



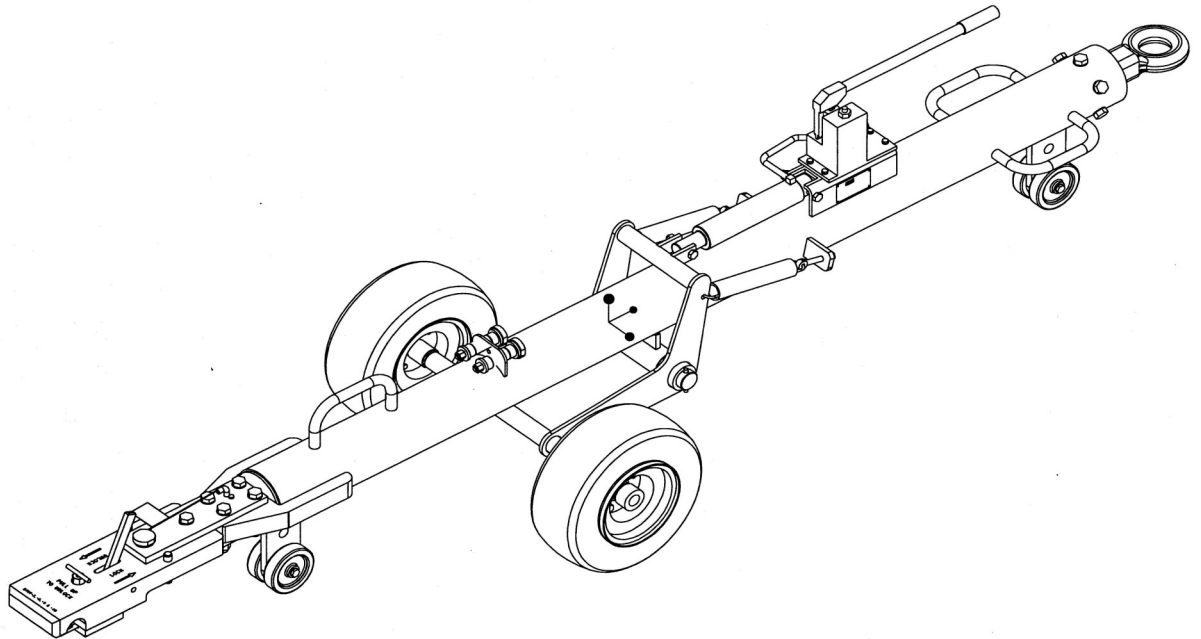
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## OPERATION AND MAINTENANCE MANUAL

### **B787 TOWBAR ASSEMBLY**

**FOR BOEING B787-3, -8, -9 AND  
-10 AIRCRAFT**

**P/N 287000-1**



Document Control Number M287000

Revision Date January 18, 2022

Revision Level C

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### RECORD OF REVISIONS

EO#	REVISION LEVEL	DATE	BY
2000-2992	NC	MAY 9, 2007	
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### HIGHLIGHTS OF REVISIONS

NC: Initial release.

A: Updated to reflect latest assembly configuration.

B: Replaced old logo with Stanley Aviation. Revised Header and Footer with Stanley Aviation for all pages. Updated Contact and Stanley Aviation pages 1,4 and 26. Removed References to Eaton with Stanley Aviation for pages 5,8,10,11,12,21 and 42.

C: Part number was superseded for page 30 Item 40

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## B787 TOWBAR ASSEMBLY P/N 287000-1

### 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 an articulating undercarriage with a hydraulic pump and a retract spring which raises and lowers the towbar. The 287000-1 configuration is used for towing the B787-3, -8, -9 and -10 aircraft with a Category IV tow fitting (per SAE AS1614).

This manual represents the Stanley Aviation 287000-1 towbar assembly parts list, with unique part lists for each of the two shear pin kits..

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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## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 3 - SPECIFICATIONS AND CAPABILITIES

#### 3.1 Applications

The Stanley Aviation 287000-1 configuration is used for towing the B787-3, -8, -9 and -10 aircraft only.

#### NOTE

**Length is approximated and is measured from the center of the towing pin 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

Length: 131" (333 cm).

Width: 36" (91 cm) maximum at the wheels and 7" (17.8 cm) at the head.

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

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

3.3.3 Weight: approximately 480 lbs (218 kg).

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## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 4 - OPERATION

#### CAUTION

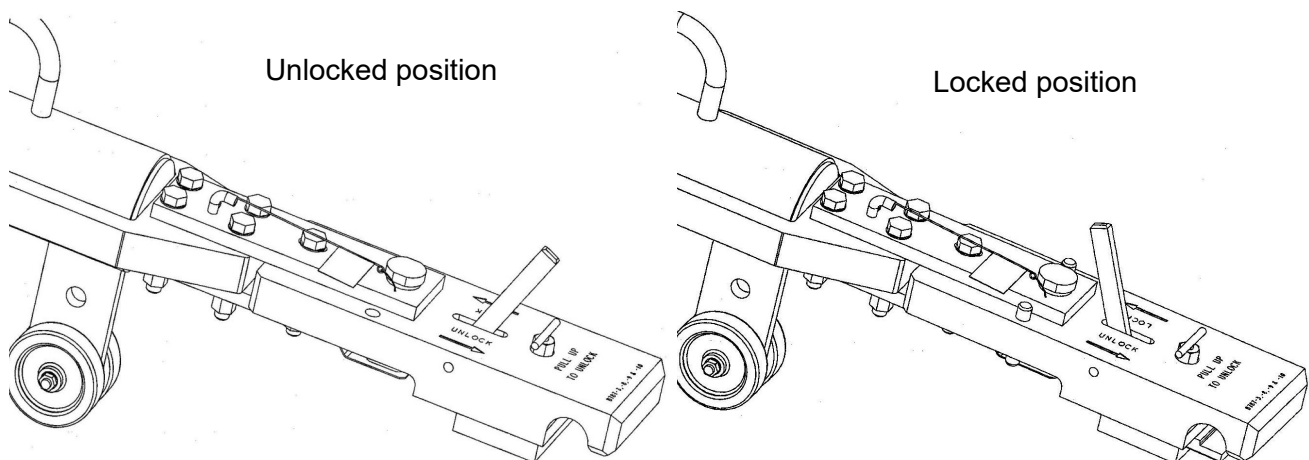
**BEFORE TOWING THE AIRCRAFT, MAKE SURE THAT THE CORRECT SHEAR PIN KIT IS INSTALLED.**

**THE 400000-100 SHEAR PIN KIT IS DESIGNED FOR USE ON THE B787-3 SERIES AIRCRAFT, AND THE 400000-101 SHEAR PIN KIT IS DESIGNED FOR USE ON THE B787-8/-9/-10 SERIES AIRCRAFT.**

**THE APPROPRIATE AIRCRAFT DASH NUMBERS ARE MARKED ON THE HEAD OF THE SHEAR PINS.**

#### 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 end of the towbar and the aircraft, manually pump the hand pump to increase the pressure in the hydraulic system. Depress the hand pump relief valve to lower the towbar.
- 4.1.4 Lift the T-handle spring plunger and move the head assembly lever to the "UNLOCK" position, as shown below.
- 4.1.5 Manually adjust the towbar head assembly until it is directly in contact with the aircraft tow fitting.
- 4.1.6 Manipulate the head assembly until the aircraft tow fitting is positioned within the towbar head assembly slide lock. Engage the aircraft tow fitting by pressing downward on the handle. Move the head assembly lever to the "LOCK" position, as shown, below.



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## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 4 - OPERATION (cont'd)

- 4..1 Aircraft Engagement (cont'd)
- 4.1.7 Check the connection to ensure that the head assembly is locked into place over the landing gear tow fitting and that the T-handle spring plunger is fully seated, again, in the DOWN position. NOTE: The T-handle spring plunger pin should automatically lock when the handle is moved away from the NLG.
  - 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 counterclockwise.

**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.

#### 4.2 Aircraft Disengagement

- 4.2.1 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.)
- 4.2.2 Disconnect the lunette eye from the tow tractor. Move the tow tractor a safe distance away from the work area.
- 4.2.3 Raise the T-handle (spring plunger lock pin), slide the head assembly lever to the "UNLOCK" position, and release the towbar head. The spring plunger does not engage when the handle is in the UNLOCK position.
- 4.2.4 Lift the towbar head assembly from the aircraft NLG tow connection and roll the towbar clear of the aircraft.
- 4.2.5 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 towing.

**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 DIS-ENGAGE IT FROM THE AIRCRAFT, THERE WILL BE A SUD-DEN, VIOLENT RELEASE OF FORCE WHICH CAN CAUSE SERIOUS INJU-RY TO THE OPER-ATOR. IF THE TOW FITTING IS WEDGED IN THE TOW-BAR HEAD, REALIGN THE TOWBAR FOR EASY SEPARATION.**

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## B787 TOWBAR ASSEMBLY P/N 287000-1

### 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.

### 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 Lubricate all grease fittings (provided on wheel bearings and axle bearings) at least every six months. 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.

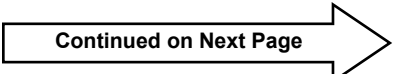
### Section 8 - INSPECTION

To ensure efficient and reliable operation, the Stanley Aviation 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.

Continued on Next Page 



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## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 8 - INSPECTION (cont'd)

#### 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.
- 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 towbar 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.
- 8.12 T-handle spring plunger, inspect the plunger for smooth operation, and lubricate as needed. Ensure that the spring plunger engages the slide when the handle is moved to the LOCK position. The spring plunger does not engage when the handle is in the UNLOCK position.

