

Installation, Maintenance and Service Manual FLN and FLS

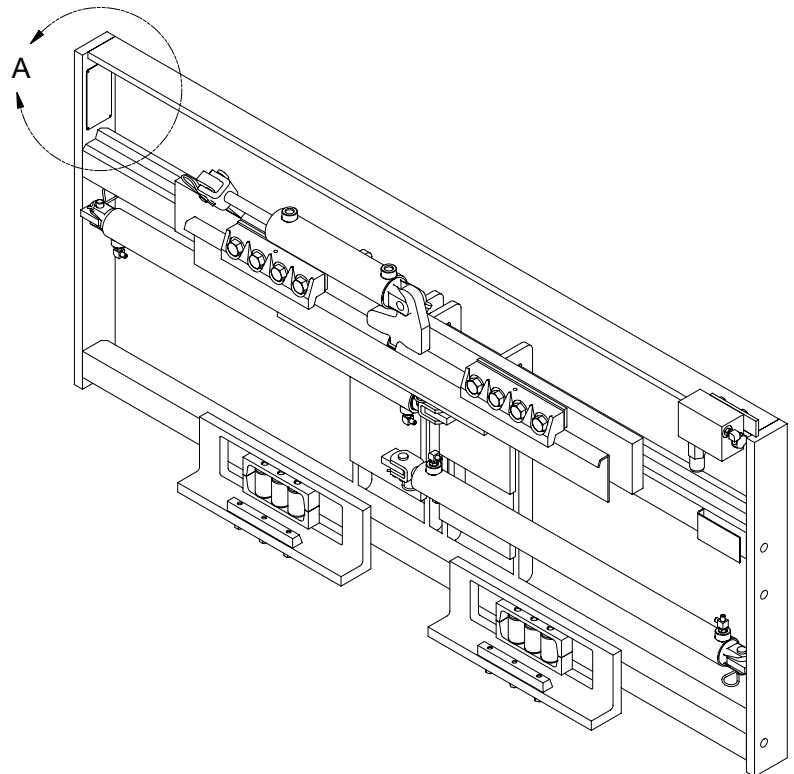
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SECTION 1 NAMEPLATE LOCATION

Notice

When you receive your attachment, locate the Long Reach nameplate (upper left corner on the body). Record the information from the nameplate, along with the date received, at the bottom of this page. If the nameplate is missing, look for the serial number stamped directly into the metal at the nameplate location and consult the factory for details.



Date received:

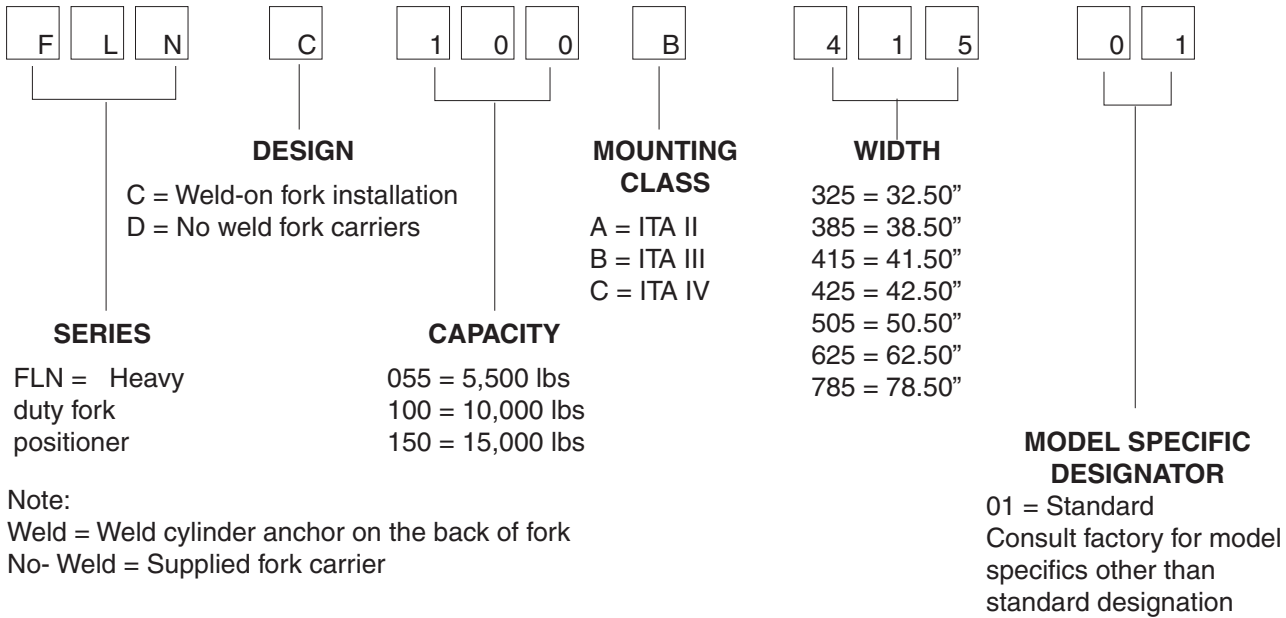
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LONG REACH®	A Division of Allied Systems Company	21433 SW Oregon Street Sherwood OR 97140 USA www.alliedsystems.com	2500005 rF
MODEL NO.:	<input style="width: 100%;" type="text"/>	SERIAL NO.:	<input style="width: 100%;" type="text"/>
CAPACITY AT LOAD CENTER:	<input style="width: 25%;" type="text"/> KG @ <input style="width: 25%;" type="text"/> MM	MASS:	<input style="width: 25%;" type="text"/> KG <input style="width: 25%;" type="text"/> MM
	<input style="width: 25%;" type="text"/> (LBS) @ <input style="width: 25%;" type="text"/> (IN)		<input style="width: 25%;" type="text"/> (LBS) <input style="width: 25%;" type="text"/> (IN)
MAXIMUM HYDRAULIC PRESSURE:	<input style="width: 25%;" type="text"/> BAR	FLOW:	<input style="width: 25%;" type="text"/> L/min
	<input style="width: 25%;" type="text"/> (PSI)	HCG:	<input style="width: 25%;" type="text"/> (GPM)
		VCG:	<input style="width: 25%;" type="text"/> (IN)
		LCG:	<input style="width: 25%;" type="text"/> (IN)
DATE:	<input style="width: 100%;" type="text"/>		SEE TRUCK NAMEPLATE FOR COMBINED TRUCK & ATTACHMENT CAPACITY

