INSTALLATION INSTRUCTIONS
and PERIODIC MAINTENANCE

D-Series

25D through 100D Non-Sideshifting & Sideshifting Clamps, 40D Turnafork™

Manual Number 668987-R7

cascade® corporation

CONTENTS

This manual provides instructions for installing a Cascade D-Series Non-Sideshifting Clamp, Sideshifting Clamp and Turnafork™. Follow the suggested installation procedures for best results. If you have any questions or need more information, contact you nearest Cascade Service Department for assistance. Refer to the back cover.

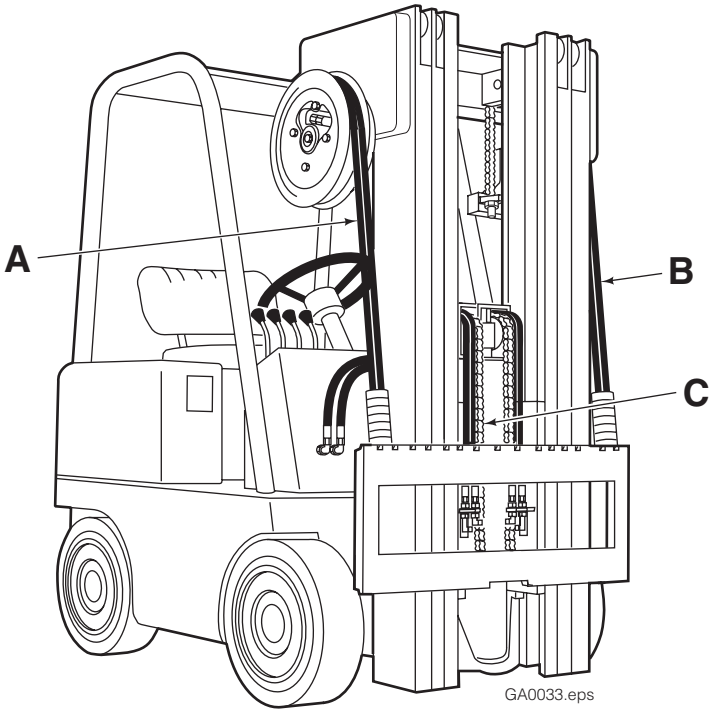
Read the **WARNING** Statements placed throughout this manual to emphasize safety during attachment installation.

IMPORTANT: Field alterations may impair performance or capability can could result in loss of warranty. Consult Cascade for any required modifications.

RECOMMENDED HYDRAULIC SUPPLY

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

- All hoses and fittings for CLAMP function should be at least No. 8, minimum internal diameter of 13/32 in. (10 mm).
- All hoses and fittings for SIDESHIFT function should be at least No. 6, minimum internal diameter of 9/32 in. (7 mm).



Non-Sideshifting

A or B
RH or LH THINLINE™ 2-port hose reel group

OR

C Mast single internal hose reeving group

Sideshifting

A or B
RH or LH THINLINE™ 2-port hose reel group

OR

C Mast double internal hose reeving group

Sideshifting with Solenoid

A 6-N-1 cable/hose reel group

OR

A and C
Cable reel and single internal hose reeving group

TRUCK REQUIREMENTS

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.

Truck Relief Setting

2000 psi (140 bar) Recommended
2300 psi (160 bar) Maximum

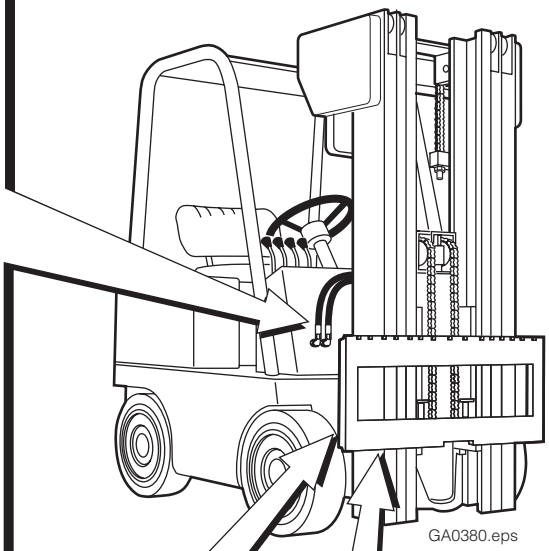
Truck Flow Volume ①

	Min. ②	Recommended	Max. ③
25D	4 GPM (15 L/min.)	5.5 GPM (21 L/min.)	5.5 GPM (21 L/min.)
35D	4 GPM (15 L/min.)	7 GPM (26 L/min.)	7 GPM (26 L/min.)
40D, 50D	4 GPM (15 L/min.)	10 GPM (38 L/min.)	10 GPM (38 L/min.)
70D, 80D, 100D	7 GPM (26 L/min)	12 GPM (45 L/min.)	15 GPM (57 L/min.)

① Cascade D-Series Clamps 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 unequal arm movement.

