INSTALLATION INSTRUCTIONS

and PERIODIC MAINTENANCE

G-Series

Rotators

Manual Number 6073002-R7

cascade® corporation

CONTENTS

INTRODUCTION

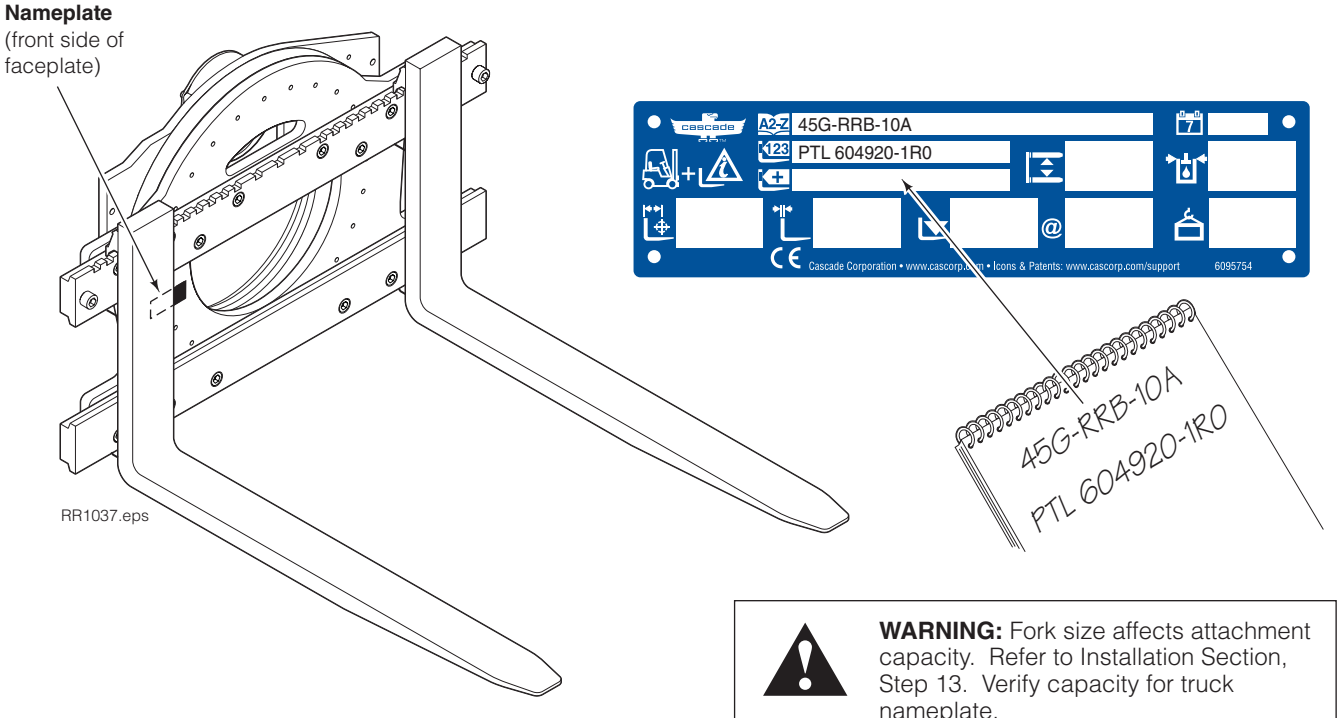
This manual provides installation instructions and periodic maintenance requirements for Cascade G-Series Rotators.

In any communication about the attachment refer to the product catalog and serial numbers stamped on the nameplate, as shown. If the nameplate is missing, the numbers can be found stamped on the left frontside of the faceplate between the fork bars.

IMPORTANT: All hoses, tubes and fittings on G-Series Rotators are JIC.

NOTE: Specifications are shown in both US and (Metric) units. All fasteners have a torque value range of ±10% of stated value.

Nameplate
(front side of faceplate)



WARNING: Fork size affects attachment capacity. Refer to Installation Section, Step 13. Verify capacity for truck nameplate.

SPECIAL DEFINITIONS

The statements shown below appear throughout this manual where special emphasis is required. Read all WARNINGS and CAUTIONS before proceeding with any work. Statements labeled IMPORTANT and NOTE are special information that is useful when servicing the attachment.

WARNING - A statement preceded by a WARNING is information that should be acted upon to prevent **bodily injury.** A WARNING is always inside a ruled box.

CAUTION – A statement preceded by CAUTION is information that should 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 handy to know and may make the job easier.

RECOMMENDED HYDRAULIC SUPPLY

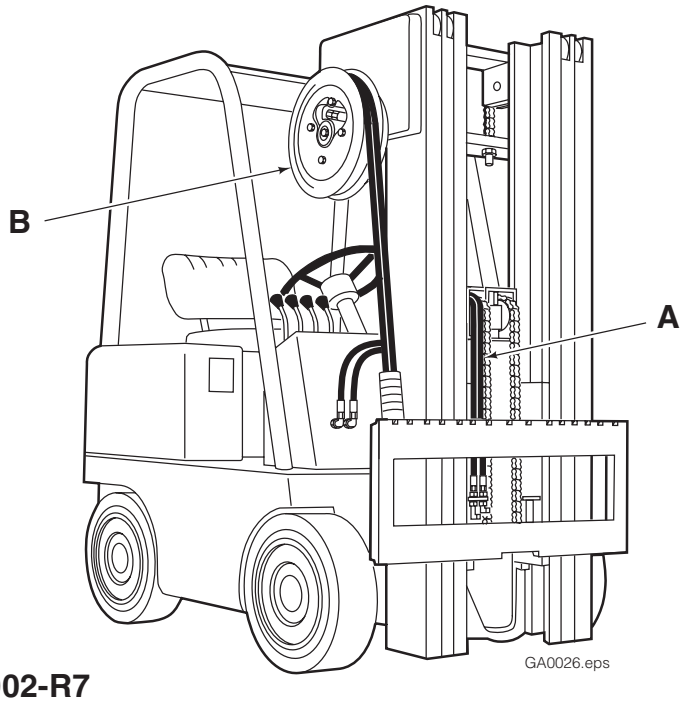
G-Series Rotators provide the best performance with one of the hydraulic supply arrangements shown. Refer to Cascade *Hose and Cable Reel Selection Guide*, Part No. 212199, to select the correct hose reel for the mast and truck. The hose and fitting requirements are:

- **ROTATE Function:**

  30G–40G –
  No. 6 with .28 in. (7 mm) minimum ID

  45G–160G –
  No. 8 with .40 in. (10 mm) minimum ID

CAUTION: Rotate function supply circuit back pressure exceeding 35 bar (500 psi) can result in excessive oil heating, reduced attachment performance and shortened hydraulic system life. Check for restrictions such as numerous fittings and fitting/hose sizes less than No. 6 (30G-40G) or No. 8. (45G-160G).



A RH or LH Single Internal Hose Reeving Group.

OR

B RH or LH THINLINE™ 2-Port Hose Reel Group.

Truck Relief Setting

2300 psi (160 bar) Maximum

Truck Flow Volume ①

	Min. ②	Recommended	Max. ③
30G, 40G	5 GPM (20 L/min)	7.5 GPM (28 L/min)	10 GPM (38 L/min)
45G – 100G	5 GPM (20 L/min)	10 GPM (38 L/min)	15 GPM (56 L/min)
130G – 160G	7 GPM (26 L/min)	12 GPM (45 L/min)	15 GPM (56 L/min)

① Cascade Rotators 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 a rotate speed less than 2 RPM.