SECTION 2 MODEL NUMBER DESCRIPTION

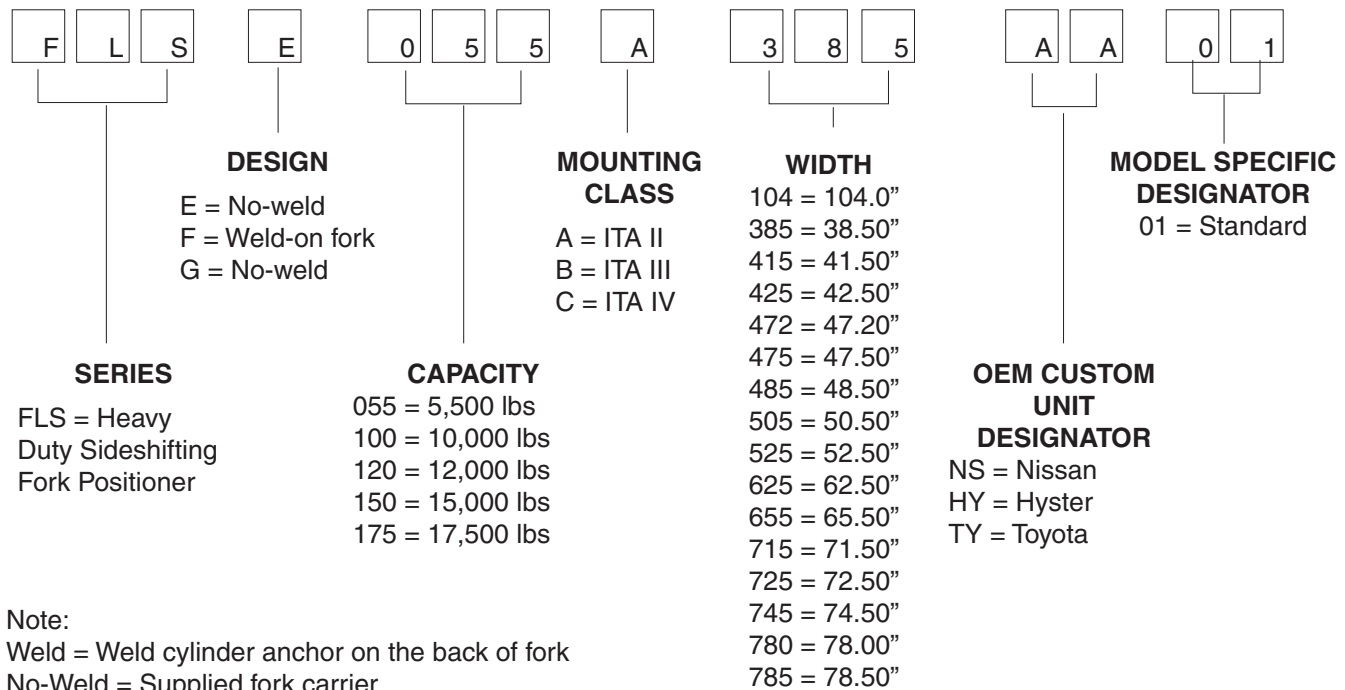
Each clamp is identified by a model number and a serial number located on the name plate attached to the unit prior to shipment. Long Reach's model numbers are designed to describe how an attachment is equipped. The guide below illustrates the information that is represented in an 15-digit model number. Always include model and serial number when ordering parts or requesting service information.

FLN Series Model Number:



Note:
 Weld = Weld cylinder anchor on the back of fork
 No-Weld = Supplied fork carrier

FLS Series Model Number:



Note:
 Weld = Weld cylinder anchor on the back of fork
 No-Weld = Supplied fork carrier

SECTION 3 SAFETY SUMMARY

3.1 Safety Information

Safety is Everyone's Responsibility

Whether you are new on the job or a seasoned veteran, these safety tips may prevent injury to you, to others, or to the materials you are handling. Always be alert, watch out for others, and follow these suggestions:

Attachments handle material, not people.

Safety starts with common sense, good judgement, properly maintained equipment, careful operation, and properly trained operators.

The safety instructions and warnings, as documented in this manual and shipped with the machine, provide the most reliable procedures for the safe operation and maintenance of your Long Reach attachment. It's your responsibility to see that they are carried out.

3.2 Safety Regulations

Know your company's safety rules. Some companies have site-specific directions and procedures. The methods outlined in your operator's manual provide a basis for safe operation of the machine. Because of special conditions, your company's material handling procedures may be somewhat different from those shown in this manual.

3.3 Safety Symbols

The following terms define the various precautions and notices:



Danger

Indicates a hazardous situation which, if not avoided, will result in death or serious injury. Carefully read the message that follows to prevent serious injury or death.



Warning

Indicates a hazardous situation which, if not avoided, could result in death or serious injury. Carefully read the message that follows to prevent serious injury or death.



Caution

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury, or equipment damage or void the machine warranty. Carefully read the message that follows to prevent minor or moderate injury.

Notice

Describes information that is useful but not safety related.



Caution

All possible safety hazards cannot be foreseen so as to be included in this manual. Therefore, the operator must always be alert to possible hazards that could endanger personnel or damage to the equipment.

Obey the following warnings before using your machine to avoid equipment damage, personal injury or death.

3.4 Operation Warnings

- You must be trained to operate this equipment prior to operation. Be extremely careful if you do not normally operate this machine. Reorient yourself to the machine before starting, then proceed slowly.
- Always operate an attachment from the driver's seat.
- Always lower the attachment if you need to leave the lift truck. A lift truck supporting a load requires your full attention.

3.5 Hydraulic Hazards



Danger

Small hydraulic hose leaks are extremely dangerous, and can inject hydraulic oil under the skin, even through gloves. Infection and gangrene are possible when hydraulic oil penetrates the skin. See a doctor immediately to prevent loss of limb or death.

