E-Series

Push/Pull & Load Push
(Includes Mark 55 Push/Pull)
This manual provides instructions for installing the Cascade Push/Pull and Load Push attachment. Follow the suggested installation procedures for best results. If you have any questions or need more information, contact Cascade Service Department. Refer to back cover.

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

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

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**RECOMMENDED HYDRAULIC SUPPLY OPTIONS**

The E-Series Push/Pull and Load Push will require one of the hydraulic supply arrangements listed, depending on the number of functions, and if solenoid adaption is required.

- Hoses and fittings for all functions should be No. 6 with a minimum internal diameter of 9/32 in. (7 mm).

Refer to Cascade Hose & Cable Reel Selection Guide (Part No. 212199) to select the correct hose reel for the mast and truck.

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**Single Function:**
(Push/Pull or Load Push)

A RH THINLINE™ 2-Port Hose Reel Group

OR

B Mast Single Internal Hose Reieving Group

**Double Function without Solenoid:**
(Sideshift, Push/Pull)

A and C
RH and LH THINLINE™ 2-Port Hose Reel Groups

OR

A and B
RH THINLINE™ 2-Port Hose Reel Group and Mast Single Internal Hose Reieving Group

OR

A RH THINLINE™ 4-Port Hose Reel Group

**Double Function with Solenoid:**

A RH 6-N-1 Cable Hose Reel Group

OR

A and B
RH Cable Reel Group and Mast Single Internal Reieving.

**Triple or Four Function with Solenoid:**
(with Hydraulically Adjustable Platens)

A RH 6-N-1 Cable Hose Reel Group.

(with Sheet-Sav™ or with both)

A and B
RH 6-N-1 Cable Hose Reel Group and Mast Internal Reieving.
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**

<table>
<thead>
<tr>
<th></th>
<th>Min.</th>
<th>Recommended</th>
<th>Max.</th>
</tr>
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<tbody>
<tr>
<td>35E, 45E</td>
<td>4 GPM</td>
<td>7 GPM</td>
<td>10 GPM</td>
</tr>
<tr>
<td></td>
<td>(16 L/min.)</td>
<td>(26 L/min.)</td>
<td>(38 L/min.)</td>
</tr>
</tbody>
</table>

1. Cascade E-Series Push/Pull and Load Push 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 mechanism speed.
3. Flow greater than maximum can result in excessive heating, reduced system performance and short hydraulic system life.

**Carriage Mount Dimension (A) ITA (ISO)**

<table>
<thead>
<tr>
<th>Class</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>14.94 in. (380.0 mm)</td>
<td>15.00 in. (381.0 mm)</td>
</tr>
<tr>
<td>III</td>
<td>18.68 in. (474.5 mm)</td>
<td>18.74 in. (476.0 mm)</td>
</tr>
</tbody>
</table>

**Carriage** — Clean and inspect carriage bars. Make sure that bars are parallel and that end are flush. Grind smooth any protruding welds that may affect sideshift lower bearings. Repair any damaged notches.

**Auxiliary Valve Functions**

Check for compliance with ITA (ISO) standards:
- Tilt Forward
- Tilt Back
- Hoist Up
- Hoist Down
- Sideshift Left
- Sideshift Right
- Platens Out
- Platens In
- Push/Extend OR Sheet-Sav™ Release
- Push/Extend OR Sheet-Sav™ Engage
Follow the steps shown to install the Push/Pull and Load Push on the truck. Read all WARNINGS and CAUTIONS carefully. If you don’t understand a procedure, ask your supervisor, or call the nearest Cascade Service Department for assistance.

1 Remove banding and bolt-on lower hooks
   A Remove banding
   B Remove bolt-on lower hooks (if equipped).

2 Unlock Quick-Change lower mounting hooks
   A Remove pin and drop hooks into unlocked position
   B Reinstall pin in lower hole (unlocked)

NOTE: Guides can be reversed to reduce hook-to-carriage clearance (See Step 4).

Tighten capscrews to: 120 ft.-lbs. (165 Nm)
3 **Mount Attachment on truck carriage**
   A Center truck behind attachment.
   B Tilt forward and raise carriage into position.
   C Engage top mounting hook with carriage. Make sure center locator tab engages center notch on top carriage bar.
   D Lift attachment 2 in. (5 cm) off pallet.

**QUICK-CHANGE TYPE**

- ITA Class II – 0.60–0.66 in. (15–17 mm)
- ITA Class III – 0.72–0.78 in. (18–20 mm)

**BOLT-ON TYPE**

- ITA Class II – 0.32–0.36 in. (8–9 mm)
- ITA Class III – 0.39–0.43 in. (10–11 mm)

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4 **Install and engage lower hooks**

**QUICK-CHANGE TYPE**

- Inspect hooks for excessive clearance. (Reverse guides to reduce clearance – see Step 2.)
- Tap into position, add clearance if sideshifting: 3/32 in. (2.5 mm) min. 3/16 in. (5 mm) max.

