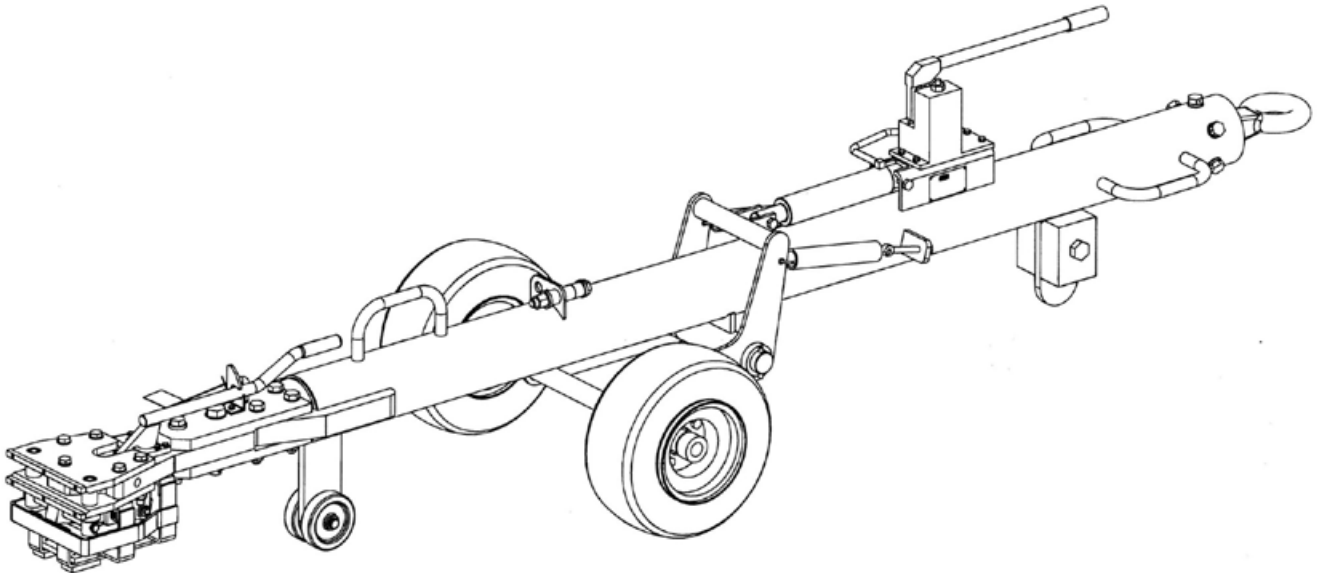


OPERATION AND MAINTENANCE MANUAL

TOWBAR ASSEMBLY

**FOR BOEING B747 AIRCRAFT
P/N 220530-1/-1A, -100/-100A,
-197/-197A,
-300/-300A, -301/-301A,
-302**



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Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

RECORD OF REVISIONS

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HIGHLIGHTS OF REVISIONS

Revision -/NC-B	No record of change
Revision C	Revised to ATA format and latest drawings
Revision D	Added text and drawings for 215031 towbar body weldment, removal/reassembly instructions for articulating and fixed undercarriages, called out shear pin kit, brought to current format, and incorporated 220500 to create one manual.
Revision E	Added diagrams for Adapter Kit assembly/disassembly, changed shear bolt hardware and replacement directions to reflect new bushing and loss of washer, revised isometric drawings
Revision F	Updated IPL for P/N 220560 to latest configuration.
Revision G	Added alternate configurations for use with smaller shear pin kit and retaining bolt. Updated IPL for P/N 230050 to latest configuration, added IPL for 110264-1 & -2 Hydraulic Pumps.
Revision H	Updated Title Page, Updated contact info title page & page 5, added description 3.3.2 page 6.
Revision J	Added P/N 220530-302 Configuration and updated views
Revision K	Added Item 22-28 P/N 220530 -Towbar Assembly & Updated P/N 2315T63 is now AGSE-S00156-P02 - Item 51

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Section 1 - DESCRIPTION

The towbar is used for towing and steering the aircraft by attaching to the aircraft's Nose Landing Gear (NLG) and being pulled by a tow tractor. The towbar primarily consists of a cylindrical steel body. At one end of the tow bar is a lunette eye, which connects to the tow tractor. The lunette eye is equipped with a shock absorbing mechanism to reduce the shock load on the NLG. At the opposite end of the towbar is a mechanical head assembly, which connects to the aircraft NLG. The towbar is mounted on either a fixed or an articulated undercarriage with a hydraulic pump and a retract spring which raises and lowers the towbar. The Stanley 220530 towbar is used for towing B747 aircraft.

This manual represents the Stanley 220530 towbar assemblies, listed by main part number, with unique parts lists for each.

For additional information on this or other aviation ground support applications, we invite you to contact one of our Customer Service Representatives, or visit our website.

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Section 2 - SAFETY CONSIDERATIONS

- This equipment is heavy and has moving parts. Whenever such a combination exists, there is the potential for serious injury. Work carefully at all times.
- Be alert and pay attention when using this equipment. Careless use, or a casual attitude during operation, may lead to an accident.
- Keep your feet clear of the towbar during all operations.
- Keep your hands clear of all pinch points on the towbar.
- Pay attention to all warnings that are stenciled on the towbar. They are there for your safety. Do not ignore or violate them.
- Walk around the towbar; don't climb over it.
- Never crawl under a towbar that is loaded.
- Do not exceed 5 MPH (8 KPH) when towing the aircraft.

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Section 3 - SPECIFICATIONS AND CAPABILITIES

3.1 Applications

The towbar is used for moving B747, when pulled by a tow tractor and designed to engage the “V” fitting Nose Landing Gear (NLG) specific to that aircraft.

NOTE

Total length is approximated and is measured from the center of the towing pins to the center of the lunette (towing) eye. Height is measured, for each end of the towbar, with the wheels fully-extended.

3.2 Dimensions

3.2.1 Length:

P/N 220530-1 is the Universal Assembly and incorporates a towbar body 111.3” (283 cm) long.

P/N 220530-100 incorporates a towbar body 111.3” (283 cm) long, with a counterbalancing ballast at the lunette eye end. Total length is 131.3” (333 cm).

P/N 220530-197 incorporates a towbar body 167.2” (425 cm) long, with a 10” (25.4cm) extension and lockwire on the lunette eye securing bolts. Total length is 197” (500 cm).

P/N 220530-300 incorporates a towbar body 111.3” (283 cm) long. Total length is 131.3” (333 cm).

P/N 220530-301 is similar to the -300, but has an added limiter kit reinforcing the lunette eye.

P/N 220530-302 incorporates a towbar body 77.28” (196.3 cm) long. Total length is 97.28” (247 cm).

3.2.2 Width: 39.9” (101 cm) (maximum) at the wheels and 10” (25.4 cm) at the head.

3.2.3 Height: 11-28” (28-71 cm) (measured from the towing pin on the head) and 11-43” (28-109 cm) from the lunette eye

3.2.4 Weight: approximately 480 lbs. (218 kg).

P/N 220530-302 weight: approximately 437 lbs. (198 kg)

3.3 Capacities

3.3.1 Pneumatic tires are designed to operate at a gauge pressure of 14 psi (0.95 atm).

3.3.2 The maximum allowable tire pressure is 45 psi or as stamped on the tire by the tire manufacturer.

3.3.3 The hydraulic system capacity is approximately 34 fluid ounces (1005 ml).

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Section 4 - OPERATION

4.1 Aircraft Engagement

- 4.1.1 Align the towbar with the aircraft centerline, directly in front of the Nose Landing Gear (NLG).
- 4.1.2 Disconnect the towbar from the tow tractor.
- 4.1.3 To raise the tow bar, manually pump the hand pump to increase the pressure in the hydraulic system. Open the hand pump selector valve to lower the towbar.
- 4.1.4 Manually adjust the towbar head assembly until it is directly in contact with the aircraft tow fitting.

NOTE

There are two, slightly different head assemblies. The 1 incorporates Head Assembly 220560-1 and uses a ball-lock pin and lock bracket to secure the handle. All other towbars incorporate Head Assembly 220560-300, Adapter Kit 220500-400, and use a spring-loaded latch to secure the handle.

- 4.1.5 Release the spring-loaded handle securing mechanism and lift the handle upward.
- 4.1.6 Manipulate the head assembly until the aircraft tow fitting is positioned within the towbar head assembly. Engage the aircraft tow fitting by pressing downward on the handle.
- 4.1.7 Check the connection to ensure that the head assembly is locked into place over the landing gear tow fitting and the handle is secured in the down position.
- 4.1.8 Use the hand pump and selector valve to raise or lower the towbar so that the lunette eye is level with the tow tractor hitch. Connect the tow tractor hitch to the towbar lunette eye.
- 4.1.9 Retract the towbar wheels fully by turning the pump release valve in the counterclockwise direction.

WARNING

TOWBAR WHEELS MUST BE FULLY RETRACTED BEFORE TOWING AIRCRAFT.

- 4.1.10 Tow the aircraft smoothly, observing the turn angle restrictions and 5 MPH (8 KPH) maximum speed.

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TOWBAR ASSEMBLY P/N 220530

Section 4 - OPERATION (cont'd)

4.2 Aircraft Disengagement

- 4.2.1 Close the towbar selector valve by turning the handle in the clockwise direction.
- 4.2.2 Using the hand pump, lower the towbar wheels until the tires are on the ground and supporting all the weight of the towbar. (Check that the lunette eye is not under heavy pressure at the tractor hitch, and can be disconnected from the tractor easily, without a violent release of load.)
- 4.2.3 Disconnect the lunette eye from the tow tractor. Move the tow tractor a safe distance away from the work area.
- 4.2.4 Release the handle locking mechanism, raise the handle, and release the towbar head.
- 4.2.5 Pull the towbar head assembly from the aircraft landing gear tow connection and roll the towbar clear of the aircraft. Push down on the handle and make sure that the handle is secured by its locking mechanism.
- 4.2.6 Connect the towbar lunette eye hook to the tow tractor hitch and adjust the towbar wheels until the tow bar is parallel to the ground for trailing.

WARNING

THE TOWBAR MUST BE CORRECTLY ALIGNED WITH THE AIRCRAFT BEFORE STARTING DISCONNECT PROCEDURE. MISALIGNMENT BETWEEN THE AIRCRAFT NOSE LANDING GEAR AND THE TOWBAR HEAD WILL CAUSE THE AIRCRAFT TOW FITTING TO BE WEDGED INTO THE TOWBAR HEAD NOTCH. IF YOU UNLOCK THE TOWBAR HEAD AND PRY ON IT TO DISENGAGE IT FROM THE AIRCRAFT, THERE WILL BE A SUDDEN, VIOLENT RELEASE OF FORCE WHICH CAN CAUSE SERIOUS INJURY TO THE OPERATOR. IF THE TOW FITTING IS WEDGED IN THE TOWBAR HEAD, REALIGN THE TOWBAR FOR EASY SEPARATION.

Section 5 - SHIPPING

The towbar may be shipped by any preferred method without special preparation. For normal shipment, the towbar may be lowered to minimum height and shipped on the tires. Secure with suitable tie downs at each end and chock the tires. Do not tie down the head assembly, as shipping damage may result. Place straps only over the towbar body, undercarriage or through the lunette eye.

Section 6 - STORAGE

For short-term storage, the towbar assembly requires no special treatment, as it has been suitably protected from normal environmental deterioration.

For long-term storage, however, the unit should be stored in a humidity-controlled environment, with the wheels and the undercarriage fully retracted, and the towbar body blocked.

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Section 7 - CLEANING

- 7.1 Clean entire assembly with a mild detergent solution followed by a clear water rinse.
- 7.2 Dry all parts using a clean cloth or low pressure compressed air.
- 7.3 [Biannually] Lubricate all grease fittings on wheel and axle bearings. Use a grease equivalent to Grade 2 Chevron Moly Grease.
- 7.4 Head Assembly should be lubricated with a high quality silicon liquid or spray.

NOTE

DO NOT USE COMPRESSED AIR TO DRY AREAS NEAR BEARINGS, GEARS, OR OTHER MOVING PARTS.

Section 8 - INSPECTION

To ensure efficient and reliable operation, the Stanley towbar must be maintained through regular preventive maintenance practices. These practices include inspection, cleaning and lubrication. All preventive maintenance must be performed at least once every six months. The manufacturer recommends more frequent maintenance in conditions of heavy service or extreme weather.

Replace any parts that do not meet inspection standards and that cannot be repaired in the field.


Routine inspection should include the following items:

- 8.1 Clean the towbar per Section 7, to permit a thorough visual inspection.
- 8.2 Inspect all parts for evidence of wear or damage.
- 8.3 Inspect the threads of load-bearing bolts for scoring, distortion, elongation or other signs of damage.
- 8.4 Inspect all bolted parts for looseness, and tighten as necessary.

NOTE

The nuts on the retaining bolt and the shear bolt are prevailing torque (Flexloc) fasteners, therefore the run-down torque for these nuts must be considered when tightening them to final specifications. Final torque should be 15 foot pounds (11 n-m) greater than the measured run-down torque.

- 8.5 Check the wheels for free-running operation and the wheel bearings for excessive play or binding. The wheels should spin freely, with no lateral or axial movement.
- 8.6 Check the tires for proper inflation of 14 psi (0.95 atm), each.

Continued on Next Page 

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 8 - INSPECTION (cont'd)

- 8.7 Check the retraction spring for operation as follows:
- 8.7.1 Close the pump release valve by turning it in the clockwise direction. Using the hand pump, elevate the towbar fully.
 - 8.7.2 Block the towbar body at both ends and securely enough in this position to prevent the tow-bar from tipping over when the wheels are off the ground.
 - 8.7.3 Open the pump release valve by turning it in the counterclockwise direction. The blocks should support the towbar in the air as the wheels retract. The retraction spring should raise the wheels to their fully retracted position, in a smooth and steady motion.
- 8.8 Raise and lower the towbar to check for smooth consistent operation.
- 8.9 Check the hydraulic hose and fittings for leaks or damage.
- 8.10 Refill the pump reservoir as required, using a hydraulic fluid equivalent to MIL-H-5606 specifications. With the cylinder collapsed (towbar at minimum height), fill the reservoir until the level of the fluid is between 1" and 1.5" below the filler plug opening.
- 8.11 Inspect the paint and plating for cuts or chips, and repair as required per Section 9-2.

CAUTION

Pump failure or seals damage may result from using a phosphate ester based hydraulic fluid (such as Skydrol®).

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Section 9 - MINOR REPAIRS

- 9.1 Replace any parts that do not meet inspection requirements and cannot be repaired in the field.
- 9.2 Minor corrosion and other surface blemishes may be removed using crocus cloth and phosphate ester resistant paint. Unpainted parts may be protected with a thin coating of light oil.

CAUTION

DO NOT paint plated surfaces or aircraft-attaching hardware.

Section 10 - MAJOR REPAIRS

No major repair is possible in the field. This unit must be returned to Stanley Aviation for overhaul, proof testing and recertification following any major damage.

Overhaul of the hydraulic pump and cylinder may become necessary after extended service. Refer to Section 12 for Hydraulic System Overhaul instructions.

WARNING

THE STANLEY TOW BAR IS EQUIPPED WITH A SHEAR BOLT. DESIGNED TO BREAK UNDER EXCESSIVE LOAD, THE SHEAR BOLT WILL BREAK BEFORE DAMAGE TO THE AIRCRAFT CAN OCCUR. SHEAR BOLT FAILURE IS INDICATED BY A SUDDEN JERK OF THE TOW VEHICLE, BY AN AUDIBLE SNAP, AND THE DEPLOYMENT OF THE WARNING FLAG. FOLLOWING A SHEAR BOLT FAILURE, THE TOW BAR MUST BE TAKEN OUT OF SERVICE FOR SHEAR BOLT RE-PLACEMENT. NEVER TOW AN AIRCRAFT WITHOUT THE SHEAR BOLT IN PLACE. SUCH ACTION COULD RESULT IN DAMAGE TO THE AIRCRAFT. SEE SECTION 12 AND FIGURES 12-1 AND 12-2.

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Section 11 - COMPONENT REMOVAL AND INSTALLATION (cont'd)

NOTE

Complete instructions on assembly and disassembly of the Stanley 220530 Towbar are included in the following sections, however, the manufacturer recommends that **COMPLETE disassembly NOT** be attempted in the field.

11.1 Adapter Kit Removal

11.1.1 Stabilize the towbar and chock both wheels.

11.1.2 Remove the 4 attachment bolts, 8 flat washers, and 4 nuts from the towbar assembly. Slide the adapter kit assembly away from the towbar body. (The remaining disassembly should be done at the workbench.)

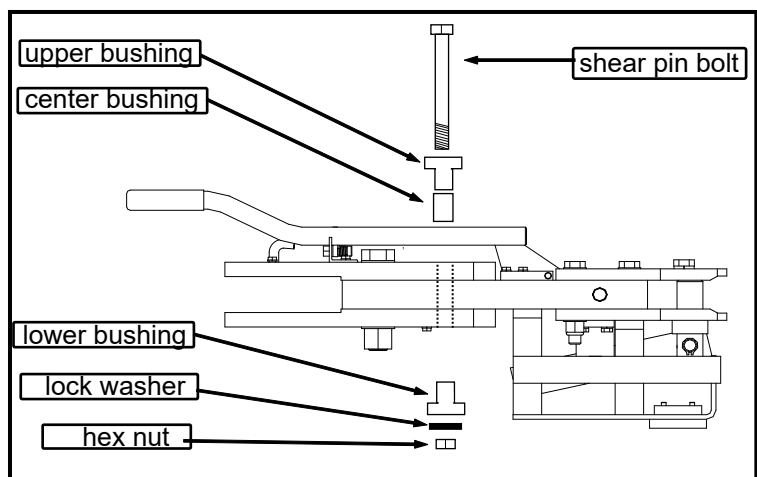
11.1.3 Disengage the signal flag lockwire by unwinding it from the cross-drilled bolt head, located on the bottom side of the lower adapter plate. (Complete removal of the bolt and lock washer is optional).

11.1.4 Remove the bolt which connects the flag to the upper adapter plate, then remove the flag. Remove all remnants of old/broken lockwire from the signal flag, and discard.

11.1.5 Loosen and remove the retaining bolt nut, retaining bolt, its associated hardware, and the shear pin retention bracket.

11.1.6 Loosen the shear bolt nut, and remove the shear bolt and its associated hardware.(Figure 11-1).

▲ FIGURE 11-1



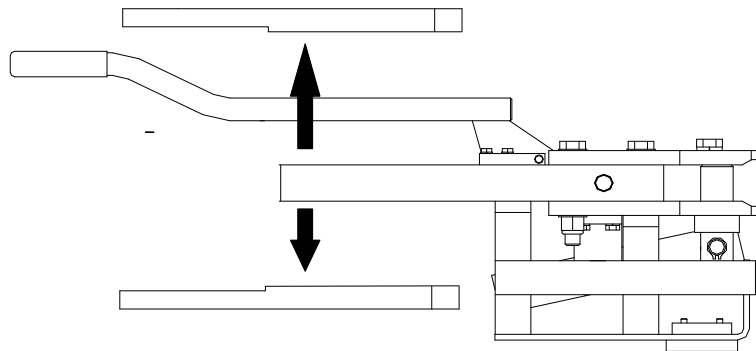
11.1.7 Remove the upper and lower adapter plates.

11.1.8 FURTHER DISASSEMBLY OF THE HEAD ASSEMBLY IS NOT ADVISED. If necessary, return the entire head assembly to Stanley Aviation.

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TOWBAR ASSEMBLY P/N 220530

Section 11 - COMPONENT REMOVAL AND INSTALLATION (cont'd)



▲ FIGURE 11-2

11.2 Adapter Kit Reassembly/Installation

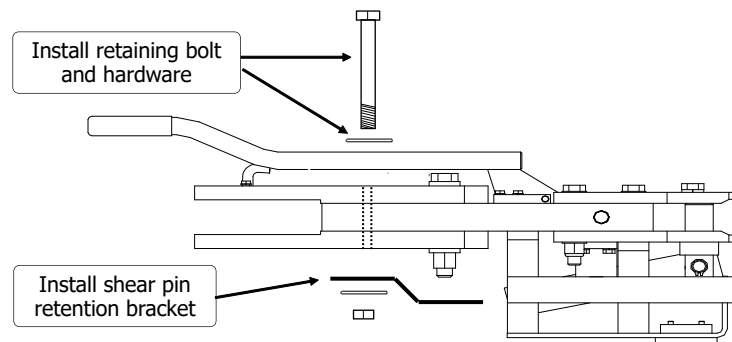
11.2.1 Bring the upper and lower adapter plates into position on the adapter head. (Figure 11-2).