- Wear personal protective equipment, such as gloves and safety glasses, whenever servicing or checking a hydraulic system.
- Assume that all hydraulic hoses and components are pressurized. Relieve all hydraulic pressure before disconnecting any hydraulic line.
- Never try to stop or check for a hydraulic leak with any part of your body; use a piece of cardboard to check for hydraulic leaks.



3.6 Electrical Hazards

Warning

Remain at least 25 feet from high voltage electrical wires. Failure to do so may result in injury or death and will damage equipment.

- All electrical cables and connectors must be in good condition (free of corrosion, damage, etc). Use caution in wet weather to avoid danger from electrical shock. Never attempt electrical testing or repair while standing in water.



- Do not wear electrically conductive jewelry, clothing, or other items while working on the electrical system.

3.7 Maintenance Warnings

Maintenance, lubrication and repair of this machine can be dangerous unless performed properly. You must have the necessary skills and information, proper tools and equipment. Work in a method that is safe, correct, and meets your company's requirements.

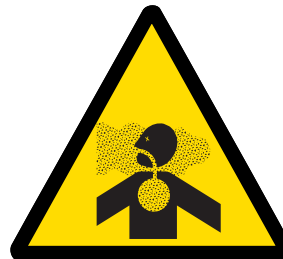
- Do not attempt to make adjustments, or perform maintenance or service unless you are authorized and qualified to do so.

- Include attachments in a scheduled maintenance and inspection program. Tailor inspection steps to the attachment.
- Unless specified in service procedures, never attempt maintenance or lubrication procedures while the machine is moving or the engine is running.
- Always perform all maintenance and lubrication procedures with the machine on level ground, parked away from traffic lanes.

Notice

Local laws and regulations may require that additional safety measures be taken.

- Never rely on the hydraulic system to support any part of the machine during maintenance or lubrication. Never stand under a component that is supported only by the hydraulics. Make sure it is resting on its mechanical stops or appropriate safety stands.
- Use caution when working around hot fluids. Always allow lubricating and hydraulic oils to cool before draining. Burns can be severe.
- Use extreme caution when using compressed air to blow parts dry. The pressure should not exceed 30 psi (208 kPa) at the nozzle. Never use compressed air on yourself. Air pressure penetrating your skin can be fatal.
- Engine exhaust fumes can cause death. If it is necessary to run the engine in an enclosed space, remove the exhaust fumes from the area with an exhaust pipe extension. Use ventilation fans and open shop doors to provide adequate ventilation.



- Before disconnecting hydraulic lines, be sure to lower all loads and relieve all hydraulic pressure. The load could fall on you, or escaping hydraulic oil could cause severe personal injury.
- Prevent personal injury or equipment damage by using a lifting device with a lifting capacity greater than twice the weight of any equipment to be lifted.

3.8 Training

- Make sure all operators are trained in the fork and attachment adaptation, operation, and use limitations. Retrain an operator if a new attachment is added to the forklift. Consult the operator's manual for instructions on how to use the new equipment.
- Know the mechanical limitations of your forklift.
- Modifications or additions that affect capacity or safe operation must have prior written approval from the forklift truck manufacturer. Capacity, operation, and maintenance instruction plates, tags, or decals shall be changed accordingly.
- Never use free rigging for a below-the-forks lift. It could affect the capacity and safe operation of a lift truck.

3.9 Labeling

- Change capacity, operation, and maintenance instruction plates, tags, or decals when a forklift truck is equipped with an attachment. If the truck is equipped with front-end attachments other than factory installed attachments, truck must be marked to identify the attachments and show the approximate weight of the truck and attachment combination at maximum elevation with load laterally centered.

3.10 Pre-start Checks

- Check your equipment before you operate it. If anything looks wrong, unusual or different, report it before using the attachment.
- Do not operate this machine if you know of malfunctions, missing parts, and/or mis-adjustments. These situations can cause or contribute to an accident or damage to the machine. Stop the machine immediately if problems arise after starting.
- Check to make sure the attachment on your truck is the same as on the truck capacity plate.
- Check for hydraulic leaks and cracked hoses or fittings. Check the hydraulic oil level in the lift truck hydraulic reservoir.
- All electrical cables and connectors must be in good condition. Use caution in wet weather to avoid danger from electrical shock.
- Always check the attachment for proper fit and engagement of the truck carriage.

3.11 Personnel Safety

- When removing or installing dismountable attachments always keep hands and feet free from dangerous positions or pinch points. Never leave a dismounted attachment in a dangerous position.

- Keep hands, feet, long hair and clothing away from power-driven parts. Do not wear loose fitting clothing or jewelry while performing maintenance and lubrication in these areas.
- Never jump on or off the machine.
- Never stand on top of material being raised, lowered, or transported. (Figure 3-1)

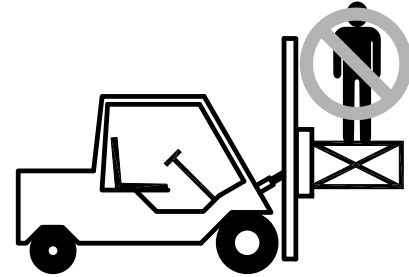


Figure 3-1

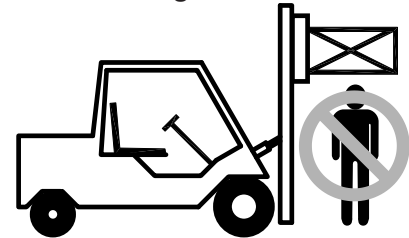


Figure 3-2

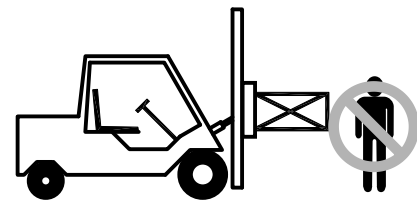


Figure 3-3

- Never use the attachment or its load to support a man-carrying device.
- Never allow anyone under a load or under the carriage. (Figure 3-2)
- Never stand in front of or beside an attachment that is being operated. Never allow another person to approach an attachment that is being operated. (Figure 3-3)
- Never leave an attachment or load in an elevated position.
- Never reach through the mast of the truck. Keep all parts of the body within the driver's compartment.

