

1.



**SPARTAN
EQUIPMENT®**

OPERATOR'S & PARTS MANUAL

FOR

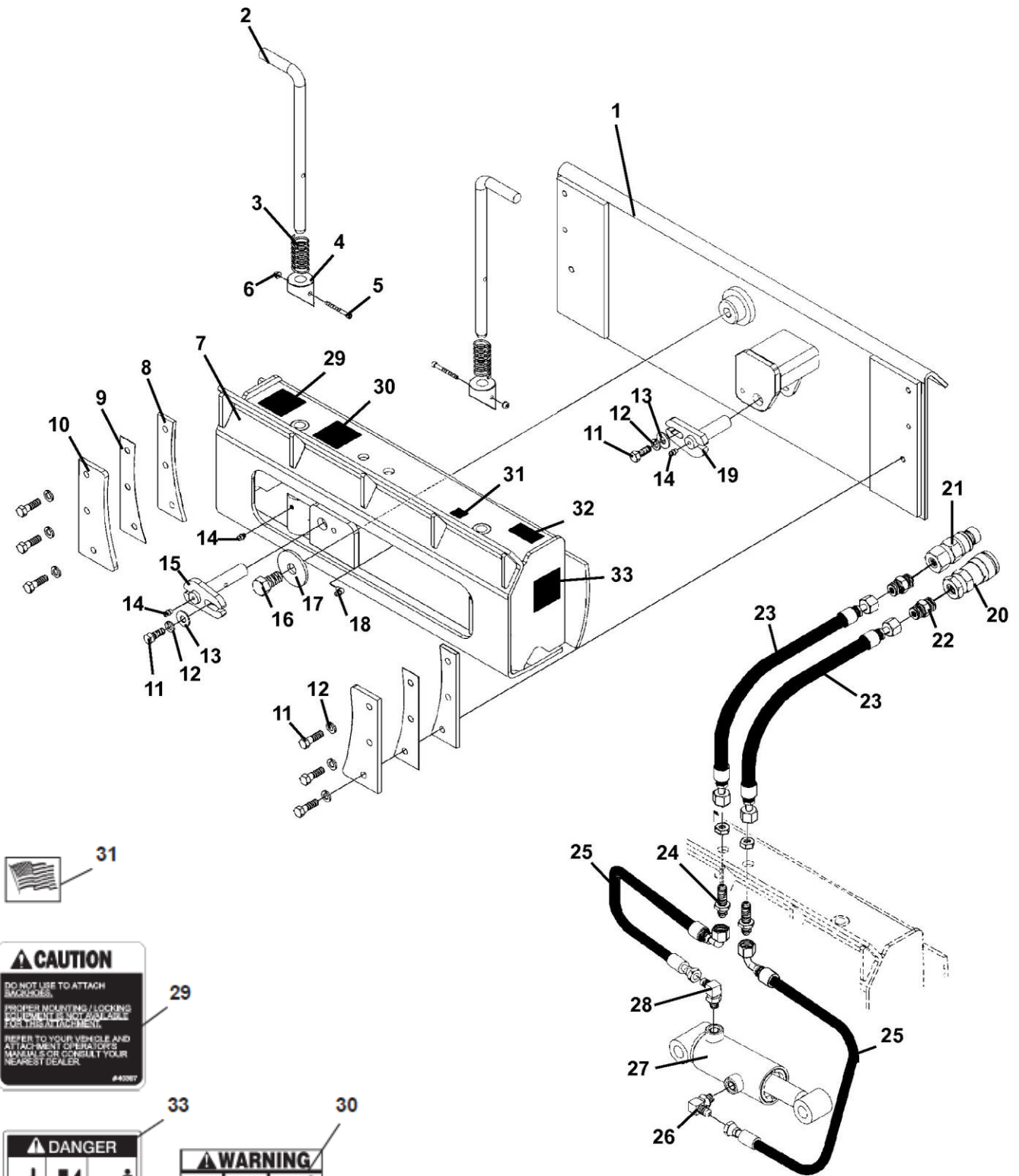
MINI TILT ATTACH PLATE



INSTRUCTIONS NUMBER: 76214

2.

TILT ATTACH ASSEMBLY



CAUTION

DO NOT USE TO ATTACH MACHINES.

PROPER MOUNTING / LOCKING EQUIPMENT IS NOT AVAILABLE FOR THIS MOUNTING.

REFER TO YOUR VEHICLE AND ATTACHMENT OPERATOR MANUALS OR CONSULT YOUR NEAREST DEALER.