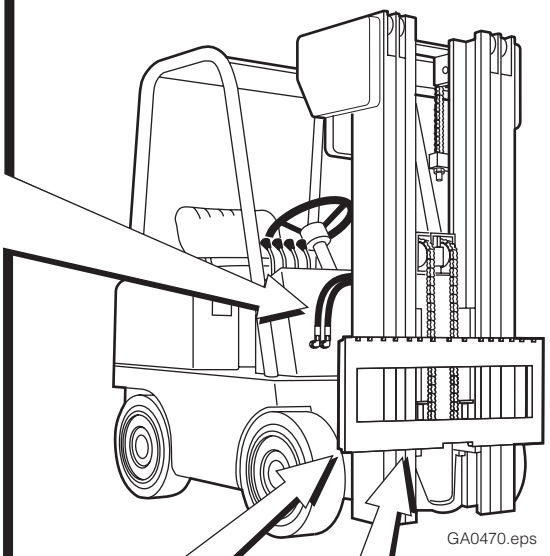
③ Flow greater than maximum can result in excessive heating, reduced system performance and short hydraulic system life.

Hoses and Fittings

30G–40G: No. 6 with .28 in. (7 mm) minimum ID

45G–160G: No. 8 with .40 in. (10 mm) minimum ID

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



GA0470.eps

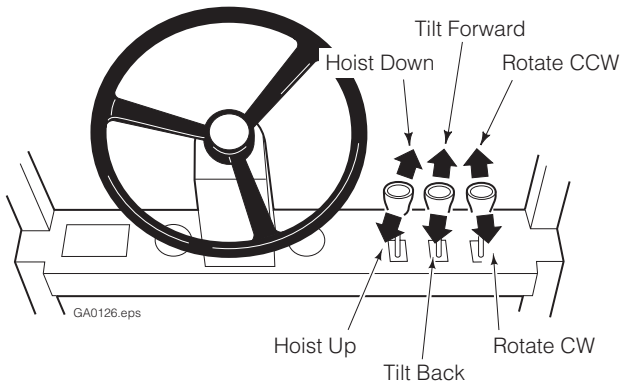
Carriage Mount Dimension (A) ANSI (ISO)

	Minimum	Maximum
Class II	14.94 in. (380.0 mm)	15.00 in. (381.0 mm)
Class III	18.68 in. (474.5 mm)	18.74 in. (476.0 mm)
Class IV	23.44 in. (595.5 mm)	23.50 in. (597.0 mm)

Carriage – Clean and inspect carriage bars for damage and smoothness. Repair any protruding welds or damaged notches.

Auxiliary Valve Functions

Check for compliance with ANSI (ISO) standards.



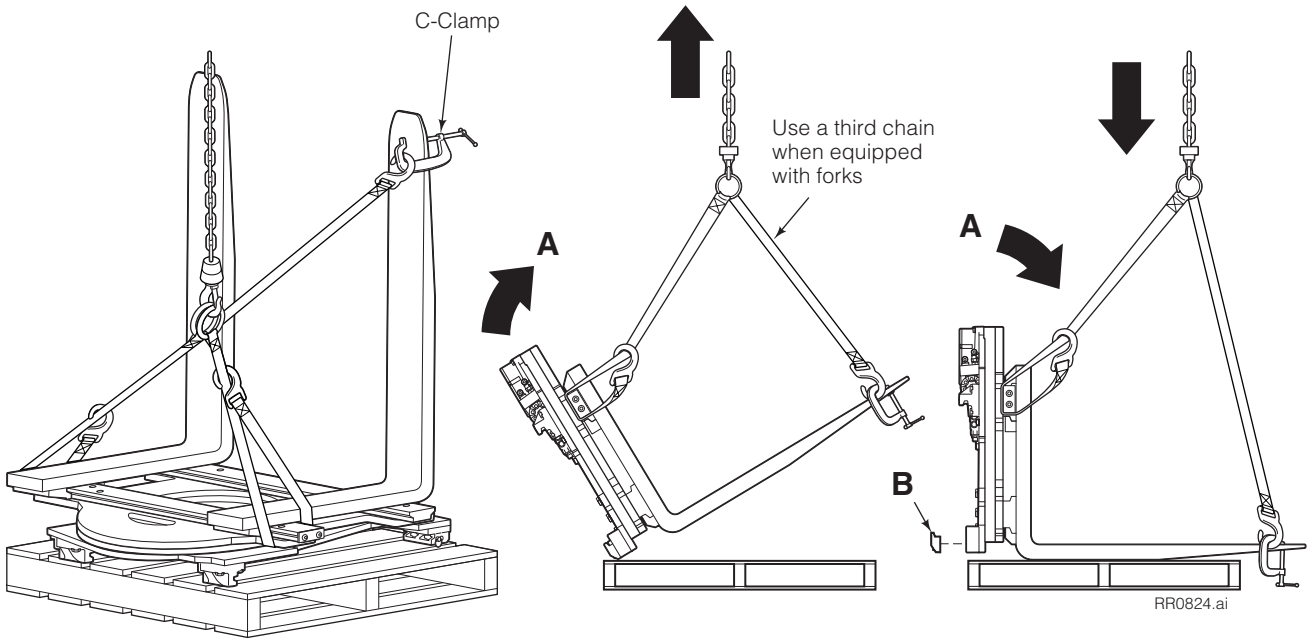
Follow the steps shown to install the atachment on the truck. Read and understand all **WARNING** statements. If you don't understand a procedure, ask your supervisor or call the nearest Cascade Service Department for assistance.

1 Attach overhead hoist, remove bolt-on lower hooks

A Remove banding, set attachment upright on pallet.

B Remove bolt-on lower mounting hooks (if equipped).

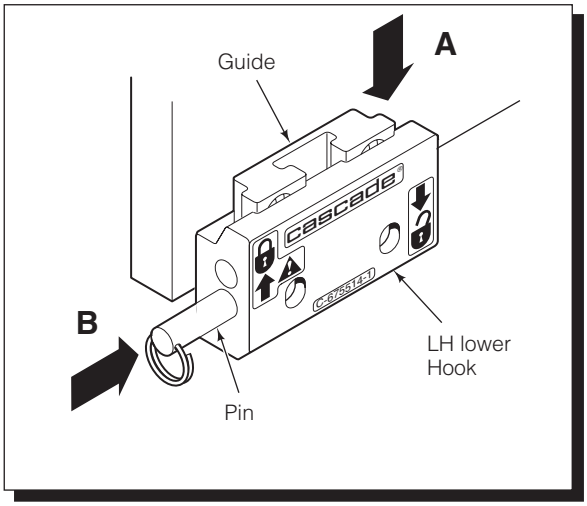
WARNING: Verify that the overhead hoist and chains or straps are rated for the weight of the attachment. Refer to nameplate for attachment weight.



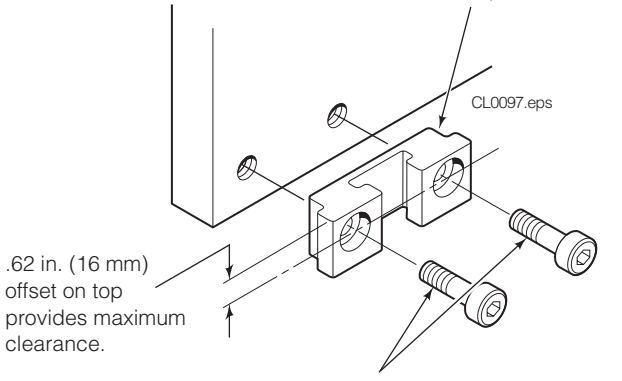
2 Unlock Quick-Change lower mounting hooks (if equipped)

A Move hooks into unlocked position.