11.2.2 Install the shear bolt and its associated hardware, taking care to do this correctly. (Refer to pg. 43 and Parts List nomenclature for the lock nuts, washers and bushings.) Tighten the lock nut onto the shear bolt and LIGHTLY to the adapter plate.

11.2.3 Install the retaining bolt (torque-limiting style) and shear bolt retention bracket. (Figure 11-3).

CAUTION

DO NOT TORQUE ANY OF THE BOLTS AT THIS STAGE. Partial and final torque will be added later.



▲ FIGURE 11-3

Continued on Next Page

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TOWBAR ASSEMBLY P/N 220530

Section 11 - COMPONENT REMOVAL AND INSTALLATION (cont'd)

11.2 Adapter Kit Reassembly/Installation (cont'd)

11.2.4 Align the adapter plates so they are parallel with the head and the small lockwire hole to accommodate the lockwire.

11.2.5 Torque both the shear bolt and retaining bolt to 120-180 in.-lbs. (10-15 ft.-lbs.).

NOTE

The nuts on the retaining bolt and the shear bolt are prevailing-torque (Flexloc) fasteners, therefore the run-down torque for these nuts must be considered when tight-ening them to final specifications. Final torque should be 15 ft.-lbs. (11 n-m) greater than the measured run-down torque.

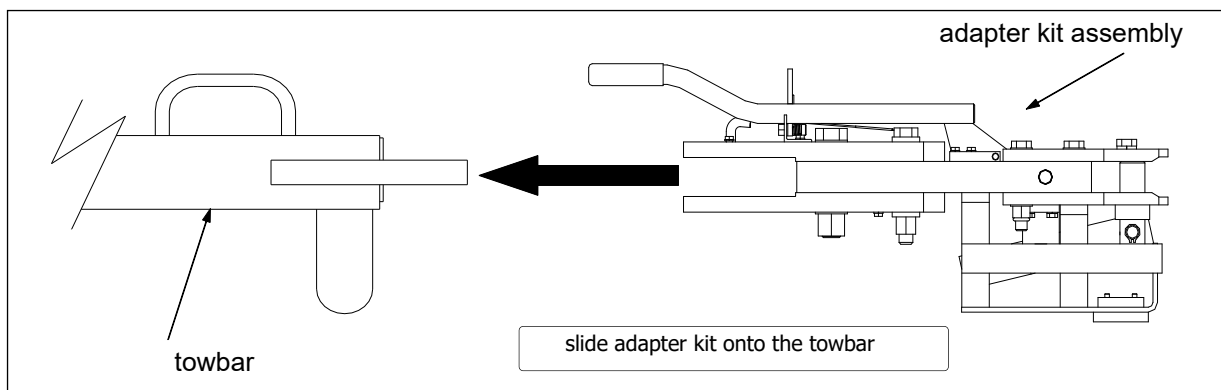
11.2.6 Remove all remnants of old/broken lockwire from the signal flag, and discard.

11.2.7 Install a length of new lockwire on the flag, sufficient enough to pass completely through the head assembly. Connect it to the cross-drilled bolt and wind around the bolt head (lower adapter plate), then attach the signal flag to the upper adapter plate with a new bolt and lock-washer.

11.2.8 Feed the lockwire through its hole, pull taut and bend it at the exit point on the lower plate. Next, thread it through and around the cross-hole, several times, to secure the flag in the lowered position. Trim off any excess wire.

11.2.9 Slide the Adapter Kit onto the towbar body, aligning the four mounting bolt holes, and se-cure, LIGHTLY, the four mounting bolts with their washers and nuts. (Figure 11-4).

11.2.10 Align the head so it is parallel with the towbar body, and torque only the shear bolt to 700 in.-lbs. (58.3 ft.-lbs.)



▲ FIGURE 11-4

11.2.11 The towbar is ready for service.

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TOWBAR ASSEMBLY P/N 220530

Section 11 - COMPONENT REMOVAL AND INSTALLATION (cont'd)

WARNING


THE UNDERCARRIAGE ASSEMBLY IS UNDER HEAVY SPRING TENSION, WHEN IN THE EXTENDED POSITION. ANY ATTEMPT TO REMOVE THE HYDRAULIC CYLINDER WHEN THE WHEELS ARE EXTENDED MAY RESULT IN SERIOUS INJURY. READ AND UNDERSTAND THE FOLLOWING INSTRUCTIONS BEFORE PROCEEDING. IT IS ADVISED THAT AT LEAST TWO EMPLOYEES WORK TOGETHER WHEN REMOVING THE HYDRAULIC SYSTEM, TO ENSURE SAFE CONTROL OF ALL THE SYSTEM COMPONENTS.

NOTE

The hydraulic system is a closed system and is composed of the pump, hose and cylinder. Unless one of these components has been damaged, the manufacturer recommends that the system remain assembled during removal. If the hydraulic system was disassembled, or if the hose was removed at any time, refill and bleed the hydraulic system as directed in Section 11-5. Use only approved hydraulic oil equivalent to MIL-H-5606 specifications.

11.3 Hydraulic System Removal

- 11.3.1 The towbar must be properly set-up before starting the removal process. With the towbar in the raised position, open the pump release valve to lower the towbar ALMOST as far as it will go. Close the release valve, again, when there is about 3" of clearance between the axle and the towbar body. (In this position, some but not all of the spring tension is eliminated. DO NOT REMOVE THE CYLINDER IN THIS POSITION, especially without loosening the lock nuts.)
- 11.3.2 Place a wood block (approximately a 2X4) between the axle and towbar body. (If it won't fit, slightly raise or lower the towbar.) Open and close the pump release valve, until the block is securely pinched between the axle and towbar body.
- 11.3.3 Chock the wheels and block the towbar body. (To remove the pump and cylinder, separately, disconnect the hydraulic hose, now.)
- 11.3.4 Remove the four attaching bolts to free the pump.
- 11.3.5 Remove the hydraulic cylinder by removing the clevis pin, cotter pin, and washer from the AFT end of the cylinder and the clevis pin, cotter pin, and washer from the forward end of the cylinder. Lift the pump and/or cylinder off the towbar body. (See Section 13 for Overhaul Instructions for the Hydraulic Cylinder and the Pump.)

Continued on Next Page 

Operation and Maintenance Manual

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Section 11 - COMPONENT REMOVAL AND INSTALLATION (cont'd)

11.4 Hydraulic System Reassembly/Installation

Installation of the pump and cylinder onto the towbar body is a straightforward process, that is the REVERSE of the removal process. (Review the removal instructions in Section 11-3.)

11.5 Refill and Bleed

11.5.1 Collapse the piston as far as it will go.

11.5.2 Install the hose fitting and the hose onto the cylinder inlet port, using an appropriate sealant on the threaded connections.

11.5.3 Holding the opposite end of the hose above the existing fluid level, slowly pour hydraulic fluid into the hose and cylinder, to minimize the entrapment of air in the hose and cylinder. (A complete refill of the hydraulic system will require 34 ounces (1005 ml) of hydraulic fluid.)

11.5.4 Connect the hose to the pump outlet port. Fill the pump reservoir with oil, to a level of 1-1.5" below the filler opening.

11.5.5 Using the hand pump, raise the towbar to its highest position, and allow the unit to sit for at least 30 minutes. Check for leaks or signs of failure.

11.5.6 Open the pump release valve by turning it in the counterclockwise direction. This will quickly release the pressure in the tow bar, and bleed any air that may have entered the system during maintenance.

11.5.7 Check the fluid level and top off as necessary.

CAUTION

Pump failure or seals damage may result from using a phosphate ester based hydraulic fluid (such as Skydrol®).

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Section 11 - COMPONENT REMOVAL AND INSTALLATION (cont'd)

WARNING


THE UNDERCARRIAGE ASSEMBLY IS UNDER HEAVY SPRING TENSION, WHEN IN THE EXTENDED POSITION. ANY ATTEMPT TO REMOVE THE UNDERCARRIAGE WHEN THE WHEELS ARE EXTENDED MAY RESULT IN SERIOUS INJURY. THE UNDERCARRIAGE MUST BE RETRACTED AND BLOCKED BEFORE PROCEEDING.

11.6 Undercarriage Removal (Welded/Fixed-type on Towbar Assembly P/N 230050)

- 11.6.1 The towbar must be properly set-up before starting the removal process. Using the pump, raise the towbar to a convenient height, and securely block both ends of the towbar body.
- 11.6.2 Open and close the pump release valve to fully retract the wheels, then securely block the axle.
- 11.6.3 Remove the wheel/hub assemblies. Pry the grease cap off; remove cotter pin, castellated nut and flat washer; and pull one of the two hubs off the axle shaft. Repeat for the remaining hub.
- 11.6.4 On both retraction spring assemblies, remove the adjusting nuts and spherical washers from their eye bolts. Once the nuts and washers have been removed, the shank of the eye bolt can be pulled out of the bracket, freeing the spring. READ THE CAUTION BELOW BEFORE PROCEEDING.

CAUTION

BE ALERT FOR ANY UNFORSEEN COMPLICATIONS DURING THIS STEP. WHEEL REMOVAL REDUCES THE LOAD ON THE SPRING, BUT THERE IS STILL TENSION IN IT. THIS TENSION SHOULD DECREASE AS YOU UNSCREW THE ADJUSTING NUT, UNTIL THERE IS NONE, BY THE TIME THE NUT IS CLOSE TO THE END OF THE EYE BOLT THREADS. IF IT BECOMES CLEAR THAT SPRING TENSION WILL NOT BE COMPLETELY ELIMINATED BEFORE THE ADJUSTING NUT REACHES THE END OF THE EYE BOLT THREADS, EXERCISE APPROPRIATE SAFETY PRECAUTIONS.

Continued on Next Page 

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 11 - COMPONENT REMOVAL AND INSTALLATION (cont'd)

11.6 Undercarriage Removal (Welded/Fixed-type on Towbar Assembly P/N 230050) (cont'd)

11.6.5 Disconnect both springs completely.

11.6.6 Remove the crossbolt and disconnect the hydraulic cylinder piston from the undercarriage. Drive out one of the roll pins (with the opposite pin still attached), and push the pivot shaft sideways, to slide it out of the undercarriage assembly. (You will need to maintain control of the undercarriage frame, while doing this, to prevent the frame from dropping down onto the towbar body and causing unnecessary damage.)

11.6.7 Remove the undercarriage frame from the towbar.

11.7 Undercarriage Reassembly/Installation (Welded/Fixed-type on Towbar Assembly P/N 230050)

11.7.1 The towbar must be properly set-up before starting the removal process. Securely block both ends of the towbar body.

11.7.2 Manipulate the undercarriage frame onto the towbar body, and bring it into alignment with the stud that is welded to the underside.

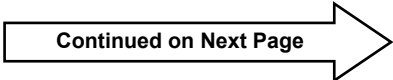
11.7.3 Insert one of two roll pins into the pivot pin, so it protrudes about 1/2" from each side, and install the pivot pin completely through the assembly, until it makes contact with the bushing shoulder. Install the second roll pin.

11.7.4 Rotate the undercarriage frame upward, and place a block under the axle housing to support it in the raised position. Install the bolt that will connect the undercarriage frame to the hydraulic cylinder.

11.7.5 Connect the hydraulic cylinder piston to the undercarriage, and attach the crossbolt.

11.7.6 Connect each spring's hook to its respective hole on the undercarriage frame. Insert the eye bolt end of each spring into the respective holes in the towbar body brackets. Install the spherical washer and nut onto the end of the positioned eye bolt, and tighten until the spring has stretched to approximately 11" long. (If necessary, a C-clamp or similar tool may be used to stretch the spring enough to install the nut and washer on the eye bolt.)

11.7.7 Service and install the wheels on the axle. (See Page 21 for details.)

Continued on Next Page 


Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 11 - COMPONENT REMOVAL AND INSTALLATION (cont'd)

11.8 Undercarriage Removal (Articulating-type on Towbar Assembly P/N 230030)

- 11.8.1 The towbar must be properly set-up before starting the removal process. Support both ends of the towbar body on sawhorses.
- 11.8.2 Open and close the pump release valve to fully retract the wheels.
- 11.8.3 Remove the wheel/hub assemblies. Pry the grease cap off; remove cotter pin, castellated nut and flat washer; and pull one of the two hubs off the axle shaft. Repeat for the remaining hub.
- 11.8.4 Remove the crossbolt and disconnect the hydraulic assembly (cylinder and pump). Remove the top "through" rod. (The rod can be removed at any time, so long as it is removed before removing the undercarriage, itself.)
- 11.8.5 Flip the towbar body upside down.
- 11.8.6 On the retraction spring assembly, remove the adjusting nut and spherical washer from the eye bolt. Once the nut and washer have been removed, the shank of the eye bolt can be pulled out of the bracket, freeing the spring. Disconnect the spring.
- 11.8.7 Drive out both of the spring pins and push the pivot shaft sideways to slide it out, in order to separate the axle assembly from the undercarriage. (Be sure to support the axle assembly while driving out the pivot shaft, in order to prevent it from dropping down onto the towbar body, and causing unnecessary damage.)
- 11.8.8 Remove the 4 bolts from the undercarriage side plates. The undercarriage can now be removed from the towbar body.

Continued on Next Page 


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TOWBAR ASSEMBLY P/N 220530

Section 11 - COMPONENT REMOVAL AND INSTALLATION (cont'd)

11.9 Undercarriage Reassembly/Installation (Articulating-type on Towbar Assembly P/N 230030)

- 11.9.1 The towbar must be properly set-up before starting assembly. Support both ends of the towbar body on sawhorses, in the upside-down position (wheel side up).
- 11.9.2 Situate the undercarriage frame over the towbar body, and align with the pivot shaft hole. Attach the 4 bolts to the undercarriage side plates.
- 11.9.3 Slide the pivot shaft completely through the axle assembly (axle tube and undercarriage side plates), and align the spring pin holes in the pivot shaft with the holes in the undercarriage frame. Secure the pivot shaft by installing the two spring pins.
- 11.9.4 Connect one end of the spring to its hole, and secure the eye bolt end by adjusting the nut and spherical washer, and tightening until the spring has stretched to approximately 11" long. (If necessary, a C-clamp or similar tool may be used to stretch the spring enough to install the nut and washer on the eye bolt.)
- 11.9.5 Flip the towbar right-side up. Install the top "through" rod in the top of the undercarriage frame.
- 11.9.6 Connect the hydraulic assembly (cylinder and pump) and attach the crossbolt.
- 11.9.7 Service and install the wheels on the axle. (See Next Page for details.)

Continued on Next Page 

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TOWBAR ASSEMBLY P/N 220530

Section 11 - COMPONENT REMOVAL AND INSTALLATION (cont'd)

11.9.7 Service and install the wheels on the axle

- (a) Prior to installing the wheels, clean and inspect the wheel bearings. If needed, re-place the wheel bearings. Pack the hub and bearings with wheel bearing grease and insert bearing braces into the hub.
- (b) Install the wheel by placing it onto the axle. Seat the bearings with hand pressure only.
- (c) On the axle, install large flat washers, small flat washers, and the slotted nut. Tighten the nut in order to seat the bearings, then loosen the nut until the first slot aligns with the hole in the axle.
- (d) Install a new cotter pin through the nut and axle.
- (e) Pack the dust cap with new bearing grease and install onto the hub. Gently tap the dust cap until seated.
- (f) Check the wheel for free rotation and for play in the bearings. Adjust as required. Inflate the tires to 14 psi (0.95 atm), each.

11.9.8 Remove the block from under the undercarriage axle.

11.9.9 Lower the wheels by pumping the handle until the wheels are on the ground and bearing the weight of the towbar body.

11.9.10 Remove the blocks from beneath the towbar body.

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TOWBAR ASSEMBLY P/N 220530

Section 11 - COMPONENT REMOVAL AND INSTALLATION (cont'd)

11.10 Lunette Removal (From the towbar body)

11.10.1 The towbar must be properly set-up before starting the removal process. Using the pump, raise the towbar to a convenient height, and securely block one or both ends of the towbar body. Chock both wheels.

11.10.2 Remove the six bolts and flat washers that hold the lunette in place, then slide the assembly out the end of the towbar body (tube).

11.10.3 Disassembly of the Shock Absorbing Unit (Take note of the location and orientation of the elastomer disks, float rings and center ring, before removing any of the components from the drawbar assembly.)

- a) Remove the cotter pin.
- b) Unscrew the castellated nut.
- c) Remove the washer.

11.10.4 Reassembly of the Shock Absorbing Unit

- a) Apply multi-purpose grease to both sides of each elastomer disk and both sides of each float ring.
- b) Install the float rings, center ring and elastomer disks onto the drawbar in the correct sequence.
- c) Install the washer and nut, tightening until there is contact with the float ring.
- d) Install the cotter pin. (The nut should be lined up with a secondary hole in the draw-bar shaft, for complete "through" placement.)

11.11 Lunette Reassembly/Installation

11.11.1 Slide the assembly into the end of the towbar body (tube), lining up the tapped holes in the lunette center ring with those in the towbar body.

11.11.2 Install the six washers and bolts.

11.11.3 Torque the bolts to 700 in-lbs. (58 ft.-lbs.).

NOTE

Always install lockwire (if applicable) and/or Loctite 242 to bolts during installation.

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TOWBAR ASSEMBLY P/N 220530

Section 12 - SHEAR BOLT FAILURE

The Stanley 220530 towbar is equipped with a Shear Bolt, which is designed to break under excessive load, thereby protecting the aircraft from unnecessary damage. Shear Bolt failure is normally accompanied by a sudden jerk of the tow vehicle and by an audible snap, however the operator may fail to notice either of these indicators in a busy and/or noisy environment. The Stanley 220530 towbar is equipped with a red warning flag to provide an immediate, positive signal that Shear Bolt failure has occurred.

The warning flag is normally restrained in the lowered (horizontal) position. Shear Bolt breakage activates a release mechanism, causing the flag to raise to a vertical position, alerting the operator to stop towing. Towing with a broken (or missing) Shear Bolt is unacceptable and introduces unnecessary risk of damage to the aircraft.

Following a Shear Bolt failure, the towbar must be taken out of service for Shear Bolt replacement. Read and understand the CAUTION, below.

CAUTION

Refer to Figures 12-1 and 12-2 on the next page.

The signal flag is held in the lowered (normal) position by a length of lockwire that passes through the upper adapter plate, the head plate and the lower adapter plate. Shear Bolt failure is accompanied by the sudden release of large forces, causing the head plate to move with respect to the adapter plates. This displacement causes the lockwire to be sheared, thus releasing the signal flag. The lockwire is actually cut into 3 pieces - 2 end pieces and a center section. The short end pieces are held securely in place and should not separate from the towbar. The center section of wire (approximately 2.5" long) will be 'captured' inside the hole in the headplate. The diameter of the lockwire and the size of the thru-hole have been engineered to maximize the probability of capture. However, there is a possibility that the piece of wire could become dislodged from the hole, fall free of the tow bar and become FOD.

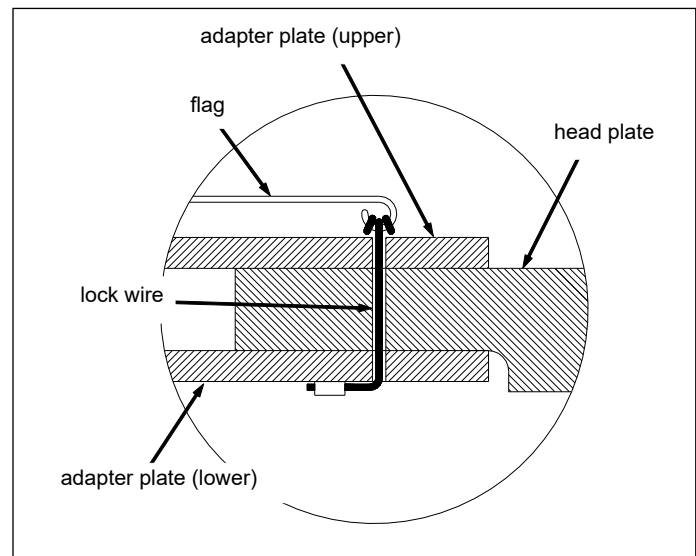
Stanley recommends that the center section of lockwire be re-covered IMMEDIATELY to prevent the possibility of having it ingested by an engine.