#40267

DANGER

To prevent serious injury or death from clothing:

- Keep all persons and objects clear while any part of this machine is in motion.

WARNING

HIGH-PRESSURE FLUID HAZARD

To prevent serious injury or death:

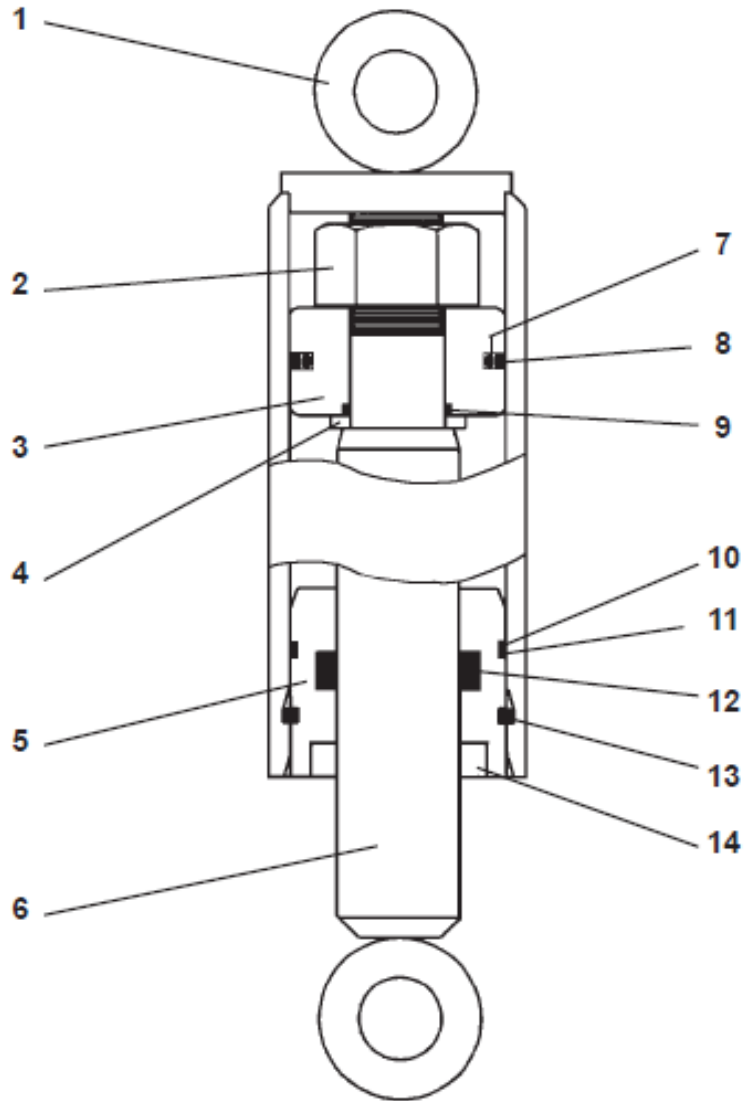
- Relieve pressure on systems before repairing or adjusting or disconnecting.
- Wear proper hand and eye protection when servicing the lines. Use wood or cardboard instead of hands.
- Keep all components in good repair.

TILT ATTACH ASSEMBLY

<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	*100147	Rear Frame (Universal)
		*103247	Rear Frame (MT50/52)
2	2	100340	Lock Handle
3	2	2003875	Compression Spring
4	2	2003876	Lock Pin
5	2	2002044	10-24 x 1.75" Socket Head Capscrew
6	2	2002078	10-24 UNC Lock Nut
7	1	100146	Front Frame
8	2	100170	Spacer Plate
9	2	100169	Shim
10	2	100168	Retainer Plate
11	8	1044	.38" UNC X 1.25" Hex Capscrew
12	8	1503	.38" Lock Washer
13	2	1514	.38" Flat Washer
14	4	6616	Grease Fitting
15	1	100173	Cylinder Pivot Pin
16	1	1112	.62" UNC X 1.00" Hex Capscrew
17	1	1517	.62" UNC Flat Washer
18	1	53031	90° Grease Fitting
19	1	100171	Cylinder Pivot Pin
20	1	14175	Female Coupler
21	1	14176	Male Coupler
22	2	30324	Straight Connector 8MBo-6MFS
23	2	38132	Hose .25" X 48" 6FFS06FFS
24	2	30295	Straight Bulkhead Connector
25	2	38189	Hose .25" X 16" 6FFS-6FF90°
26	1	30209	90° Elbow
27	1	100161	Cylinder Assembly
28	1	30204	90° Elbow 6MBo-6MFS
29	1	40397	Caution Do Not Attach Backhoe Decal
30	1	40151	Warning High Pressure Fluid Decal
31	1	4338	Made In U.S.A. Decal
32	-	--	Serial Number Tag Location
33	2	40149	Danger Pinch Point Decal