B Reinstall pin in lower hole.



NOTE: Guides can be reversed to change hook to carriage clearance. Refer to Step 7.



Apply Loctite 242 (blue) and tighten capscrews:
CL II/III – 120 ft.-lbs. (165 Nm)

3 Prepare Hoses

A Position truck carriage behind attachment.

B Determine hose lengths required.

C Cut hoses to length and install end fittings.

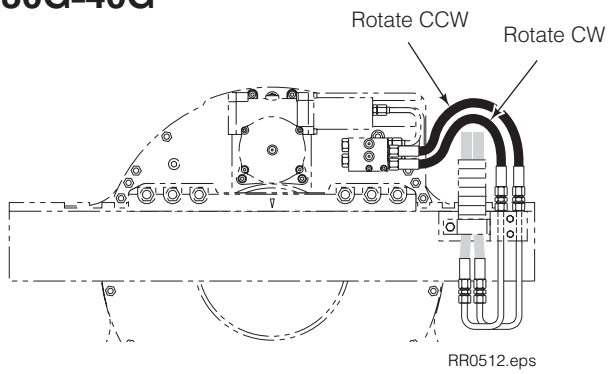
IMPORTANT: Flush hoses (Step 4) before operating attachment.

CAUTION: Rotate function supply circuit back pressure exceeding 35 bar (500 psi) can result in excessive oil heating, reduced attachment performance and shortened hydraulic system life. Check for restrictions such as numerous fittings and fitting/hose sizes less than No. 6 (30G-40G) or No. 8. (45G-160G).

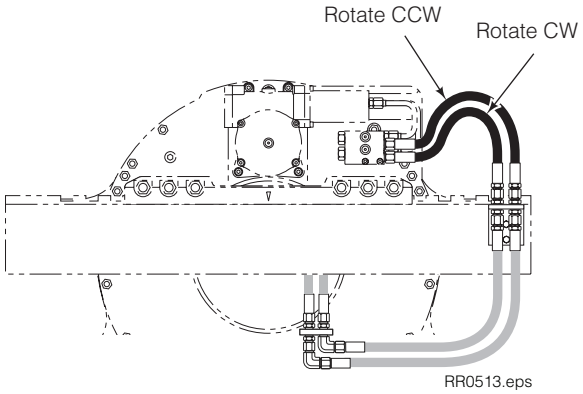
CAUTION: Hoses should be 2300 psi (160 bar) working pressure rated for 30G-160G attachment functions.

INSTALLATION USING RH 2-PORT *THINLINE*™ HOSE REEL:

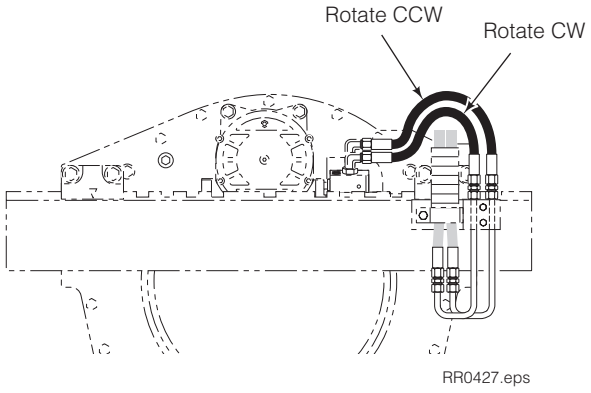
30G–40G

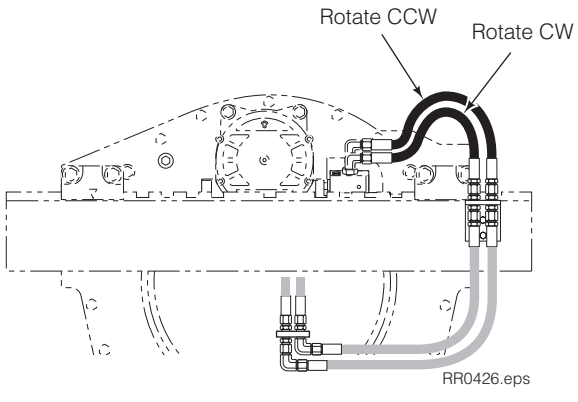


INSTALLATION USING INTERNAL HOSE REEVING:

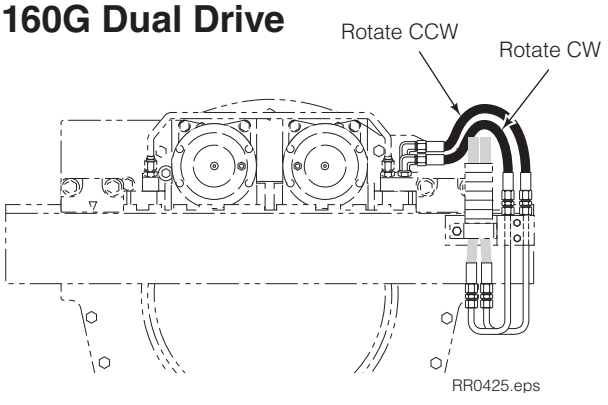


45G–130G





160G Dual Drive

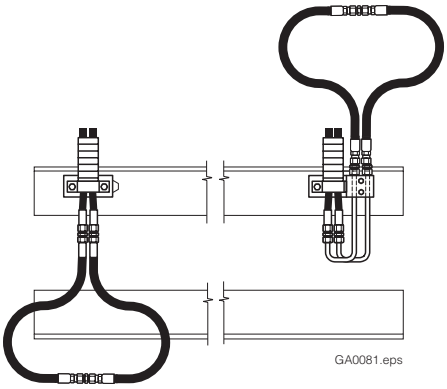


4 Flush hydraulic supply hoses

A Install hoses as shown below.

B Operate auxiliary valves for 30 sec.

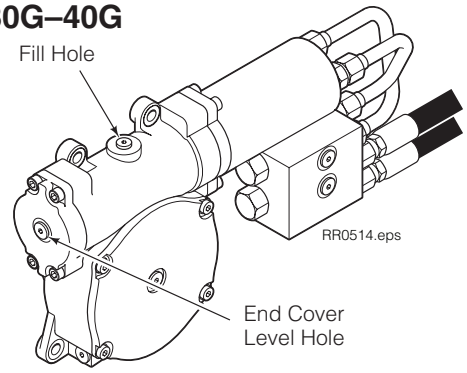
C Remove union fittings.



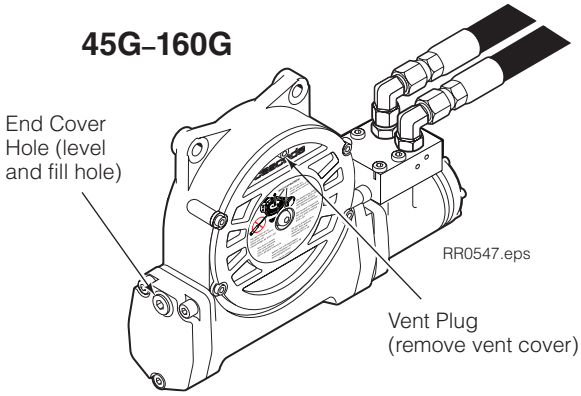
5 Remove gearbox end cover level hole Check lubricant level

If necessary, fill gearbox with Cascade Gear Lube 656300 or equivalent SAE 90 wt. gear lube (AGMA 'mild' 6EP Gear Oil).