Warning

The capacity of the truck and attachment combined may be less than the attachment capacity. Consult truck nameplate!

Notice

The dealer and/or the user are responsible for installing any valving required to meet the recommended hydraulic pressures and flow. The required valving can be furnished by the dealer, the truck factory or Long Reach.

3.15 Operator's Controls

Some lift trucks are equipped with a single lever to control both hoist and tilt functions, others have separate levers for each function. Refer to your lift truck manual for more information.

For clarity, the direction of arm movement is shown on the control handle. To move the arms in the direction shown, pull the handle towards the operator. To move the arms in the opposite direction, the push the handle away from the operator. (Figure 3-5)

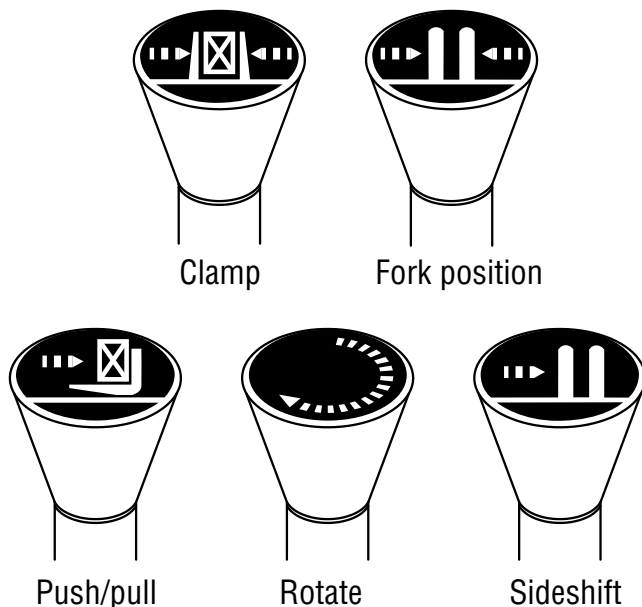


Figure 3-5 Operator controls

Lifting speed is controlled by the speed of the engine and the position of the control lever. Engine speed has no effect on lowering speed.

Before going on the job, shift the truck control levers one way and then the other to determine which direction the attachment moves when the levers are shifted. Make sure the attachment moves smoothly throughout its travel, without binding or pinching hoses.

Warning

If the attachment does NOT operate smoothly, do not take it on the job. Check with your supervisor about needed repairs to avoid injury or equipment damage.

3.16 Industry Standards

ANSI/ITSDF B56.1-2009 is the published sequence and direction standard for lever- and hand-type controls.

Notice

The chart on the following page shows industry standards. Your equipment may be different. If you do not routinely operate this equipment, refresher training is recommended. You must acquaint yourself with this manual and the equipment before starting, and then proceed slowly.

Special controls such as automatic devices should be identified, preferably according to the recommendations in Figure 6.

When a function is controlled by a pair of push buttons, they should operate in the same sense as the lever controls. For example, pushing a button located to the rear (relative to the operator's position) should serve the same function as moving a control lever to the rear.

3.17 Clamp Open Control

Effective October 7, 2010, a new safety standard (ANSI/ITSDF B56.1, Section 7.25.7) for all lift trucks with a load bearing clamp (paper roll clamp, carton clamp, etc.) requires the driver to make two distinct motions before opening or releasing the clamp. For example, you must press a switch and then move a lever to unclamp the load. This requirement applies to new and used attachments being mounted on new trucks shipping from the factory after October 7, 2010, and is a recommended feature to be installed on dealer orders and existing applications.

Function	Direction of motion	
	Load	Operator's hand on control handle, facing the load*
Hoist	Up	Rearward or up
	Down	Forward or down
Reach	Retract	Rearward or up**
	Extend	Forward or down
Tilt	Rearward	Rearward or up**
	Forward	Forward or down
Sideshift	Right	Rearward or up
	Left	Forward or down
Push-pull	Rearward	Rearward or up**
	Forward	Forward or down
Rotate, lateral	Clockwise	Rearward or up
	Counterclockwise	Forward or down
Rotate, longitude	Rearward	Rearward or up
	Forward	Forward or down
Load stabilizer	Down	Rearward or up
	Up	Forward or down
Swing	Right	Rearward or up
	Left	Forward or down
Slope	Clockwise	Rearward or up
	Counterclockwise	Forward or down
Fork position	Together	Rearward or up
	Apart	Forward or down
Trip	Engage	Rearward or up
	Release	Forward or down
Grip	Engage	Rearward or up
	Release	Forward or down
Truck stabilizer	Raise	Rearward or up
	Lower	Forward or down
Clamp	Clamp	Rearward or up
	Release	Forward or down

* For high lift order picker trucks and center control pallet trucks, predominant motion of the operator's hand when actuating the control handle while facing away from the load.

** The sense of rotation of the control handle is intended to be in the same direction as the desired motion of the mast or load.

**Figure 3-6 ANSI/ITSDF
Sequence of location and direction of motion for lever- or hand-type controls**

SECTION 4 INSTALLATION PROCEDURE

Warning

The capacity of the truck and attachment combination may be less than the capacity shown on the attachment alone. Consult truck nameplate!

Notice

it is the responsibility of the dealer and / or the user either to furnish and install the required valving to meet the recommended hydraulic pressures and flow or to arrange installation of the required valving at the truck factory or at Long Reach. recommended hydraulic supplies are as follows:

	Min.	Max.	PSI
Class II	3.2	4.1	2,200 - 3,000
Class III	2.9	6.4	2,200 - 3,000
Class IV	4.0	12.0	2,200 - 3,000

4.1 Truck Requirements

Long Reach attachments have been designed to operate within specific limits. Operating pressures above the stipulated maximum may cause structural damage to the attachment and may result in loss of warranty. Hydraulic flow less than the recommended rates, or the use of small I.D. hoses may reduce operating speed. Higher flow can result in excessive heat buildup, erratic operation and damage to the truck / attachment hydraulic system.