#### CAUTION

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

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## B787 TOWBAR ASSEMBLY P/N 287000-1

### 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 14 for Hydraulic System Overhaul instructions.)

#### WARNING

**THE STANLEY AVIATION 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 AND BY AN AUDIBLE SNAP. FOLLOWING A SHEAR BOLT FAILURE, THE TOW BAR MUST BE TAKEN OUT OF SERVICE FOR SHEAR PIN REPLACEMENT. NEVER TOW AN AIRCRAFT WITHOUT THE SHEAR PIN 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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## B787 TOWBAR ASSEMBLY P/N 287000-1

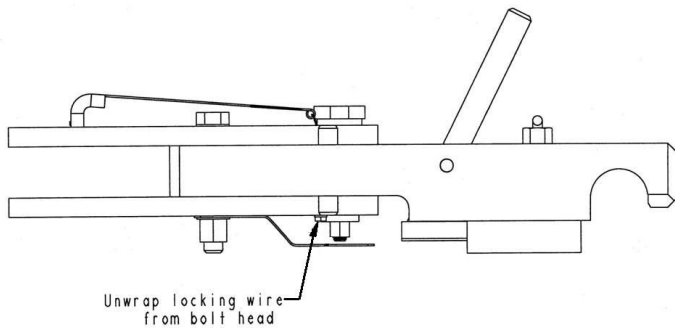
### Section 11 - COMPONENT REMOVAL AND INSTALLATION

**NOTE**

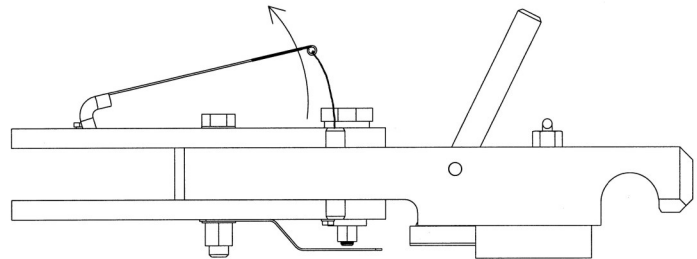
Complete instructions on assembly and disassembly of the Stanley Aviation 287000-1 Towbar are included in the following sections, however, the manufacturer recommends that **COMPLETE** disassembly **NOT** be attempted in the field.


#### 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 lock wire by unwinding it from the cross-drilled bolt head, located on the bottom side of the lower adapter plate. (Figure 11-1) (Removal of the bolt and lock washer is optional.)
- 11.1.4 Remove the .25 hex head bolt attaching the flag to the upper adapter plate, then remove the flag (Figure 11-2).

**FIGURE 11-1**

Move warning flag to raised position: locking wire will come out of its hole.

**FIGURE 11-2**

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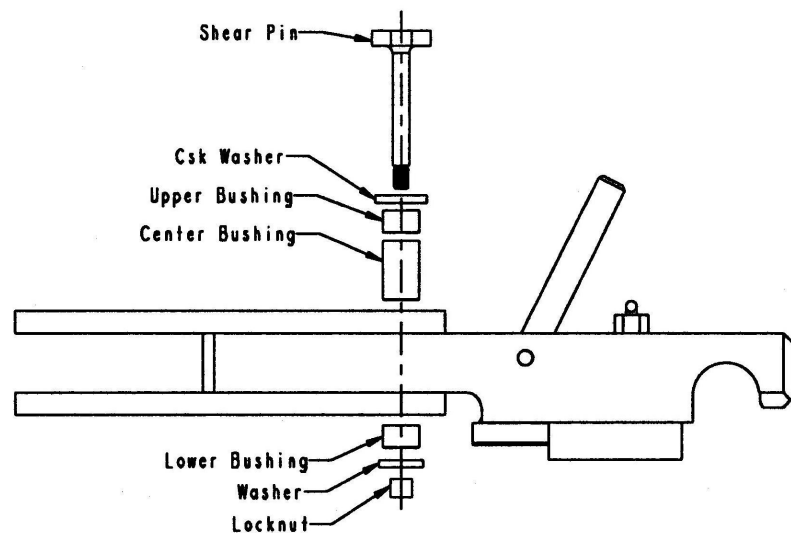
## B787 TOWBAR ASSEMBLY P/N 287000-1

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

#### 11.1 Adapter Kit Removal (cont'd)

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

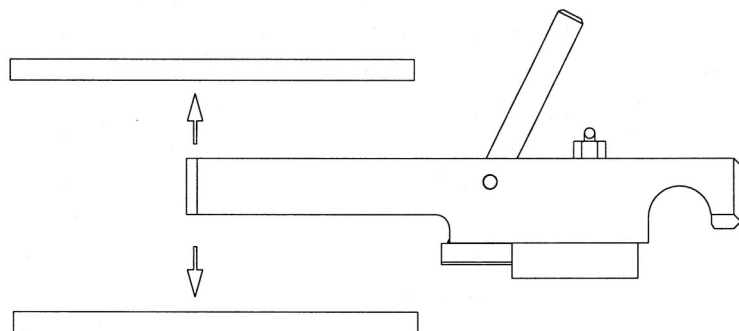
11.1.6 Loosen the shear bolt nut, and remove the shear bolt and its associated hardware.



**FIGURE 11-3**

11.1.7 Remove the upper and lower adapter plates (Figure 11-4).

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



**FIGURE 11-4**

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## B787 TOWBAR ASSEMBLY P/N 287000-1

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

#### 11.2 Adapter Kit Reassembly/Installation

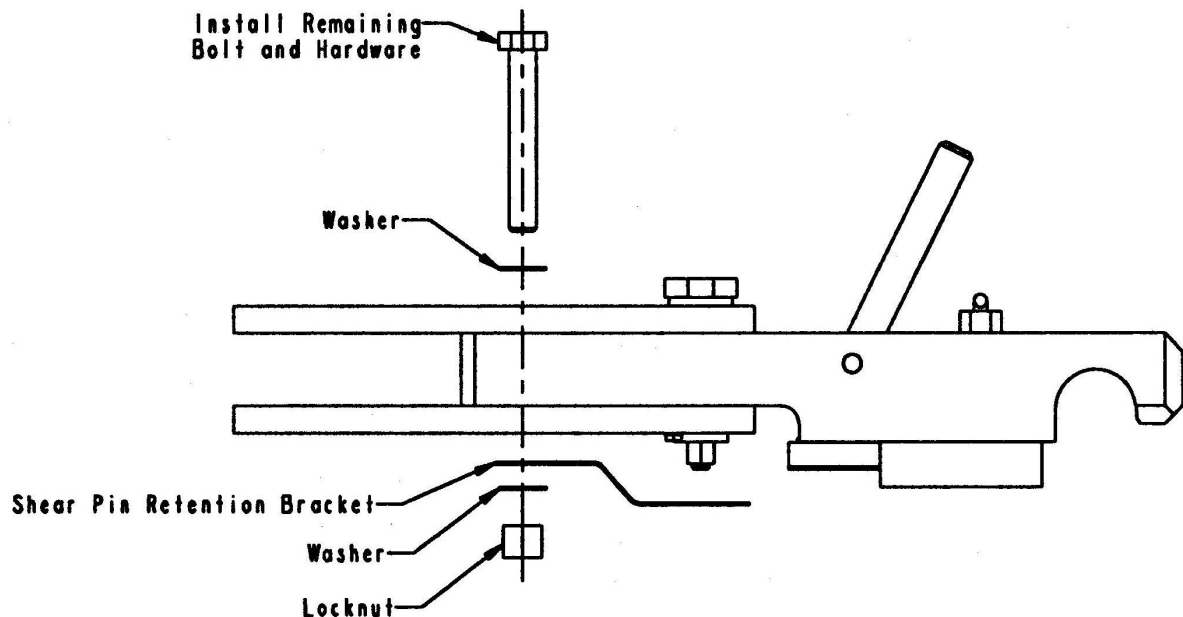
#### NOTE

The upper and lower adapter plates are interchangeable, but their orientation is important. Install both the upper and lower adapter plates, to the adapter head, with the blind threaded holes facing **DOWNWARD**. This will allow the small Lock wire holes to line up, will prevent the holes from acting as a water trap, and will allow installation of the locking wire attachment bolt. The through tapped hole is for attaching the signal flag and is only used on the upper adapter plate.


- 11.2.1 Bring the upper and lower adapter plates into position on the adapter head.
- 11.2.2 Install the shear bolt and its associated hardware, taking care to do this correctly. (Refer to Figure 11-3 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 (if applicable) (Figure 11-5).

#### CAUTION

**DO NOT TORQUE ANY OF THE BOLTS AT THIS STAGE. Partial and final torque will be added later. Always apply Loctite 242 to bolts during installation.**



**FIGURE 11-5**

Continued on Next Page 

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### 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 lock wire hole to accommodate the lock wire.
- 11.2.5 Torque both the shear bolt and retaining bolt to 10-15 ft.-lbs. past run-down torque.
- 11.2.6 Remove all remnants of old/broken lock wire from the signal flag, and discard.
- 11.2.7 Install a length of new lock wire 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 .65 hex head bolt and lockwasher.
- 11.2.8 Feed the lock wire 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 (4) mounting bolt holes, and torque the four (4) mounting bolts with their washers and nuts to 75-100 ft-lbs (Figure 11-6).

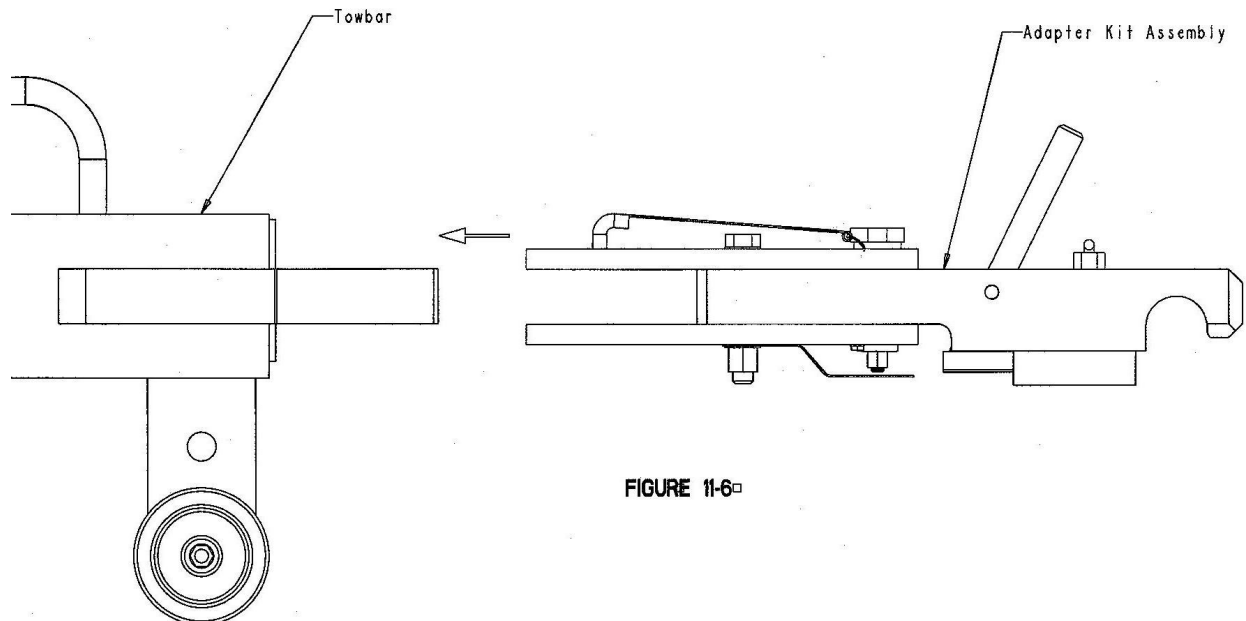


FIGURE 11-6

11.2.12 The towbar is now ready for service

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### 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.)
- 11.3.4 Remove the four (4) attaching bolts to free the pump.
- 11.3.5 Remove the hydraulic cylinder by removing the nut and bolt from the aft end of the cylinder and the nut and bolt from the forward end of the cylinder. Lift the pump and/or cylinder off the towbar body. (See Section 14 for Overhaul Instructions for the Hydraulic Cylinder and the Pump.)