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



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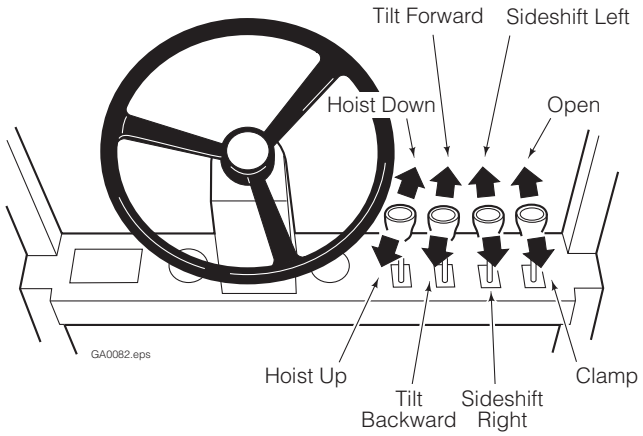
Carriage Mount Dimension (A) ITA (ISO)

	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. Make sure the bars are parallel and that ends are flush. Repair any damaged notches.

Auxiliary Valve Functions

Check for compliance with ITA (ISO) Standards



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INSTALLATION

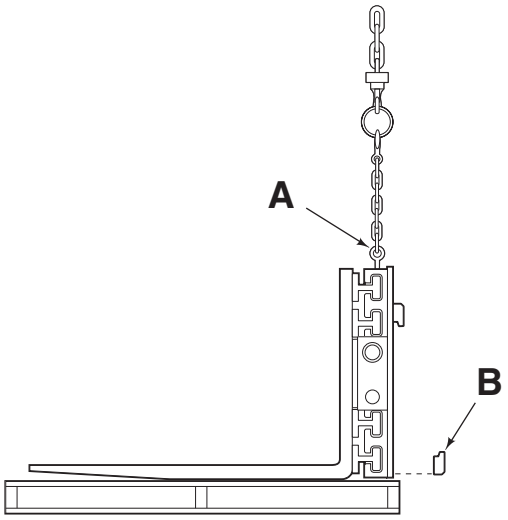
Follow the steps shown to install the attachment on the truck. Read and understand **WARNING** and **CAUTION** statements. If you don't understand a procedure, ask your supervisor or call the nearest Cascade Service Department of assistance.

1 Attach overhead hoist

A Remove banding, use multiple chains to stabilize the attachment while lifting. Set the attachment upright on the pallet.

B If equipped, remove bolt-on lower mounting hooks.

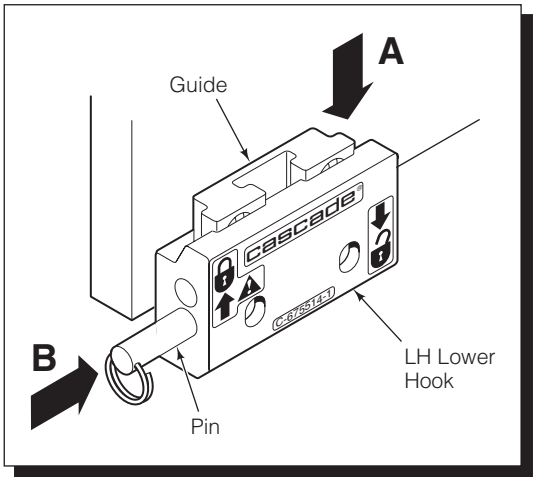
WARNING: Check the attachment weight (located on the nameplate) to make sure the overhead hoist and chains or straps are at least the rated capacity of the attachment.



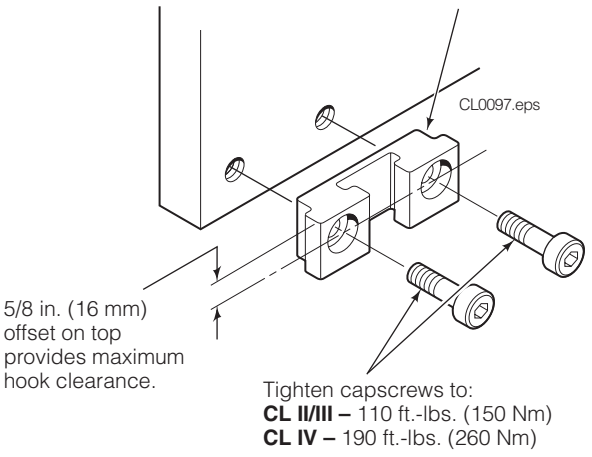
2 Unlock quick-change lower mounting hooks

A Remove pin and drop hooks into unlocked position.

B Re-installed pin in lower hole.



NOTE: Guides can be reversed to change hook-to-carriage clearance. Refer to lower hook installation, Step 6.