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TOWBAR ASSEMBLY P/N 220530

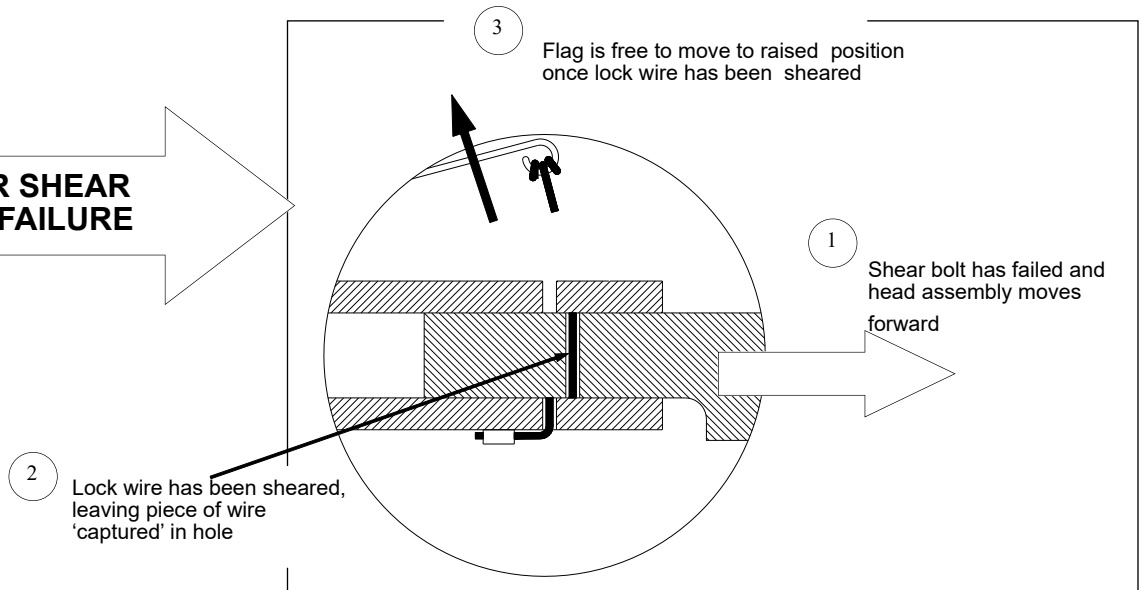
Section 12- SHEAR BOLT FAILURE (cont'd)

BEFORE SHEAR BOLT FAILURE



▲ FIGURE 12-1

AFTER SHEAR BOLT FAILURE



▲ FIGURE 12-2

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 13– SHEAR BOLT REPLACEMENT

The complete Shear Bolt assembly must be replaced in the event of damage or breakage, not just individual components. Replace the entire unit as an assembly. DO NOT attempt to salvage and re-use any parts from a damaged or broken Shear Bolt. It is not necessary to remove the head assembly from the towbar when replacing a Shear Bolt. It can be performed while the head assembly is in-place, on the towbar.

- 13.1 The head plate will move forward, when the Shear Bolt breaks. You must realign the upper and lower adapter plates in order to remove all the pieces and to install new parts.
- 13.2 Loosen the head plate's retaining bolt. If the head plate won't move, you may need to loosen the attaching bolts on the adapter plate, as well.
- 13.3 Remove all pieces of the Shear Bolt and lock nut, the upper and center bushings. REMOVE ANY TRACES OF BROKEN LOCKWIRE.
- 13.4 From the top, install a new upper shoulder bushing and a new shear pin. Seat the bushing FLUSH against the upper adapter plate.
- 13.5 From the bottom, install the lower shoulder bushing, the center straight bushing, lock washer, and lock nut. Seat the bushing FLUSH against the lower adapter plate. Tighten the nut only to surface contact. DO NOT TORQUE.
- 13.6 Re-tighten the adapter plate attaching bolts (if they were previously loosened) and the retaining bolt.
- 13.7 Torque the shear bolt and retaining bolt to 120-180 in.-lbs. (10-15 ft.-lbs.) beyond run-down torque.

NOTE

The nuts on the retaining bolt and the shear bolt are prevailing-torque (Flexloc) fasteners, therefore the run-down torque for these nuts must be considered when tightening them to final specifications. Final torque should be 15 ft.-lbs. (11 n-m) greater than the measured run-down torque.

- 13.8 Replace the signal flag lockwire. (Refer to Section 11-2.)

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TOWBAR ASSEMBLY P/N 220530

Section 14– SERVICE INSTRUCTIONS

14.1 Hydraulic Cylinder Overhaul

It is advised that at least two employees work together when removing the hydraulic system, to ensure safe control of all the system components. (Refer to Sections 11-3 and 11-4 on removal from the towbar body, as well as installation.)

- 14.1.1 Remove the hose fitting from the cylinder.
- 14.1.2 Drain the oil into an approved container for disposal or recycling. Move the piston rod in and out to pump the oil out of the cylinder. Inspect the oil for metal shavings or contamination.
- 14.1.3 Clean the outside of the cylinder.
- 14.1.4 Extend the piston rod and clean it using a degreasing solvent. Inspect the rod surface for corrosion, peeling of the chrome layer, scoring, bending, or other damage. Replace the cylinder if any damage is found.
- 14.1.5 Inspect the cylinder tube for dents, corrosion, holes, or bending. Replace the cylinder if any damage is found.
- 14.1.6 Unscrew the gland nut from the tube and remove.
- 14.1.7 Remove the packing and adapter:
 - a) Cover the opening around the base of the rod with a clean shop rag.
 - b) Carefully applying low air pressure to the input port to dislodge the packing and adapter.
 - c) Ensure that all packing and adapter rings have been removed.
- 14.1.8 Clean the cylinder by flushing it with a suitable cleaning agent.
- 14.1.9 Remove and discard the wiper seal from inside the gland nut, and install a new one.
- 14.1.10 Install a new adapter and packing set into the rod. Ensure that the points are facing toward the open end of the cylinder.
- 14.1.11 Install the gland nut onto the rod. Be careful not to damage the wiper seal.
- 14.1.12 Screw the nut into the cylinder and tighten it to compress the packing.

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TOWBAR ASSEMBLY P/N 220530

Section 14– SERVICE INSTRUCTIONS (cont'd)

14.1 Hydraulic Cylinder Overhaul (cont'd)

- 14.1.13 Install the cylinder onto the tow bar, with the port facing up. (Refer to Sections 11-3 and 11-4).
- 14.1.14 Fill and bleed the system. Use only approved hydraulic oil equivalent to MIL-H-5606 specifications. (Refer to Section 11-5). DO NOT use the towbar until the system has been properly bled.


CAUTION

Pump failure or seals damage may result from using a phosphate-ester-based hydraulic fluid (such as Skydrol®).

14.2 Hydraulic Pump Overhaul

(It is advised that at least two employees work together when removing the hydraulic system, to ensure safe control of all the system components. (Refer to Sections 11-3 and 11-4 on removal from the towbar body, as well as installation.)

- 14.2.1 Thoroughly clean the outside of the pump.
- 14.2.2 Remove the pump handle by removing the cotter pin and pivot pin.
- 14.2.3 Remove the piston head and piston pin from the top of the piston.
- 14.2.4 Remove the fill plug and six bolts which hold the cover in-place. Lift the cover off the body.
- 14.2.5 Push the piston down through the opening in the cover while removing the cover from the reservoir.
- 14.2.6 Carefully remove the piston from its cylinder bore. Set the piston aside on a clean, lint-free cloth. Do not damage the mating surfaces of the piston or the cylinder bore.
- 14.2.7 Drain the oil from the reservoir into an approved container for disposal or recycling.
- 14.2.8 Remove the valve plug, located on the inside of the reservoir, next to the cylinder.
- 14.2.9 Remove the valve plug, located below the outlet port, on the outside of the reservoir. Save both the spring and the ball for reuse.
- 14.2.10 Remove the release lever, packing nut, and the packing with the release valve shaft.
- 14.2.11 Thoroughly clean each part and the reservoir.

Continued on Next Page 

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TOWBAR ASSEMBLY P/N 220530

Section 14– SERVICE INSTRUCTIONS (cont'd)

14.2 Hydraulic Pump Overhaul (cont'd)

- 14.2.12 Inspect the piston and cylinder for scoring and corrosion. Inspect the check valve seat and the ball for scoring and corrosion. Inspect the release valve shaft for bending or scoring near the packing surface. Inspect for a broken or missing retract spring. Replace components as necessary, or obtain a new pump assembly.
- 14.2.13 Replace the valve plugs with new gaskets. Re-install the ball and spring.
- 14.2.14 Replace the release valve shaft and install new rubber packing and release valve packing, replacing the rubber packing first. Replace the packing nut and torque to 70–90 in.-lbs.
- 14.2.15 Replace the release valve lever.

NOTE

The release valve should move 70° - 90° before reaching the cap screw stop. The release valve packing nut should be adjusted to keep the packing from leaking without preventing the spring from closing the release valve.

- 14.2.16 Replace the piston in the cylinder. Do not score, scrape, or damage any of the surfaces. The piston and cylinder must be replaced as a unit if they are damaged. APPLY A THIN LAYER OF OIL TO THE PISTON PRIOR TO SLIDING IT INTO THE CYLINDER.
- 14.2.17 Replace the seal in the cover with new seal.
- 14.2.18 Remove handle pivot bracket by unscrewing nut from inside cover. Install new gasket, then replace nut and washer. Tighten nut securely. (Some pump models have a cast handle pivot bracket, so this step may not apply.)
- 14.2.19 Remove old cover gasket and clean mating surfaces on reservoir and cover. Install a new cover gasket on the reservoir.
- 14.2.20 Replace the cover on the reservoir, while carefully sliding the piston through the wiper seal. Install the six cover bolts, and tighten evenly and securely.
- 14.2.21 Replace piston head, handle, and pivot pin. Secure using a new cotter pin.
- 14.2.22 Install the pump onto the towbar. (Refer to Sections 11-3 and 11-4.)
- 14.2.23 Fill and bleed the system. Use only approved hydraulic oil equivalent to MIL-H-5606 specifications. (Refer to Section 11-5). DO NOT use the towbar until the system has been properly bled.

CAUTION

Pump failure or seals damage may result from using a phosphate-ester-based hydraulic fluid (such as Skydrol®).

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Section 15– ILLUSTRATED PARTS LIST

15.1 How to use this Parts List

Turn to the Assembly Figure and identify the part by location and appearance. Note the Item Number assigned to the illustrated part. Locate the Item Number in the appropriate parts list. The line entry for that Item Number provides the, Part Number, Description, and Quantity required Per Assembly.

15.2 Units Per Assembly

Quantities specified in the Units Per Assembly column are the total number of each part required for the indicated assembly, if the part is included in a higher-level assembly. The total quantity required is a product of the quantities indicated at each level, up to the Top Assembly.

15.3 How to order Replacement Parts

Replacement parts and/or spare parts listed in this manual may be ordered by specifying the Top Assembly Part Number, the Subassembly Part Number (if any), the Item Number, Description, and the Quantity Required.

Example:

TOP ASSEMBLY P/N 215030-1 TOWBAR ASSEMBLY
SUBASSEMBLY ITEM 20, ADAPTER KIT

Item number	Part number	Description	Quantity Req'd/ Units Per Assembly
4	101715-75	washer	2

In the above example, there are two washers per adapter kit, and one adapter kit per towbar, so to replace all washers on the adapter kit bolt, a quantity of 2 is specified.

Replacement and/or spare parts may be ordered from:

STANLEY AVIATION CORPORATION

10805 Painter Ave.

Santa Fe Springs, California 90670, USA

Tel: 1.562.906.9300

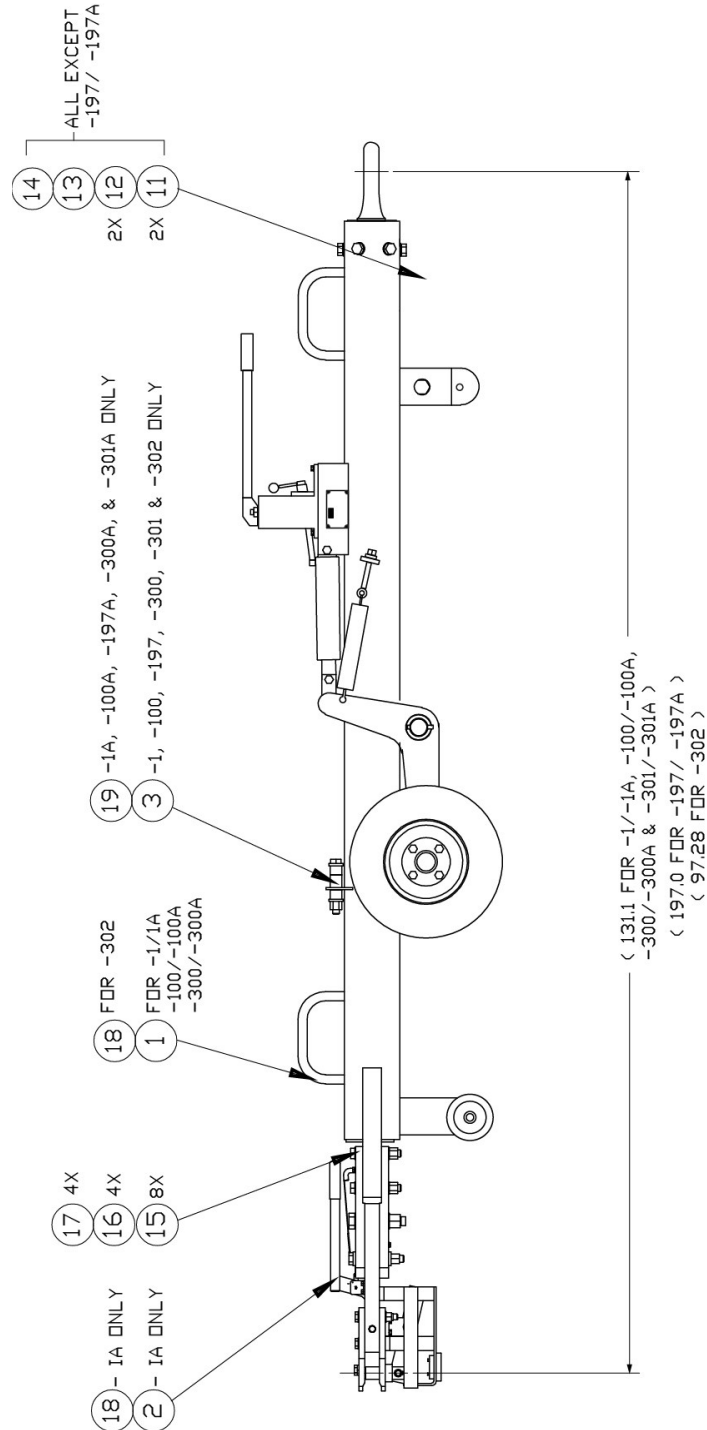
Fax: 1.562.906.9308

agse@agsecorp.com

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Section 15- ILLUSTRATED PARTS LIST (cont'd)

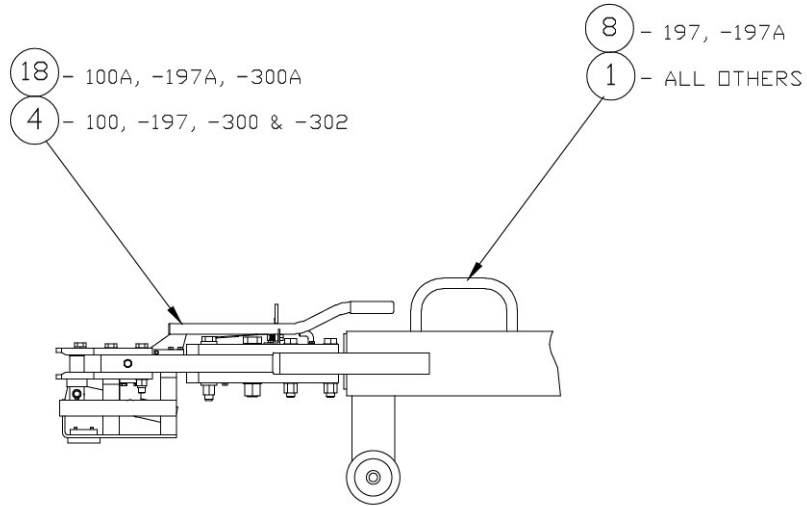


See page 32 for parts list

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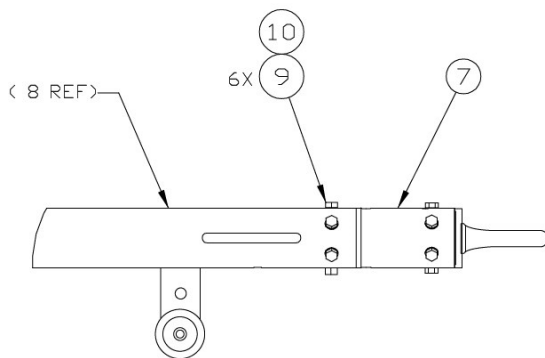
TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)

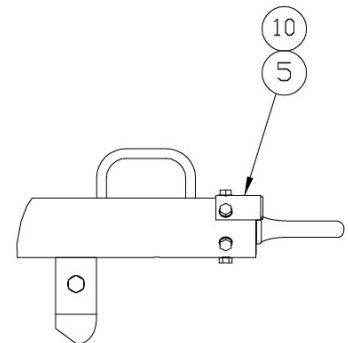


-100/ -100A ASSEMBLY
-197/ -197A ASSEMBLY
-300/ -300A ASSEMBLY
-302 ASSEMBLY

P/N 220530-100/-100A, -197/-197A, -300/-300A Head Assembly Detail



P/N 220530-197/-197A Lunette Assembly Detail



P/N 220530-301/-301A Limiter Kit Detail

See page 32 for parts list

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TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)

QTY REQD										ITEM NO	PART NO	DESCRIPTION
									X		220530-1	B747 TOWBAR ASSEMBLY
								X			220530-1A	B747 TOWBAR ASSEMBLY
							X				220530-100	B747 TOWBAR ASSEMBLY
						X					220530-100A	B747 TOWBAR ASSEMBLY
					X						220530-197	B747 TOWBAR ASSEMBLY
				X							220530-197A	B747 TOWBAR ASSEMBLY
	1		X								220530-300	B747 TOWBAR ASSEMBLY
1		X									220530-300A	B747 TOWBAR ASSEMBLY
	X										220530-301	B747 TOWBAR ASSEMBLY
X											220530-301A	B747 TOWBAR ASSEMBLY
X											220530-302	B747 TOWBAR ASSEMBLY
		1	1			1	1	1	1	1	230050-3	TOWBAR ASSEMBLY
									1	2	220500-100	ADAPTER KIT
1		1	1		1		1		1	3	220500-300	SHEAR PIN KIT
1		1	1		1		1			4	220500-400	ADAPTER KIT
	1	1								5	214200-1	LIMITER KIT
				1	1					7	230031-20	EXTENSION KIT
				1	1					8	230050-181	TOWBAR ASSEMBLY
				6	6					9	101898-100H	BOLT, HEX HEAD, GR8, .75-16UNF X 1.00L, DRILLED HEAD
				A/R	A/R					10	MS20995-C41	LOCK WIRE
2		2	2			2	2	2	2	11	230036-1	BALLAST
2		2	2			2	2	2	2	12	101715-100	FLATWASHER, Ø1.00
1		1	1			1	1	1	1	13	101875-100	LOCK NUT, 1.0-8UNC
1		1	1			1	1	1	1	14	102520-700	BOLT, HEX HEAD, GR8, 1.0-8UNC X 7.00L
8		8	8	8	8	8	8	8	8	15	101715-75	FLATWASHER, Ø.75
4		4	4	4	4	4	4	4	4	16	101898-500	BOLT, HEX HEAD, GR8, .75-16UNF X 5.00L
4		4	4	4	4	4	4	4	4	17	101876-75	LOCK NUT, .75-16UNF
								1		18	220500-101	ADAPTER KIT
		1		1		1		1		19	220500-200	SHEAR PIN KIT
		1		1		1				20	220500-401	ADAPTER KIT
1										21	230050-206	TOWBAR ASSEMBLY