4.2 Carriage

1. The truck carriage must conform to the American National Standard (ANSI) dimensions shown in ANSI/ITSDF B56.11.4-2005, reaffirmed 2000.
2. Make sure the truck carriage is clean, conforms to ANSI recommendations, and the notches are not damaged.

4.3 Hydraulics

1. The truck hydraulic system must supply to the attachment hydraulic oil that meets the specifications required to operate the attachment properly.

2. When the truck hydraulic system pressures (PSI) exceeds specified maximum, a relief valve is recommended in the attachment auxiliary system of the truck or on the attachment.
3. When the truck hydraulic system flow (gpm) exceeds specified maximum, a flow control valve is recommended to ensure optimal performance.
4. Consult the truck factory and / or Long Reach for guidance.

4.4 Attachment Installation

1. Prior to connecting the truck hydraulic system to the attachment, the system must be purged through the filtration system. This will eliminate any contamination that might exist in the auxiliary hydraulic system of the truck.
2. Purging can be accomplished by installing a jumper line and operating each hydraulic function (clamp, rotate and side shift if equipped) in each direction for a minimum of 30 seconds. (Figure 4-1)

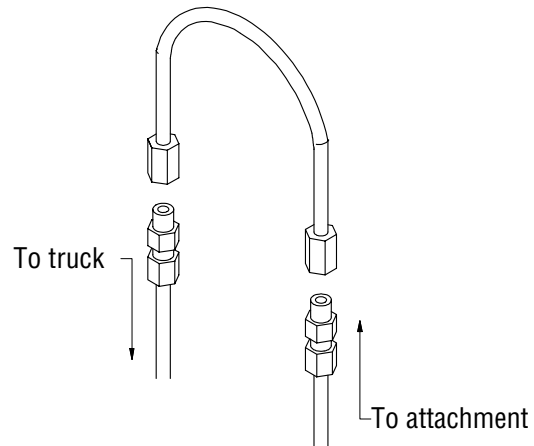


Figure 4-1, Jumper Line

3. Remove the lower bolt-on retainers and, if applicable, make a note of any factory installed shims. Shims are used to space the retainer closer to the truck carriage. if the attachment is equipped with quick change hooks, simply remove the retaining pin and the quick change hook (Figure 4-2).

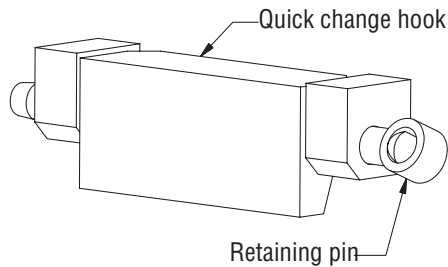


Figure 4-2, Quick Change Hook

4. Center the truck behind the attachment and drive toward the attachment with the mast tilted forward approximately 4 degrees.
5. Line up the locking lug (under the mid plate, if applicable) with the appropriate notch on the truck's carriage. Check that the bronze side shifting wear strips are in the proper place, if applicable.
6. Slowly raise the truck carriage completely to engage the top hooks with the truck carriage. Tilt carriage back until the unit is against the carriage bottom fork bar (0 degrees).
7. Inspect for proper engagement of the locking lug in the corresponding notch of the truck's carriage. Inspect any wear strips, if applicable, to ensure they are properly aligned in the top hooks.
8. To install the lower roller assemblies (side-shift) use a suitable device to move the attachment away from the carriage approximately 2". Place a block between the attachment and the carriage to hold it in position. Install the rollers into the heel plate pockets on the lower right and left hand sides of the attachment. The rollers do not need to face a particular direction. Gently move the bottom of the attachment out to remove the block. Lower the attachment down the face of the carriage. Ensure that the rollers remained in the pockets and are in contact with the carriage.
9. Install the bolt-on lower hooks. Inspect clearance to the carriage on lower hooks. Adjust the lower hooks for a maximum clearance of **3/32"** (see Figure 4-4). On Class II and Class III units, tighten the 3/8" bolts to **33 ft-lbs**. On Class IV units tighten the 1/2" bolts to **77 ft-lbs**. On units using 9/16" UNC bolts, tighten the bolts to **112 ft-lbs**.

10. Weld on the supplemental locking lug that is supplied with the attachment, (two pieces of 1/2 x 1/2 x 2.00 steel included with the attachment) with either E-6011 or E-6013 welding rod, or equivalent, on each side of the truck carriage. (Figure 4-3).

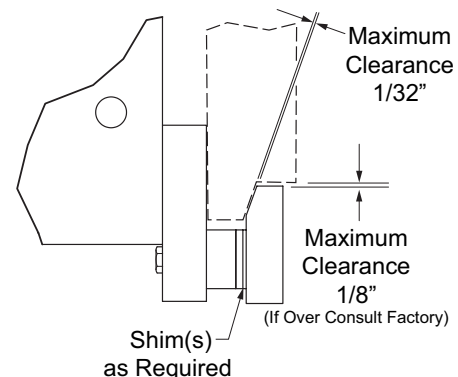
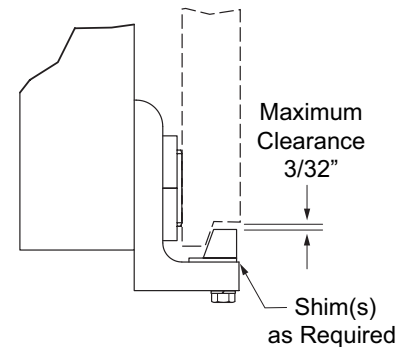


Figure 4-3, Lower Hook Clearance

Locking lugs are not required for side shifting units with midplates.

11. If quick hooks are installed, place the retaining pin through the quick change hook.
12. Apply grease to bronze top hooks through fittings and spread on entire slide area of mid plate.
13. Check all fittings, connections and bolts for any interference.

4.5 Fork Cylinder Anchor (Some FLS and FLN Models)

1. Refer to documentation that came with your machine for fork lug location.
2. Make sure cylinder is parallel to carriage weldment.

Notice

Cylinder anchors are shipped with new attachments. Always protect cylinder rod from weld spatter, etc.