Tighten capscrews to:
CL II/III – 110 ft.-lbs. (150 Nm)
CL IV – 190 ft.-lbs. (260 Nm)

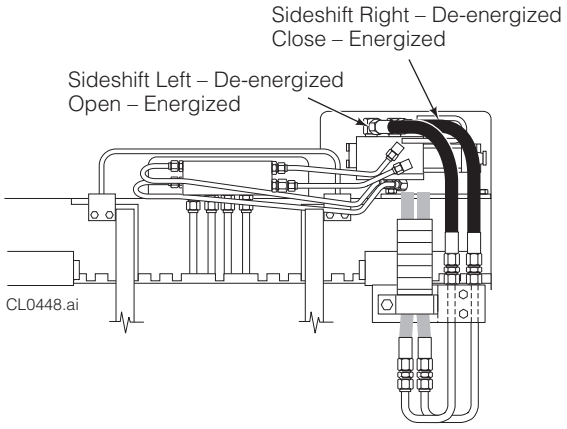
3 Prepare hoses

CAUTION: Connect the hydraulic hoses to the attachment using Cascade Attachment Installation Kit No. 659245 for non-sideshifting clamps and clamps with solenoid adaption, Kit No. 659249 for sideshifting clamps **OR** use hoses and fittings as shown.

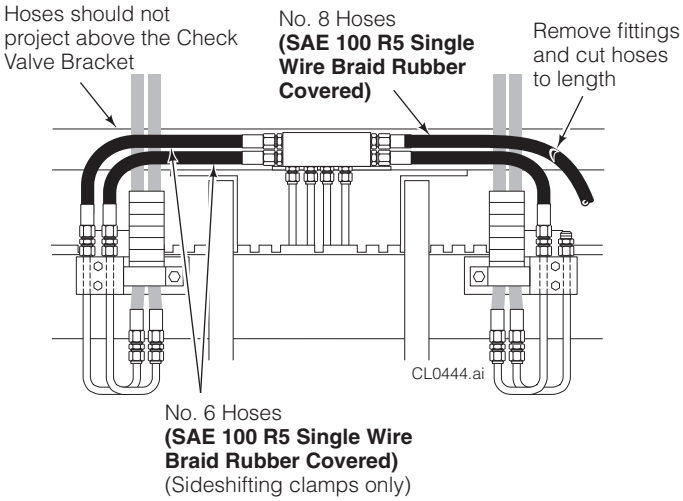
A Position the truck carriage behind the attachment to determine hose lengths required for hydraulic supply configuration.

B Cut hoses to length and install end fittings or use hose kits supplied.

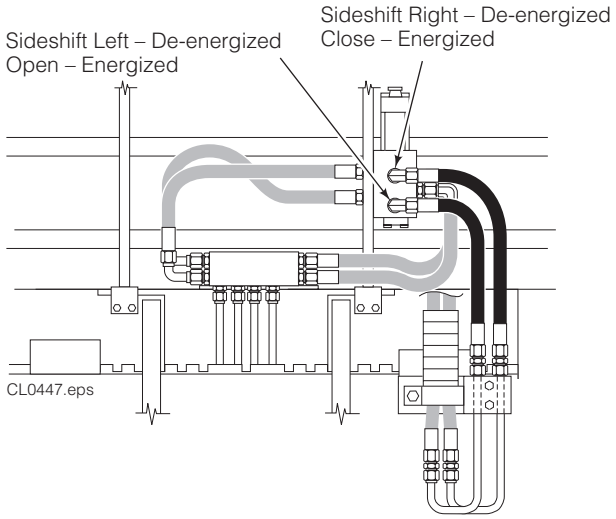
> **WARNING**: Do not remove the fitting from the valve Clamp (CL) port. For No. 6 hose connection, use a 6-8 reducer.



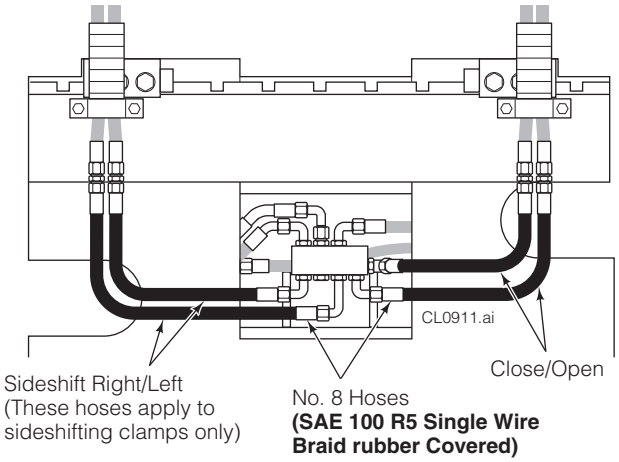
25D, 35D, 40D, 50D
Solenoid Adaption without Backrest