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TOWBAR ASSEMBLY P/N 220530

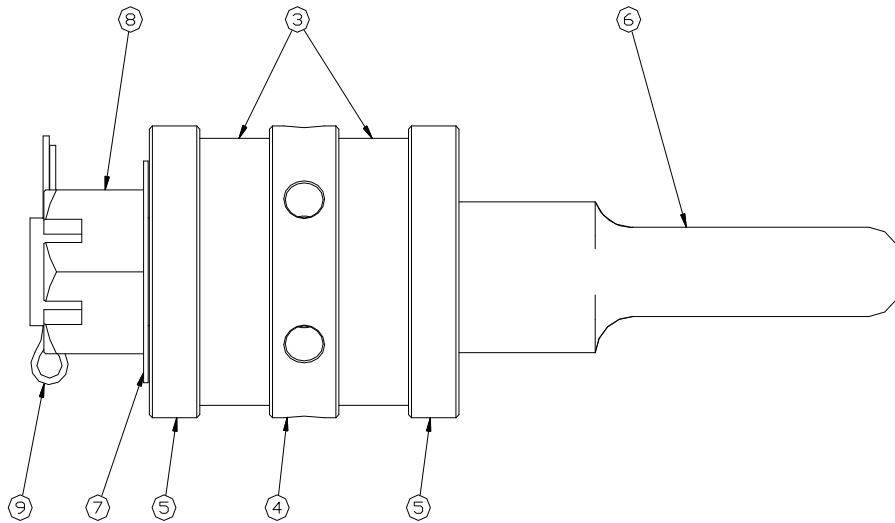
Section 15– ILLUSTRATED PARTS LIST (cont'd)

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									X			220530-1A	B747 TOWBAR ASSEMBLY
								X				220530-100	B747 TOWBAR ASSEMBLY
							X					220530-100A	B747 TOWBAR ASSEMBLY
					X							220530-197	B747 TOWBAR ASSEMBLY
				X								220530-197A	B747 TOWBAR ASSEMBLY
			X									220530-300	B747 TOWBAR ASSEMBLY
		X										220530-300A	B747 TOWBAR ASSEMBLY
	X											220530-301	B747 TOWBAR ASSEMBLY
X												220530-301A	B747 TOWBAR ASSEMBLY
												220530-302	B747 TOWBAR ASSEMBLY
1	-	-	-	1	-	-	-	-	-	1	22	AM-2207	AGSE PLACARD
										1	23	220530-40-SK1	STENCIL KIT FOR 220530-1
									1		24	220530-40-SK2	STENCIL KIT FOR 220530-100
					1						25	220530-40-SK3	STENCIL KIT FOR 220530-197
				1							26	220530-40-SK4	STENCIL KIT FOR 220530-300
		1									27	220530-40-SK5	STENCIL KIT FOR 220530-301
1											28	220530-40-SK6	STENCIL KIT FOR 220530-302

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TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



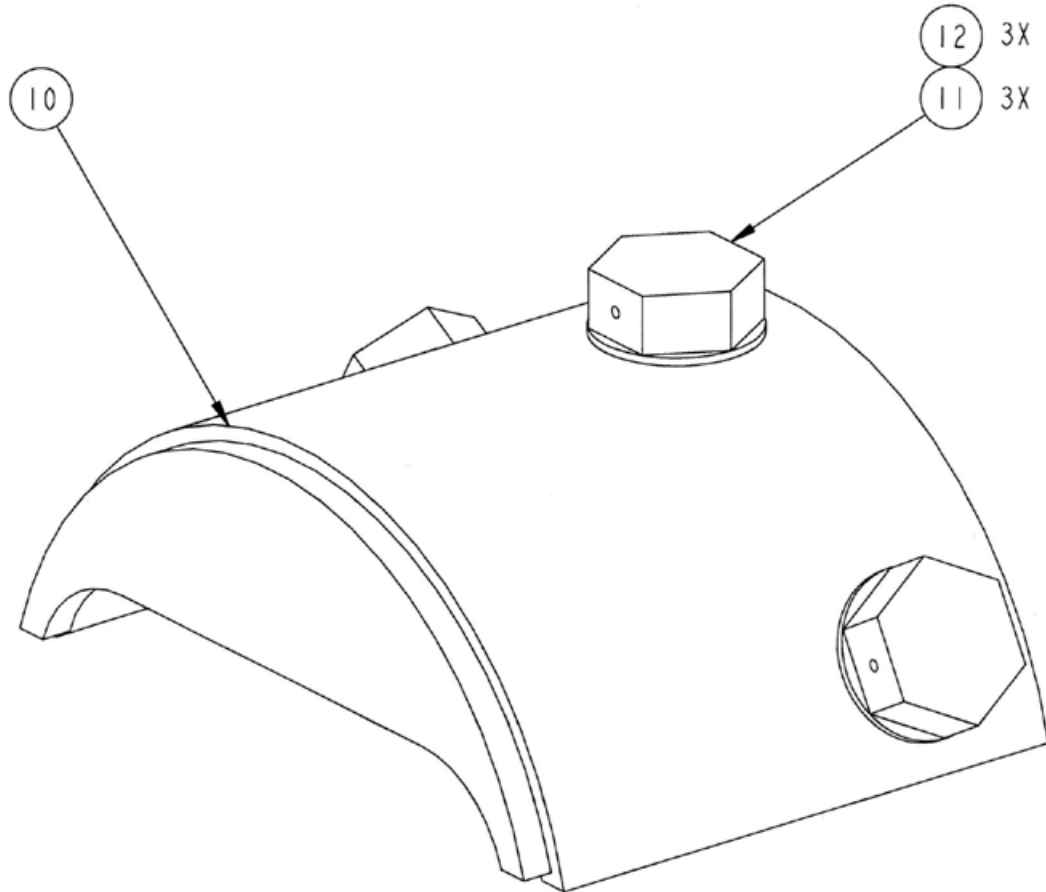
P/N 214033-1 Lunette Assembly

QTY REQD	ITEM NO.	PART NO.	DESCRIPTION
		214033-1	LUNETTE ASSEMBLY, SHOCK ABSORBING
2	3	102081-2	ELASTOMER DISC
1	4	214022-1	CENTER RING
2	5	214021-1	FLOAT RING
1	6	104319-2	DRAWBAR
1	7	104319-3	FLAT WASHER
1	8	104319-4	SLOTTED NUT
1	9	104319-5	COTTER PIN

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Section 15– ILLUSTRATED PARTS LIST (cont'd)



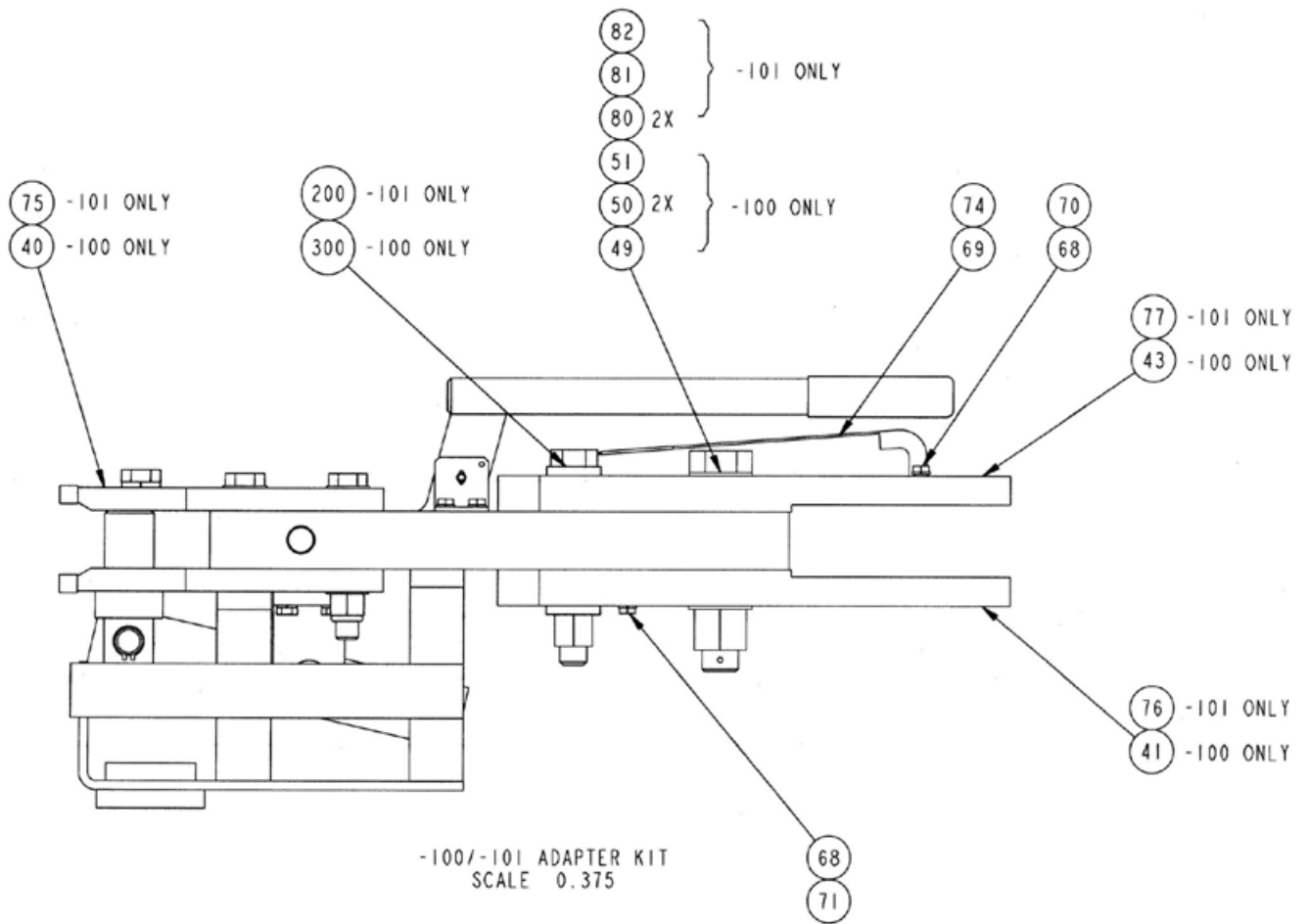
▲ P/N 214200-1 Limiter Kit

QTY REQD	ITEM NO	PART NO	DESCRIPTION
X		214200-1	LIMITER KIT
1	10	214203-1	LIMITER WELDMENT
3	11	101898-125H	BOLT, HEX HEX GR8, .75-16UNF X 1.25L, DRILLED HEAD
3	12	101715-75	FLATWASHER, Ø.75

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



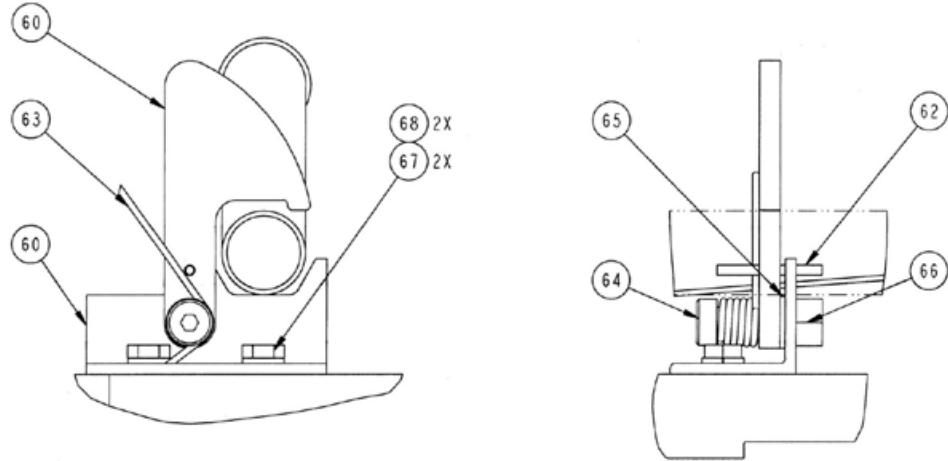
P/N 220500-100/-101 Adapter Kit

See page 37 for parts list

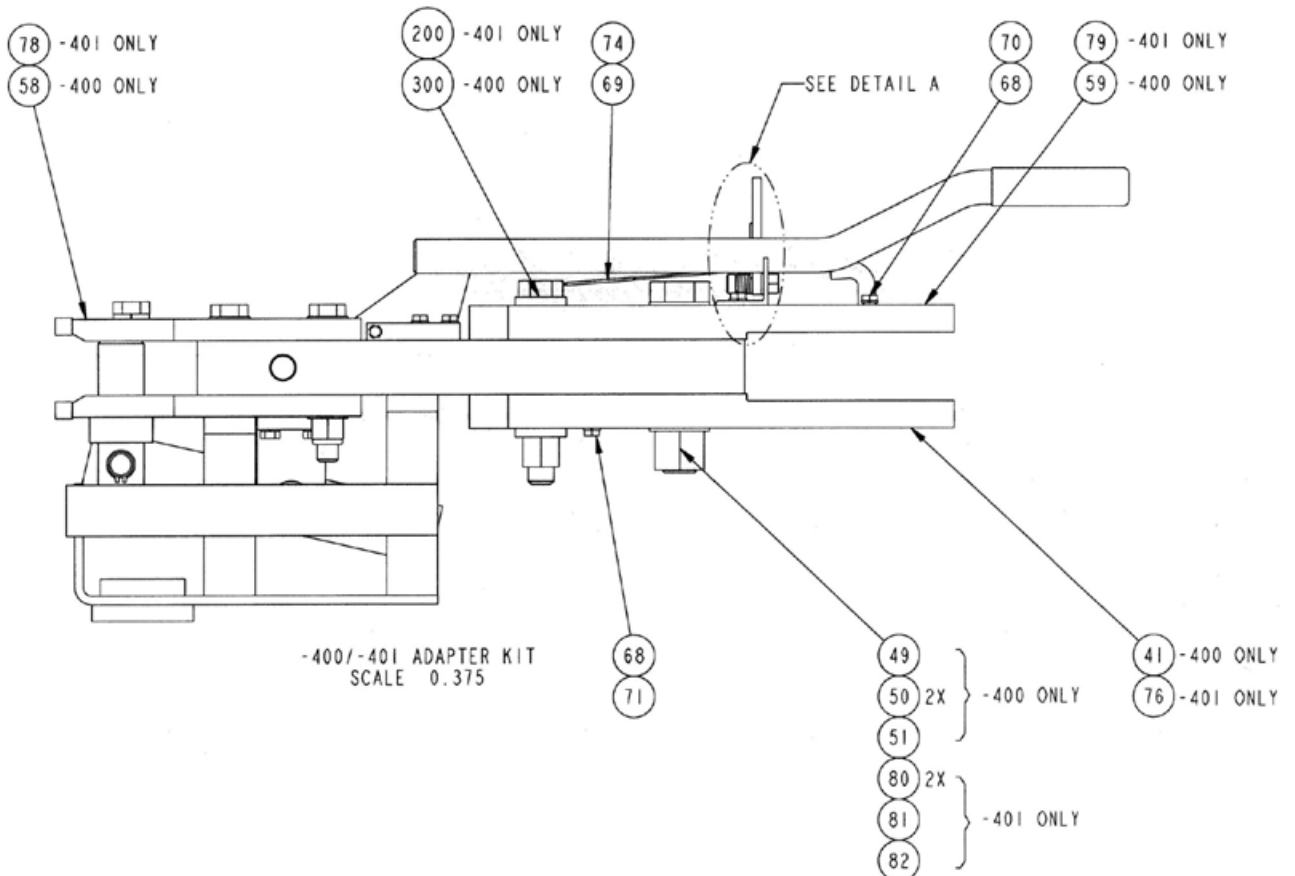
Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



DETAIL A
SCALE 1.000



-400/-401 ADAPTER KIT
SCALE 0.375

P/N 220500-400/-401 Adapter Kit

See page 37 for parts list

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15– ILLUSTRATED PARTS LIST (cont'd)

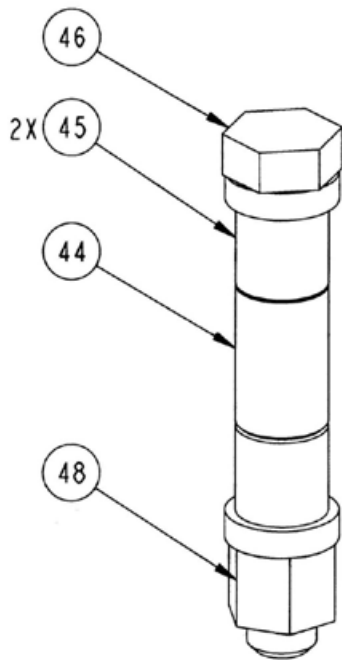
QTY REQD				ITEM NO	PART NO	DESCRIPTION
			X	100	220500-100	ADAPTER KIT
		X		101	220500-101	ADAPTER KIT
	X			400	220500-400	ADAPTER KIT
X				401	220500-401	ADAPTER KIT
			1	40	220560-1	HEAD ASSEMBLY
	1		1	41	220586-1	ADAPTER PLATE, LOWER
			1	43	220586-3	ADAPTER PLATE, UPPER
				44	204109-21	SHEAR BUSHING, HEADLESS
				45	201057-19	SHEAR BUSHING, SHOULDER
				46	101898-550	BOLT, HEX HEAD, GR8, .75-16UNF X 5.50L
				48	101876-75	LOCK NUT, .75-16UNF
	1		1	49	101905-500	BOLT, HEX HEAD, GR8, 1.00-12UNF X 5.00L
	2		2	50	101715-100	FLATWASHER, Ø1.00
	1		1	51	101876-1	LOCK NUT, 1.00-12UNF
	1			58	220560-300	HEAD ASSEMBLY
	1			59	220586-2	ADAPTER PLATE, UPPER
1	1			60	220596-1	MOUNT ANGLE
1	1			61	220597-1	LATCH
1	1			62	100059-56	ROLL PIN
1	1			63	LTL-078N-01S	TORSION SPRING
1	1			64	MS51975-18	SHOULDER BOLT
1	1			65	101715-38	FLATWASHER, Ø.38
1	1			66	101875-31	LOCK NUT, .31-18UNC
2	2			67	102511-75	BOLT, HEX HEAD, GR8, .25-20UNC X .75L
4	4	2	2	68	103109-25	LOCKWASHER, Ø.25
1	1	1	1	69	215030-21	WARNING FLAG ASSEMBLY
1	1	1	1	70	102471-50	BOLT, HEX HEAD, GR5, .25-20UNC X .50L
1	1	1	1	71	102471-38H	
				72	201057-26	BUSHING, SHOULDER
				73	204109-44	SHEAR BUSHING, HEADLESS
A/R	A/R	A/R	A/R	74	MS20995C32	LOCKWIRE, Ø.032, STAINLESS
		1		75	220560-11	HEAD ASSEMBLY
1		1		76	220586-11	ADAPTER PLATE, LOWER
		1		77	220586-31	ADAPTER PLATE, UPPER
1				78	220560-301	HEAD ASSEMBLY
1				79	220586-21	ADAPTER PLATE, UPPER
2		2		80	101715-88	FLATWASHER, Ø.88
1		1		81	101876-88	LOCK NUT, .88-14UNF
1		1		82	101899-500	BOLT, HEX HEAD, GR8, .88-14UNF X 5.00L
1		1		200	220500-200	SHEAR PIN KIT
	1		1	300	220500-300	SHEAR PIN KIT

P/N 220500-100/-101 and -400/-401 Adapter Kit BOM

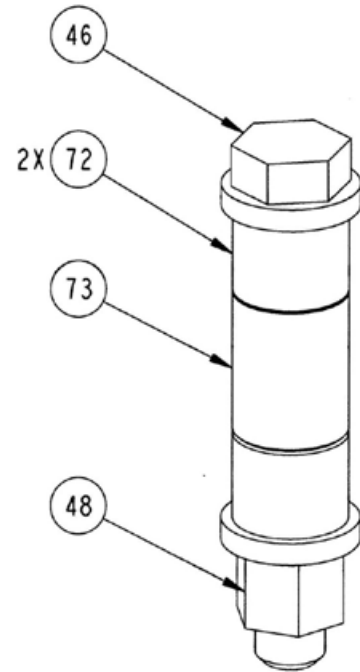
Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