4.6 Fork Installation Instructions

Warning

Over-torquing the installation hardware can result in a bent positioner side plate and/or broken set screw(s).

Notice

Cylinder rod clevis pins must be removed to slide the fork positioners into alignment with the installation notches on the fork bottom bar.

Narrow Fork

1. Tighten the included long Allen set screws until they touch the forks. Without further tightening of the set screws, tighten the installation jam nut against the carrier to **41 ft-lbs**.
2. Check the set screws for interference.
3. Apply grease to face of the upper and lower fork bars.

Wide Fork

1. Tighten the included short Allen set screws until they touch the forks. Without further tightening of the set screws, tighten the installation jam nut against the carrier to **41 ft-lbs**.
2. Check the set screws for interference.
3. Apply grease to face of the upper and lower fork bars.

4.7 Hydraulic Connections

1. Install the lines from the truck's hydraulics to the attachment hydraulics. (Figure 4-4)

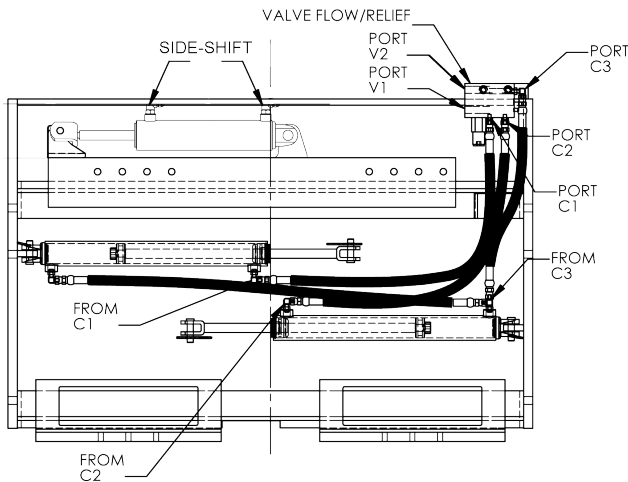


Figure 4-4, Hydraulic Connection

2. Inspect installation to ensure hoses are not kinked or pinched between the truck carriage and attachment.
3. Operate the attachment continuously for several minutes to determine that all hydraulic connections are secure with no leaks.
4. With the mast in the vertical position, open the attachment arms fully. After this procedure, check that the truck's hydraulic reservoir oil level is at the recommended level.
5. Before placing the attachment in operation check the following:
 - a. Inspect all hoses and fittings for leaks and routing clearance. Be sure to include clearance of jumper hoses to the mast.
 - b. Check the valve and cylinder for leaks.
 - c. Check cotter pins at each end of the cylinder for security.
6. After completing the installation, operate the attachment without a load for several cycles to remove any air in the hydraulic system. Test the attachment with a load to make sure the attachment operates correctly.

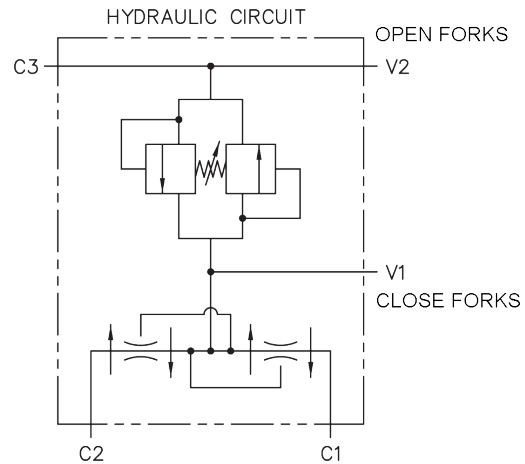


Figure 4-5, Hydraulic Schematic

SECTION 5 MAINTENANCE SCHEDULE

Daily:

1. Visually inspect all hoses, fittings, cylinders, and valves for signs of hydraulic leaks.
2. Visually inspect for external damage or cracks.
3. Check lower hooks for proper clearance. Maximum clearance is 3/16 of an inch.
4. If the attachment is equipped with Quick Change Hooks check the slide plate latch for engagement.

40 Hour Maintenance:

1. On the bronze top hooks check grease fittings to ensure that they are clean and properly working. Apply grease if needed.
2. Apply grease to face of the upper and lower fork bars.

100 Hour Maintenance:

1. Complete the above daily checks.
2. Check all hoses and fittings for wear or damage. Inspect for hydraulic leaks.
3. Check for loose or missing bolts.
4. Check wear on the bronze top hooks. Bronze top hooks should be replaced when the clearance between the bottom hook and the carriage is greater than 3/16 of an inch, or when wear on the mid plate becomes visible.

250 Hour Maintenance:

1. Check the torque on all bolts securing the bronze top hooks, upper retainers and lower hooks per the torque specification charts in Section 6 of this manual.

Recommended Grease:

Mobile XHP222 Special or similar quality EP-2 with Lithium Complex Base.

Notes:

SECTION 6 SERVICE PROCEDURE

6.1 Attachment Removal

1. Position the attachment arms to the width of the unit's body.

Warning

Before disconnecting any hydraulic connections be sure to turn off the truck's power and activate the truck's hydraulic functions in both directions to bleed off the hydraulic pressure.

2. Disconnect the hydraulic connection for the attachment positioning at the hydraulic valve, ports V1 and V2. (Figure 6-1)

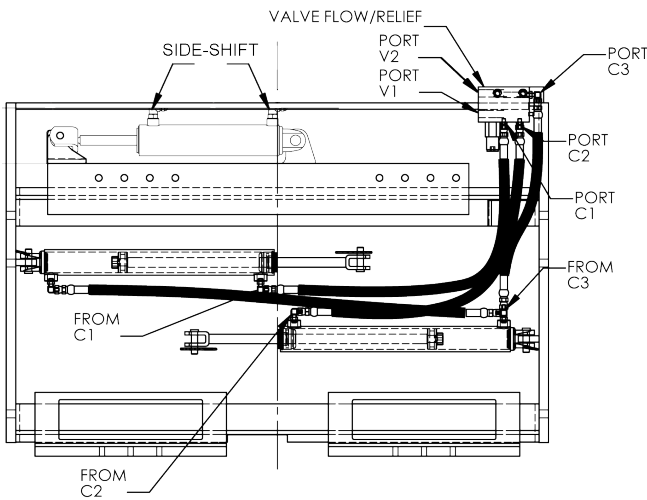


Figure 6-1, Hydraulic Connection

3. Disconnect the side shift connections.
4. Slightly raise the truck carriage to allow the removal of the bottom mounting hooks. If the attachment is equipped with Quick Change Hooks, simply remove retaining pin and pull lower hooks down. (See Figure 6-2)