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### 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 Extend 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.

#### CAUTION

**Pump failure or seals damage may result from using a phosphate-ester-based hydraulic fluid (such as Skydrol®). Use hydraulic fluid equivalent to the MIL-H-5606 specifications.**

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.



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## B787 TOWBAR ASSEMBLY P/N 287000-1

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

#### WARNING

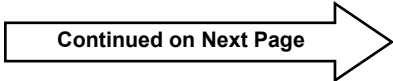
**THE UNDERCARRIAGE ASSEMBLY IS UNDER HEAVY SPRING TENSION, WHEN IN THE EXTENDED POSITION. ANY ATTEMPT TO REMOVE THE UNDERCARRIAGE WHEN THE WHEELS ARE EXTENDED MAY RESULT IN SERIOUS INJURY. THE UNDERCARRIAGE MUST BE RETRACTED AND BLOCKED BEFORE PROCEEDING.**

#### 11.6 Undercarriage Removal

- 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 tires. Pry the grease cap off; remove cotter pin, castellated nut and flat washer; and pull one of the two hubs off the axle shaft. Slide the axle shaft out of its housing (with the opposite hub still attached), and take off 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.**
- 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.

#### CAUTION

**BE ALERT FOR ANY UNFORSEEN COMPLICATIONS DURING THIS STEP. WHEEL REMOVAL REDUCES THE LOAD ON THE SPRINGS, BUT THERE IS STILL TENSION IN THEM. THIS TENSION SHOULD DECREASE AS YOU UNSCREW THE ADJUSTING NUTS, 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 ELIMATED BEFORE THE ADJUSTING NUT REACHES THE END OF THE EYE BOLT THREADS, EXERCISE APPROPRIATE SAFETY PRECAUTIONS.**

Continued on Next Page 

# Operation and Maintenance Manual


## B787 TOWBAR ASSEMBLY P/N 287000-1

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

#### 11.7 Undercarriage Reassembly/Installation

- 11.7.1 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.
- 11.7.2 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 (1) 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 cross bolt.
- 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.)

Continued on Next Page

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# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

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

11.7.8 Service and install the wheels on the axle.

- (a) Prior to installing the wheels, clean and inspect the wheel bearings. If needed, replace the wheel bearings. Pack the hub and bearings with wheel bearing grease and insert bearing braces into the hub.

<b>NOTE</b>	<b>TO ENSURE THAT GREASE IS PUSHED COMPLETELY THROUGH THE BEARING CAGES, THE USE OF A TOOL SIMILAR TO SKF P/N VKN 550 IS RECOMMENDED.</b>
-------------	---

- (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.

11.7.9 Remove the block from under the undercarriage axle.

11.7.10 Lower the wheels by using the hydraulic pump, until the wheels are on the ground and bearing the weight of the towbar body.

11.7.11 Remove the blocks from beneath the towbar body.

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

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

#### 11.8 Lunette Removal

11.8.1 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.

11.8.2 Remove the six (6) bolts and flat washers that hold the lunette in place, then slide the assembly out the end of the towbar body (tube).

Disassemble the Shock Absorbing Unit:

- (a) Remove the cotter pin.
- (b) Unscrew the castellated nut.
- (c) Remove the washer.
- (d) Take note of the location and orientation of the elastomer disks, float rings and centering, before removing any of the components from the drawbar assembly.

Reassemble the Shock Absorbing Unit:

- (a) Apply multi-purpose grease to both sides of each elastomer disk.
- (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. Loosen the nut slightly until the first slot aligns with the hole in the threads.
- (d) Install the cotter pin.

#### 11.9 Lunette Reassembly/Installation

11.9.1 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.

11.9.2 Install the six (6) washers and bolts.

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

#### NOTE

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

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 12 - SHEAR BOLT FAILURE

The Stanley Aviation 287000-1 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 Aviation 287000-1 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 lock wire 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 lock wire to be sheared, thus releasing the signal flag. The lock wire 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 di-iameter of the lock wire 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 dis-lodged from the hole, fall free of the tow bar and become FOD.**

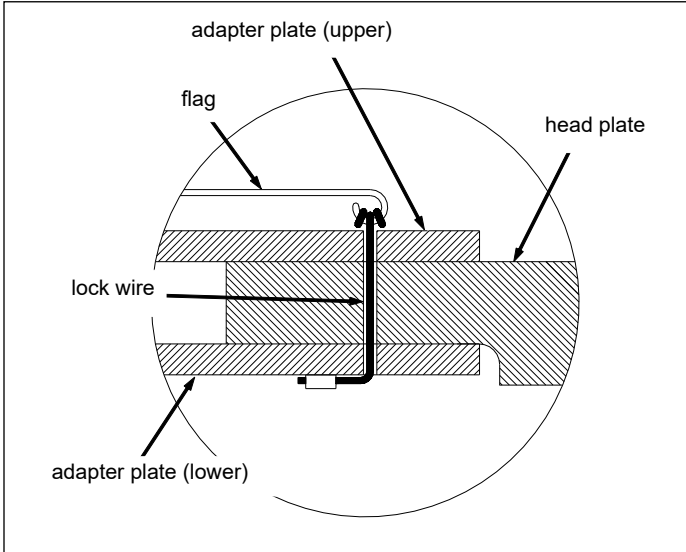
**Stanley Aviation recommends that the center section of lock wire be recovered IMMEDIATELY to prevent the possibility of having it ingested by an engine.**

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

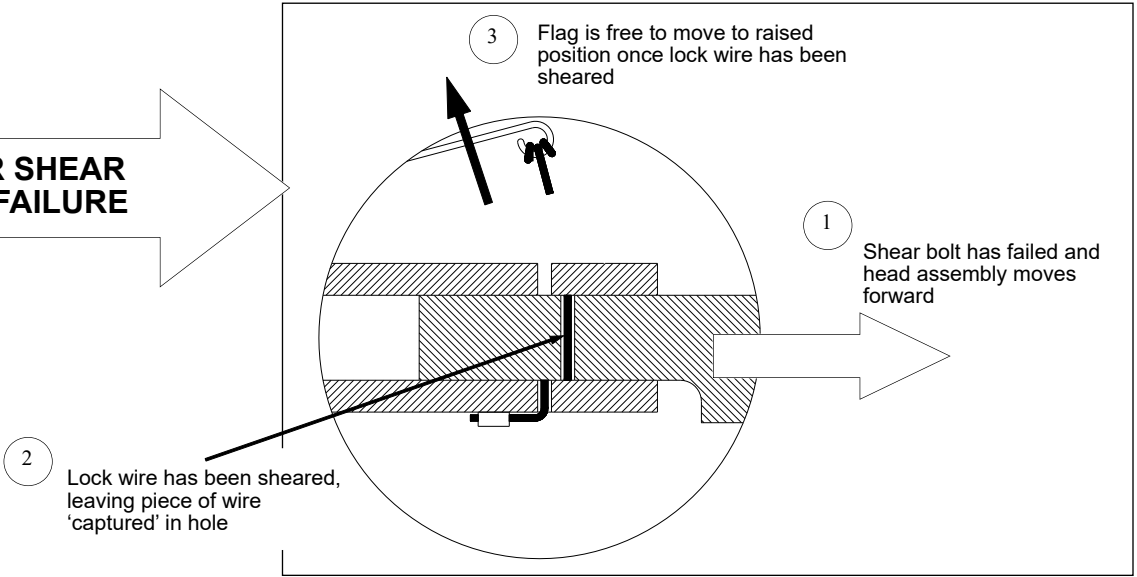
**Section 12 - SHEAR BOLT FAILURE (cont'd)**

**BEFORE SHEAR BOLT FAILURE**



▲ **FIGURE 12-1**

**AFTER SHEAR BOLT FAILURE**



▲ **FIGURE 12-2**

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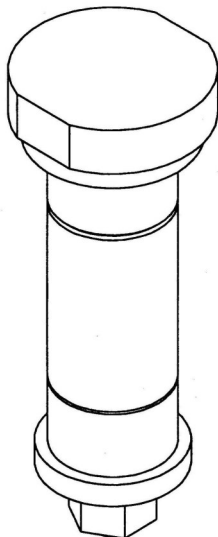
# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 13 - SHEAR PIN KIT REPLACEMENT

The complete Shear Pin Kit 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 two short, straight bushings, and the single long straight bushing. REMOVE ANY TRACES OF BROKEN LOCKWIRE.
- 13.4 From the top, install a new countersunk washer and a new shear bolt.
- 13.5 From the bottom, install the upper short bushing, the long bushing, the lower short bushing, the lower flatwasher, and the lock nut. Torque the lock nut to 15 ft-lbs past rundown torque.
- 13.6 Re-tighten the adapter plate attaching bolts (if they were previously loosened) and the retaining bolt.
- 13.7 Replace the signal flag lock wire. (Refer to Section 11-2.)



#### **400000-100 SHEAR PIN KIT (FOR B787-3 ONLY)**

The 400010-1 shear bolt has markings on the head: B787-3.

#### **400000-101 SHEAR PIN KIT (FOR B787-8, -9 AND -10 ONLY)**

The 400010-2 shear bolt has markings on the head: B787-8 -9 -10.

**Shear Bolt Replacement Kit  
P/N 400000-100 or -101**

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### 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.
- 14.1.13 Install the cylinder onto the towbar, 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®).**



# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 14 - SERVICE INSTRUCTIONS (cont'd)

- 4.1 Hydraulic Pump Overhaul (Note: The item numbers below refer to pump P/N 110264-1. The procedure is similar for the P/N 110264-2 pump.)

(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.) (Refer to Section 15 for Illustrated Parts List.)