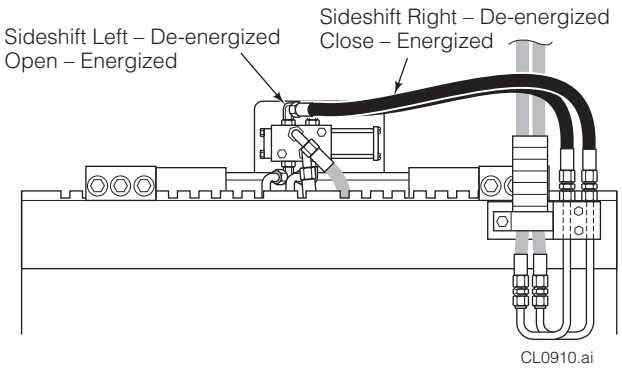
25D, 35D, 40D, 50D



25D, 35D, 40D, 50D
Solenoid Adaption with Backrest



70D, 80D, 100D



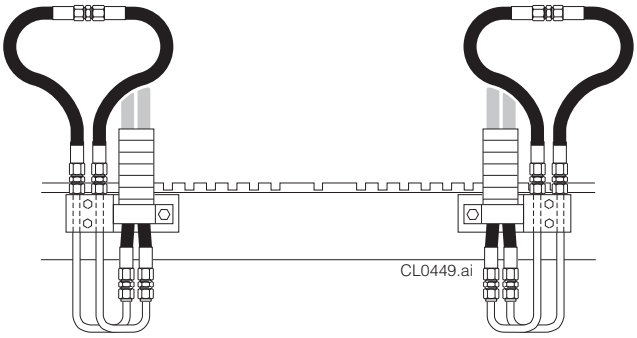
25D, 35D, 40D, 50D
Solenoid Adaption

4 Flush hydraulic supply hoses

A Install hoses using union fittings.

B Operate valves for 30 seconds.

C Remove union fittings.



5 Mount Clamp on truck carriage

A Center truck behind attachment.

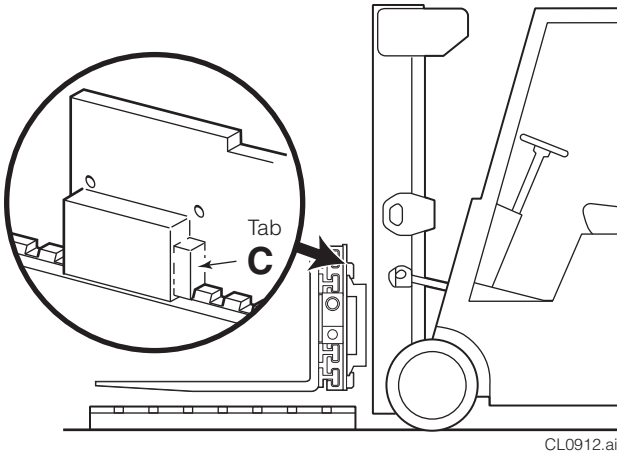
B Tilt forward and raise carriage into position.

C Engage the mounting hook tab with the closest upper carriage bar notch and raise the truck carriage into position behind the attachment.

D Lift attachment off the pallet.

NOTE: The attachment may not be perfectly centered on the carriage bar when the mounting hook tab is engaged in the closest carriage notch. This is normal.

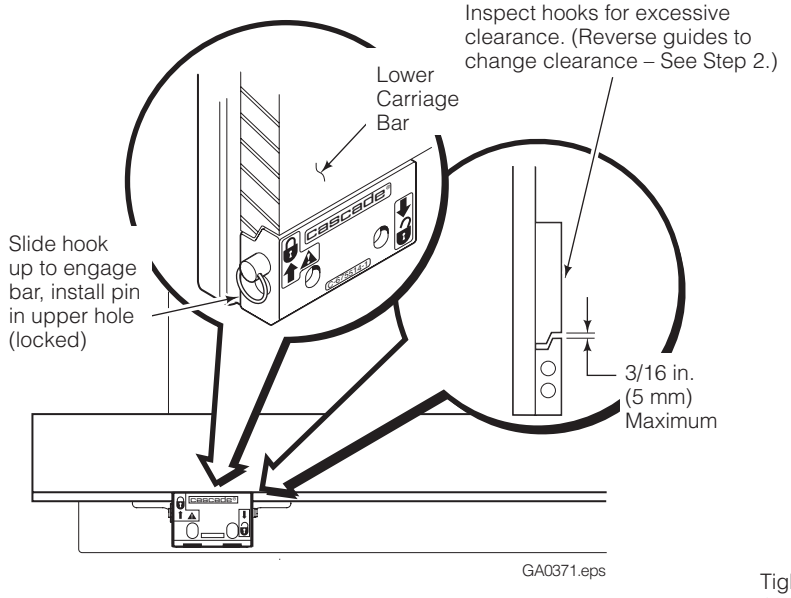
NOTE: The lower hooks cannot be properly installed if the upper hook tab is not engaged in the carriage notch.