30G–40G



45G–160G



6 30G–40G Mount attachment on truck carriage

A Center truck behind attachment.

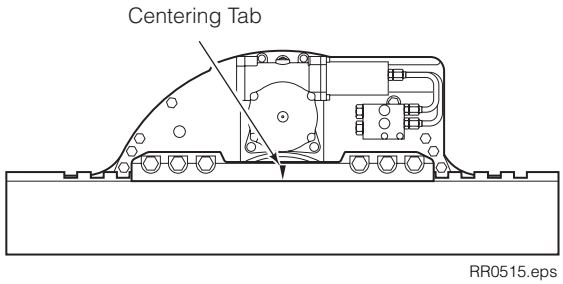
B Tilt forward and raise carriage into position.

C Engage top mounting hooks with carriage.

30G–40G – Make sure the centering tab engages the center notch on top carriage bar.

D Lift attachment 2 in. (5 cm) off pallet.

30G–40G



6 45G–160G Mount attachment on truck carriage

A Center truck behind attachment.

B Tilt forward and raise carriage into position.

C Engage top mounting hooks with carriage.

45G–160G – Make sure locator tab in left hook engages closest notch on top carriage bar. If attachment is not centered on carriage, a new locator notch must be ground into the upper carriage bar using the ITA dimensions shown below.

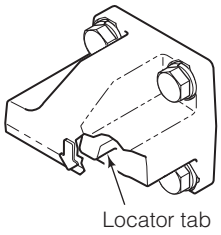
D Lift attachment 2 in. (5 cm) off pallet.

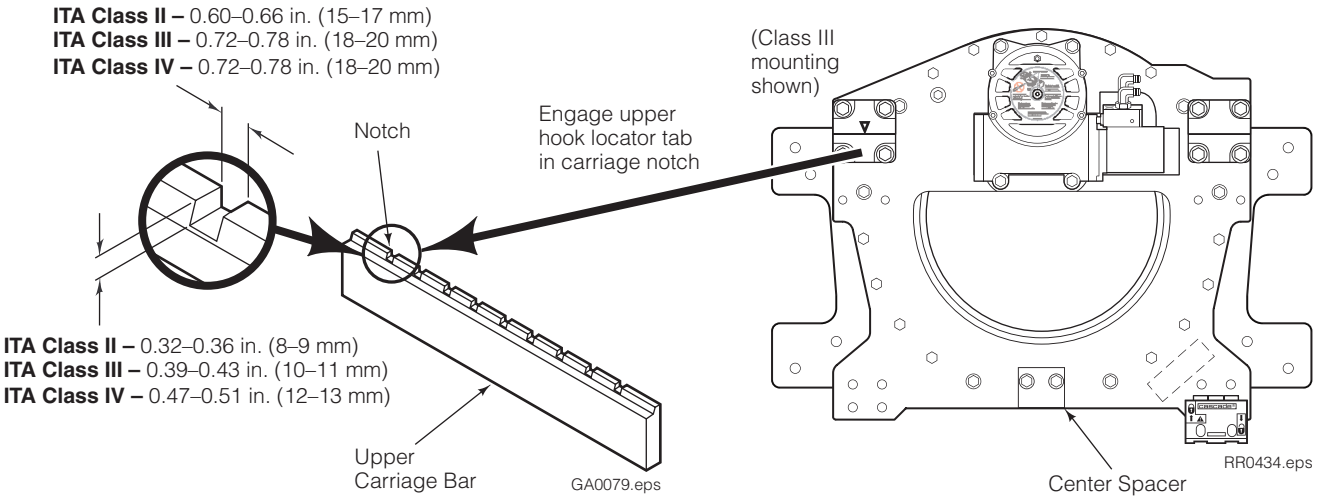
WARNING: Cascade Corporation recommends that a qualified welder experienced in this type of repair be used for best quality when installing stop blocks.

WARNING: Do not remove the carriage locator tab from an upper hook. Grind a new notch into the carriage bar to accomodate the tab for centering.

WARNING: Revolving attachments not equipped with an on-center locator tab must have an upper hook with a locator tab. If the upper hook locator tab is missing, the hook must be replaced.

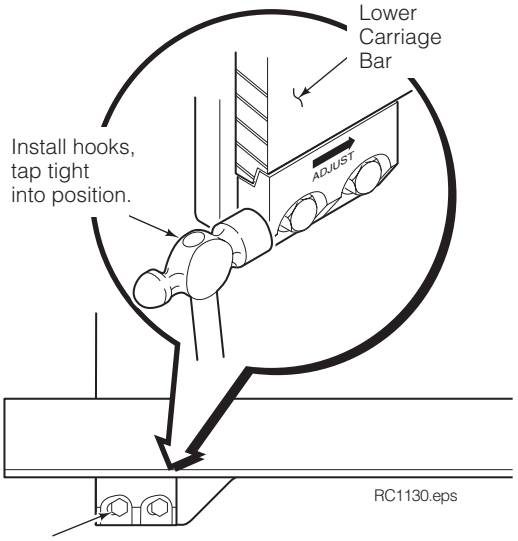
45G–160G





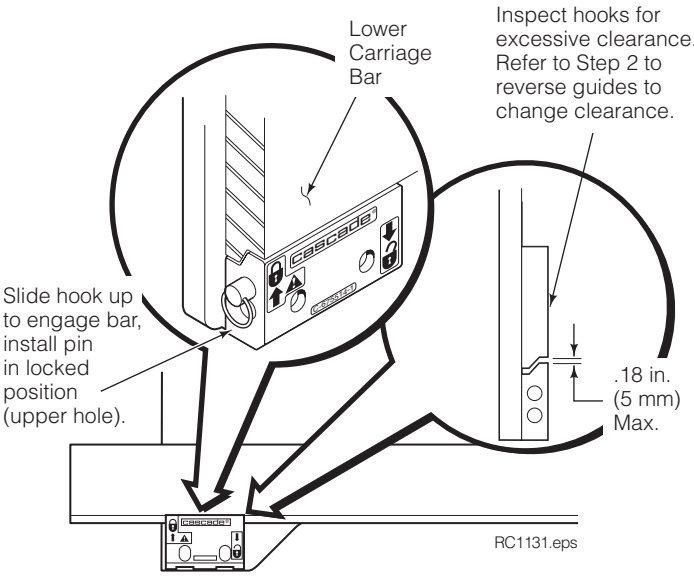
7 Install and engage lower hooks

BOLT-ON TYPE



Apply Loctite 242 (blue) and tighten Capscrews:
CL II/III – 120 ft.-lbs. (165 Nm)
CL IV – 235 ft.-lbs. (320 Nm)

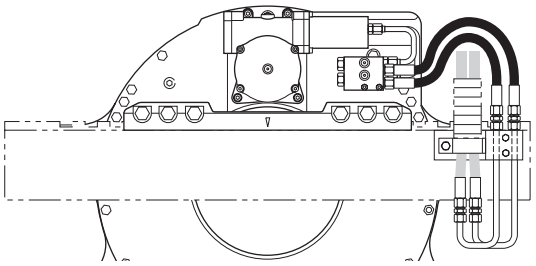
QUICK-CHANGE TYPE



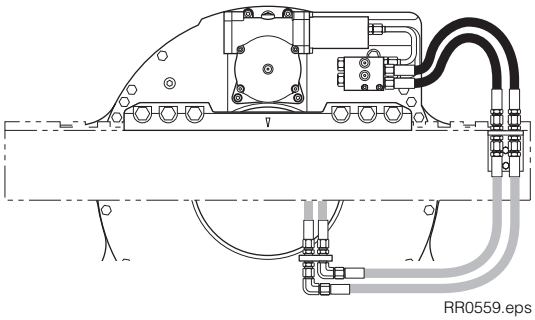
8 Connect hoses to hose terminal fittings as shown in Step 3