**BOLT-ON TYPE**

- Tighten capscrews to: 120 ft.-lbs. (165 Nm)
5 Prepare hoses
A Determine hose lengths required for hydraulic supply configuration of truck.
B Cut hoses to length, install end fittings or quick-disconnect kits.

CAUTION: Allow 4 in. (10 cm) extra hose length in each direction for sideshifting movement between Attachment and truck carriage.

**SINGLE or TWO-FUNCTION WITHOUT SOLENOID ADAPTATION**

**NON-SIDESHIFTING**
- RH THINLINE™ 2-Port Hose Reel Group
- Mast Single Internal Reeving

**SIDESHIFTING**
- RH THINLINE™ 2-Port Hose Reel Group
- LH THINLINE™ 2-Port Hose Reel Group
- Mast Single Internal Reeving

**SIDESHIFTING**
- RH THINLINE™ 4-Port Hose Reel Group

**TWO-FUNCTION WITH SOLENOID ADAPTATION**

**SIDESHIFTING**
- RH 6-N-1 Cable/Hose Reel Group

**NON-SIDESHIFTING**
- RH Cable Reel Group
- Mast Single Internal Reeving

Prepare hoses

- A Determine hose lengths required for hydraulic supply configuration of truck.
- B Cut hoses to length, install end fittings or quick-disconnect kits.

**CAUTION:** Allow 4 in. (10 cm) extra hose length in each direction for sideshifting movement between Attachment and truck carriage.

**SINGLE or TWO-FUNCTION WITHOUT SOLENOID ADAPTATION**

**NON-SIDESHIFTING**
- RH THINLINE™ 2-Port Hose Reel Group
- Mast Single Internal Reeving

**SIDESHIFTING**
- RH THINLINE™ 2-Port Hose Reel Group
- LH THINLINE™ 2-Port Hose Reel Group
- Mast Single Internal Reeving

**SIDESHIFTING**
- RH THINLINE™ 4-Port Hose Reel Group

**TWO-FUNCTION WITH SOLENOID ADAPTATION**

**SIDESHIFTING**
- RH 6-N-1 Cable/Hose Reel Group

**NON-SIDESHIFTING**
- RH Cable Reel Group
- Mast Single Internal Reeving

Prepare hoses

- A Determine hose lengths required for hydraulic supply configuration of truck.
- B Cut hoses to length, install end fittings or quick-disconnect kits.

**CAUTION:** Allow 4 in. (10 cm) extra hose length in each direction for sideshifting movement between Attachment and truck carriage.
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THREE-FUNCTION WITH
SOLENOID ADAPTION

SHEETS-SAV™
RH 6-N-1 Cable Hose Reel Group
and
Mast Single Internal Reieving

SIDESHIFT AND
HYDRAULICALLY-ADJUSTABLE PLATENS
LH THINLINE™ 2-Port Hose Reel Group

PUSH/PULL
LH THINLINE™ 2-Port Hose Reel Group
or
Mast Single Internal Reieving
6 Flush hydraulic supply hoses
   A Install hoses as shown.
   B Operate auxiliary valves for 30 sec.
   C Remove hoses.

7 Connect hoses prepared in Step 5 to Attachment fittings

8 Install solenoid control knob (Solenoid-equipped units)
   Button toward driver
   Adapter
   Truck control valve handle
   Snap Ring
   Two Function Cover Plate (1 button)
   Three Function Cover Plate (2 buttons)
9 Install wiring – typical (Solenoid-equipped units)

TWO-FUNCTION (Single-button control knob)

Connection for hydraulically-positioned platens (if equipped)

To Single Pushbutton

IMPORTANT: Diode banded end must connect to positive (+) side of circuit.

User-Supplied Wiring

IMPORTANT: Recommended wire size 18-AWG minimum with 1/4-in. (6 mm) terminals.

7.5-Amp Fuse

Control Knob
Pushbutton (Normally Open)

White
Black

Solenoid Valve

Solenoid Coils

Solenoid Valve for hydraulically-positioned platens (if equipped)

White
Black

Single-Button Control Knob

7.5-Amp Fuse

IMPORTANT: Recommended wire size 18-AWG minimum with 1/4-in. (6 mm) terminals.
THREE-FUNCTION
(Two-button control knob)

IMPORTANT: Recommended wire size 18-AWG minimum with 1/4-in. (6 mm) terminals.

7.5-Amp Fuse
Control Knob Pushbuttons (Normally Open)
Diodes (2)
Solenoid Valves (2)
Solenoid Valve for hydraulically-positioned platens (if equipped)

User-Supplied Wiring
IMPORTANT: Recommended wire size 18-AWG minimum with 1/4-in. (6 mm) terminals.

Two-Button Control Knob

IMPORTANT: Diode banded end must connect to positive (+) side of circuit.

Connection for hydraulically-positioned platens (if equipped).
Cycle Attachment functions
- With no load, cycle all Attachment functions several times.
- Check for operation in accordance with ITA (ISO) standards.
- Push/Pull a maximum load and sideshift left and right. Check for smoothness and adequate speed.
- Check for leaks at fittings, valves and cylinders.