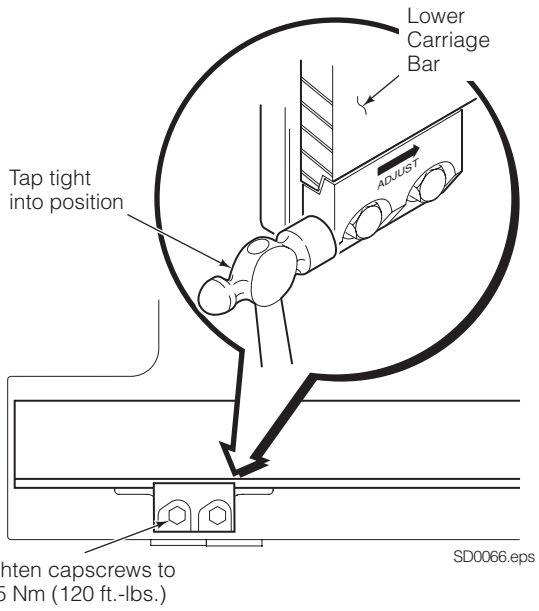
WARNING: The mounting hooks must properly engaged with the upper carriage bar. The tab on the left mounting hook must be engaged in a mating notch on the upper carriage bar.

6 Install and engage lower hooks

QUICK-CHANGE TYPE

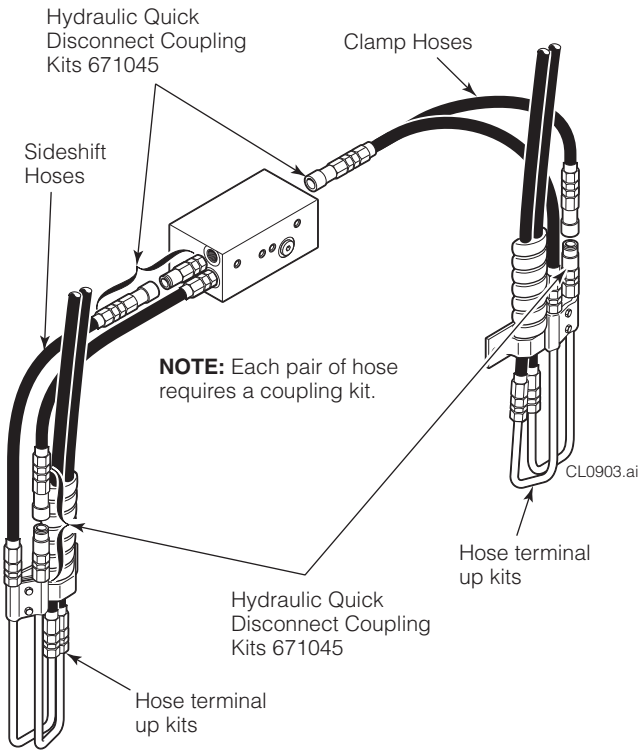


BOLT-ON TYPE



7 If equipped, install hydraulic quick disconnect coupling kits (part no. 671045)

NOTE: Use one kit for non-sideshifting clamps and two kits for sideshifting clamps. Refer to Installation Instructions 671422 for complete installation procedures.



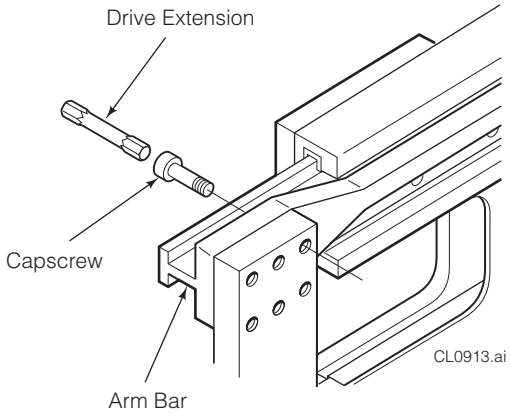
8 Tighten fork or arm capscrews

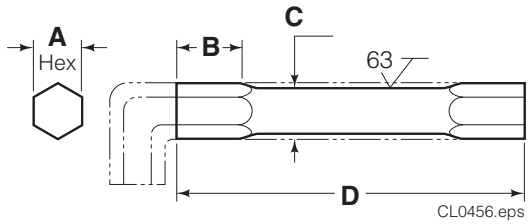
Use drive extension tool 668020 (25D), 667699 (35D, 40D, 50D) or 676218 (70D, 80D, 100D) to tighten capscrews to the following torque values:

25D – 190–220 ft.-lbs. (257–298 Nm)
35D,40D,50D – 280–320 ft.-lbs. (380-434 Nm)
70D, 80D, 100D – 680–720 ft.-lbs. (922–976 Nm)

IMPORTANT: Be careful not to damage the arm bar. Premature bearing failure will occur.

Short adapters are commercially available: Williams 1/2 in. drive to 5/8 in. hex (25D) and 1/2 in. drive to 5/8 in. hex (35D, 40D, 50D) and 3/4 in. drive to 3/4 in. hex (70D, 80D, 100D). Drive extension dimensions are provided to make the tool from an allen wrench. Do not use mild steel hex stock.