INSTALLATION USING RH 2-PORT *THINLINE*™ HOSE REEL:

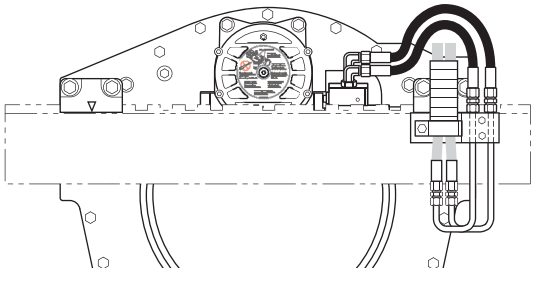
30G–40G



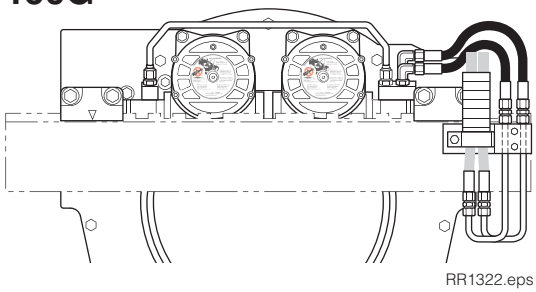
INSTALLATION USING INTERNAL HOSE REEVING:



45G–130G



160G

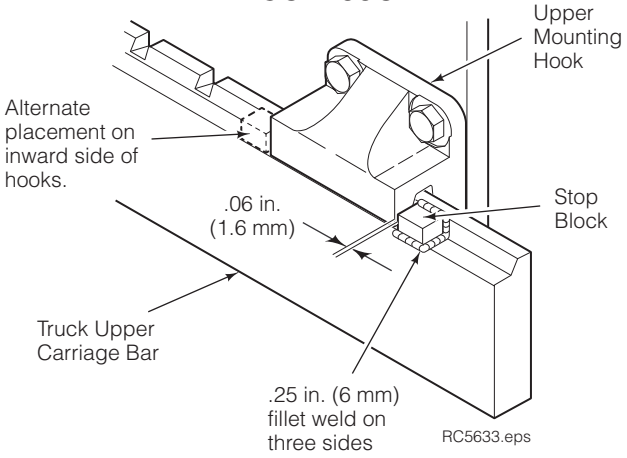


9 Install stop block kit

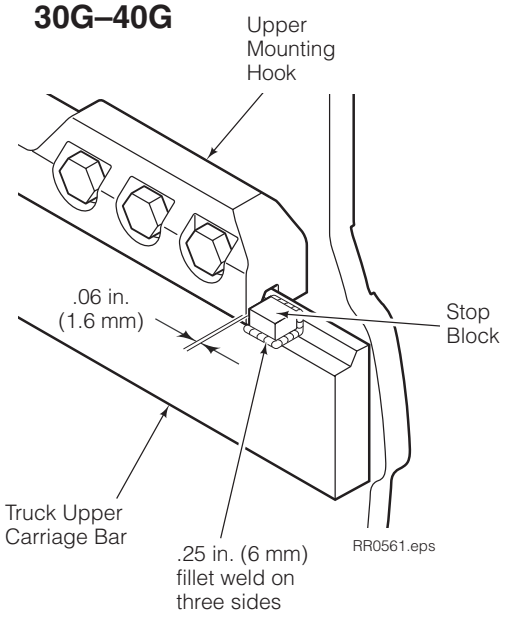
- Install stop blocks to the carriage upper bar on the outward side of both hooks. If the carriage is to narrow, weld the stop blocks on the inward side of the hooks. Preheat stop block and carriage bar weld area to 325° F (180° C).
- Use AWS E7018 low hydrogen rod and weld a .25 in. (6 mm) fillet full length on three sides of each stop block.

WARNING: Cascade Corporation recommends that a qualified welder experienced in this type of repair be used for best quality when installing stop blocks.

45G–160G



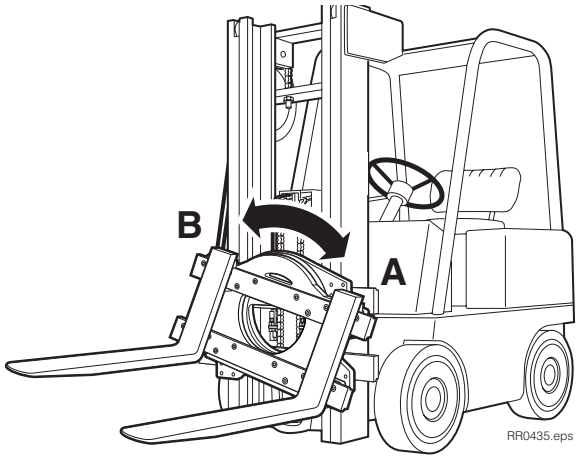
30G–40G



10 Cycle Rotation Function

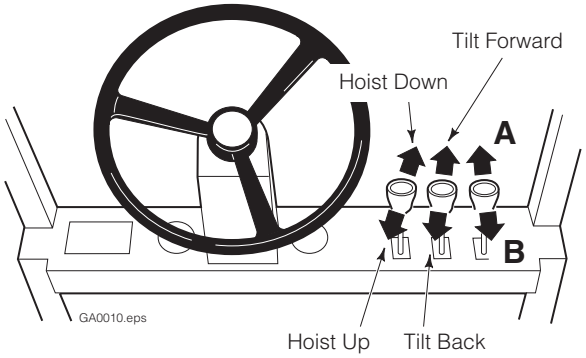
WARNING: Make sure all personnel are clear of the attachment during testing.

- With no load, cycle rotation function several times.
- Check functions for operation in accordance with ANSI (ISO) standards.
- Pick up a maximum load and rotate. Check for smoothness and normal rotation.
- Check for leaks at hoses, fittings and rotator drive.



WARNING: Truck control handle and attachment function activation shown here conforms to ANSI/ITSDF 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.

Auxiliary Valve Functions



ROTATE
(Driver's view)

A Counterclockwise (CCW)

B Clockwise (CW)

11 Fork Welding Preparation (forks without middle hook installed)

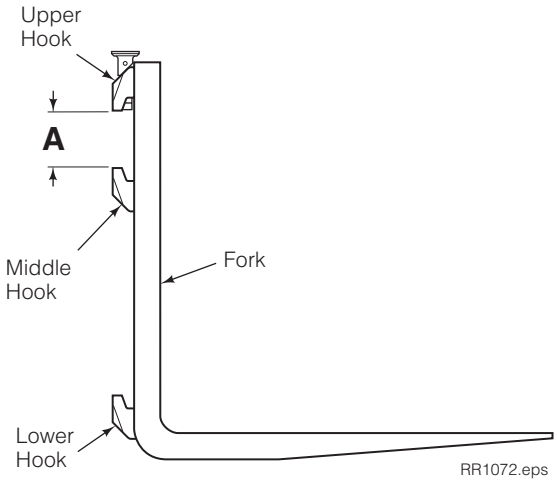
A Clean all surfaces to be welded. Remove paint, oil, grease and other contaminants.

B Position the middle hook using the dimensions shown. Mark the hook position on the fork.