CYLINDER ASSEMBLY^{3.}

ASSEMBLY #100161



CYLINDER ASSEMBLY

ASSEMBLY #100161

<u>ITEM</u>	<u>REQ'D</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	100162	Cylinder Tube
2	1	1482	Hex Nut (Torque to 150-200 ft lbs)
3	1	6992	Piston
4	1	52644	Washer
5	1	64891	Cylinder Gland
6	1	100165	Cylinder Rod
7	1	4637*	O'Ring
8	1	4636*	Piston Ring
9	1	4635*	O'Ring
10	1	4633*	O'Ring
11	1	4634*	Back-Up Washer
12	1	45262*	Poly-Pak Seal
13	1	7164*	Gland Retainer
14	1	4981*	Rod Wiper

NOTE: Seal Kit #45581 includes all parts marked with an asterisk (*). Parts are not sold separately.

SAFETY STATEMENTS



THIS SYMBOL BY ITSELF OR WITH A WARNING WORD THROUGHOUT THIS MANUAL IS USED TO CALL YOUR ATTENTION TO INSTRUCTIONS INVOLVING YOUR PERSONAL SAFETY OR THE SAFETY OF OTHERS. FAILURE TO FOLLOW THESE INSTRUCTIONS CAN RESULT IN INJURY OR DEATH.

DANGER

THIS SIGNAL WORD IS USED WHERE SERIOUS INJURY OR DEATH WILL RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.

WARNING

THIS SIGNAL WORD IS USED WHERE SERIOUS INJURY OR DEATH COULD RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.

CAUTION

THIS SIGNAL WORD IS USED WHERE MINOR INJURY COULD RESULT IF THE INSTRUCTIONS ARE NOT FOLLOWED PROPERLY.

NOTICE

NOTICE INDICATES A PROPERTY DAMAGE MESSAGE.

GENERAL SAFETY PRECAUTIONS

WARNING! READ MANUAL PRIOR TO INSTALLATION



Improper installation, operation, or maintenance of this equipment could result in serious injury or death. Operators and maintenance personnel should read this manual, as well as all manuals related to this equipment and the prime mover thoroughly before beginning installation, operation, or maintenance. **FOLLOW ALL SAFETY INSTRUCTIONS IN THIS MANUAL AND THE PRIME MOVER'S MANUAL(S).**

READ AND UNDERSTAND ALL SAFETY STATEMENTS



Read all safety decals and safety statements in all manuals prior to operating or working on this equipment. Know and obey all OSHA regulations, local laws, and other professional guidelines for your operation. Know and follow good work practices when assembling, maintaining, repairing, mounting, removing, or operating this equipment.

KNOW YOUR EQUIPMENT



Know your equipment's capabilities, dimensions, and operations before operating. Visually inspect your equipment before you start, and never operate equipment that is not in proper working order with all safety devices intact. Check all hardware to ensure it is tight. Make certain that all locking pins, latches, and connection devices are properly installed and secured. Remove and replace any damaged, fatigued, or excessively worn parts. Make certain all safety decals are in place and are legible. Keep decals clean, and replace them if they become worn or hard to read.

GENERAL SAFETY PRECAUTIONS

WARNING!



PROTECT AGAINST FLYING DEBRIS

Always wear proper safety glasses, goggles, or a face shield when driving pins in or out, or when any operation causes dust, flying debris, or any other hazardous material.

WARNING!



LOWER OR SUPPORT RAISED EQUIPMENT

Do not work under raised booms without supporting them. Do not use support material made of concrete blocks, logs, buckets, barrels, or any other material that could suddenly collapse or shift positions. Make sure support material is solid, not decayed, warped, twisted, or tapered. Lower booms to ground level or on blocks. Lower booms and attachments to the ground before leaving the cab or operator's station.