Dimensions – in. (mm)

Model	A	B	C	D
25D	.50 (12.7)	.75 (19.0)	.46 (11.6)	3.50 (88.0)
35D 40D 50D	.62 (15.7)	.50 (12.7)	.58 (14.7)	3.50 (88.0)
70D 80D 100D	.75 (19.0)	.50 (12.7)	.75 (19.0)	5.00 (127)

CUSTOM ARM INSTALLATION

Attachments without arms are supplied with two arm bases. Special forks can be welded directly to them or they can be used as a base to fabricate custom built arms.

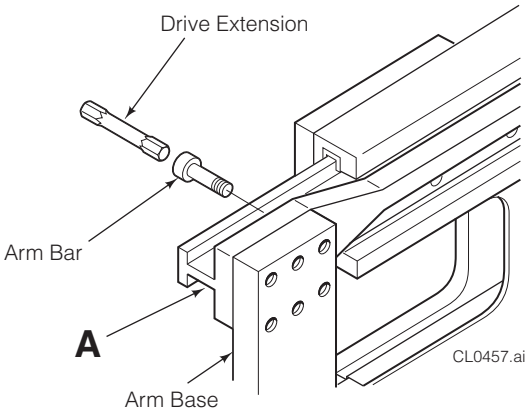
WARNING: Cascade requires that a qualified or certified welder experienced in this type of fabrication be used for best quality.

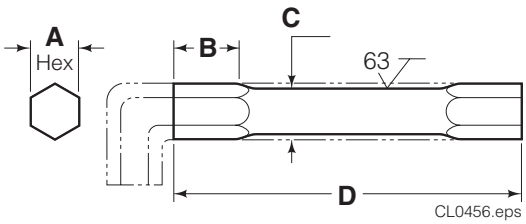
CAUTION: Weld fabricated arms to the arm bases only. Do not else or bolt special built arms or forks directly to the arm bars.

The arm base material is AISI C-1020 HR with the following specifications:

- TENSILE STRENGTH – 420 mPa (61,000 PSI) Minimum
- YIELD STRENGTH – 300 mPa (43,000 PSI) Minimum
- CARBON CONTENT – 23% Maximum

CAUTION: The surface flatness of the arm base must remain within .25 mm (0.10 in.) in capscrew area and arm must slide manually.





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25D	.50 (12.7)	.75 (19.0)	.46 (11.6)	3.50 (88.0)
35D 40D 50D	.62 (15.7)	.50 (12.7)	.58 (14.7)	3.50 (88.0)
70D 80D 100D	.75 (19.0)	.50 (12.7)	.75 (19.0)	5.00 (127)

A Fasten the arm bases to the arm bars. Tighten the capscrews to the torque values indicated below with a drive extension tool, 668020 (25D), 667699 (35D, 40D, 50D) or 676218 (70D, 80D, 100D) to tighten capscrews to the following torque values:

25D – 190–220 ft.-lbs. (257–298 Nm)
35D,40D,50D – 280–320 ft.-lbs. (380-434 Nm)
70D, 80D, 100D – 680–720 ft.-lbs. (922–976 Nm)

IMPORTANT: Be careful not to damage the arm bar. Premature bearing failure will occur.

Short adapters care commercially available: Williams 1/2 in. drive to 5/8 in. hex (25D) and 1/2 in. drive to 5/8 in. hex (35D, 40D, 50D) and 3/4 in. drive to 3/4 in. hex (70D, 80D, 100D). Drive extension dimensions are provided to make the tool from an allen wrench. Do not use mild steel hex stock.

B Lubricate the cylinder rod threads, nut threads and spherical portion of the nut with wheel bearing grease.

C Install the hex washer on the rod end with the beveled side facing the lug.

D Engage the rod end into the lug.

E Tighten the rod end nut to the following torque values:

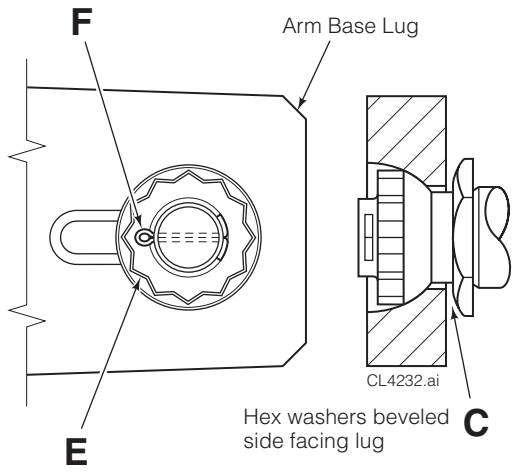
25D, 25D, 40D, 50D – 150–175 ft.-lbs. (203–237 Nm)
70D, 80D, 100D – 225–250 ft.-lbs. (305–340 Nm)

Prevent rod turning by using wrench on hex washer.

NOTE: The rod nut is being tightened against the hex washer. The nut will not be tight against the arm base lug. This looseness allows for cylinder alignment during clamping.

F Install the locking cap and cotter pin.

G Lubricate the bearing portion of the arm bars with a thin film of chassis grease, if permitted by your application.



A Check the cylinder anchor nuts for properly installed locking caps and cotter pins.

B Check for external leaks at the fittings and rod ends.