C Tack the hook in four places with .25 in. (6 mm) long welds. Recheck dimensions.

WARNING: Each fork must have three hooks. Cascade forks for rotators are equipped with a middle hook. If the attachment is supplied without forks, middle hooks are provided. They must be welded using the following procedures.

Rotator Model	Hook Spacing Dimension 'A'
30G, 40G, 45G, 55G	3.05 +.06 -0 in. (77.5 +1.0 -0 mm)
65G	3.60 +.06 -0 in. (91.5 +1.0 -0 mm)
80G	4.70 +.06 -0 in. (119.5 +1.5 -0 mm)
100G	5.85 +.06 -0 in. (148.5 +1.5 -0 mm)
130G	5.98 ± .03 in. (152.0 ± 0.8 mm)
160G	6.77 ± .03 in. (172.0 ± 0.8 mm)



12 Fork Middle Hook Welding

A Preheat weld area (full fork width and 6 in. above and below hook) to 500° F (260° C) minimum, 600° F (315° C) maximum before welding. Maximum interpass temperature should not exceed 700° F (370° C).

B Finish weld middle hook to fork. Apply welds in the hook weld prep areas using the lower hook as an example of the welds required. Note the **'B'** no weld area. Use the following weld method:

Attach ground clamp to the fork upright. Weld using FCAW (Flux Core Arc Welding). AWS E100T1-K3 electrode, .06 in. (1.5 mm) diameter with 100% CO_2 or 75% Ar/ 25% CO_2 @ 30-45 CFH. Apply fillet and groove welds using stringer bead technique. Minimum weld pass width .25 in. (6.3 mm), maximum weld pass thickness .50 in. (12.5 mm). DCRP welding current, 230-300 amps, 29-31 volts. Travel speed 8-12 IPM. Completely remove slag between passes. Slow cool, by covering with insulating blanket, to 150° F (65° C).

C Inspect welds. No undercut, overlap, cracks of any kind (including crater crackers) or porosity.

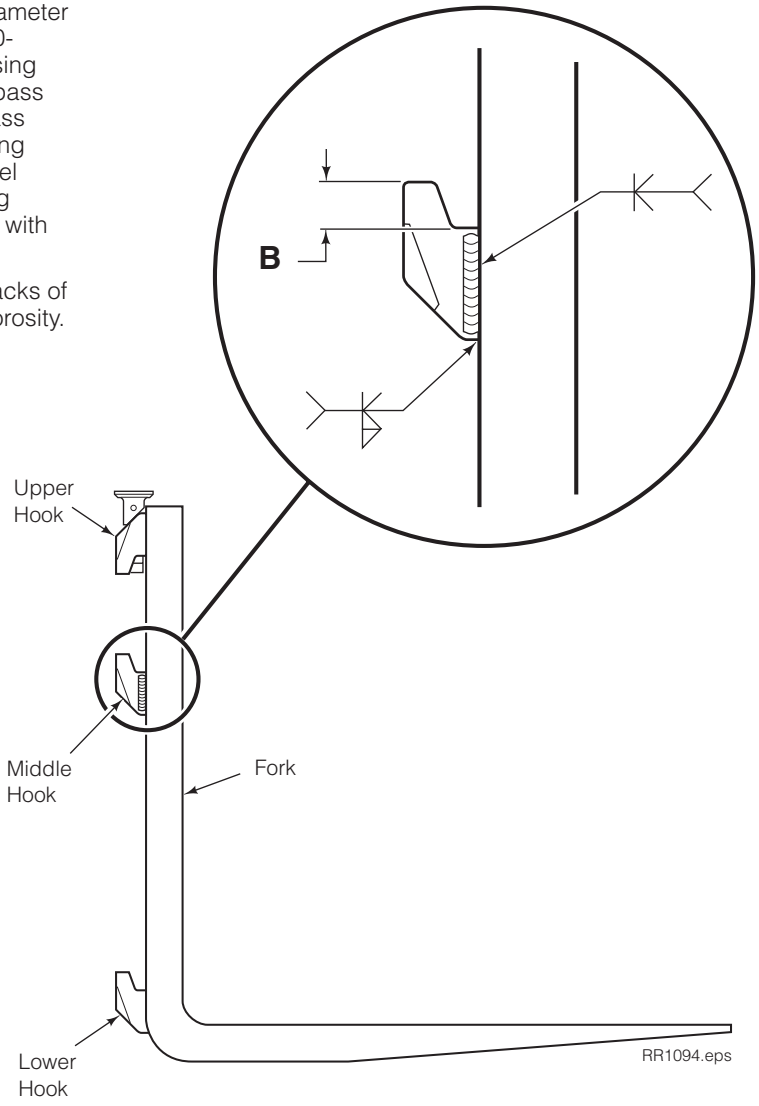
D Clean weld area and repaint.

WARNING: Applications that hold a load inverted with a 50% or more capacity, must use Cascade rotator forks.

Applications that dump a load when the attachment is rotated at 45° from vertical, can use pallet forks with the installed middle hook.

Rotator Model	No-Weld Dimension 'B'
30G, 40G, 45G, 55G	.62 in. (16 mm)
65G, 80G, 100G	.75 in. (19 mm)
130G, 160G	.89 in. (22 mm)

Reference: S-22588, S-22566, S-22567, S-22927, S-23847, CWS 38, CPS 69.



13 Install forks

Make sure forks are rated for the loads being handled. Fork size chosen may reduce attachment rating (see next page).

> **WARNING:** Forks must have **three hooks**. Cascade forks for rotators are already equipped with a middle hook. If the attachment is supplied without forks, middle hooks are provided. See Step 11 for middle hook installation procedure.

A Rotate the carriage to the horizontal position. Remove the fork keepers from the upper fork carriage bar.

B Release the spring locks on top of the forks.

C Slide the forks into position on the fork carriage bars.

NOTE: If the fork middle hook fit up is too tight, sand or grind the tip.

D Lock each fork in place by pushing the spring lock lever down or twisting the button down. Shake forks to make sure the pin is fully engaged in a fork bar notch.

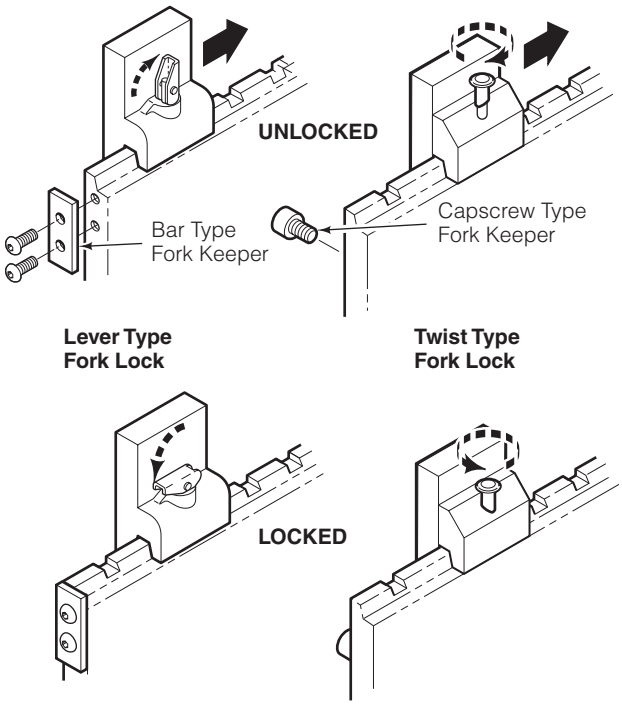
E Reinstall the keepers. Tighten the capscrews to a torque of:

Capscrew Type:
30G–160G - 200 ft.-lbs. (270 Nm)

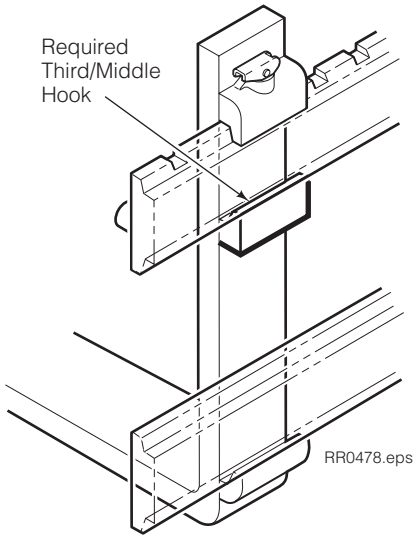
Bar Type:
45G–65G - 65 ft.-lbs. (90 Nm)

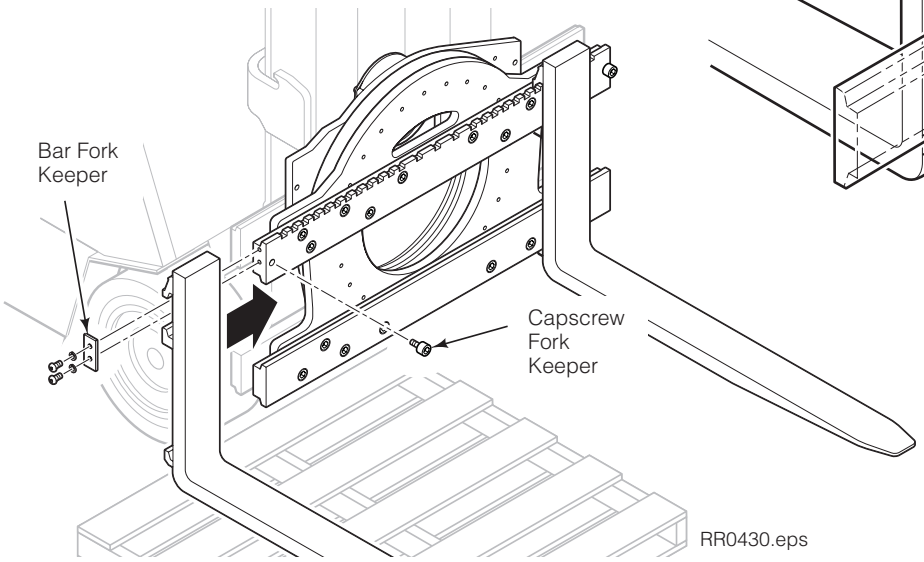
Apply Loctite 242 (blue) to Bar Type capscrews. Threaded holes must be clean and dry before reassembly.

F Reverse the above procedures for removal.



> **WARNING:** When installing or removing forks, rotate carriage to **horizontal position**. Use pallets or blocks to raise forks to installation height. Keep feet clear of forks when installing. **Fork keepers must be in place at all times during attachment operation.**





CAUTION: Attachment and fork capacity are dependant on fork size.
Shaded area indicates maximum rating fork size.

ROTATOR & FORK CAPACITY at 24 in. (600 mm) Load Center

Model	Fork Class	Fork Size (W x T)							
		4 x 1.25 in.	100 x 35 mm	4 x 1.5 in.	100 x 40 mm	5 x 1.5 in.	122 x 40 mm	5 x 1.75 in.	122 x 45 mm
30G	II	3,000 lbs.	1,361 kg	3,000 lbs.	1,361 kg	3,000 lbs.	1,361 kg	3,000 lbs.	1,361 kg
40G	II	3,145 lbs.	1,427 kg	4,000 lbs.	1,815 kg	4,000 lbs.	1,815 kg	4,000 lbs.	1,815 kg
45G	II	3,145 lbs.	1,427 kg	4,500 lbs.	2,042 kg	4,500 lbs.	2,042 kg	4,500 lbs.	2,042 kg
55G	II	3,145 lbs.	1,427 kg	4,675 lbs.	2,121 kg	5,100 lbs.	2,314 kg	5,500 lbs.	2,495 kg
65G	III	–	–	–	–	5,100 lbs.	2,314 kg	6,500 lbs.	2,949 kg
80G	III	–	–	–	–	–	–	6,460 lbs.	2,930 kg
100G	III	–	–	–	–	–	–	6,460 lbs.	2,930 kg

Model	Fork Class	Fork Size (W x T)						
		5 x 2.0 in.	122 x 50 mm	6 x 2.0 in.	150 x 50 mm	6 x 2.5 in.	150 x 65 mm	150 x 70 mm
65G	III	6,500 lbs.	2,949 kg	–	–	–	–	–
80G	III	8,000 lbs.	3,629 kg	8,000 lbs.	3,629 kg	8,000 lbs.	3,629 kg	3,629 kg
100G	III	8,075 lbs.	3,663 kg	10,000 lbs.	4,536 kg	10,000 lbs.	4,536 kg	4,536 kg
130G	IV	8,075 lbs.	3,663 kg	10,200 lbs.	4,626 kg	13,000 lbs.	5,910 kg	5,910 kg
160G	IV	8,075 lbs.	3,663 kg	10,200 lbs.	4,626 kg	16,000 lbs.	7,257 kg	7,270 kg

Model	Fork Class	Fork Size (W x T)	
		7 x 2.0 in.	180 x 50 mm
80G	III	8,000 lbs.	3,629 kg
100G	III	10,000 lbs.	4,536 kg
130G	IV	13,000 lbs.	5,900 kg
160G	IV	13,150 lbs.	5,964 kg

ROTATOR & FORK CAPACITY at 20 in. (500 mm) Load Center

Model	Fork Class	Fork Size (W x T)			
		100 x 35 mm	100 x 40 mm	122 x 40 mm	122 x 45 mm
30G	II	1,650 kg	1,650 kg	1,650 kg	1,650 kg
40G	II	1,740 kg	2,200 kg	2,200 kg	2,200 kg
45G	II	1,950 kg	2.500 kg	2,500 kg	2,500 kg
55G	II	1,950 kg	2,500 kg	2,700 kg	2,700 kg
65G	III	–	–	2,800 kg	3,200 kg
80G	III	–	–	–	4,000 kg
100G	III	–	–	–	4,000 kg

Model	Fork Class	Fork Size (W x T)				
		122 x 50 mm	150 x 50 mm	150 x 65 mm	150 x 70 mm	180 x 50 mm
80G	III	4,000 kg	4,000 kg	4,000 kg	4,000 kg	4,000 kg
100G	III	4,930 kg	5,000 kg	5,000 kg	5,000 kg	5,000 kg
130G	IV	4,930 kg	5,100 kg	6,400 kg	6,400 kg	6,400 kg
160G	IV	4,930 kg	5,100 kg	7,900 kg	7,900 kg	6,400 kg

Daily Inspection

At the beginning of each operational shift, complete the following inspections:

- Check for loose or missing bolts, worn or damaged hoses, and hydraulic leaks.
- Check that fork locking pins and end bar keepers are installed and functional.
- Check decals and nameplate for legibility.

WARNING: After completing any service procedure, always test the atachment through five complete cycles. First test empty, then test with a load to make sure the attachment operates correctly before returning it to the job.

1000-Hour Maintenance

After each 1000 hours of truck operation, in addition to the daily inspections, perform the following procedures:

WARNING: A sampling of faceplate and baseplate bearing assembly capscrews must be checked for proper torque at 1000 hours (see TB183). A complete inspection is required every 2000 hours. Failure to keep the capscrews tightened can result in attachment damage and serious injury.