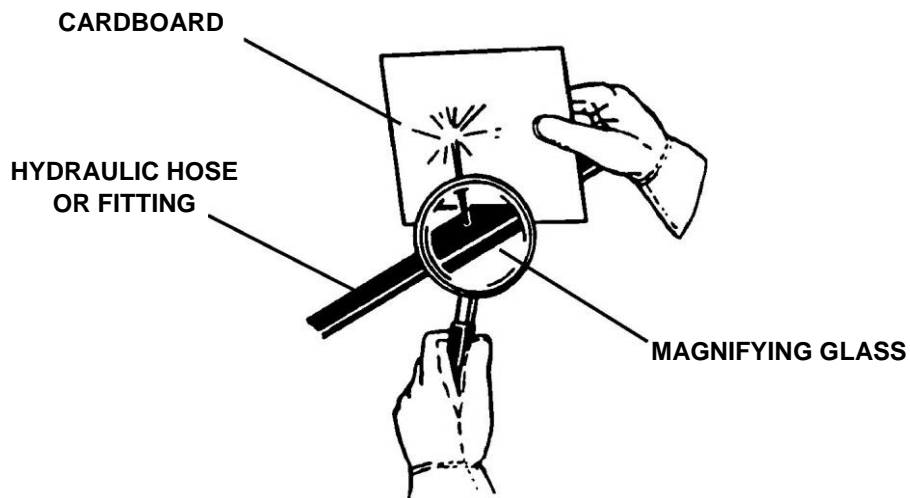
WARNING!



USE CARE WITH HYDRAULIC FLUID PRESSURE

Hydraulic fluid under pressure can penetrate the skin and cause serious injury or death. Hydraulic leaks under pressure may not be visible. Before connecting or disconnecting hydraulic hoses, read your prime mover's operator's manual for detailed instructions on connecting and disconnecting hydraulic hoses or fittings.

- Keep unprotected body parts, such as face, eyes, and arms as far away as possible from a suspected leak. Flesh injected with hydraulic fluid may develop gangrene or other permanent disabilities.
- If injured by injected fluid, see a doctor at once. If your doctor is not familiar with this type of injury, ask him to research it immediately to determine proper treatment.
- Wear safety glasses, protective clothing, and use a piece of cardboard or wood when searching for hydraulic leaks. **DO NOT USE YOUR HANDS!** SEE ILLUSTRATION.



GENERAL SAFETY PRECAUTIONS

WARNING!



DO NOT MODIFY MACHINE OR ATTACHMENTS

Modifications may weaken the integrity of the attachment and may impair the function, safety, life, and performance of the attachment. When making repairs, use only the manufacturer's genuine parts, following authorized instructions. Other parts may be substandard in fit and quality. Never modify any ROPS (Roll Over Protection Structure) or FOPS (Falling Object Protective Structure) equipment or device. Any modifications must be authorized in writing by the manufacturer.

WARNING!



SAFELY MAINTAIN AND REPAIR EQUIPMENT

- Do not wear loose clothing or any accessories that can catch in moving parts. If you have long hair, cover or secure it so that it does not become entangled in the equipment.
- Work on a level surface in a well-lit area.
- Use properly grounded electrical outlets and tools.
- Use the correct tools for the job at hand. Make sure they are in good condition for the task required.
- Wear the protective equipment specified by the tool manufacturer.

SAFELY OPERATE EQUIPMENT



Do not operate equipment until you are completely trained by a qualified operator in how to use the controls, know its capabilities, dimensions, and all safety requirements. See your machine's manual for these instructions.

- Keep all step plates, grab bars, pedals, and controls free of dirt, grease, debris, and oil.
- Never allow anyone to be around the equipment when it is operating.
- Do not allow riders on the attachment or the prime mover.
- Do not operate the equipment from anywhere other than the correct operator's position.
- Never leave equipment unattended with the engine running, or with this attachment in a raised position.
- Do not alter or remove any safety feature from the prime mover or this attachment.
- Know your work site safety rules as well as traffic rules and flow. When in doubt on any safety issue, contact your supervisor or safety coordinator for an explanation.

INSTALLATION

CAUTION: DO NOT USE TO ATTACH BACKHOES. PROPER MOUNTING / LOCKING EQUIPMENT IS NOT AVAILABLE FOR THIS ATTACHMENT.



ATTACHING

Install the tilt attach by following your power unit operator's manual for proper installation of an attachment. Connect the power and return hoses to the auxiliary hydraulic couplers on the loader. **IMPORTANT:** All hose routings should be check for kinks or pinching. Reroute if necessary. Install your specific attachment to the tilt attach by following your power unit operator's manual for proper installation of an attachment.

WARNING! To Avoid Serious Personal Injury, make sure the tilt attach is securely latched to the attachment **AND** the attachment mechanism of your unit. Failure to do so could result in separation of the attachment from the tilt attach or the tilt attach from the power unit.