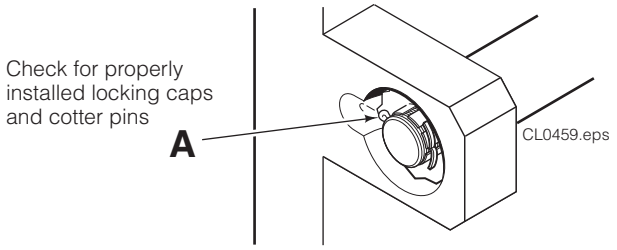
25D, 35D, 40D, 50D – The clamp utilizes a regenerative hydraulic circuit in the arm opening mode. The arms will open at a faster speed than when closing. This is normal. If required, the regenerative function can be eliminated. Refer to Service Manual 669224.

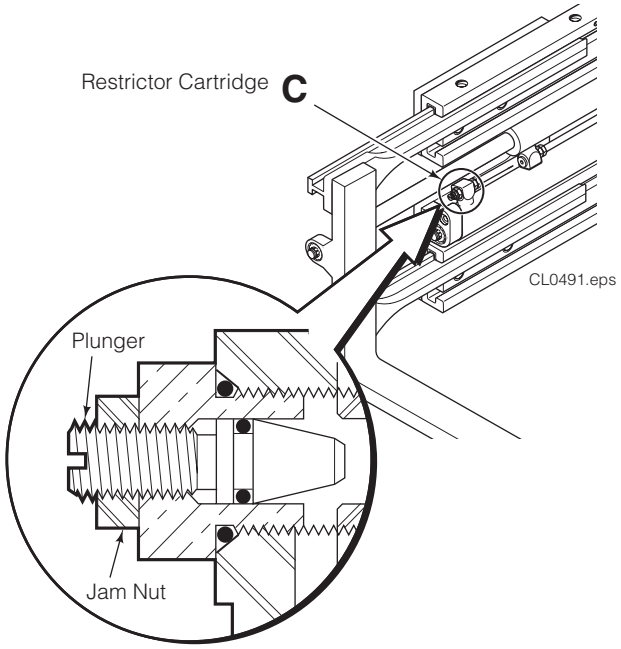
C Check for equal arm travel. If arm travel is unequal, the restrictor cartridges should be adjusted as follows:

- **a.** Loosen the jam nuts on the restrictor cartridges. Screw in the plungers until they bottom. Screw each plunger out three full turns.
- **b.** Activate the arms to the fully open position.
- **c.** Activate the arms to close until one arm bottoms out. Measure the amount of stroke remaining in the opposite arm.
- **d.** If unequal closing movement exceeds 2 in. (50 mm), screw the plunger in 1/2 turn on the cylinder that bottoms first.
- **e.** Repeat step **a** through **d** until unequal closing movement is less than 2 in. (50 mm).

D Before picking up a load, cycle each clamp function through several full cycles. Check for operation in accordance with ITA (ISO) standards.

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





100-Hour Maintenance

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

- Inspect the cylinder anchor joint for lubrication and correct hold.

  NOTE: Anchor joint operates with a loose clearance. Lubricate with wheel bearing grease.

- Arm bearing life can be extended by a light application of chassis grease, if permitted by your application.
- Tighten arm capscrews to the following torque value:

  25D – 190–220 ft.-lbs. (257–298 Nm)
  35D, 40D, 50D – 280–320 ft.-lbs. (380-434 Nm)
  70D, 80D, 100D – 680–720 ft.-lbs. (922–976 Nm)

500-Hour Maintenance

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

- Check the lower mounting hook engagement clearance with the truck carriage bar:

  Quick-Change Hooks – 3/32 in. (2.5 mm) minimum
  3/16 in. (5 mm) maximum

  Bolt-On Hooks – Tight against lower carriage bar

  If adjustment is necessary, refer to Installation Step 6. Tighten the lower hook capscrews as follows:

  Class II/III Mounting – 110 ft.-lbs. (150 Nm)
  Class IV Mounting – 190 ft.-lbs. (260 Nm)

- **70D, 80D, 100D –** Tighten the upper hook capscrews to 210 ft.-lbs. (285 Nm).
- Check clamp force. Cascade Clamp Force Indicators 200645, 680075, 830141 are available for this test.

1000-Hour Maintenance

After each 2000 hours to lift truck operation, in addition to the 100-hour and 500-hour maintenance procedures, perform the following procedures.

- Inspect the arm bearings for wear. If any bearing is worn to less than .040 in. (1 mm) thickness, replace all bearings. Refer to Service Manual 669224, Section 5.2-5.