- 4.1.1 Close the vent screw on the reservoir and thoroughly clean all outside surfaces of the Pump, reservoir and base plate.
- 4.1.2 Disconnect the hose going to the cylinder. Remove the Pump assembly from the towbar.
- 4.1.3 Remove the vent assembly (#40) from the reservoir and drain the oil into an environmentally safe container.
- 4.1.4 Remove reservoir by removing the reservoir mounting bolts (#46) that go through Pump body.
- 4.1.5 Remove the clevis pin (#36) and swing the linkage assembly away from Pump. Check for excessive wear and replace as necessary.
- 4.1.6 Remove the four (4) screws (#5) and the split flanges (#30) and set aside.
- 4.1.7 Remove the piston (#33), tube (#34) and valve body (#8) as a unit from the main body. Once removed, the piston and valve body can be taken OUT THE BOTTOM of the tube.
- 4.1.8 Remove the outlet check ball and spring (#28 and 26) and set aside.
- 4.1.9 Remove the manual release assembly by unscrewing the bearing (#16). The knob assembly can then be set aside as well as the check body (#21).
- 4.1.10 Remove and discard all o-rings, back-up rings, and wipers.
- 4.1.11 Thoroughly clean each part and inspect for signs of corrosion, scoring or abnormal wear. Examine the check seats for any imperfections that would affect function. Remove all loose paint. Replace components as necessary or obtain a new Pump.
- 4.1.12 Using only the seals in Seal Kit Number SRK-040032, install the seals after applying a light film of a compatible fluid (MIL-H-5606 or equal).
- 4.1.13 Reassemble the unit in reverse order shown above; torque the flange screws (#5) and reservoir mounting bolts (#46) to 150 in.-lbs. (12.5 ft.-lbs.).
- 4.1.14 Refill the reservoir with approximately 17 oz. of MIL-H-5606 or equal fluid and check for any sign of external leakage. Replace the vent assembly and install on towbar.

**CAUTION**

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

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### 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 287000-1 TOWBAR ASSEMBLY  
 SUBASSEMBLY ITEM 2, P/N 400000-1 ADAPTER KIT**

Item Number	Part Number	Description	Quantity Req'd/ Units Per Assembly
17	101715-75	Flatwasher, Ø.75	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

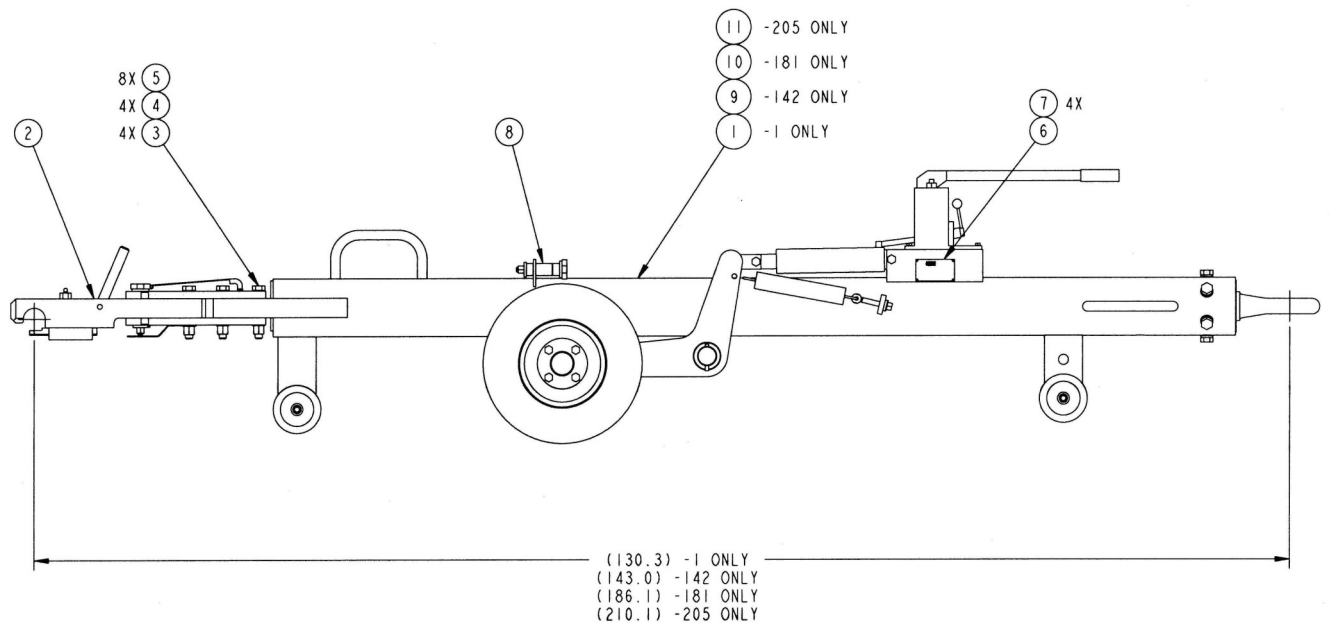
# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

**Section 15 - ILLUSTRATED PARTS LIST (cont'd)**

QTY REQD				ITEM NO	PART NO.	DESCRIPTION
-	-	-	X	-	287000-1	TOWBAR ASSEMBLY-B787
-	-	X	-	-	287000-142	TOWBAR ASSEMBLY-B787, 143"
-	X	-	-	-	287000-181	TOWBAR ASSEMBLY-B787, 186"
X	-	-	-	-	287000-205	TOWBAR ASSEMBLY-B787, 210"
-	-	-	1	1	230050-1	TOWBAR, SHOCK ABSORBING LUNETTE
1	1	1	1	2	400000-1	ADAPTER KIT, TOWBAR HEAD
4	4	4	4	3	101898-500	BOLT, HEX HEAD, GR8, .75-16UNF X 5.00L
4	4	4	4	4	101876-75	LOCKNUT, .75-16UNF
8	8	8	8	5	101715-75	FLATWASHER, Ø.75
1	1	1	1	6	102001-1	NAMEPLATE
4	4	4	4	7	102489-2	DRIVE SCREW
1	1	1	1	8	400000-101	SHEAR PIN KIT, 787-8, -9, -10
-	-	1	-	9	230050-142	TOWBAR, SHOCK ABSORBING LUNETTE, 142"
-	1	-	-	10	230050-181	TOWBAR, SHOCK ABSORBING LUNETTE, 181"
1	-	-	-	11	230050-205	TOWBAR, SHOCK ABSORBING LUNETTE, 205"

P/N 287000 PARTS LIST

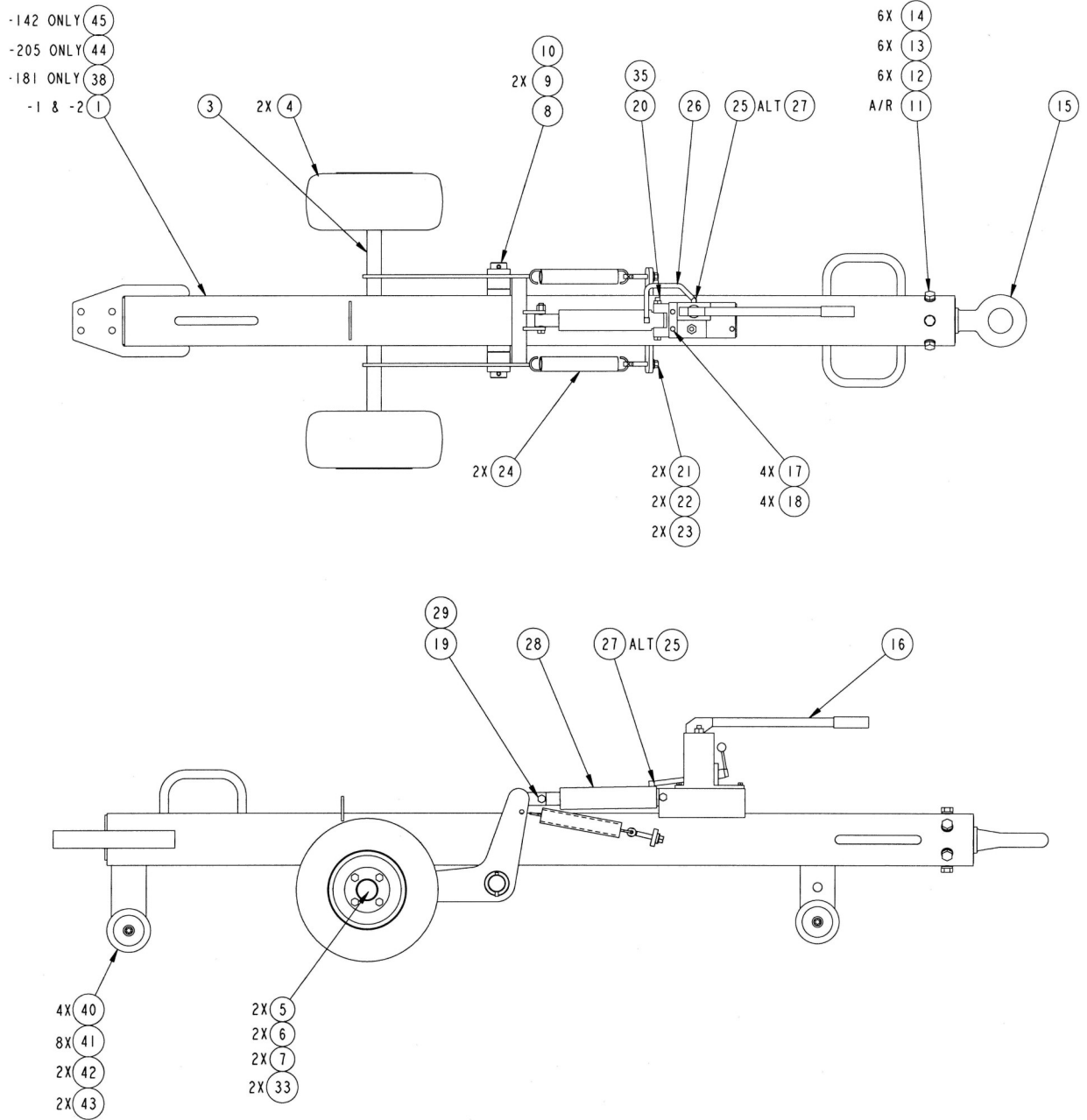


P/N 287000 TOWBAR ASSEMBLY

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

**Section 15 - ILLUSTRATED PARTS LIST (cont'd)**



**230050-1 ASSEMBLY**  
**230050-2, -181, -205, -142 SIMILAR**

See pages 29-30 for parts list

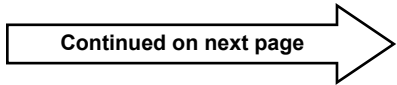
P/N 230050 TOWBAR SUB-ASSEMBLY

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 15 - ILLUSTRATED PARTS LIST (cont'd)