-200 SHEAR PIN KIT
SCALE 0.750



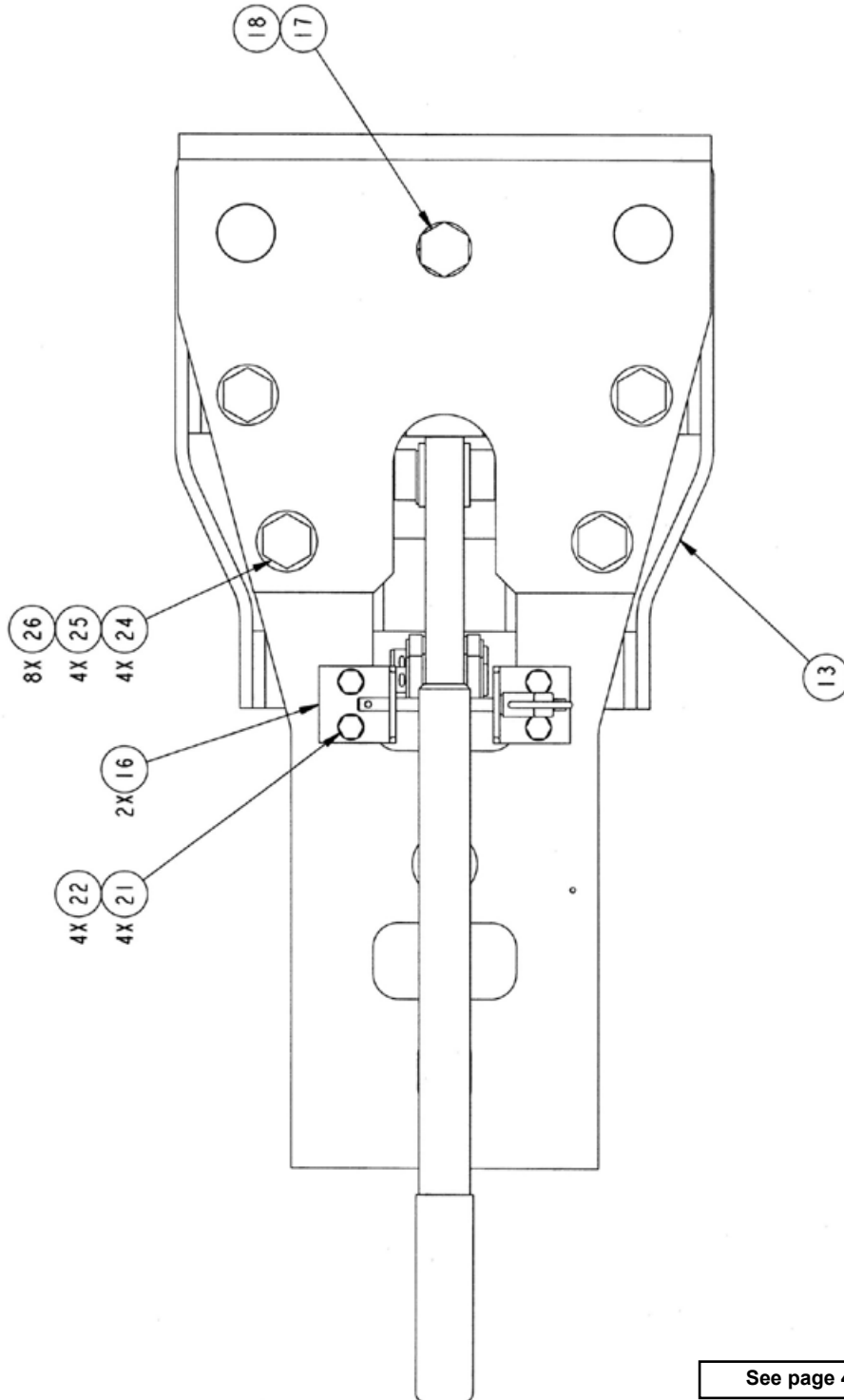
-300 SHEAR PIN KIT
SCALE 0.750

QTY REQD		ITEM NO	PART NO	DESCRIPTION
	X	200	220500-200	SHEAR PIN KIT
X		300	220500-300	SHEAR PIN KIT
	1	44	204109-21	SHEAR BUSHING, HEADLESS
	2	45	201057-19	SHEAR BUSHING, SHOULDER
1	1	46	101898-550	BOLT, HEX HEAD, GR8, .75-16UNF X 5.50L
1	1	48	101876-75	LOCK NUT, .75-16UNF
2		72	201057-26	BUSHING, SHOULDER
1		73	204109-44	SHEAR BUSHING, HEADLESS

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TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)

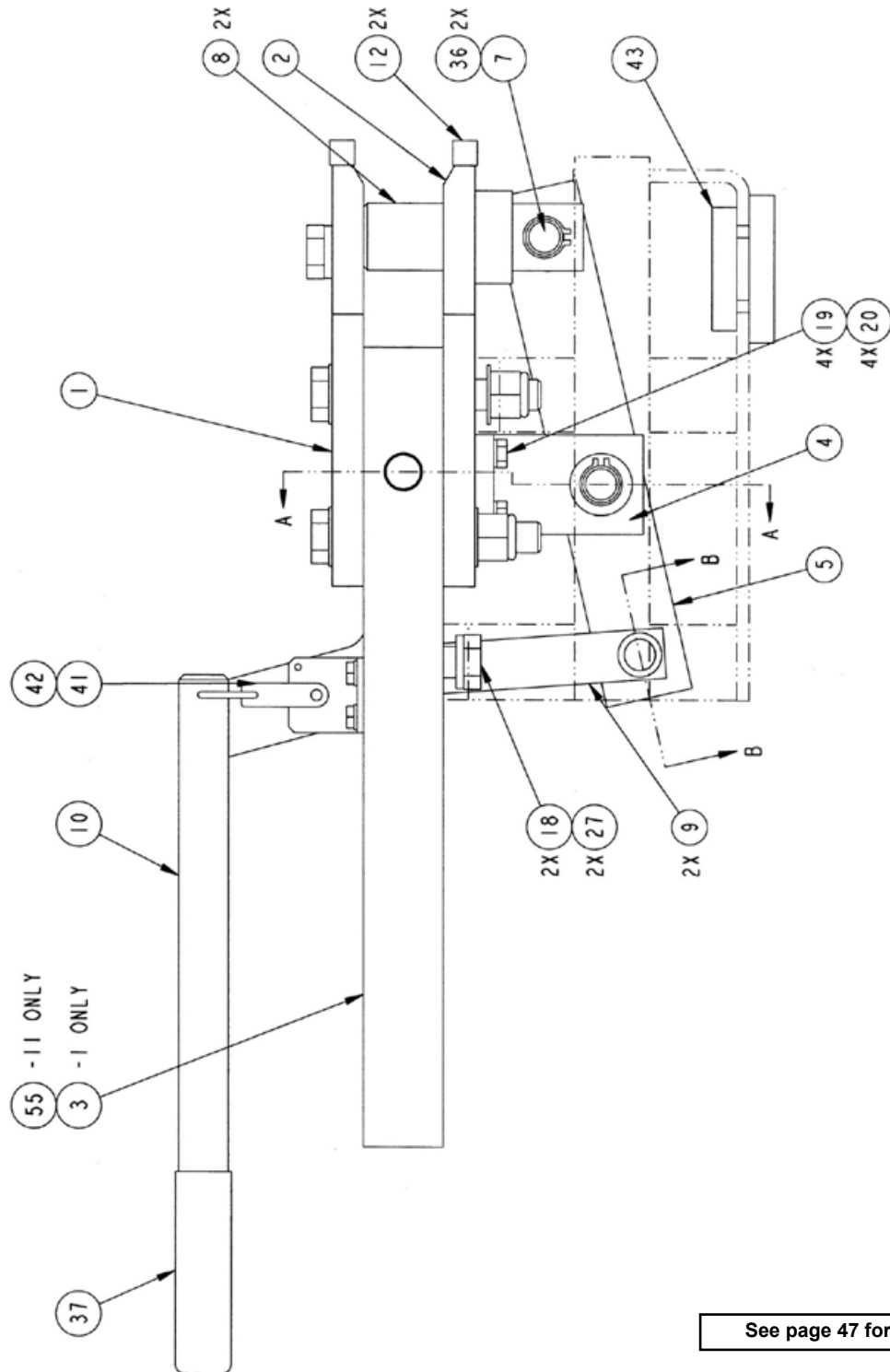


See page 47 for parts list

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)

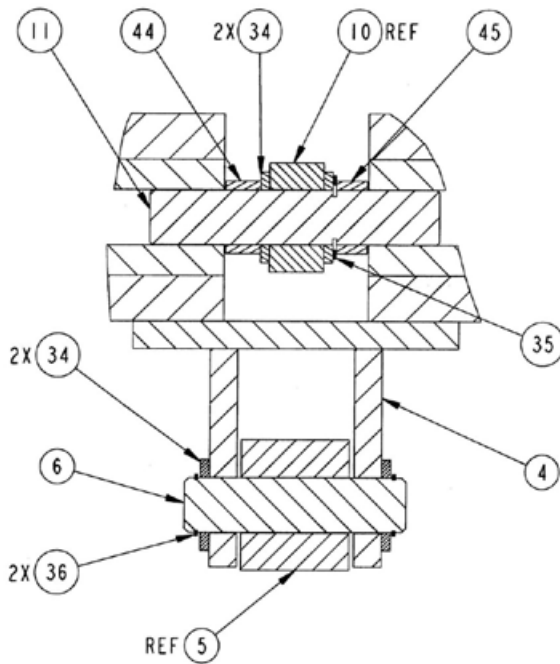


See page 47 for parts list

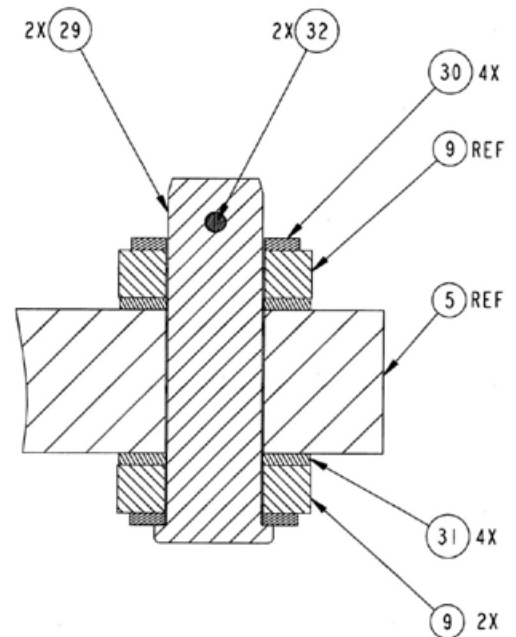
Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



SECTION A-A
SCALE 0.750



SECTION B-B
(BOTTOM OF ITEMS 9 SHOWN,
TOP IS SIMILAR)
SCALE 2.000

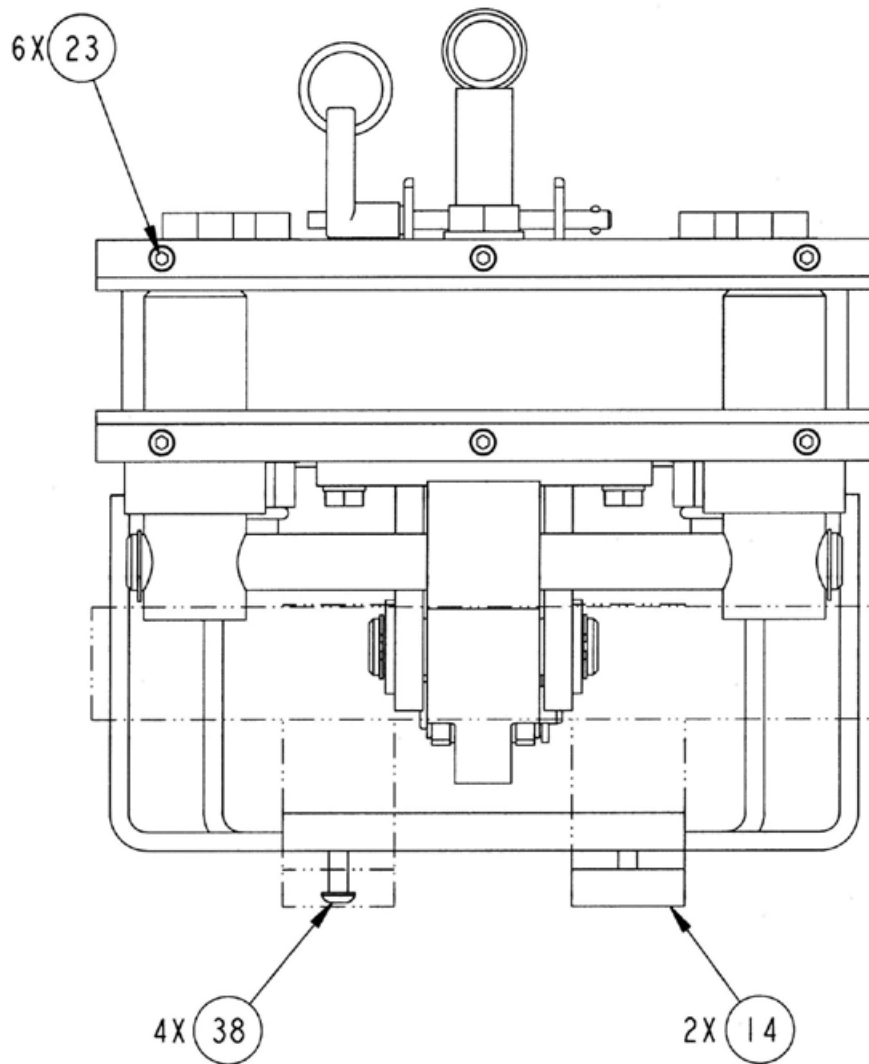
See page 47 for parts list

P/N 220560-1/-11 Head Assembly

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



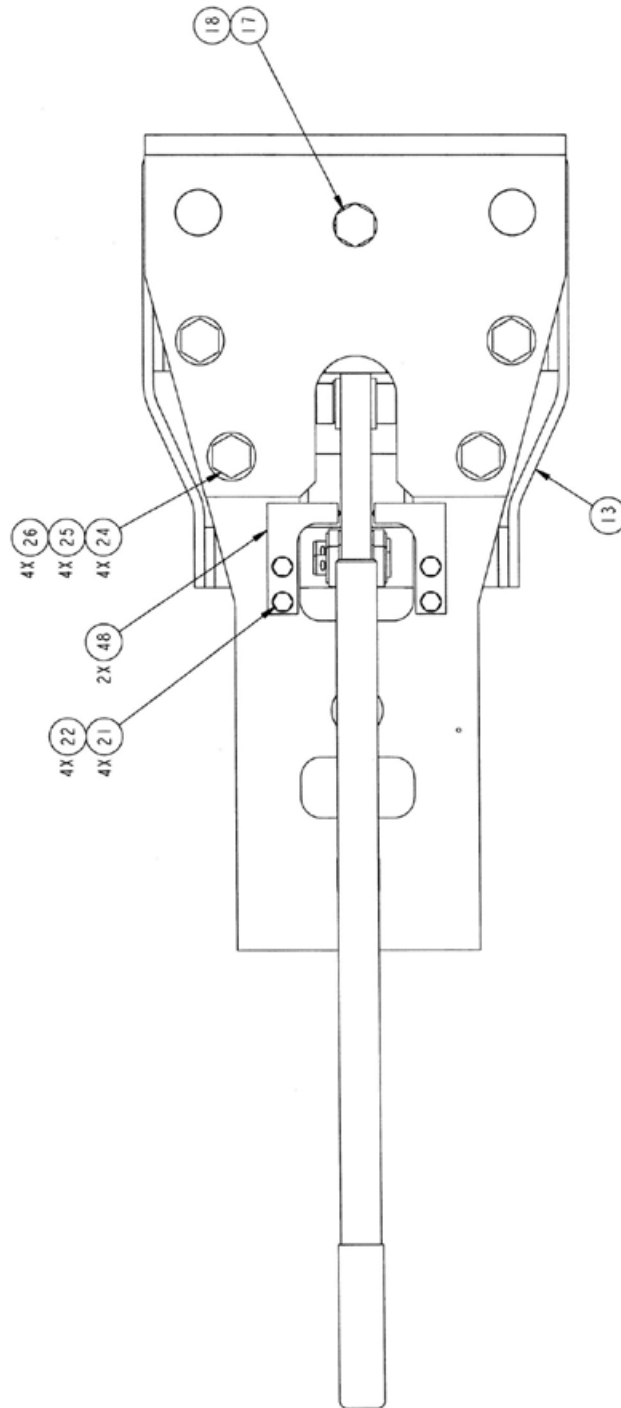
See page 47 for parts list

P/N 220560-1/-11 Head Assembly

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15– ILLUSTRATED PARTS LIST (cont'd)



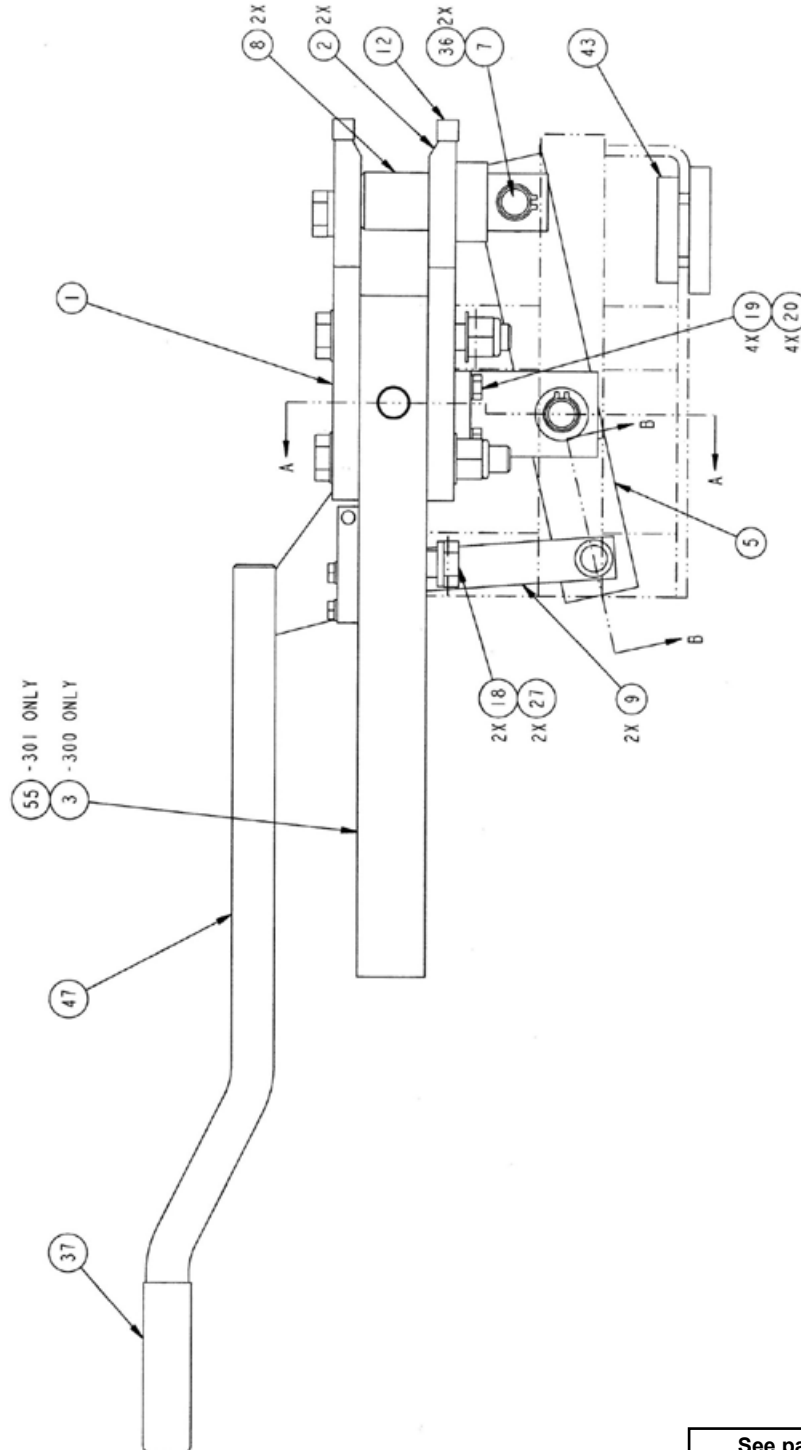
See page 47 for parts list

P/N 220560-300/-301 Head Assembly

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)