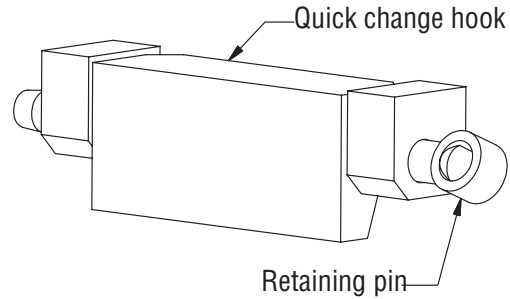


Figure 6-2, Quick Change Hook

5. Position the attachment on the edge of a pallet. Lower the attachment so that the lower carriage bar misses the pallet when lowered. Tilt the mast forward to allow the carriage to disengage from the upper mounting hooks and back away. If lowering onto a floor, blocks of wood can be placed under the body of the attachment to raise the rear.
6. To reinstall, follow the installation procedure in this manual.

Warning

When hydraulic service has been performed, activate the hydraulic functions several times to bleed out trapped air in the system before returning attachment to service.

6.2 Cylinder Removal

1. Remove the cylinder rod end cotter pin and clevis pin.
2. Disconnect the hydraulic connections.
3. Remove cotter pin and clevis pin at the base end of the cylinder.

6.3 Cylinder Installation

1. Install the clevis pin and cotter pin into the base end of the cylinder.
2. Attach the hydraulic connections to the cylinder.
3. Extend the cylinder until the rod end hole lines up with the mounting hole. Install the clevis pin and cotter pin into the rod end of the cylinder.
4. Turn on the truck's power and activate the positioning cylinders several times to bleed out trapped air.

Warning

When hydraulic service has been performed, activate the hydraulic functions several times to bleed out trapped air in the system before returning attachment to service.

6.4 Cylinder Disassembly

1. Remove the cylinder from the attachment. See removal instructions.
2. Clamp the cylinder lightly at the base end in a soft jawed vise. Use a block or other support under the rod end of the cylinder. (Figure 6-3)

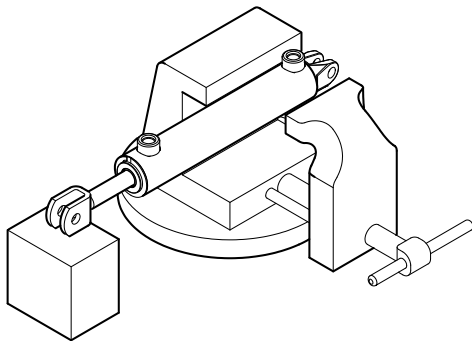


Figure 6-3, Cylinder Vise

3. Spread and remove the retaining ring from the gland cap.
4. Push gland inward 1 inch and pry out lock ring.
5. Remove the rod assembly from the cylinder tube.
6. Clamp the rod assembly in a soft jawed vise on the wrench flats, **not on the rod surface**. If the rod does not have wrench flats use two pieces of wood on both sides of the rod to prevent scarring. (Figure 6-4)

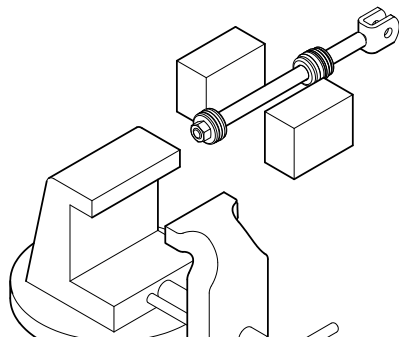


Figure 6-4, Cylinder Shaft

7. Remove the piston retaining nut and remove the piston. (Figure 6-5)

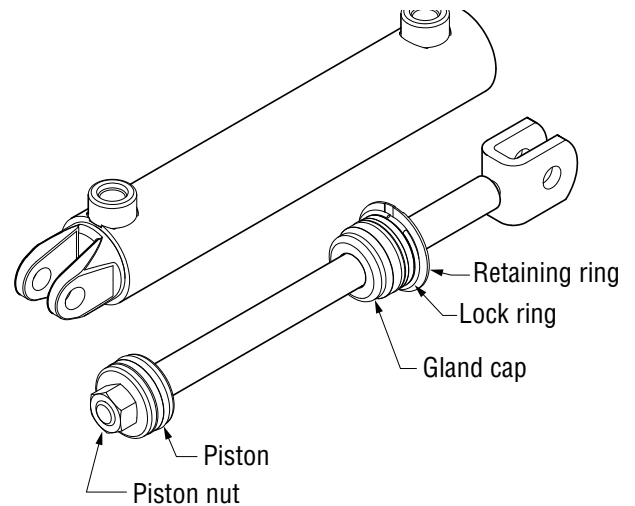


Figure 6-5, Rod Assembly

8. Carefully pry up on the piston seals using a blunt tip screw driver being careful not to scratch the seal grooves. Cut the seals to remove from the piston. (Figure 6-6)

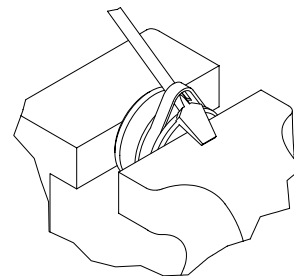


Figure 6-6, Piston Seal

9. Use the same procedure as above to remove the seals from the gland cap.

6.5 Cylinder Inspection

Inspect the cylinder tube bore for:

1. Deep scratches or nicks.
2. Signs of galling or excessive wear.
3. Out-of-roundness or deformities of the barrel.

Inspect the piston for:

1. Scratches or nicks on seal grooves.
2. Wear on O.D.

Inspect the cylinder rod for:

1. Scratches or nicks on the rod surface.
2. Straightness of the rod.
3. Damaged threads.

Inspect the gland cap for:

1. Scratches or nicks in seal grooves.
2. Damaged threads or spanner wrench holes.
3. Excessive wear in bore.

Replace any component found to be defective.