DETACHING

On firm, level ground. Lower the lift arms against the frame and place the attachment on the ground.

Move the control levers back and forth to relieve pressure in the line. Disconnect couplers.

NOTE: Connect couplers together or install dust caps and plugs to prevent contaminants from entering the hydraulic system.

Follow your power unit operator's manual for detaching (removing) an attachment.

LUBRICATION

NOTE: Frequent lubrication of grease fittings with a multi-purpose grease will greatly increase the life of the product.

IMPORTANT: DISENGAGE THE AUXILIARY HYDRAULICS, STOP THE ENGINE, ENGAGE PARKING BRAKE AND REMOVE KEY BEFORE LEAVING THE OPERATOR'S STATION.

OPERATION

The tilt attach is controlled by a cylinder that is connected to the front and rear frames. The cylinder is activated by the auxiliary hydraulic system controls. See your loader manual for location and proper operation of the auxiliary hydraulic system controls and operate the tilt attach accordingly to tilt to the left or right.

NOTE: When mounting an attachment onto the tilt attach, be sure to take into consideration that the tilt attach weights approximately 110-120 lbs., depending on the mounting plate, and moves the center of gravity away from the skid-steer loader approximately 5.75".

WARNING! Tilting some attachments may change the location of the center of gravity which may cause loader tip over. Use extreme caution when tilting large or heavy attachments. Severe injury or death may occur.



TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	REMEDY
Tilt Attach fails to tilt	Obstruction in hydraulic line.	Remove obstruction or replace.
	Hydraulic couplers not completely connected.	Check and tighten couplers.
	Hydraulic couplers malfunctioning or non-compatible.	Replace.
	Defective hydraulic cylinder.	Replace cylinder.
Tilts too slowly	Cold oil.	Warm oil with engine at idle.
	Engine speed too slow.	Open throttle
	Oil leaking past cylinder packings.	Replace cylinder seals
	Foreign material inside front frame, spacer plates and/or shims.	Clear all foreign material from attachment.
Fails to maintain tilt position.	Broken or leaking hydraulic lines.	Replace broken hose and check for leaks.
	Oil leaking past cylinder packings.	Replace cylinder seals.
External leaking	Broken or loose hydraulic lines or fittings.	Check for leaks and repair or replace.
	Cylinder seals damaged.	Replace cylinder seals.

MAINTENANCE

Regular maintenance is the key to long equipment life and safe operation. Maintenance has been reduced to the absolute minimum. However it is important that these maintenance functions be performed as described below.

DAILY

- Check all bolts and nuts for tightness.
- Replace any missing hardware with approved replacement parts.
- Check hydraulic system for leaks as described in the Safety Precautions Section.
- Visually inspect the attachment for worn parts.
- Check for dirt and foreign material in rear frame and around clamp plates.

IMPORTANT: When replacing parts use only factory approved replacement parts. Manufacturer will not claim responsibility for use of unapproved parts or accessories and/or other damages as a result of their use.

MAINTENANCE AND SERVICE

90.

CYLINDER SEAL REPLACEMENT

The following information is provided to assist you in the event you should need to repair or rebuild a hydraulic cylinder. When working on hydraulic cylinders, make sure that the work area and tools are clean and free of dirt to prevent contamination of the hydraulic system and damage to the hydraulic cylinders. Always protect the active part of the cylinder rod (the chrome section). Nicks or scratches on the surface of the rod could result in cylinder failure. Clean all parts thoroughly with a cleaning solvent before reassembly.