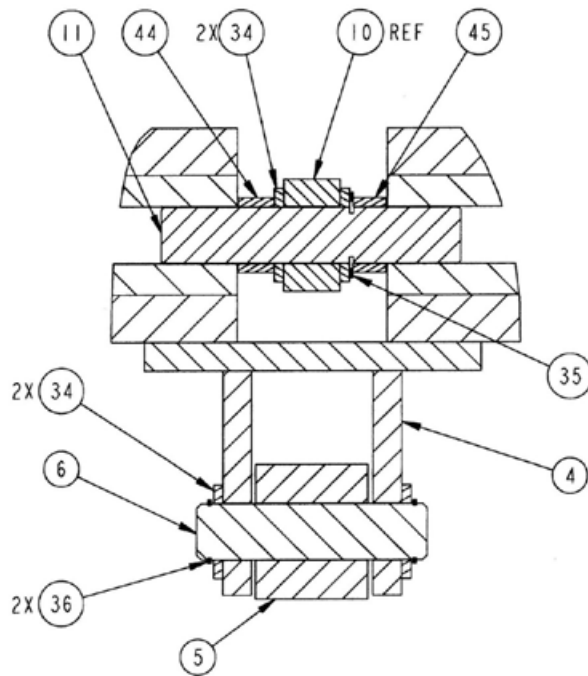


See page 47 for parts list

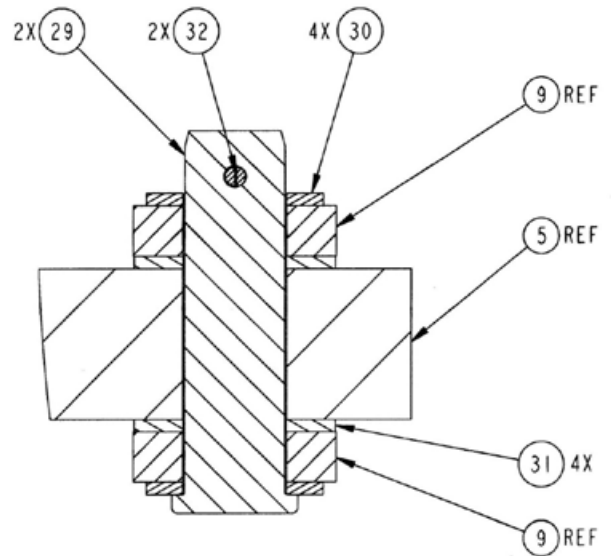
Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



SECTION A-A
SCALE 0.750



SECTION B-B
(BOTTOM OF ITEMS 9 SHOWN,
TOP IS SIMILAR)
SCALE 2.000

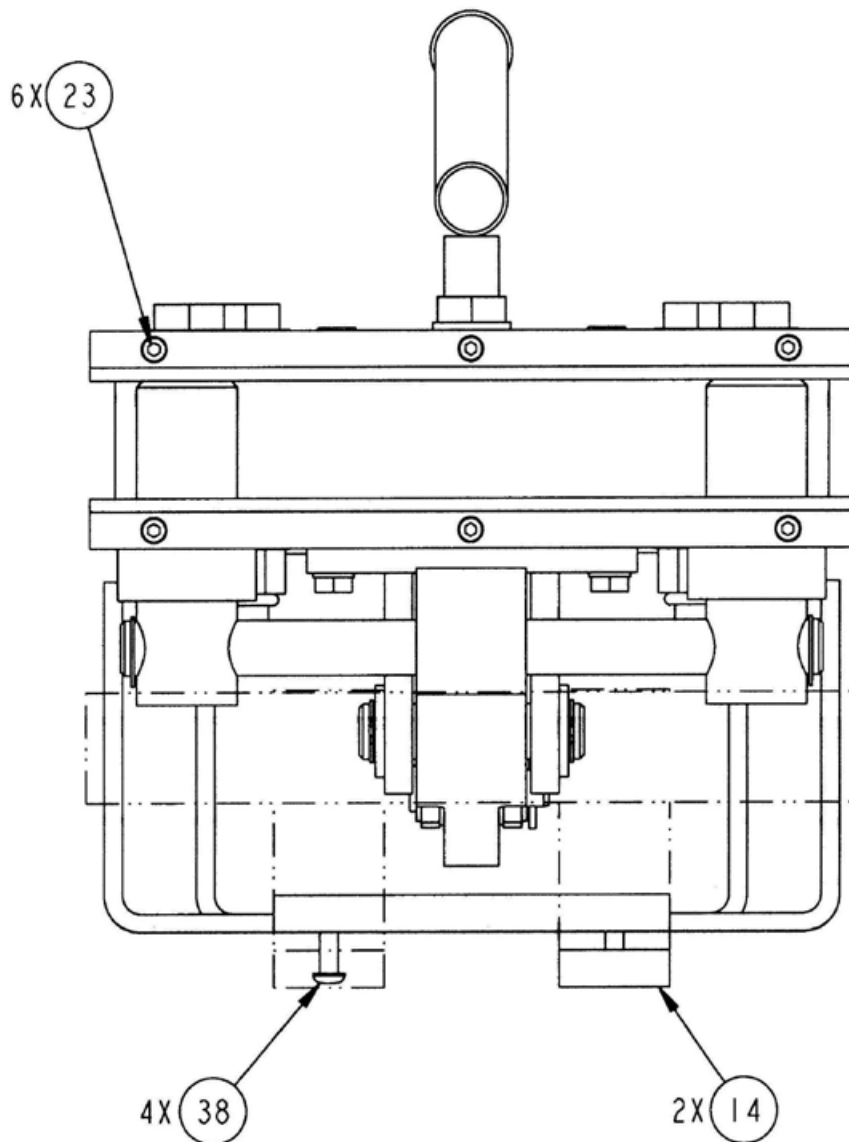
See page 47 for parts list

P/N 220560-300/-301 Head Assembly

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



See page 47 for parts list

P/N 220560-300/-301 Head Assembly

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15– ILLUSTRATED PARTS LIST (cont'd)

QTY REQD				ITEM NO.	PART NO.	DESCRIPTION
			X		220560-1	HEAD ASSEMBLY B747
		X			220560-11	HEAD ASSEMBLY B747
	X				220560-300	HEAD ASSEMBLY B747
X					220560-301	HEAD ASSEMBLY B747
1	1	1	1	1	220561-1	UPPER PLATE
1	1	1	1	2	220563-1	LOWER PLATE
	1		1	3	220565-1	CENTER PLATE
1	1	1	1	4	220567-1	PIVOT BRACKET
1	1	1	1	5	220568-1	TOGGLE
1	1	1	1	6	220569-1	PIVOT PIN, LOWER
1	1	1	1	7	220570-1	CROSS PIN
2	2	2	2	8	220571-1	ENGAGEMENT PIN
2	2	2	2	9	220572-1	LINK
1		1	1	10	220573-1	HANDLE WELDMENT
1	1	1	1	11	220585-1	PIVOT PIN, UPPER
2	2	2	2	12	220584-1	BUMPER
1	1	1	1	13	220576-1	GUARD WELDMENT
2	2	2	2	14	220581-1	BOTTOM BUMPER
				15	(DELETED)	
		2	2	16	220583-1	LOCK BRACKET
1	1	1	1	17	101897-300	BOLT, HEX HEAD, GR8, .63-18UNF X 3.00L
3	3	3	3	18	103109-62	LOCKWASHER, Ø.62
4	4	4	4	19	101892-100	BOLT, HEX HEAD, GR8, .31-24UNF X 1.00L
4	4	4	4	20	103109-31	LOCKWASHER, Ø.31
4	4	4	4	21	102471-75	BOLT, HEX HEAD, GR5, .25-20UNC X .75L
4	4	4	4	22	103109-25	LOCKWASHER, Ø.25
6	6	6	6	23	104031-75	SOCK. HEAD CAP SCREW, #10-32UNF X .75L
4	4	4	4	24	101897-425	BOLT, HEX HEAD, GR8, .63-18UNF X 4.25L
4	4	4	4	25	101876-62	LOCK NUT, .63-18UNF
8	8	8	8	26	101715-62	FLATWASHER, Ø.62
2	2	2	2	27	101897-75	BOLT, HEX HEAD, GR8, .63-18UNF X .75L
				28	(DELETED)	
2	2	2	2	29	MS20392-7C49	PIN, STRAIGHT, HEADED, Ø.50 X 1.531 GRIP
4	4	4	4	30	101715-50	FLATWASHER, Ø.50

Continued on next page

P/N 220560 Head Assembly BOM

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

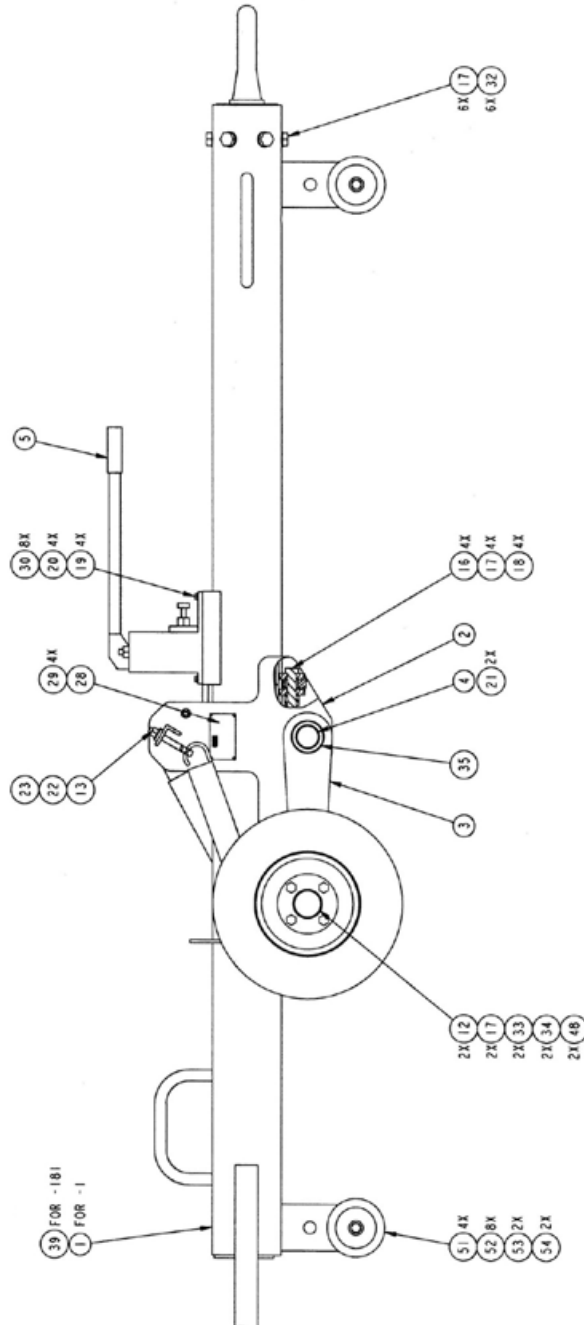
Section 15– ILLUSTRATED PARTS LIST (cont'd)

QTY REQD				ITEM NO.	PART NO.	DESCRIPTION
			X		220560-1	HEAD ASSEMBLY B747
		X			220560-11	HEAD ASSEMBLY B747
	X				220560-300	HEAD ASSEMBLY B747
X					220560-301	HEAD ASSEMBLY B747
4	4	4	4	31	TT-1001	THRUST WASHER
2	2	2	2	32	102542-06075	COTTER PIN
				33	(DELETED)	
4	4	4	4	34	TT1205-1	THRUST WASHER
1	1	1	1	35	5133-75	SNAP RING
4	4	4	4	36	5100-75	SNAP RING
1	1	1	1	37	100256-2	HANDLE GRIP
4	4	4	4	38	91306A383	SCREW, BUTTON HEAD
				39	(DELETED)	
				40	(DELETED)	
		1	1	41	CL-4-BLPL-2.50	BALL-LOCK PIN
		1	1	42	101809-09	LANYARD ASSEMBLY
1	1	1	1	43	220587-1	TOGGLE STOP
1	1	1	1	44	220588-2	SPACER
1	1	1	1	45	220588-1	SPACER
				46	(DELETED)	
1	1	1		47	220590-1	HANDLE WELDMENT
2	2			48	220594-1	STOP ASSEMBLY

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)

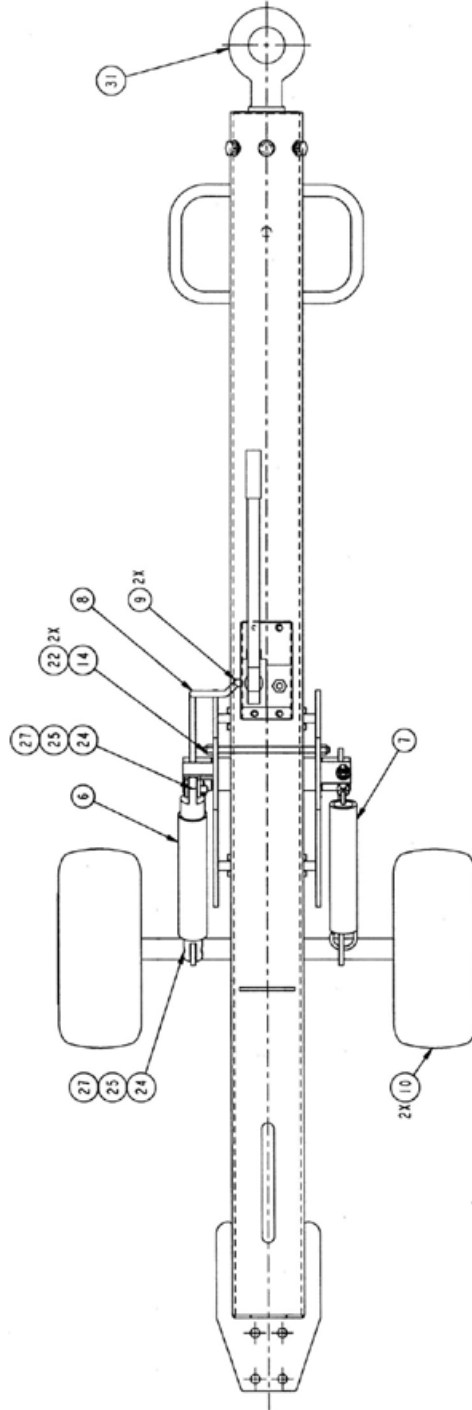


▲ P/N 230030-1 & -181

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



▲ P/N 230030-1 & -181

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15– ILLUSTRATED PARTS LIST (cont'd)

QTY REQD	ITEM NO	PART NO	DESCRIPTION
X		230030-1	TOWBAR ASSEMBLY
X		230030-181	TOWBAR ASSEMBLY
	1	214031-1	BODY WELDMENT, 125"
1	1	110358-1	CRADLE WELDMENT
1	1	214016-1	AXLE WELDMENT
1	1	110270-1	SHAFT
1	1	110264-1	HYDRAULIC PUMP
1	1	110259-1	HYDRAULIC CYLINDER
1	1	110632-1	SPRING
1	1	110782-24	HYDRAULIC HOSE
2	2	101746-59	HYDRAULIC FITTING
2	2	230033-1	TIRE/WHEEL ASSEMBLY
		11	(NOT USED)
2	2	101715-100	FLATWASHER, Ø1.00
1	1	110265-1	EYE BOLT
1	1	110262-1	ROD
		15	(NOT USED)
4	4	101898-300	BOLT, HEX HEAD, GR8, .75-16UNF X 3.00L
12	12	101715-75	FLATWASHER, Ø.75
4	4	101876-75	LOCK NUT, .75-16UNF
4	4	102472-125	BOLT, HEX HEAD, GR5, .31-18UNC X 1.25L
4	4	101875-31	LOCK NUT, .31-18UNC
2	2	100059-32	ROLL PIN
3	3	101875-50	LOCK NUT, .50-13UNC
1	1	CL-3-SW	SPHERICAL WASHER
2	2	101715-56	FLATWASHER, Ø.56
2	2	102542-08100	COTTER PIN, Ø.13 X 1.00L

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TOWBAR ASSEMBLY P/N 220530

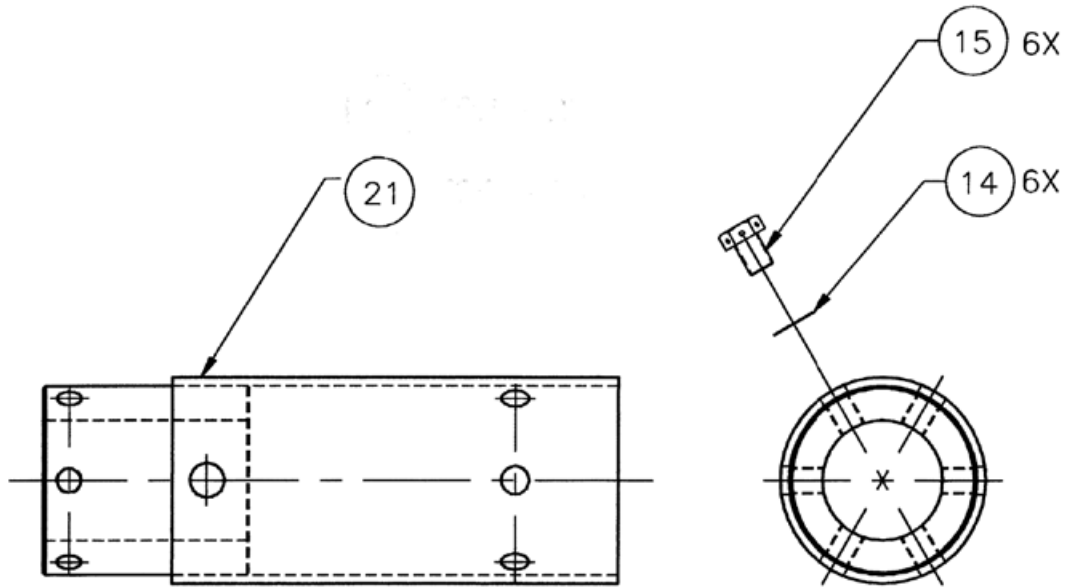
Section 15– ILLUSTRATED PARTS LIST (cont'd)

QTY REQD	ITEM NO	PART NO	DESCRIPTION
	X	230030-1	TOWBAR ASSEMBLY
X		230030-181	TOWBAR ASSEMBLY
		26	(NOT USED)
2	2	27	MS20392-8C51 CLEVIS PIN
1	1	28	102001-1 ID PLATE
4	4	29	102489-2 DRIVE SCREW, U-TYPE
4	4	30	101715-31 FLATWASHER, Ø.31
1	1	31	214033-1 LUNETTE ASSEMBLY
6	6	32	101898-100 BOLT, HEX HEAD, GR8, .75-16UNF X 1.00L
2	2	33	101870-75 SLOTTED NUT, .75-16UNF
2	2	34	102542-08200 COTTER PIN, Ø.13 X 2.00L
1	1	35	100112-1 GREASE ZERK
		36-38	(NOT USED)
1		39	214031-181 BODY WELDMENT, 181"
		40-47	(NOT USED)
2	2	48	DC-00996-198 BEARING PROTECTOR
		49-50	(NOT USED)
4	4	51	AGSE-S00156-P02 WHEEL, PHENOLIC
8	8	52	101715-50 FLATWASHER, Ø.50
2	2	53	102475-425 BOLT, HEX HEAD, GR5, .50-13UNC X 4.25L
2	2	54	104179-50 LOCK NUT, THIN, .50-13UNC

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15– ILLUSTRATED PARTS LIST (cont'd)