- Check a sample of baseplate capscrews for proper torque value. See Technical Bulletin TB183 or Service Manual 6089468 (30G–40G) or Service Manual 6073955 (45G–160G) for checking and replacement procedures.
- Check a sample of bearing capscrews for proper torque value. See Technical Bulletin TB183 or Service Manual 6089468 (30G–40G) or Service Manual 6073955 (45G–160G) for checking and replacement procedures.
- Tighten lower mounting hook capscrews to a torque of:

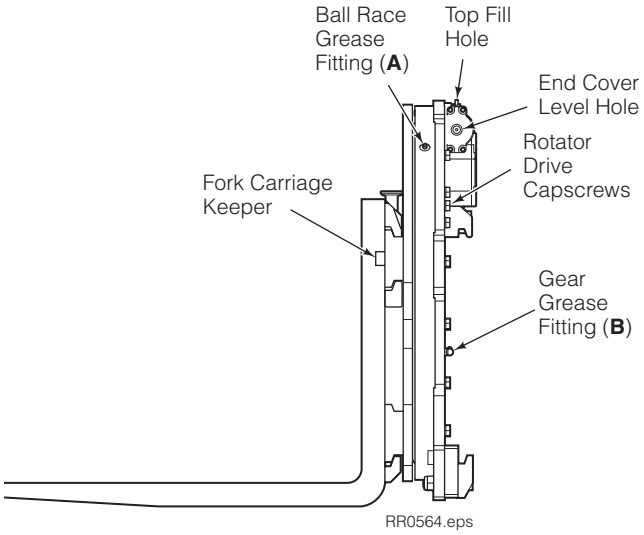
  CL II/III – 120 ft.-lbs. (165 Nm)
  CL IV – 235 ft.-lbs. (320 Nm).
- Tighten rotator drive capscrews to a torque of:

  30G–40G – 24 ft.-lbs. (32 Nm)
  45G–160G – 75 ft.-lbs. (105 Nm)
- Lubricate rotation bearing assembly ball race (**A**), and gear (**B**) with EP-2 grease (Whitmore 'Omnitask' or equivalent). Rotate in 90 degree increments and grease in each position.
- Check rotator drive gearcase lubricant level.

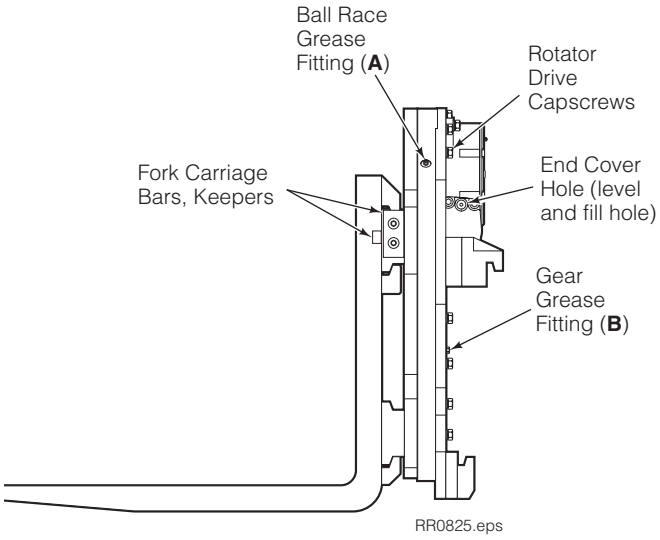
  30G–40G (Initial 1000 Hours only) – Lubricant should be filled up to the end cover level hole. Add lubricant through the top fill hole.

  45G–160G – Lubricant should be filled up to the end cover hole. Add lubricant through the end cover hole.

  If necessary, fill with Cascade Rotator Drive Lubricant, Part No. 656300, or SAE 90 wt. gear lube (AGMA 'mild' 6 EP Gear Oil). Replace plug.



30G-40G
Left Side



45G-160G
Left Side

2000-Hour Maintenance

After each 2000 hours of truck operation, in addition to daily inspections and 1000-hour maintenance, perform the following procedures:

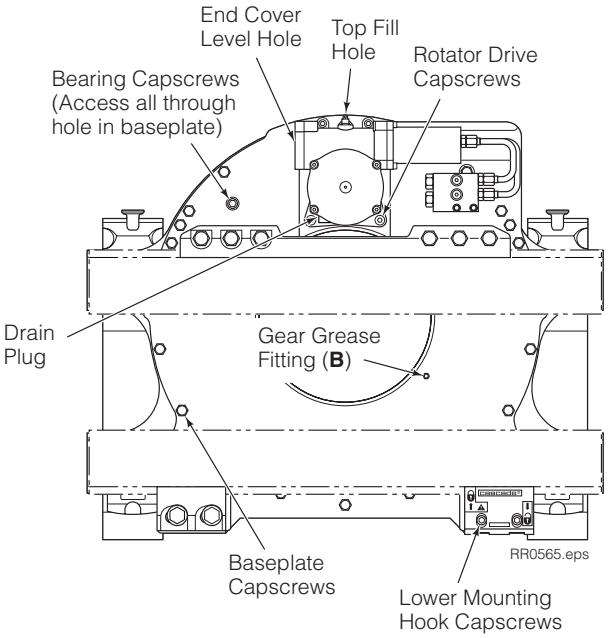
- Change rotator drive gearcase lubricant. Drain oil out the bottom case hole. Refer to Service Manual 6089468 for service. Fill through top fill hole up to the end cover level hole. Use Cascade Rotator Drive Lubricant, Part No. 656300, or SAE 90 wt. gear lube (AGMA 'mild' 6 EP Gear Oil). Replace plug.
- Check all rotation bearing capscrews for proper torque value. See Technical Bulletin TB183 or Service Manual 6089468 (30G–40G) or Service Manual 6073955 (45G–160G) for checking and replacement procedures.
- 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 B56.1-2005.

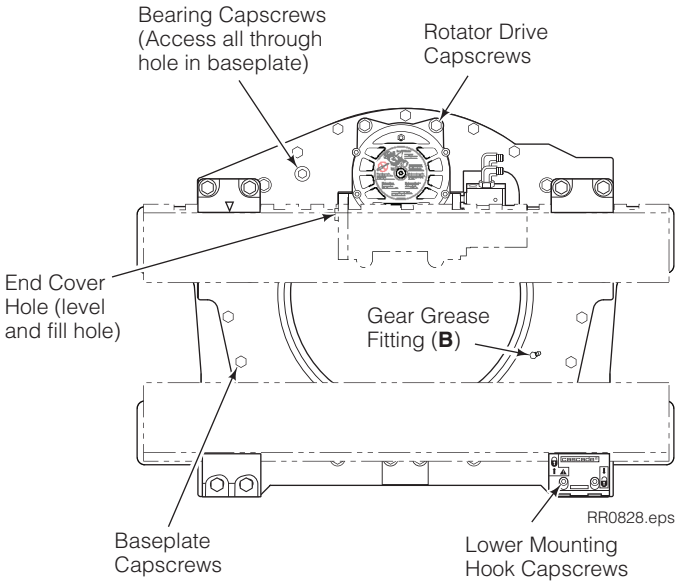
  Inspect for the following defects:

  – 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

  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).



30G-40G
Back (Driver's) View



45G-160G
Back (Driver's) View

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Do you have questions you need answered right now? Call your nearest Cascade Service Department.
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