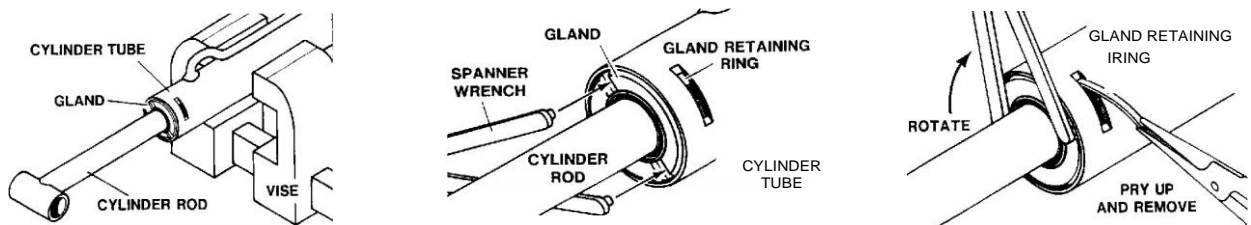
DISASSEMBLY PROCEDURE

IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

RETAINING RING TYPE GLAND

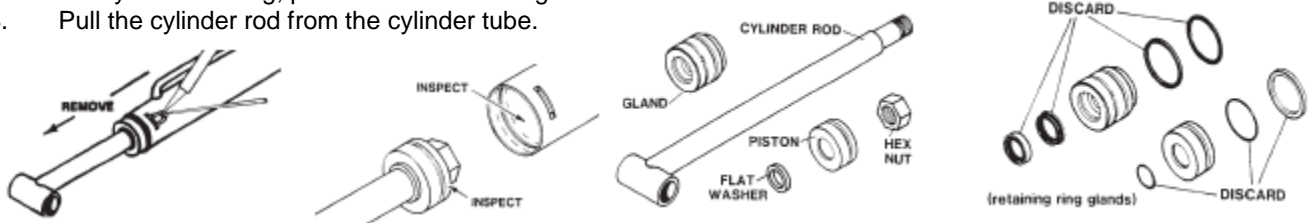
5. Mount the cylinder tube securely in a vise. **NOTICE:** Do not clamp too tight and distort the tube.

6. Rotate the gland with a spanner wrench (available from your dealer), until the gland retaining ring appears in the milled slot.



Pry up the end of the gland retaining ring with a pointed tool. Rotate the gland with a spanner wrench while removing the retaining ring. **NOTE:** The gland and piston seal(s) can be pulled out and cut as they appear in the milled slot during disassembly. After cutting, pull them out through the milled slot.

3. Pull the cylinder rod from the cylinder tube.



4. Inspect the piston and the bore of the cylinder tube for deep scratches or galling. If damaged, the piston and cylinder tube must be replaced.

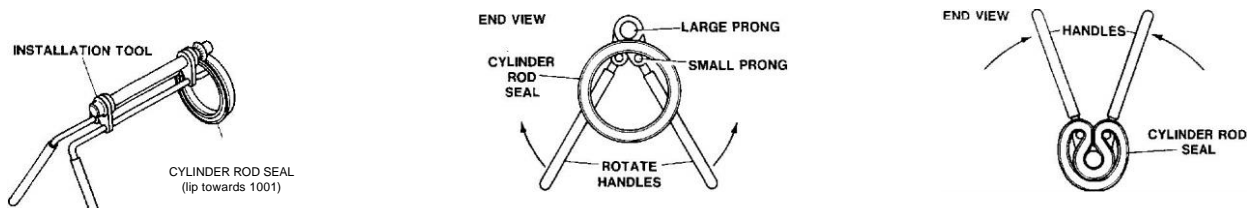
5. Remove the hex nut, piston, flat washer or spacer tube (if so equipped), and gland from the cylinder rod. If the cylinder rod is rusty, scratched, or bent, it must be replaced.

6. Remove and discard all old seals.

ASSEMBLY PROCEDURE

IMPORTANT: Replace all seals even if they do not appear to be damaged. Failure to replace all seals may result in premature cylinder failure.

1. Install the cylinder rod seal in the gland first. Be careful not to damage the seal in the process as it is somewhat difficult to install. A special installation tool is available to help with installing the seal. Simply fit the end of the tool over the seal so that the large prong of the tool is on the outside of the seal, and the two smaller prongs on the inside. The lip of the seal should be facing towards the tool. Rotate the handles on the tool around to wrap the seal around the end of the tool.

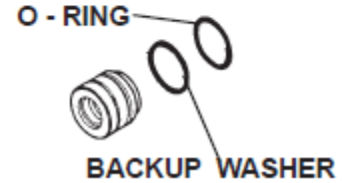
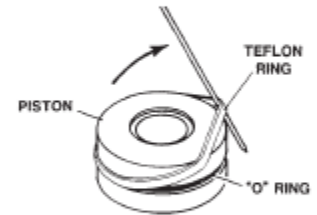
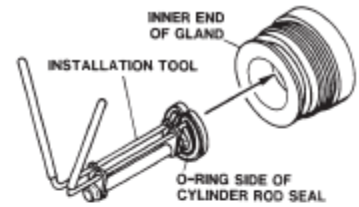


MAINTENANCE AND SERVICE

Now insert the seal into the gland from the inner end. Position the seal in its groove, and release and remove the tool. Press the seal into its seat the rest of the way by hand.