**Solenoid Equipped with Adjustable Platens**
- Sideshift Left
- Faceplate Push/Extend (press knob button 1)
- Platens Out (press knob button 2)
- Sideshift Right
- Faceplate Pull/Retract (press knob button 1)
- Platens In (press knob button 2)

**Push/Pull & Load Push with Sideshift**
- Sideshift Left
- Sideshift Right
- Faceplate Push/Extend
- Faceplate Pull/Retract

**Sequence Valve Equipped Attachments**
- Sideshift Left and Platens Out (after complete sideshift left)
- Sideshift Right and Platens In (after complete sideshift right)
- Faceplate Push
- Faceplate Retract

**Solenoid Equipped with Sheet-Sav™**
- Sideshift Left
- Sideshift Right
- Faceplate Push/Extend
- Sheet-Sav™ Release (press knob button)
- Faceplate Pull/Retract
- Sheet-Sav™ Engage (press knob button)

**Sheet-Sav™**
- Sideshift Left
- Faceplate Push/Extend (press knob button 1)
- Platens Out (press knob button 2)
- Sideshift Right
- Faceplate Pull/Retract (press knob button 1)
- Platens In (press knob button 2)
- Sideshift Left and Platens Out (after complete sideshift left)
- Sideshift Right and Platens In (after complete sideshift right)
- Faceplate Push
- Faceplate Retract

**Auxiliary Valve Functions**
- Hoist down
- Tilt forward
- Hoist up
- Tilt back

**WARNING:** Truck control handle and attachment function activation shown here conforms to ASME/ANSI B56.1 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.

**WARNING:** Make sure all personnel are clear of the attachment during testing.
Adjust platens
A Release platen safety locks.
B Move platens to obtain 4–12 in. (10–30 cm) spacing required between platens.
C Engage platen safety locks.

If required, graphite coating may be removed using an appropriate solvent.

Lubricate sideshift bearings
NOTE: Sideshift Attachment to access grease fittings. Use general-purpose lithium based chassis grease (NLGI grade 2).

Adjust faceplate stop group (if equipped)
A Pull outward on stop block and turn to stop position to be adjusted.
B Adjust capscrew for faceplate position.

Purge air from attachment hydraulic system
A Push/Extend faceplate.
B Continue to hold auxiliary valve control lever open 10 sec. to remove trapped air.
C Repeat for other functions (sideshift, adjustable platens, gripper).
15 Adjust faceplate gripper bar (if required)

**NOTE:** The gripper bar is controlled by sequence valves which are Factory-adjusted to operate as follows:

- **Faceplate Extend** – Gripper bar fully raised/up when faceplate reaches full extension.
- **Faceplate Retract** – Gripper bar fully lowered/down before faceplate retracts.

**PUSH/PULL**

*One Cartridge Valve*

*Three Cartridge Valve*
PUSH/PULL WITH SHEET-SAV™

Turn CW to lower sooner, CCW to lower later

Faceplate retracts
Gripper bar fully down

Turn CW to raise sooner, CCW to raise later

Faceplate fully extended
Gripper bar fully up

PP0332.eps
**PERIODIC MAINTENANCE**

**CAUTION:** For extreme conditions applied to push/pull, refer to TB 297 in place of this periodic maintenance. Failure to follow this schedule may result in push/pull failures and void warranty.

**100-Hour Maintenance**

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

- Check for loose or missing bolts, worn or damaged hoses and hydraulic leaks.

**NOTE:** Nylon protection sleeves are available to prevent hoses from rubbing (Cascade part number 6086044 and 6088062).

- Inspect faceplate and frame sliding bearing blocks for lubrication. Lubricate as necessary with Dubois FGG-2 food industry grease (Cascade Part No. 669306).

**500-Hour Maintenance**

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

- Inspect all mechanism pivot point bushings and pins for excessive wear and replace as necessary. See Service Manual 686455.

- Tighten the mechanism pivot pin retainer capscrews to 10 ft.-lbs. (13 Nm).

- Tighten the gripper assembly capscrews to 120 ft.-lbs. (165 Nm).

- Tighten the platen hook capscrews to 120 ft.-lbs. (165 Nm).

**WARNING:** Platen capscrews must be tightened regularly to prevent equipment damage or personnel injury.

- Check the clearance between the lower mounting hooks and the truck carriage bar:
  
  **Quick-Change Hooks** – 3/16 in. (5 mm) maximum.
  
  **Bolt-on Hooks** – Tight against lower carriage bar if non-sideshifting or 3/16 in. (5 mm) max. if sideshifting.

- If hook adjustment is necessary, refer to Installation Step 2 or 4 in this Manual, or see Service Manual 686455, Section 5. Tighten the lower hook mounting capscrews to 120 ft.-lbs. (165 Nm).

**1000-Hour Maintenance**

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

- Check accumulator pre-charge and adjust to truck relief pressure if required. Use Charging Kit 228235 and refer to Accumulator User Guide 227196 for procedures.
Do you have questions you need answered right now? Call your nearest Cascade Parts Department. Visit us online at www.cascorp.com

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