QTY REQD				ITEM NO	PART NO.	DESCRIPTION
-	-	-	X	-	230050-1	TOWBAR ASSEMBLY
-	-	X	-	-	230050-142	TOWBAR ASSEMBLY, 142"
-	X	-	-	-	230050-181	TOWBAR ASSEMBLY, 181"
X	-	-	-	-	230050-205	TOWBAR ASSEMBLY, 205"
-	-	-	1	1	215031-1	TOWBAR BODY WELDMENT
-	-	-	-	2	(DELETED)	
1	1	1	1	3	215020-1	AXLE WELDMENT
2	2	2	2	4	230033-1	TIRE/WHEEL ASSEMBLY
2	2	2	2	5	101715-75L	FLATWASHER
2	2	2	2	6	101870-75	SLOTTED NUT
2	2	2	2	7	102542-08200	COTTER PIN
1	1	1	1	8	110270-1	SHAFT
2	2	2	2	9	100059-32	ROLL PIN
1	1	1	1	10	100112-1	GREASE ZERK
A/R	A/R	A/R	A/R	11	MS20995C32	LOCKWIRE, Ø.032, STAINLESS
6	6	6	6	12	101715-75	FLATWASHER, Ø.75
6	6	6	6	13	101898-150H	BOLT, HEX HEAD, GR8, .75-16UNF X 1.50L (DRILLED HEAD)
6	6	6	6	14	103109-75	LOCK WASHER, Ø.75
1	1	1	1	15	214033-1	LUNETTE ASSEMBLY
1	1	1	1	16	110264-2	HYDRAULIC PUMP (ALT: 110264-1)
4	4	4	4	17	102492-125	BOLT, HEX HEAD, GR5, .31-24UNF X 1.25L
4	4	4	4	18	101715-31	FLATWASHER, Ø.31
1	1	1	1	19	101876-56	LOCK NUT, .56-18UNF
1	1	1	1	20	101896-475	BOLT, HEX HEAD, GR8, .56-18UNF X 4.75L


 Continued on next page

P/N 230050 PARTS LIST  
 SUB-ASSEMBLY WITH SHOCK ABSORBING LUNETTE

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 15 - ILLUSTRATED PARTS LIST (cont'd)

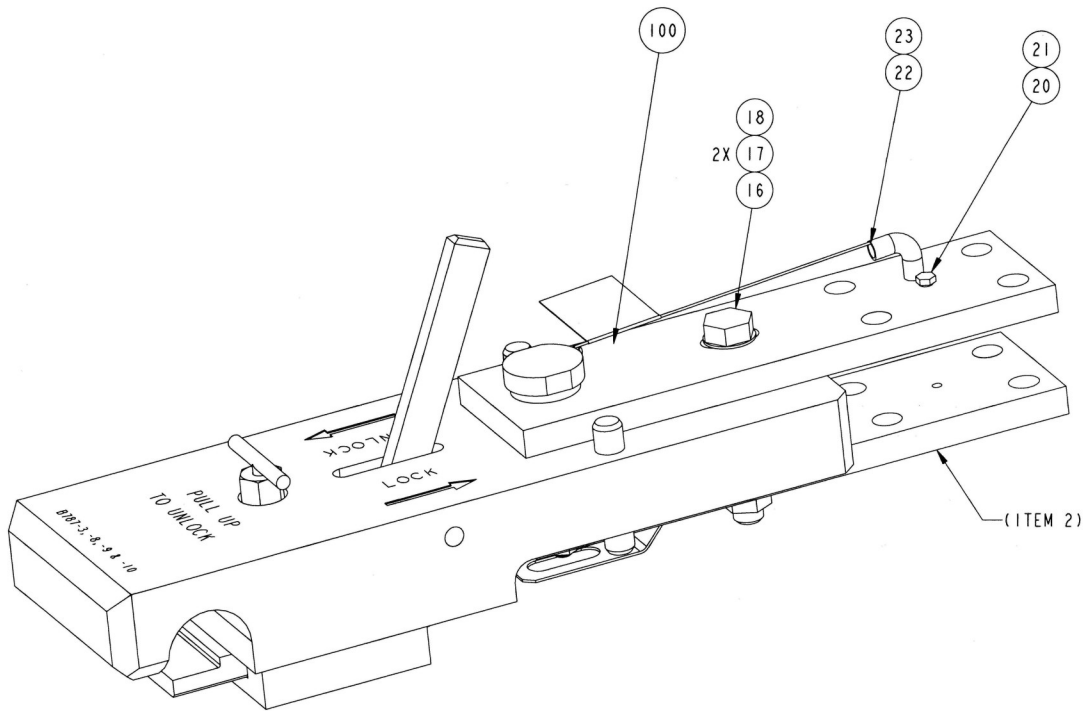
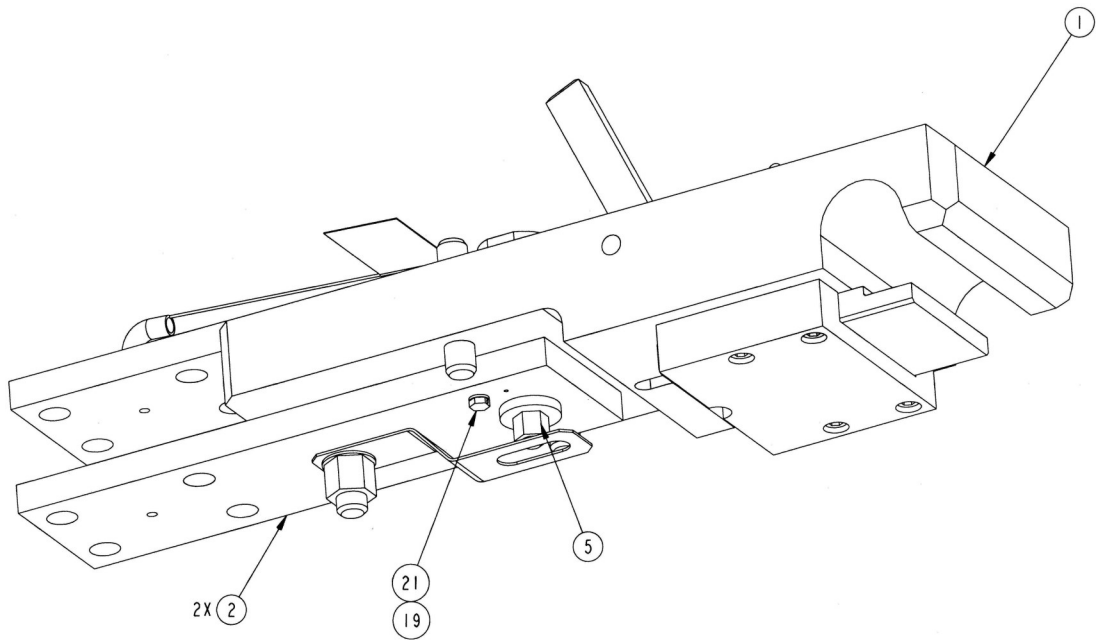
QTY REQD				ITEM NO	PART NO.	DESCRIPTION
-	-	-	X	-	230050-1	TOWBAR ASSEMBLY
-	-	X	-	-	230050-142	TOWBAR ASSEMBLY, 142"
-	X	-	-	-	230050-181	TOWBAR ASSEMBLY, 181"
X	-	-	-	-	230050-205	TOWBAR ASSEMBLY, 205"
2	2	2	2	21	101875-50	LOCK NUT, .50-13UNC
2	2	2	2	22	CL-3-SW	SPHERICAL WASHER
2	2	2	2	23	110265-1	EYE BOLT
2	2	2	2	24	81185	SPRING
1	1	1	1	25	101746-59	HYDRAULIC FITTING (ALT: 101822-52)
1	1	1	1	26	110782-14	HYDRAULIC HOSE
1	1	1	1	27	101822-52	HYDRAULIC FITTING (ALT: 101746-59)
1	1	1	1	28	AT-789	HYDRAULIC CYLINDER
1	1	1	1	29	101896-325	BOLT, HEX HEAD, GR8, .56-18UNF X 3.25L
				30-32	(DELETED)	
2	2	2	2	33	DC-00996-198	BEARING PROTECTOR
				34	(DELETED)	
1	1	1	1	35	101874-56	LOCK NUT, .56-18UNF
				36-37	(DELETED)	
-	1	-	-	38	215031-181	TOWBAR BODY WELDMENT
				39	(DELETED)	
4	4	4	4	40	2337T26	WHEEL, PHENOLIC
8	8	8	8	41	101715-50	FLATWASHER, Ø.50
4	4	4	4	42	102475-425	BOLT, HEX HEAD, GR8, .50-13UNC X 4.25L
4	4	4	4	43	104179-50	LOCK NUT, THIN, .50-13UNC
1	-	-	-	44	215031-205	TOWBAR BODY WELDMENT
-	-	1	-	45	215031-142	TOWBAR BODY WELDMENT

P/N 230050 PARTS LIST  
 SUB-ASSEMBLY WITH SHOCK ABSORBING LUNETTE

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

Section 15 - ILLUSTRATED PARTS LIST (cont'd)