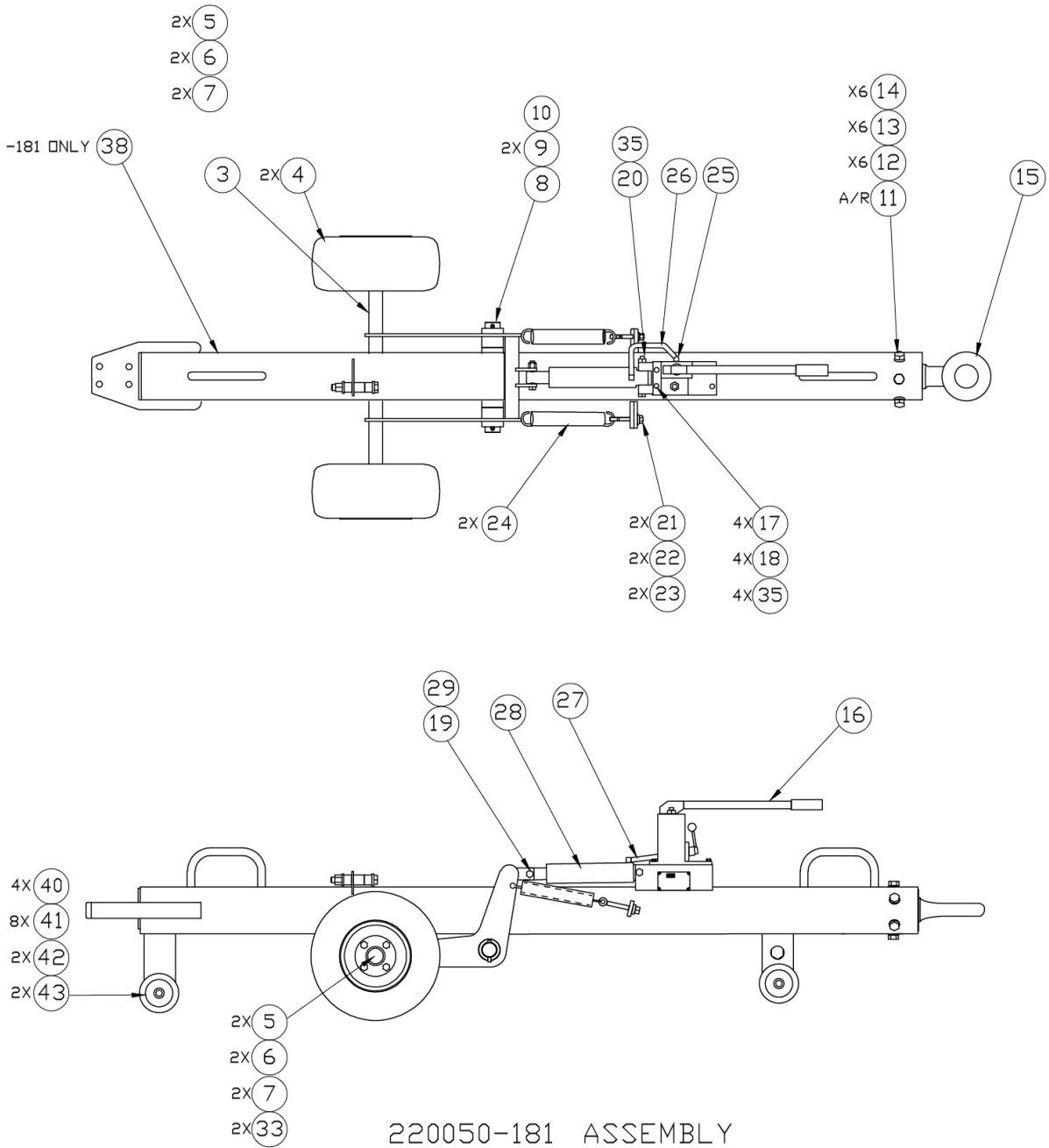
P/N 230031-20 Extension Kit

ITEM NO.	PART NO.	DESCRIPTION	UNITS PER ASSEMBLY
			-20
	230031-20	EXTENSION KIT, 10 INCH	REF
14	101715-75	WASHER, FLAT	6
15	101898-100H	BOLT	6
21	230031-21	WELDMENT	1

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TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)

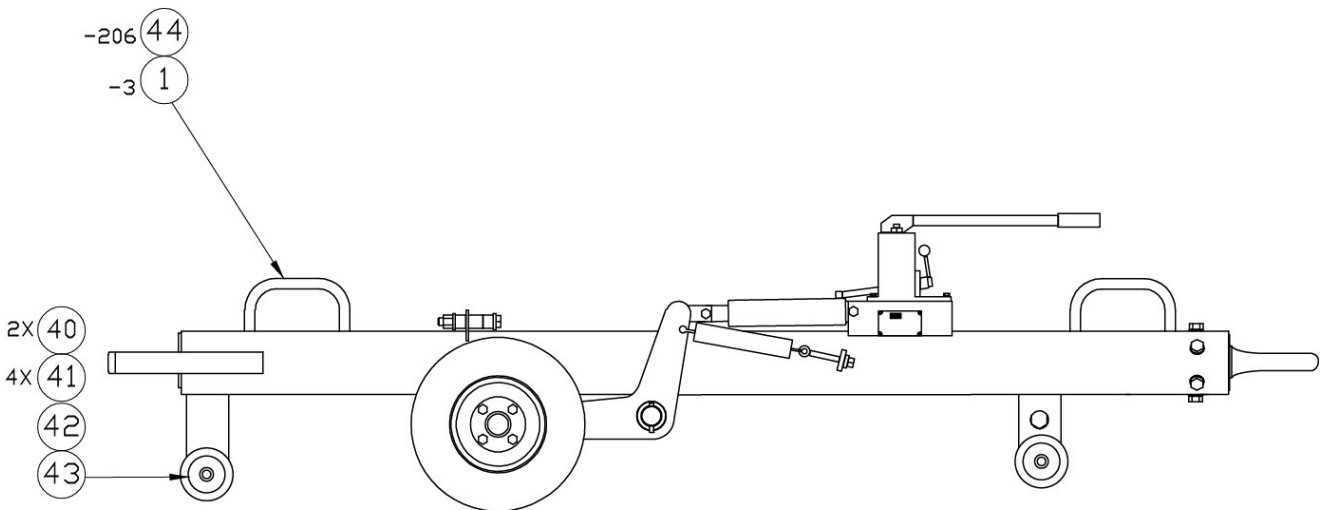


▲ P/N 230050-3, -181 & -206

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



230050-3 & -206 ASSEMBLY
(SAME AS -181 ASSY EXCEPT AS NOTED)

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15– ILLUSTRATED PARTS LIST (cont'd)

QTY REQD			ITEM NO	PART NO	DESCRIPTION
		X		230050-3	TOWBAR ASSEMBLY, B747
	X			230050-181	TOWBAR ASSEMBLY
X				230050-206	TOWBAR ASSEMBLY
		1	1	215031-1	TOWBAR BODY WELDMENT
			2	(DELETED)	
1	1	1	3	215020-1	AXLE WELDMENT
2	2	2	4	230033-1	TIRE/WHEEL ASSEMBLY
2	2	2	5	101715-75L	FLATWASHER, Ø.75, THIN
2	2	2	6	101870-75	SLOTTED NUT
2	2	2	7	102542-08200	COTTER PIN
1	1	1	8	110270-1	SHAFT
2	2	2	9	100059-32	ROLL PIN
1	1	1	10	100112-1	GREASE ZERK
A/R	A/R	A/R	11	MS20995C32	LOCKWIRE, Ø.032, STAINLESS
6	6	6	12	101715-75	FLATWASHER, Ø.75, THIN
6	6	6	13	101898-100	BOLT, HEX HEAD, GR8, .75-16UNF X 1.00L, DRILLED HEAD
6	6	6	14	103109-75	LOCKWASHER, Ø.75
1	1	1	15	214033-1	LUNETTE ASSEMBLY
1	1	1	16	110264-2	HYDRAULIC PUMP
4	4	4	17	102492-125	BOLT, HEX HEAD, GR5, .31-24UNF X 1.25L
4	4	4	18	101715-31	FLATWASHER, Ø.31
1	1	1	19	101876-56	LOCK NUT, .56-18UNF
1	1	1	20	101896-475	BOLT, HEX HEAD, GR8, .56-18UNF X 4.75L
2	2	2	21	101875-50	LOCK NUT, .50-13UNC
2	2	2	22	CL-3-SW	SPHERICAL WASHER
2	2	2	23	110265-1	EYE BOLT
2	2	2	24	81185	SPRING
1	1	1	25	101746-59	HYDRAULIC FITTING

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TOWBAR ASSEMBLY P/N 220530

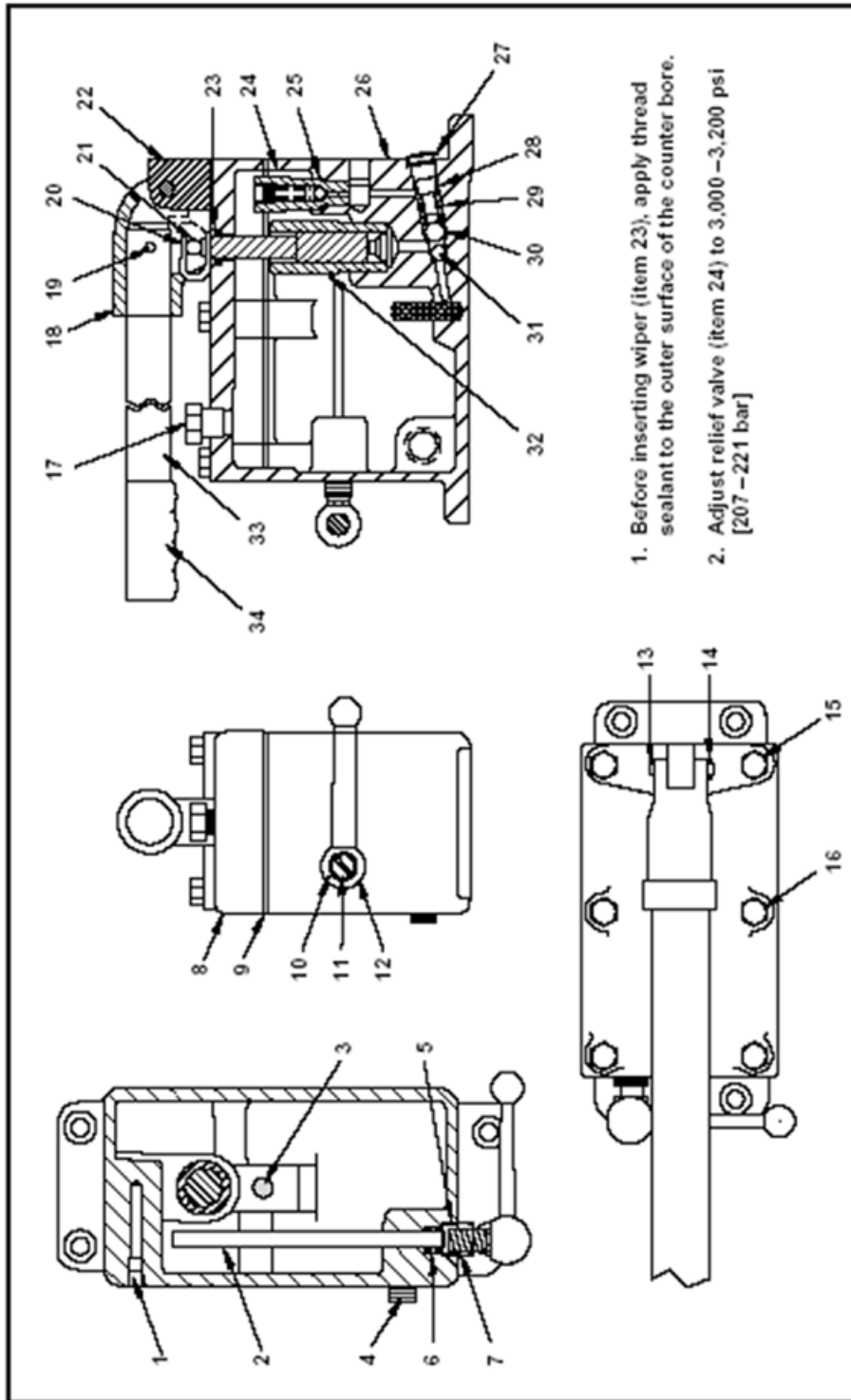
Section 15– ILLUSTRATED PARTS LIST (cont'd)

QTY REQD			ITEM NO	PART NO	DESCRIPTION
		X		230050-3	TOWBAR ASSEMBLY, B747
	X			230050-181	TOWBAR ASSEMBLY
X				230050-206	TOWBAR ASSEMBLY
1	1	1	26	110782-14	HYDRAULIC HOSE
1	1	1	27	101822-52	HYDRAULIC FITTING
1	1	1	28	AT-789	HYDRAULIC CYLINDER
1	1	1	29	101896-325	BOLT, HEX HEAD, GR8, .56-18UNF X 3.25L
			30-32	(DELETED)	
2	2	2	33	DC-00996-198	BEARING PROTECTOR
			34	(DELETED)	
1	1	1	35	101874-56	LOCK NUT, .56-18UNF
			36-37	(DELETED)	
1	1		38	215031-181	TOWBAR BODY WELDMENT
			39	(DELETED)	
2	4	2	40	2337T26	WHEEL, PHENOLIC
4	8	4	41	101715-38	FLATWASHER, Ø.50
1	2	1	42	102475-425	BOLT, HEX HEAD, GR8, .550-13UNC X 4.25L
1	4	1	43	101875-38	LOCK NUT, THIN, .50-13UNC
1			44	2150331-206	TOWBAR WELDMENT

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TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



1. Before inserting wiper (item 23), apply thread sealant to the outer surface of the counter bore.
2. Adjust relief valve (item 24) to 3,000 -3,200 psi [207 -221 bar]

▲ P/N 110261-1 Hand Pump Assembly

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15– ILLUSTRATED PARTS LIST (cont'd)

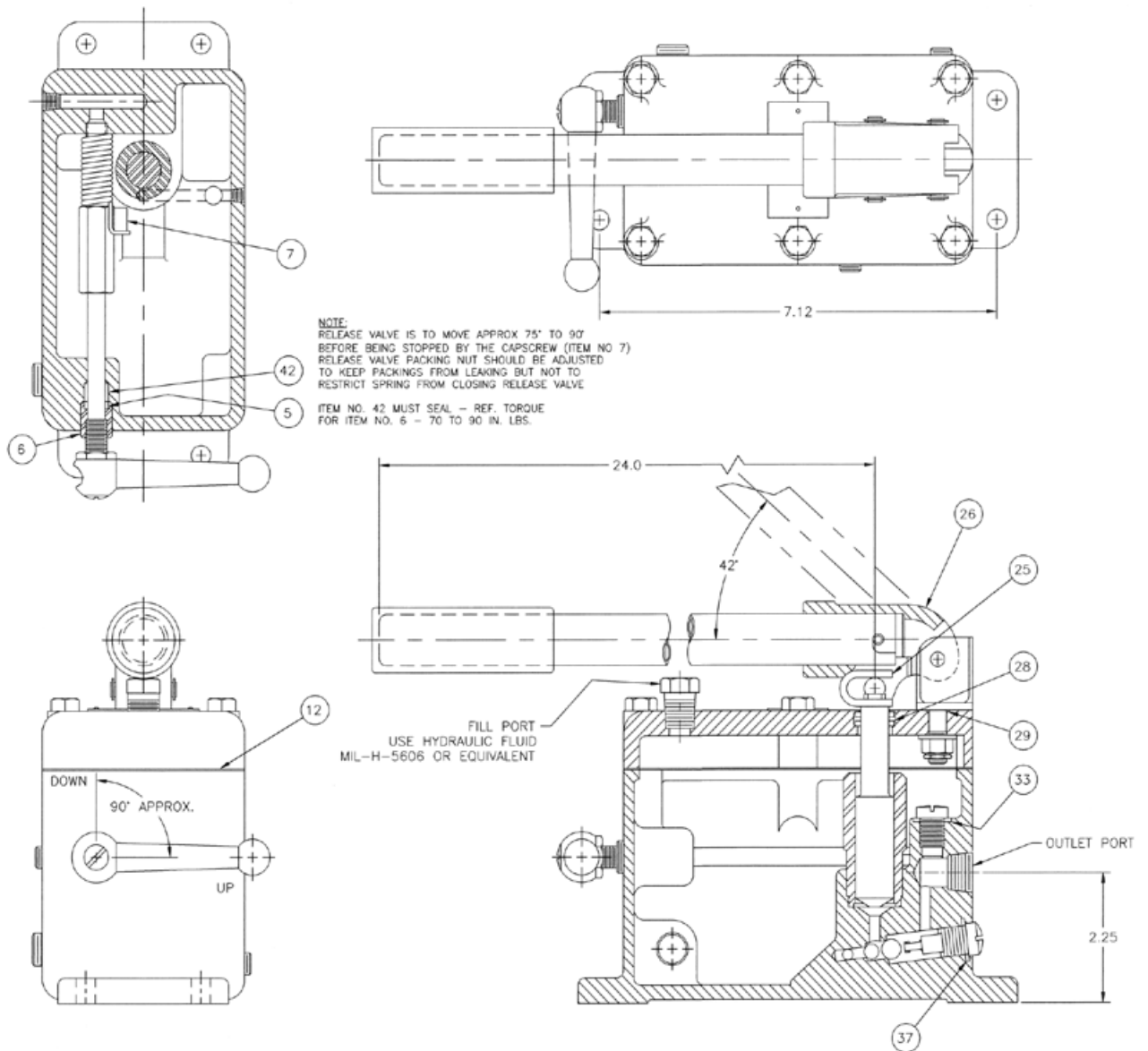
2	23		A1028.476	WIPER*
1	22		DA2056.111	BRACKET
1	21		P146.57	CROSS PIN
1	20	110261-25	B1005.264	PISTON HEAD
1	19		B1096.057	PIN*
1	18		B8011.060	HANDLE BEAM
1	17		CJ589950W	VENT PLUG ASSEMBLY
4	16		B1047.046	CAP SCREW
2	15		B1049.046	HEX HEAD CAP SCREW
1	14		B1017.058	COTTER PIN*
1	13		A8029.061	LINK PIN
1	12		P60.12	LEVER (INCL. 10,11)
1	11		P45.138	SCREW
1	10		P45.139	WASHER
1	9		A1018.037	GASKET
1	8		DA2756.098	BASE COVER
1	7		P6011SR	PACKING NUT (INCL. 5, 6)
1	6	110261-21	CK195.041	SQUARE RING*
2	5	110261-5	A1028.074	RELEASE VALVE PACKING*
1	4		A1009.245	PLUG
1	3		P307.18	SCREEN
1	2	110261-7	A1581.900	RELEASE VALVE
1	1		A1006.245	PIPE PLUG
QTY REQ'D	ITEM NO.	STANLEY PART NO.	ALTERNATE PART NO.	DESCRIPTION

* Parts included in Spares Kit. Spares Kit includes seals for Piston Assembly (Item 32)

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TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



▲ P/N 110261-3 Hydraulic Pump Spare Kit

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TOWBAR ASSEMBLY P/N 220530

Section 15– ILLUSTRATED PARTS LIST (cont'd)

1	42	110261-42	D11.74	RUBBER PACKING*
1	37	110261-37	S15.167	VALVE PLUG GASKET*
1	33	110261-33	B159.167	VALVE PLUG GASKET*
1	29	110261-29	A8006.037	GASKET*
2	28	110261-28	A1028.476	SEAL*
1	26	110261-26	B1005060 A8083070	HANDLE/BEAM (NOTE 2)
1	25	110261-25	B1005.264	PISTON HEAD (NOTE 2)
1	21	110261-21	CK195.041	SQUARE RING*
1	12	110261-12	A1018.037	COVER GASKET *
1	7	110261-7	A1581.900	RELEASE VALVE
2	5	110261-5	A1028.074	RELEASE VALVE PACKING*
X		110261-3		HYDRAULIC PUMP SPARES KIT
X		110261-1		HYDRAULIC PUMP
UNITS PER ASSEMBLY	ITEM NO.	STANLEY PART NO.	ALTERNATE PART NO.	DESCRIPTION

NOTE 1: This Parts List and the Figures on page 2 are provided, only, to aid in the overhaul of the Hydraulic Pump 110261-1. The Spares Kit must be ordered separately.

NOTE 2: These parts are NOT included in the Spares Kit 110261-3, and must be ordered separately.

* Included in the Spares Kit, itself.