6.6 Cylinder Assembly

1. Spray the piston, gland cap, and seals with WD40 or other similar product to ease slipping of the seals in place.
2. Note the direction of the seal on the piston. Improper installation will result in poor performance. The cupped side or O-ring side of the seal should be facing the gland cap. (Figure 6-7)

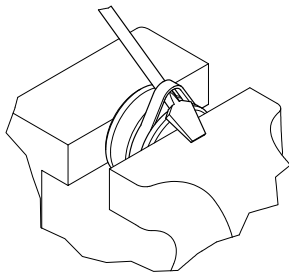


Figure 6-7, Piston Seal

3. Install the seals and wipers in the gland cap. Note the direction of the seals. The cupped side or O-ring side of the seal should be facing the piston. (Figure 6-8)

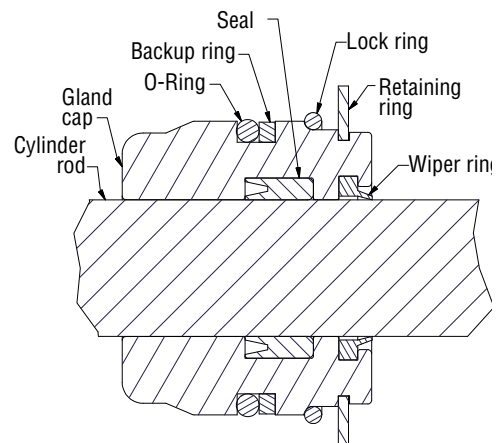


Figure 6-8, Gland Cap Seal

4. Install the gland cap on the cylinder rod being extremely careful not to cut the rod seal on the threads of the rod or rod shoulder. If available use a sleeve to cover the rod threads or plastic electrical tape.
5. Install the piston on the rod and tighten the locknut to 90 ft-lbs (0.56 UNF), 22 ft-lbs (0.75 UNF).
6. Spray the inside of the cylinder tube with lubricant to ease inserting the rod and piston. Insert the rod and piston into the cylinder tube. Tap the rod in with a rubber mallet if resistance is encountered.
7. Press on the lock ring and spread retaining ring to install onto the gland cap.

6.7 Hydraulic Valve Removal

1. Turn off the truck's power and activate the hydraulic functions in both directions several times to relief the built up hydraulic pressure.
2. Disconnect the hydraulic hoses from the truck at the attachments valve ports V1 (open) and V2 (close). (Figure 6-9)

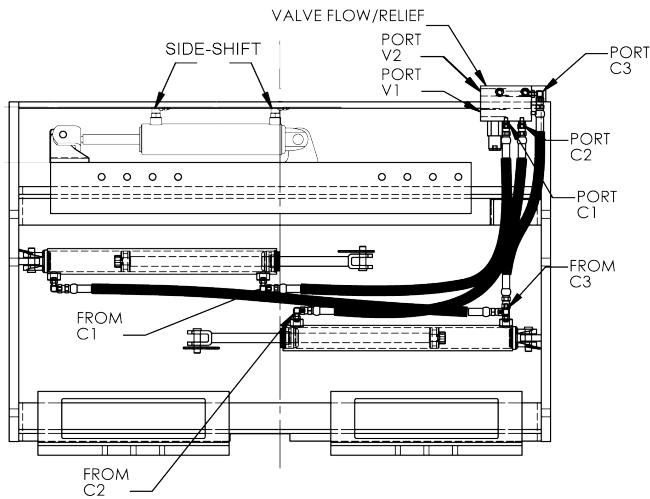


Figure 6-9, Hydraulic Hoses

3. Disconnect the hydraulic hoses at the valve ports C1 and C2.
4. Remove the valve mounting bolts and remove valve.

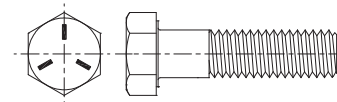
6.8 Hydraulic Valve Installation

1. Reassembly in the reverse order above.
2. Turn on the truck's power and activate the hydraulic functions several times to bleed out trapped air.

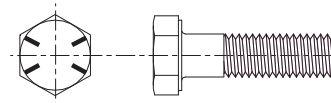
6.9 Torque Specifications

The following torque values are to be used on all fasteners unless otherwise specified.

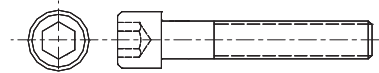
Lubricated refers to fasteners in the "As Received" condition, which is normally a light preservative oil coating on unplated fasteners and no oil coating on plated fasteners. No special steps are taken to add further lubrication prior to assembly. Dry refers to parts that have been degreased, both mating parts.



Grade 5



Grade 8



Socket Head Capscrew

GRADE 8 COURSE THREAD		GRADE 5 COURSE THREAD		SOCKET HEAD COURSE THREAD	
Bolt Size	Lubricated Torque	Bolt Size	Lubricated Torque	Capscrew Size	Lubricated Torque
1/4"	129 in-lbs	1/4"	91 in-lbs	1/4"	150 in-lbs
5/16"	23 ft-lbs	5/16"	16 ft-lbs	5/16"	26 ft-lbs
3/8"	40	3/8"	28	3/8"	46
7/16"	63	7/16"	45	7/16"	74
1/2"	96	1/2"	68	1/2"	115
9/16"	140	9/16"	98	9/16"	160
5/8"	195	5/8"	140	5/8"	215
3/4"	340	3/4"	240	3/4"	385
7/8"	550	7/8"	390	7/8"	615
1"	820	1"	580	1"	920
1-1/8"	1,160	1-1/8"	715	1-1/8"	1,305
1-1/4"	1,640	1-1/4"	1,010	1-1/4"	1,840
1-3/8"	2,150	1-3/8"	1,330	1-3/8"	2,415
1-1/2"	2,850	1-1/2"	1,760	1-1/2"	3,205

Figure 6-10 Torque Chart