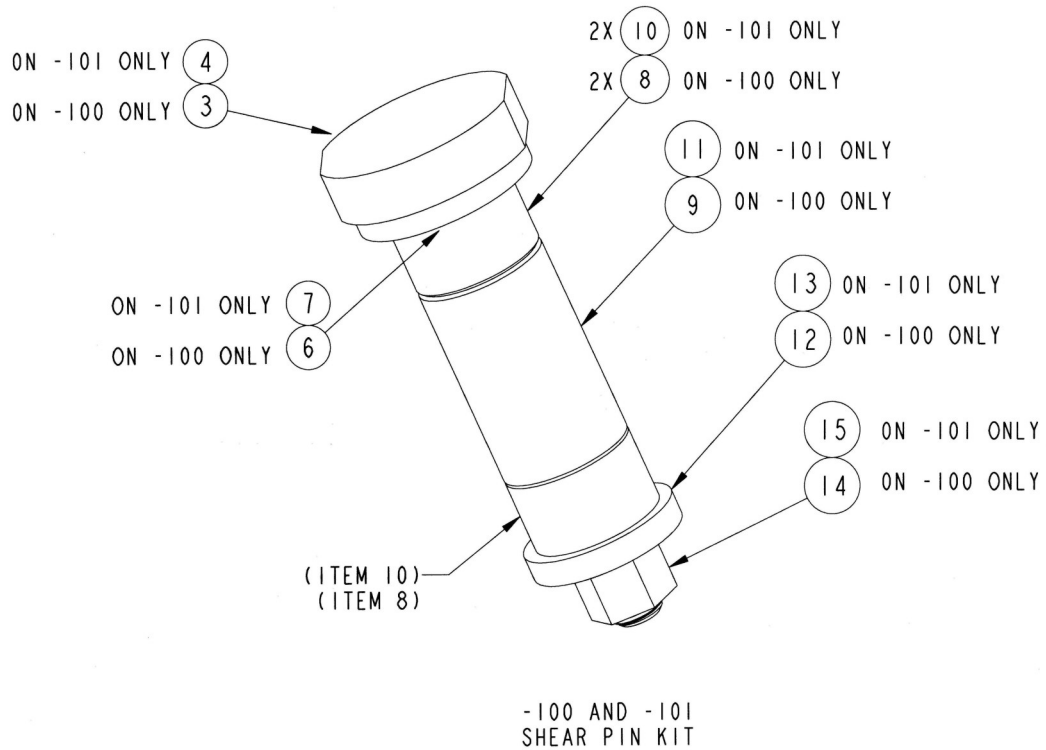
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P/N 400000-1 TOWBAR HEAD ADAPTER KIT

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

**Section 15 - ILLUSTRATED PARTS LIST (cont'd)**



See next page for parts list

P/N 400000-100/-101 SHEAR PIN KITS



# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 15 - ILLUSTRATED PARTS LIST (cont'd)

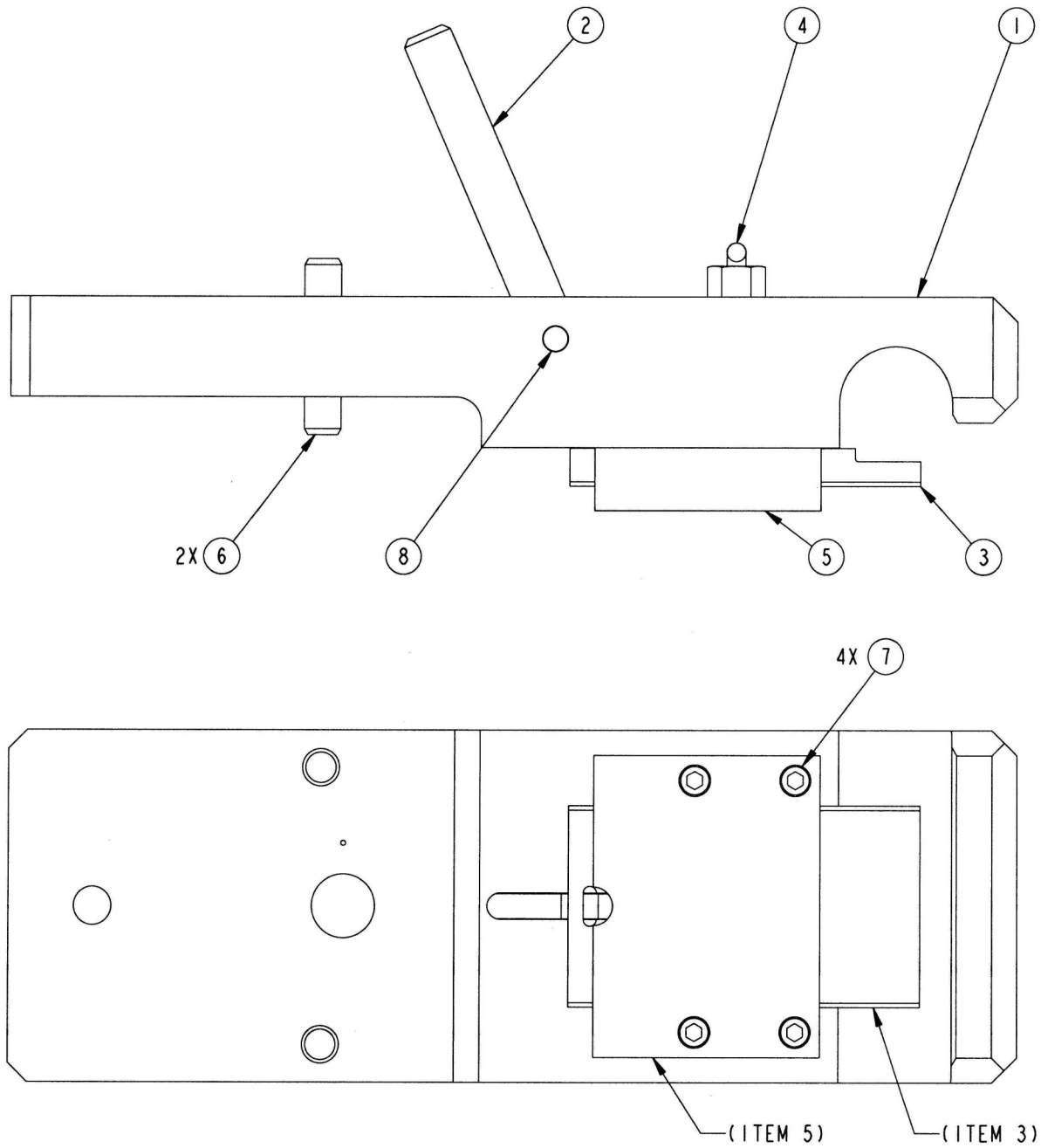
QTY			ITEM NO	PART NO.	DESCRIPTION
-	-	X	-	400000-1	ADAPTER KIT, B787
-	X	1	100	400000-100	SHEAR PIN KIT, 787-3
X	-	-	101	400000-101	SHEAR PIN KIT, 787-8,-9,-10
-	-	1	1	400001-1	HEAD ASSEMBLY
-	-	2	2	400009-1	ADAPTER PLATE
-	1	-	3	400010-1	SHEAR BOLT, .50-20UNF
1	-	-	4	400010-2	SHEAR BOLT, .62-18UNF
-	-	1	5	400011-3	SHEAR PIN RETENTION BRACKET
-	1	-	6	400013-1	FLATWASHER, CSK, STAINLESS
1	-	-	7	400013-2	FLATWASHER, CSK, STAINLESS
-	2	-	8	204109-47	SHEAR BUSHING, HEADLESS X .75
-	1	-	9	204109-48	SHEAR BUSHING, HEADLESS X 2.00
2	-	-	10	204109-49	SHEAR BUSHING, HEADLESS X .75
1	-	-	11	204109-50	SHEAR BUSHING, HEADLESS X 2.00
-	1	-	12	215032-28	FLATWASHER, STAINLESS
1	-	-	13	215032-29	FLATWASHER, STAINLESS
-	1	-	14	101876-50	LOCKNUT, .50-20UNF
1	-	-	15	101876-62	LOCKNUT, .62-18UNF
-	-	1	16	101876-75	LOCKNUT, .75-16UNF
-	-	2	17	101715-75	FLATWASHER, n .75
-	-	1	18	101898-500	BOLT, HEX HEAD, GR8, .75-16UNF X 5.00L
-	-	1	19	102471-38H	BOLT, HEX HEAD, GR5, .25-20UNC X .38L
-	-	1	20	102471-50	BOLT, HEX HEAD, GR5, .25-20UNC X .50L
-	-	2	21	103109-25	LOCKWASHER, Ø.25
-	-	1	22	215030-21	WARNING FLAG ASSEMBLY
-	-	A/R	23	MS20995C32	LOCK WIRE, Ø.032, STAINLESS

### P/N 400000 PARTS LIST

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

Section 15 - ILLUSTRATED PARTS LIST (cont'd)



See next page for parts list

P/N 400001-1 TOWBAR HEAD

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 15 - ILLUSTRATED PARTS LIST (cont'd)

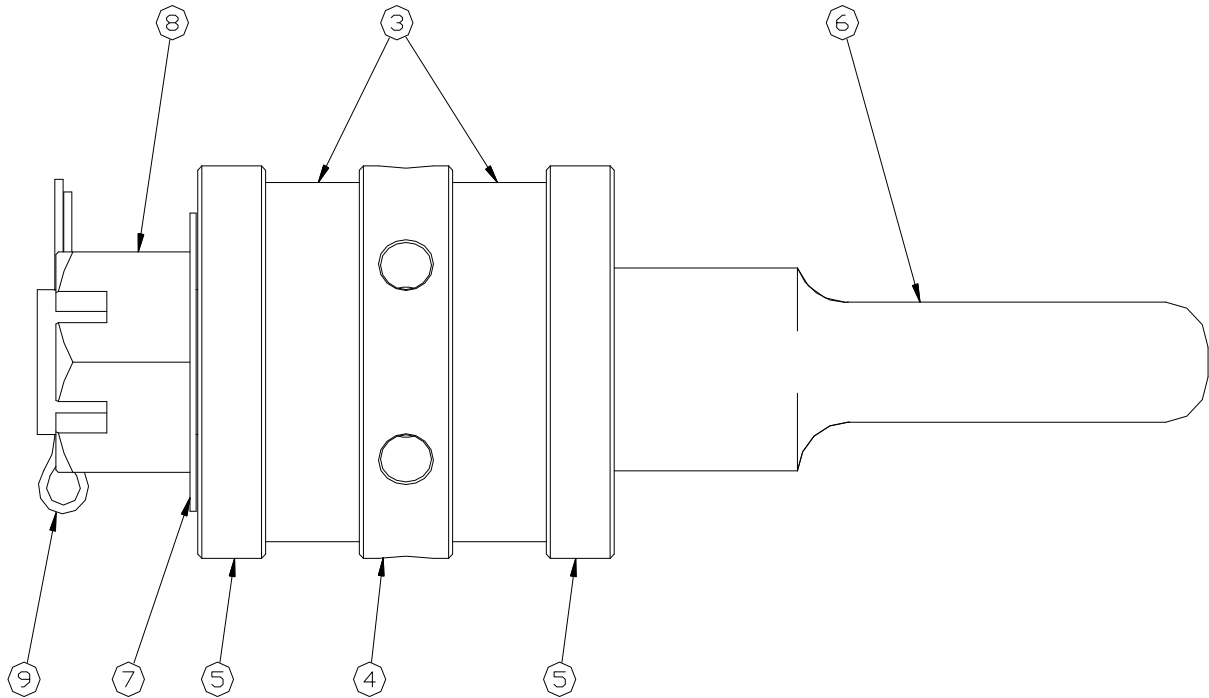
QTY REQD	ITEM NO.	PART NO.	DESCRIPTION
X	-	400001-1	TOWBAR HEAD
1	1	400002-1	HEAD PLATE
1	2	400003-1	HANDLE
1	3	400004-1	SLIDE
1	4	400005-1	T-HANDLE SPRING PLUNGER
1	5	205284-6	BRIDGE
2	6	215033-1	DOWEL PIN
4	7	104036-125	SHC SCREW, .38-16UNC X 1.25L
1	8	90145A726	DOWEL PIN, Ø.500 X 3.5L