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TOWBAR ASSEMBLY P/N 220530

Section 15– ILLUSTRATED PARTS LIST (cont'd)

1	-	101876-25	-	LOCK NUT, .25-28 UNF
1	-	102491-175	-	BOLT, .25-28 UNF X 1.75
1	-	110261-6	-	HAND PUMP ASSEMBLY (BASIC) (NOTE 3)
1	34	-	CL343550	HANDLE GRIP
1	33	-	A1009.070	HANDLE
1	32	-	A8115.900	PISTON ASSEMBLY (INCL. 23)
1	31	-	B1008.016	VALVE BALL*
1	30	-	B1011.016	BALL*
1	29	-	S1.183	SPRING*
1	28	-	P307.186	VALVE PLUG*
1	27	110261-37	S15.167	GASKET*
1	26	-	C1026.005	PUMP BASE
1	25	110261-33	B159.167	GASKET
1	24	-	DC8141950	RELIEF VALVE (INCL. 25)
QTY REQ'D	ITEM NO.	STANLEY PART NO.	ALTERNATE PART NO.	DESCRIPTION

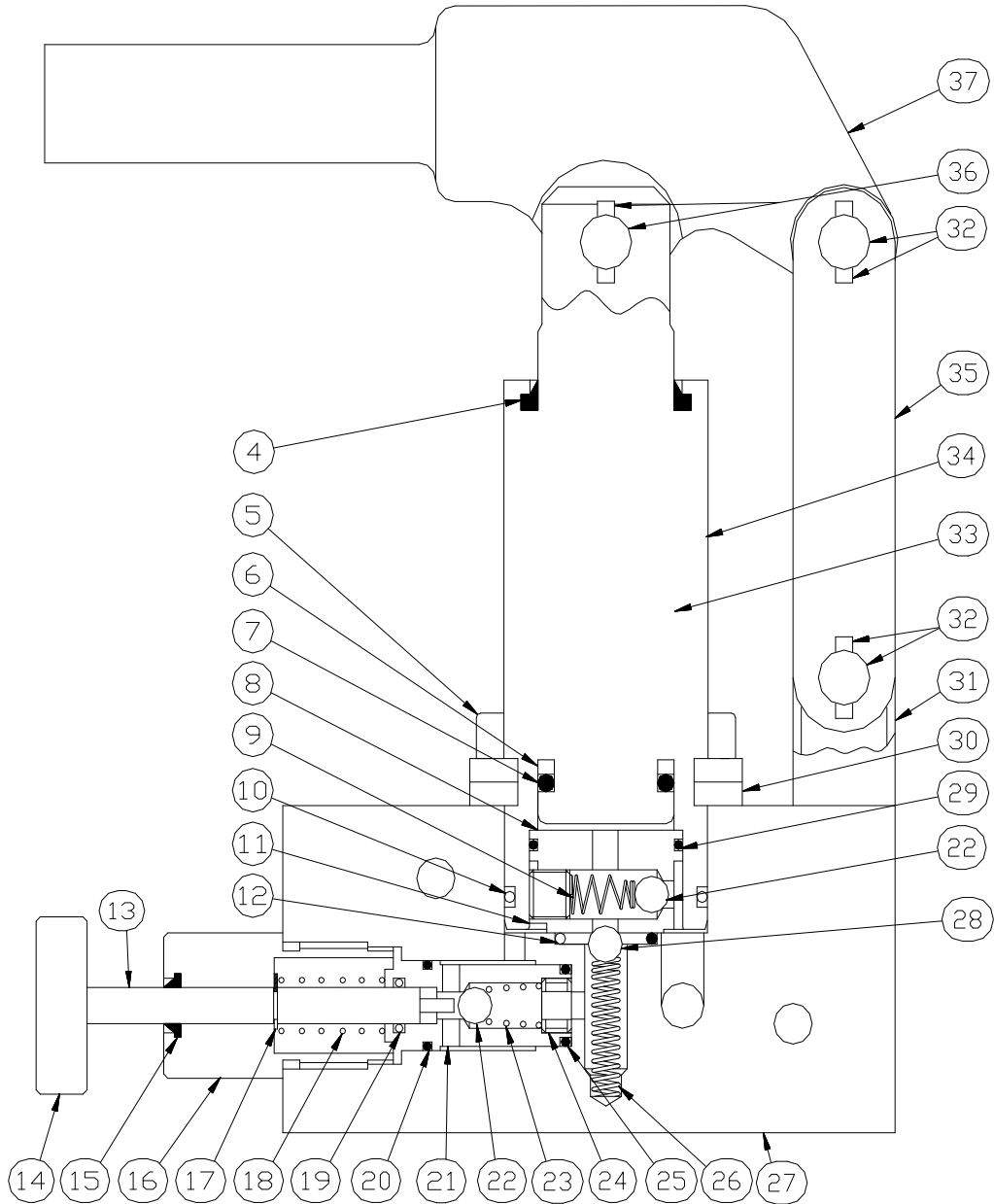
NOTE 3: The Hand Pump Assembly is sold without the handle, which must be ordered separately.

* Parts included in Spares Kit. Spares Kit includes seals for Piston Assembly (Item 32)

Operation and Maintenance Manual

TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)

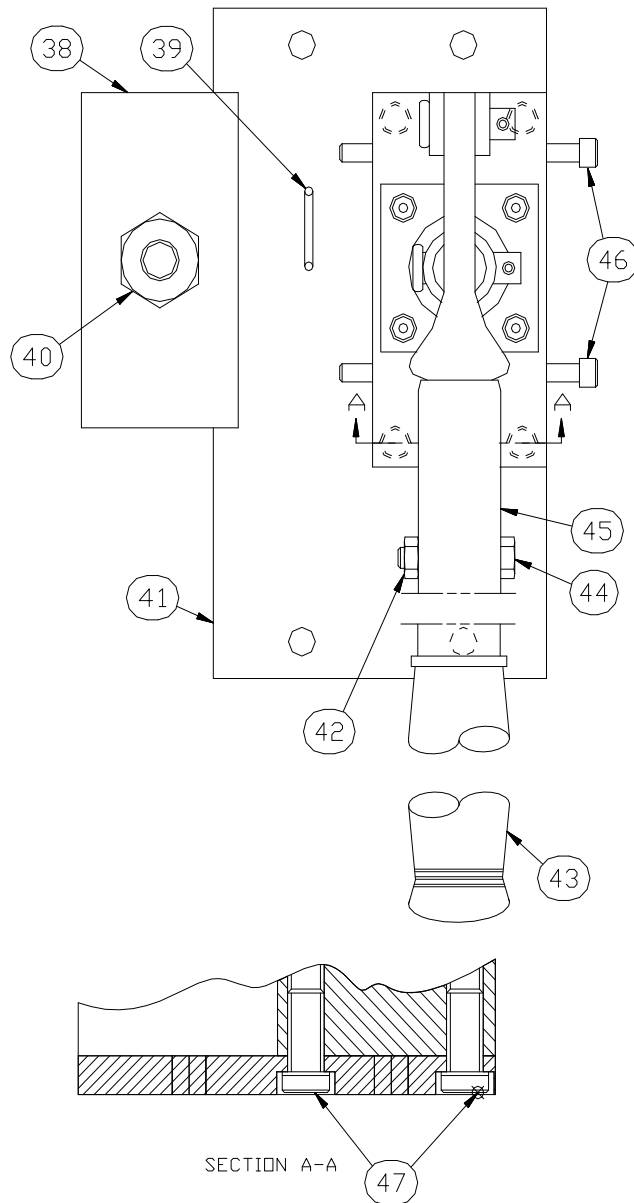


P/N 110264-1 Hydraulic Pump Assembly & Spares

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TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



See next page for parts list

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TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)

	47	4	110264-47	LOW HD. SOC. CAP SCR.
	46	2	110264-46	MOUNTING BOLT
	45	1	110264-45	HANDLE, PUMP EXTENSION
	44	1	110264-44	HEX HD, CAP SCREW
	43	1	110264-43	GRIP, HANDLE
	42	1	110264-42	NUT 1/4-20
	41	1	110264-41	PUMP MOUNTING PLATE
	40	1	110264-40	VENT ASS'Y.
*	39	1	110264-39	O'RING (RESERVOIR & PUMP)
	38	1	110264-38	RESERVOIR
	37	1	110264-37	PUMP HANDLE
	36	1	110264-36	ASS'Y, CLEVIS PIN
	35	2	110264-35	STRAP
	34	1	110264-34	TUBE
	33	1	110264-33	PISTON
	32	2	110264-32	ASS'YM PIN LINKAGE
	31	1	110264-31	PIVOT
	30	4	110264-30	FLANGE HALF
*	29	1	110264-29	O'RING, BUNA
	28	1	110264-28	BALL, OULET CHECK
	27	1	110264-27	BODY
*	26	1	110264-26	SPRING, OUTLET CHECK
*	25	1	110264-25	O'RING
	24	1	110264-24	HOLLOW LOC
	23	1	110264-23	SPRING
	22	2	110264-22	BALL
	21	1	110264-21	CHECK BODY
*	20	1	110264-20	O'RING
*	19	1	110264-19	O'RING
	18	1	110264-18	SPRING
	17	1	110264-17	SNAP RING
*	16	1	110264-16	BEARING
*	15	1	110264-15	WIPER
	14	1	110264-14	KNOB
*	13	1	110264-13	ROD
*	12	1	110264-12	O'RING
*	11	1	110264-11	PLUG PIPE
*	10	1	110264-10	O'RING, BUNA
	9	1	110264-9	SPRING, INTAKE CHECK
*	8	1	110264-8	VALVE BODY
*	7	1	110264-7	O'RING, BUNA
*	6	1	110264-6	BACK-UP
*	5	4	110264-5	SCREW
*	4	1	110264-4	WIPER
	ITEM	QTY	STANLEY PART NUMBER	DESCRIPTION

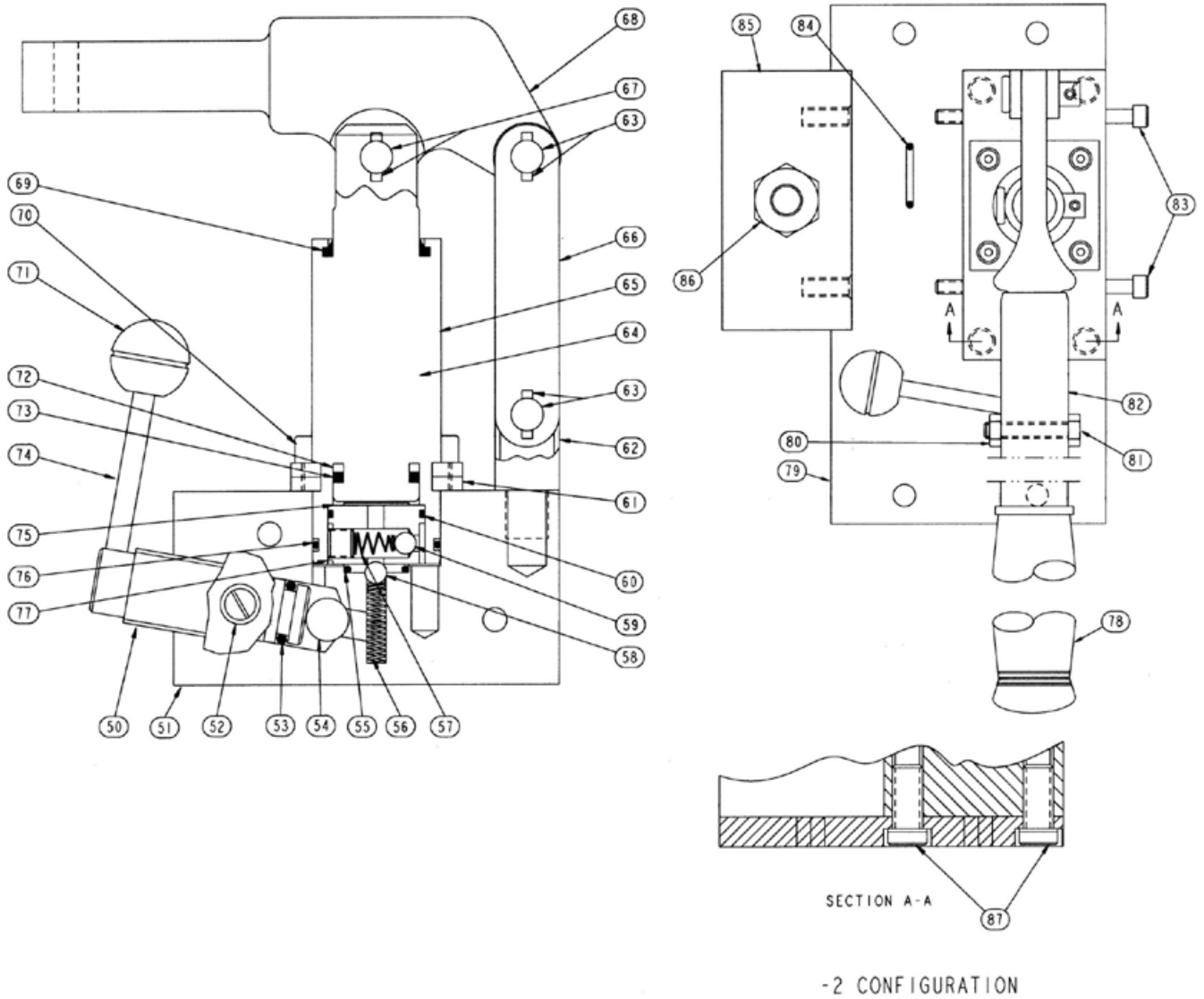
* = INCLUDED IN SEAL KIT (STANLEY P/N 110264-3)


NOTE: HANDLE ITEMS #42-45 ASSEMBLED BUT UNATTACHED

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TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



See next page for parts list 

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TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)

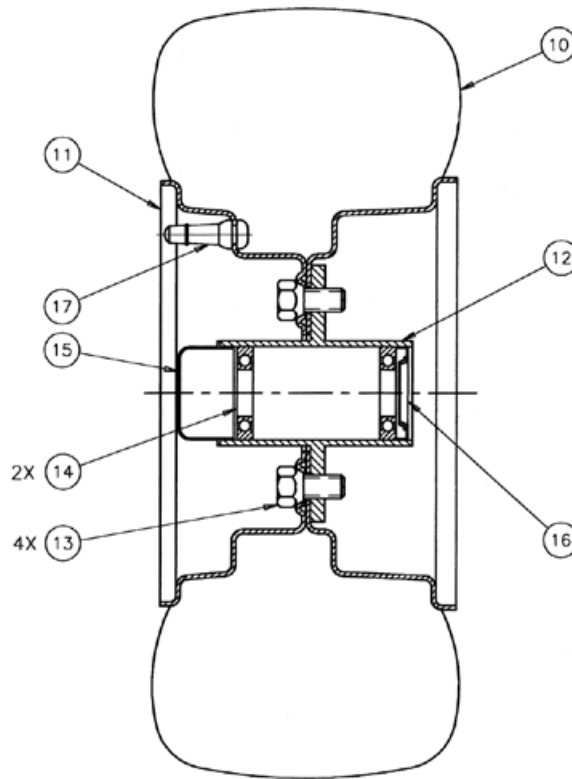
	87	4	110264-47	LOW HD. SOC. CAP SCR. 3/8-16 X 1/2 LG
	86	1	110264-40	VENT ASS'Y
	85	1	110264-38	RESERVOIR
	84	1	110264-39	O'RING (RESERVOIR & PUMP)
	83	2	110264-46	MOUNTING BOLTS (RESERVOIR & PUMP)
	82	1	110264-82	HANDLE, PUMP EXTENSION
	81	1	110264-44	HEX HD. CAP. 1/2-20 X 1 1/4 LG.
	80	1	110264-42	NUT 1/4-20
*	79	1	110264-41	PUMP MOUNTING PLATE
	78	1	110264-43	GRIP, HANDLE
	77	1	110264-11	PLUG PIPE
	76	1	110264-10	O'RING, BUNA
	75	2	110264-8	VALVE BODY
	74	1	110264-74	ROLL PIN
	73	1	110264-7	O'RING, BUNA
	72	2	110264-6	BACK-UP
	71	4	110264-71	KNOB
	70	4	110264-70	SCREW
*	69	1	110264-4	WIPER
	68	1	110264-68	PUMP HANDLE
	67	1	110264-36	ASS'Y, CLEVIS PIN
	66	2	110264-35	STRAP
*	65	1	110264-34	TUBE
	64	1	110264-33	PISTON
	63	2	110264-32	ASS'Y, PIN LINKAGE
	62	1	110264-31	PIVOT
	61	4	110264-30	FLANGE HALF
*	60	1	110264-29	O'RING, BUNA
*	59	1	110264-22	BALL
	58	1	110264-58	BALL, OUTLET CHECK
	57	1	110264-9	SPRING, INTAKE CHECK
	56	1	110264-26	SPRING, OUTLET CHECK
*	55	1	110264-12	O'RING
	54	1	110264-54	BALL RELEASE
	53	1	110264-53	O'RING, BUNA
*	52	1	110264-52	RELEASE SCREW RETAINER
	51	1	110264-51	PUMP BODY - RESERVOIR UNITS
*	50	1	110264-50	RELEASE SCREW
	ITEM	QTY	STANLEY PART NUMBER	DESCRIPTION

* = INCLUDED IN SEAL KIT SRK-070014
(STANLEY P/N 110264-200)

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TOWBAR ASSEMBLY P/N 220530

Section 15- ILLUSTRATED PARTS LIST (cont'd)



▲ P/N 230033-1 Tire/Wheel Assembly

1	17	230033-17	VALVE STEM
1	16	230033-16	GREASE SEAL
1	15	230033-15	DUST CAP
2	14	230033-14	BEARING
4	13	230033-13	THREAD-IN BOLT
1	12	230033-12	HUB W/STUDS
1	11	230033-11	WHEEL
1	10	230033-10	TIRE
X	-	230033-1	TIRE AND WHEEL ASSEMBLY
-1			
UNITS PER ASSEMBLY	ITEM NO.	PART NO.	DESCRIPTION

This document provides assembly instructions for installation of P/N 230033-400 Wheel Replacement Kit on various towbars manufactured by Stanley Aviation. Sufficient parts are included for both old and new style axles. The **new** axle can be identified by an intermediate shoulder between the axle center section and wheel spindle. This shoulder is absent on old style axles.

A. NEW STYLE AXLE

1. Remove dust cap from hub and pack hub, bearings and dust cap with wheel bearing grease.
2. Install wheel bearings in hub.
3. Install grease seal on inner bearing with open face of seal toward bearing. Wheel studs project toward the **outer** bearing.
4. Install wheel on spindle followed by 3/4 inch I.D. washer, slotted nut and cotter pin. Discard 1" I.D. washer. **CAUTION: DO NOT TORQUE SLOTTED NUT. TIGHTEN ONLY TO ELIMINATE PLAY IN ASSEMBLY, THEN BACK OFF AS REQUIRED TO INSTALL COTTER PIN.**

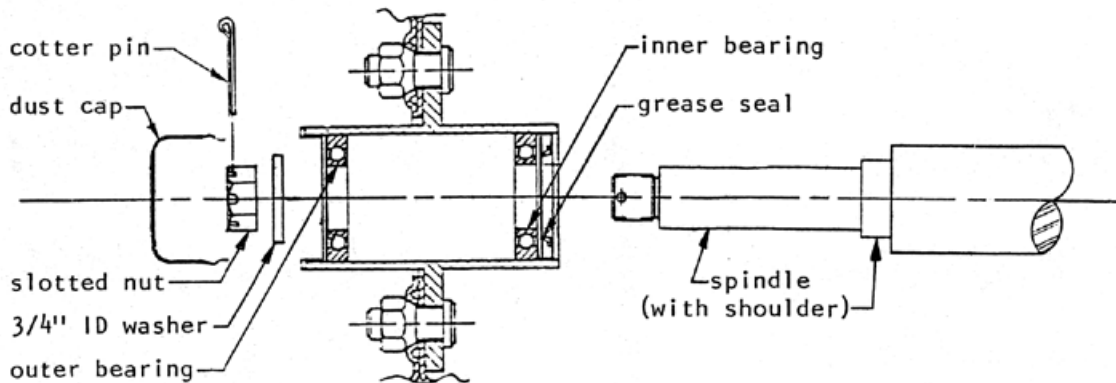


FIGURE 1, NEW STYLE AXLE

B. OLD STYLE AXLE

1. Remove dust cap from hub and pack hub, bearings and dust cap with wheel bearing grease.
2. Install wheel bearings in hub.
3. Install special 1" I.D. washer on spindle.
4. Install wheel on spindle followed by 3/4" I.D. washer, slotted nut and cotter pin. Discard grease seal. **CAUTION: DO NOT TORQUE SLOTTED NUT. TIGHTEN ONLY TO ELIMINATE PLAY IN ASSEMBLY, THEN BACK OFF AS REQUIRED TO INSTALL COTTER PIN.**

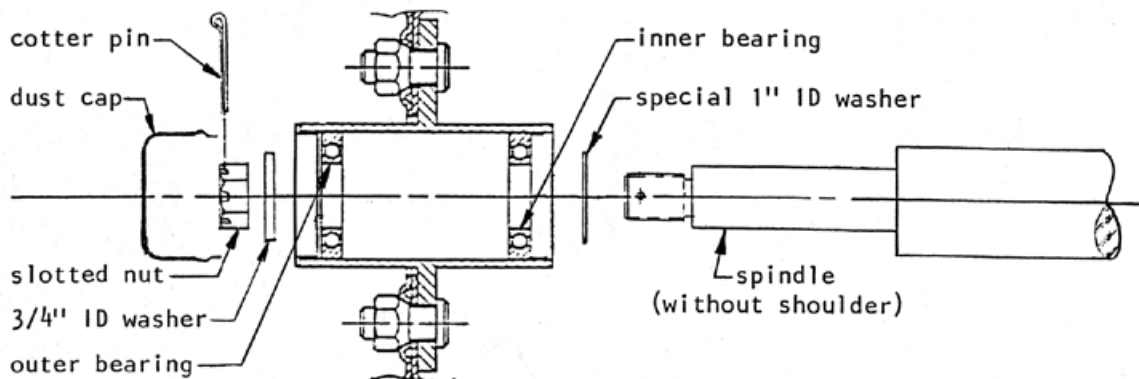


FIGURE 2, OLD STYLE AXLE