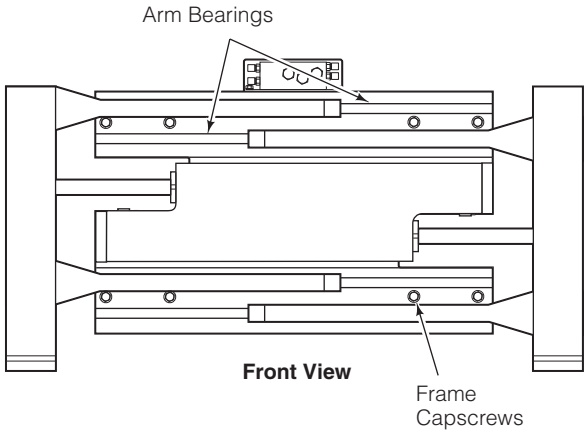
2000-Hour Maintenance

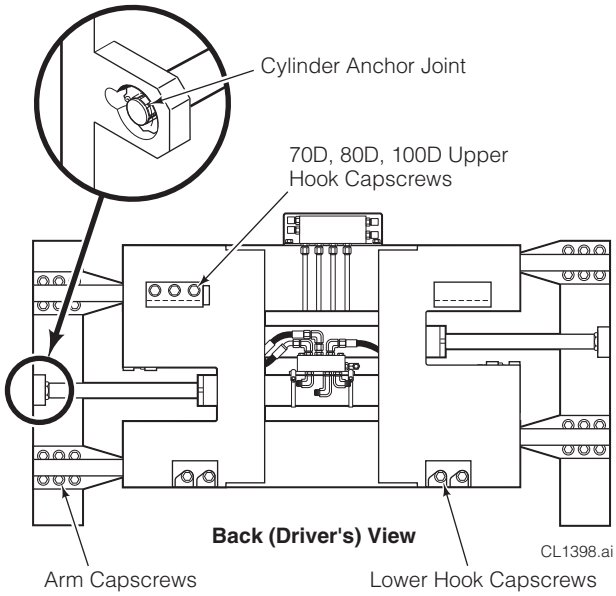
After each 2000 hours to lift truck operation, in addition to the 100-hour, 500-hour and 1000-hour maintenance procedures, perform the following procedures.

- Inspect the arm bearings for wear. If any bearing is worn to less than .040 in. (1 mm) thickness, replace all bearings. Refer to Service Manual 669224, Section 5.2-5.
- Tighten the frame-to-mounting plate capscrews as follows:

  25D, 35D – 60 ft.-lbs. (85 Nm)
  40D, 50D – 110 ft.-lbs. (150 Nm)
  70D, 80D, 100D – 190 ft.-lbs. (260 Nm)

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





Do you have questions you need answered right now?
Call your nearest Cascade Service Department.
Visit us online at www.cascorp.com

AMERICAS

Cascade Corporation
U.S. Headquarters
2201 NE 201st
Fairview, OR 97024-9718
Tel: 800-CASCADE (227-2233)
Fax: 888-329-8207

Cascade Canada Inc.
5570 Timberlea Blvd.
Mississauga, Ontario
Canada L4W-4M6
Tel: 905-629-7777
Fax: 905-629-7785

Cascade do Brasil
Rua João Guerra, 134
Macuco, Santos - SP
Brasil 11015-130
Tel: 55-13-2105-8800
Fax: 55-13-2105-8899

EUROPE-AFRICA

Cascade Italia S.R.L.
European Headquarters
Via Dell'Artigianato 1
37050 Vago di Lavagno (VR)
Italy
Tel: 39-045-8989111
Fax: 39-045-8989160

Cascade (Africa) Pty. Ltd.
PO Box 625, Isando 1600
60A Steel Road
Sparton, Kempton Park
South Africa
Tel: 27-11-975-9240
Fax: 27-11-394-1147

ASIA-PACIFIC

Cascade Japan Ltd.
2-23, 2-Chome,
Kukuchi Nishimachi
Amagasaki, Hyogo
Japan, 661-0978
Tel: 81-6-6420-9771
Fax: 81-6-6420-9777

Cascade Korea
121B 9L Namdong Ind.
Complex, 691-8 Gojan-Dong
Namdong-Ku
Inchon, Korea
Tel: +82-32-821-2051
Fax: +82-32-821-2055

Cascade-Xiamen
No. 668 Yangguang Rd.
Xinyang Industrial Zone
Haicang, Xiamen City
Fujian Province
P.R. China 361026
Tel: 86-592-651-2500
Fax: 86-592-651-2571

Cascade India Material Handling Private Limited
No 34, Global Trade Centre
1/1 Rambaugh Colony
Lal Bahadur Shastri Road,
Navi Peth, Pune 411 030
(Maharashtra) India
Phone: +91 020 2432 5490
Fax: +91 020 2433 0881

Cascade Australia Pty. Ltd.
1445 Ipswich Road
Rocklea, QLD 4107
Australia
Tel: 1-800-227-223
Fax: +61 7 3373-7333

Cascade New Zealand
15 Ra Ora Drive
East Tamaki, Auckland
New Zealand
Tel: +64-9-273-9136
Fax: +64-9-273-9137

Sunstream Industries Pte. Ltd.
18 Tuas South Street 5
Singapore 637796
Tel: +65-6795-7555
Fax: +65-6863-1368

02-2011 Part Number 668987-R7