### P/N 400001-1 TOWBAR HEAD PARTS LIST

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

**Section 15 - ILLUSTRATED PARTS LIST (cont'd)**



P/N 214033-1 LUNETTE ASSEMBLY

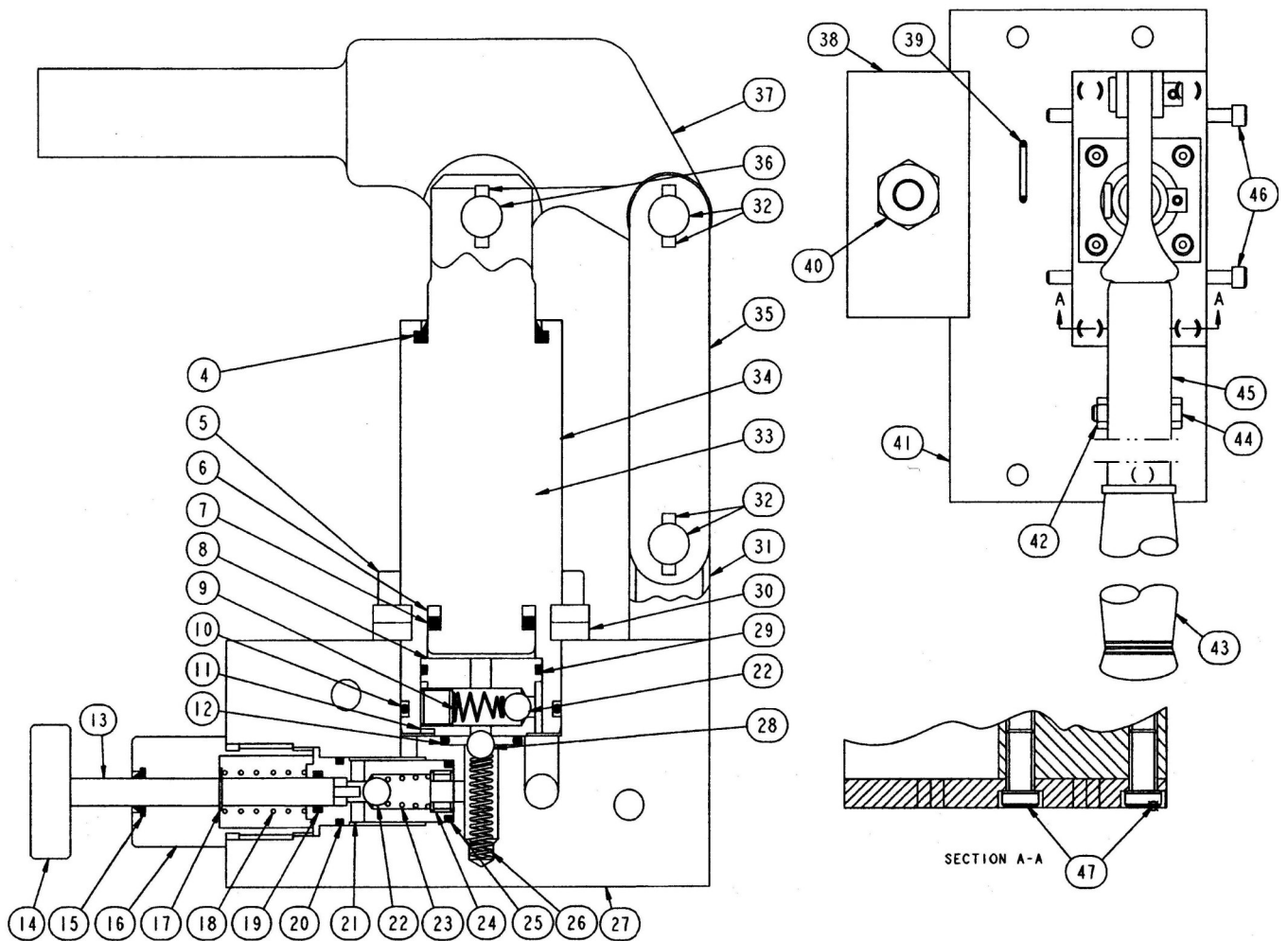
ITEM NO.	PART NO.	DESCRIPTION	UNITS PER ASSEMBLY
-	214033-1	LUNETTE ASSEMBLY, SHOCK ABSORBING	REF
3	102081-2	ELASTOMER DISC	2
4	214022-1	CENTER RING	1
5	214021-1	FLOAT RING	2
6	104319-2	DRAWBAR	1
7	104319-3	FLAT WASHER	1
8	104319-4	SLOTTED NUT	1
9	10439-5	COTTER PIN	1

P/N 214033-1 PARTS LIST

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 15 - ILLUSTRATED PARTS LIST (cont'd)



P/N 110264-1 HYDRAULIC HAND PUMP

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 15 - ILLUSTRATED PARTS LIST (cont'd)

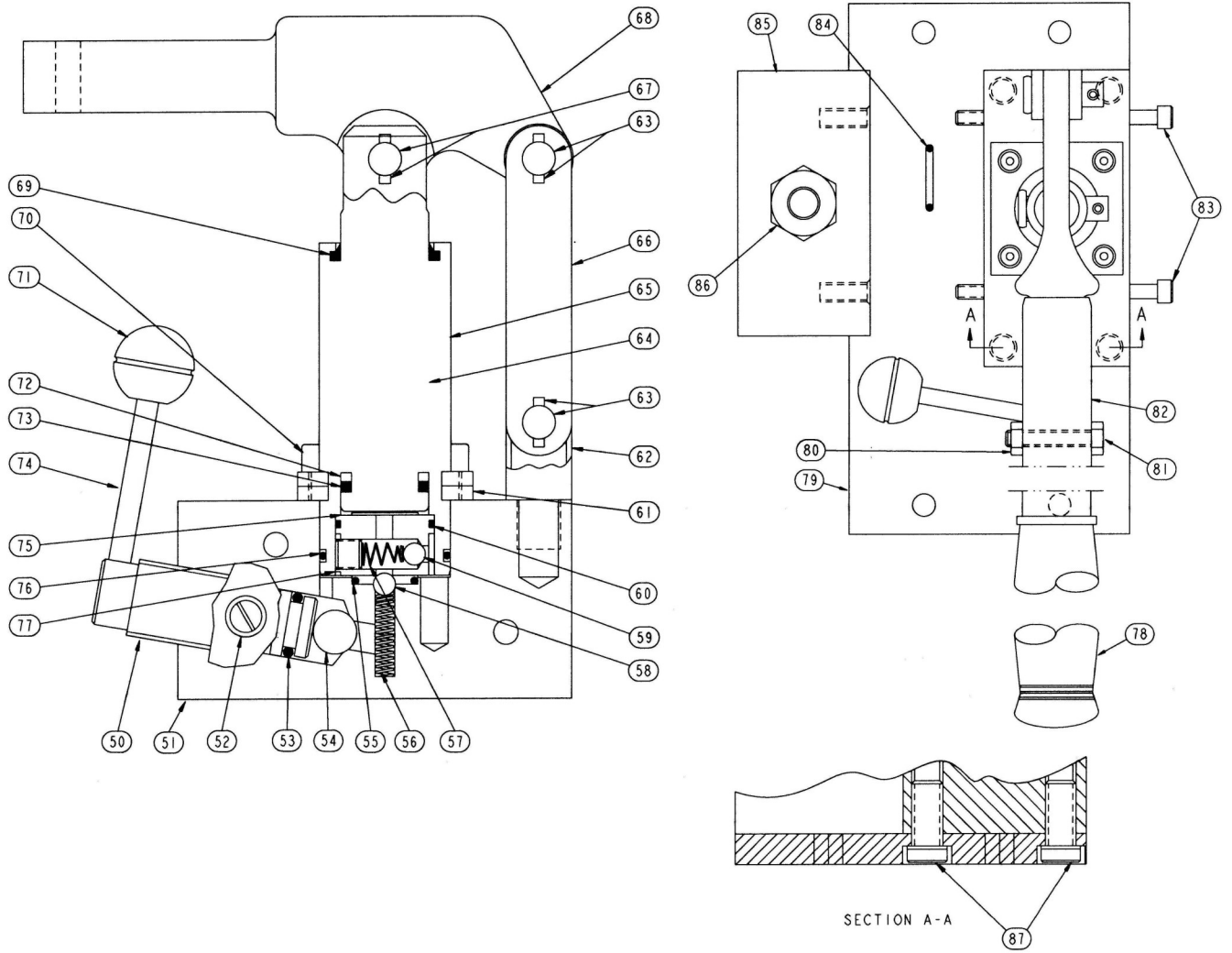
ITEM	QTY	STANLEY PART NUMBER	MANUFACTURER'S PART NUMBER	DESCRIPTION
47	4	110264-47	09-AEDF-06-16 X 08	LOW HD. SOC. CAP SCR.
46	2	110264-46	09-ADDF-04-20 X 40	MOUNTING BOLTS
45	1	110264-45	CXD-040032-004	HANDLE, PUMP EXTENSION
44	1	110264-44	09-AAFC-04-20 X20	HEX HD. CAP SCR.
43	1	110264-43	529-000	GRIP, HANDLE
42	1	110264-42	08-AAFH-04-20	NUT 1/4-20
41	1	110264-41	CXD-010013-001	PUMP MOUNTING PLATE
40	1	110264-40	CXD-020018-505	VENT ASS'Y.
*	39	110264-39	01-210-A070	O'RING (RESERVOIR & PUMP)
	38	110264-38	CXD-000027-001	RESERVOIR
	37	110264-37	CXD-010013-008-1	PUMP HANDLE
	36	110264-36	531-000P	ASS'Y. CLEVIS PIN
	35	110264-35	512-000	STRAP
	34	110264-34	504-080	TUBE
	33	110264-33	507-081	PISTON
	32	110264-32	510-000P	ASS'Y. PIN LINKAGE
	31	110264-31	508-000	PIVOT
	30	110264-30	506-000	FLANGE HALF
*	29	110264-29	524-000	O'RING, BUNA
	28	110264-28	515-000	BALL, OUTLET CHECK
	27	110264-27	CXD-040023-001	BODY
	26	110264-26	514-000	SPRING, OUTLET CHECK
*	25	110264-25	01-013-A070	O'RING
	24	110264-24	09-AYDF-06-24 X 03	HOLLOW LOC
	23	110264-23	516-001	SPRING
	22	110264-22	517-000	BALL
	21	110264-21	CXD-040032-002	CHECK BODY
*	20	110264-20	01-014-A070	O'RING
*	19	110264-19	01-010-A070	O'RING
	18	110264-18	LC-045E-12-MW	SPRING
	17	110264-17	15-01 5100-.25	SNAP RING
	16	110264-16	CXC-880001-004	BEARING
*	15	110264-15	07-108-AG70	WIPER
	14	110264-14	CXC-870039-006	KNOB
	13	110264-13	CXD-040032-003	ROD
*	12	110264-12	522-000	O'RING
	11	110264-11	540-000	PLUG PIPE
*	10	110264-10	525-002	O'RING, BUNA
	9	110264-9	516-001	SPRING, INTAKE CHECK
	8	110264-8	503-001	VALVE BODY
*	7	110264-7	526-080	O'RING, BUNA
*	6	110264-6	534-080	BACK-UP
	5	110264-5	518-000P	SCREW
*	4	110264-4	528-080	WIPER
ITEM	QTY	STANLEY PART NUMBER	MANUFACTURER'S PART NUMBER	DESCRIPTION