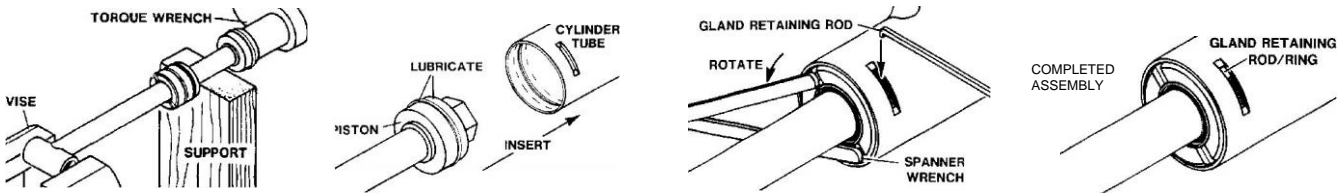
NOTE: Threaded gland is shown in diagram for reference only.

- Install the new piston ring, rod wiper, O-rings, and backup washers, if applicable, on the piston. Be careful not to damage the seals. Caution must be used when installing the piston ring. The ring must be stretched carefully over the piston with a smooth, round, pointed tool.
- Slide the gland onto the cylinder rod being careful not to damage the rod wiper. Then install the spacer, or flat washer (if so equipped), small O-ring, piston, and hex nut onto the end of the cylinder rod.
- Secure the cylinder rod (mounting end) in a vise, with a support at its center. Torque the nut to the amount shown on the chart for the thread diameter of the cylinder rod. (see chart)



Thread Diameter	POUNDS - FEET
7/8"	150-200
*1"	230-325
1-1/8"	350-480
1-1/4"	490-670
1-3/8"	670-900

* 1" Thread Diameter WITH 1.25" Rod Diameter
 Min. 230 ft. lbs. Max. 250 ft. lbs.



IMPORTANT: Do not contact the active surface of the cylinder rod with the vise. Damage to the rod could result.

IMPORTANT: Ensure that the piston ring fits squarely into the cylinder tube and piston groove, otherwise the ring may be damaged and a leak will occur.

- Apply a lubricant (such as Lubriplate #105) to the piston and teflon ring. Insert the cylinder rod assembly into the cylinder tube.
- Rotate the gland with a spanner wrench until the hole (drilled into the retaining slot of the gland) appears in the milled slot of the cylinder tube. Insert the hooked end of the gland retaining rod into the hole.

Rotate the gland until the gland retaining rod forms a ring between the gland and the cylinder tube. When complete, the bent end of the gland retainer ring should be hidden (not turned so it is exposed in the slot) to prevent it from popping out.

WARNING!



Cylinders serviced in the field are to be tested for leakage prior to the attachment being placed in work. Failure to test rebuilt cylinders could result in damage to the cylinder and/or the attachment, cause severe personal injury or even death.




BOLT TORQUE

BOLT TORQUE SPECIFICATIONS

GENERAL TORQUE SPECIFICATION TABLE

Use the following torques when special torques are not given. These values apply to fasteners as received from suppliers, dry, or when lubricated with normal engine oil. They do not apply if special graphited or moly disulphide greases or other extreme pressure lubricants are used. This applies to both UNF and UNC threads. Remember to always use grade five or better when replacing bolts.

IMPORTANT: On all PLATED GRADE 8 bolts, reduce torque 15 from listed bolt torque specification.

SAE Grade No.		2				5				8*			
Bolt head identification marks as per grade. NOTE: Manufacturing Marks Will Vary													
		TORQUE		TORQUE		TORQUE		TORQUE		TORQUE		TORQUE	
Bolt Size		Pounds Feet		Newton-Meters		Pounds Feet		Newton-Meters		Pounds Feet		Newton-Meters	
Inches	Millimeters	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
1/4	6.35	5	6	7	8	9	11	12	15	12	15	16	20
5/16	7.94	10	12	14	16	17	20.5	23	28	24	29	33	39
3/8	9.53	20	23	27	31	35	42	48	57	45	54	61	73
7/16	11.11	30	35	41	47	54	64	73	87	70	84	95	114
1/2	12.70	45	52	61	70	80	96	109	130	110	132	149	179
9/16	14.29	65	75	88	102	110	132	149	179	160	192	217	260
5/8	15.88	95	105	129	142	150	180	203	244	220	264	298	358
3/4	19.05	150	185	203	251	270	324	366	439	380	456	515	618
7/8	22.23	160	200	217	271	400	480	542	651	600	720	814	976
1	25.40	250	300	339	406	580	696	787	944	900	1080	1220	1464
1-1/8	25.58	-	-	-	-	800	880	1085	1193	1280	1440	1736	1953
1-1/4	31.75	-	-	-	-	1120	1240	1519	1681	1820	2000	2468	2712
1-3/8	34.93	-	-	-	-	1460	1680	1980	2278	2380	2720	3227	3688
1-1/2	38.10	-	-	-	-	1940	2200	2631	2983	3160	3560	4285	4827

