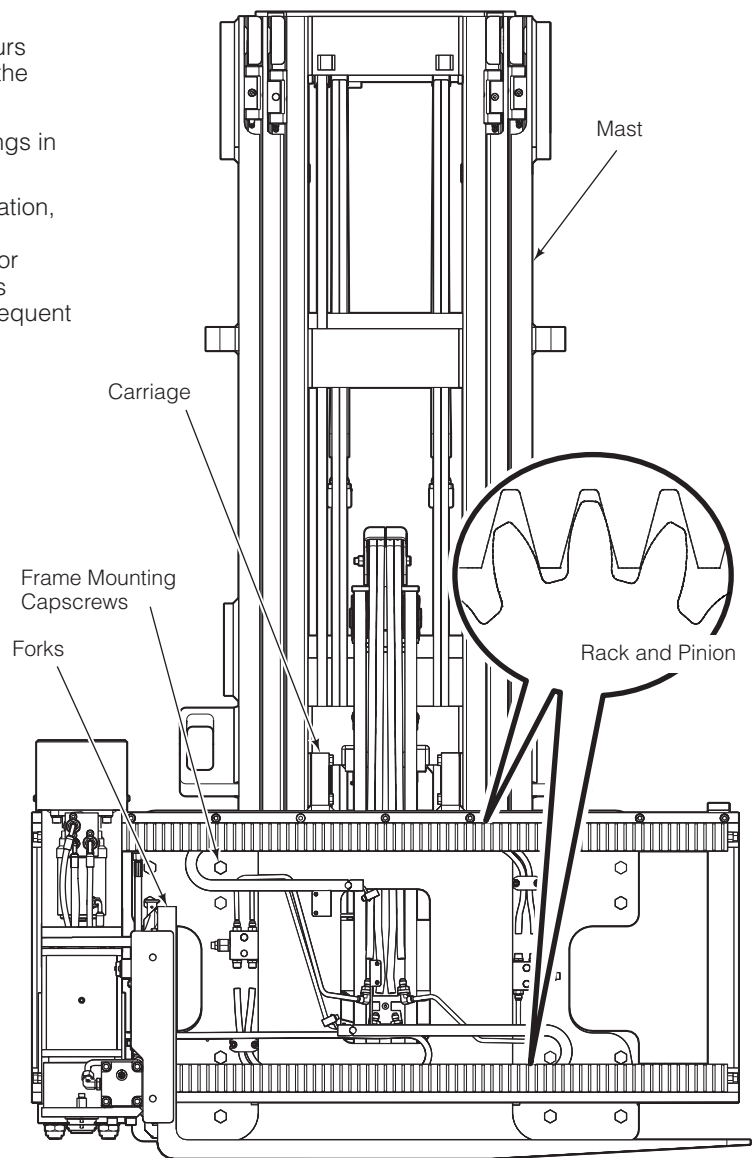
- Surface cracks
- Straightness of blade and shank
- Fork angle
- Difference in height of fork tips
- Positioning lock
- Wear on fork blade and shank
- Wear on fork hooks
- Legibility of marking

NOTE: Fork Safety Kit 3014162 contains wear calipers, inspection sheets and safety poster. Also available is fork hook & carriage wear gauge 209560 (Class II), 209561 (Class III) and 6105257 (Class IV).

5000-Hour Maintenance

After each 5000 hours of truck operation, in addition to the daily and 1000-hour maintenance, perform the following procedures:

- Replace the thrust rollers.



Front View
(Fork carriage pivoted/rotated left)

Do you have questions you need answered right now?

Call your nearest Cascade Service Department.

Visit us online at www.cascorp.com

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