HYDRAULIC HAND PUMP PARTS LIST  
 INCLUDING P/N 110264-3 SPARES KIT (ITEMS MARKED \*)

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

Section 15 - ILLUSTRATED PARTS LIST (cont'd)



P/N 110264-2 HYDRAULIC HAND PUMP



# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 15 - ILLUSTRATED PARTS LIST (cont'd)

87	4	110264-47	09-AEDF-06-16 X 08	LOW HD. SOC. CAP SCR. 3/8-16 X 1/2 LG.
86	1	110264-40	CXD-020018-505	VENT ASS'Y.
85	1	110264-38	CXD-000027-001	RESERVOIR
* 84	1	110264-39	01-210-A070	O'RING (RESERVOIR & PUMP)
83	2	110264-46	09-ADDF-04-20 X 40	MOUNTING BOLTS (RESERVOIR & PUMP)
82	1	110264-82	CXD-070014-001	HANDLE, PUMP EXTENSION
81	1	110264-44	09-AAFC-04-20 X 20	HEX HD. CAP SCR. 1/4-20 X 1 1/4 LG.
80	1	110264-42	08-AAFH-04-20	NUT 1/4-20
79	1	110264-41	CXD-010013-001	PUMP MOUNTING PLATE
78	1	110264-43	529-000	GRIP, HANDLE
77	1	110264-11	540-000	PLUG PIPE
* 76	1	110264-10	525-002	O'RING, BUNA
75	1	110264-8	503-001	VALVE BODY
74	1	110264-74	14-01-.250 X 3.00	ROLL PIN
* 73	1	110264-7	526-080	O'RING, BUNA
* 72	1	110264-6	534-080	BACK-UP
71	1	110264-71	CXD-010013-009	KNOB
70	4	110264-70	518-000	SCREW
* 69	1	110264-4	528-080	WIPER
68	1	110264-68	509-C00	PUMP HANDLE
67	1	110264-36	531-000P	ASS'Y. CLEVIS PIN
66	2	110264-35	512-000	STRAP
65	1	110264-34	504-080	TUBE
64	1	110264-33	507-081	PISTON
63	2	110264-32	510-000P	ASS'Y. PIN LINKAGE
62	1	110264-31	508-000	PIVOT
61	4	110264-30	506-000	FLANGE HALF
* 60	1	110264-29	524-000	O'RING, BUNA
59	1	110264-22	517-000	BALL
58	1	110264-58	515-000	BALL, OUTLET CHECK
57	1	110264-9	516-001	SPRING, INTAKE CHECK
56	1	110264-26	514-000	SPRING, OUTLET CHECK
* 55	1	110264-12	522-000	O'RING
54	1	110264-54	513-000	BALL RELEASE
* 53	1	110264-53	521-000	O'RING, BUNA
52	1	110264-52	530-000	RELEASE SCREW RETAINER
51	1	110264-51	501-000-M01	PUMP BODY - RESERVOIR UNITS
50	1	110264-50	502-000-001	RELEASE SCREW
ITEM	QTY	STANLEY PART NO.	MANUFACTURER'S PART NO.	DESCRIPTION
PARTS LIST				

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

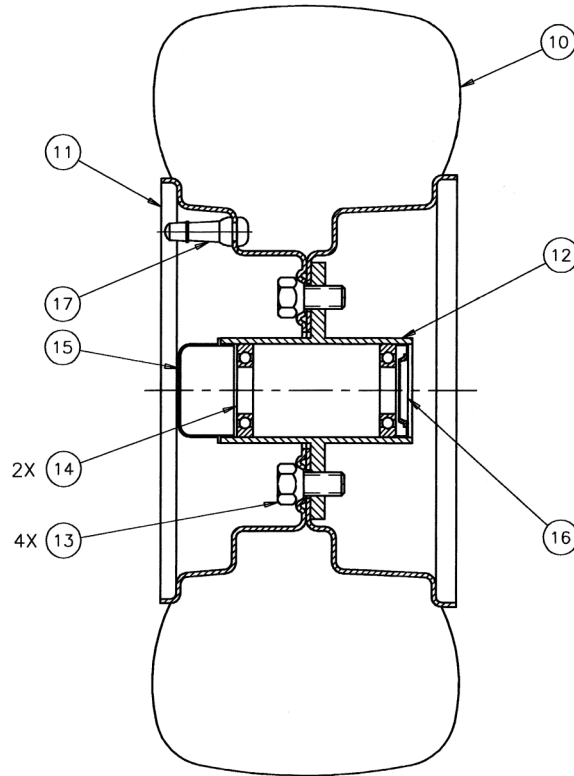
### P/N 110264-2 HYDRAULIC HAND PUMP



# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

**Section 15 - ILLUSTRATED PARTS LIST (cont'd)**



**▲ TIRE AND WHEEL ASSEMBLY  
P/N 230033-1**


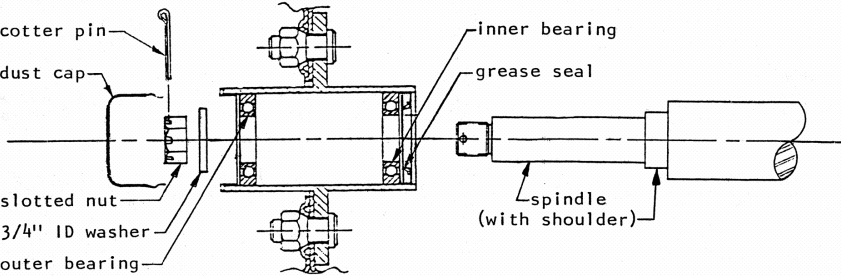
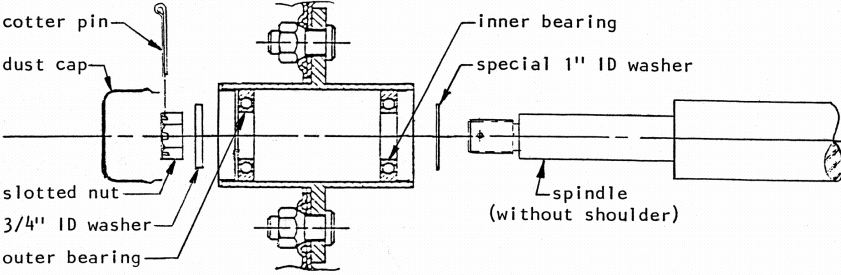
1	17	230033-17	VALVE STEM
1	16	230033-16	GREASE SEAL
1	15	230033-15	DUST CAP
2	14	230033-14	BEARING
4	13	230033-13	THREAD-IN BOLT
1	12	230033-12	HUB W/STUDS
1	11	230033-11	WHEEL
1	10	230033-10	TIRE
X	-	230033-1	TIRE AND WHEEL ASSEMBLY
-1			
UNITS PER ASSEMBLY	ITEM NO.	PART NO.	DESCRIPTION

# Operation and Maintenance Manual

## B787 TOWBAR ASSEMBLY P/N 287000-1

### Section 15 - ILLUSTRATED PARTS LIST (cont'd)

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.

	<p>P/N 230033-20 ASSEMBLY INSTRUCTIONS FOR P/N 230033-400 WHEEL REPLACEMENT KIT</p>	<p>GROUND SUPPORT EQUIPMENT DWG. # 230033 SHEET 2 OF 2 REVISION C</p>
<p>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.</p>		
<p>A. NEW STYLE AXLE</p>		
<ol style="list-style-type: none"> <li>1. Remove dust cap from hub and pack hub, bearings and dust cap with wheel bearing grease.</li> <li>2. Install wheel bearings in hub.</li> <li>3. Install grease seal on inner bearing with open face of seal toward bearing. Wheel studs project toward the outer bearing.</li> <li>4. Install wheel on spindle followed by 3/4 inch I.D. washer, slotted nut and cotter pin. Discard 1" I.D. washer. <b>CAUTION: DO NOT TORQUE SLOTTED NUT. TIGHTEN ONLY TO ELIMINATE PLAY IN ASSEMBLY, THEN BACK OFF AS REQUIRED TO INSTALL COTTER PIN.</b></li> </ol>		
		
<p>FIGURE 1, NEW STYLE AXLE</p>		
<p>B. OLD STYLE AXLE</p>		
<ol style="list-style-type: none"> <li>1. Remove dust cap from hub and pack hub, bearings and dust cap with wheel bearing grease.</li> <li>2. Install wheel bearings in hub.</li> <li>3. Install special 1" I.D. washer on spindle.</li> <li>4. Install wheel on spindle followed by 3/4" I.D. washer, slotted nut and cotter pin. Discard grease seal. <b>CAUTION: DO NOT TORQUE SLOTTED NUT. TIGHTEN ONLY TO ELIMINATE PLAY IN ASSEMBLY, THEN BACK OFF AS REQUIRED TO INSTALL COTTER PIN.</b></li> </ol>		
		
<p>FIGURE 2, OLD STYLE AXLE</p>		