METRIC BOLT TORQUE SPECIFICATIONS

Size of Screw	Grade No.	Coarse Thread			Fine Thread		
		Pitch (mm)	Pounds Feet	Newton-Meters	Pitch (mm)	Pounds Feet	Newton-Meters
M6	5.6	1.0	3.6-5.8	4.9-7.9	-	-	-
	8.8		5.8-4	7.9-12.7		-	-
	10.9		7.2-10	9.8-13.6		-	-
M8	5.6	1.25	7.2-14	9.8-19	1.0	12-17	16.3-23
	8.8		17-22	23-29.8		19-27	25.7-36.6
	10.9		20-26	27.1-35.2		22-31	29.8-42
M10	5.6	1.5	20-25	27.1-33.9	1.25	20-29	27.1-39.3
	8.8		34-40	46.1-54.2		35-47	47.4-63.7
	10.9		38-46	51.5-62.3		40-52	54.2-70.5
M12	5.6	1.75	28-34	37.9-46.1	1.25	31-41	42-55.6
	8.8		51-59	69.1-79.9		56-68	75.9-92.1
	10.9		57-66	77.2-89.4		62-75	84-101.6
M14	5.6	2.0	49-56	66.4-75.9	1.5	52-64	70.5-86.7
	8.8		81-93	109.8-126		90-106	122-143.6
	10.9		96-109	130.1-147.7		107-124	145-168
M16	5.6	2.0	67-77	90.8-104.3	1.5	69-83	93.5-112.5
	8.8		116-130	157.2-176.2		120-138	162.6-187
	10.9		129-145	174.8-196.5		140-158	189.7-214.1
M18	5.6	2.0	88-100	119.2-136	1.5	100-117	136-158.5
	8.8		150-168	203.3-227.6		177-199	239.8-269.6
	10.9		175-194	237.1-262.9		202-231	273.7-313
M20	5.6	2.5	108-130	146.3-176.2	1.5	132-150	178.9-203.3
	8.8		186-205	252-277.8		206-242	279.1-327.9
	10.9		213-249	288.6-337.4		246-289	333.3-391.6

LIMITED WARRANTY

All new Spartan Equipment products are warranted to be free from defects in materials or workmanship which may cause failure under normal usage and service when used for the purpose intended.

In the event of failure within twelve (12) months from initial retail sale, lease or rental date (excluding cable, ground engaging parts such as sprockets, digging chain, bearings, teeth, tamping and demolition heads, blade cutting edges, pilot bits, auger teeth, auger heads & broom bristles), if after examination, Spartan Equipment determines failure was due to defective material and/or workmanship, parts will be repaired or replaced. Spartan Equipment may request defective part or parts be returned prepaid to them for inspection at their place of business at Joppa, MD, or to a location specified by Spartan Equipment.

Any claims under this warranty must be made within fifteen (15) days after the Buyer learns of the facts upon which such claim is based. All claims not made in writing and received by Spartan Equipment within the time period specified above shall be deemed waived.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES EXPRESSED OR IMPLIED AND THERE ARE NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL SPARTAN EQUIPMENT BE LIABLE FOR CONSEQUENTIAL OR SPECIAL DAMAGE.

SPARTAN EQUIPMENT'S LIABILITY FOR ANY AND ALL LOSSES AND DAMAGES TO BUYER, RESULTING FROM ANY CAUSE WHATSOEVER, INCLUDING SPARTAN EQUIPMENT'S NEGLIGENCE, IRRESPECTIVE OF WHETHER SUCH DEFECTS ARE DISCOVERABLE OR LATENT, SHALL IN NO EVENT EXCEED THE PURCHASE PRICE OF THE PARTICULAR PRODUCTS WITH RESPECT TO WHICH LOSSES OR DAMAGES ARE CLAIMED, OR, AT THE ELECTION OF SPARTAN EQUIPMENT, THE REPAIR OR REPLACEMENT OF DEFECTIVE OR DAMAGED PRODUCTS.